

# Semiconductor Product Catalog





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| P12FE7R5SBK | 52   | P38LF6QLK   | 50   | P85W28HP2F  | 54   | S2L20U       | 32   | S30SC6MT   | 28   | SG10SC4M    | 28   | ST02D-140F2 | 48   | VR-61F1   | 44   |
| P13F28HP2   | 54   | P38LF6QNK   | 50   | P86F6SN     | 52   | S2L40U       | 32   | S30TC15T   | 28   | SG10SC6M    | 28   | ST02D-170   | 48   |           |      |
| P13F50HP2   | 54   | P40B10SL    | 50   | P88FP10SN   | 52   | S2L60        | 32   | S30V60T    | 10   | SG10SC9M    | 28   | ST02D-170F2 | 48   |           |      |
| P14FE6SBK   | 52   | P40B10SN    | 50   | P88FP10SNK  | 52   | S2V60        | 8    | S30V80V    | 10   | SG10TC15M   | 28   | ST02D-200   | 48   |           |      |
| P15F50HP2   | 54   | P40B6SL     | 50   | P90FG5R5SL  | 52   | S2V80        | 8    | S30VT60    | 18   | SG15SC4M    | 28   | ST02DH-280  | 48   |           |      |
| P15F60HP2   | 54   | P40F10SN    | 52   | P94FG5R5SL  | 52   | S2VB60       | 16   | S30VT80    | 18   | SG15SC6M    | 28   | ST02DH-320  | 48   |           |      |
| P15F60HP2F  | 54   | P40F12SN    | 52   | P98LF6QL    | 50   | S2WB(A)80    | 12   | S30VT160   | 18   | SG20JC6M    | 28   | ST03-43F1   | 46   |           |      |
| P15FH60HP2  | 54   | P40LF12SL   | 50   | P98LF6QLK   | 50   | S3K60        | 32   | S30VTA60   | 18   | SG20LC20USM | 36   | ST03-47F1   | 46   |           |      |
| P15LA12SL   | 50   | P40LF12SLK  | 50   | P98LF6QN    | 50   | S3L20U       | 32   | S30VTA80   | 18   | SG20SC3LM   | 28   | ST03-58F1   | 46   |           |      |
| P16B6SB     | 50   | P40LF12SN   | 50   | P98LF6QNK   | 50   | S3L40U       | 32   | S30VTA160  | 18   | SG20SC4M    | 28   | ST03-68F1   | 46   |           |      |
| P17F28HP2   | 54   | P40LF12SNK  | 50   | P100FA7R5EN | 52   | S3L60        | 32   | S40HC1R5T  | 28   | SG20SC6M    | 28   | ST03-240F1  | 46   |           |      |
| P18LA12SL   | 50   | P42F6EN     | 52   | P100FH4ENK  | 52   | S3V60        | 8    | S40T15V    | 24   | SG20SC9M    | 28   | ST03D-82    | 48   |           |      |
| P19LA10SL   | 50   | P46LF7R5SL  | 50   | P100FP12SN  | 52   | S3V80        | 8    | S50VB60    | 16   | SG20TC10M   | 28   | ST03D-140   | 48   |           |      |
| P20B12SL    | 50   | P46LF7R5SLK | 50   | P100FP12SNK | 52   | S3V100D      | 8    | S50VB80    | 16   | SG20TC12M   | 28   | ST03D-170   | 48   |           |      |
| P20B12SN    | 50   | P46LF7R5SN  | 50   | P105LF4QL   | 50   | S3WB60       | 16   | S60HC1R5T  | 28   | SG20TC15M   | 28   | ST03D-200   | 48   |           |      |
| P20F50HP2   | 54   | P46LF7R5SNK | 50   | P105LF4QLK  | 50   | S4VB60       | 16   | S60HC3T    | 28   | SG30JC6M    | 28   | ST03DH-240  | 48   |           |      |
| P20FE12SLK  | 52   | P50F10SN    | 52   | P105LF4QN   | 50   | S5VB60       | 16   | S60JC10V   | 28   |             |      | ST04-12F1   | 46   |           |      |

# GENERAL RECTIFYING DIODES




General Rectifying Diodes are defined as high-voltage and PN junction type devices.

These devices utilize our original glass passivation which is physically stable with a superior structure for resistance against heat and humidity. Variations are available for breakdown voltage up to 800V and output current from 1 to 30A.

## Single

| Surface Mount  |  |      |             |          |                 |       |                        |
|--|--|------|-------------|----------|-----------------|-------|------------------------|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM [V] |                 |       | Remarks                |
|  |  |      |             | 400      | 600             | 800   |                        |
| <br>3.9 × 1.8 × 1.4(mm)     | DO-219AA similar<br>M1F                | B2   | 1           |          | M1F60<br>M1FE60 | M1F80 | ① —  <— ②              |
|  |  |      | 2           | M1FE40   |                 |       |                        |
| <br>5.0 × 2.5 × 2.0(mm)     | DO-214AC<br>1F                         | B3-1 | 1           |          | D1F60<br>D1FE60 |       |                        |
|  |  |      | 1.1         |          | LN1F60          |       |                        |
|  |  |      | 1.2         |          | D1F60A          |       |                        |
| <br>4.7 × 2.4 × 0.98(mm)    | SC-110B<br>CE                          | B5-1 | 3           |          | D3CE60V         |       |                        |
|  |  |      | 3.5         |          | D3CE60VE        |       |                        |
| <br>5.1 × 3.75 × 2.0(mm)    | DO-214AA similar<br>M2F                | B6   | 1.2         |          | M2F60           |       |                        |
|  |  |      | 3           | M3FE40   | M3F60<br>M3FE60 |       |                        |
| <br>7.6 × 4.0 × 2.8(mm)     | DO-214AA similar<br>2F                 | B9-1 | 1.4         |          | D2F60           |       |                        |
|  |  |      | 3           |          | D3F60<br>D3FE60 |       |                        |
|  |  |      | 4           |          | D4F60           |       |                        |
|  |  |      | 5           |          | D5FE60          |       |                        |
| <br>9.5 × 6.6 × 2.65(mm)    | SC-63<br>E-pack                        | G1-5 | 5           | DE5VE40  |                 |       | ①④ —  <— ②<br>N.C. — ③ |
| <br>6.5 × 4.5 × 1.1(mm)    | TO-277A similar<br>FY                  | G4   | 10          |          | D10FY60VE       |       | ① —  <— ②③             |
| <br>9.6 × 6.6 × 2.3(mm)   | TO-252AA similar<br>FR                 | G5   | 10          |          | D10FR60V        |       | ① —  <— ②④<br>N.C. — ③ |
|  |  |      | 15          |          | D15FR60V        |       |                        |
| <br>13.2 × 10.2 × 4.7(mm) | SC-83 similar<br>STO-220               | H1-2 | 25          |          | DF25V60         |       | ①②④ —  <— ③            |
| <br>13.2 × 10.2 × 4.6(mm) | SC-83 similar<br>FD                    | H2-1 | 25          |          | D25FD60V        |       | ① —  <— ②④<br>N.C. — ③ |

■ : New product

| Axial  |  |      |             |          |         |       |           |
|--|--|------|-------------|----------|---------|-------|-----------|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM [V] |         |       | Remarks   |
|  |  |      |             | 400      | 600     | 800   |           |
| <br>3.0 × φ 2.6(mm) | AX057                                  | A1   | 1           |          | D1N60   | D1N80 | ① —  <— ② |
| <br>7.0 × φ 4.4(mm) | AX10                                   | A5-1 | 1.7         |          | S2V60   | S2V80 |           |
| <br>7.0 × φ 4.4(mm) | AX14                                   | A7   | 3           |          | S3V100D |       |           |
|  |  |      | 3.5         |          | S3V60   | S3V80 |           |

## Single

| Surface Mount                          |      |           |                          |                       |          |          |            |                            |                      |                          |                 |                      |            |
|--|------|-----------|--------------------------|-----------------------|----------|----------|------------|----------------------------|----------------------|--------------------------|-----------------|----------------------|------------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No.  | Absolute Maximum Ratings |                       |          |          |            | Electrical Characteristics |                      |                          |                 | Based on<br>AEC-Q101 | Automotive |
|  |      |           | IF (AV) [A]              | Conditions<br>Ta [°C] | IFSM [A] | VRRM [V] | Tj [°C]    | Vf (max) [V]               | Conditions<br>IF [A] | Ir (max)<br>VR=VRRM [μA] | VESD (typ) [kV] |                      |            |
| DO-219AA similar<br>M1F                | B2   | M1F60     | 1                        | 25                    | 25       | 600      | 150        | 1.10                       | 1                    | 10                       | —               | —                    | ○          |
|  |      | M1FE60    | 1                        | 129 *1                | 30       | 600      | 150        | 1.10                       | 1                    | 10                       | 25              | ○                    | ○          |
|  |      | M1F80     | 1                        | 25                    | 25       | 800      | 150        | 1.10                       | 1                    | 10                       | —               | —                    | ○          |
|  |      | M1FE40    | 2                        | 103 *2                | 25       | 400      | 150        | 1.10                       | 1                    | 10                       | —               | ○                    | ○          |
| DO-214AC<br>1F                         | B3-1 | D1F60     | 1                        | 25                    | 25       | 600      | 150        | 1.10                       | 1                    | 10                       | —               | —                    | ○          |
|  |      | D1FE60    | 1                        | 126 *1                | 30       | 600      | 150        | 1.10                       | 1                    | 10                       | 25              | ○                    | ○          |
|  |      | LN1F60 *3 | 1.1                      | 25                    | 25       | 600      | 150        | 1.05                       | 0.8                  | 10                       | —               | —                    | ○          |
| SC-110B<br>CE                          | B5-1 | D1F60A    | 1.2                      | 25                    | 45       | 600      | 150        | 0.97                       | 1.2                  | 10                       | —               | —                    | ○          |
|  |      | D3CE60V   | 3                        | 101 *1                | 50       | 600      | 150        | 1.10                       | 3                    | 10                       | —               | —                    | ○          |
| DO-214AA similar<br>M2F                | B6   | D3CE60VE  | 3.5                      | 93 *1                 | 60       | 600      | -55 to 150 | 1.10                       | 3.5                  | 10                       | 25              | ○                    | ■          |
|  |      | M2F60     | 1.2                      | 51                    | 50       | 600      | 150        | 0.97                       | 1.2                  | 10                       | —               | —                    | ○          |
|  |      | M3FE40    | 3                        | 76 *1                 | 75       | 400      | 150        | 1.10                       | 3                    | 10                       | 30              | —                    | ○          |
|  |      | M3F60     | 3                        | 100 *1                | 90       | 600      | 150        | 1.05                       | 3                    | 10                       | —               | —                    | ○          |
| DO-214AA similar<br>M3FE60             | B6   | M3FE60    | 3                        | 76 *1                 | 90       | 600      | 150        | 1.05                       | 3                    | 10                       | 25              | ○                    | ○          |
|  |      | D2F60     | 1.4                      | 25                    | 60       | 600      | 150        | 1.05                       | 1.4                  | 10                       | —               | —                    | ○          |
|  |      | D3F60     | 3                        | 80 *1                 | 150      | 600      | 150        | 1.05                       | 3                    | 10                       | —               | —                    | ○          |
|  |      | D3FE60    | 3                        | 105 *1                | 150      | 600      | 150        | 1.05                       | 3                    | 10                       | 25              | ○                    | ○          |
| DO-214AA similar<br>2F                 | B9-1 | D4F60     | 4                        | 68 *1                 | 200      | 600      | 150        | 0.95                       | 4                    | 10                       | —               | —                    | ○          |
|  |      | D5FE60    | 5                        | 82 *1                 | 300      | 600      | 150        | 0.95                       | 5                    | 10                       | 25              | ○                    | ○          |
|  |      | D5F60     | 5                        | 82 *1                 | 300      | 600      | 150        | 0.95                       | 5                    | 10                       | 25              | ○                    | ○          |
| SC-63<br>E-pack                        | G1-5 | DE5VE40   | 5                        | 130 *2                | 80       | 400      | 150        | 1.00                       | 5                    | 10                       | 30              | —                    | ■          |
| TO-277A similar<br>FY                  | G4   | D10FY60VE | 10                       | 120 *1                | 220      | 600      | -55 to 150 | 1.10                       | 10                   | 10                       | 25              | ○                    | ○          |
| TO-252AA similar<br>FR                 | G5   | D10FR60V  | 10                       | 130 *2                | 200      | 600      | -55 to 150 | 1.05                       | 10                   | 10                       | —               | —                    | ■          |
|  |      | D15FR60V  | 15                       | 125 *2                | 300      | 600      | -55 to 150 | 1.05                       | 15                   | 10                       | —               | —                    | ■          |
| SC-83 similar<br>STO-220               | H1-2 | DF25V60   | 25                       | 136 *2                | 400      | 600      | 150        | 1.10                       | 25                   | 10                       | —               | —                    | —          |
| SC-83 similar<br>FD                    | H2-1 | D25FD60V  | 25                       | 113 *2                | 450      | 600      | 150        | 1.10                       | 25                   | 10                       | —               | ○                    | ○          |


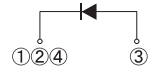
■ : New product \*1 : Tl \*2 : Tc \*3 : trr(max)=3.5μs ■ : Please contact us.

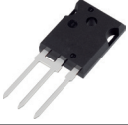
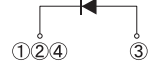
| Axial                                  |      |          |                          |                       |          |          |         |                            |                      |                          |                 |                      |            |
|--|------|----------|--------------------------|-----------------------|----------|----------|---------|----------------------------|----------------------|--------------------------|-----------------|----------------------|------------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No. | Absolute Maximum Ratings |                       |          |          |         | Electrical Characteristics |                      |                          |                 | Based on<br>AEC-Q101 | Automotive |
|  |      |          | IF (AV) [A]              | Conditions<br>Ta [°C] | IFSM [A] | VRRM [V] | Tj [°C] | Vf (max) [V]               | Conditions<br>IF [A] | Ir (max)<br>VR=VRRM [μA] | VESD (typ) [kV] |                      |            |
| AX057                                  | A1   | D1N60    | 1                        | 25                    | 30       | 600      | 150     | 1.05                       | 1                    | 10                       | —               | —                    | —          |
|  |      | D1N80    | 1                        | 25                    | 30       | 800      | 150     | 1.05                       | 1                    | 10                       | —               | —                    | —          |
| AX10                                   | A5-1 | S2V60    | 1.7                      | 40                    | 60       | 600      | 150     | 1.05                       | 1.7                  | 10                       | —               | —                    | —          |
|  |      | S2V80    | 1.7                      | 40                    | 60       | 800      | 150     | 1.05                       | 1.7                  | 10                       | —               | —                    | —          |
| AX14                                   | A7   | S3V100D  | 3                        | 130 *1                | 150      | 800      | 150     | 1.05                       | 3                    | 10 *2                    | —               | —                    | —          |
|  |      | S3V60    | 3.5                      | 40                    | 120      | 600      | 150     | 1.05                       | 2.6                  | 10                       | —               | —                    | —          |
|  |      | S3V80    | 3.5                      | 40                    | 120      | 800      | 150     | 1.05                       | 2.6                  | 10                       | —               | —                    | —          |

\*1 : Tl \*2 : VR=1000V

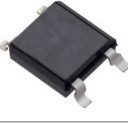
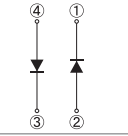

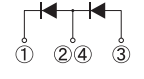
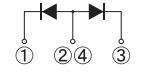
# GENERAL RECTIFYING DIODES

## Single


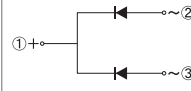
| Two Terminal Type  |  |      |                        |                      |         |     |   |
|--|--|------|------------------------|----------------------|---------|-----|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |         |     | Remarks   |
|  |  |      |                        | 400                  | 600     | 800 |   |
| <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>—<br>MTO-3PT               | K2   | 30                     |                      | S30V60T |     |  |

| Three Terminal Type  |  |      |                        |                      |         |     |   |
|--|--|------|------------------------|----------------------|---------|-----|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |         |     | Remarks   |
|  |  |      |                        | 400                  | 600     | 800 |   |
| <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>—<br>MTO-3PV               | K6   | 30                     |                      | S30V80V |     |  |

## Array

| Surface Mount  |  |      |                        |                      |           |     |   |
|--|--|------|------------------------|----------------------|-----------|-----|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |           |     | Remarks   |
|  |  |      |                        | 400                  | 600       | 800 |   |
| <br>10.0 × 6.8 × 2.6(mm)  | —<br>—<br>1NA                          | C6-2 | 3                      |                      | S1NAD80   |     |  |
| <br>13.2 × 10.2 × 4.7(mm) | —<br>—<br>SC-83 similar<br>STO-220     | H1-5 | 5                      |                      | DF5VD60   |     |  |
|  |  |      | 15                     |                      | DF15VD60  |     |   |
|  |  | H1-7 | 16                     |                      | DF16VC60R |     |  |

## Diode Module

| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |         |     | Remarks   |
|---|--|------|------------------------|----------------------|---------|-----|---|
|   |  |      |                        | 400                  | 600     | 800 |   |
| <br>22.3 × 22.3 × 25.0(mm) | —<br>—<br>D30VC                        | E2   | 30                     |                      | D30VC60 |     |  |

## Single

| Two Terminal Type                      |      |          |                           |                                      |                         |                         |                        |                                |                                     |   |                                   |                      |            |
|--|------|----------|---------------------------|--------------------------------------|-------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|-----------------------------------|----------------------|------------|
| Package                                |      | Type No. | Absolute Maximum Ratings  |                                      |                         |                         |                        | Electrical Characteristics     |                                     |   |                                   | Based on<br>AEC-Q101 | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | V <sub>RRM</sub><br>[V] | T <sub>J</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[μA] | V <sub>ESD</sub><br>(typ)<br>[kV] |                      |            |
| TO-247AD<br>—<br>MTO-3PT               | K2   | S30V60T  | 30                        | 119                                  | 360                     | 600                     | 150                    | 1.1                            | 30                                  | 10  | —                                 | —                    | —          |

| Three Terminal Type                    |      |          |                           |                                      |                         |                         |                        |                                |                                     |   |                                   |                      |            |
|--|------|----------|---------------------------|--------------------------------------|-------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|-----------------------------------|----------------------|------------|
| Package                                |      | Type No. | Absolute Maximum Ratings  |                                      |                         |                         |                        | Electrical Characteristics     |                                     |   |                                   | Based on<br>AEC-Q101 | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | V <sub>RRM</sub><br>[V] | T <sub>J</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[μA] | V <sub>ESD</sub><br>(typ)<br>[kV] |                      |            |
| TO-247AD<br>—<br>MTO-3PV               | K6   | S30V80V  | 30                        | 131                                  | 450                     | 800                     | 150                    | 1.1                            | 30                                  | 10  | —                                 | —                    | ○          |

## Array

| Surface Mount                          |      |           |                           |                                      |                         |                         |                        |                                |                                     |   |                                   |                      |            |
|--|------|-----------|---------------------------|--------------------------------------|-------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|-----------------------------------|----------------------|------------|
| Package                                |      | Type No.  | Absolute Maximum Ratings  |                                      |                         |                         |                        | Electrical Characteristics     |                                     |   |                                   | Based on<br>AEC-Q101 | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |           | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | V <sub>RRM</sub><br>[V] | T <sub>J</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[μA] | V <sub>ESD</sub><br>(typ)<br>[kV] |                      |            |
| —<br>—<br>1NA                          | C6-2 | S1NAD80   | 3                         | 102 *                                | 110                     | 800                     | 150                    | 1.05                           | 0.75                                | 10  | —                                 | —                    | —          |
| —<br>—<br>SC-83 similar<br>STO-220     | H1-5 | DF5VD60   | 5                         | 140                                  | 140                     | 600                     | 150                    | 1.05                           | 2.50                                | 10  | —                                 | —                    | —          |
|  |      | DF15VD60  | 15                        | 127                                  | 190                     | 600                     | 150                    | 1.05                           | 7.50                                | 10  | —                                 | —                    | —          |
|  | H1-7 | DF16VC60R | 16                        | 124                                  | 190                     | 600                     | 150                    | 1.05                           | 8.00                                | 10  | —                                 | —                    | —          |

\* : Tl

## Diode Module


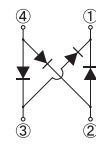






| Package                                |      | Type No. | Absolute Maximum Ratings  |                                      |                         |                         |                        | Electrical Characteristics     |                                     |   |                                   | Based on<br>AEC-Q101 | Automotive |
|--|------|----------|---------------------------|--------------------------------------|-------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|-----------------------------------|----------------------|------------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | V <sub>RRM</sub><br>[V] | T <sub>J</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[μA] | V <sub>ESD</sub><br>(typ)<br>[kV] |                      |            |
| —<br>—<br>D30VC                        | E2   | D30VC60  | 30                        | 124                                  | 300                     | 600                     | 150                    | 1.05                           | 15                                  | 10  | —                                 | —                    | —          |

# BRIDGE DIODES


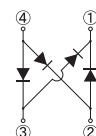





Bridge Diodes are suitable for the rectification of commercial voltage.

Variations are available for various packaging as well as high voltage (Max 1600V), high IFSM, low VF, and low noise.

## Small Bridge Diodes

| Surface Mount   |  |      |            |                         |           |      |   |
|---|--|------|------------|-------------------------|-----------|------|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF(AV) [A] | VRRM [V]                |           |      | Remarks   |
|   |  |      |            | 600                     | 800       | 1000 |   |
|  7.0 × 4.7 × 2.6(mm)   | TO-269AA<br>—<br>1Z                    | C2-1 | 0.8        | S1ZB60                  | S1ZB80    |      |  |
|  6.2 × 5.15 × 1.45(mm) | —<br>SOPA-4                            | C1   | 1          |                         | D1UBA80   |      |   |
|  10.0 × 6.8 × 2.6(mm)  | —<br>1N                                | C4   | 1          | S1NB60                  | S1NB80    |      |   |
|  10.0 × 6.8 × 2.6(mm)  | —<br>1NA                               | C6-1 | 1          |                         | S1NBB80   |      |   |
|  10.0 × 6.8 × 2.6(mm)  | —<br>1NA                               | C6-1 | 1.5        | S1NBC60                 | S1NBC80   |      |   |
|  10.6 × 10.2 × 3.1(mm) | —<br>1W                                | C8   | 1          | S1WB(A)60<br>S1WB(A)60B | S1WB(A)80 |      |   |
|  10.6 × 10.2 × 3.1(mm) | —<br>1W                                | C8   | 2          |                         | S2WB(A)80 |      |   |

## THD (Through Hole Device)

| THD (Through Hole Device)  |  |      |            |                         |           |      |   |
|--|--|------|------------|-------------------------|-----------|------|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF(AV) [A] | VRRM [V]                |           |      | Remarks   |
|  |  |      |            | 600                     | 800       | 1000 |   |
|  3.8 × 4.7 × 2.5(mm)    | —<br>1Z                                | C3   | 0.8        | S1ZB60                  | S1ZB80    |      |  |
|  6.5 × 6.8 × 2.5(mm)  | —<br>1N                                | C5   | 1          | S1NB60                  | S1NB80    |      |   |
|  6.5 × 6.8 × 2.5(mm)  | —<br>1NA                               | C7   | 1          |                         | S1NBB80   |      |   |
|  6.5 × 6.8 × 2.5(mm)  | —<br>1NA                               | C7   | 1.5        | S1NBC60                 | S1NBC80   |      |   |
|  6.2 × 10.2 × 3.0(mm) | —<br>1W                                | C9   | 1          | S1WB(A)60<br>S1WB(A)60B | S1WB(A)80 |      |   |
|  6.2 × 10.2 × 3.0(mm) | —<br>1W                                | C9   | 2          |                         | S2WB(A)80 |      |   |

## Small Bridge Diodes

| Surface Mount                          |      |            |            |                          |                    |          |          |            |                            |                   |                       |    |            |
|--|------|------------|------------|--------------------------|--------------------|----------|----------|------------|----------------------------|-------------------|-----------------------|----|------------|
| Package                                |      | Type No.   | Spec. Code | Absolute Maximum Ratings |                    |          |          |            | Electrical Characteristics |                   |                       | UL | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |            |            | IF (AV) [A]              | Conditions Ta [°C] | IFSM [A] | VRRM [V] | Tj [°C]    | VF (max) [V]               | Conditions IF [A] | IR (max) VR=VRRM [μA] |    |            |
| —<br>TO-269AA                          | C2-1 | S1ZB60     | -7072      | 0.8                      | 25                 | 30       | 600      | 150        | 1.05                       | 0.4               | 10                    | —  | —          |
| —<br>1Z                                |      | S1ZB80     | -7072      | 0.8                      | 25                 | 30       | 800      | 150        | 1.05                       | 0.4               | 10                    | —  | —          |
| —<br>SOPA-4                            | C1   | D1UBA80    | -7062      | 1                        | 25                 | 30       | 800      | 150        | 0.95                       | 0.4               | 10                    | —  | —          |
| —<br>1N                                | C4   | S1NB60     | -7062      | 1                        | 25                 | 30       | 600      | 150        | 1.05                       | 0.5               | 10                    | —  | —          |
| —<br>1N                                |      | S1NB80     | -7062      | 1                        | 25                 | 30       | 800      | 150        | 1.05                       | 0.5               | 10                    | —  | —          |
| —<br>1NA                               | C6-1 | S1NBB80    | -7062      | 1                        | 26                 | 50       | 800      | 150        | 1.05                       | 0.5               | 10                    | —  | —          |
| —<br>1NA                               |      | S1NBC60    | -7062      | 1.5                      | 105 *              | 60       | 600      | 150        | 1.05                       | 0.75              | 10                    | —  | —          |
| —<br>1NA                               |      | S1NBC80    | -7062      | 1.5                      | 105 *              | 60       | 800      | 150        | 1.05                       | 0.75              | 10                    | —  | —          |
| —<br>1W                                | C8   | S1WB(A)60  | -7062      | 1                        | 25                 | 30       | 600      | 150        | 1.00                       | 0.5               | 10                    | —  | —          |
| —<br>1W                                |      | S1WB(A)60B | -7062      | 1                        | 25                 | 50       | 600      | 150        | 1.00                       | 0.5               | 10                    | —  | —          |
| —<br>1W                                |      | S1WB(A)80  | -7062      | 1                        | 25                 | 30       | 800      | 150        | 1.00                       | 0.5               | 10                    | —  | —          |
| —<br>1W                                |      | S2WB(A)80  | -7062      | 2                        | 112 *              | 50       | 800      | -40 to 150 | 1.05                       | 1                 | 10                    | —  | —          |

\* : TI

## THD (Through Hole Device)

| THD (Through Hole Device)              |      |            |            |                          |                    |          |          |            |                            |                   |                       |    |            |
|--|------|------------|------------|--------------------------|--------------------|----------|----------|------------|----------------------------|-------------------|-----------------------|----|------------|
| Package                                |      | Type No.   | Spec. Code | Absolute Maximum Ratings |                    |          |          |            | Electrical Characteristics |                   |                       | UL | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |            |            | IF (AV) [A]              | Conditions Ta [°C] | IFSM [A] | VRRM [V] | Tj [°C]    | VF (max) [V]               | Conditions IF [A] | IR (max) VR=VRRM [μA] |    |            |
| —<br>1Z                                | C3   | S1ZB60     | -7101      | 0.8                      | 25                 | 30       | 600      | 150        | 1.05                       | 0.4               | 10                    | —  | —          |
| —<br>1Z                                |      | S1ZB80     | -7101      | 0.8                      | 25                 | 30       | 800      | 150        | 1.05                       | 0.4               | 10                    | —  | —          |
| —<br>1N                                | C5   | S1NB60     | -7101      | 1                        | 25                 | 30       | 600      | 150        | 1.05                       | 0.5               | 10                    | —  | —          |
| —<br>1N                                |      | S1NB80     | -7101      | 1                        | 25                 | 30       | 800      | 150        | 1.05                       | 0.5               | 10                    | —  | —          |
| —<br>1NA                               | C7   | S1NBB80    | -7101      | 1                        | 26                 | 50       | 800      | 150        | 1.05                       | 0.5               | 10                    | —  | —          |
| —<br>1NA                               |      | S1NBC60    | -7101      | 1.5                      | 105 *              | 60       | 600      | 150        | 1.05                       | 0.75              | 10                    | —  | —          |
| —<br>1NA                               |      | S1NBC80    | -7101      | 1.5                      | 105 *              | 60       | 800      | 150        | 1.05                       | 0.75              | 10                    | —  | —          |
| —<br>1W                                | C9   | S1WB(A)60  | -7101      | 1                        | 25                 | 30       | 600      | 150        | 1.00                       | 0.5               | 10                    | —  | —          |
| —<br>1W                                |      | S1WB(A)60B | -7101      | 1                        | 25                 | 50       | 600      | 150        | 1.00                       | 0.5               | 10                    | —  | —          |
| —<br>1W                                |      | S1WB(A)80  | -7101      | 1                        | 25                 | 30       | 800      | 150        | 1.00                       | 0.5               | 10                    | —  | —          |
| —<br>1W                                |      | S2WB(A)80  | -7101      | 2                        | 112 *              | 50       | 800      | -40 to 150 | 1.05                       | 1                 | 10                    | —  | —          |

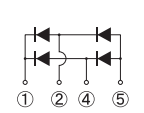
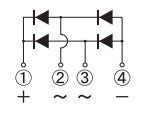
\* : TI



# BRIDGE DIODES

## SIP (Single In-line Package) Bridge Diodes

| THD (Through Hole Device)  |  |      |             |                              |                  |          | Remarks |
|--|--|------|-------------|------------------------------|------------------|----------|---------|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM [V]                     |                  |          |         |
|  |  |      |             | 600                          | 800              | 1000     |         |
| <br>24.0 × 13.8 × 3.1(mm)   | —<br>—<br>D3K                          | D1   | 2           |                              | UD2KB80          |          |         |
|  |  |      | 3           |                              | UD3KB80          |          |         |
|  |  |      | 4           |                              | UD4KB80          |          |         |
|  |  |      | 6           |                              | UD6KBA80         |          |         |
| <br>24.5 × 20.0 × 3.5(mm)   | —<br>—<br>2S                           | D2   | 1.5         | D2SBA60<br>D2SB60            |                  |          |         |
|  |  |      | 2           | D2SB60A                      |                  |          |         |
| <br>25.2 × 25.0 × 4.2(mm)   | —<br>—<br>JB                           | D5   | 6           | D6JBB60V                     | D6JBB80V         |          |         |
|  |  |      | 8           | D8JBB60V                     | D8JBB80V         |          |         |
|  |  |      | 10          | D10JBB60V                    | D10JBB80V        |          |         |
| <br>32.5 × 25.0 × 4.6(mm)   | —<br>—<br>3S                           | D3   | 4           | D3SBA60<br>D3SB60<br>D4SB60L | D3SB80<br>D4SB80 |          |         |
|  |  |      | 10          | D10XB60<br>D10XB60H          | D10XB80          |          |         |
| <br>29.4 × 29.0 × 4.6(mm)   | —<br>—<br>JA                           | D6   | 15          | D15JAB60V                    | D15JAB80V        |          |         |
|  |  |      | 25          | D25JAB60V                    | D25JAB80V        |          |         |
| <br>37.5 × 30.0 × 4.6(mm) | —<br>—<br>5S                           | D4   | 6           | D5SBA60<br>D5SB60<br>D6SB60L | D5SB80<br>D6SB80 |          |         |
|  |  |      | 15          | D15XB60<br>D15XB60H          | D15XB80          | D15XB100 |         |
|  |  |      | 20          | D20XB60                      | D20XB80          |          |         |
|  |  |      | 25          | D25XB60                      | D25XB80          | D25XB100 |         |
| <br>47.0 × 45.7 × 7.5(mm) | —<br>—<br>TSB(4pin)                    | D7   | 50          |                              | D50XB80          |          |         |
|  |  |      | 50          |                              | D50JCB80V        |          |         |
| <br>47.0 × 45.7 × 7.5(mm) | —<br>—<br>JC(4pin)                     |      |             |                              |                  |          |         |




■ : New product

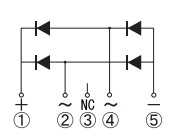
## SIP (Single In-line Package) Bridge Diodes

| THD (Through Hole Device)              |      |           |                          |                          |             |             |                            |                 |                         |    |            |                             |
|--|------|-----------|--------------------------|--------------------------|-------------|-------------|----------------------------|-----------------|-------------------------|----|------------|-----------------------------|
| Package                                |      | Type No.  | Absolute Maximum Ratings |                          |             |             | Electrical Characteristics |                 |                         | UL | Automotive |                             |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |           | IF (AV)<br>[A]           | Conditions<br>Tc<br>[°C] | IFSM<br>[A] | VRRM<br>[V] | Tj<br>[°C]                 | Vf (max)<br>[V] | Conditions<br>IF<br>[A] |    |            | Ir (max)<br>VR=VRRM<br>[μA] |
| —<br>—<br>D3K                          | D1   | UD2KB80   | 2                        | 143                      | 62          | 800         | 150                        | 1.05            | 1                       | 10 | UL         | —                           |
|  |      | UD3KB80   | 3                        | 140                      | 90          | 800         | 150                        | 1.05            | 1.5                     | 10 | UL         | —                           |
|  |      | UD4KB80   | 4                        | 138                      | 135         | 800         | 150                        | 1.00            | 2                       | 10 | UL         | —                           |
|  |      | UD6KBA80  | 6                        | 131                      | 135         | 800         | 150                        | 1.05            | 3                       | 10 | UL         | —                           |
|  |      | UD8KBA80  | 8                        | 126                      | 165         | 800         | 150                        | 1.05            | 4                       | 10 | UL         | —                           |
| —<br>—<br>2S                           | D2   | D2SBA60   | 1.5                      | 25 *1                    | 60          | 600         | 150                        | 1.05            | 0.75                    | 10 | —          | —                           |
|  |      | D2SB60    | 1.5                      | 25 *1                    | 80          | 600         | 150                        | 1.05            | 0.75                    | 10 | —          | —                           |
|  |      | D2SB60A   | 2                        | 115 *2                   | 120         | 600         | 150                        | 0.95            | 1                       | 10 | —          | —                           |
| —<br>—<br>JB                           | D5   | D6JBB60V  | 6                        | 131                      | 100         | 600         | 150                        | 1.05            | 3                       | 10 | UL         | —                           |
|  |      | D6JBB80V  | 6                        | 131                      | 100         | 800         | 150                        | 1.05            | 3                       | 10 | UL         | —                           |
|  |      | D8JBB60V  | 8                        | 130                      | 130         | 600         | 150                        | 1.05            | 4                       | 10 | UL         | —                           |
|  |      | D8JBB80V  | 8                        | 130                      | 130         | 800         | 150                        | 1.05            | 4                       | 10 | UL         | —                           |
|  |      | D10JBB60V | 10                       | 129                      | 150         | 600         | 150                        | 1.05            | 5                       | 10 | UL         | —                           |
| —<br>—<br>3S                           | D3   | D3SBA60   | 4                        | 108                      | 80          | 600         | 150                        | 1.05            | 2                       | 10 | UL         | —                           |
|  |      | D3SB60    | 4                        | 108                      | 120         | 600         | 150                        | 1.05            | 2                       | 10 | UL         | —                           |
|  |      | D4SB60L   | 4                        | 111                      | 150         | 600         | 150                        | 0.95            | 2                       | 10 | UL         | —                           |
|  |      | D3SB80    | 4                        | 108                      | 120         | 800         | 150                        | 1.05            | 2                       | 10 | UL         | —                           |
|  |      | D4SB80    | 4                        | 108                      | 150         | 800         | 150                        | 0.95            | 2                       | 10 | UL         | —                           |
|  |      | D10XB60   | 10                       | 100                      | 120         | 600         | 150                        | 1.10            | 5                       | 10 | UL         | —                           |
|  |      | D10XB60H  | 10                       | 112                      | 170         | 600         | 150                        | 1.05            | 5                       | 10 | UL         | —                           |
|  |      | D10XB80   | 10                       | 100                      | 120         | 800         | 150                        | 1.10            | 5                       | 10 | UL         | —                           |
|  |      | D15JAB60V | 15                       | 110                      | 200         | 600         | 150                        | 1.05            | 7.5                     | 10 | UL         | —                           |
|  |      | D15JAB80V | 15                       | 110                      | 200         | 800         | 150                        | 1.05            | 7.5                     | 10 | UL         | —                           |
| —<br>—<br>JA                           | D6   | D25JAB60V | 25                       | 107                      | 350         | 600         | 150                        | 1.05            | 12.5                    | 10 | UL         | —                           |
|  |      | D25JAB80V | 25                       | 107                      | 350         | 800         | 150                        | 1.05            | 12.5                    | 10 | UL         | —                           |
|  |      | D5SBA60   | 6                        | 111                      | 120         | 600         | 150                        | 1.05            | 3                       | 10 | UL         | —                           |
|  |      | D5SB60    | 6                        | 110                      | 170         | 600         | 150                        | 1.05            | 3                       | 10 | UL         | —                           |
|  |      | D6SB60L   | 6                        | 112                      | 170         | 600         | 150                        | 1.05            | 3                       | 10 | UL         | —                           |
|  |      | D5SB80    | 6                        | 110                      | 170         | 800         | 150                        | 1.05            | 3                       | 10 | UL         | —                           |
|  |      | D6SB80    | 6                        | 110                      | 170         | 800         | 150                        | 1.05            | 3                       | 10 | UL         | —                           |
|  |      | D15XB60   | 15                       | 100                      | 200         | 600         | 150                        | 1.10            | 7.5                     | 10 | UL         | —                           |
|  |      | D15XB60H  | 15                       | 107                      | 240         | 600         | 150                        | 1.05            | 7.5                     | 10 | UL         | —                           |
|  |      | D15XB80   | 15                       | 100                      | 200         | 800         | 150                        | 1.10            | 7.5                     | 10 | UL         | —                           |
|  |      | D15XB100  | 15                       | 110                      | 200         | 1000        | 150                        | 1.10            | 7.5                     | 10 | UL         | —                           |
|  |      | D20XB60   | 20                       | 87                       | 240         | 600         | 150                        | 1.10            | 10                      | 10 | UL         | —                           |
|  |      | D20XB80   | 20                       | 87                       | 240         | 800         | 150                        | 1.10            | 10                      | 10 | UL         | —                           |
|  |      | D25XB60   | 25                       | 98                       | 350         | 600         | 150                        | 1.05            | 12.5                    | 10 | UL         | ■                           |
|  |      | D25XB80   | 25                       | 98                       | 350         | 800         | 150                        | 1.05            | 12.5                    | 10 | UL         | ■                           |
|  |      | D25XB100  | 25                       | 106                      | 350         | 1000        | 150                        | 1.05            | 12.5                    | 10 | UL         | —                           |
| ■ D35XB80                              | 35   | 93        | 550                      | 800                      | -55 to 150  | 1.05        | 17.5                       | 10              | UL                      | —  |            |                             |
| —<br>—<br>TSB(4pin)                    | D7   | D50XB80   | 50                       | 95                       | 600         | 800         | 150                        | 1.05            | 25                      | 10 | UL         | —                           |
|  |      | D50JCB80V | 50                       | 94                       | 600         | 800         | 150                        | 1.05            | 25                      | 10 | UL         | ■                           |

■ : New product \*1 : Ta \*2 : Tl ■ : Please contact us. UL : UL recognized (UL File No. E142422)

## DIP (Dual In-line Package) Bridge Diode

| DIP (Dual In-line Package) Bridge Diode  |  |       |             |          |           |      | Remarks |
|--|--|-------|-------------|----------|-----------|------|---------|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig.  | IF (AV) [A] | VRRM [V] |           |      |         |
|  |  |       |             | 600      | 800       | 1000 |         |
| <br>47.0 × 45.7 × 7.5(mm) | —<br>—<br>JH                           | D10-1 | 70          |          | D70JHB80V |      |         |


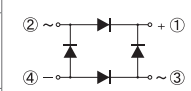








## DIP (Dual In-line Package) Bridge Diode


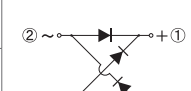



| DIP (Dual In-line Package) Bridge Diode |       |           |                          |                          |             |             |                            |                 |                         |    |            |                             |
|---|-------|-----------|--------------------------|--------------------------|-------------|-------------|----------------------------|-----------------|-------------------------|----|------------|-----------------------------|
| Package                                 |       | Type No.  | Absolute Maximum Ratings |                          |             |             | Electrical Characteristics |                 |                         | UL | Automotive |                             |
| JEDEC Code<br>JEITA Code<br>House Name  | Fig.  |           | IF (AV)<br>[A]           | Conditions<br>Tc<br>[°C] | IFSM<br>[A] | VRRM<br>[V] | Tj<br>[°C]                 | Vf (max)<br>[V] | Conditions<br>IF<br>[A] |    |            | Ir (max)<br>VR=VRRM<br>[μA] |
| —<br>—<br>JH                            | D10-1 | D70JHB80V | 70                       | 99                       | 500         | 800         | -55 to 150                 | 1.1             | 35                      | 10 | —          | —                           |

# BRIDGE DIODES


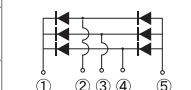


## SQIP (Square In-line Package) Bridge Diodes

| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM [V] |         |      | Remarks   |
|--|--|------|-------------|----------|---------|------|---|
|  |  |      |             | 600      | 800     | 1000 |   |
|  13.0 × 13.0 × 27.5(mm) | —<br>S2VB                              | E3   | 2           | S2VB60   |         |      |  |
|  17.0 × 17.0 × 32.5(mm) | —<br>S4VB                              | E4   | 4           | S4VB60   |         |      |   |
|  25.0 × 25.0 × 32.5(mm) | —<br>S5VB                              | E5   | 6           | S5VB60   |         |      |   |
|  22.0 × 22.0 × 32.5(mm) | —<br>S10VB                             | E6   | 10          | S10VB60  |         |      |   |
|  26.5 × 26.5 × 25.0(mm) | —<br>S15VB                             | E7   | 15          | S15VB60  |         |      |   |
|  32.0 × 32.0 × 25.0(mm) | —<br>S25VB                             | E8   | 25          | S25VB60  | S25VB80 |      |   |
|  36.0 × 36.0 × 24.0(mm) | —<br>S50VB                             | E9   | 50          | S50VB60  | S50VB80 |      |   |

## Input/Output In-line Terminal Type


| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM [V] |         |      | Remarks   |
|--|--|------|-------------|----------|---------|------|---|
|  |  |      |             | 600      | 800     | 1000 |   |
|  17.0 × 17.0 × 31.0(mm) | —<br>S3WB                              | E10  | 2.3         | S3WB60   |         |      |  |
|  22.5 × 22.5 × 32.5(mm) | —<br>S10WB                             | E11  | 10          | S10WB60  |         |      |   |
|  26.5 × 26.5 × 32.5(mm) | —<br>S15WB                             | E12  | 15          | S15WB60  |         |      |   |
|  32.5 × 32.5 × 32.5(mm) | —<br>S20WB                             | E13  | 20          | S20WB60  | S20WB80 |      |   |

## 3 Phase Bridge Diodes

| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM [V]   |             |   | Remarks   |
|---|--|------|-------------|------------|-------------|---|---|
|   |  |      |             | 800        | 1200        | 1600  |   |
|  47.0 × 45.7 × 7.5(mm) | —<br>TSB(5pin)                         | D8   | 30          | D30XT80    |             |   |  |
|   | —<br>JC(5pin)                          |      | 45          | D45XT80    |             | D45XT160  |   |
|  47.0 × 45.7 × 7.5(mm) | —<br>JF                                | D9   | 75          | D75JFT80V  |             |   |   |
|   | —<br>JH                                |      | 100         | D100JHT80V | D100JHT120V |  D100JHT160V |   |


 : New product

## SQIP (Square In-line Package) Bridge Diodes

| Package                                |      | Type No. | Absolute Maximum Ratings |                       |          |          | Electrical Characteristics |              |                      | UL | Automotive  |                          |
|--|------|----------|--------------------------|-----------------------|----------|----------|----------------------------|--------------|----------------------|----|---|--------------------------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | IF (AV) [A]              | Conditions<br>Tc [°C] | IFSM [A] | VRRM [V] | Tj [°C]                    | Vf (max) [V] | Conditions<br>IF [A] |    |   | Ir (max)<br>VR=VRRM [μA] |
| —<br>S2VB                              | E3   | S2VB60   | 2 *1                     | 40                    | 40       | 600      | 150                        | 1.05         | 1                    | 10 | —   | —                        |
| —<br>S4VB                              | E4   | S4VB60   | 4                        | 40                    | 80       | 600      | 150                        | 1.05         | 2                    | 10 | —   | —                        |
| —<br>S5VB                              | E5   | S5VB60   | 6                        | 40                    | 200      | 600      | 150                        | 1.05         | 3                    | 10 | —   | —                        |
| —<br>S10VB                             | E6   | S10VB60  | 10                       | 40                    | 200      | 600      | 150                        | 1.05         | 5                    | 10 | —   | —                        |
| —<br>S15VB                             | E7   | S15VB60  | 15                       | 83 *2                 | 200      | 600      | 150                        | 1.05         | 7.5                  | 10 | —   | —                        |
| —<br>S25VB                             | E8   | S25VB60  | 25                       | 85 *2                 | 400      | 600      | 150                        | 1.05         | 12.5                 | 10 | —   | —                        |
| —                                      |      | S25VB80  | 25                       | 85 *2                 | 400      | 800      | 150                        | 1.05         | 12.5                 | 10 | —   | —                        |
| —<br>S50VB                             | E9   | S50VB60  | 50                       | 95 *2                 | 500      | 600      | 150                        | 1.05         | 25                   | 10 | —   | —                        |
| —                                      |      | S50VB80  | 50                       | 95 *2                 | 500      | 800      | 150                        | 1.05         | 25                   | 10 |  | —                        |











\*1 : Without heatsink \*2 : Tc  : UL recognized (UL File No. E142422)


## Input/Output In-line Terminal Type

| Package                                |      | Type No. | Absolute Maximum Ratings |                       |          |          | Electrical Characteristics |              |                      | UL | Automotive  |                          |
|--|------|----------|--------------------------|-----------------------|----------|----------|----------------------------|--------------|----------------------|----|---|--------------------------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | IF (AV) [A]              | Conditions<br>Tc [°C] | IFSM [A] | VRRM [V] | Tj [°C]                    | Vf (max) [V] | Conditions<br>IF [A] |    |   | Ir (max)<br>VR=VRRM [μA] |
| —<br>S3WB                              | E10  | S3WB60   | 2.3                      | 40 *                  | 120      | 600      | 150                        | 1.05         | 2                    | 10 | —   | —                        |
| —<br>S10WB                             | E11  | S10WB60  | 10                       | 74                    | 170      | 600      | 150                        | 1.05         | 5                    | 10 | —   | —                        |
| —<br>S15WB                             | E12  | S15WB60  | 15                       | 77                    | 200      | 600      | 150                        | 1.05         | 7.5                  | 10 | —   | —                        |
| —<br>S20WB                             | E13  | S20WB60  | 20                       | 76                    | 500      | 600      | 150                        | 1.05         | 10                   | 10 | —   | —                        |
| —                                      |      | S20WB80  | 20                       | 76                    | 500      | 800      | 150                        | 1.05         | 10                   | 10 |  | —                        |

\* : Ta  : UL recognized (UL File No. E142422)

## 3 Phase Bridge Diodes

| THD (Through Hole Device)              |       | Type No.  | Absolute Maximum Ratings |                       |          |          | Electrical Characteristics |              |                      | UL  | Automotive  |                          |
|--|-------|---|--------------------------|-----------------------|----------|----------|----------------------------|--------------|----------------------|-----|---|--------------------------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig.  |   | IF (AV) [A]              | Conditions<br>Tc [°C] | IFSM [A] | VRRM [V] | Tj [°C]                    | Vf (max) [V] | Conditions<br>IF [A] |     |   | Ir (max)<br>VR=VRRM [μA] |
| —<br>TSB(5pin)                         | D8    | D30XT80   | 30                       | 117                   | 300      | 800      | 150                        | 1.05         | 10                   | 10  |  | —                        |
|  |       | D45XT80   | 45                       | 101                   | 400      | 800      | 150                        | 1.05         | 15                   | 10  |  | —                        |
|  |       | D45XT160  | 45                       | 97                    | 330      | 1600     | 150                        | 1.05         | 15                   | 100 |  | —                        |
|  |       | D30JCT120V  | 30                       | 116                   | 300      | 1200     | 150                        | 1.05         | 10                   | 10  |  | —                        |
|  |       | D45JCT120V  | 45                       | 99                    | 450      | 1200     | 150                        | 1.05         | 15                   | 10  |  | —                        |
| —<br>JF                                | D9    | D45JCT160V  | 45                       | 97                    | 450      | 1600     | 150                        | 1.05         | 15                   | 10  |  | —                        |
|  |       | D75JFT80V   | 75                       | 109                   | 400      | 800      | 150                        | 1.05         | 25                   | 10  | —   | —                        |
| —<br>JH                                | D10-2 | D100JHT80V  | 100                      | 99                    | 500      | 800      | -55 to 150                 | 1.10         | 35                   | 10  |  | —                        |
|  |       | D100JHT120V   | 100                      | 92                    | 450      | 1200     | -55 to 150                 | 1.17         | 35                   | 10  |  | —                        |
|  |       |  D100JHT160V | 100                      | 92                    | 540      | 1600     | -55 to 150                 | 1.15         | 35                   | 10  |  | —                        |

 : New product  : UL recognized (UL File No. E142422)

# BRIDGE DIODES

| Series | Feature                   |
|--------|---------------------------|
| S      | Evenly balanced Vf and Ir |
| N      | Low Vf, High Voltage      |
| K      | Low Vf                    |

## 3 Phase Bridge Diodes

| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | If (AV) [A] | VRRM [V] |  |   | Remarks   |
|---|--|------|-------------|----------|--|---|---|
|   |  |      |             | 600      | 800  | 1600  |   |
| <br>36.0 × 36.0 × 24.0(mm) | -                                      | SVT  | E15         | 10       | S10VT60  | S10VT80   |  |
|   |  |      |             | 15       | S15VT60  | S15VT80   |   |
|   |  |      |             | 20       | S20VT60  | S20VT80   |   |
|   |  |      |             | 30       | S30VT60  | S30VT80   |   |
| <br>36.0 × 36.0 × 23.0(mm) | -                                      | SVTA | E14         | 10       | S10VTA60   | S10VTA80  |  |
|   |  |      |             | 15       | S15VTA60   | S15VTA80  |   |
|   |  |      |             | 20       | S20VTA60   | S20VTA80  |   |
|   |  |      |             | 30       | S30VTA60   | S30VTA80  |   |
| <br>89.0 × 50.0 × 16.6(mm)  | -                                      | -    | F7          | 150      |  MG038B150080A |  MG038D150160A |  |
|   |  |      |             | 200      |  MG038A200080A |  MG038C200160A |   |

 : New product  : Under development

## High Speed Bridge Diodes (SBD)

| THD (Through Hole Device)  |  |      |             |          |         |          |   |
|--|--|------|-------------|----------|---------|----------|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | If (AV) [A] | VRRM [V] |         |          | Remarks   |
|  |  |      |             | 40       | 60      | 200      |   |
| <br>32.5 × 25.0 × 4.6(mm) | -                                      | D3   | 4           | D4SBS4   | D4SBS6  | D4SBN20  |  |
|  |  |      | 10          | D10SBS4  |         |          |   |
|  |  |      | 15          |          | D15XBS6 |          |   |
| <br>37.5 × 30.0 × 4.6(mm) | -                                      | D4   | 6           |          |         | D6SBN20  |  |
|  |  |      | 15          |          |         | D15XBN20 |   |
|  |  |      | 20          |          | D20XBS6 |          |   |
|  |  |      | 30          |          |         | D30XBN20 |   |

## High Speed Bridge Diodes (FRD)

| THD (Through Hole Device)  |  |      |             |          |     |            |   |
|--|--|------|-------------|----------|-----|------------|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | If (AV) [A] | VRRM [V] |     |            | Remarks   |
|  |  |      |             | 200      | 400 | 1000       |   |
| <br>32.5 × 25.0 × 4.6(mm) | -                                      | D3   | 4           | D4SBL20U |     |            |  |
| <br>47.0 × 45.7 × 7.5(mm) | -                                      | D7   | 30          |          |     | D30JCB100K |  |

## 3 Phase Bridge Diodes

| Package                                |       | Type No.  | Absolute Maximum Ratings  |                       |             |             | Electrical Characteristics |                 |                      |                             | UL  | Automotive  |   |
|--|-------|---|---|-----------------------|-------------|-------------|----------------------------|-----------------|----------------------|-----------------------------|---|---|---|
| JEDEC Code<br>JEITA Code<br>House Name | Fig.  |   | If (AV)<br>[A]  | Conditions<br>Tc [°C] | IfSM<br>[A] | VRRM<br>[V] | Tj<br>[°C]                 | Vf (max)<br>[V] | Conditions<br>If [A] | Ir (max)<br>Vr=VRRM<br>[μA] |   |   |   |
| -                                      | SVT   | E15   | S10VT60   | 10                    | 137         | 170         | 600                        | 150             | 1.05                 | 3.5                         | 10  | -   | - |
|  |       | S10VT80   | 10  | 137                   | 150         | 800         | 150                        | 1.05            | 3.5                  | 10                          | -   | -   |   |
|  |       | S15VT60   | 15  | 132                   | 200         | 600         | 150                        | 1.05            | 5                    | 10                          | -   | -   |   |
|  |       | S15VT80   | 15  | 132                   | 200         | 800         | 150                        | 1.05            | 5                    | 10                          | -   | -   |   |
|  |       | S20VT60   | 20  | 128                   | 300         | 600         | 150                        | 1.05            | 7                    | 10                          | -   | -   |   |
|  |       | S20VT80   | 20  | 128                   | 300         | 800         | 150                        | 1.05            | 7                    | 10                          | -   | -   |   |
|  |       | S30VT60   | 30  | 121                   | 400         | 600         | 150                        | 1.05            | 10                   | 10                          | -   | -   |   |
|  |       | S30VT80   | 30  | 121                   | 400         | 800         | 150                        | 1.05            | 10                   | 10                          |  | -   |   |
| -                                      | SVTA  | E14   | S10VTA60  | 10                    | 137         | 170         | 600                        | 150             | 1.05                 | 3.5                         | 10  | -   | - |
|  |       | S10VTA80  | 10  | 137                   | 150         | 800         | 150                        | 1.05            | 3.5                  | 10                          | -   | -   |   |
|  |       | S15VTA60  | 15  | 132                   | 200         | 600         | 150                        | 1.05            | 5                    | 10                          | -   | -   |   |
|  |       | S15VTA80  | 15  | 132                   | 200         | 800         | 150                        | 1.05            | 5                    | 10                          | -   | -   |   |
|  |       | S20VTA60  | 20  | 128                   | 300         | 600         | 150                        | 1.05            | 7                    | 10                          | -   | -   |   |
|  |       | S20VTA80  | 20  | 128                   | 300         | 800         | 150                        | 1.05            | 7                    | 10                          | -   | -   |   |
|  |       | S30VTA60  | 30  | 121                   | 400         | 600         | 150                        | 1.05            | 10                   | 10                          | -   | -   |   |
|  |       | S30VTA80  | 30  | 121                   | 400         | 800         | 150                        | 1.05            | 10                   | 10                          | -   | -   |   |
| -                                      | MG038 | F7  |  MG038B150080A | 150                   | 125         | 2350        | 800                        | 150             | 1.05                 | 67                          | 10  |  | - |
|  |       |  MG038D150160A | 150   | 125                   | 2350        | 1600        | 150                        | 1.05            | 50                   | 10                          | to be certified   | -   |   |
|  |       |  MG038A200080A | 200   | 125                   | 2750        | 800         | 150                        | 1.05            | 67                   | 10                          |  | -   |   |
|  |       |  MG038C200160A | 200   | 125                   | 2750        | 1600        | 150                        | 1.05            | 50                   | 10                          | to be certified   | -   |   |

 : New product  : Under development  : UL recognized (UL File No. E142422)

## High Speed Bridge Diodes (SBD)

| THD (Through Hole Device)              |      |          |                          |                       |             |             |                            |                 |                      |                             |     |            |          |          |
|--|------|----------|--------------------------|-----------------------|-------------|-------------|----------------------------|-----------------|----------------------|-----------------------------|-----|------------|----------|----------|
| Package                                |      | Type No. | Absolute Maximum Ratings |                       |             |             | Electrical Characteristics |                 |                      |                             | UL  | Automotive | Remarks  |          |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | If (AV)<br>[A]           | Conditions<br>Tc [°C] | IfSM<br>[A] | VRRM<br>[V] | Tj<br>[°C]                 | Vf (max)<br>[V] | Conditions<br>If [A] | Ir (max)<br>Vr=VRRM<br>[μA] |     |            |          |          |
| -                                      | 3S   | D3       | D4SBS4                   | 4                     | 116         | 60          | 40                         | 150             | 0.55                 | 2                           | 2mA | -          | -        | S series |
|  |      | D4SBS6   | 4                        | 114                   | 60          | 60          | 150                        | 0.62            | 2                    | 2mA                         | -   | -          | S series |          |
|  |      | D4SBN20  | 4                        | 103                   | 60          | 200         | 150                        | 0.90            | 2                    | 1.5                         | -   | -          | N series |          |
|  |      | D10SBS4  | 10                       | 67                    | 100         | 40          | 150                        | 0.55            | 5                    | 3.5mA                       | -   | -          | S series |          |
|  |      | D15XBS6  | 15                       | 59                    | 150         | 60          | 150                        | 0.63            | 7.5                  | 6.0mA                       | -   | -          | S series |          |
| -                                      | 5S   | D4       | D6SBN20                  | 6                     | 110         | 120         | 200                        | 150             | 0.90                 | 3                           | 2   | -          | -        | N series |
|  |      | D15XBN20 | 15                       | 106                   | 200         | 200         | 150                        | 0.90            | 7.5                  | 5                           | -   | -          | N series |          |
|  |      | D20XBS6  | 20                       | 100                   | 200         | 60          | 150                        | 0.63            | 10                   | 8.0mA                       | -   | -          | S series |          |
|  |      | D30XBN20 | 30                       | 91                    | 350         | 200         | 150                        | 0.90            | 15                   | 10                          | -   | -          | N series |          |

## High Speed Bridge Diodes (FRD)

| THD (Through Hole Device)              |          |          |                          |                       |             |             |                            |                 |                      |                             |    |   |         |          |
|--|----------|----------|--------------------------|-----------------------|-------------|-------------|----------------------------|-----------------|----------------------|-----------------------------|----|---|---------|----------|
| Package                                |          | Type No. | Absolute Maximum Ratings |                       |             |             | Electrical Characteristics |                 |                      |                             | UL | Automotive  | Remarks |          |
| JEDEC Code<br>JEITA Code<br>House Name | Fig.     |          | If (AV)<br>[A]           | Conditions<br>Tc [°C] | IfSM<br>[A] | VRRM<br>[V] | Tj<br>[°C]                 | Vf (max)<br>[V] | Conditions<br>If [A] | Ir (max)<br>Vr=VRRM<br>[μA] |    |   |         |          |
| -                                      | 3S       | D3       | D4SBL20U                 | 4                     | 108         | 80          | 200                        | 150             | 0.98                 | 2                           | 10 | -   | -       |          |
| -                                      | JC(4pin) | D7       | D30JCB100K               | 30                    | 90          | 450         | 1000                       | 150             | 1.90                 | 15                          | 10 |  | ○       | K series |

 : UL recognized (UL File No. E142422)


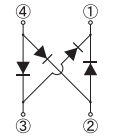

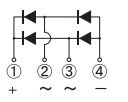
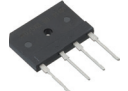
# BRIDGE DIODES

## Low Vf Bridge Diodes

| THD (Through Hole Device)  |  |      |                        |                      |     |      |   |
|--|--|------|------------------------|----------------------|-----|------|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |     |      | Remarks   |
|  |  |      |                        | 600                  | 800 | 1000 |   |
| <br>37.5 × 30.0 × 4.6(mm) | —<br>—<br>5S                           | D4   | 15                     | LL15XB60             |     |      |  |
|  |  |      | 25                     | LL25XB60             |     |      |   |

## Low Noise Bridge Diodes

| Surface Mount  |  |      |                        |                      |     |      |   |
|--|--|------|------------------------|----------------------|-----|------|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |     |      | Remarks   |
|  |  |      |                        | 600                  | 800 | 1000 |   |
| <br>10.6 × 10.2 × 3.1(mm) | —<br>—<br>1W                           | C8   | 1.1                    | LN1WBA60             |     |      |  |

| THD (Through Hole Device)  |  |      |                        |                       |     |      |   |
|--|--|------|------------------------|-----------------------|-----|------|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V]  |     |      | Remarks   |
|  |  |      |                        | 600                   | 800 | 1000 |   |
| <br>6.2 × 10.2 × 3.0(mm)  | —<br>—<br>1W                           | C9   | 1.1                    | LN1WBA60              |     |      |  |
| <br>32.5 × 25.0 × 4.6(mm) | —<br>—<br>3S                           | D3   | 4                      | LN4SB60               |     |      |  |
| <br>37.5 × 30.0 × 4.6(mm) | —<br>—<br>5S                           | D4   | 6                      | LN6SB60               |     |      |   |
|  |  |      | 15                     | LN15XB60<br>LN15XB60H |     |      |   |
|  |  |      | 25                     | LN25XB60              |     |      |   |

## Low Vf Bridge Diodes

| THD (Through Hole Device)              |      |          |                           |                                      |                         |                         |                        |                                |                                     |   |                                  |    |            |
|--|------|----------|---------------------------|--------------------------------------|-------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|----------------------------------|----|------------|
| Package                                |      | Type No. | Absolute Maximum Ratings  |                                      |                         |                         |                        | Electrical Characteristics     |                                     |   |                                  | UL | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | V <sub>RRM</sub><br>[V] | T <sub>J</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[μA] | t <sub>rr</sub><br>(max)<br>[μs] |    |            |
| —<br>—<br>5S                           | D4   | LL15XB60 | 15                        | 124                                  | 200                     | 600                     | 150                    | 0.90                           | 7.5                                 | 10  | 3                                | UL | —          |
|  |      | LL25XB60 | 25                        | 113                                  | 300                     | 600                     | 150                    | 0.92                           | 12.5                                | 10  | 3                                | UL | ■          |

■ : Please contact us. UL : UL recognized (UL File No. E142422)

## Low Noise Bridge Diodes

| Surface Mount-THD (Through Hole Device) |                    |           |                           |                                      |                         |                         |                        |                                |                                     |   |                                  |    |            |                      |
|---|--------------------|-----------|---------------------------|--------------------------------------|-------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|----------------------------------|----|------------|----------------------|
| Package                                 |                    | Type No.  | Absolute Maximum Ratings  |                                      |                         |                         |                        | Electrical Characteristics     |                                     |   |                                  | UL | Automotive | Remarks              |
| JEDEC Code<br>JEITA Code<br>House Name  | Fig.               |           | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | V <sub>RRM</sub><br>[V] | T <sub>J</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[μA] | t <sub>rr</sub><br>(max)<br>[μs] |    |            |                      |
| —<br>—<br>1W                            | C8(SMD)<br>C9(DIP) | LN1WBA60  | 1.1                       | 25 *                                 | 50                      | 600                     | 150                    | 1.00                           | 0.55                                | 10  | 5                                | —  | —          | SMD-7072<br>DIP-7101 |
| —<br>—<br>3S                            | D3                 | LN4SB60   | 4                         | 111                                  | 150                     | 600                     | 150                    | 0.95                           | 2                                   | 10  | 5                                | UL | —          |                      |
| —<br>—<br>5S                            | D4                 | LN6SB60   | 6                         | 111                                  | 170                     | 600                     | 150                    | 1.05                           | 3                                   | 10  | 5                                | UL | —          |                      |
|   |                    | LN15XB60  | 15                        | 100                                  | 200                     | 600                     | 150                    | 1.10                           | 7.5                                 | 10  | 5                                | —  | —          |                      |
|   |                    | LN15XB60H | 15                        | 106                                  | 290                     | 600                     | 150                    | 1.05                           | 7.5                                 | 10  | 5                                | —  | —          |                      |
|   |                    | LN25XB60  | 25                        | 85                                   | 350                     | 600                     | 150                    | 1.05                           | 12.5                                | 10  | 5                                | —  | —          |                      |

\* : T<sub>a</sub> UL : UL recognized (UL File No. E142422)












# SCHOTTKY BARRIER DIODES

Schottky Barrier Diodes are diodes using a barrier at the junction of a metal and the semiconductor.

These are very suitable rectification devices featuring high speed and a low Vf diode.

| Series | Feature                           |
|--------|-----------------------------------|
| S      | Evenly balanced Vf and Ir         |
| M      | Evenly balanced Low Vf and Ir     |
| N      | High Voltage                      |
| H      | Ultra Low Vf, Tj=125°C guaranteed |
| J      | Low Ir                            |
| SL     | Ultra Low Ir, Tj=175°C guaranteed |
| Y      | Evenly balanced Vf and Low Ir     |

## Single

| Surface Mount   |  |      |               |                  |                |                          |                      |        |                        |           |     |
|---|--|------|---------------|------------------|----------------|--------------------------|----------------------|--------|------------------------|-----------|-----|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | If(AV)<br>[A] | VRRM[V]          |                |                          |                      |        |                        | Remarks   |     |
|   |  |      |               | 30               | 40             | 45                       | 60                   | 80     | 100                    |           | 150 |
|    | DO-219AB similar<br>SC-109<br>G1F      | B1-1 | 1             | DG1M3<br>DG1H3   | DG1S4          |                          | DG1S6                |        |                        | DG1J10A   |     |
|   |  |      | 1.4           |                  |                |                          |                      |        | DG1N15A                |           |     |
|   |  |      | 1.5           | DG1M3A<br>DG1H3A |                |                          | DG1S6A               |        |                        |           |     |
|    | DO-219AA similar<br>M1F                | B2   | 1.2           |                  |                |                          | M1FS6                |        |                        |           |     |
|   |  |      | 1.3           |                  | M1FS4          |                          |                      |        |                        |           |     |
|   |  |      | 1.5           |                  | M1FJ4          |                          |                      |        |                        |           |     |
|   |  |      | 1.7           | M1FH3            |                |                          |                      |        |                        |           |     |
|   | DO-214AC<br>1F                         | B3-1 | 3             | M1FM3            |                |                          |                      |        |                        | D1FJ10    |     |
|   |  |      | 1             |                  | D1FS4          |                          | D1FS6                |        |                        |           |     |
|   |  |      | 1.1           |                  |                |                          |                      |        |                        |           |     |
|   |  |      | 1.5           |                  | D1FS4A         |                          |                      |        |                        |           |     |
|   |  |      | 2             |                  | D1FT4<br>D1FJ4 |                          | D1FT6                | D1FJ8  | D1FT10                 |           |     |
|  | SC-110B<br>CE                          | B5-1 | 2.5           |                  |                |                          | D1FS6A               |        |                        |           |     |
|   |  |      | 3             | D1FH3            | D1FT4A         |                          | D1FT6A               | D1FJ8A | D1FT10A                | D1FT15A   |     |
|   |  |      | 5             | D1FM3            |                |                          |                      |        |                        |           |     |
|  | DO-214AA similar<br>M2F                | B6   | 6             | M2FH3<br>M2FM3   |                |                          |                      |        |                        |           |     |
|   |  |      |               |                  |                |                          |                      |        |                        |           |     |
|  | SC-63<br>E-pack                        | B9-1 | 1.5           |                  |                |                          | D2FS6                |        |                        |           |     |
|   |  |      | 1.6           |                  | D2FS4          |                          |                      |        |                        |           |     |
|   |  |      | 2.6           |                  | D3FS4A         |                          |                      |        |                        |           |     |
|   |  |      | 3             |                  |                |                          | D3FS6                |        | D3FJ10                 |           |     |
|  | SC-63<br>E-pack                        | G1-2 | 3             |                  | DE3S4M         |                          | DE3S6M               |        |                        |           |     |
|   |  |      | 5             |                  | DE5S4M         |                          | DE5S6M               |        |                        |           |     |
|   |  |      | 10            | DE10S3L          |                |                          |                      |        |                        |           |     |
|  | TO-277A similar<br>FY                  | G4   | 5             |                  |                | D5FY4R5ST<br>D5FY4R5SY   | D5FY6ST<br>D5FY6SY   |        | D5FY10ST<br>D5FY10SY   | D5FY15ST  |     |
|   |  |      | 10            |                  |                | D10FY4R5ST<br>D10FY4R5SY | D10FY6ST<br>D10FY6SY |        | D10FY10ST<br>D10FY10SY | D10FY15ST |     |
|   |  |      | 15            |                  |                | D15FY4R5ST<br>D15FY4R5SY | D15FY6ST<br>D15FY6SY |        | D15FY10ST<br>D15FY10SY | D15FY15ST |     |
|  | TO-252AA similar<br>FR                 | G5   | 15            |                  | D15FR4ST       |                          |                      |        |                        |           |     |
|   |  |      | 20            |                  | D20FR4ST       | D20FR4R5S                |                      |        |                        |           |     |





■ : New product

## Single



| Surface Mount                          |         |               |           |                          |                   |                          |             |                            |                    |                         |                                |                      |            |           |                     |           |          |
|--|---------|---------------|-----------|--------------------------|-------------------|--------------------------|-------------|----------------------------|--------------------|-------------------------|--------------------------------|----------------------|------------|-----------|---------------------|-----------|----------|
| JEDEC Code<br>JEITA Code<br>House Name | Package | Fig.          | Type No.  | Absolute Maximum Ratings |                   |                          |             | Electrical Characteristics |                    |                         |                                | Based on<br>AEC-Q101 | Automotive | Series    |                     |           |          |
|  |         |               |           | VRRM<br>[V]              | If<br>(AV)<br>[A] | Conditions<br>Tc<br>[°C] | IFSM<br>[A] | Tj<br>[°C]                 | Vf<br>(max)<br>[V] | Conditions<br>If<br>[A] | Ir<br>(max)<br>Vr=VRRM<br>[mA] |                      |            |           | Ct<br>(typ)<br>[pF] |           |          |
| DO-219AB similar<br>SC-109<br>G1F      | B1-1    |               | DG1M3     | 30                       | 1                 | 27 *1                    | 20          | 150                        | 0.46               | 0.7                     | 0.05                           | 36                   | ○          | ○         | M series            |           |          |
|  |         | DG1H3         | 30        | 1                        | 113 *2            | 20                       | 125         | 0.36                       | 0.7                | 1                       | 37                             | —                    | ○          | H series  |                     |           |          |
|  |         | DG1S4         | 40        | 1                        | 36 *1             | 30                       | 150         | 0.55                       | 0.7                | 0.8                     | 37                             | ○                    | ○          | S series  |                     |           |          |
|  |         | DG1S6         | 60        | 1                        | 128 *2            | 30                       | 150         | 0.58                       | 0.7                | 1                       | 32                             | ○                    | ○          | S series  |                     |           |          |
|  |         | DG1J10A       | 100       | 1                        | 125 *2            | 30                       | 150         | 0.82                       | 1                  | 0.1                     | 43                             | —                    | ○          | J series  |                     |           |          |
|  |         | DG1N15A       | 150       | 1.4                      | 65 *1             | 30                       | 150         | 0.88                       | 1.4                | 0.05                    | 32                             | ○                    | ○          | N series  |                     |           |          |
|  |         | DG1M3A        | 30        | 1.5                      | 37 *1             | 30                       | 150         | 0.46                       | 1.5                | 0.05                    | 70                             | ○                    | ○          | M series  |                     |           |          |
|  |         | DG1H3A        | 30        | 1.5                      | 107 *2            | 30                       | 125         | 0.36                       | 1.5                | 1                       | 70                             | ○                    | ○          | H series  |                     |           |          |
|  |         | DG1S6A        | 60        | 1.5                      | 122 *2            | 40                       | 150         | 0.53                       | 1                  | 0.05                    | 43                             | ○                    | ○          | S series  |                     |           |          |
|  |         | M1FS6         | 60        | 1.2                      | 25 *1             | 40                       | 150         | 0.58                       | 1.1                | 1                       | 53                             | ○                    | ○          | S series  |                     |           |          |
| DO-219AA similar<br>M1F                | B2      |               | M1FS4     | 40                       | 1.33              | 25 *1                    | 30          | 150                        | 0.55               | 1.1                     | 0.8                            | 50                   | ○          | ○         | S series            |           |          |
|  |         | M1FJ4         | 40        | 1.5                      | 31 *1             | 30                       | 150         | 0.63                       | 1.5                | 0.05                    | 65                             | ○                    | ○          | J series  |                     |           |          |
|  |         | M1FH3         | 30        | 1.7                      | 25 *1             | 30                       | -55 to 125  | 0.36                       | 1.5                | 1                       | 80                             | —                    | —          | H series  |                     |           |          |
|  |         | M1FM3         | 30        | 3                        | 100               | 30                       | 150         | 0.46                       | 1.5                | 0.05                    | 80                             | ○                    | ○          | M series  |                     |           |          |
| DO-214AC<br>1F                         | B3-1    |               | D1FJ10    | 100                      | 1                 | 52 *1                    | 50          | 150                        | 0.72               | 1                       | 0.2                            | 63                   | ○          | ○         | J series            |           |          |
|  |         | D1FS4         | 40        | 1.1                      | 51 *1             | 30                       | 150         | 0.55                       | 1.1                | 1                       | 65                             | ○                    | ○          | S series  |                     |           |          |
|  |         | D1FS6         | 60        | 1.1                      | 38 *1             | 40                       | 150         | 0.58                       | 1.1                | 1                       | 50                             | ○                    | ○          | S series  |                     |           |          |
|  |         | D1FS4A        | 40        | 1.5                      | 28 *1             | 60                       | 150         | 0.48                       | 1.5                | 2                       | 95                             | ○                    | ○          | S series  |                     |           |          |
|  |         | D1FT4         | 40        | 2                        | 143 *2            | 60                       | 175         | 0.74                       | 2                  | 5μA                     | 63                             | ○                    | ○          | SL series |                     |           |          |
|  |         | D1FJ4         | 40        | 2                        | 117 *2            | 50                       | 150         | 0.61                       | 2                  | 0.2                     | 96                             | ○                    | ○          | J series  |                     |           |          |
|  |         | D1FT6         | 60        | 2                        | 141 *2            | 60                       | 175         | 0.78                       | 2                  | 5μA                     | 53                             | ○                    | ○          | SL series |                     |           |          |
|  |         | D1FJ8         | 80        | 2                        | 110               | 30                       | 150         | 0.74                       | 1.5                | 0.2                     | 40                             | —                    | ○          | Y series  |                     |           |          |
|  |         | D1FT10        | 100       | 2                        | 136 *2            | 50                       | 175         | 0.86                       | 2                  | 5μA                     | 40                             | ○                    | ○          | SL series |                     |           |          |
|  |         | D1FS6A        | 60        | 2.5                      | 103 *2            | 60                       | 150         | 0.57                       | 2.5                | 0.2                     | 80                             | ○                    | ○          | S series  |                     |           |          |
|  |         | D1FH3         | 30        | 3                        | 95                | 60                       | 125         | 0.36                       | 3                  | 2                       | 130                            | —                    | —          | H series  |                     |           |          |
|  |         | D1FT4A        | 40        | 3                        | 127 *2            | 90                       | 175         | 0.74                       | 3                  | 8μA                     | 93                             | ○                    | ○          | SL series |                     |           |          |
|  |         | D1FT6A        | 60        | 3                        | 125 *2            | 90                       | 175         | 0.78                       | 3                  | 8μA                     | 78                             | ○                    | ○          | SL series |                     |           |          |
|  |         | D1FJ8A        | 80        | 3                        | 100               | 30                       | 150         | 0.74                       | 3                  | 0.4                     | 70                             | —                    | ○          | Y series  |                     |           |          |
|  |         | D1FT10A       | 100       | 3                        | 116 *2            | 60                       | 175         | 0.86                       | 3                  | 8μA                     | 60                             | ○                    | ○          | SL series |                     |           |          |
|  |         | D1FT15A       | 150       | 3                        | 116 *2            | 60                       | 175         | 0.88                       | 3                  | 8μA                     | 52                             | ○                    | ○          | SL series |                     |           |          |
|  |         | D1FM3         | 30        | 5                        | 83                | 90                       | 150         | 0.46                       | 3                  | 0.1                     | 130                            | ○                    | ○          | M series  |                     |           |          |
|  |         | SC-110B<br>CE | B5-1      |                          | D3CE4S            | 40                       | 3           | 106 *2                     | 80                 | 150                     | 0.52                           | 3                    | 0.3        | 97        | —                   | ○         | S series |
|  |         |               |           | D3CE6S                   | 60                | 3                        | 112 *2      | 100                        | 150                | 0.58                    | 3                              | 0.3                  | 110        | ○         | ○                   | S series  |          |
|  |         |               |           | D3CE15ST                 | 150               | 3                        | 136 *2      | 80                         | 175                | 0.88                    | 3                              | 8μA                  | 52         | ○         | ○                   | SL series |          |
| D5CE4S                                 | 40      |               |           | 5                        | 94 *2             | 120                      | -55 to 150  | 0.52                       | 5                  | 0.5                     | 157                            | —                    | ○          | S series  |                     |           |          |
| DO-214AA similar<br>M2F                | B6      |               | M2FH3     | 30                       | 6                 | 70                       | 110         | 125                        | 0.36               | 6                       | 4                              | 240                  | —          | —         | H series            |           |          |
|  |         | M2FM3         | 30        | 6                        | 99                | 120                      | 150         | 0.46                       | 6                  | 0.2                     | 240                            | ○                    | ○          | M series  |                     |           |          |
| SC-63<br>E-pack                        | B9-1    |               | D2FS6     | 60                       | 1.5               | 31 *1                    | 60          | 150                        | 0.58               | 2                       | 2                              | 120                  | —          | ○         | S series            |           |          |
|  |         | D2FS4         | 40        | 1.6                      | 34 *1             | 60                       | 150         | 0.55                       | 1.6                | 2.5                     | 150                            | —                    | ○          | S series  |                     |           |          |
|  |         | D3FS4A        | 40        | 2.6                      | 34 *1             | 150                      | 150         | 0.45                       | 2.6                | 5                       | 340                            | ○                    | ○          | S series  |                     |           |          |
|  |         | D3FS6         | 60        | 3                        | 87 *2             | 80                       | 150         | 0.58                       | 3                  | 2.5                     | 130                            | —                    | ○          | S series  |                     |           |          |
| SC-63<br>E-pack                        | G1-2    |               | D3FJ10    | 100                      | 3                 | 92 *2                    | 100         | 150                        | 0.74               | 3                       | 0.4                            | 143                  | —          | ○         | J series            |           |          |
|  |         | DE3S4M        | 40        | 3                        | 121               | 70                       | 150         | 0.55                       | 3                  | 2.5                     | 150                            | —                    | —          | S series  |                     |           |          |
|  |         | DE3S6M        | 60        | 3                        | 117               | 80                       | 150         | 0.58                       | 3                  | 2.5                     | 130                            | —                    | —          | S series  |                     |           |          |
|  |         | DE5S4M        | 40        | 5                        | 101               | 80                       | 150         | 0.55                       | 5                  | 3.5                     | 180                            | —                    | —          | S series  |                     |           |          |
| SC-63<br>E-pack                        | G1-4    |               | DE5S6M    | 60                       | 5                 | 96                       | 90          | 150                        | 0.58               | 5                       | 4.5                            | 200                  | —          | —         | S series            |           |          |
|  |         | DE10S3L       | 30        | 10                       | 124               | 250                      | 150         | 0.45                       | 8                  | 10                      | 640                            | —                    | —          | S series  |                     |           |          |
| TO-277A similar<br>FY                  | G4      |               | D5FY4R5ST | 45                       | 5                 | 165 *2                   | 240         | -55 to 175                 | 0.74               | 5                       | 15μA                           | 187                  | ○          | ○         | SL series           |           |          |
|  |         | D5FY4R5SY     | 45        | 5                        | 138 *2            | 220                      | -55 to 150  | 0.59                       | 5                  | 0.2                     | 155                            | ○                    | ○          | Y series  |                     |           |          |
|  |         | D5FY6ST       | 60        | 5                        | 164 *2            | 210                      | -55 to 175  | 0.78                       | 5                  | 15μA                    | 148                            | ○                    | ○          | SL series |                     |           |          |
|  |         | D5FY6SY       | 60        | 5                        | 138 *2            | 210                      | -55 to 150  | 0.67                       | 5                  | 0.2                     | 170                            | ○                    | ○          | Y series  |                     |           |          |
|  |         | D5FY10ST      | 100       | 5                        | 162 *2            | 210                      | -55 to 175  | 0.86                       | 5                  | 15μA                    | 104                            | ○                    | ○          | SL series |                     |           |          |
|  |         | D5FY10SY      | 100       | 5                        | 132 *2            | 130                      | -55 to 150  | 0.8                        | 5                  | 0.2                     | 141                            | ○                    | ○          | Y series  |                     |           |          |
|  |         | D5FY15ST      | 150       | 5                        | 162 *2            | 210                      | -55 to 175  | 0.88                       | 5                  | 15μA                    | 92                             | ○                    | ○          | SL series |                     |           |          |
|  |         | D10FY4R5ST    | 45        | 10                       | 155 *2            | 250                      | -55 to 175  | 0.74                       | 10                 | 30μA                    | 330                            | ○                    | ○          | SL series |                     |           |          |
|  |         | D10FY4R5SY    | 45        | 10                       | 126 *2            | 290                      | -55 to 150  | 0.59                       | 10                 | 0.4                     | 302                            | ○                    | ○          | Y series  |                     |           |          |
|  |         | D10FY6ST      | 60        | 10                       | 154 *2            | 230                      | -55 to 175  | 0.78                       | 10                 | 30μA                    | 263                            | ○                    | ○          | SL series |                     |           |          |
|  |         | D10FY6SY      | 60        | 10                       | 127 *2            | 250                      | -55 to 150  | 0.67                       | 10                 | 0.4                     | 262                            | ○                    | ○          | Y series  |                     |           |          |
|  |         | D10FY10ST     | 100       | 10                       | 152 *2            | 230                      | -55 to 175  | 0.86                       | 10                 | 30μA                    | 185                            | ○                    | ○          | SL series |                     |           |          |
|  |         | D10FY10SY     | 100       | 10                       | 118 *2            | 260                      | -55 to 150  | 0.8                        | 10                 | 0.4                     | 253                            | ○                    | ○          | Y series  |                     |           |          |
|  |         | D10FY15ST     | 150       | 10                       | 149 *2            | 230                      | -55 to 175  | 0.88                       | 10                 | 30μA                    | 159                            | ○                    | ○          | SL series |                     |           |          |
|  |         | D15FY4R5ST    | 45        | 15                       | 145 *2            | 270                      | -55 to 175  | 0.74                       | 15                 | 40μA                    | 398                            | ○                    | ○          | SL series |                     |           |          |
| D15FY4R5SY                             | 45      | 15            | 116 *2    | 310                      | -55 to 150        | 0.59                     | 15          | 0.5                        | 410                | ○                       | ○                              | Y series             |            |           |                     |           |          |
| D15FY6ST                               | 60      | 15            | 143 *2    | 250                      | -55 to 175        | 0.78                     | 15          | 40μA                       | 345                | ○                       | ○                              | SL series            |            |           |                     |           |          |
| D15FY6SY                               | 60      | 15            | 117 *2    | 280                      | -55 to 150        | 0.67                     | 15          | 0.5                        | 345                | ○                       | ○                              | Y series             |            |           |                     |           |          |
| D15FY10ST                              | 100     | 15            | 141 *2    | 250                      | -55 to 175        | 0.86                     | 15          | 40μA                       | 242                | ○                       | ○                              | SL series            |            |           |                     |           |          |
| D15FY10SY                              | 100     | 15            | 114 *2    | 280                      | -55 to 150        | 0.83                     | 15          | 0.5                        | 297                | ○                       | ○                              | Y series             |            |           |                     |           |          |
| D15FY15ST                              | 150     | 15            | 138 *2    | 230                      | -55 to 175        | 0.88                     | 15          | 40μA                       | 209                | ○                       | ○                              | SL series            |            |           |                     |           |          |
| TO-252AA similar<br>FR                 | G5      |               | D15FR4ST  | 40                       | 15                | 152                      | 250         | -55 to 175                 | 0.74               | 15                      | 40μA                           | 398                  | ○          | ■         | SL series           |           |          |
|  |         | D20FR4ST      | 40        |                          |                   |                          |             |                            |                    |                         |                                |                      |            |           |                     |           |          |

# SCHOTTKY BARRIER DIODES


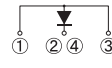
## Single

| Axial   |  |      |                        |                      |       |   |
|---|--|------|------------------------|----------------------|-------|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |       | Remarks   |
|   |  |      |                        | 40                   | 60    |   |
|  3.0 × φ 2.6(mm) | —<br>—<br>AX057                        | A1   | 1                      | D1NS4                | D1NS6 |  |
|  5.0 × φ 4.0(mm) | —<br>—<br>AX078                        | A4-1 | 2                      | D2S4M                | D2S6M |   |
|  7.0 × φ 4.4(mm) | —<br>—<br>AX14                         | A7   | 3                      | D3S4M                | D3S6M |   |

## Two Terminal Type

| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |        |        |   | Remarks |
|---|--|------|------------------------|----------------------|--------|--------|---|---------|
|   |  |      |                        | 40                   | 60     | 90     | 150   |         |
|  28.5 × 10.0 × 4.5(mm) | —<br>SC-91<br>FTO-220G                 | J4   | 5                      | SG5S4M               | SG5S6M | SG5S9M |  |         |

## Three Terminal Type

| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |    |    |         | Remarks   |
|--|--|------|------------------------|----------------------|----|----|---------|---|
|  |  |      |                        | 40                   | 60 | 90 | 150     |   |
|  41.0 × 16.0 × 5.0(mm) | TO-247AD<br>—<br>MTO-3PV               | K7-2 | 40                     |                      |    |    | S40T15V |  |
|  |  |      | 90                     |                      |    |    | S90T15V |   |

## Single

| Axial                                  |      |          |                          |                           |                                      |                         |                        |                                |                                     |   |                                 |                      |            |          |
|--|------|----------|--------------------------|---------------------------|--------------------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|---------------------------------|----------------------|------------|----------|
| Package                                |      | Type No. | Absolute Maximum Ratings |                           |                                      |                         |                        | Electrical Characteristics     |                                     |   |                                 | Based on<br>AEC-Q101 | Automotive | Series   |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | V <sub>RRM</sub><br>[V]  | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>a</sub><br>[°C] | I <sub>FSM</sub><br>[A] | T <sub>j</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[mA] | C <sub>t</sub><br>(typ)<br>[pF] |                      |            |          |
| —<br>—<br>AX057                        | A1   | D1NS4    | 40                       | 1                         | 59                                   | 30                      | 150                    | 0.55                           | 1                                   | 0.8   | 50                              | —                    | —          | S series |
| —<br>—<br>AX078                        | A4-1 | D1NS6    | 60                       | 1                         | 46                                   | 30                      | 150                    | 0.58                           | 1                                   | 1   | 53                              | —                    | —          | S series |
| —<br>—<br>—                            | A4-1 | D2S4M    | 40                       | 2                         | 122 *1                               | 60                      | 150                    | 0.55                           | 2                                   | 2   | 95                              | —                    | —          | S series |
| —<br>—<br>—                            |      | D2S6M    | 60                       | 2                         | 119 *1                               | 60                      | 150                    | 0.58                           | 2                                   | 2   | 90                              | —                    | —          | S series |
| —<br>—<br>—                            | A7   | D3S4M    | 40                       | 3                         | 63                                   | 80                      | 150                    | 0.55                           | 3                                   | 3.5   | 150                             | —                    | —          | S series |
| —<br>—<br>AX14                         |      | D3S6M    | 60                       | 3                         | 133 *1                               | 80                      | 150                    | 0.58                           | 3                                   | 2.5   | 130                             | —                    | —          | S series |

\*1 : Tl

## Two Terminal Type




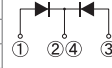

| Two Terminal Type                      |      |          |                          |                           |                                      |                         |                        |                                |                                     |   |                                 |                      |            |          |
|--|------|----------|--------------------------|---------------------------|--------------------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|---------------------------------|----------------------|------------|----------|
| Package                                |      | Type No. | Absolute Maximum Ratings |                           |                                      |                         |                        | Electrical Characteristics     |                                     |   |                                 | Based on<br>AEC-Q101 | Automotive | Series   |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | V <sub>RRM</sub><br>[V]  | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>c</sub><br>[°C] | I <sub>FSM</sub><br>[A] | T <sub>j</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[mA] | C <sub>t</sub><br>(typ)<br>[pF] |                      |            |          |
| —<br>SC-91<br>FTO-220G                 | J4   | SG5S4M   | 40                       | 5                         | 131                                  | 150                     | 150                    | 0.52                           | 5                                   | 0.5   | 157                             | —                    | —          | S series |
|  |      | SG5S6M   | 60                       | 5                         | 130                                  | 120                     | 150                    | 0.56                           | 5                                   | 0.5   | 165                             | —                    | —          | S series |
|  |      | SG5S9M   | 90                       | 5                         | 124                                  | 90                      | 150                    | 0.75                           | 5                                   | 0.5   | 140                             | —                    | —          | S series |

## Three Terminal Type

| Three Terminal Type                    |      |          |                          |                           |                                      |                         |                        |                                |                                     |   |                                 |                      |            |          |
|--|------|----------|--------------------------|---------------------------|--------------------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|---------------------------------|----------------------|------------|----------|
| Package                                |      | Type No. | Absolute Maximum Ratings |                           |                                      |                         |                        | Electrical Characteristics     |                                     |   |                                 | Based on<br>AEC-Q101 | Automotive | Series   |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | V <sub>RRM</sub><br>[V]  | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>c</sub><br>[°C] | I <sub>FSM</sub><br>[A] | T <sub>j</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[mA] | C <sub>t</sub><br>(typ)<br>[pF] |                      |            |          |
| TO-247AD<br>—<br>MTO-3PV               | K7-2 | S40T15V  | 150                      | 40                        | 131                                  | 700                     | 150                    | 0.92                           | 40                                  | 0.12  | 595                             | —                    | ○          | N series |
|  |      | S90T15V  | 150                      | 90                        | 122                                  | 1400                    | 150                    | 0.95                           | 90                                  | 0.35  | 1690                            | —                    | ○          | N series |

# SCHOTTKY BARRIER DIODES

## Center Tap, Common Cathode

| Surface Mount  |  |      |                   |           |                     |          |          |            |           |            | Remarks  |   |
|--|--|------|-------------------|-----------|---------------------|----------|----------|------------|-----------|------------|----------|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF<br>(AV)<br>[A] | VRRM[V]   |                     |          |          |            |           | Remarks    |          |   |
|  |  |      |                   | 30        | 40                  | 60       | 90       | 100        | 120       |            |          | 150   |
| <br>9.5 × 6.6 × 2.65(mm)  | —<br>SC-63<br>E-pack                   | G1-1 | 5                 | DE55C3ML  | DE55C4M             | DE55C6M  |          |            |           |            |          |   |
|  |  |      | 10                | DE10SC3L  | DE10SC4             |          |          |            |           |            |          |   |
| <br>9.5 × 6.6 × 2.65(mm)  | TO-252AB similar<br>SC-63<br>FE        | G3-1 | 6                 |           | D6FEC4ST            |          |          | D6FEC10ST  | D6FEC12ST | D6FEC15ST  |          |   |
|  |  |      |                   |           |                     |          |          |            |           |            |          |   |
| <br>13.2 × 10.2 × 4.7(mm) | —<br>SC-83 similar<br>STO-220          | H1-1 | 10                |           | DF10SC4M            | DF10SC6  | DF10SC9  |            |           |            | DF10NC15 |  |
|  |  |      | 15                |           | DF15SC4M            |          |          | DF15JC10   |           | DF15NC15   |          |   |
|  |  |      | 20                |           | DF20SC4M            |          | DF20SC9M | DF20JC10   |           | DF20NC15   |          |   |
|  |  |      | 25                |           |                     | DF25SC6M |          |            |           |            |          |   |
|  |  |      | 30                | DF30SC3ML | DF30JC4<br>DF30SC4M | DF30JC6  |          | DF30JC10   |           | DF30NC15   |          |   |
| <br>13.2 × 10.2 × 4.6(mm) | —<br>SC-83 similar<br>FD               | H2-2 | 10                |           |                     |          |          | D10FDC10ST |           |            |          |   |
|  |  |      | 20                |           |                     |          |          | D20FDC10ST |           | D20FDC15ST |          |   |
|  |  |      | 30                |           | D30FDC4S            |          |          | D30FDC10ST |           | D30FDC15ST |          |   |
|  |  |      | 40                |           |                     |          |          | D40FDC10ST |           | D40FDC15ST |          |   |

## Center Tap, Common Cathode

| Surface Mount                          |         |      |            |                          |                   |                          |             |                            |                    |                         |                                |                      |            |        |                     |
|--|---------|------|------------|--------------------------|-------------------|--------------------------|-------------|----------------------------|--------------------|-------------------------|--------------------------------|----------------------|------------|--------|---------------------|
| JEDEC Code<br>JEITA Code<br>House Name | Package | Fig. | Type No.   | Absolute Maximum Ratings |                   |                          |             | Electrical Characteristics |                    |                         |                                | Based on<br>AEC-Q101 | Automotive | Series |                     |
|  |         |      |            | VRRM<br>[V]              | IF<br>(AV)<br>[A] | Conditions<br>Tc<br>[°C] | IFSM<br>[A] | Tj<br>[°C]                 | Vf<br>(max)<br>[V] | Conditions<br>IF<br>[A] | Ir<br>(max)<br>VR=VRRM<br>[mA] |                      |            |        | Ct<br>(typ)<br>[pF] |
| —<br>SC-63<br>E-pack                   | G1-1    |      | DE55C3ML   | 30                       | 5                 | 110                      | 90          | 150                        | 0.45               | 2.5                     | 3.5                            | 190                  | —          | ■      | S series            |
|  |         |      | DE55C4M    | 40                       | 5                 | 101                      | 80          | 150                        | 0.55               | 2.5                     | 3.5                            | 150                  | —          | ■      | S series            |
|  |         |      | DE55C6M    | 60                       | 5                 | 92                       | 80          | 150                        | 0.58               | 2.5                     | 2.5                            | 130                  | —          | ■      | S series            |
|  |         |      | DE10SC3L   | 30                       | 10                | 124                      | 100         | 150                        | 0.45               | 4                       | 5                              | 290                  | —          | ■      | S series            |
|  |         |      | DE10SC4    | 40                       | 10                | 132                      | 100         | 150                        | 0.55               | 5                       | 3.5                            | 210                  | —          | ■      | S series            |
| TO-252AB similar<br>SC-63<br>FE        | G3-1    |      | D6FEC4ST   | 40                       | 6                 | 158                      | 90          | 175                        | 0.74               | 3                       | 8μA                            | 93                   | ○          | ○      | SL series           |
|  |         |      | D6FEC10ST  | 100                      | 6                 | 154                      | 100         | 175                        | 0.86               | 3                       | 8μA                            | 60                   | ○          | ○      | SL series           |
|  |         |      | D6FEC12ST  | 120                      | 6                 | 154                      | 100         | 175                        | 0.87               | 3                       | 8μA                            | 60                   | ○          | ○      | SL series           |
| —<br>SC-83 similar<br>STO-220          | H1-1    |      | D6FEC15ST  | 150                      | 6                 | 154                      | 100         | 175                        | 0.88               | 3                       | 8μA                            | 52                   | ○          | ○      | SL series           |
|  |         |      | DF10SC4M   | 40                       | 10                | 125                      | 100         | 150                        | 0.55               | 5                       | 3.5                            | 180                  | —          | —      | S series            |
|  |         |      | DF10SC6    | 60                       | 10                | 132                      | 150         | 150                        | 0.58               | 5                       | 4.5                            | 260                  | —          | —      | S series            |
|  |         |      | DF10SC9    | 90                       | 10                | 131                      | 150         | 150                        | 0.75               | 5                       | 3                              | 185                  | —          | —      | S series            |
|  |         |      | DF10NC15   | 150                      | 10                | 123                      | 100         | 150                        | 0.88               | 5                       | 0.2                            | 110                  | —          | —      | N series            |
|  |         |      | DF15SC4M   | 40                       | 15                | 129                      | 150         | 150                        | 0.55               | 7.5                     | 5                              | 340                  | —          | —      | S series            |
|  |         |      | DF15JC10   | 100                      | 15                | 126                      | 150         | 150                        | 0.86               | 7.5                     | 0.6                            | 200                  | —          | —      | J series            |
|  |         |      | DF15NC15   | 150                      | 15                | 126                      | 150         | 150                        | 0.88               | 7.5                     | 0.3                            | 155                  | —          | —      | N series            |
|  |         |      | DF20SC4M   | 40                       | 20                | 122                      | 230         | 150                        | 0.55               | 10                      | 7.5                            | 390                  | —          | —      | S series            |
|  |         |      | DF20SC9M   | 90                       | 20                | 111                      | 200         | 150                        | 0.75               | 10                      | 10                             | 370                  | —          | —      | S series            |
|  |         |      | DF20JC10   | 100                      | 20                | 121                      | 200         | 150                        | 0.86               | 10                      | 0.7                            | 260                  | —          | —      | J series            |
|  |         |      | DF20NC15   | 150                      | 20                | 121                      | 200         | 150                        | 0.88               | 10                      | 0.4                            | 200                  | —          | —      | N series            |
|  |         |      | DF25SC6M   | 60                       | 25                | 115                      | 300         | 150                        | 0.58               | 12.5                    | 10                             | 490                  | —          | —      | S series            |
|  |         |      | DF30SC3ML  | 30                       | 30                | 119                      | 350         | 150                        | 0.48               | 15                      | 10                             | 820                  | —          | —      | S series            |
|  |         |      | DF30JC4    | 40                       | 30                | 115                      | 250         | 150                        | 0.61               | 15                      | 0.7                            | 560                  | —          | —      | J series            |
|  |         |      | DF30SC4M   | 40                       | 30                | 112                      | 360         | 150                        | 0.55               | 15                      | 10                             | 590                  | —          | —      | S series            |
|  |         |      | DF30JC6    | 60                       | 30                | 108                      | 250         | 150                        | 0.69               | 15                      | 0.7                            | 490                  | —          | —      | J series            |
|  |         |      | DF30JC10   | 100                      | 30                | 116                      | 300         | 150                        | 0.86               | 15                      | 1                              | 390                  | —          | —      | J series            |
|  |         |      | DF30NC15   | 150                      | 30                | 115                      | 300         | 150                        | 0.88               | 15                      | 0.5                            | 300                  | —          | —      | N series            |
|  |         |      | DF40SC3L   | 30                       | 40                | 112                      | 400         | 150                        | 0.45               | 15                      | 17                             | 1200                 | —          | —      | S series            |
|  | DF40SC4 | 40   | 40         | 106                      | 350               | 150                      | 0.55        | 20                         | 14                 | 860                     | —                              | —                    | S series   |        |                     |
| —<br>SC-83 similar<br>FD               | H2-2    |      | D10FDC10ST | 100                      | 10                | 158                      | 150         | 175                        | 0.86               | 5                       | 15μA                           | 104                  | ○          | ○      | SL series           |
|  |         |      | D20FDC10ST | 100                      | 20                | 119                      | 250         | 150                        | 0.86               | 10                      | 30μA                           | 185                  | ○          | ○      | N series            |
|  |         |      | D20FDC15ST | 150                      | 20                | 118                      | 250         | 150                        | 0.88               | 10                      | 30μA                           | 159                  | —          | ○      | N series            |
|  |         |      | D30FDC4S   | 40                       | 30                | 114                      | 300         | 150                        | 0.55               | 15                      | 1.5                            | 415                  | ○          | ○      | S series            |
|  |         |      | D30FDC10ST | 100                      | 30                | 108                      | 300         | 150                        | 0.86               | 15                      | 40μA                           | 242                  | —          | ○      | N series            |
|  |         |      | D30FDC15ST | 150                      | 30                | 107                      | 300         | 150                        | 0.88               | 15                      | 40μA                           | 209                  | —          | ○      | N series            |
|  |         |      | D40FDC10ST | 100                      | 40                | 105                      | 400         | 150                        | 0.86               | 20                      | 60μA                           | 360                  | —          | ○      | N series            |
|  |         |      | D40FDC15ST | 150                      | 40                | 103                      | 400         | 150                        | 0.88               | 20                      | 60μA                           | 315                  | —          | ○      | N series            |

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SCHOTTKY BARRIER DIODES

# SCHOTTKY BARRIER DIODES

## Center Tap, Common Cathode

| Three Terminal Type  |  |      |                   |           |                     |          |                      |          |           |           |           |   |   |
|--|--|------|-------------------|-----------|---------------------|----------|----------------------|----------|-----------|-----------|-----------|---|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF<br>(AV)<br>[A] | VRRM[V]   |                     |          |                      |          |           |           |           | Remarks   |   |
|  |  |      |                   | 15        | 30                  | 40       | 60                   | 90       | 100       | 120       | 150       |   | 600   |
| <br>28.5 × 10.0 × 4.5(mm) | SC-91<br>FTO-220G                      | J9   | 8                 |           | SG8SC4M             |          |                      |          |           |           |           |   |  |
|  |  |      | 10                | SG10SC3LM | SG10SC4M            | SG10SC6M | SG10SC9M             |          |           |           | SG10TC15M |   |   |
|  |  |      | 15                |           | SG15SC4M            | SG15SC6M |                      |          |           |           |           |   |   |
|  |  |      | 20                |           | SG20SC3LM           | SG20SC4M | SG20JC6M<br>SG20SC6M | SG20SC9M | SG20TC10M | SG20TC12M | SG20TC15M |   |   |
|  |  |      | 30                |           | SG30SC3LM           | SG30SC4M | SG30JC6M<br>SG30SC6M |          | SG30TC10M | SG30TC12M | SG30TC15M |   |   |
| <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>MTO-3PT                    | K5-2 | 20                |           |                     |          |                      | S20SC9MT |           |           |           |  |   |
|  |  |      | 30                |           |                     | S30SC4MT | S30SC6MT             |          |           | S30TC15T  |           |   |   |
|  |  |      | 40                | S40HC1R5T |                     |          |                      |          |           |           |           |   |   |
|  |  |      | 60                | S60HC1R5T | S60HC3T<br>S60SC3LT | S60SC4MT | S60SC6MT             |          |           |           |           |   |   |
| <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>MTO-3PV                    | K7-1 | 60                |           |                     |          |                      |          |           | S60JC10V  |           |   |   |

## Center Tap, Common Cathode

| Three Terminal Type                    |      |                     |                          |                   |                          |             |            |                            |                         |                                |                     |                      |            |           |
|--|------|---------------------|--------------------------|-------------------|--------------------------|-------------|------------|----------------------------|-------------------------|--------------------------------|---------------------|----------------------|------------|-----------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No.            | Absolute Maximum Ratings |                   |                          |             |            | Electrical Characteristics |                         |                                |                     | Based on<br>AEC-Q101 | Automotive | Series    |
|  |      |                     | VRRM<br>[V]              | IF<br>(AV)<br>[A] | Conditions<br>Tc<br>[°C] | IFSM<br>[A] | Tj<br>[°C] | Vf<br>(max)<br>[V]         | Conditions<br>IF<br>[A] | Ir<br>(max)<br>Vr=VRRM<br>[mA] | Ct<br>(typ)<br>[pF] |                      |            |           |
| SC-91<br>FTO-220G                      | J9   | SG8SC4M             | 40                       | 8                 | 155                      | 80          | 175        | 0.56                       | 4.0                     | 0.3                            | 100                 | -                    | -          | S series  |
|  |      | SG10SC3LM           | 30                       | 10                | 136                      | 150         | 150        | 0.45                       | 4.0                     | 5                              | 310                 | -                    | -          | S series  |
|  |      | SG10SC4M            | 40                       | 10                | 150                      | 150         | 175        | 0.52                       | 5.0                     | 0.5                            | 157                 | -                    | -          | S series  |
|  |      | SG10SC6M            | 60                       | 10                | 145                      | 140         | 175        | 0.56                       | 5.0                     | 0.5                            | 165                 | -                    | -          | S series  |
|  |      | SG10SC9M            | 90                       | 10                | 139                      | 150         | 175        | 0.75                       | 5.0                     | 0.5                            | 140                 | -                    | -          | S series  |
|  |      | SG10TC15M           | 150                      | 10                | 153                      | 120         | 175        | 0.88                       | 5.0                     | 15μA                           | 92                  | -                    | -          | SL series |
|  |      | SG15SC4M            | 40                       | 15                | 117                      | 150         | 150        | 0.52                       | 7.5                     | 0.8                            | 230                 | -                    | -          | S series  |
|  |      | SG15SC6M            | 60                       | 15                | 113                      | 180         | 150        | 0.61                       | 7.5                     | 0.6                            | 185                 | -                    | -          | S series  |
|  |      | SG20SC3LM           | 30                       | 20                | 124                      | 250         | 150        | 0.45                       | 8.0                     | 9                              | 570                 | -                    | -          | S series  |
|  |      | SG20SC4M            | 40                       | 20                | 115                      | 200         | 150        | 0.52                       | 10.0                    | 1.1                            | 315                 | -                    | -          | S series  |
|  |      | SG20JC6M            | 60                       | 20                | 106                      | 200         | 150        | 0.69                       | 10.0                    | 0.1                            | 250                 | -                    | -          | J series  |
|  |      | SG20SC6M            | 60                       | 20                | 107                      | 200         | 150        | 0.61                       | 10.0                    | 0.8                            | 250                 | -                    | -          | S series  |
|  |      | SG20SC9M            | 90                       | 20                | 112                      | 200         | 150        | 0.75                       | 10.0                    | 1                              | 245                 | -                    | -          | S series  |
|  |      | SG20TC10M           | 100                      | 20                | 140                      | 200         | 175        | 0.86                       | 10.0                    | 30μA                           | 185                 | -                    | -          | SL series |
|  |      | SG20TC12M           | 120                      | 20                | 137                      | 200         | 175        | 0.87                       | 10.0                    | 30μA                           | 175                 | -                    | -          | SL series |
|  |      | SG20TC15M           | 150                      | 20                | 136                      | 200         | 175        | 0.88                       | 10.0                    | 30μA                           | 159                 | -                    | -          | SL series |
|  |      | SG30SC3LM           | 30                       | 30                | 117                      | 350         | 150        | 0.45                       | 12.5                    | 15                             | 960                 | -                    | -          | M series  |
|  |      | SG30SC4M            | 40                       | 30                | 101                      | 300         | 150        | 0.55                       | 15.0                    | 1.5                            | 415                 | -                    | -          | S series  |
|  |      | SG30JC6M            | 60                       | 30                | 90                       | 250         | 150        | 0.69                       | 15.0                    | 0.15                           | 325                 | -                    | -          | J series  |
|  |      | SG30SC6M            | 60                       | 30                | 100                      | 300         | 150        | 0.61                       | 15.0                    | 1.2                            | 385                 | -                    | -          | S series  |
|  |      | SG30TC10M           | 100                      | 30                | 126                      | 300         | 175        | 0.86                       | 15.0                    | 40μA                           | 242                 | -                    | -          | SL series |
|  |      | SG30TC12M           | 120                      | 30                | 122                      | 300         | 175        | 0.87                       | 15.0                    | 40μA                           | 228                 | -                    | -          | SL series |
|  |      | SG30TC15M           | 150                      | 30                | 122                      | 300         | 175        | 0.88                       | 15.0                    | 40μA                           | 209                 | -                    | -          | SL series |
|  |      | SG40TC10M           | 100                      | 40                | 116                      | 350         | 175        | 0.86                       | 20.0                    | 60μA                           | 362                 | -                    | -          | SL series |
|  |      | SG40TC12M           | 120                      | 40                | 112                      | 350         | 175        | 0.87                       | 20.0                    | 60μA                           | 336                 | -                    | -          | SL series |
|  |      | TO-247AD<br>MTO-3PT | K5-2                     | S20SC9MT          | 90                       | 20          | 136        | 200                        | 150                     | 0.75                           | 10.0                | 1                    | 245        | -         |
| S30SC4MT                               | 40   |                     |                          | 30                | 132                      | 300         | 150        | 0.55                       | 15.0                    | 1.5                            | 410                 | -                    | -          | S series  |
| S30SC6MT                               | 60   |                     |                          | 30                | 129                      | 300         | 150        | 0.61                       | 15.0                    | 1.2                            | 385                 | -                    | -          | S series  |
| S30TC15T                               | 150  |                     |                          | 30                | 128                      | 300         | 150        | 0.88                       | 15.0                    | 40μA                           | 209                 | -                    | -          | N series  |
| S40HC1R5T                              | 15   |                     |                          | 40                | 111                      | 450         | 125        | 0.41                       | 20.0                    | 10                             | 960                 | -                    | -          | H series  |
| S60HC1R5T                              | 15   |                     |                          | 60                | 110                      | 600         | 125        | 0.41                       | 30.0                    | 15                             | 1400                | -                    | -          | H series  |
| S60HC3T                                | 30   |                     |                          | 60                | 112                      | 650         | 125        | 0.40                       | 30.0                    | 20                             | 1100                | -                    | -          | H series  |
| S60SC3LT                               | 30   |                     |                          | 60                | 138                      | 650         | 150        | 0.48                       | 30.0                    | 25                             | 1600                | -                    | -          | S series  |
| TO-247AD<br>MTO-3PV                    | K7-1 | S60SC4MT            | 40                       | 60                | 127                      | 500         | 150        | 0.55                       | 30.0                    | 3                              | 790                 | -                    | -          | S series  |
|  |      | S60SC6MT            | 60                       | 60                | 121                      | 470         | 150        | 0.67                       | 30.0                    | 2                              | 640                 | -                    | -          | S series  |
| TO-247AD<br>MTO-3PV                    | K7-1 | S60JC10V            | 100                      | 60                | 118                      | 500         | 150        | 0.95                       | 30.0                    | 0.2                            | 695                 | -                    | ○          | J series  |



# SCHOTTKY BARRIER DIODES

## Array

| Surface Mount  |  |      |                        |                      |    |   |
|--|--|------|------------------------|----------------------|----|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |    | Remarks   |
|  |  |      |                        | 40                   | 60 |   |
| <br>7.0 × 4.7 × 2.6(mm) | TO-269AA<br>—<br>1Z                    | C2-2 | 1.2                    | S1ZAS4               |    |  |

## Diode Module

| Diode Module  |  |      |                        |                      |          |   |
|---|--|------|------------------------|----------------------|----------|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |          | Remarks   |
|   |  |      |                        | 40                   | 60       |   |
| <br>43.0 × 27.0 × 21.0(mm) | —<br>—<br>Module                       | F1   | 120                    | D120SC4M             | D120SC6M |  |
| 240   |  |      | D240SC4M               | D240SC6M             |          |   |
| <br>43.0 × 27.0 × 21.0(mm) |  | F3-1 | 180                    | D180SC4M             | D180SC6M |  |
|   |  |      | 360                    | D360SC4M             | D360SC6M |   |

## Array

| Surface Mount                          |      |          |                          |                           |                                      |                         |                        |                                |                                     |   |                                 |                      |            |          |
|--|------|----------|--------------------------|---------------------------|--------------------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|---------------------------------|----------------------|------------|----------|
| Package                                |      | Type No. | Absolute Maximum Ratings |                           |                                      |                         |                        | Electrical Characteristics     |                                     |   |                                 | Based on<br>AEC-Q101 | Automotive | Series   |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | V <sub>RRM</sub><br>[V]  | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>a</sub><br>[°C] | I <sub>FSM</sub><br>[A] | T <sub>j</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[mA] | C <sub>t</sub><br>(typ)<br>[pF] |                      |            |          |
| TO-269AA<br>—<br>1Z                    | C2-2 | S1ZAS4   | 40                       | 1.2                       | 47                                   | 40                      | 150                    | 0.55                           | 1                                   | 1   | 65                              | —                    | —          | S series |

## Diode Module

| Diode Module                           |      |          |                          |                           |                                      |                         |                        |                                |                                     |   |                                 |                      |            |          |
|--|------|----------|--------------------------|---------------------------|--------------------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|---------------------------------|----------------------|------------|----------|
| Package                                |      | Type No. | Absolute Maximum Ratings |                           |                                      |                         |                        | Electrical Characteristics     |                                     |   |                                 | Based on<br>AEC-Q101 | Automotive | Series   |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | V <sub>RRM</sub><br>[V]  | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>c</sub><br>[°C] | I <sub>FSM</sub><br>[A] | T <sub>j</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[mA] | C <sub>t</sub><br>(typ)<br>[pF] |                      |            |          |
| —<br>—<br>Module                       | F1   | D120SC4M | 40                       | 120                       | 90                                   | 800                     | 125                    | 0.58                           | 60                                  | 40  | 2.1                             | —                    | —          | S series |
|  |      | D120SC6M | 60                       | 120                       | 85                                   | 800                     | 125                    | 0.67                           | 60                                  | 40  | 2.2                             | —                    | —          | S series |
|  |      | D240SC4M | 40                       | 240                       | 77                                   | 1600                    | 125                    | 0.6                            | 120                                 | 80  | 4.2                             | —                    | —          | S series |
|  | F3-1 | D240SC6M | 60                       | 240                       | 71                                   | 1600                    | 125                    | 0.67                           | 120                                 | 80  | 4.4                             | —                    | —          | S series |
|  |      | D180SC4M | 40                       | 180                       | 83                                   | 800                     | 125                    | 0.58                           | 60                                  | 40  | 2.1                             | —                    | —          | S series |
|  |      | D180SC6M | 60                       | 180                       | 78                                   | 800                     | 125                    | 0.67                           | 60                                  | 40  | 2.2                             | —                    | —          | S series |
| D360SC4M                               | 40   | 360      | 64                       | 1600                      | 125                                  | 0.6                     | 120                    | 80                             | 4.2                                 | —   | —                               | S series             |            |          |
| D360SC6M                               | 60   | 360      | 58                       | 1600                      | 125                                  | 0.67                    | 120                    | 80                             | 4.4                                 | —   | —                               | S series             |            |          |













# FAST RECOVERY DIODES

Fast Recovery Diodes are high speed type PN junction rectifying devices.




These diodes for the switching of power supply are suitable for use in household appliances, OA apparatuses, and FA apparatuses.

| Series | Feature                        |
|--------|--------------------------------|
| K      | Low Vf                         |
| ML     | Low Vf, Low trr, Soft Recovery |
| US     | Ultra Fast, Soft Recovery      |
| A      | Ultra Fast, Low Vf             |

## Single

| Surface Mount   |  |      |                         |           |                 |                     |        |           |                              |                    |   |   |
|---|--|------|-------------------------|-----------|-----------------|---------------------|--------|-----------|------------------------------|--------------------|---|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF(AV)<br>[A]           | VRRM[V]   |                 |                     |        |           |                              | Remarks            |   |   |
|   |  |      |                         | 200       | 400             | 600                 | 700    | 1000      | 1200                         |                    |   |   |
|    | DO-219AA similar<br>M1F                | B2   | 1                       |           |                 | M1FK60              |        |           |                              |                    |   |   |
|   |  |      | 1.1                     | M1FL20U   |                 |                     |        |           |                              |                    |   |   |
|   |  |      | 1.5                     |           | M1FL40U         |                     |        |           |                              |                    |   |   |
|    | DO-214AC<br>1F                         | B3-1 | 0.8                     |           |                 | D1FK60              | D1FK70 |           |                              |                    |   |   |
|   |  |      | 1                       |           |                 |                     |        | D1FK100   | <b>N</b> D1FK120P<br>D1FK120 |                    |   |   |
|   |  |      | 1.1                     | D1FL20U   |                 |                     |        |           |                              |                    |   |   |
|    | SC-110B<br>CE                          | B5-1 | 3                       | D3CE20LUS |                 | D3CE60K             |        |           |                              |                    |    |   |
|   |  |      | DO-214AA similar<br>M2F | B6        | 1.5             | M2FL20U             |        |           |                              |                    |   |   |
|   |  |      |                         |           | 3               | M3FL20U             |        |           |                              |                    |   |   |
|    |  | B9-1 | 1.3                     |           | D2FL40          |                     |        |           |                              |                    |   |   |
|   |  |      | 1.5                     | D2FL20U   |                 | D2FK60              |        |           |                              |                    |   |   |
|   |  |      | 2.1                     |           |                 | D3FK60              |        |           |                              |                    |   |   |
|   |  | G1-5 | 3                       | DE3L20UA  |                 |                     |        |           |                              |                    |  |   |
|   |  |      | TO-277A similar<br>FY   | G4        | 5               |                     |        | D5FY60K   |                              |                    |   |   |
|   |  |      |                         |           | SC-63<br>E-pack | G1-5                | 5      |           |                              | DE5L60U<br>DE5L60A |   |   |
|  |  | H1-2 | 8                       |           |                 |                     |        | DF8L60US  |                              |                    |   |  |
|   |  |      | 10                      |           |                 | DF10L60             |        |           |                              |                    |   |   |
|   |  |      | 20                      |           |                 | DF20L60<br>DF20L60U |        |           |                              |                    |   |   |
|  | TO-252AA similar<br>FR                 | G5   | 10                      |           |                 | D10FR60LA           |        |           |                              |                    |  |   |
|   |  |      | 15                      |           |                 | D15FR60LA           |        |           |                              |                    |   |   |
|   |  |      | SC-83 similar<br>FD     | H2-1      | 8               |                     |        | D8FD60LUS |                              |                    |   |   |
| 20  |  |      |                         |           | D20FD60LU       |                     |        |           |                              |                    |   |   |
|  |  | H2-1 | 30                      |           |                 | D30FD60K            |        |           |                              |                    |   |   |

**N** : New product

| Axial   |  |      |               |         |         |                  |     |      |         |         |   |
|---|--|------|---------------|---------|---------|------------------|-----|------|---------|---------|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF(AV)<br>[A] | VRRM[V] |         |                  |     |      |         | Remarks |   |
|   |  |      |               | 200     | 400     | 600              | 700 | 1000 |         |         |   |
|  | AX057                                  | A1   | 0.8           |         |         | D1NF60<br>D1NK60 |     |      |         |         |   |
|   |  |      | 1             | D1NL20U | D1NL40U |                  |     |      | D1NK100 |         |   |
|  | AX078                                  | A4-1 | 1.5           | D2L20U  |         |                  |     |      |         |         |  |
|   |  |      | 2             |         | D2L40U  |                  |     |      |         |         |   |
|  | AX10                                   | A5-1 | 1.5           | S2L20U  |         | S2L60            |     |      |         |         |   |
|   |  |      | 2             |         | S2L40U  |                  |     |      | S2K100  |         |   |
|  | AX14                                   | A7   | 2.2           |         |         | S3L60            |     |      |         |         |   |
|   |  |      | 3             | S3L20U  | S3L40U  | S3K60            |     |      |         |         |   |

## Single

| Surface Mount                          |         |      |                         |                          |                   |                          |             |                            |                    |                         |                                |                      |            |        |                      |          |
|--|---------|------|-------------------------|--------------------------|-------------------|--------------------------|-------------|----------------------------|--------------------|-------------------------|--------------------------------|----------------------|------------|--------|----------------------|----------|
| JEDEC Code<br>JEITA Code<br>House Name | Package | Fig. | Type No.                | Absolute Maximum Ratings |                   |                          |             | Electrical Characteristics |                    |                         |                                | Based on<br>AEC-Q101 | Automotive | Series |                      |          |
|  |         |      |                         | VRRM<br>[V]              | IF<br>(AV)<br>[A] | Conditions<br>Tc<br>[°C] | IFSM<br>[A] | Tj<br>[°C]                 | Vf<br>(max)<br>[V] | Conditions<br>IF<br>[A] | Ir<br>(max)<br>Vr=VRRM<br>[μA] |                      |            |        | trr<br>(max)<br>[ns] |          |
| DO-219AA similar<br>M1F                | B2      |      | M1FK60                  | 600                      | 1                 | 116 *1                   | 15          | 150                        | 1.5                | 1                       | 10                             | 75                   | —          | ○      | K series             |          |
|  |         |      | M1FL20U                 | 200                      | 1.1               | 25 *2                    | 30          | 150                        | 0.98               | 1.1                     | 10                             | 35                   | ○          | ○      | —                    |          |
|  |         |      | M1FL40U                 | 400                      | 1.5               | 139                      | 30          | 175                        | 1.2                | 1                       | 10                             | 25                   | ■          | ○      | —                    |          |
| DO-214AC<br>1F                         | B3-1    |      | D1FK60                  | 600                      | 0.8               | 29 *2                    | 20          | 150                        | 1.3                | 0.8                     | 10                             | 75                   | ○          | ○      | K series             |          |
|  |         |      | D1FK70                  | 700                      | 0.8               | 32 *2                    | 25          | 150                        | 1.3                | 0.8                     | 10                             | 400                  | ○          | ○      | —                    |          |
|  |         |      | D1FK100                 | 1000                     | 1                 | 97 *1                    | 20          | 150                        | 2.1                | 1                       | 10                             | 75                   | ○          | ○      | K series             |          |
|  |         |      | <b>N</b> D1FK120P       | 1200                     | 1                 | 79 *1                    | 18          | -55 to 150                 | 3.0                | 1                       | 10                             | 85                   | ○          | ■      | ○                    | K series |
|  |         |      | D1FK120                 | 1200                     | 1                 | 75 *1                    | 20          | 150                        | 3.0                | 1                       | 10                             | 120                  | —          | ■      | ○                    | K series |
|  |         |      | D1FL20U                 | 200                      | 1.1               | 25 *2                    | 20          | 150                        | 0.98               | 1.1                     | 10                             | 35                   | ○          | ○      | —                    |          |
| SC-110B<br>CE                          | B5-1    |      | D3CE20LUS               | 200                      | 3                 | 105 *1                   | 60          | -55 to 150                 | 0.98               | 3                       | 10                             | 25                   | ○          | ○      | —                    |          |
|  |         |      | D3CE60K                 | 600                      | 3                 | 78 *1                    | 50          | 150                        | 1.45               | 3                       | 10                             | 80                   | ○          | ○      | K series             |          |
|  |         |      | DO-214AA similar<br>M2F | B6                       |                   | M2FL20U                  | 200         | 1.5                        | 31 *2              | 50                      | 150                            | 0.92                 | 1.5        | 10     | 35                   | —        |
| M3FL20U                                | 200     | 3    |                         |                          |                   | 75 *1                    | 75          | 150                        | 0.95               | 3                       | 10                             | 35                   | ○          | ○      | —                    |          |
|  | B9-1    |      |                         |                          |                   | D2FL40                   | 400         | 1.3                        | 25 *2              | 40                      | 150                            | 1.3                  | 1.3        | 10     | 50                   | —        |
|  |         |      | D2FL20U                 | 200                      | 1.5               | 25 *2                    | 50          | 150                        | 0.98               | 1.5                     | 10                             | 35                   | ○          | ○      | —                    |          |
|  |         |      | D2FK60                  | 600                      | 1.5               | 101 *1                   | 40          | 150                        | 1.3                | 1.5                     | 10                             | 75                   | —          | ○      | K series             |          |
| SC-63<br>E-pack                        | G1-5    |      | D3FK60                  | 600                      | 2.1               | 93 *1                    | 120         | 150                        | 1.2                | 2.1                     | 10                             | 75                   | —          | ○      | K series             |          |
|  |         |      | DE3L20UA                | 200                      | 3                 | 137                      | 60          | 150                        | 0.98               | 3                       | 10                             | 35                   | —          | ■      | —                    |          |
|  |         |      | DE5L60U                 | 600                      | 5                 | 91                       | 60          | 150                        | 3.0                | 5                       | 25                             | 25                   | —          | —      | —                    |          |
| DE5L60A                                | 600     | 5    | 119                     | 60                       | 150               | 2.0                      | 5           | 10                         | 50                 | —                       | ■                              | —                    |            |        |                      |          |
| TO-277A similar<br>FY                  | G4      |      | D5FY60K                 | 600                      | 5                 | 130 *1                   | 200         | -55 to 150                 | 1.25               | 5                       | 10                             | 95                   | —          | ■      | K series             |          |
| SC-83 similar<br>STO-220               | H1-2    |      | DF8L60US                | 600                      | 8                 | 66                       | 60          | 150                        | 3.6                | 8                       | 50                             | 25                   | —          | —      | US series            |          |
|  |         |      | DF10L60                 | 600                      | 10                | 105                      | 100         | 150                        | 1.9                | 10                      | 10                             | 50                   | —          | —      | —                    |          |
|  |         |      | DF20L60                 | 600                      | 20                | 84                       | 170         | 150                        | 1.9                | 20                      | 25                             | 70                   | —          | —      | —                    |          |
|  |         |      | DF20L60U                | 600                      | 20                | 93                       | 160         | 150                        | 3.0                | 20                      | 25                             | 35                   | —          | —      | —                    |          |
| TO-252AA similar<br>FR                 | G5      |      | D10FR60LA               | 600                      | 10                | 110                      | 140         | -55 to 150                 | 2.1                | 10                      | 10                             | 28                   | ○          | ○      | A series             |          |
|  |         |      | D15FR60LA               | 600                      | 15                | 95                       | 220         | -55 to 150                 | 2.1                | 15                      | 10                             | 30                   | ○          | ○      | A series             |          |
| SC-83 similar<br>FD                    | H2-1    |      | D8FD60LUS               | 600                      | 8                 | 120                      | 60          | 175                        | 3.6                | 8                       | 50                             | 25                   | —          | ○      | US series            |          |
|  |         |      | D20FD60LU               | 600                      | 20                | 93                       | 160         | 150                        | 3.0                | 20                      | 25                             | 35                   | ○          | ○      | —                    |          |
|  |         |      | D30FD60K                | 600                      | 30                | 102                      | 300         | 150                        | 1.7                | 30                      | 10                             | 95                   | —          | ■      | K series             |          |


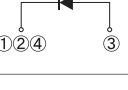
**N** : New product \*1 : Tl \*2 : Ta ■ : Please contact us.

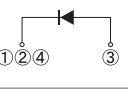
| Axial                                  |         |      |          |                          |                   |                          |             |                            |                    |                         |                                |                      |            |        |                      |
|--|---------|------|----------|--------------------------|-------------------|--------------------------|-------------|----------------------------|--------------------|-------------------------|--------------------------------|----------------------|------------|--------|----------------------|
| JEDEC Code<br>JEITA Code<br>House Name | Package | Fig. | Type No. | Absolute Maximum Ratings |                   |                          |             | Electrical Characteristics |                    |                         |                                | Based on<br>AEC-Q101 | Automotive | Series |                      |
|  |         |      |          | VRRM<br>[V]              | IF<br>(AV)<br>[A] | Conditions<br>Ta<br>[°C] | IFSM<br>[A] | Tj<br>[°C]                 | Vf<br>(max)<br>[V] | Conditions<br>IF<br>[A] | Ir<br>(max)<br>Vr=VRRM<br>[μA] |                      |            |        | trr<br>(max)<br>[ns] |
|  | AX057   | A1   | D1NF60   | 600                      | 0.8               | 25                       | 50          | 150                        | 1.3                | 0.8                     | 10                             | 400                  | —          | —      | —                    |
|  |         |      | D1NK60   | 600                      | 0.8               | 26                       | 35          | 150                        | 1.3                | 0.8                     | 10                             | 75                   | —          | —      | K series             |
|  |         |      | D1NL20U  | 200                      | 1                 | 25                       | 25          | 150                        | 0.98               | 1                       | 10                             | 35                   | —          | —      | —                    |
|  |         |      | D1NL40U  | 400                      | 1                 | 137 *1                   | 50          | 150                        | 1.25               | 1                       | 10                             | 25                   | —          | —      | —                    |
|  | AX078   | A4-1 | D2L20U   | 200                      | 1.5               | 125 *1                   | 40          | 150                        | 0.98               | 1.5                     | 10                             | 35                   | —          | —      | —                    |
|  |         |      | D2L40U   | 400                      | 2                 | 108 *1                   | 80          | 150                        | 1.25               | 2                       | 10                             | 35                   | —          | —      | —                    |
|  | AX10    | A5-1 | S2L20U   | 200                      | 1.5               | 25                       | 50          | 150                        | 0.98               | 1.5                     | 10                             | 35                   | —          | —      | —                    |
|  |         |      | S2L60    | 600                      | 1.5               | 125 *1                   | 50          | 150                        | 1.5                | 1.5                     | 10                             | 50                   | —          | —      | —                    |
|  |         |      | S2L40U   | 400                      | 2                 | 120 *1                   | 100         | 150                        | 1.25               | 2                       | 10                             | 35                   | —          | —      | —                    |
|  | AX14    | A7   | S2K100   | 1000                     | 2                 | 91 *1                    | 65          | 150                        | 2.1                | 2                       | 10                             | 75                   | —          | —      | K series             |
|  |         |      | S3L60    | 600                      | 2.2               | 132 *1                   | 60          | 150                        | 1.5                | 2.2                     | 10                             | 50                   | —          | —      | —                    |
|  |         |      | S3L20U   | 200                      | 3                 | 128 *1                   | 60          | 150                        | 0.98               | 2.1                     | 10                             | 35                   | —          | —      | —                    |
|  |         |      | S3L40U   | 400                      | 3                 | 126 *1                   | 150         | 150                        | 1.25               | 3                       | 10                             | 35                   | —          | —      | —                    |
| S3K60                                  | 600     | 3    | 123 *1   | 120                      | 150               | 1.3                      | 3           | 10                         | 100                | —                       | —                              | —                    | K series   |        |                      |

\*1 : Tl


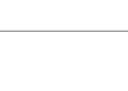
# FAST RECOVERY DIODES

## Single

| Two Terminal Type   |  |            |                           |                      |            |   |   |
|---|--|------------|---------------------------|----------------------|------------|---|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig.       | I <sub>F(AV)</sub><br>[A] | V <sub>RRM</sub> [V] |            |   | Remarks   |
|   |  |            |                           | 200                  | 400        | 600   |   |
| <br>28.5 × 10.0 × 4.5(mm) | —<br>SC-91A<br>FTO-220                 | J1         | 3                         |                      |            | SF3L60U   |  |
|   |  |            | 5                         |                      |            | SF5L60U   |   |
|   |  |            | 10                        |                      |            | SF10L60U  |   |
|   |  |            | 20                        |                      |            | SF20L60U  |   |
|   |  |            | 3                         |                      |            | SF3K60M   |   |
| <br>28.5 × 10.0 × 4.5(mm) | —<br>SC-91<br>FTO-220AG                | J3         | 5                         |                      | SF5L40UM   |  |   |
|   |  |            | 8                         |                      | SF8K60M    |   |   |
|   |  |            | 10                        |                      | SF10K60M   |   |   |
|   |  |            | 10                        |                      | SF10L60MVM |   |   |
|   |  |            | 10                        |                      | SF10L60MSM |   |   |
|   |  |            | 20                        |                      | SF20K60M   |   |   |
|   |  |            | 20                        |                      | SF20L60MVM |   |   |
| 20  |  | SF20L60MSM |                           |                      |            |   |   |
| <br>28.5 × 10.0 × 4.5(mm) | —<br>SC-91<br>FTO-220G                 | J4         | 5                         | SG5L20USM            |            |   |  |
|   |  |            | 10                        | SG10L20USM           |            |   |   |
| <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>—<br>MTO-3PT               | K2         | 20                        |                      |            | S20K60T   |  |
|   |  |            | 30                        |                      |            | S30K60T   |   |

| Three Terminal Type   |  |      |                           |                      |          |      |   |
|---|--|------|---------------------------|----------------------|----------|------|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub><br>[A] | V <sub>RRM</sub> [V] |          |      | Remarks   |
|   |  |      |                           | 600                  | 1000     | 1200 |   |
| <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>—<br>MTO-3PV               | K6   | 20                        |                      | S20K100V |      |  |
|   |  |      | 30                        | S30K60V              | S30K100V |      |   |

## Center Tap, Common Cathode

| Surface Mount   |  |      |                           |                      |          |     |     |   |
|---|--|------|---------------------------|----------------------|----------|-----|-----|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub><br>[A] | V <sub>RRM</sub> [V] |          |     |     | Remarks   |
|   |  |      |                           | 200                  | 300      | 400 | 600 |   |
| <br>9.5 × 6.6 × 2.65(mm)  | —<br>SC-63<br>E-pack                   | G1-1 | 5                         | DE5LC20U             |          |     |     |  |
| <br>13.2 × 10.2 × 4.7(mm) | —<br>SC-83 similar<br>STO-220          | H1-1 | 10                        | DF10LC20U            | DF10LC30 |     |     |  |
|   |  |      | 20                        | DF20LC20US           | DF20LC30 |     |     |   |
| <br>13.2 × 10.2 × 4.6(mm) | —<br>SC-83 similar<br>FD               | H2-2 | 20                        | D20FDC20L            |          |     |     |  |
|   |  |      |                           | D20FDC20LUS          |          |     |     |   |

## Single

| Two Terminal Type                      |      |            |                          |                           |                                      |                         |                        |                                |                                     |   |                                  |                      |            |           |
|--|------|------------|--------------------------|---------------------------|--------------------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|----------------------------------|----------------------|------------|-----------|
| Package                                |      | Type No.   | Absolute Maximum Ratings |                           |                                      |                         |                        | Electrical Characteristics     |                                     |   |                                  | Based on<br>AEC-Q101 | Automotive | Series    |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |            | V <sub>RRM</sub><br>[V]  | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | T <sub>J</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[μA] | t <sub>rr</sub><br>(max)<br>[ns] |                      |            |           |
| —<br>SC-91A<br>FTO-220                 | J1   | SF3L60U    | 600                      | 3                         | 115                                  | 40                      | 150                    | 3.00                           | 3                                   | 25  | 20                               | —                    | —          | —         |
|  |      | SF5L60U    | 600                      | 5                         | 96                                   | 60                      | 150                    | 3.00                           | 5                                   | 25  | 25                               | —                    | —          | —         |
|  |      | SF10L60U   | 600                      | 10                        | 85                                   | 120                     | 150                    | 3.00                           | 10                                  | 25  | 25                               | —                    | ■          | —         |
|  |      | SF20L60U   | 600                      | 20                        | 68                                   | 180                     | 150                    | 3.00                           | 20                                  | 25  | 35                               | —                    | ■          | —         |
| —<br>SC-91<br>FTO-220AG                | J3   | SF3K60M    | 600                      | 3                         | 132                                  | 90                      | 150                    | 1.45                           | 3                                   | 10  | 80                               | —                    | —          | K series  |
|  |      | SF5L40UM   | 400                      | 5                         | 121                                  | 100                     | 150                    | 1.25                           | 5                                   | 10  | 30                               | —                    | ■          | —         |
|  |      | SF5K60M    | 600                      | 5                         | 119                                  | 120                     | 150                    | 1.50                           | 5                                   | 10  | 85                               | —                    | ■          | K series  |
|  |      | SF8K60USM  | 600                      | 8                         | 70                                   | 60                      | 150                    | 3.60                           | 8                                   | 50  | 25                               | —                    | —          | US series |
|  |      | SF8K60M    | 600                      | 8                         | 108                                  | 150                     | 150                    | 1.50                           | 8                                   | 10  | 90                               | —                    | ■          | K series  |
|  |      | SF10K60M   | 600                      | 10                        | 106                                  | 180                     | 150                    | 1.50                           | 10                                  | 10  | 95                               | —                    | —          | K series  |
|  |      | SF10L60MVM | 600                      | 10                        | 119                                  | 200                     | 150                    | 1.10                           | 10                                  | 10  | 115                              | —                    | —          | ML series |
|  |      | SF10L60MSM | 600                      | 10                        | 110                                  | 160                     | 150                    | 1.37                           | 10                                  | 10  | 60                               | —                    | —          | ML series |
|  |      | SF20K60M   | 600                      | 20                        | 96                                   | 240                     | 150                    | 1.50                           | 20                                  | 10  | 95                               | —                    | —          | K series  |
|  |      | SF20L60MVM | 600                      | 20                        | 106                                  | 250                     | 150                    | 1.10                           | 20                                  | 10  | 130                              | —                    | —          | ML series |
| SF20L60MSM                             | 600  | 20         | 96                       | 220                       | 150                                  | 1.37                    | 20                     | 10                             | 70                                  | —   | —                                | ML series            |            |           |
| —<br>SC-91<br>FTO-220G                 | J4   | SG5L20USM  | 200                      | 5                         | 125                                  | 90                      | 150                    | 0.96                           | 5                                   | 10  | 25                               | —                    | —          | —         |
|  |      | SG10L20USM | 200                      | 10                        | 101                                  | 200                     | 150                    | 0.96                           | 10                                  | 10  | 25                               | —                    | —          | —         |
| TO-247AD<br>—<br>MTO-3PT               | K2   | S20K60T    | 600                      | 20                        | 121                                  | 300                     | 150                    | 1.50                           | 20                                  | 10  | 95                               | —                    | —          | K series  |
|  |      | S30K60T    | 600                      | 30                        | 123                                  | 450                     | 150                    | 1.50                           | 30                                  | 10  | 100                              | —                    | —          | K series  |

■ : Please contact us.

| Three Terminal Type                    |      |          |                          |                           |                                      |                         |                        |                                |                                     |   |                                  |                      |            |          |
|--|------|----------|--------------------------|---------------------------|--------------------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|----------------------------------|----------------------|------------|----------|
| Package                                |      | Type No. | Absolute Maximum Ratings |                           |                                      |                         |                        | Electrical Characteristics     |                                     |   |                                  | Based on<br>AEC-Q101 | Automotive | Series   |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | V <sub>RRM</sub><br>[V]  | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | T <sub>J</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[μA] | t <sub>rr</sub><br>(max)<br>[ns] |                      |            |          |
| TO-247AD<br>—<br>MTO-3PV               | K6   | S20K100V | 1000                     | 20                        | 127                                  | 550                     | 150                    | 2.10                           | 20                                  | 10  | 120                              | —                    | ○          | K series |
|  |      | S30K60V  | 600                      | 30                        | 108                                  | 450                     | 150                    | 1.50                           | 30                                  | 10  | 100                              | —                    | ○          | K series |
|  |      | S30K100V | 1000                     | 30                        | 116                                  | 600                     | 150                    | 2.10                           | 30                                  | 10  | 120                              | —                    | ○          | K series |

## Center Tap, Common Cathode


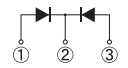




| Surface Mount                          |      |            |                          |                           |                                      |                         |                        |                                |                                     |   |                                  |                      |            |        |
|--|------|------------|--------------------------|---------------------------|--------------------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|----------------------------------|----------------------|------------|--------|
| Package                                |      | Type No.   | Absolute Maximum Ratings |                           |                                      |                         |                        | Electrical Characteristics     |                                     |   |                                  | Based on<br>AEC-Q101 | Automotive | Series |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |            | V <sub>RRM</sub><br>[V]  | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | T <sub>J</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[μA] | t <sub>rr</sub><br>(max)<br>[ns] |                      |            |        |
| —<br>SC-63<br>E-pack                   | G1-1 | DE5LC20U   | 200                      | 5                         | 81                                   | 50                      | 150                    | 0.98                           | 2.5                                 | 10  | 35                               | —                    | ■          | —      |
| —<br>SC-83 similar<br>STO-220          | H1-1 | DF10LC20U  | 200                      | 10                        | 127                                  | 80                      | 150                    | 0.98                           | 5                                   | 10  | 35                               | —                    | —          | —      |
|  |      | DF10LC30   | 300                      | 10                        | 124                                  | 80                      | 150                    | 1.30                           | 5                                   | 25  | 30                               | —                    | —          | —      |
|  |      | DF20LC20US | 200                      | 20                        | 125                                  | 180                     | 150                    | 0.96                           | 10                                  | 10  | 25                               | —                    | —          | —      |
| —<br>SC-83 similar<br>FD               | H2-2 | DF20LC30   | 300                      | 20                        | 124                                  | 180                     | 150                    | 1.30                           | 10                                  | 25  | 30                               | —                    | —          | —      |
|  |      | D20FDC20L  | 200                      | 20                        | 113                                  | 100                     | 175                    | 1.20                           | 10                                  | 10  | 30                               | ○                    | ○          | —      |
| D20FDC20LUS                            | 200  | 20         | 125                      | 180                       | 150                                  | 0.96                    | 10                     | 10                             | 25                                  | —   | ○                                | —                    |            |        |

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# FAST RECOVERY DIODES

## Center Tap, Common Cathode

### Three Terminal Type

| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub><br>[A] | V <sub>RRM</sub> [V] |            |                        |   | Remarks   |
|--|--|------|---------------------------|----------------------|------------|------------------------|---|---|
|  |  |      |                           | 200                  | 300        | 400                    | 600   |   |
| <br>28.5 × 10.0 × 4.5(mm) | —<br>SC-91<br>FTO-220AG                | J8-1 | 5                         |                      |            | SF5LC40UM              |  |   |
|  |  |      | 10                        |                      |            | SF10LC40UM             |   |   |
|  |  |      | 20                        |                      | SF20LC30M  | SF10KC60M<br>SF20KC60M |   |   |
| <br>28.5 × 10.0 × 4.5(mm) | —<br>SC-91<br>FTO-220G                 | J9   | 5                         | SG5LC20USM           |            |                        |   |   |
|  |  |      | 10                        | SG10LC20USM          |            |                        |   |   |
|  |  |      | 20                        | SG20LC20USM          |            |                        |   |   |
| <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>—<br>MTO-3PT               | K5-2 | 20                        | S20LC20UST           | S20LC30T   | S20LC40UT              | S20LC60UST  |  |
|  |  |      |                           | S20LC40UV            | S20LC60USV |                        |   |   |
| <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>—<br>MTO-3PV               | K7-1 | 20                        |                      |            | S20LC40UV              | S20LC60USV  |   |

## Center Tap, Common Cathode

### Three Terminal Type

| JEDEC Code<br>JEITA Code<br>House Name | Package | Fig. | Type No.    | Absolute Maximum Ratings |                           |                                      |                         | Electrical Characteristics |                                |                                     |   | Based on<br>AEC-Q101 | Automotive | Series |                                  |
|--|---------|------|-------------|--------------------------|---------------------------|--------------------------------------|-------------------------|----------------------------|--------------------------------|-------------------------------------|---|----------------------|------------|--------|----------------------------------|
|  |         |      |             | V <sub>RRM</sub><br>[V]  | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | T <sub>J</sub><br>[°C]     | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[μA] |                      |            |        | t <sub>rr</sub><br>(max)<br>[ns] |
| —<br>SC-91<br>FTO-220AG                | J8-1    |      | SF5LC40UM   | 400                      | 5                         | 132                                  | 80                      | 150                        | 1.25                           | 2.5                                 | 10  | 30                   | —          | —      | —                                |
|  |         |      | SF10LC40UM  | 400                      | 10                        | 120                                  | 100                     | 150                        | 1.25                           | 5                                   | 10  | 30                   | —          | —      | —                                |
|  |         |      | SF10KC60M   | 600                      | 10                        | 109                                  | 120                     | 150                        | 1.50                           | 5                                   | 10  | 85                   | —          | ■      | K series                         |
|  |         |      | SF20LC30M   | 300                      | 20                        | 107                                  | 250                     | 150                        | 1.30                           | 10                                  | 25  | 30                   | —          | —      | —                                |
| —<br>SC-91<br>FTO-220G                 | J9      |      | SF20KC60M   | 600                      | 20                        | 97                                   | 180                     | 150                        | 1.50                           | 10                                  | 10  | 95                   | —          | ■      | K series                         |
|  |         |      | SG5LC20USM  | 200                      | 5                         | 133                                  | 70                      | 150                        | 0.96                           | 2.5                                 | 10  | 25                   | —          | —      | —                                |
|  |         |      | SG10LC20USM | 200                      | 10                        | 122                                  | 90                      | 150                        | 0.96                           | 5                                   | 10  | 25                   | —          | —      | —                                |
| TO-247AD<br>—<br>MTO-3PT               | K5-2    |      | SG20LC20USM | 200                      | 20                        | 95                                   | 150                     | 150                        | 0.96                           | 10                                  | 10  | 25                   | —          | —      | —                                |
|  |         |      | S20LC20UST  | 200                      | 20                        | 126                                  | 120                     | 150                        | 0.96                           | 10                                  | 10  | 25                   | —          | —      | —                                |
|  |         |      | S20LC30T    | 300                      | 20                        | 124                                  | 220                     | 150                        | 1.30                           | 10                                  | 25  | 30                   | —          | —      | —                                |
|  |         |      | S20LC40UT   | 400                      | 20                        | 123                                  | 130                     | 150                        | 1.25                           | 10                                  | 10  | 30                   | —          | —      | —                                |
| TO-247AD<br>—<br>MTO-3PV               | K7-1    |      | S20LC60UST  | 600                      | 20                        | 63                                   | 60                      | 150                        | 3.60                           | 10                                  | 50  | 25                   | —          | —      | —                                |
|  |         |      | S20LC40UV   | 400                      | 20                        | 123                                  | 200                     | 150                        | 1.25                           | 10                                  | 10  | 30                   | —          | ○      | —                                |
|  |         |      | S20LC60USV  | 600                      | 20                        | 65                                   | 60                      | 150                        | 3.60                           | 10                                  | 50  | 25                   | —          | ○      | —                                |



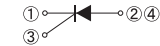



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# THYRISTORS

The Thyristor, in its normal state, will block an applied voltage in either direction, but when an appropriate current pulse is applied to the gate, current will flow through the anode to the cathode thus turning on power to the load circuit.  
 The Thyristor has a planar passivation, and is available in both the general reverse-blocking type and the type without reverse voltage.  
 The Thyristor without reverse voltage is suitable for a circuit limiting inrush current.

## Thyristors

| Package                                |  10.0 × 6.6 × 2.3(mm) |  28.5 × 10.0 × 4.5(mm) |                                     |  |
|--|--|---|-------------------------------------|--|
| JEDEC Code<br>JEITA Code<br>House Name | TO-252AA<br>—<br>FB  | —<br>SC-91<br>FTO-220AG   |                                     |  |
| Fig.                                   | G2-2   | J8-5  |                                     |  |
| Internal Circuit                       |                       |                        |                                     |  |
| $I_T(AV)$ [A]                          | 3  | 5   | 5                                   | 8  |
| $V_{DRM}$ [V]                          | 400  | KC3FB40H  | KC5FB40H                            |  |
|  | 600  |   | KC5FB60H<br>KC5FB60HR<br>KC5FB60HRT |  KC5SF60HRT |
|  | 800  |   |                                     |  KC8SF80  |

 : New product

## Thyristors

| Package<br>JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No.   | Absolute Maximum Ratings |                  |                      |                             |                  |               | Electrical Characteristics |                               |                          |                           |                        | Based on<br>AEC-Q101 | Automotive |
|---|------|--|--------------------------|------------------|----------------------|-----------------------------|------------------|---------------|----------------------------|-------------------------------|--------------------------|---------------------------|------------------------|----------------------|------------|
|   |      |  | $V_{DRM}$<br>[V]         | $V_{RRM}$<br>[V] | $I_T$<br>(AV)<br>[A] | Conditions<br>$T_c$<br>[°C] | $I_{TSM}$<br>[A] | $T_j$<br>[°C] | $V_{TM}$<br>(max)<br>[V]   | Conditions<br>$I_{TM}$<br>[A] | $V_{GT}$<br>(max)<br>[V] | $I_{GT}$<br>(max)<br>[μA] | $I_H$<br>(max)<br>[mA] |                      |            |
| TO-252AA<br>—<br>FB                               | G2-2 | KC3FB40H   | 400                      | 400              | 3                    | 111                         | 40               | -40 to 125    | 1.4                        | 4                             | 0.8                      | 100                       | 5                      | —                    | —          |
|   |      | KC5FB40H   | 400                      | 400              | 5                    | 101                         | 65               | -40 to 125    | 1.6                        | 10                            | 0.8                      | 200                       | typ.1                  | —                    | —          |
|   |      | KC5FB60H   | 600                      | 600              | 5                    | 98                          | 90               | -40 to 125    | 1.8                        | 15                            | 0.8                      | 100                       | 5                      | —                    | —          |
|   |      | KC5FB60HR  | 600                      | —                | 5                    | 98                          | 90               | -40 to 125    | 1.8                        | 15                            | 0.8                      | 100                       | 5                      | —                    | —          |
| —<br>SC-91<br>FTO-220AG                           | J8-5 |  KC5SF60HRT | 600                      | —                | 5                    | 127                         | 82               | -40 to 150    | 1.8                        | 15                            | 0.8                      | 100                       | 5                      | —                    | —          |
|   |      |  KC8SF80    | 800                      | 800              | 8                    | 130                         | 120              | -40 to 150    | 1.5                        | 20                            | 1.0                      | 15mA                      | 100                    | —                    | —          |

 : New product




# SIDACs

SIDAC series are semiconductor devices energized by the addition of a specific voltage. They are commonly used for switching devices or pulse generating devices.

## Bi-directional (K1V series)

- Features
  1. Symmetrical characteristics.
  2. Operating directly from the AC mains, and can be used in all kinds of pulse generating circuits.
  3. The glass passivation ensures high reliability.




- Applications
  1. Pulse generation : gas igniters,HID(high intensity discharge)lamp drive circuit,etc.
  2. AC switching : drive circuit for switching power supplies,voltage detecting circuits,etc.
  3. Over voltage protection : AC line surge protection,capacitor rupture prevention,etc.

| Package              |  |  |  |
|----------------------|---|---|---|
| JEDEC Code           | DO-214AC  | -   | -   |
| JEITA Code           | -   | -   | -   |
| House Name           | 1F  | AX06  | AX10  |
| Fig.                 | B4-3  | A2-1  | A5-3  |
| Internal Circuit     | ①—N—②   |   |   |
| V <sub>DRM</sub> [V] | 5   | K1VZL09   |   |
|                      | 15  | K1VZL20   |   |
|                      | 90  |   | K1V(A)10<br>K1V(A)11<br>K1V(A)12  |
|                      | 115   |   | K1V(A)16  |
|                      | 180   |   | K1V22<br>K1V24<br>K1V26   |
|                      | 270   |   | K1V22(W)<br>K1V24(W)<br>K1V26(W)<br>K1V36(W)<br>K1V38(W)                            |

## Uni-directional (G1V series)

- Features
  1. Uni-directional characteristics.
  2. Smaller package than bi-directional SIDAC.
  3. Switching operation from DC power for pulse generation.
  4. The glass passivation ensures high reliability.

- Applications
  1. Pulse generation : gas igniters,negative ion generators, HID(high intensity discharge) lamp drive circuit,etc.
  2. Over voltage protection : DC line surge protection.

| Package                 |  |  |  |
|-------------------------|---|---|---|
| JEDEC Code              | DO-214AC  | -   | -   |
| JEITA Code              | -   | -   | -   |
| House Name              | 1F  | AX06  | AX078   |
| Fig.                    | B3-3  | A2-3  | A4-3  |
| Internal Circuit        | ①—N—②   |   |   |
| V <sub>DRM(A)</sub> [V] | 70  | G1VL8C  | G1V(A)8C  |
|                         | 90  | G1VL10C   | G1V(A)10C   |
|                         | 100   |   | G1V(A)12C   |
|                         | 110   |   | G1V(A)13C   |
|                         | 115   |   | G1V(A)15C   |
|                         | 120   | G1VL15C   | G1V(A)14C   |
|                         | 170   | G1VL20C   | G1V(A)20C   |
|                         | 190   | G1VL22C<br>G1VL24C  |   |
|                         | 210   |   | G1V(B)20C<br>G1V(B)22C<br>G1V(B)24C   |

## Bi-directional (K1V series)

| Surface Mount |            | Type No. | Absolute Maximum Ratings |                     |            |                  |                | Electrical Characteristics |                    |            |                 |                | Automotive         |                |            |
|---------------|------------|----------|--------------------------|---------------------|------------|------------------|----------------|----------------------------|--------------------|------------|-----------------|----------------|--------------------|----------------|------------|
| JEDEC Code    | Fig.       |          | V <sub>DRM</sub>         | I <sub>T</sub>      | Conditions | T <sub>stg</sub> | T <sub>J</sub> | V <sub>BO</sub>            | I <sub>DRM</sub>   | Conditions | I <sub>BO</sub> | I <sub>H</sub> |                    | V <sub>T</sub> | Conditions |
| JEITA Code    | House Name | [V]      | [A]                      | T <sub>L</sub> [°C] | [°C]       | [°C]             | [V]            | [μA]                       | V <sub>D</sub> [V] | [mA]       | [mA]            | [V]            | I <sub>T</sub> [A] |                |            |
| DO-214AC      | B4-3       | K1VZL09  | 5                        | 0.5                 | 110        | -40 to 125       | 125            | 8 to 12                    | 5                  | 5          | 20              | 20             | 1.2                | 0.5            | -          |
| 1F            |            | K1VZL20  | 15                       | 0.5                 | 110        | -40 to 125       | 125            | 18 to 22                   | 5                  | 15         | 20              | 20             | 1.2                | 0.5            | -          |

| Axial      |            | Type No. | Absolute Maximum Ratings |                     |            |                  |                  |            |        | Electrical Characteristics |                 |                |                    |            | Automotive |                |
|------------|------------|----------|--------------------------|---------------------|------------|------------------|------------------|------------|--------|----------------------------|-----------------|----------------|--------------------|------------|------------|----------------|
| JEDEC Code | Fig.       |          | V <sub>DRM</sub>         | I <sub>T</sub>      | Conditions | I <sub>TSM</sub> | I <sub>TRM</sub> | Conditions | dit/dt | T <sub>J</sub>             | V <sub>BO</sub> | I <sub>H</sub> | V <sub>T</sub>     | Conditions |            | R <sub>S</sub> |
| JEITA Code | House Name | [V]      | [A]                      | T <sub>L</sub> [°C] | [A]        | [A]              | f [Hz]           | [A/μs]     | [°C]   | [V]                        | [mA]            | [V]            | I <sub>T</sub> [A] | [kΩ]       |            |                |
| -          | AX06       | K1V(A)10 | 90                       | 1                   | 109        | 16               | 60               | 60         | 50     | 125                        | 95 to 113       | 50             | 1.6                | 1          | 0.1        | -              |
|            |            | K1V(A)11 | 90                       | 1                   | 109        | 16               | 60               | 60         | 50     | 125                        | 104 to 118      | 50             | 1.6                | 1          | 0.1        | -              |
|            |            | K1V(A)12 | 90                       | 1                   | 109        | 16               | 60               | 60         | 50     | 125                        | 110 to 125      | 50             | 1.6                | 1          | 0.1        | -              |
|            |            | K1V(A)16 | 115                      | 1                   | 98         | 16               | 60               | 60         | 50     | 125                        | 145 to 170      | 50             | 1.6                | 1          | 0.1        | -              |
| -          | A5-3       | K1V10    | 90                       | 1                   | 112        | 20               | 80               | 60         | 80     | 125                        | 95 to 113       | 50             | 1.5                | 1          | 0.1        | -              |
|            |            | K1V11    | 90                       | 1                   | 112        | 20               | 80               | 60         | 80     | 125                        | 104 to 118      | 50             | 1.5                | 1          | 0.1        | -              |
|            |            | K1V12    | 90                       | 1                   | 112        | 20               | 80               | 60         | 80     | 125                        | 110 to 125      | 50             | 1.5                | 1          | 0.1        | -              |
|            |            | K1V14    | 115                      | 1                   | 109        | 20               | 80               | 60         | 80     | 125                        | 125 to 150      | 30             | 1.5                | 1          | 0.1        | -              |
|            |            | K1V22    | 180                      | 1                   | 108        | 20               | 50               | 60         | 80     | 125                        | 200 to 230      | 20             | 1.5                | 1          | 0.1        | -              |
|            |            | K1V24    | 180                      | 1                   | 108        | 20               | 50               | 60         | 80     | 125                        | 220 to 250      | 20             | 1.5                | 1          | 0.1        | -              |
|            | AX10       | K1V26    | 180                      | 1                   | 108        | 20               | 50               | 60         | 80     | 125                        | 240 to 270      | 20             | 1.5                | 1          | 0.1        | -              |
|            |            | K1V22(W) | 180                      | 1                   | 91         | 16               | 50               | 60         | 80     | 125                        | 200 to 230      | 50             | 3                  | 1          | 0.1        | -              |
|            |            | K1V24(W) | 180                      | 1                   | 91         | 16               | 50               | 60         | 80     | 125                        | 220 to 250      | 50             | 3                  | 1          | 0.1        | -              |
|            |            | K1V26(W) | 180                      | 1                   | 91         | 16               | 50               | 60         | 80     | 125                        | 240 to 265      | 50             | 3                  | 1          | 0.1        | -              |
|            |            | K1V36(W) | 270                      | 1                   | 92         | 13               | 40               | 60         | 50     | 125                        | 340 to 380      | 50             | 3                  | 1          | 0.1        | -              |
|            |            | K1V38(W) | 270                      | 1                   | 92         | 13               | 40               | 60         | 80     | 125                        | 360 to 400      | 50             | 3                  | 1          | 0.1        | -              |

## Uni-directional (G1V series)

| Surface Mount |            | Type No. | Absolute Maximum Ratings |                     |            |                  |            | Electrical Characteristics |                |                 |                |                    | Automotive |            |
|---------------|------------|----------|--------------------------|---------------------|------------|------------------|------------|----------------------------|----------------|-----------------|----------------|--------------------|------------|------------|
| JEDEC Code    | Fig.       |          | V <sub>DRM(A)</sub>      | I <sub>T</sub>      | Conditions | I <sub>TRM</sub> | Conditions | dit/dt                     | T <sub>J</sub> | V <sub>BO</sub> | I <sub>H</sub> | V <sub>T</sub>     |            | Conditions |
| JEITA Code    | House Name | [V]      | [A]                      | T <sub>L</sub> [°C] | [A]        | f [Hz]           | [A/μs]     | [°C]                       | [V]            | [mA]            | [V]            | I <sub>T</sub> [A] |            |            |
| DO-214AC      | 1F         | G1VL8C   | 70                       | 1                   | 98         | 80               | 60         | 150                        | 125            | 75 to 90        | 100            | 1.5                | 1          | -          |
|               |            | G1VL10C  | 90                       | 1                   | 98         | 150              | 60         | 150                        | 125            | 95 to 110       | 100            | 1.5                | 1          | -          |
|               |            | G1VL15C  | 120                      | 1                   | 98         | 120              | 60         | 150                        | 125            | 142 to 157      | 60             | 1.5                | 1          | -          |
|               |            | G1VL20C  | 170                      | 1                   | 98         | 120              | 60         | 150                        | 125            | 190 to 210      | 60             | 1.5                | 1          | -          |
|               |            | G1VL22C  | 190                      | 1                   | 98         | 280              | 5          | 150                        | 125            | 210 to 230      | 60             | 1.5                | 1          | -          |
|               |            | G1VL24C  | 190                      | 1                   | 98         | 280              | 5          | 150                        | 150            | 230 to 250      | 60             | 1.5                | 1          | -          |

| Axial      |            | Type No.  | Absolute Maximum Ratings |                     |            |                  |            | Electrical Characteristics |                |                 |                |                    | Automotive |            |
|------------|------------|-----------|--------------------------|---------------------|------------|------------------|------------|----------------------------|----------------|-----------------|----------------|--------------------|------------|------------|
| JEDEC Code | Fig.       |           | V <sub>DRM(A)</sub>      | I <sub>T</sub>      | Conditions | I <sub>TRM</sub> | Conditions | dit/dt                     | T <sub>J</sub> | V <sub>BO</sub> | I <sub>H</sub> | V <sub>T</sub>     |            | Conditions |
| JEITA Code | House Name | [V]       | [A]                      | T <sub>L</sub> [°C] | [A]        | f [Hz]           | [A/μs]     | [°C]                       | [V]            | [mA]            | [V]            | I <sub>T</sub> [A] |            |            |
| -          | AX06       | G1V(A)8C  | 70                       | 1                   | 98         | 80               | 60         | 80                         | 125            | 75 to 90        | 100            | 1.5                | 1          | -          |
|            |            | G1V(A)10C | 90                       | 1                   | 98         | 80               | 60         | 80                         | 125            | 95 to 110       | 60             | 1.5                | 1          | -          |
|            |            | G1V(A)12C | 100                      | 1                   | 98         | 80               | 60         | 80                         | 125            | 110 to 130      | 60             | 1.5                | 1          | -          |
|            |            | G1V(A)13C | 110                      | 1                   | 98         | 80               | 60         | 80                         | 125            | 120 to 138      | 60             | 1.5                | 1          | -          |
|            |            | G1V(A)14C | 120                      | 1                   | 98         | 80               | 60         | 80                         | 125            | 130 to 150      | 60             | 1.5                | 1          | -          |
|            |            | G1V(A)15C | 115                      | 1                   | 98         | 80               | 60         | 80                         | 125            | 142 to 157      | 60             | 1.5                | 1          | -          |
| -          | AX078      | G1V(A)20C | 170                      | 1                   | 98         | 80               | 60         | 80                         | 125            | 190 to 210      | 60             | 1.5                | 1          | -          |
|            |            | G1V(B)20C | 170                      | 1                   | 102        | 120              | 60         | 220                        | 150            | 190 to 210      | 60             | 1.5                | 1          | -          |
|            |            | G1V(B)22C | 190                      | 1                   | 98         | 160              | 60         | 220                        | 125            | 210 to 230      | 60             | 1.5                | 1          | -          |
|            |            | G1V(B)24C | 210                      | 1                   | 102        | 120              | 60         | 220                        | 150            | 230 to 250      | 60             | 1.5                | 1          | -          |



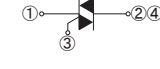
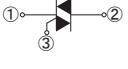








# TRIACs

TRIACs are bidirectional Thyristors.

Our TRIACs are easy to use for motor and heater controls due to balanced gate sensitivity and  $(di/dt)_c$ .


Our lineup ranges from  $V_{DRM}=600$  to 800V,  $I_{T(RMS)}=3$  to 20A.

## TRIACs (Triode for Alternating Current)

| Package                                |  10.0 × 6.6 × 2.3(mm) |  28.5 × 10.0 × 4.5(mm)  |
|--|--|--|
| JEDEC Code<br>JEITA Code<br>House Name | TO-252AA<br>—<br>FB  | SC-91<br>FTO-220AG   |
| Fig.                                   | G2-3   | J8-4   |
| Internal Circuit                       |                       |   |
| $V_{DRM}[V]$                           | 600  |  |
| $I_{T(RMS)} [A]$                       | 3  |  KD3FB60  |
|  | 5  |  KD3SF60E<br> KD3SF60  |
|  | 8  |  KD5SF60  |
|  | 12   |  KD8SF60  |
|  | 16   |  KD12SF60   |
|  | 20   |  KD16SF60<br> KD20SF60 |








 : New product

## TRIACs (Triode for Alternating Current)

| Surface Mount                          |      | Type No.  | Absolute Maximum Ratings |                  |               | Electrical Characteristics |                            |  |   |   |                                     | Based on AEC-Q101 | Automotive |
|--|------|---|--------------------------|------------------|---------------|----------------------------|----------------------------|--|---|---|-------------------------------------|-------------------|------------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |   | $I_T$ (RMS)<br>[A]       | $V_{DRM}$<br>[V] | $T_J$<br>[°C] | $V_{TM}$ (max)<br>[V]      | Conditions<br>$I_{TM}$ [A] | $V_{GT}$ (max)<br>(I, II, III)*<br>[V] | $I_{GT}$ (max)<br>(I, II, III)*<br>[mA] | $(dv/dt)_c$<br>( $T_J=150^\circ C, V_D=2/3V_{DRM}$ )<br>[V/ $\mu s$ ] | Conditions<br>$(di/dt)_c$<br>[A/ms] |                   |            |
| TO-252AA<br>—<br>FB                    | G2-3 |  KD3FB60 | 3                        | 600              | -40 to 150    | 1.7                        | 4.5                        | 1.5                                    | 15                                      | 1   | -1.5                                | —                 | —          |

 : New product \* : Operation mode IV is not guaranteed.

## Two Terminal Type

| Two Terminal Type  |      | Type No.   | Absolute Maximum Ratings |                  |               | Electrical Characteristics |                            |  |   |   |                                     | Based on AEC-Q101 | Automotive |
|--|------|--|--------------------------|------------------|---------------|----------------------------|----------------------------|--|---|---|-------------------------------------|-------------------|------------|
| JEDEC Code<br>JEITA Code<br>House Name   | Fig. |  | $I_T$ (RMS)<br>[A]       | $V_{DRM}$<br>[V] | $T_J$<br>[°C] | $V_{TM}$ (max)<br>[V]      | Conditions<br>$I_{TM}$ [A] | $V_{GT}$ (max)<br>(I, II, III)*<br>[V] | $I_{GT}$ (max)<br>(I, II, III)*<br>[mA] | $(dv/dt)_c$<br>( $T_J=150^\circ C, V_D=2/3V_{DRM}$ )<br>[V/ $\mu s$ ] | Conditions<br>$(di/dt)_c$<br>[A/ms] |                   |            |
| SC-91<br>FTO-220AG   | J8-4 |  KD3SF60E | 3                        | 600              | -40 to 150    | 1.5                        | 4.5                        | 1.5                                    | 10                                      | —   | —                                   | —                 | —          |
|  |      |  KD3SF60  | 3                        | 600              | -40 to 150    | 1.5                        | 4.5                        | 1.5                                    | 20                                      | 1   | -1.5                                | —                 | —          |
|  |      |  KD5SF60  | 5                        | 600              | -40 to 150    | 1.8                        | 7                          | 1.5                                    | 20                                      | 1   | -2.5                                | —                 | —          |
|  |      |  KD8SF60  | 8                        | 600              | -40 to 150    | 1.6                        | 12                         | 1.5                                    | 30                                      | 1   | -4.0                                | —                 | —          |
|  |      |  KD12SF60 | 12                       | 600              | -40 to 150    | 1.6                        | 20                         | 1.5                                    | 30                                      | 1   | -6.0                                | —                 | —          |
|  |      |  KD16SF60 | 16                       | 600              | -40 to 150    | 1.5                        | 25                         | 1.5                                    | 30                                      | 1   | -8.0                                | —                 | —          |
|  KD20SF60 | 20   | 600  | -40 to 150               | 1.4              | 30            | 1.5                        | 30                         | 1                                      | -10.0                                   | —   | —                                   |                   |            |

 : New product \* : Operation mode IV is not guaranteed.

| Operation Mode | Terminal Characteristics |       |     |
|----------------|--------------------------|-------|-----|
|                | ① T1                     | ②④ T2 | ③ G |
| I              | —                        | +     | +   |
| II             | —                        | +     | —   |
| III            | +                        | —     | —   |
| IV             | +                        | —     | +   |




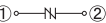

# SURGE ABSORBERS

Surge Absorbers are semiconductor devices of the Thyristor type that turns on when triggered by their rated voltage. They are commonly used for lightning surge protection in communications equipment.

## Thyristor Surge Suppressors

- Features**
1. Bi-directional or uni-directional characteristics.
  2. High speed response.
  3. Large surge current capacity.
  4. Repetitive use against surges is possible.



- Applications**
1. Lightning surge adsorption for communications circuits.
  2. Lightning surge adsorption for transmitters and switchboards.
  3. Surge protection for ISDN terminals.

| Series                                  | KL Series  | KU Series   | KP Series  |          |
|---|--|---|--|----------|
| Package                                 | <br>5.0 × 2.5 × 2.0(mm) | <br>5.1 × 3.75 × 2.0(mm) | <br>7.6 × 4.0 × 2.8(mm) |          |
| JEDEC Code<br>JEITA Code<br>House Name  | DO-214AC<br>-<br>1F  | DO-214AA similar<br>-<br>M2F  | -<br>-<br>2F   |          |
| Fig.                                    | B4-3   | B7<br>B8  | B9-4   |          |
| Internal Circuit                        |                         |                        |  |          |
| Off-state Voltage<br>V <sub>D</sub> [V] | 5  | KL3Z07  |  |          |
|   | 15   | KL3Z18  |  |          |
|   | 58   | KL3L07  |  |          |
|   | 63   |   | KU10L08  |          |
|   | 70   |   | KU4F8  |          |
|   | 90   |   | KU10NU11   |          |
|   | 92   |   | KP20NU11<br>KP40NU11   |          |
|   | 100  |   | KU4F12   |          |
|   | 115  |   | KU10NU13   |          |
|   | 120  | KL3N14  | KU10N14<br>KU15N14   |          |
|   | 175  | KL3R20  |  |          |
|   | 180  |   |  | KP40RU22 |
|   | 190  |   | KU10R23NS  |          |
|   | 220  |   | KU10R27NS  |          |
| 250                                     |  | KU10R29NS   |  |          |
| 275                                     |  | KU5S31NS<br>KU10S31NS<br>KU10S35NS  |  |          |

## Varistor

- Features**
1. Bi-directional surge absorption is possible.
  2. Low junction capacitance.

- Applications**
1. Telephone set surge absorption.
  2. Digital communications circuit surge absorption.
  3. ISDN terminal surge absorption.

|  |  |
|--|--|
| Package                                | <br>5.0 × 2.5 × 2.0(mm) |
| JEDEC Code<br>JEITA Code<br>House Name | DO-214AC<br>-<br>1F  |
| Fig.                                   | B4-1   |
| Internal Circuit                       |                         |
| V <sub>F2</sub> [V]                    | 2.75 ± 0.25  |
|  | VR-61F1  |

## Thyristor Surge Suppressors

| JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No.  | Absolute Maximum Ratings |                    |                         | Electrical Characteristics |                                 |                                 | UL     | Automotive |                                 |
|--|------|-----------|--------------------------|--------------------|-------------------------|----------------------------|---------------------------------|---------------------------------|--------|------------|---------------------------------|
|  |      |           | I <sub>TSM</sub><br>[A]  | Conditions<br>[μs] | V <sub>DRM</sub><br>[V] | T <sub>J</sub><br>[°C]     | V <sub>BO</sub><br>(min)<br>[V] | I <sub>H</sub><br>(min)<br>[mA] |        |            | C <sub>t</sub><br>(max)<br>[pF] |
| DO-214AC<br>-<br>1F                    | B4-3 | KL3Z07    | 30                       | 10/1000            | 5                       | 125                        | 5.5 *1                          | 50                              | -      | -          |                                 |
|  |      | KL3Z18    | 30                       | 10/1000            | 15                      | 125                        | 15.5 *1                         | 50                              | -      | -          |                                 |
|  |      | KL3L07    | 30                       | 10/1000            | 58                      | 125                        | 65                              | 100                             | 90     | -          | -                               |
|  |      | KL3N14    | 30                       | 10/1000            | 120                     | 125                        | 130                             | 100                             | 50     | -          | -                               |
| DO-214AA similar<br>-<br>M2F           | B7   | KU10L08   | 100                      | 10/1000            | 63                      | 125                        | 70                              | 100                             | 180    | UL         | -                               |
|  |      | KU4F8     | 40                       | 10/1000            | 70                      | 125                        | 75                              | 100                             | 100    | -          | -                               |
|  | B8   | KU10NU11  | 100                      | 10/1000            | 60                      | 125                        | 100                             | 150                             | -      | -          | -                               |
|  |      | KU4F12    | 40                       | 10/1000            | 100                     | 125                        | 110                             | 100                             | 100    | -          | -                               |
|  | B7   | KU10NU13  | 100                      | 10/1000            | 60                      | 125                        | 120                             | 100                             | -      | -          | -                               |
|  |      | KU10N14   | 100                      | 10/1000            | 120                     | 125                        | 125                             | 100                             | 140    | UL         | -                               |
|  |      | KU15N14   | 150                      | 10/1000            | 120                     | 125                        | 125                             | 100                             | 110    | UL         | -                               |
|  |      | KU10R23NS | 100                      | 10/1000            | 190                     | 125                        | 290 *2                          | 100                             | 90     | -          | -                               |
|  |      | KU10R27NS | 100                      | 10/1000            | 220                     | 125                        | 320 *2                          | 100                             | 70     | UL         | -                               |
|  |      | KU10R29NS | 100                      | 10/1000            | 250                     | 125                        | 400 *2                          | 100                             | 70     | UL         | -                               |
|  |      | KU5S31NS  | 50                       | 10/1000            | 275                     | 125                        | 420 *2                          | 150                             | 70     | -          | -                               |
|  |      | KU10S31NS | 100                      | 10/1000            | 275                     | 125                        | 420 *2                          | 100                             | 90     | UL         | -                               |
| -<br>-<br>2F                           | B9-4 | KU10S35NS | 100                      | 10/1000            | 275                     | 125                        | 450 *2                          | 100                             | 90     | -          | -                               |
|  |      | KP20NU11  | 325                      | 10/700             | 60                      | 125                        | 100                             | 150                             | 295 *3 | -          | -                               |
|  |      | KP40NU11  | 500                      | 10/700             | 60                      | 125                        | 100                             | 150                             | 485 *3 | -          | -                               |
| KP40RU22                               | 500  | 10/700    | 60                       | 125                | 195                     | 100                        | 285 *3                          | -                               | -      |            |                                 |

\*1 : V<sub>BR</sub> \*2 : V<sub>CL(max)</sub> \*3 : typ.  : UL497B recognized (UL File No.E183905)

## Varistor

| JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No. | Absolute Maximum Ratings    |                         |                        | Electrical Characteristics |                                      | Automotive |
|--|------|----------|-----------------------------|-------------------------|------------------------|----------------------------|--------------------------------------|------------|
|  |      |          | I <sub>F(RMS)</sub><br>[mA] | I <sub>FSM</sub><br>[A] | T <sub>J</sub><br>[°C] | V <sub>F1</sub><br>[V]     | Conditions<br>I <sub>F</sub><br>[mA] |            |
| DO-214AC<br>-<br>1F                    | B4-1 | VR-61F1  | 370                         | 7.5                     | 150                    | 2.3 ± 0.25                 | 1                                    | -          |

# TVS (Transient Surge Suppressor)

TVSs are low voltage PN junction type devices.

These devices utilize technologically stable glass passivation (an in-house design) with a structural advantage that brings high resistance against heat and humidity.

They are available with a voltage range between 12 to 320V and peak pulse power from 200 to 8000W.

## TVS (Transient Voltage Suppressor)

- Features
- 1.High speed response.
  - 2.Absorption energy tolerance capacity.
  - 3.Narrow clamping voltage width.

- Applications
- 1.IC protection for telephones.
  - 2.IC protection against abnormal voltage.
  - 3.Protection for load dump noise.

| Peak pulse power                       | 200W                              |                | 600W           | 2000W          | 6000 ~ 8000W (Load Dump Surge Protecting) |                          |                |
|--|-----------------------------------|----------------|----------------|----------------|---|--------------------------|----------------|
| Package                                |                                   |                |                |                |   |                          |                |
| JEDEC Code<br>JEITA Code<br>House Name | DO-219AB similar<br>SC-109<br>G1F | DO-214AC<br>1F | DO-214AC<br>1F | DO-214AC<br>2F | MCP                                       | SC-83 similar<br>STO-220 | TO-263AB<br>FZ |
| Fig.                                   | B1-2                              | B3-2           | B4-2           | B5-2           | B9-5                                      | B10                      | E1             |
| Internal Circuit                       |                                   |                |                |                |   |                          |                |
| V <sub>BR</sub> (typ)<br>[V]           | 12.5                              | ST02-12G1      | ST04-12F1      |                |   |                          |                |
|  | 14                                | ST02-14G1      | ST04-14F1      |                |   | ST80-14MF                |                |
|  | 16                                | ST02-16G1      | ST04-16F1      |                |   |                          |                |
|  | 18                                | ST02-18G1      | ST04-18F1      | DL04-18F1      | ST06-18CE                                 |                          |                |
|  | 20                                | ST02-20G1      | ST04-20F1      |                |   |                          |                |
|  | 24                                | ST02-24G1      | ST04-24F1      |                |   |                          |                |
|  | 27                                | ST02-27G1      | ST04-27F1      |                | ST06-27CE                                 | ST20-27F2                | ST70-27MF      |
|  | 30                                | ST02-30G1      | ST04-30F1      |                | ST06-30CE                                 | ST20-30F2                | ST70-30MF      |
|  | 33                                | ST02-33G1      | ST04-33F1      | DL04-33F1      | ST06-33CE                                 | ST20-33F2                |                |
|  | 36                                | ST02-36G1      | ST04-36F1      | DL04-36F1      | ST06-36CE                                 | ST20-36F2                |                |
|  | 39                                | ST02-39G1      | ST04-39F1      |                | ST06-39CE                                 |                          |                |
|  | 40                                |                |                |                |   | ST60-40MF                |                |
|  | 43                                | ST02-43G1      | ST03-43F1      |                |   |                          |                |
|  | 47                                | ST02-47G1      | ST03-47F1      |                |   | ST20-47F2                |                |
|  | 48                                |                |                |                |   | ST60-48MF                |                |
|  | 58                                | ST02-58G1      | ST03-58F1      |                |   |                          |                |
|  | 68                                |                | ST03-68F1      |                |   |                          |                |
|  | 75                                |                | ST02-75F1      |                |   |                          |                |
|  | 82                                |                | ST02-82F1      |                |   |                          |                |
|  | 100                               |                | ST02-100F1     |                |   |                          |                |
| 120                                    |                                   | ST02-120F1     |                |                |   |                          |                |
| 145                                    |                                   | ST02-140F1     |                |                |   |                          |                |
| 170                                    |                                   | ST02-170F1     |                |                |   |                          |                |
| 200                                    |                                   | ST02-200F1     |                |                |   |                          |                |
| 240                                    |                                   | ST03-240F1     |                |                |   |                          |                |
| 280                                    |                                   | ST02-280F1     |                |                |   |                          |                |
| 320                                    |                                   | ST02-320F1     |                |                |   |                          |                |

■ : New product

## TVS (Transient Voltage Suppressor)

| JEDEC Code<br>JEITA Code<br>House Name     | Fig. | Type No.       | Absolute Maximum Ratings |                        |                               | Electrical Characteristics      |                                 |                                      |                                 | Based on<br>AEC-Q101 | Automotive |                                     |   |   |
|--|------|----------------|--------------------------|------------------------|-------------------------------|---------------------------------|---------------------------------|--------------------------------------|---------------------------------|----------------------|------------|-------------------------------------|---|---|
|  |      |                | Prsm<br>[W]              | T <sub>J</sub><br>[°C] | V <sub>R</sub><br>(DC)<br>[V] | V <sub>BR</sub><br>(min)<br>[V] | V <sub>BR</sub><br>(max)<br>[V] | Conditions<br>I <sub>R</sub><br>[mA] | I <sub>R</sub><br>(max)<br>[μA] |                      |            | Conditions<br>V <sub>R</sub><br>[V] |   |   |
| DO-219AB similar<br>SC-109<br>G1F          | B1-2 | ST02-12G1      | 200                      | -55 to 175             | 9                             | 11.5                            | 13.5                            | 5                                    | 5                               | 9                    | ○          | ○                                   |   |   |
|  |      | ST02-14G1      | 200                      | -55 to 175             | 12.8                          | 13.5                            | 15                              | 5                                    | 5                               | 12.8                 | ○          | ○                                   |   |   |
|  |      | ST02-16G1      | 200                      | -55 to 175             | 13.6                          | 14.4                            | 17.6                            | 5                                    | 5                               | 13.6                 | ○          | ○                                   |   |   |
|  |      | ST02-18G1      | 200                      | -55 to 175             | 13                            | 16.8                            | 19.1                            | 5                                    | 5                               | 13                   | ○          | ○                                   |   |   |
|  |      | ST02-20G1      | 200                      | -55 to 175             | 16                            | 18.8                            | 22                              | 5                                    | 5                               | 16                   | ○          | ○                                   |   |   |
|  |      | ST02-24G1      | 200                      | -55 to 175             | 20                            | 22                              | 25.6                            | 5                                    | 5                               | 20                   | ○          | ○                                   |   |   |
|  |      | ST02-27G1      | 200                      | -55 to 175             | 23                            | 25.1                            | 28.9                            | 2                                    | 5                               | 23                   | ○          | ○                                   |   |   |
|  |      | ST02-30G1      | 200                      | -55 to 175             | 24                            | 28                              | 32                              | 2                                    | 5                               | 24                   | ○          | ○                                   |   |   |
|  |      | ST02-33G1      | 200                      | -55 to 175             | 25                            | 31                              | 35                              | 2                                    | 5                               | 25                   | ○          | ○                                   |   |   |
|  |      | ST02-36G1      | 200                      | -55 to 175             | 27                            | 34                              | 38                              | 2                                    | 5                               | 27                   | ○          | ○                                   |   |   |
|  |      | ST02-39G1      | 200                      | -55 to 175             | 30                            | 37                              | 41                              | 2                                    | 5                               | 30                   | ○          | ○                                   |   |   |
|  |      | ST02-43G1      | 200                      | -55 to 175             | 33                            | 40                              | 45                              | 2                                    | 5                               | 33                   | ○          | ○                                   |   |   |
|  |      | ST02-47G1      | 195                      | -55 to 175             | 37                            | 42                              | 52                              | 2                                    | 5                               | 37                   | ■          | ○                                   |   |   |
| DO-214AC<br>1F                             | B3-2 | ST04-12F1      | 400                      | -55 to 175             | 9                             | 11.5                            | 13.5                            | 1                                    | 5                               | 9                    | ○          | ○                                   |   |   |
|  |      | ST04-14F1      | 400                      | -55 to 175             | 12.8                          | 13.5                            | 15                              | 1                                    | 5                               | 12.8                 | ○          | ○                                   |   |   |
|  |      | ST04-16F1      | 400                      | -55 to 175             | 13.6                          | 14.4                            | 17.6                            | 1                                    | 5                               | 13.6                 | ○          | ○                                   |   |   |
|  |      | ST04-18F1      | 400                      | -55 to 175             | 15.3                          | 16.8                            | 19.1                            | 1                                    | 5                               | 15.3                 | ○          | ○                                   |   |   |
|  |      | ST04-20F1      | 400                      | -55 to 175             | 16                            | 18.8                            | 21.2                            | 1                                    | 5                               | 16                   | ○          | ○                                   |   |   |
|  |      | ST04-24F1      | 400                      | -55 to 175             | 20                            | 22.8                            | 25.6                            | 1                                    | 5                               | 20                   | ○          | ○                                   |   |   |
|  |      | ST04-27F1      | 400                      | -55 to 175             | 23                            | 24.3                            | 29.7                            | 1                                    | 5                               | 23                   | ○          | ○                                   |   |   |
|  |      | ST04-30F1      | 400                      | -55 to 175             | 24                            | 28                              | 32                              | 1                                    | 5                               | 24                   | ○          | ○                                   |   |   |
|  |      | ST04-33F1      | 400                      | -55 to 175             | 25                            | 31                              | 35                              | 1                                    | 5                               | 25                   | ○          | ○                                   |   |   |
|  |      | ST04-36F1      | 400                      | -55 to 175             | 27                            | 34                              | 38                              | 1                                    | 5                               | 27                   | ○          | ○                                   |   |   |
|  |      | ST04-39F1      | 400                      | -55 to 175             | 30                            | 37                              | 41                              | 1                                    | 5                               | 30                   | ○          | ○                                   |   |   |
|  |      | ST03-43F1      | 300                      | -55 to 150             | 33                            | 40                              | 45                              | 1                                    | 5                               | 33                   | ○          | ○                                   |   |   |
|  |      | ST03-47F1      | 300                      | -55 to 150             | 37                            | 42                              | 52                              | 1                                    | 5                               | 37                   | ○          | ○                                   |   |   |
|  |      | ST03-58F1      | 300                      | -55 to 150             | 45                            | 52                              | 64                              | 1                                    | 5                               | 45                   | ○          | ○                                   |   |   |
|  |      | ST03-68F1      | 300                      | -55 to 150             | 58                            | 64.4                            | 71.2                            | 1                                    | 5                               | 58                   | ○          | ○                                   |   |   |
|  |      | ST02-75F1      | 200                      | -55 to 150             | 61                            | 70                              | 79                              | 1                                    | 5                               | 61                   | ○          | ○                                   |   |   |
|  |      | ST02-82F1      | 200                      | -55 to 150             | 67                            | 74                              | 90                              | 1                                    | 5                               | 67                   | ○          | ○                                   |   |   |
|  |      | ST02-100F1     | 200                      | -55 to 150             | 80                            | 90                              | 110                             | 1                                    | 5                               | 80                   | ○          | ○                                   |   |   |
|  |      | ST02-120F1     | 200                      | -55 to 150             | 100                           | 110                             | 130                             | 1                                    | 5                               | 33                   | ■          | ○                                   |   |   |
|  |      | ST02-140F1     | 200                      | -55 to 150             | 120                           | 130                             | 160                             | 1                                    | 5                               | 120                  | ■          | ○                                   |   |   |
|  |      | ST02-170F1     | 200                      | -55 to 150             | 145                           | 155                             | 185                             | 1                                    | 5                               | 145                  | ■          | ○                                   |   |   |
|  |      | ST02-200F1     | 200                      | -55 to 150             | 170                           | 185                             | 215                             | 1                                    | 5                               | 170                  | ■          | ○                                   |   |   |
|  |      | ST03-240F1     | 310                      | -55 to 175             | 200                           | 220                             | 250                             | 1                                    | 5                               | 200                  | ■          | ○                                   |   |   |
|  |      | ST02-280F1     | 200                      | -55 to 175             | 230                           | 250                             | 300                             | 1                                    | 5                               | 230                  | ○          | ○                                   |   |   |
|  |      | ST02-320F1     | 150                      | -55 to 175             | 260                           | 300                             | 350                             | 1                                    | 5                               | 260                  | ○          | ○                                   |   |   |
|  |      | DO-214AC<br>1F | B4-2                     | DL04-18F1              | 400                           | -55 to 150                      | 13                              | 16.8                                 | 19.1                            | 5                    | 5          | 13                                  | ○ | ○ |
|  |      |                |                          | DL04-33F1              | 400                           | -55 to 175                      | 25                              | 31                                   | 35                              | 1                    | 5          | 25                                  | ○ | ○ |
| DL04-36F1                                  | 400  |                |                          | -55 to 175             | 27                            | 34                              | 38                              | 1                                    | 5                               | 27                   | ○          | ○                                   |   |   |
| SC-110B<br>CE                              | B5-2 | ST06-18CE      | 600                      | -55 to 175             | 13                            | 16.8                            | 19.1                            | 1                                    | 5                               | 13                   | ○          | ○                                   |   |   |
|  |      | ST06-27CE      | 600                      | -55 to 175             | 23                            | 25                              | 29                              | 1                                    | 5                               | 23                   | ○          | ○                                   |   |   |
|  |      | ST06-30CE      | 600                      | -55 to 175             | 24                            | 28                              | 32                              | 1                                    | 5                               | 24                   | ○          | ○                                   |   |   |
|  |      | ST06-33CE      | 600                      | -55 to 175             | 25                            | 31                              | 35                              | 1                                    | 5                               | 25                   | ○          | ○                                   |   |   |
|  |      | ST06-36CE      | 600                      | -55 to 175             | 27                            | 34                              | 38                              | 1                                    | 5                               | 27                   | ○          | ○                                   |   |   |
| -  | B9-5 | ST20-47F2      | 1700                     | -55 to 175             | 37                            | 42                              | 52                              | 1                                    | 5                               | 37                   | ○          | ○                                   |   |   |
|  |      | ST20-27F2      | 2000                     | -55 to 175             | 23                            | 24.3                            | 29.7                            | 1                                    | 5                               | 23                   | ○          | ○                                   |   |   |
|  |      | ST20-30F2      | 2000                     | -55 to 175             | 24                            | 28                              | 32                              | 1                                    | 5                               | 24                   | ○          | ○                                   |   |   |
|  |      | ST20-33F2      | 2000                     | -55 to 175             | 25                            | 31                              | 35                              | 1                                    | 5                               | 25                   | ○          | ○                                   |   |   |
| -  | B10  | ST20-36F2      | 2000                     | -55 to 175             | 27                            | 34                              | 38                              | 1                                    | 5                               | 27                   | ○          | ○                                   |   |   |
|  |      | ST80-14MF      | 8000                     | -40 to 150             | 12                            | 13                              | 15                              | 1                                    | 10                              | 12                   | ○          | ○                                   |   |   |
|  |      | ST70-27MF      | 7000                     | -40 to 150             | 23                            | 24.3                            | 29.7                            | 1                                    | 5                               | 23                   | ○          | ○                                   |   |   |
|  |      | ST70-30MF      | 7000                     | -40 to 150             | 26                            | 27.5                            | 33                              | 1                                    | 5                               | 26                   | ○          | ○                                   |   |   |
| -  | E1   | ST60-40MF      | 6000                     | -40 to 150             | 32                            | 36.5                            | 44                              | 1                                    | 5                               | 32                   | ○          | ○                                   |   |   |
|  |      | ST60-48MF      | 6000                     | -40 to 150             | 40                            | 43.2                            | 54                              | 1                                    | 5                               | 40                   | ○          | ○                                   |   |   |
|  |      | ST70-27F       | 7000                     | -40 to 150             | 23                            | 24.3                            | 29.7                            | 1                                    | 5                               | 23                   | ○          | ○                                   |   |   |
| SC-83 similar<br>STO-220<br>TO-263AB<br>FZ | H6   | ST70-27FZ      | 7000                     | -55 to 175             | 23                            | 25                              | 29                              | 1                                    | 5                               | 23                   | ○          | ○                                   |   |   |

■ : New product ■ : Please contact us.








# TVS (Transient Surge Suppressor)

## Power Clampers

- Features
- 1.High speed response.
  - 2.Absorption energy tolerance capacity.
  - 3.Narrow clampingvoltage width.
  - 4.Reverse blocking type.

- Application 1.Snubber circuit in the primary side of switch-mode power supplies.

| Package                      | <br>7.6 × 4.0 × 2.8(mm) | <br>5.0 × φ 4.0(mm) | <br>7.0 × φ 4.4(mm) |
|------------------------------|--|--|--|
| JEDEC Code                   | —  | —  | —  |
| JEITA Code                   | —  | —  | —  |
| House Name                   | 2F   | AX078  | AX10   |
| Fig.                         | B9-3   | A4-2   | A5-2   |
| Internal Circuit             |                         |                    |  |
| V <sub>BR</sub> (typ)<br>[V] | 82   | ST02D-82   | ST03D-82   |
|                              | 145  | ST02D-140F2  | ST03D-140  |
|                              | 170  | ST02D-170F2  | ST03D-170  |
|                              | 200  | ST02D-200  | ST03D-200  |
|                              | 240  |  | ST03DH-240   |
|                              | 280  |  | ★ ST02DH-280   |
| 320                          |  | ★ ST02DH-320   |  |

★ : Under development

## Power Clampers

| Surface Mount |      | Type No.    | Absolute Maximum Ratings |                        |                                 |     | Electrical Characteristics      |                                 |                                      |                                 |                                 |                                     | Automotive |
|---------------|------|-------------|--------------------------|------------------------|---------------------------------|-----|---------------------------------|---------------------------------|--------------------------------------|---------------------------------|---------------------------------|-------------------------------------|------------|
| Package       |      |             | PrSM<br>[W]              | T <sub>J</sub><br>[°C] | V <sub>RM</sub><br>(max)<br>[V] |     | ZD                              |                                 |                                      | Di                              |                                 |                                     |            |
| JEDEC Code    | Fig. |             |                          |                        | ZD                              | Di  | V <sub>BR</sub><br>(min)<br>[V] | V <sub>BR</sub><br>(max)<br>[V] | Conditions<br>I <sub>R</sub><br>[mA] | I <sub>R</sub><br>(max)<br>[μA] | I <sub>R</sub><br>(max)<br>[μA] | Conditions<br>V <sub>R</sub><br>[V] |            |
| —             | B9-3 | ST02D-140F2 | 200                      | -40 to 150             | 120                             | 600 | 130                             | 160                             | 1                                    | 5                               | 5                               | 600                                 | —          |
| 2F            |      | ST02D-170F2 | 200                      | -40 to 150             | 145                             | 600 | 155                             | 185                             | 1                                    | 5                               | 5                               | 600                                 | —          |

| Axial        |      | Type No.     | Absolute Maximum Ratings |                        |                                 |      | Electrical Characteristics      |                                 |                                      |                                 |                                 |                                     | Automotive |
|--------------|------|--------------|--------------------------|------------------------|---------------------------------|------|---------------------------------|---------------------------------|--------------------------------------|---------------------------------|---------------------------------|-------------------------------------|------------|
| Package      |      |              | PrSM<br>[W]              | T <sub>J</sub><br>[°C] | V <sub>RM</sub><br>(max)<br>[V] |      | ZD                              |                                 |                                      | Di                              |                                 |                                     |            |
| JEDEC Code   | Fig. |              |                          |                        | ZD                              | Di   | V <sub>BR</sub><br>(min)<br>[V] | V <sub>BR</sub><br>(max)<br>[V] | Conditions<br>I <sub>R</sub><br>[mA] | I <sub>R</sub><br>(max)<br>[μA] | I <sub>R</sub><br>(max)<br>[μA] | Conditions<br>V <sub>R</sub><br>[V] |            |
| —<br>AX078   | A4-2 | ST02D-82     | 200                      | -40 to 150             | 67                              | 600  | 74                              | 90                              | 1                                    | 5                               | 5                               | 600                                 | —          |
|              |      | ST02D-140    | 200                      | -40 to 150             | 120                             | 600  | 130                             | 160                             | 1                                    | 5                               | 5                               | 600                                 | —          |
|              |      | ST02D-170    | 200                      | -40 to 150             | 145                             | 600  | 155                             | 185                             | 1                                    | 5                               | 5                               | 600                                 | —          |
|              |      | ST02D-200    | 200                      | -40 to 150             | 170                             | 600  | 185                             | 215                             | 1                                    | 5                               | 5                               | 600                                 | —          |
| —<br>AX10    | A5-2 | ST03D-82     | 300                      | -40 to 150             | 67                              | 600  | 74                              | 90                              | 1                                    | 5                               | 5                               | 600                                 | —          |
|              |      | ST03D-140    | 300                      | -40 to 150             | 120                             | 600  | 130                             | 160                             | 1                                    | 5                               | 5                               | 600                                 | —          |
|              |      | ST03D-170    | 300                      | -40 to 150             | 145                             | 600  | 155                             | 185                             | 1                                    | 5                               | 5                               | 600                                 | —          |
|              |      | ST03D-200    | 300                      | -40 to 150             | 170                             | 600  | 185                             | 215                             | 1                                    | 5                               | 5                               | 600                                 | —          |
|              |      | ST03DH-240   | 300                      | -40 to 150             | 200                             | 1000 | 220                             | 250                             | 1                                    | 5                               | 10                              | 1000                                | —          |
|              |      | ★ ST02DH-280 | 300                      | -40 to 150             | 230                             | 1000 | 250                             | 300                             | 1                                    | 5                               | 10                              | 1000                                | —          |
| ★ ST02DH-320 | 300  | -40 to 150   | 260                      | 1000                   | 300                             | 350  | 1                               | 5                               | 10                                   | 1000                            | —                               |                                     |            |

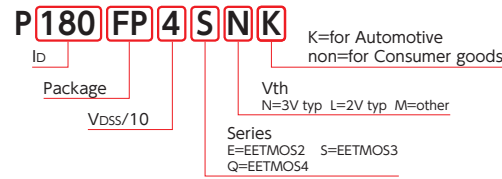
★ : Under development

# POWER MOSFETS

The EETMOS series offer world-class performance applying a trench-gate structure with an optimized layout hence lowered Qg.

| Series     | Feature                    |
|------------|----------------------------|
| EETMOS2    | Evenly balanced Ron and Qg |
| EETMOS3/3Z | Low Ron, Low Qg            |
| EETMOS4    | Ultra Low Ron, Low Qg      |

How to read



## EETMOS Series (Nch Single)

| Surface Mount          |                         | JEDEC Code<br>JEITA Code<br>House Name | Fig.                 | Id [A]           | Vdss [V] |    |    |     |     | Remarks |  |  |  |  |  |  |
|------------------------|-------------------------|--|----------------------|------------------|----------|----|----|-----|-----|---------|--|--|--|--|--|--|
| Package                | Id [A]                  |  |                      |                  | 40       | 60 | 75 | 100 | 120 |         |  |  |  |  |  |  |
| 6.0 × 4.9 × 1.0(mm)    | LA                      | G6                                     | 15                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 18                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 19                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 23                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 25                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 30                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 56                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
| 6.05 × 5.30 × 1.05(mm) | MO-235B similar<br>- LF | G7                                     | 25                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 32                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 38                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 40                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 46                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 50                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 64                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 70                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 72                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 98                   |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 105                  |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 140                  |                  |          |    |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  | 10.0 × 6.6 × 2.3(mm) | TO-252AA<br>- FB | G2-1     | 8  |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  |                      |                  |          | 16 |    |     |     |         |  |  |  |  |  |  |
|                        |                         |  |                      |                  |          | 20 |    |     |     |         |  |  |  |  |  |  |
| 24                     |                         |  |                      |                  |          |    |    |     |     |         |  |  |  |  |  |  |
| 25                     |                         |  |                      |                  |          |    |    |     |     |         |  |  |  |  |  |  |
| 26                     |                         |  |                      |                  |          |    |    |     |     |         |  |  |  |  |  |  |
| 30                     |                         |  |                      |                  |          |    |    |     |     |         |  |  |  |  |  |  |
| 32                     |                         |  |                      |                  |          |    |    |     |     |         |  |  |  |  |  |  |
| 40                     |                         |  |                      |                  |          |    |    |     |     |         |  |  |  |  |  |  |
| 54                     |                         |  |                      |                  |          |    |    |     |     |         |  |  |  |  |  |  |
| 60                     |                         |  |                      |                  |          |    |    |     |     |         |  |  |  |  |  |  |






: New product

## EETMOS Series (Nch Single)

| Surface Mount    |        | JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No.   | Absolute Maximum Ratings |        |         |        |            | Electrical Characteristics |                    |                 |               |               | Based on<br>AEC-Q101 | Automotive | Series |                       |
|------------------|--------|--|------|------------|--------------------------|--------|---------|--------|------------|----------------------------|--------------------|-----------------|---------------|---------------|----------------------|------------|--------|-----------------------|
| Package          | Id [A] |  |      |            | Vdss [V]                 | Id [A] | Idp [A] | Pt [W] | Tch [°C]   | Rds(on) (typ) [mΩ]         | Rds(on) (max) [mΩ] | Ciss (typ) [pF] | Qg (typ) [nC] | Vth (typ) [V] |                      |            |        | Rth(j-c) (max) [°C/W] |
| LA               | G6     | -                                      | -    | P56LA4SN   | 40                       | 56     | 168     | 99     | -55 to 150 | 4.5                        | 5.7                | 1680            | 38            | 3.0           | 1.26                 | -          | -      | EETMOS3               |
|                  |        |  |      | P19LA10SL  | 100                      | 19     | 57      | 83     | -55 to 150 | 28                         | 35                 | 1730            | 38            | 2.0           | 1.5                  | -          | -      | EETMOS3               |
|                  |        |  |      | P23LA10SL  | 100                      | 23     | 69      | 99     | -55 to 150 | 23                         | 29                 | 2080            | 46            | 2.0           | 1.26                 | -          | -      | EETMOS3               |
|                  |        |  |      | P30LA10SL  | 100                      | 30     | 90      | 142    | -55 to 150 | 16.8                       | 21.0               | 2890            | 61            | 2.0           | 0.88                 | -          | -      | EETMOS3               |
|                  |        |  |      | P15LA12SL  | 120                      | 15     | 45      | 83     | -55 to 150 | 40                         | 50                 | 1735            | 38.5          | 2.0           | 1.5                  | -          | -      | EETMOS3               |
|                  |        |  |      | P18LA12SL  | 120                      | 18     | 54      | 99     | -55 to 150 | 35                         | 44                 | 2090            | 47            | 2.0           | 1.26                 | -          | -      | EETMOS3               |
|                  |        |  |      | P25LA12SL  | 120                      | 25     | 75      | 142    | -55 to 150 | 24                         | 30                 | 2900            | 61            | 2.0           | 0.88                 | -          | -      | EETMOS3               |
|                  |        |  |      | P70LF4QLK  | 40                       | 70     | 210     | 123    | -55 to 175 | 3.6                        | 4.5                | 2360            | 49            | 2.0           | 1.21                 | ○          | ○      | EETMOS4               |
|                  |        |  |      | P70LF4QNK  | 40                       | 70     | 210     | 123    | -55 to 175 | 3.9                        | 4.9                | 1890            | 38            | 3.0           | 1.21                 | ○          | ○      | EETMOS4               |
|                  |        |  |      | P105LF4QLK | 40                       | 105    | 315     | 168    | -55 to 175 | 2.1                        | 2.7                | 4090            | 76            | 2.0           | 0.89                 | ○          | ○      | EETMOS4               |
|                  |        |  |      | P105LF4QNK | 40                       | 105    | 315     | 168    | -55 to 175 | 2.2                        | 2.8                | 3400            | 62            | 3.0           | 0.89                 | ○          | ○      | EETMOS4               |
|                  |        |  |      | P105LF4QN  | 40                       | 105    | 315     | 168    | -55 to 175 | 2.2                        | 2.8                | 3400            | 62            | 3.0           | 0.89                 | -          | -      | EETMOS4               |
|                  |        |  |      | P140LF4QLK | 40                       | 140    | 560     | 217    | -55 to 175 | 1.17                       | 1.42               | 6630            | 122           | 2.0           | 0.69                 | ○          | ○      | EETMOS4               |
|                  |        |  |      | P140LF4QL  | 40                       | 140    | 560     | 217    | -55 to 175 | 1.17                       | 1.42               | 6630            | 122           | 2.0           | 0.69                 | -          | -      | EETMOS4               |
|                  |        |  |      | P140LF4QNK | 40                       | 140    | 560     | 217    | -55 to 175 | 1.22                       | 1.48               | 5530            | 96            | 3.0           | 0.69                 | ○          | ○      | EETMOS4               |
|                  |        |  |      | P140LF4QN  | 40                       | 140    | 560     | 217    | -55 to 175 | 1.22                       | 1.48               | 5530            | 96            | 3.0           | 0.69                 | -          | -      | EETMOS4               |
|                  |        |  |      | P38LF6QLK  | 60                       | 38     | 114     | 123    | -55 to 175 | 7.9                        | 9.9                | 2340            | 49            | 2.0           | 1.21                 | ○          | ○      | EETMOS4               |
|                  |        |  |      | P38LF6QNK  | 60                       | 38     | 114     | 123    | -55 to 175 | 8.3                        | 10.4               | 1875            | 35            | 3.0           | 1.21                 | ○          | ○      | EETMOS4               |
|                  |        |  |      | P64LF6QLK  | 60                       | 64     | 192     | 168    | -55 to 175 | 4.5                        | 5.7                | 4260            | 77            | 2.0           | 0.89                 | ○          | ○      | EETMOS4               |
|                  |        |  |      | P64LF6QL   | 60                       | 64     | 192     | 168    | -55 to 175 | 4.5                        | 5.7                | 4260            | 77            | 2.0           | 0.89                 | -          | -      | EETMOS4               |
| P64LF6QNK        | 60     | 64                                     | 192  | 168        | -55 to 175               | 4.5    | 5.7     | 3540   | 61         | 3.0                        | 0.89               | ○               | ○             | EETMOS4       |                      |            |        |                       |
| P64LF6QN         | 60     | 64                                     | 192  | 168        | -55 to 175               | 4.5    | 5.7     | 3540   | 61         | 3.0                        | 0.89               | -               | -             | EETMOS4       |                      |            |        |                       |
| P98LF6QLK        | 60     | 98                                     | 392  | 217        | -55 to 175               | 2.5    | 3.2     | 6770   | 126        | 2.0                        | 0.69               | ○               | ○             | EETMOS4       |                      |            |        |                       |
| P98LF6QL         | 60     | 98                                     | 392  | 217        | -55 to 175               | 2.5    | 3.2     | 6770   | 126        | 2.0                        | 0.69               | -               | -             | EETMOS4       |                      |            |        |                       |
| P98LF6QNK        | 60     | 98                                     | 392  | 217        | -55 to 175               | 2.6    | 3.3     | 5650   | 96         | 3.0                        | 0.69               | ○               | ○             | EETMOS4       |                      |            |        |                       |
| P98LF6QN         | 60     | 98                                     | 392  | 217        | -55 to 175               | 2.6    | 3.3     | 5650   | 96         | 3.0                        | 0.69               | -               | -             | EETMOS4       |                      |            |        |                       |
| P46LF7R5SLK      | 75     | 46                                     | 138  | 168        | 175                      | 8.2    | 10.3    | 2890   | 61         | 2.0                        | 0.89               | ○               | ○             | EETMOS3       |                      |            |        |                       |
| P46LF7R5SL       | 75     | 46                                     | 138  | 168        | 175                      | 8      | 10      | 2380   | 48         | 3.0                        | 0.89               | ○               | ○             | EETMOS3       |                      |            |        |                       |
| P46LF7R5SN       | 75     | 46                                     | 138  | 168        | -55 to 175               | 8      | 10      | 2380   | 48         | 3.0                        | 0.89               | -               | -             | EETMOS3       |                      |            |        |                       |
| P72LF7R5SLK      | 75     | 72                                     | 288  | 217        | 175                      | 4.6    | 5.8     | 4870   | 100        | 2.0                        | 0.69               | ○               | ○             | EETMOS3       |                      |            |        |                       |
| P72LF7R5SL       | 75     | 72                                     | 288  | 217        | -55 to 175               | 4.6    | 5.8     | 4870   | 100        | 2.0                        | 0.69               | -               | -             | EETMOS3       |                      |            |        |                       |
| P72LF7R5SN       | 75     | 72                                     | 288  | 217        | 175                      | 4.5    | 5.7     | 4080   | 78         | 3.0                        | 0.69               | ○               | ○             | EETMOS3       |                      |            |        |                       |
| P72LF7R5SN       | 75     | 72                                     | 288  | 217        | -55 to 175               | 4.5    | 5.7     | 4080   | 78         | 3.0                        | 0.69               | -               | -             | EETMOS3       |                      |            |        |                       |
| P32LF10SLK       | 100    | 32                                     | 96   | 168        | 175                      | 15.7   | 19.7    | 2890   | 61         | 2.0                        | 0.89               | ○               | ○             | EETMOS3       |                      |            |        |                       |
| P32LF10SL        | 100    | 32                                     | 96   | 168        | -55 to 175               | 15.7   | 19.7    | 2890   | 61         | 2.0                        | 0.89               | -               | -             | EETMOS3       |                      |            |        |                       |
| P32LF10SNK       | 100    | 32                                     | 96   | 168        | 175                      | 14.4   | 18.0    | 2430   | 48         | 3.0                        | 0.89               | ○               | ○             | EETMOS3       |                      |            |        |                       |
| P32LF10SN        | 100    | 32                                     | 96   | 168        | -55 to 175               | 14.4   | 18.0    | 2430   | 48         | 3.0                        | 0.89               | -               | -             | EETMOS3       |                      |            |        |                       |
| P50LF10SLK       | 100    | 50                                     | 200  | 217        | 175                      | 9.0    | 11.3    | 4900   | 102        | 2.0                        | 0.69               | ○               | ○             | EETMOS3       |                      |            |        |                       |
| P50LF10SL        | 100    | 50                                     | 200  | 217        | -55 to 175               | 9.0    | 11.3    | 4900   | 102        | 2.0                        | 0.69               | -               | -             | EETMOS3       |                      |            |        |                       |
| P50LF10SNK       | 100    | 50                                     | 200  | 217        | 175                      | 8.3    | 10.4    | 4130   | 80         | 3.0                        | 0.69               | ○               | ○             | EETMOS3       |                      |            |        |                       |
| P50LF10SN        | 100    | 50                                     | 200  | 217        | -55 to 175               | 8.3    | 10.4    | 4130   | 80         | 3.0                        | 0.69               | -               | -             | EETMOS3       |                      |            |        |                       |
| P25LF12SLK       | 120    | 25                                     | 75   | 168        | 175                      | 23     | 29      | 2930   | 61         | 2.0                        | 0.89               | ○               | ○             | EETMOS3       |                      |            |        |                       |
| P25LF12SL        | 120    | 25                                     | 75   | 168        | -55 to 175               | 23     | 29      | 2930   | 61         | 2.0                        | 0.89               | -               | -             | EETMOS3       |                      |            |        |                       |
| P25LF12SNK       | 120    | 25                                     | 75   | 168        | 175                      | 21     | 27      | 2430   | 48         | 3.0                        | 0.89               | ○               | ○             | EETMOS3       |                      |            |        |                       |
| P25LF12SN        | 120    | 25                                     | 75   | 168        | -55 to 175               | 21     | 27      | 2430   | 48         | 3.0                        | 0.89               | -               | -             | EETMOS3       |                      |            |        |                       |
| P40LF12SLK       | 120    | 40                                     | 160  | 217        | 175                      | 13.0   | 16.3    | 5000   | 102        | 2.0                        | 0.69               | ○               | ○             | EETMOS3       |                      |            |        |                       |
| P40LF12SL        | 120    | 40                                     | 160  | 217        | -55 to 175               | 13.0   | 16.3    | 5000   | 102        | 2.0                        | 0.69               | -               | -             | EETMOS3       |                      |            |        |                       |
| P40LF12SNK       | 120    | 40                                     | 160  | 217        | 175                      | 12.3   | 15.4    | 4075   | 80         | 3.0                        | 0.69               | ○               | ○             | EETMOS3       |                      |            |        |                       |
| P40LF12SN        | 120    | 40                                     | 160  | 217        | -55 to 175               | 12.3   | 15.4    | 4075   | 80         | 3.0                        | 0.69               | -               | -             | EETMOS3       |                      |            |        |                       |
| TO-252AA<br>- FB | G2-1   | -                                      | -    | P24B4SB    | 40                       | 24     | 72      | 20     | -55 to 150 | 14.8                       | 18.5               | 645             | 16.5          | 2.0           | 6.28                 | -          | -      | EETMOS3               |
|                  |        |  |      | P54B4SN    | 40                       | 54     | 162     | 44     | -55 to 150 | 5.0                        | 6.3                | 1650            | 36            | 3.0           | 2.84                 | -          | -      | EETMOS3               |
|                  |        |  |      | P60B4EL    | 40                       | 60     | 240     | 62.5   | -55 to 150 | 3.3                        | 4.2                | 2900            | 57            | 2.0           | 2                    | -          | -      | EETMOS2               |
|                  |        |  |      | P60B4SN    | 40                       | 60     | 180     | 62.5   | -55 to 150 | 3.2                        | 4.0                | 2830            | 59            | 3.0           | 2                    | -          | -      | EETMOS3               |
|                  |        |  |      | P16B6SB    | 60                       | 16     | 48      | 20     | -55 to 150 | 29                         | 37                 | 655             | 17            | 2.0           | 6.28                 | -          | -      | EETMOS3               |
|                  |        |  |      | P25B6EB    | 60                       | 25     | 70      | 35     | -55 to 150 | 23                         | 29                 | 785             | 14.5          | 2.0           | 3.55                 | -          | -      | EETMOS2               |
|                  |        |  |      | P40B6SL    | 60                       | 40     | 120     | 44     | -55 to 150 | 9.5                        | 12.0               | 2050            | 43            | 2.0           | 2.84                 | -          | -      | EETMOS3               |
|                  |        |  |      | P60B6EL    | 60                       | 60     | 240     | 62.5   | -55 to 150 | 6.1                        | 7.7                | 2920            | 55            | 2.0           | 2                    | -          | -      | EETMOS2               |
|                  |        |  |      | P60B6EN    | 60                       | 60     | 240     | 62.5   | -55 to 150 | 6.4                        | 8.0                | 2550            | 44            | 3.0           | 2                    | -          | -      | EETMOS2               |
|                  |        |  |      | P60B6SN    | 60                       | 60     | 180     | 62.5   | -55 to 150 | 5.3                        | 6.7                | 2780            | 55            | 3.0           | 2                    | -          | -      | EETMOS3               |
|                  |        |  |      | P8B10SB    | 100                      | 8      | 24      | 20     | -55 to 150 | 75                         | 94                 | 665             | 16.5          | 2.0           | 6.28                 | -          | -      | EETMOS3               |
|                  |        |  |      | P26B10SL   | 100                      | 26     | 78      | 44     | -55 to 150 | 24                         | 30                 | 1975            | 43            | 2.0           | 2.84                 | -          | -      | EETMOS3               |
|                  |        |  |      | P26B10SN   | 100                      | 26     | 78      | 44     | -55 to 150 | 22                         | 28                 | 1700            | 35            | 3.0           | 2.84                 | -          | -      | EETMOS3               |
|                  |        |  |      | P30B10EL   | 100                      | 30     | 90      | 44     | -55 to 150 | 24                         | 30                 | 2000            | 37            | 2.0           | 2.84                 | -          | -      | EETMOS2               |
|                  |        |  |      | P40B10SL   | 100                      | 40     | 120     | 62.5   | -55 to 150 | 14.8                       | 18.5               | 3210            | 66            | 2.0           | 2                    | -          | -      | EETMOS3               |
|                  |        |  |      | P40B10SN   | 100                      | 40     | 120     | 62.5   | -55 to 150 | 13.4                       | 16.8               | 2880            | 56            | 3.0           | 2                    | -          | -      | EETMOS3               |
|                  |        |  |      | P20B12SL   |                          |        |         |        |            |                            |                    |                 |               |               |                      |            |        |                       |



# POWER MOSFETS

## EETMOS Series (Nch Single)

| Surface Mount   |  |      |        |          |    |    |    |    |     |         |           | Remarks   |             |            |              |
|---|--|------|--------|----------|----|----|----|----|-----|---------|-----------|-----------|-------------|------------|--------------|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | Id [A] | Vdss [V] |    |    |    |    |     | Remarks |           |           |             |            |              |
|   |  |      |        | 40       | 50 | 55 | 60 | 75 | 100 |         | 120       |           | 150         |            |              |
|    | TO-252AB similar<br>SC-63<br>FE        | G3-2 | 8      |          |    |    |    |    |     |         | P8FE10SBK |           |             |            |              |
|   |  |      | 12     |          |    |    |    |    |     |         |           |           | P12FE7R5SBK |            |              |
|   |  |      | 14     |          |    |    |    |    |     |         |           |           |             | P14FE6SBK  |              |
|   |  |      | 20     |          |    |    |    |    |     |         |           |           |             | P20FE12SLK |              |
|   |  |      | 22     |          |    |    |    |    |     |         |           |           |             | P22FE4SBK  |              |
|   |  |      | 26     |          |    |    |    |    |     |         |           |           |             | P26FE10SLK |              |
|   |  |      | 30     |          |    |    |    |    |     |         |           |           |             | P30FE4SLK  |              |
|    | TO-263AB<br>-<br>FG                    | H4   | 32     |          |    |    |    |    |     |         |           | P32FG15SL |             |            |              |
|   |  |      | 80     |          |    |    |    |    |     |         |           | P80FG6EAL |             |            |              |
|   |  |      | 85     |          |    |    |    |    |     |         |           |           |             | P85FG6EAL  |              |
|   |  |      | 90     |          |    |    |    |    |     |         |           |           |             | P90FG5R5SL |              |
|   |  |      | 94     |          |    |    |    |    |     |         |           |           |             | P94FG5R5SL |              |
|    | TO-263AB-1<br>-<br>FH                  | H3   | 80     |          |    |    |    |    |     |         |           | P80FH5ENK |             |            |              |
|   |  |      | 100    |          |    |    |    |    |     |         |           |           |             | P100FH4ENK |              |
|  | SC-83 similar<br>FP                    | H5   | 70     |          |    |    |    |    |     |         |           |           | P70FP12SNK  |            |              |
|   |  |      | 88     |          |    |    |    |    |     |         |           |           |             |            | P88FP10SNK   |
|   |  |      | 100    |          |    |    |    |    |     |         |           |           |             |            | P100FP12SNK  |
|   |  |      | 126    |          |    |    |    |    |     |         |           |           |             |            | P126FP10SNK  |
|   |  |      | 153    |          |    |    |    |    |     |         |           |           |             |            | P153FP6SNK   |
|   |  |      | 168    |          |    |    |    |    |     |         |           |           |             |            | P168FP7R5SNK |
|   |  |      | 175    |          |    |    |    |    |     |         |           |           |             |            | P175FP4SNK   |
|   |  |      | 180    |          |    |    |    |    |     |         |           |           |             |            | P180FP4SNK   |
|  | TO-263SC<br>-<br>FZ-7p                 | H7   | 211    |          |    |    |    |    |     |         |           |           | P211FZ4QMKA |            |              |
|   |  |      | 240    |          |    |    |    |    |     |         |           |           |             |            | P240FZ4QLA   |

■ : New product

## THD (Through Hole Device)

| THD (Through Hole Device)   |  |      |        |          |    |    |    |    |     | Remarks |          |     |             |          |            |
|---|--|------|--------|----------|----|----|----|----|-----|---------|----------|-----|-------------|----------|------------|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | Id [A] | Vdss [V] |    |    |    |    |     |         | Remarks  |     |             |          |            |
|   |  |      |        | 40       | 50 | 60 | 70 | 75 | 100 |         |          | 120 |             |          |            |
|  | SC-91<br>FTO-220AG                     | J8-2 | 22     |          |    |    |    |    |     |         | P22F10SN |     |             |          |            |
|   |  |      | 32     |          |    |    |    |    |     |         |          |     | P32F12SN    |          |            |
|   |  |      | 34     |          |    |    |    |    |     |         |          |     |             | P34F6EL  |            |
|   |  |      | 40     |          |    |    |    |    |     |         |          |     |             | P40F10SN |            |
|   |  |      | 42     |          |    |    |    |    |     |         |          |     |             | P42F6EN  |            |
|   |  |      | 50     |          |    |    |    |    |     |         |          |     |             | P50F10SN |            |
|   |  |      | 55     |          |    |    |    |    |     |         |          |     |             | P55F6EN  |            |
|   |  |      | 66     |          |    |    |    |    |     |         |          |     |             |          | P66F7R5SNK |
|   |  |      | 70     |          |    |    |    |    |     |         |          |     |             |          | P70F7R5SN  |
|  | TO-220AB<br>SC-46<br>FA                | J5   | 100    |          |    |    |    |    |     |         |          |     | P100FA7R5EN |          |            |
|   |  |      | 82     |          |    |    |    |    |     |         |          |     |             |          | P82F7R5SN  |
|   |  |      | 86     |          |    |    |    |    |     |         |          |     |             |          | P86F6SN    |

■ : New product

## EETMOS Series (Nch Single)

| Surface Mount                          |      |                     |                          |            |         |        |            |                            |                    |                 |               |               |                       |     | Based on<br>AEC-Q101 | Automotive | Series |
|--|------|---------------------|--------------------------|------------|---------|--------|------------|----------------------------|--------------------|-----------------|---------------|---------------|-----------------------|-----|----------------------|------------|--------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No.            | Absolute Maximum Ratings |            |         |        |            | Electrical Characteristics |                    |                 |               |               |                       |     |                      |            |        |
|  |      |                     | Vdss [V]                 | Id [A]     | Idp [A] | Pt [W] | Tch [°C]   | Rds(on) (typ) [mΩ]         | Rds(on) (max) [mΩ] | Ciss (typ) [pF] | Qg (typ) [nC] | Vth (typ) [V] | Rth(j-c) (max) [°C/W] |     |                      |            |        |
| TO-252AB similar<br>SC-63<br>FE        | G3-2 | P22FE4SBK           | 40                       | 22         | 66      | 24     | -55 to 175 | 15.2                       | 19.0               | 645             | 16.5          | 2.0           | 6.2                   | ○   | ○                    | EETMOS3    |        |
|  |      | P30FE4SLK           | 40                       | 30         | 90      | 44     | -55 to 175 | 6.3                        | 8.0                | 2020            | 44            | 2.0           | 3.4                   | ○   | ○                    | EETMOS3    |        |
|  |      | P14FE6SBK           | 60                       | 14         | 42      | 24     | -55 to 175 | 31                         | 39                 | 655             | 16.3          | 2.0           | 6.2                   | ○   | ○                    | EETMOS3    |        |
|  |      | P30FE6SLK           | 60                       | 30         | 90      | 44     | -55 to 175 | 10.9                       | 13.8               | 2050            | 43            | 2.0           | 3.4                   | ○   | ○                    | EETMOS3    |        |
|  |      | P12FE7R5SBK         | 75                       | 12         | 36      | 24     | -55 to 175 | 40                         | 50                 | 660             | 16.6          | 2.0           | 6.2                   | ○   | ○                    | EETMOS3    |        |
|  |      | P30FE7R5SLK         | 75                       | 30         | 90      | 44     | -55 to 175 | 14.1                       | 17.8               | 2020            | 45            | 2.0           | 3.4                   | ○   | ○                    | EETMOS3    |        |
|  |      | P8FE10SBK           | 100                      | 8          | 24      | 24     | -55 to 175 | 79                         | 99                 | 665             | 16.5          | 2.0           | 6.2                   | ○   | ○                    | EETMOS3    |        |
|  |      | P26FE10SLK          | 100                      | 26         | 78      | 44     | -55 to 175 | 24                         | 30                 | 1975            | 43            | 2.0           | 3.4                   | ○   | ○                    | EETMOS3    |        |
|  |      | P20FE12SLK          | 120                      | 20         | 60      | 44     | -55 to 175 | 35                         | 44                 | 2110            | 46            | 2.0           | 3.4                   | ○   | ○                    | EETMOS3    |        |
|  |      | TO-263AB<br>-<br>FG | H4                       | P90FG5R5SL | 55      | 90     | 360        | 128                        | 150                | 3.0             | 3.8           | 5130          | 106                   | 2.0 | 0.97                 | -          | -      |
| P94FG5R5SL                             | 55   |                     |                          | 94         | 376     | 156    | 150        | 2.5                        | 3.2                | 7170            | 140           | 2.0           | 0.8                   | -   | -                    | EETMOS3    |        |
| P80FG6EAL                              | 60   |                     |                          | 80         | 320     | 128    | 150        | 3.6                        | 4.9                | 4700            | 90            | 2.0           | 0.97                  | -   | -                    | EETMOS2    |        |
| P85FG6EAL                              | 60   |                     |                          | 85         | 340     | 156    | 150        | 3.2                        | 4.3                | 5700            | 105           | 2.0           | 0.8                   | -   | -                    | EETMOS2    |        |
| P80FG7R5EN                             | 75   |                     |                          | 80         | 320     | 128    | 150        | 5.1                        | 6.4                | 4100            | 67            | 3.0           | 0.97                  | -   | -                    | EETMOS2    |        |
| P32FG15SL                              | 150  |                     |                          | 32         | 96      | 100    | 150        | 32                         | 40                 | 3530            | 72            | 2.0           | 1.25                  | -   | -                    | EETMOS3    |        |
| TO-263AB-1<br>-<br>FH                  | H3   |                     |                          | P100FH4ENK | 40      | 100    | 400        | 175                        | 150                | 1.6             | 2.0           | 5500          | 100                   | 3.0 | 0.71                 | -          | ○      |
|  |      | P80FH5ENK           | 50                       | 80         | 320     | 128    | 150        | 3.0                        | 3.8                | 4000            | 70            | 3.0           | 0.97                  | -   | ○                    | EETMOS2    |        |
| SC-83 similar<br>FP                    | H5   | P175FP4SNK          | 40                       | 175        | 700     | 178    | 175        | 1.3                        | 1.6                | 5900            | 116           | 3.0           | 0.84                  | ○   | ○                    | EETMOS3    |        |
|  |      | P175FP4SN           | 40                       | 175        | 700     | 178    | 175        | 1.3                        | 1.6                | 5900            | 116           | 3.0           | 0.84                  | -   | -                    | EETMOS3    |        |
|  |      | P180FP4SNK          | 40                       | 180        | 720     | 238    | 175        | 0.95                       | 1.15               | 9220            | 160           | 3.0           | 0.63                  | ■   | ○                    | EETMOS3    |        |
|  |      | P180FP4SN           | 40                       | 180        | 720     | 238    | 175        | 0.95                       | 1.15               | 9220            | 160           | 3.0           | 0.63                  | -   | -                    | EETMOS3    |        |
|  |      | P153FP6SNK          | 60                       | 153        | 612     | 178    | 175        | 2.4                        | 3.0                | 5850            | 105           | 3.0           | 0.84                  | ■   | ○                    | EETMOS3    |        |
|  |      | P153FP6SN           | 60                       | 153        | 612     | 178    | 175        | 2.4                        | 3.0                | 5850            | 105           | 3.0           | 0.84                  | -   | -                    | EETMOS3    |        |
|  |      | P180FP6SNK          | 60                       | 180        | 720     | 238    | 175        | 1.6                        | 2.0                | 9380            | 158           | 3.0           | 0.63                  | ■   | ○                    | EETMOS3    |        |
|  |      | P180FP6SN           | 60                       | 180        | 720     | 238    | 175        | 1.6                        | 2.0                | 9380            | 158           | 3.0           | 0.63                  | -   | -                    | EETMOS3    |        |
|  |      | P168FP7R5SNK        | 75                       | 168        | 672     | 238    | -55 to 175 | 2.2                        | 2.8                | 9600            | 155           | 3.0           | 0.63                  | ■   | ○                    | EETMOS3    |        |
|  |      | P168FP7R5SN         | 75                       | 168        | 672     | 238    | 175        | 2.2                        | 2.8                | 9600            | 155           | 3.0           | 0.63                  | -   | -                    | EETMOS3    |        |
|  |      | P88FP10SNK          | 100                      | 88         | 352     | 178    | -55 to 175 | 6.1                        | 7.6                | 6100            | 108           | 3.0           | 0.84                  | ■   | ○                    | EETMOS3    |        |
|  |      | P88FP10SN           | 100                      | 88         | 352     | 178    | 175        | 6.1                        | 7.6                | 6100            | 108           | 3.0           | 0.84                  | -   | -                    | EETMOS3    |        |
|  |      | P126FP10SNK         | 100                      | 126        | 504     | 238    | 175        | 3.8                        | 4.8                | 9500            | 160           | 3.0           | 0.63                  | ■   | ○                    | EETMOS3    |        |
|  |      | P126FP10SN          | 100                      | 126        | 504     | 238    | 175        | 3.8                        | 4.8                | 9500            | 160           | 3.0           | 0.63                  | -   | -                    | EETMOS3    |        |
|  |      | P70FP12SNK          | 120                      | 70         | 280     | 178    | -55 to 175 | 8.9                        | 11.1               | 6100            | 109           | 3.0           | 0.84                  | ■   | ○                    | EETMOS3    |        |
|  |      | P70FP12SN           | 120                      | 70         | 280     | 178    | 175        | 8.9                        | 11.1               | 6100            | 109           | 3.0           | 0.84                  | -   | -                    | EETMOS3    |        |
|  |      | P100FP12SNK         | 120                      | 100        | 400     | 238    | 175        | 5.6                        | 7.0                | 9600            | 164           | 3.0           | 0.63                  | ■   | ○                    | EETMOS3    |        |
|  |      | P100FP12SN          | 120                      | 100        | 400     | 238    | 175        | 5.6                        | 7.0                | 9600            | 164           | 3.0           | 0.63                  | -   | -                    | EETMOS3    |        |
| TO-263SC<br>-<br>FZ-7p                 | H7   | P211FZ4QMKA         | 40                       | 211        | 752     | 178    | 175        | 1.10                       | 1.38               | 8550            | 145           | 4.0           | 0.84                  | -   | -                    | EETMOS4    |        |
|  |      | P240FZ4QLA          | 40                       | 240        | 720     | 178    | -55 to 175 | 1.03                       | 1.29               | 9675            | 171           | 2.0           | 0.84                  | -   | -                    | EETMOS4    |        |
|  |      | P240FZ4QNK          | 40                       | 240        | 720     | 178    | -55 to 175 | 1.07                       | 1.34               | 7915            | 133           | 3.0           | 0.84                  | ○   | ○                    | EETMOS4    |        |
|  |      | P240FZ4QNKA         | 40                       | 240        | 720     | 178    | -55 to 175 | 1.07                       | 1.34               | 7915            | 133           | 3.0           | 0.84                  | ○   | ○                    | EETMOS4    |        |

■ : New product ■ : Please contact us.

## THD (Through Hole Device)

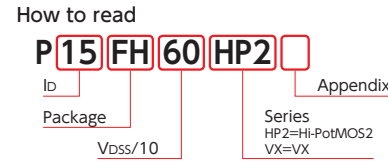
| THD (Through Hole Device)              |      |             |                          |        |         |        |            |                            |                    |                 |               |               |                       |   | Based on<br>AEC-Q101 | Automotive | Series |
|--|------|-------------|--------------------------|--------|---------|--------|------------|----------------------------|--------------------|-----------------|---------------|---------------|-----------------------|---|----------------------|------------|--------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No.    | Absolute Maximum Ratings |        |         |        |            | Electrical Characteristics |                    |                 |               |               |                       |   |                      |            |        |
|  |      |             | Vdss [V]                 | Id [A] | Idp [A] | Pt [W] | Tch [°C]   | Rds(on) (typ) [mΩ]         | Rds(on) (max) [mΩ] | Ciss (typ) [pF] | Qg (typ) [nC] | Vth (typ) [V] | Rth(j-c) (max) [°C/W] |   |                      |            |        |
| SC-91<br>FTO-220AG                     | J8-2 | P70F5EN     | 50                       | 70     | 280     | 53     | 150        | 2.7                        | 3.2                | 5500            | 100           | 3.0           | 2.35                  | - | -                    | EETMOS2    |        |
|  |      | P34F6EL     | 60                       | 34     | 136     | 35     | -55 to 150 | 9.0                        | 11.0               | 1960            | 41            | 2.0           | 3.55                  | - | -                    | EETMOS2    |        |
|  |      | P42F6EN     | 60                       | 42     | 168     | 40     | 150        | 6.7                        | 8.4                | 2540            | 47            | 3.0           | 3.12                  | - | -                    | EETMOS2    |        |
|  |      | P55F6EN     | 60                       | 55     | 220     | 44     | 150        | 4.4                        | 5.5                | 4100            | 73            | 3.0           | 2.84                  | - | -                    | EETMOS2    |        |
|  |      | P86F6SN     | 60                       | 86     | 344     | 58     | 150        | 2.4                        | 3.0                | 9380            | 181           | 3.0           | 2.15                  | - | -                    | EETMOS3    |        |
|  |      | P66F7R5SNK  | 75                       | 66     | 264     | 51     | -55 to 150 | 4.0                        | 5.0                | 6070            | 115           | 3.0           | 2.45                  | - | ○                    | EETMOS3    |        |
|  |      | P66F7R5SN   | 75                       | 66     | 264     | 51     | 150        | 4.0                        | 5.0                | 6070            | 115           | 3.0           | 2.45                  | - | -                    | EETMOS3    |        |
|  |      | P70F7R5EN   | 75                       | 70     | 280     | 53     | 150        | 3.8                        | 4.8                | 5720            | 105           | 3.0           | 2.35                  | - | -                    | EETMOS2    |        |
|  |      | P82F7R5SN   | 75                       | 82     | 328     | 58     | -55 to 150 | 3.0                        | 3.8                | 9600            | 168           | 3.0           | 2.15                  | - | -                    | EETMOS3    |        |
|  |      | P22F10SN    | 100                      | 22     | 66      | 35     | 150        | 22                         | 28                 | 1700            | 34            | 3.0           | 3.55                  | - | -                    | EETMOS3    |        |
|  |      | P40F10SN    | 100                      | 40     | 160     | 44     | 150        | 8.5                        | 10.7               | 4500            | 92            | 3.0           | 2.84                  | - | -                    | EETMOS3    |        |
|  |      | P50F10SN    | 100                      | 50     | 200     | 51     | 150        | 6.9                        | 8.7                | 5880            | 114           | 3.0           | 2.45                  | - | -                    | EETMOS3    |        |
|  |      | P32F12SN    | 120                      | 32     | 128     | 44     | 150        | 12.4                       | 15.5               | 4540            | 92            | 3.0           | 2.84                  | - | -                    | EETMOS3    |        |
|  |      | P40F12SN    | 120                      | 40     | 160     | 51     | 150        | 9.5                        | 11.9               | 6000            | 117           | 3.0           | 2.45                  | - | -                    | EETMOS3    |        |
| TO-220AB<br>SC-46<br>FA                | J5   | P100FA7R5EN | 75                       | 100    | 400     | 140    | 150        | 4.2                        | 5.0                | 5720            | 104           | 3.0           | 0.89                  | - | -                    | EETMOS2    |        |

■ : New product

# POWER MOSFETS

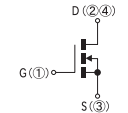
The Hi-PotMOS series are MOSFETs with a high breakdown strength, and they are 100% screened using di/dt & avalanche testing.

| Series           | Feature   |
|------------------|---|
| HP2 (Hi-PotMOS2) | High breakdown resistance, Avalanche rated, di/dt inspection(all parts)                       |
| VX               | Automotive qualified, Avalanche rated, di/dt inspection(all parts), High Breakdown resistance |



## HP2 • VX Series (Nch Single)

| Surface Mount |  |          |        |                      |          |            |          |             |             |  |
|---------------|--|----------|--------|----------------------|----------|------------|----------|-------------|-------------|--|
| Package       | JEDEC Code<br>JEITA Code<br>House Name | Fig.     | Id [A] | Vdss [V]             |          |            |          |             | Remarks     |  |
|               |  |          |        | 250/280/300          | 400      | 500/525    | 600      | 900         |             |  |
|               | TO-252AA<br>-<br>FB                    | G2-1     | 0.5    |                      |          |            |          |             |             |  |
|               |  |          | 1      |                      |          | P1B52HP2   |          | P0R5B60HP2  |             |  |
|               |  |          | 1.5    |                      |          | P1R5B40HP2 |          |             |             |  |
|               |  |          | 2      |                      |          |            |          | P2B60HP2F   |             |  |
|               |  |          | 2.5    |                      |          |            |          | P2R5B52HP2F |             |  |
|               |  |          | 3      | P3B28HP2             |          |            |          |             |             |  |
|               |  |          | 4      |                      |          |            | P4B40HP2 |             | P4B60HP2F   |  |
|               |  |          | 5      |                      |          |            |          |             | P5B52HP2    |  |
|               |  |          | 6      | P6B28HP2             | P6B40HP2 |            |          |             | P6B52HP2    |  |
|               |  |          | 8      | P8B28HP2<br>P8B30HP2 |          |            |          |             |             |  |
| 9             | <b>N</b> P9B30HP2F                     | P9B40HP2 |        |                      |          |            |          |             |             |  |
| 10            |  |          |        |                      |          |            |          |             |             |  |
|               | TO-252AB similar<br>SC-63<br>FE        | G3-2     | 1      |                      |          |            |          |             | P1FE90VX3   |  |
|               |  |          | 2      |                      |          |            |          |             | P2FE60VX5K  |  |
|               |  |          | 6      | P6FE25VX5K           |          |            |          |             |             |  |
|               | TO-263AB-1<br>-<br>FH                  | H3       | 3      |                      |          |            |          |             | ★ P3FH90VX3 |  |
|               |  |          | 5      |                      |          |            |          |             | ★ P5FH90VX3 |  |
|               |  |          | 7      |                      |          |            |          |             |             |  |
|               |  |          | 15     |                      |          |            |          |             | P7FH60HP2   |  |
|               |  |          | 20     |                      |          |            |          |             | P15FH60HP2  |  |
|               |  |          | 36     | P36FH28HP2           |          |            |          |             |             |  |



**N** : New product ★ : Under development

## THD (Through Hole Device)

| THD (Through Hole Device) |  |      |        |            |     |     |     |     |                       |            |                         |
|---------------------------|--|------|--------|------------|-----|-----|-----|-----|-----------------------|------------|-------------------------|
| Package                   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | Id [A] | Vdss [V]   |     |     |     |     | Remarks               |            |                         |
|                           |  |      |        | 280        | 400 | 500 | 600 | 900 |                       |            |                         |
|                           | -<br>SC-91<br>FTO-220AG                | J8-2 | 3      |            |     |     |     |     | P3F60HP2              |            |                         |
|                           |  |      | 4      |            |     |     |     |     | P4F60HP2              | ★ P4F90VX3 |                         |
|                           |  |      | 5      |            |     |     |     |     | P5F50HP2<br>P5F50HP2F | P5F60HP2   |                         |
|                           |  |      | 6      |            |     |     |     |     | P6F50HP2              |            |                         |
|                           |  |      | 7      |            |     |     |     |     |                       | P7F60HP2   | ★ P7F90VX3              |
|                           |  |      | 8      | P8F28HP2   |     |     |     |     |                       | P8F50HP2   |                         |
|                           |  |      | 10     |            |     |     |     |     |                       | P10F50HP2  | P10F60HP2               |
|                           |  |      | 12     |            |     |     |     |     |                       |            | P12F60HP2               |
|                           |  |      | 13     | P13F28HP2  |     |     |     |     |                       | P13F50HP2  |                         |
|                           |  |      | 15     |            |     |     |     |     |                       | P15F50HP2  | P15F60HP2<br>P15F60HP2F |
|                           |  |      | 17     | P17F28HP2  |     |     |     |     |                       |            |                         |
|                           |  |      | 20     |            |     |     |     |     |                       | P20F50HP2  |                         |
|                           |  |      | 21     | P21F28HP2  |     |     |     |     |                       |            |                         |
|                           |  |      | 26     | P26F28HP2  |     |     |     |     |                       |            |                         |
| 36                        | P36F28HP2                              |      |        |            |     |     |     |     |                       |            |                         |
|                           | -<br>SC-91<br>FTO-220A                 | J7-2 | 23     |            |     |     |     |     | P23F40HP2FM           |            |                         |
|                           | TO-247AD<br>-<br>MTO-3P                | K4-2 | 85     | P85W28HP2F |     |     |     |     |                       |            |                         |
|                           |  |      |        |            |     |     |     |     |                       |            |                         |
|                           | TO-247AD<br>-<br>MTO-3PV               | K7-4 | 30     |            |     |     |     |     | P30W60HP2V            |            |                         |

★ : Under development

## HP2 • VX Series (Nch Single)

| Surface Mount                          |      |                                 |                          |            |        |            |                            |                           |                 |               |               |                       |                                 |                      |            |        |     |    |
|--|------|---------------------------------|--------------------------|------------|--------|------------|----------------------------|---------------------------|-----------------|---------------|---------------|-----------------------|---------------------------------|----------------------|------------|--------|-----|----|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No.                        | Absolute Maximum Ratings |            |        |            | Electrical Characteristics |                           |                 |               |               |                       | Body Diode<br>trr (typ)<br>[ns] | Based on<br>AEC-Q101 | Automotive | Series |     |    |
|  |      |                                 | Vdss [V]                 | Id [A]     | Pr [W] | Tch [°C]   | Rds(ON) (typ) [Ω] Vgs=10V  | Rds(ON) (max) [Ω] Vgs=10V | Ciss (typ) [pF] | Qg (typ) [nC] | Vth (typ) [V] | Rth(j-c) (max) [°C/W] |                                 |                      |            |        |     |    |
| TO-252AA<br>-<br>FB                    | G2-1 | P3B28HP2                        | 280                      | 3          | 35     | 150        | 1.7                        | 2.0                       | 120             | 3.6           | 3.75          | 3.55                  | -                               | -                    | -          | HP2    |     |    |
|  |      | P6B28HP2                        | 280                      | 6          | 35     | 150        | 0.66                       | 0.85                      | 240             | 5.7           | 3.75          | 3.55                  | -                               | -                    | -          | HP2    |     |    |
|  |      | P8B28HP2                        | 280                      | 8          | 54     | 150        | 0.38                       | 0.50                      | 400             | 9.8           | 3.75          | 2.31                  | -                               | -                    | -          | HP2    |     |    |
|  |      | P8B30HP2                        | 300                      | 8          | 54     | 150        | 0.42                       | 0.50                      | 400             | 9.8           | 3.75          | 2.31                  | -                               | -                    | -          | HP2    |     |    |
|  |      | <b>N</b> P9B30HP2F              | 300                      | 9          | 54     | -55 to 150 | 0.44                       | 0.55                      | 402             | 14.0          | 4.5 *1        | 2.31                  | 72                              | -                    | -          | -      | HP2 |    |
|  |      | P10B28HP2                       | 280                      | 10         | 70     | 150        | 0.30                       | 0.40                      | 500             | 11.4          | 3.75          | 1.78                  | -                               | -                    | -          | HP2    |     |    |
|  |      | P1R5B40HP2                      | 400                      | 1.5        | 35     | 150        | 4.2                        | 5.0                       | 120             | 3.9           | 3.75          | 3.55                  | -                               | -                    | -          | HP2    |     |    |
|  |      | P4B40HP2                        | 400                      | 4          | 35     | 150        | 1.54                       | 1.90                      | 245             | 6.5           | 3.75          | 3.55                  | -                               | -                    | -          | HP2    |     |    |
|  |      | P6B40HP2                        | 400                      | 6          | 54     | 150        | 0.84                       | 1.05                      | 400             | 10            | 3.75          | 2.31                  | -                               | -                    | -          | HP2    |     |    |
|  |      | P9B40HP2                        | 400                      | 9          | 40     | 150        | 0.65                       | 0.80                      | 575             | 14.5          | 3.75          | 3.12                  | -                               | -                    | -          | HP2    |     |    |
|  |      | P1B52HP2                        | 525                      | 1          | 35     | 150        | 6.0                        | 7.2                       | 125             | 4.3           | 3.75          | 3.55                  | -                               | -                    | -          | HP2    |     |    |
|  |      | P2R5B52HP2F                     | 525                      | 2.5        | 35     | 150        | 2.5                        | 3.2                       | 240             | 6.7           | 3.25          | 3.55                  | 52                              | -                    | -          | HP2    |     |    |
|  |      | P5B52HP2                        | 525                      | 5          | 54     | 150        | 1.4                        | 1.7                       | 400             | 10.5          | 3.75          | 2.31                  | -                               | -                    | -          | HP2    |     |    |
|  |      | P6B52HP2                        | 525                      | 6          | 70     | 150        | 1.10                       | 1.35                      | 520             | 15            | 3.75          | 1.78                  | -                               | -                    | -          | HP2    |     |    |
|  |      | P0R5B60HP2                      | 600                      | 0.5        | 35     | 150        | 8.3                        | 10.0                      | 120             | 4.3           | 3.75          | 3.55                  | -                               | -                    | -          | HP2    |     |    |
|  |      | P2B60HP2F                       | 600                      | 2          | 35     | 150        | 3.4                        | 4.2                       | 240             | 6.8           | 3.25          | 3.55                  | 52                              | -                    | -          | HP2    |     |    |
|  |      | P4B60HP2F                       | 600                      | 4          | 70     | 150        | 1.6                        | 1.9                       | 520             | 13            | 3.25          | 1.78                  | 75                              | -                    | -          | HP2    |     |    |
|  |      | TO-252AB similar<br>SC-63<br>FE | G3-2                     | P1FE90VX3  | 900    | 1          | 36                         | -55 to 150                | 9.5             | 14.0          | 193           | 10.8                  | 3.5                             | 3.4                  | -          | ○      | ○   | VX |
|  |      |                                 |                          | P6FE25VX5K | 250    | 6          | 27                         | 150                       | 0.58            | 0.70          | 250           | 10                    | 3.75                            | 4.62                 | -          | -      | ○   | VX |
|  |      |                                 |                          | P2FE60VX5K | 600    | 2          | 27                         | 150                       | 3.4             | 4.2           | 247           | 12                    | 3.75                            | 4.62                 | -          | -      | ○   | VX |
| TO-263AB-1<br>-<br>FH                  | H3   | P36FH28HP2                      | 280                      | 36         | 175    | 150        | 0.08                       | 0.12                      | 1730            | 35            | 3.75          | 0.71                  | -                               | -                    | -          | HP2    |     |    |
|  |      | P20FH50HP2                      | 500                      | 20         | 175    | 150        | 0.29                       | 0.36                      | 1735            | 40            | 3.75          | 0.71                  | -                               | -                    | -          | HP2    |     |    |
|  |      | ★ P3FH90VX3                     | 900                      | 3          | 128    | -55 to 150 | 2.8                        | 3.4                       | 600             | 22            | 4.0 *1        | 0.97                  | -                               | ■                    | ○          | VX     |     |    |
|  |      | ★ P5FH90VX3                     | 900                      | 5          | 175    | -55 to 150 | 1.2                        | 1.5                       | 1380            | 41            | 4.0 *1        | 0.71                  | -                               | ■                    | ○          | VX     |     |    |
|  |      | P7FH60HP2                       | 600                      | 7          | 128    | 150        | 0.88                       | 1.05                      | 810             | 19            | 3.75          | 0.97                  | -                               | -                    | -          | HP2    |     |    |
|  |      | P15FH60HP2                      | 600                      | 15         | 175    | 150        | 0.41                       | 0.49                      | 1750            | 37            | 3.75          | 0.71                  | -                               | -                    | -          | HP2    |     |    |

**N** : New product ★ : Under development \*1 : max. ■ : Please contact us.

## THD (Through Hole Device)

| THD (Through Hole Device)              |            |   |                          |             |            |            |                            |                           |                 |               |               |                       |                                 |                      |            |        |   |     |
|--|------------|---|--------------------------|-------------|------------|------------|----------------------------|---------------------------|-----------------|---------------|---------------|-----------------------|---------------------------------|----------------------|------------|--------|---|-----|
| JEDEC Code<br>JEITA Code<br>House Name | Fig.       | Type No.  | Absolute Maximum Ratings |             |            |            | Electrical Characteristics |                           |                 |               |               |                       | Body Diode<br>trr (typ)<br>[ns] | Based on<br>AEC-Q101 | Automotive | Series |   |     |
|  |            |   | Vdss [V]                 | Id [A]      | Pr [W]     | Tch [°C]   | Rds(ON) (typ) [Ω] Vgs=10V  | Rds(ON) (max) [Ω] Vgs=10V | Ciss (typ) [pF] | Qg (typ) [nC] | Vth (typ) [V] | Rth(j-c) (max) [°C/W] |                                 |                      |            |        |   |     |
| -<br>SC-91<br>FTO-220AG                | J8-2       | P8F28HP2  | 280                      | 8           | 52.5       | -55 to 150 | 0.38                       | 0.5                       | 400             | 9.8           | 3.75          | 2.38                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P13F28HP2   | 280                      | 13          | 65         | 150        | 0.23                       | 0.3                       | 630             | 15            | 3.75          | 1.92                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P17F28HP2   | 280                      | 17          | 79         | 150        | 0.17                       | 0.23                      | 830             | 19.5          | 3.75          | 1.58                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P21F28HP2   | 280                      | 21          | 85         | 150        | 0.13                       | 0.18                      | 1000            | 20.5          | 3.75          | 1.47                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P26F28HP2   | 280                      | 26          | 90         | 150        | 0.11                       | 0.15                      | 1200            | 24.5          | 3.75          | 1.39                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P36F28HP2   | 280                      | 36          | 95         | 150        | 0.08                       | 0.12                      | 1730            | 35            | 3.75          | 1.32                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P5F50HP2  | 500                      | 5           | 52.5       | 150        | 1.3                        | 1.6                       | 400             | 10.5          | 3.75          | 2.38                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P5F50HP2F   | 500                      | 5           | 52.5       | 150        | 1.38                       | 1.65                      | 405             | 10.5          | 3.25          | 2.38                  | 70                              | -                    | -          | HP2    |   |     |
|  |            | P6F50HP2  | 500                      | 6           | 62.5       | 150        | 1.00                       | 1.25                      | 500             | 12.5          | 3.75          | 2.00                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P8F50HP2  | 500                      | 8           | 65         | 150        | 0.8                        | 1.0                       | 610             | 15            | 3.75          | 1.92                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P10F50HP2   | 500                      | 10          | 79         | -55 to 150 | 0.60                       | 0.75                      | 820             | 20            | 3.75          | 1.58                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P13F50HP2   | 500                      | 13          | 85         | 150        | 0.48                       | 0.60                      | 1050            | 25            | 3.75          | 1.47                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P15F50HP2   | 500                      | 15          | 90         | 150        | 0.4                        | 0.5                       | 1340            | 27            | 3.75          | 1.39                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P20F50HP2   | 500                      | 20          | 95         | 150        | 0.29                       | 0.36                      | 1735            | 40            | 3.75          | 1.32                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P3F60HP2  | 600                      | 3           | 52.5       | 150        | 1.92                       | 2.30                      | 400             | 10            | 3.75          | 2.38                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P4F60HP2  | 600                      | 4           | 62.5       | 150        | 1.5                        | 1.8                       | 505             | 12.5          | 3.75          | 2.00                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P5F60HP2  | 600                      | 5           | 65         | 150        | 1.17                       | 1.40                      | 615             | 15            | 3.75          | 1.92                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P7F60HP2  | 600                      | 7           | 79         | 150        | 0.88                       | 1.05                      | 810             | 19            | 3.75          | 1.58                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P10F60HP2   | 600                      | 10          | 85         | 150        | 0.67                       | 0.80                      | 1040            | 23            | 3.75          | 1.47                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P12F60HP2   | 600                      | 12          | 90         | 150        | 0.56                       | 0.67                      | 1230            | 26.5          | 3.75          | 1.39                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P15F60HP2   | 600                      | 15          | 95         | -55 to 150 | 0.41                       | 0.49                      | 1750            | 37            | 3.75          | 1.32                  | -                               | -                    | -          | HP2    |   |     |
|  |            | P15F60HP2F  | 600                      | 15          | 95         | -55 to 150 | 0.44                       | 0.53                      | 1720            | 34            | 3.25          | 1.32                  | 88                              | -                    | -          | HP2    |   |     |
|  |            | ★ P4F90VX3  | 900                      | 4           | 79         | 150        | 2.8                        | 3.6                       | 595             | 21            | 4.0 *1        | 1.58                  | -                               | -                    | -          | VX     |   |     |
|  |            | ★ P7F90VX3  | 900                      | 7           | 95         | 150        | 1.2                        | 1.7                       | 1375            | 42            | 4.0 *1        | 1.32                  | -                               | -                    | -          | VX     |   |     |
|  |            | -<br>SC-91<br>FTO-220A<br>TO-247AD<br>-<br>MTO-3P | J7-2                     | P23F40HP2FM | 400        | 23         | 104                        | 150                       | 0.17            | 0.24          | 1620          | 40                    | 3.25                            | 1.2                  | 68         | -      | - | HP2 |
|  |            |   |                          | K4-2        | P85W28HP2F | 280        | 85                         | 310                       | -55 to 150      | 0.035         | 0.045         | 4440                  | 90                              | 3.45                 | 0.4        | 76     | - | -   |
| K7-4                                   | P30W60HP2V |   |                          |             | 600        | 30         | 310                        | -55 to 150                | 0.185           | 0.23          | 3935          | 70                    | 3.75                            | 0.4                  | -          | -      | - | HP2 |

★ : Under development \*1 : max.



# POWER MODULES

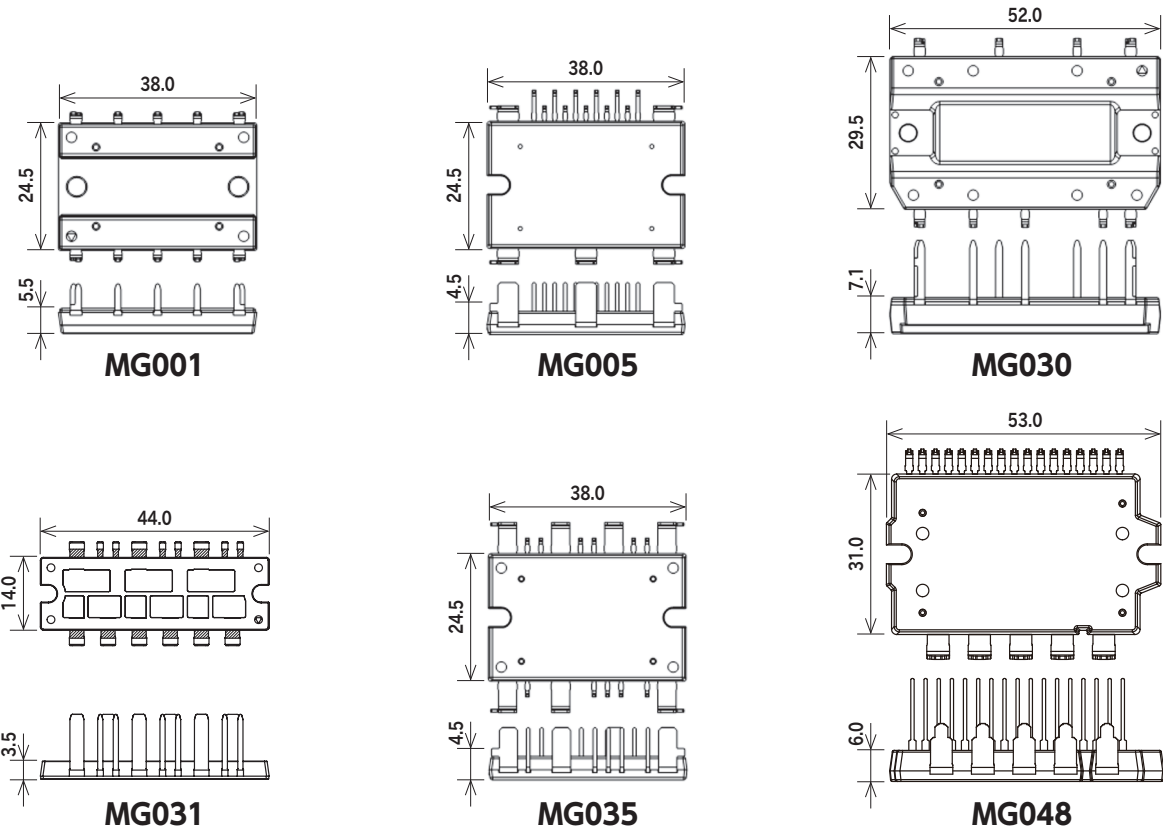
Power Modules include combinations of various power semiconductors.

They are easy to design, reduce the number of components needed in the device, are suitable for device downsizing, and mitigate heat-dissipation concerns.

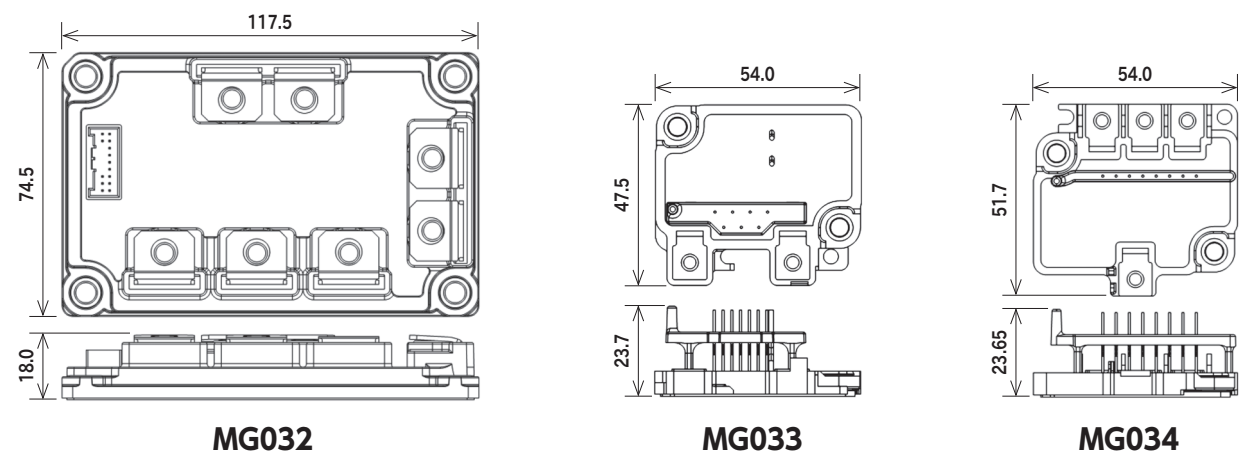
At Shindengen, a multitude of packages allow us to meet customer needs of MOSFET, diodes, and other products.

Semi customizable support and customizable package design support are available.

## Transfer Type Package Sample



## Potting Type Package Sample



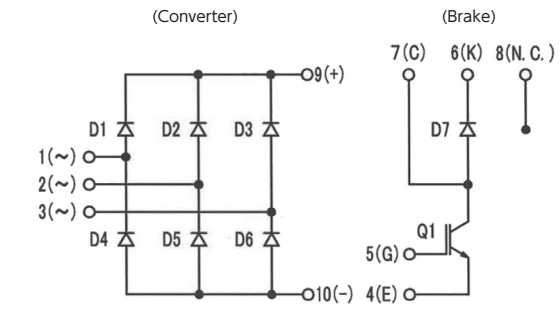
## CB Module Series

### Converter + Brake Modules

| Type No. | Package    |            | Converter Diode          |      |                          |            | Brake IGBT               |            |                          |      | Brake FRD                |            |                          |         | UL  | Automotive |            |          |            |           |
|----------|------------|------------|--------------------------|------|--------------------------|------------|--------------------------|------------|--------------------------|------|--------------------------|------------|--------------------------|---------|-----|------------|------------|----------|------------|-----------|
|          |            |            | Absolute Maximum Ratings |      | Electric Characteristics |            | Absolute Maximum Ratings |            | Electric Characteristics |      | Absolute Maximum Ratings |            | Electric Characteristics |         |     |            |            |          |            |           |
|          | JEDEC Code | JEITA Code | Fig.                     | VRRM | IF (AV)                  | Conditions | Vf (max)                 | Conditions | VCEs                     | Ic   | VCE (sat) (typ)          | Conditions | VRRM                     | IF (AV) |     |            | Conditions | Vf (max) | Conditions | trr (max) |
|          | House Name |            | [V]                      | [A]  | Tc [°C]                  | [V]        | [A]                      | [V]        | [A]                      | [V]  | [A]                      | [V]        | [A]                      | [°C]    | [V] | [A]        | [ns]       |          |            |           |
| MG020200 | -          | -          | F4                       | 600  | 20.0                     | 137        | 1.05                     | 7.0        | 600                      | 28.0 | 2.10                     | 15.0       | 600                      | 3.0     | 137 | 1.65       | 3.0        | 50       | UL         | -         |
| MG020201 | MG001      | -          | F4                       | 600  | 30.0                     | 136        | 1.05                     | 10.0       | 600                      | 30.0 | 2.00                     | 30.0       | 600                      | 3.0     | 137 | 1.65       | 3.0        | 50       | UL         | -         |

UL : UL recognize(UL File No.E142422)

### Equivalent Circuit Schematic



MG001

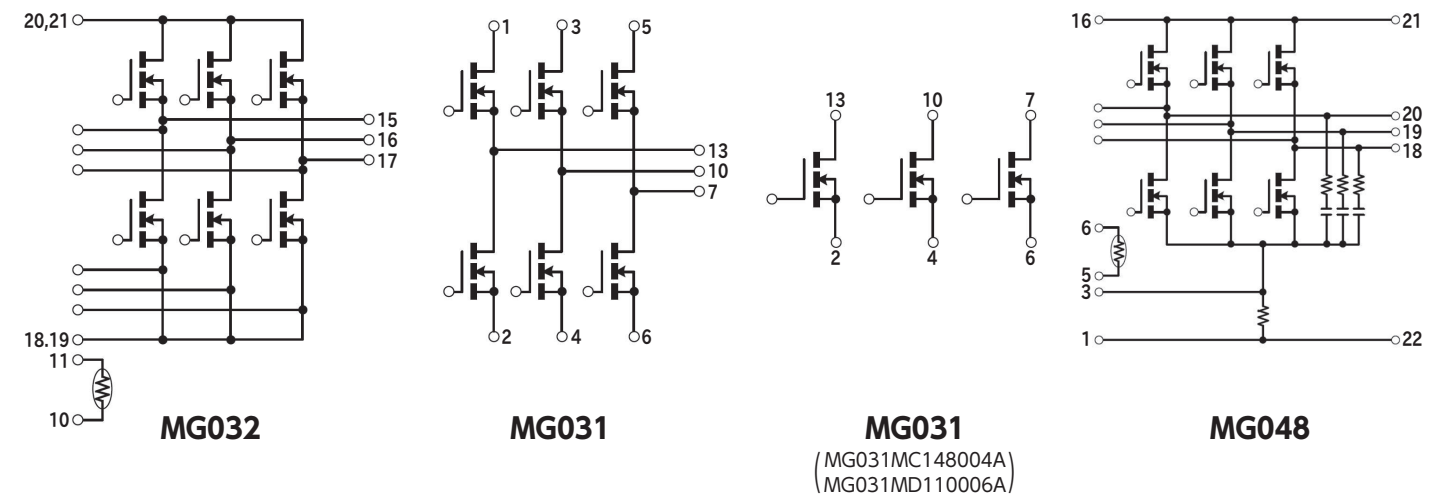
## INV Module Series

### Inverter Modules

| Type No.        | Package    |            | Absolute Maximum Ratings |         |         |     |      | Electrical Characteristics |               |            |          |           |                | UL   | Automotive |   |
|-----------------|------------|------------|--------------------------|---------|---------|-----|------|----------------------------|---------------|------------|----------|-----------|----------------|------|------------|---|
|                 |            |            | Vbss                     | Id      | IdP     | Pt  | Tch  | Rds(on) (typ)              | Rds(on) (max) | Ciss (typ) | Qg (typ) | Vth (typ) | Rth(j-c) (max) |      |            |   |
|                 | JEDEC Code | JEITA Code | [V]                      | [A]     | [A]     | [W] | [°C] | [mΩ]                       | [mΩ]          | [pF]       | [nC]     | [V]       | [°C/W]         |      |            |   |
|                 | House Name | Fig.       | VGS=10V                  | VGS=10V | VGS=10V |     |      |                            |               |            |          |           |                |      |            |   |
| MG032A4207R5A   | -          | -          | F6                       | 75      | 420     | 840 | 500  | 150                        | -             | 0.98       | 80120    | 505       | 3.0            | 0.25 | -          | ○ |
| MG032B420010A   | MG032      | -          | F6                       | 100     | 420     | 840 | 500  | 150                        | 0.99          | 1.37       | 91800    | 500       | 3.0            | 0.25 | -          | ○ |
| MG031B090004A   | -          | -          | F5                       | 40      | 90      | 360 | 125  | 175                        | 2.34          | 3.20       | 4180     | 76        | 2.0            | 1.2  | -          | ○ |
| ★MG031E120004A  | -          | -          | F5                       | 40      | 120     | 480 | 125  | 175                        | 2.44          | 3.10       | 3540     | 68        | 3.0            | 1.2  | -          | ■ |
| ★MG031G148004A  | -          | -          | F5                       | 40      | 148     | 592 | 154  | 175                        | 1.75          | 2.20       | 5330     | 96        | 3.0            | 0.97 | -          | ○ |
| ★MG031L080006A  | MG031      | -          | F5                       | 60      | 80      | 320 | 125  | 175                        | 4.47          | 5.60       | 3570     | 65        | 3.0            | 1.2  | -          | ■ |
| ★MG031N110006A  | MG031      | -          | F5                       | 60      | 110     | 440 | 154  | 175                        | 3.0           | 3.8        | 5630     | 94        | 3.0            | 0.97 | -          | ■ |
| ★MG031MC148004A | -          | -          | F5                       | 40      | 148     | 592 | 154  | 175                        | 1.75          | 2.20       | 5330     | 96        | 3.0            | 0.97 | -          | ■ |
| ★MG031MD110006A | -          | -          | F5                       | 60      | 110     | 440 | 154  | 175                        | 3.1           | 3.9        | 5630     | 94        | 3.0            | 0.97 | -          | ■ |
| ★MG048A150004A  | -          | -          | F8                       | 40      | 150     | 600 | 147  | 150                        | 2.1           | 2.7        | 5900     | 111       | 3.0            | 0.85 | -          | ■ |
| ★MG048B100006A  | MG048      | -          | F8                       | 60      | 100     | 400 | 147  | 150                        | 2.82          | 3.92       | 8186     | 136       | 3.0            | 0.85 | -          | ■ |

■ : New product ★ : Under development ■ : Please contact us.

### Equivalent Circuit Schematic

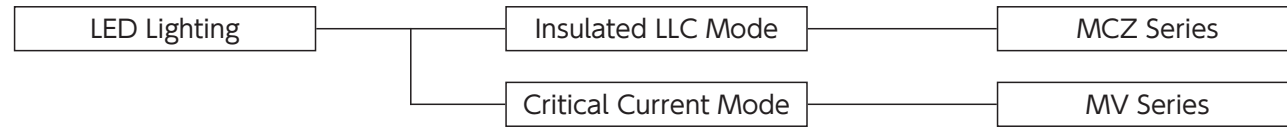




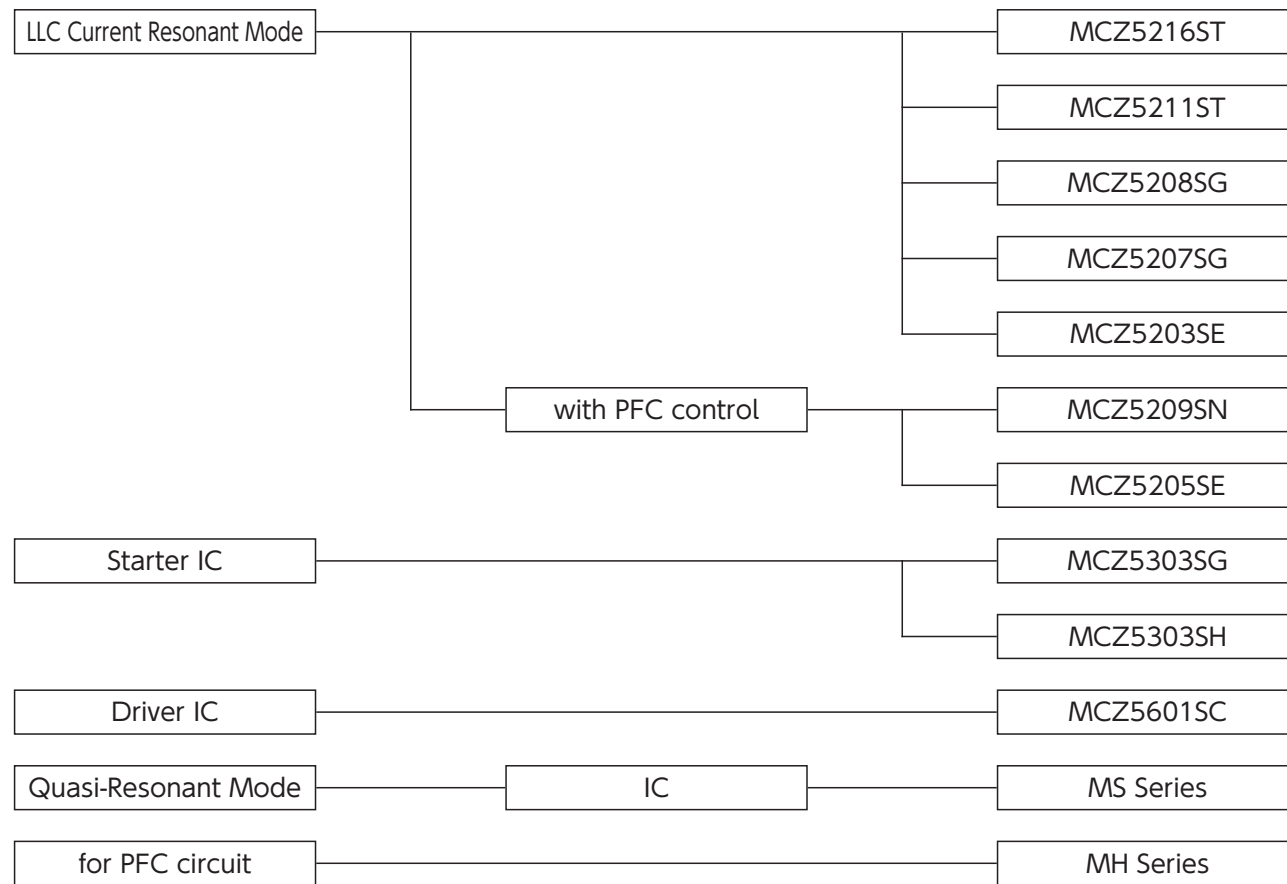
# POWER ICs

## Line up

### IC for LED Lighting



### IC for Power Supply





## IC for LED Lighting

### Critical Current Mode Power Supply ICs for LED Lighting : MV Series

- Outline** The MV series has a specialized function for LED lighting with PWM & Linear dimming that operates Critical Current Mode without auxiliary winding. On and off width modulation function allows for smooth deep dimming of 1% or less.

## MV Series

### Critical Current Mode Power Supply ICs for LED Lighting

| Package   |      | Type No. | HV Startup | Vcc [V]  | Output | ON/OFF   | Built-in Regulator Voltage [V] | Linear Dimming       | PWM Dimming | Automotive |     |   |
|---|------|----------|------------|----------|--------|----------|--------------------------------|----------------------|-------------|------------|-----|---|
| JEDEC Code<br>JEITA Code<br>House Name  | Fig. |          |            |          |        |          |                                |                      |             |            |     |   |
|  | -    | SOP8J    | L2         | MV1001SC | Yes    | 9 to 16  | 1ch                            | -                    | -           | -          | -   |   |
|   |      |          | MV1002SC   | No       |        |          |                                |                      |             |            |     |   |
|   |      |          | MV1011SC   | Yes      |        |          |                                |                      |             |            |     |   |
|   |      |          | MV1012SC   | No       |        |          |                                |                      |             |            |     |   |
|  | -    | SOP16    | L5         | MV2002SG | No     | 10 to 16 | 2ch                            | Cont. by REF Voltage | 3.3         | Yes        | Yes | - |
|   |      |          | MV2052SG   | No       | 5      |          |                                |                      | -           |            |     |   |

# POWER ICs

## IC for Power Supply

### LLC Current Resonant Mode Controller ICs for Bridge Converter : MCZ Series

- Outline** The MCZ series is an advanced symmetric LLC current resonant mode controller for bridge converters. Symmetric LLC resonant converter applications are greatly expanding due to their extremely high efficiency and low noise characteristics.

### Starter ICs with Built-in Burst Function : MCZ5303

- Outline** A dedicated IC that provides a low power consumption start-up for circuits without an IC. Low power consumption standby is possible due to the ON/OFF Control IC with burst function. It is especially effective when used in conjunction with the LLC current resonance power supply.

### High/Low Side Driving IC

- Outline** A driving IC for MOSFET and IGBT power devices. With built-in high-withstand voltage components, it can be used for a variety of uses such as inverter and power supply, etc.






### Low Power Standby Quasi-Resonant Power Supply ICs : MS Series

- Outline** The MS series consumes much less power in standby mode than conventional MR series. The ICs incorporate various functions to make it more user-friendly and easier to design a power supply with fewer external components.

### PFC ICs : MH Series



- Outline** The MH series is a PFC circuit control IC which enables multistage interleave. An efficient, high power operation is possible by utilizing a slave IC composed of multistage interleave and a master IC that can be used alone.

## MCZ Series


| LLC Current Resonant Mode Controller ICs for Bridge Converter                       |            |      |           |  |            |                 |               |             |            |                         |                  |                            |                         |                         |            |            |     |     |       |             |     |     |     |     |       |             |     |       |             |     |       |             |   |
|---|------------|------|-----------|--|------------|-----------------|---------------|-------------|------------|-------------------------|------------------|----------------------------|-------------------------|-------------------------|------------|------------|-----|-----|-------|-------------|-----|-----|-----|-----|-------|-------------|-----|-------|-------------|-----|-------|-------------|---|
| Package   |            | Fig. | Type No.  | Type                                       | HV Startup | High-side Drive | Vcc (max) [V] | Vin Sensing | Burst Mode | Maximum Frequency [kHz] | X-cap. discharge | Capacitive Mode Protection | Over Voltage Protection | Over Current Protection | Automotive |            |     |     |       |             |     |     |     |     |       |             |     |       |             |     |       |             |   |
| JEDEC Code  | JEITA Code |      |           |  |            |                 |               |             |            |                         |                  |                            |                         |                         |            | House Name |     |     |       |             |     |     |     |     |       |             |     |       |             |     |       |             |   |
|  | -          | L6   | MCZ5216ST | LLC Current Resonant Mode                  | Yes        | Yes             | 35            | Yes         | Yes        | 500                     | Yes              | Yes                        | Latch                   | Timer Latch             | -          |            |     |     |       |             |     |     |     |     |       |             |     |       |             |     |       |             |   |
|   | SOP18      |      | MCZ5211ST | LLC Current Resonant Mode                  | Yes        |                 |               |             | Yes        | 500                     | No               |                            |                         |                         | -          |            |     |     |       |             |     |     |     |     |       |             |     |       |             |     |       |             |   |
|  | -          | L8   | MCZ5209SN | LLC Current Resonant Mode with PFC Control | Yes        |                 |               |             | Yes        | 35                      | Yes              |                            |                         |                         | Yes        | 300        | No  | Yes | Latch | Timer Latch | -   |     |     |     |       |             |     |       |             |     |       |             |   |
|   | SOP24      |      | MCZ5207SG | LLC Current Resonant Mode                  | No         |                 |               |             |            |                         |                  |                            |                         |                         | Yes        | 300        | No  |     |       |             | -   |     |     |     |       |             |     |       |             |     |       |             |   |
|  | -          | L5   | MCZ5208SG | LLC Current Resonant Mode                  | No         |                 |               |             |            |                         |                  |                            |                         |                         | Yes        | 35         | Yes |     |       |             | Yes | 500 | No  | Yes | Latch | Timer Latch | -   |       |             |     |       |             |   |
|   | SOP16      |      | MCZ5205SE | LLC Current Resonant Mode with PFC Control | No         |                 |               |             |            |                         |                  |                            |                         |                         |            |            |     |     |       |             | No  | 300 | No  |     |       |             | -   |       |             |     |       |             |   |
|  | -          | L7   | MCZ5205SE | LLC Current Resonant Mode with PFC Control | No         |                 |               |             |            |                         |                  |                            |                         |                         |            |            |     |     |       |             | Yes | 35  | Yes |     |       |             | No  | 300   | No          | Yes | Latch | Timer Latch | - |
|   | SOP22      |      | MCZ5203SE | LLC Current Resonant Mode                  | No         |                 |               |             |            |                         |                  |                            |                         |                         |            |            |     |     |       |             |     |     |     |     |       |             | No  | 300   | No          |     |       |             | - |
|  | -          | L7   | MCZ5203SE | LLC Current Resonant Mode                  | No         | Yes             | 35            | Yes         |            |                         |                  | No                         | 300                     | No                      |            |            |     |     |       |             |     |     |     |     |       |             | Yes | Latch | Timer Latch |     |       |             | - |
|   | SOP22      |      |           |  |            |                 |               |             |            |                         |                  |                            |                         |                         |            |            |     |     |       |             |     |     |     |     |       |             |     |       |             |     |       |             |   |

 : New product

### Starter ICs with Built-in Burst Function

| Package   |            | Fig. | Type No.  | Vin Applied Voltage [V] | Vcc Output Voltage [V] | HV Startup | Vin Sensing | Burst Mode | Automotive |
|---|------------|------|-----------|-------------------------|------------------------|------------|-------------|------------|------------|
| JEDEC Code  | JEITA Code |      |           |                         |                        |            |             |            |            |
|  | -          | L5   | MCZ5303SG | 95 to 450               | 18.5(typ)              | Yes        | Yes         | Yes        | -          |
|   | SOP16      |      |           |                         |                        |            |             | No         | No         |
|  | -          | L3   | MCZ5303SH | 95 to 450               | 18.5(typ)              | Yes        | No          | No         | -          |
|   | SOP8/7J    |      |           |                         |                        |            |             |            |            |



### High/Low Side Driver ICs

| Package  |            | Fig. | Type No.  | Output             | High-side Floating Supply Voltage [V] | Vcc (max) [V] | Input/Output Channel | Vcc_UVLO [V] | VBS_UVLO [V] | Typ. Output Current |             | Automotive |
|--|------------|------|-----------|--------------------|---------------------------------------|---------------|----------------------|--------------|--------------|---------------------|-------------|------------|
| JEDEC Code   | JEITA Code |      |           |                    |                                       |               |                      |              |              | House Name          | Source [mA] |            |
|  | -          | L2   | MCZ5601SC | High-side/Low-side | 600                                   | 22            | 2/2                  | 8.2 to 9.0   | 7.2 to 8.0   | 400                 | 400         | -          |
|  | SOP8J      |      |           |                    |                                       |               |                      |              |              |                     |             |            |

 : New product

## MS Series


### Low Power Standby Quasi-Resonant Power Supply ICs

| Package   |            | Fig. | Type No.   | Vin [V]   | Vcc [V]  | Over Voltage Protection | Over Current Protection | Stand-by Operation           | Bottom Skip | Automotive |
|---|------------|------|------------|-----------|----------|-------------------------|-------------------------|------------------------------|-------------|------------|
| JEDEC Code  | JEITA Code |      |            |           |          |                         |                         |                              |             |            |
|  | -          | L3   | ★ MS1007SH | 95 to 450 | 11 to 21 | Auto restart            | Auto restart            | Auto Burst Mode              | 1 skip      | -          |
|   | SOP8/7J    |      | MS1004SH   |           |          |                         |                         | Auto Burst Mode/S-Stby Mode  | 2 skip      | -          |
|   |            |      | MS1003SH   |           |          |                         |                         | Auto Burst Mode/S-Stby Mode  | 1 skip      | -          |
|  | -          | L4   | MS1006SK   | 95 to 450 | 11 to 24 | Vcc Latch               | Timer Latch 2sec. (typ) | Auto Burst Mode/UT-Stby Mode | 2 skip      | -          |
|   | SOP14      |      | MS1005SK   |           |          |                         |                         | Auto Burst Mode/UT-Stby Mode | 1 skip      | -          |

★ : Under development

## MH Series

### PFC ICs

| Package   |            | Fig. | Type No. | Type                        | Operation Mode | Vin Sensing | Vcc [V]  | Zero Current Detection | Diodes Short Protection | FB Open Short Protection | Over Voltage Protection | Automotive |
|---|------------|------|----------|-----------------------------|----------------|-------------|----------|------------------------|-------------------------|--------------------------|-------------------------|------------|
| JEDEC Code  | JEITA Code |      |          |                             |                |             |          |                        |                         |                          |                         |            |
|  | -          | L2   | MH2501SC | Critical Current Mode       | Master         | Unnecessary | 13 to 23 | Auxiliary Winding      | Yes                     | Yes                      | Yes                     | -          |
|   | SOP8J      |      | MH2511SC | Synchronizes with Master IC | Slave          |             | 11 to 23 | -                      | No                      | No                       | No                      | -          |

# PACKAGE LIST

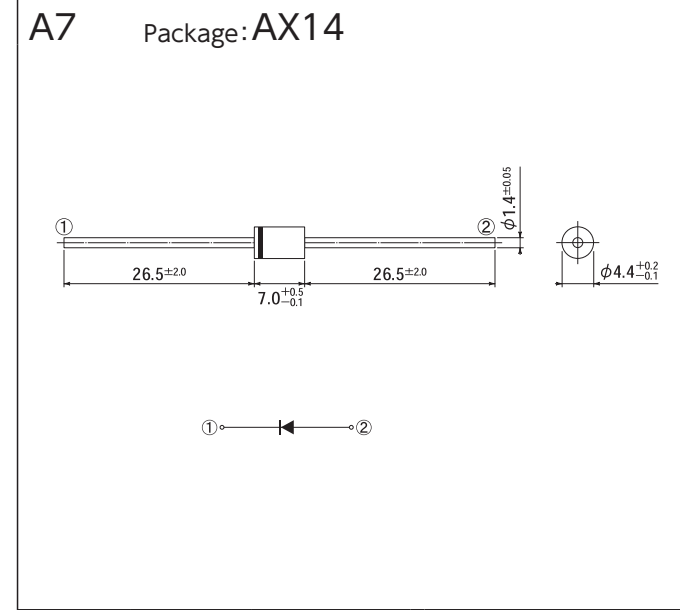
|   | 1   | 2  | 3  | 4   | 5   | 6 | 7   | 8   | 9   | 10   |   |
|---|---|--|--|---|---|---|---|---|---|--|---|
| A | A1 Package:AX057<br>                               | A2 Package:AX06<br>                             | A3 Package:AX06<br>                       | A4 Package:AX078<br>                      | A5 Package:AX10<br>                      |   | A6 Package:AX10<br>                                | A7 Package:AX14<br>                                |   |  |   |
| B | B1 Package:DO-219AB similar <small>5LF</small><br> | B2 Package:DO-219AA <small>M1F</small><br>      | B3 Package:DO-214AC <small>1F</small><br> | B4 Package:DO-214AC <small>1F</small><br> | B5 Package:SC-110B <small>CE</small><br> |   | B6 Package:DO-214AA similar <small>M2F</small><br> | B7 Package:DO-214AA similar <small>M2F</small><br> | B8 Package:DO-214AA similar <small>M2F</small><br> | B9 Package:2F<br>       | B10 Package:2F<br>     |
| C | C1 Package:SOPA-4<br>                             | C2 Package:TO-269AA <small>1Z(SMD)</small><br> | C3 Package:1Z (DIP)<br>                  | C4 Package:1N(SMD)<br>                   | C5 Package:1N(DIP)<br>                  |   | C6 Package:1NA(SMD)<br>                           | C7 Package:1NA(DIP)<br>                           | C8 Package:1W(SMD)<br>                            | C9 Package:1W(DIP)<br> |   |
| D | D1 Package:D3K<br>                               | D2 Package:2S<br>                             | D3 Package:3S<br>                       | D4 Package:5S<br>                       | D5 Package:JB<br>                      |   | D6 Package:JA<br>                                | D7 Package:TSB (4pin) ,JC (4pin)<br>             | D8 Package:TSB (5pin) ,JC (5pin)<br>             | D9 Package:JF<br>     | D10 Package:JH<br>   |
| E | E1 Package:MCP<br>                               | E2 Package:D30VC<br>                          | E3 Package:S2VB<br>                     | E4 Package:S4VB<br>                     | E5 Package:S5VB<br>                    |   | E6 Package:S10VB<br>                             | E7 Package:S15VB<br>                             | E8 Package:S25VB<br>                             | E9 Package:S50VB<br>  | E10 Package:S3WB<br> |
|   | 11  | 12   | 13   | 14  | 15  |   |   |   |   |  |   |
| E | E11 Package:S10WB<br>                            | E12 Package:S15WB<br>                         | E13 Package:S20WB<br>                   | E14 Package:SVTA<br>                    | E15 Package:SVT<br>                    |   |   |   |   |  |   |

# PACKAGE LIST

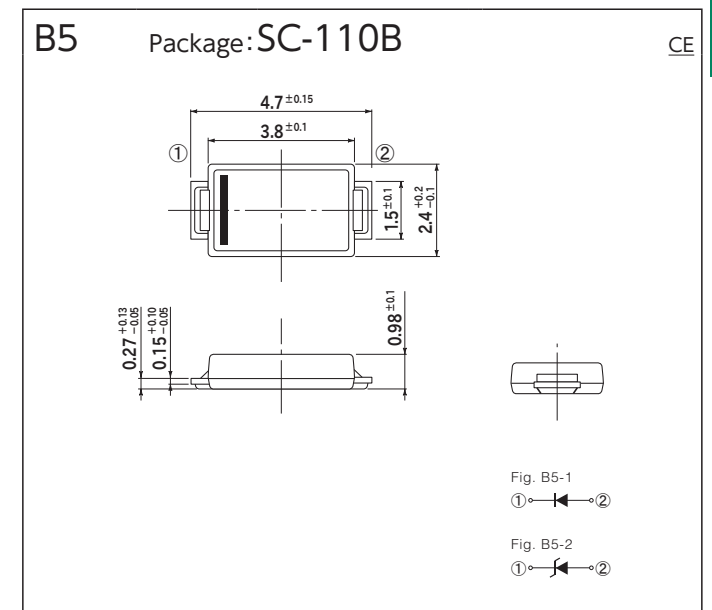
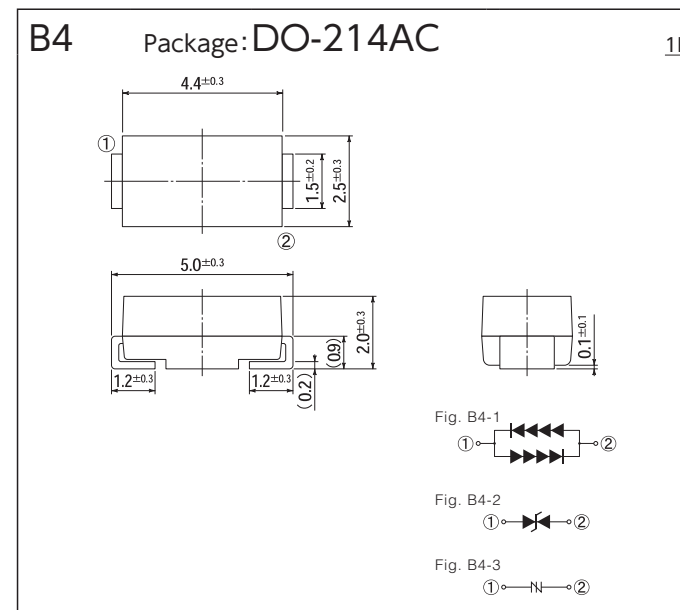
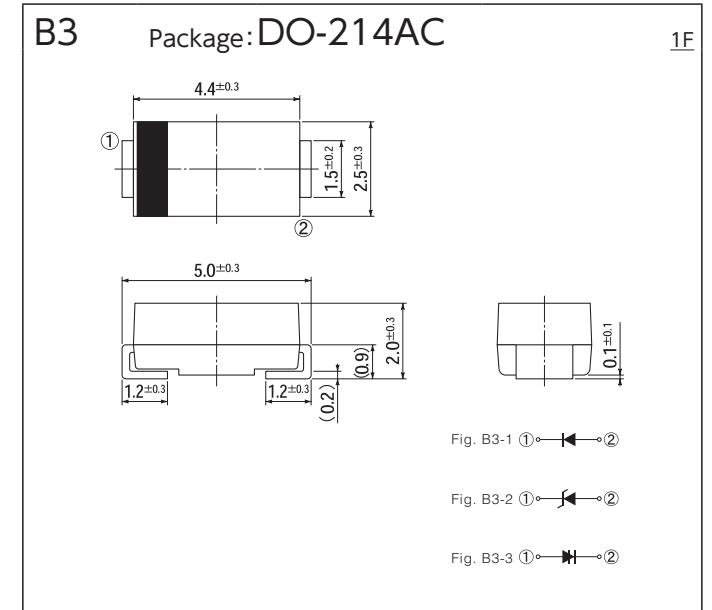
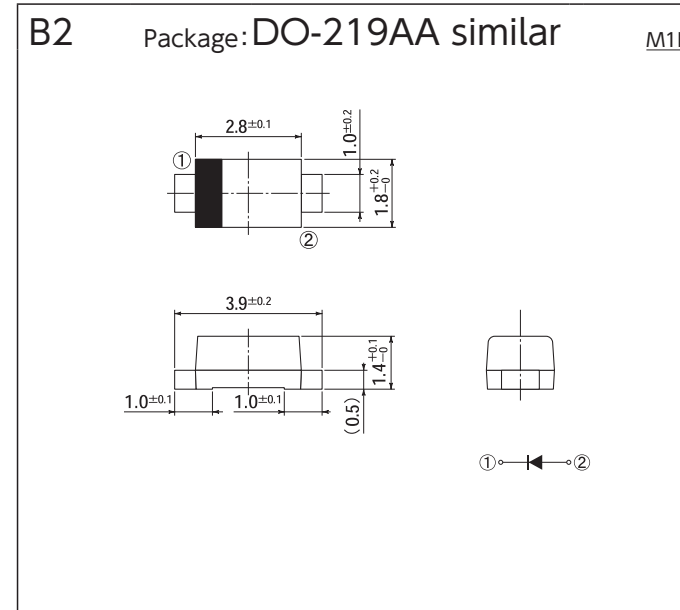
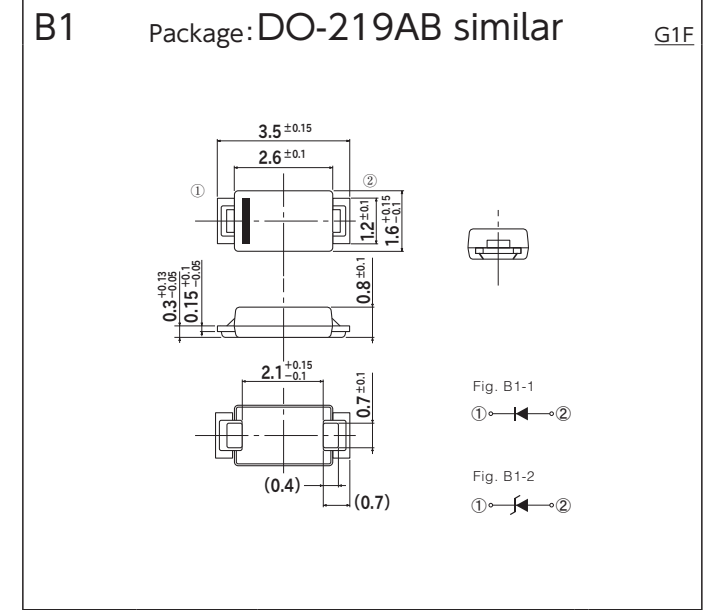
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| F | F1 Package:Module<br>                | F2 Package:Module<br>                 | F3 Package:Module<br>                | F4 Package:MG001<br>                  | F5 Package:MG031<br>                  | F6 Package:MG032<br>                | F7 Package:MG038<br>                | F8 Package:MG048<br>                 |                                     |    |
| G | G1 Package:SC-63 E-pack<br>          | G2 Package:TO-252AA EB<br>            | G3 Package:TO-252AB similar EE<br>   | G4 Package:DO-277A similar EY<br>     | G5 Package:TO-252AA similar EB<br>    | G6 Package:LA<br>                   | G7 Package:MO-235B similar LE<br>   |                                      |                                     |    |
| H | H1 Package:SC-83 similar STO-220<br> | H2 Package:SC-83 similar EB<br>       | H3 Package:TO-263AB-1 EH<br>         | H4 Package:TO-263AB EG<br>            | H5 Package:SC-83 similar EB<br>       | H6 Package:TO-263AB EZ<br>          | H7 Package:TO-263-SC EZ-7b<br>      |                                      |                                     |    |
| J | J1 Package:SC-91A FTO-220(2pin)<br>  | J2 Package:SC-91 FTO-220A(2pin)<br>   | J3 Package:SC-91 FTO-220AG(2pin)<br> | J4 Package:SC-91 FTO-220G(2pin)<br>   | J5 Package:TO-220AB EA<br>            | J6 Package:SC-91A FTO-220(3pin)<br> | J7 Package:SC-91 FTO-220A(3pin)<br> | J8 Package:SC-91 FTO-220AG(3pin)<br> | J9 Package:SC-91 FTO-220G(3pin)<br> |    |
| K | K1 Package:SC-93 ITO-3PT(2pin)<br>   | K2 Package:TO-247AD MTO-3PT(2pin)<br> | K3 Package:SC-93 ITO-3PT(3pin)<br>   | K4 Package:TO-247AD MTO-3PT(3pin)<br> | K5 Package:TO-247AD MTO-3PT(3pin)<br> | K6 Package:TO-247AD MTO-3PV<br>     | K7 Package:TO-247AD MTO-3PV<br>     |                                      |                                     |    |
| L | L1 Package:SOP8<br>                  | L2 Package:SOP8J<br>                  | L3 Package:SOP8/7J<br>               | L4 Package:SOP14<br>                  | L5 Package:SOP16<br>                  | L6 Package:SOP18<br>                | L7 Package:SOP22<br>                | L8 Package:SOP24<br>                 |                                     |    |

# OUTLINE DIMENSIONS

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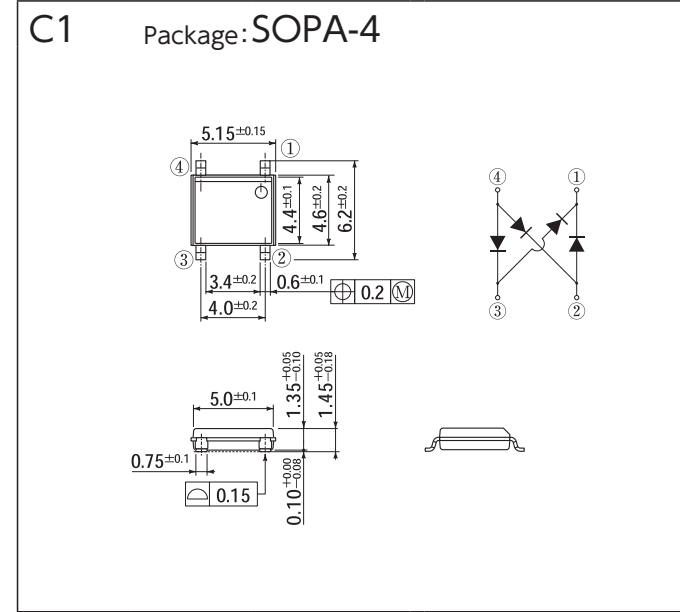
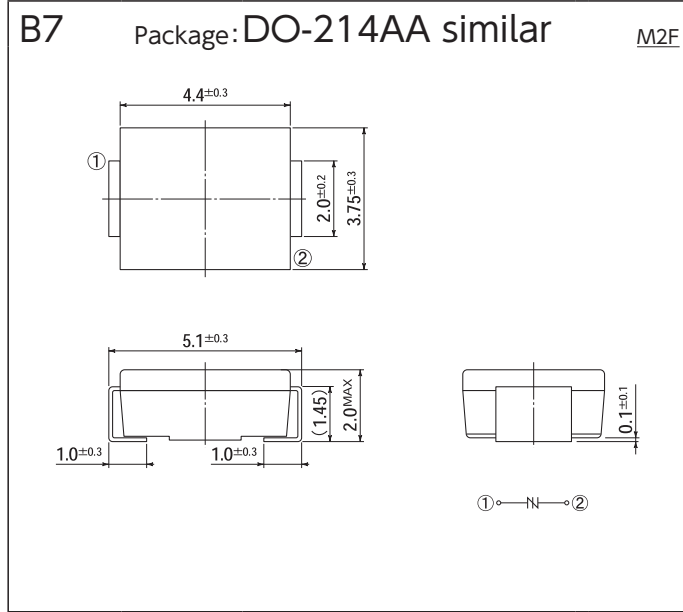
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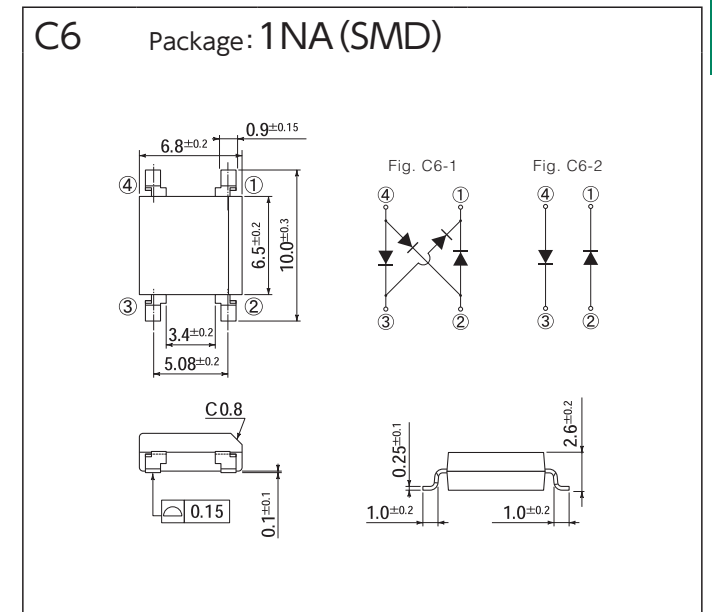
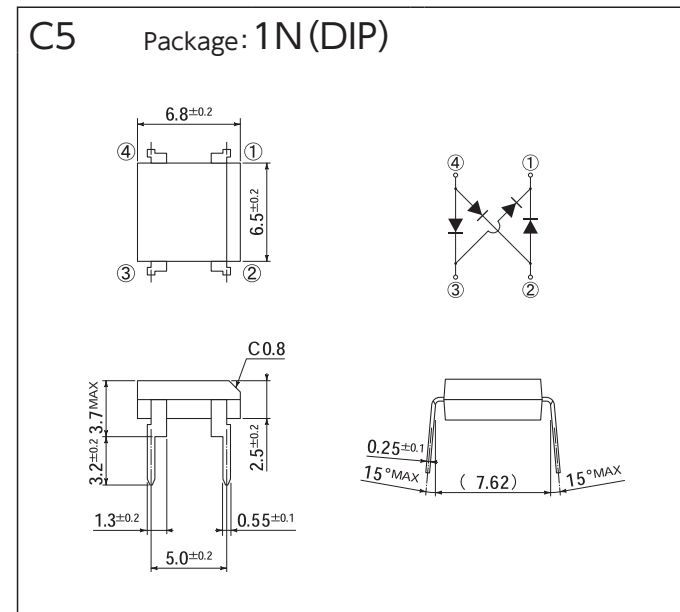
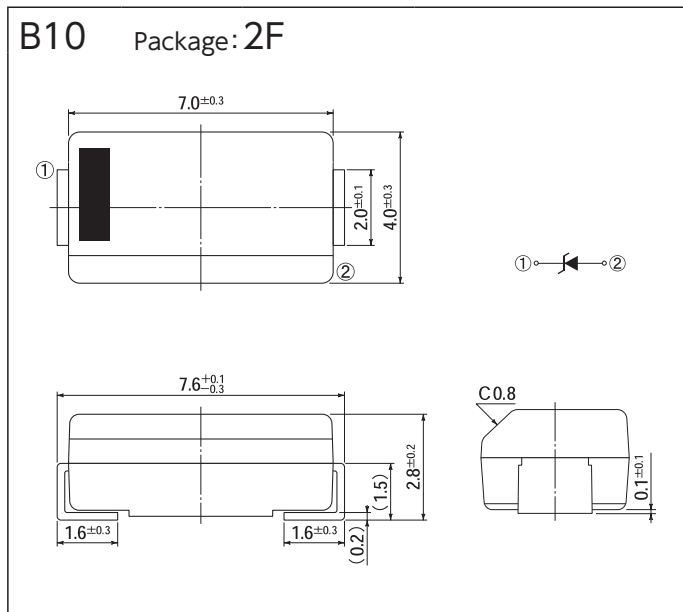
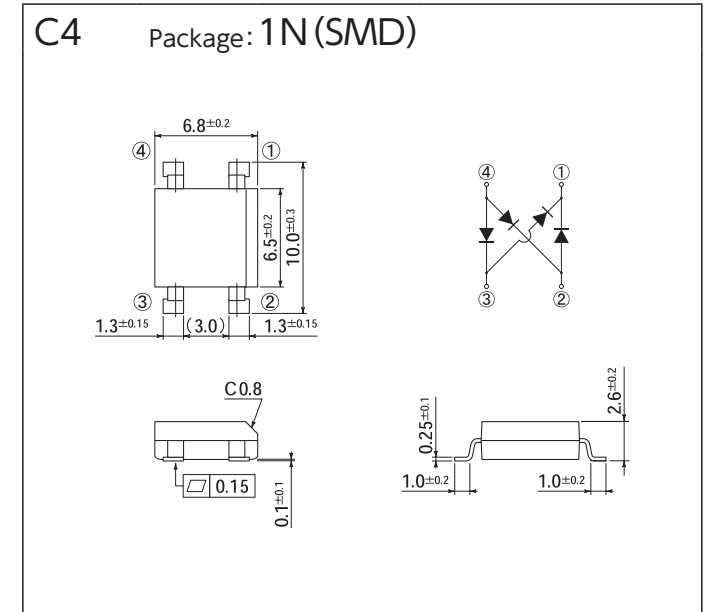
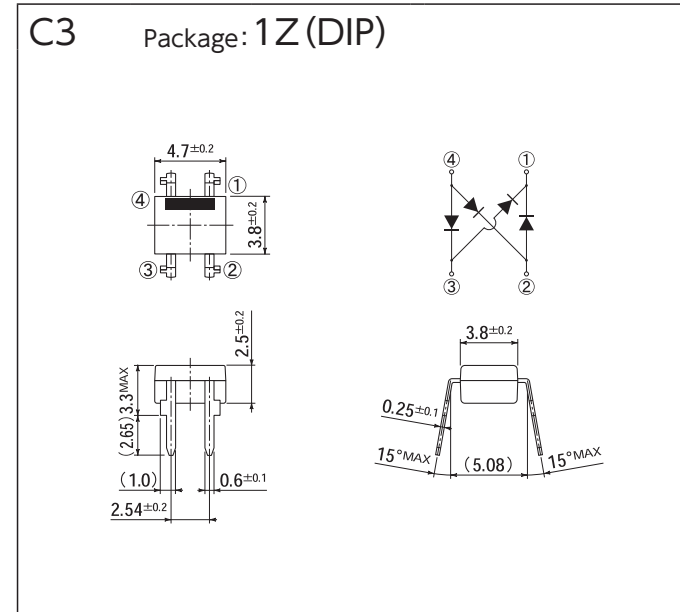
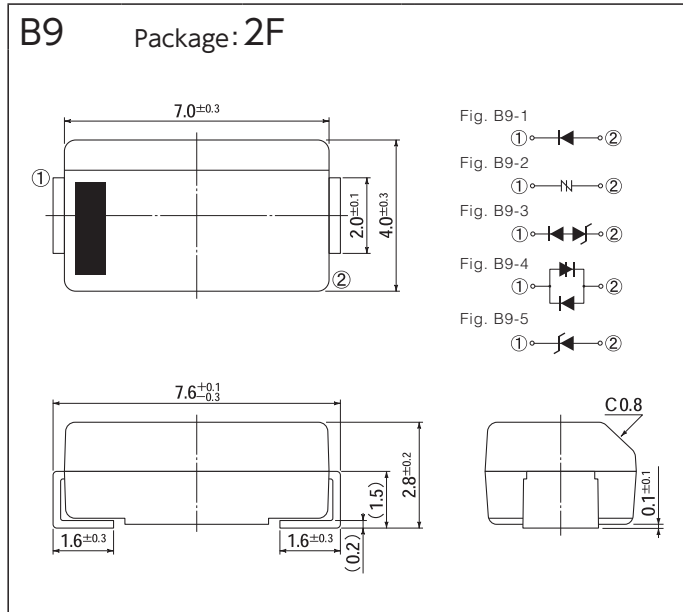
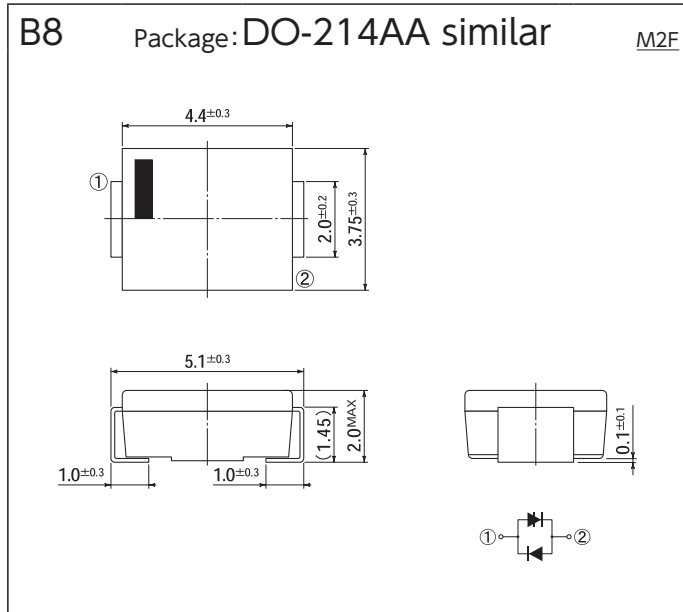
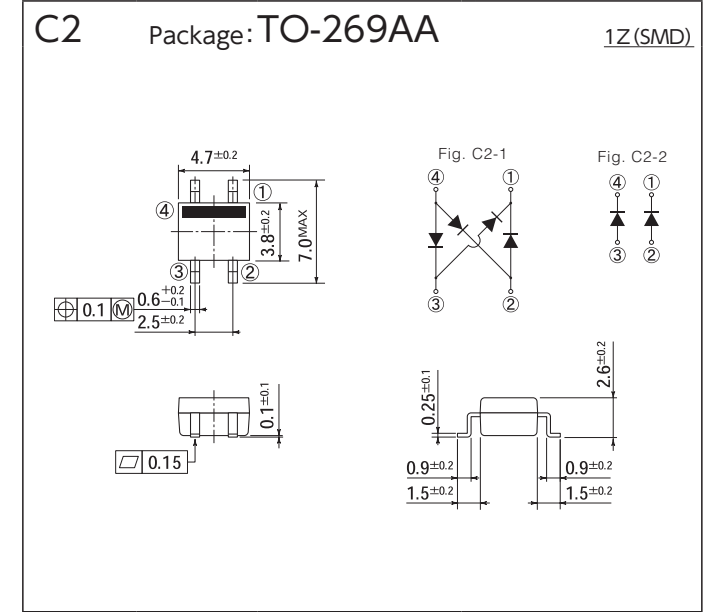


# OUTLINE DIMENSIONS

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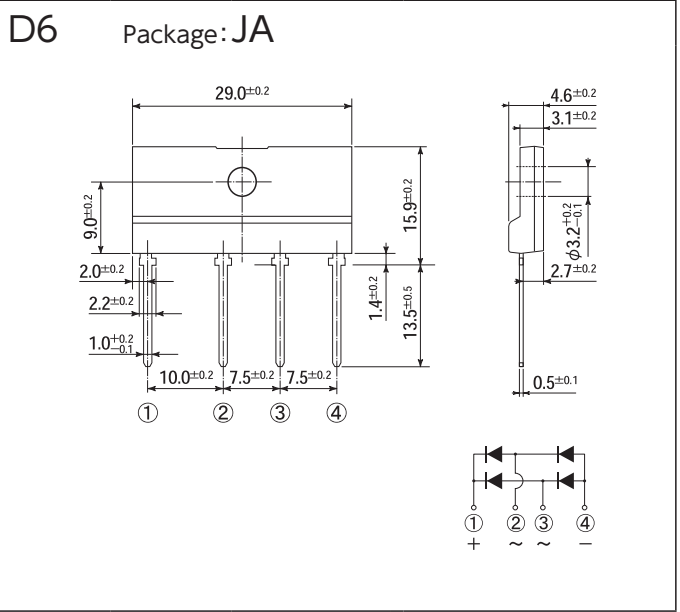
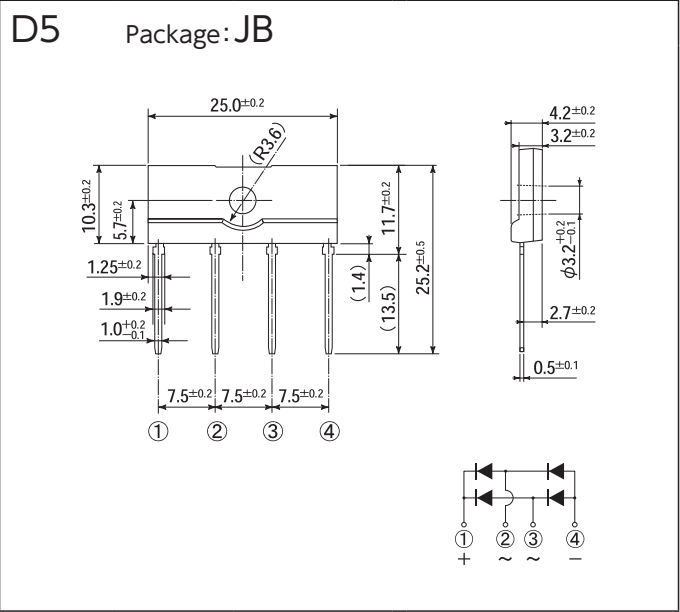
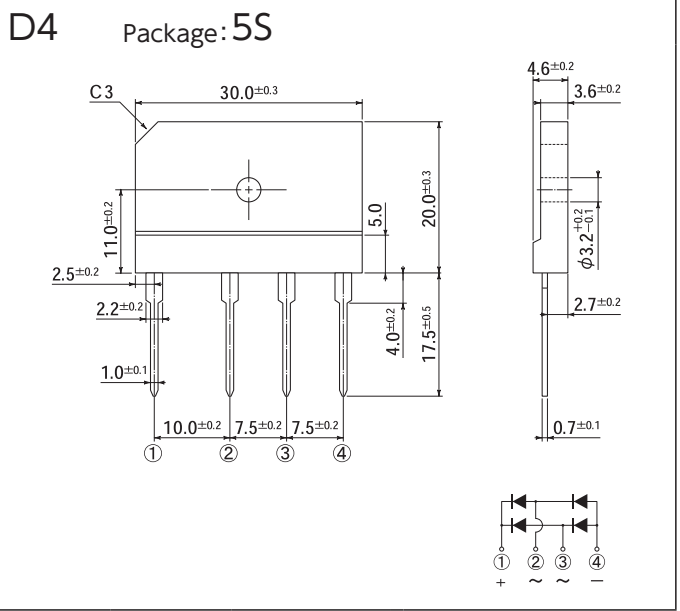
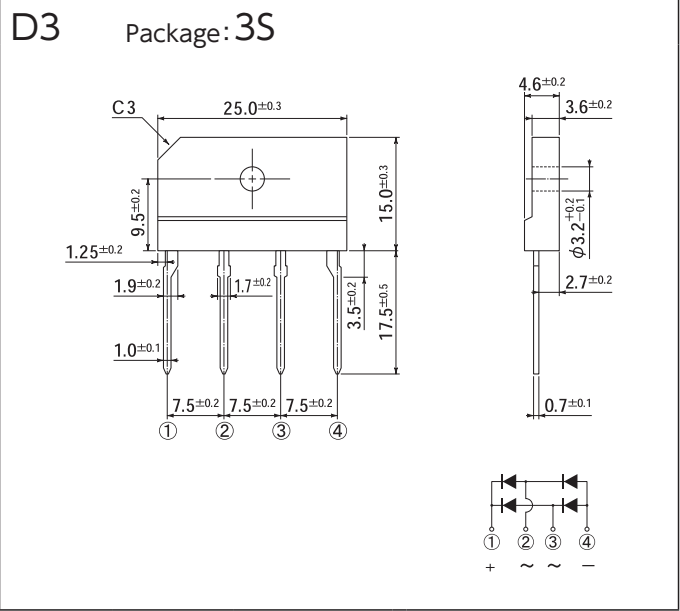
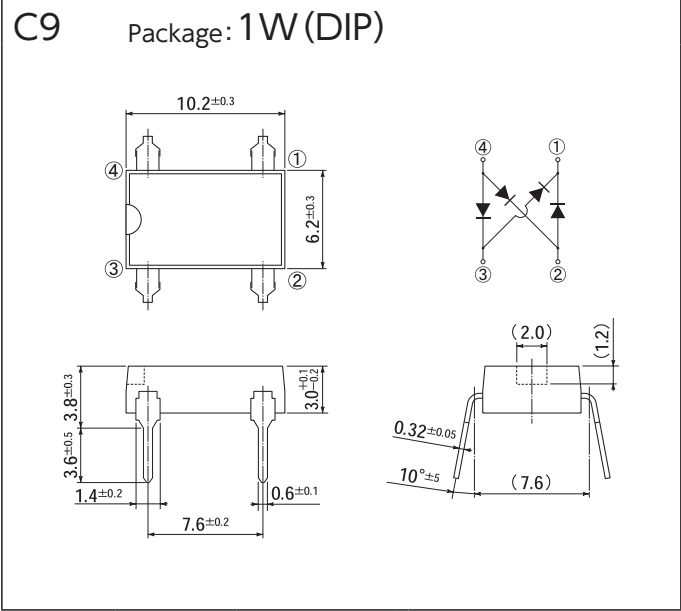
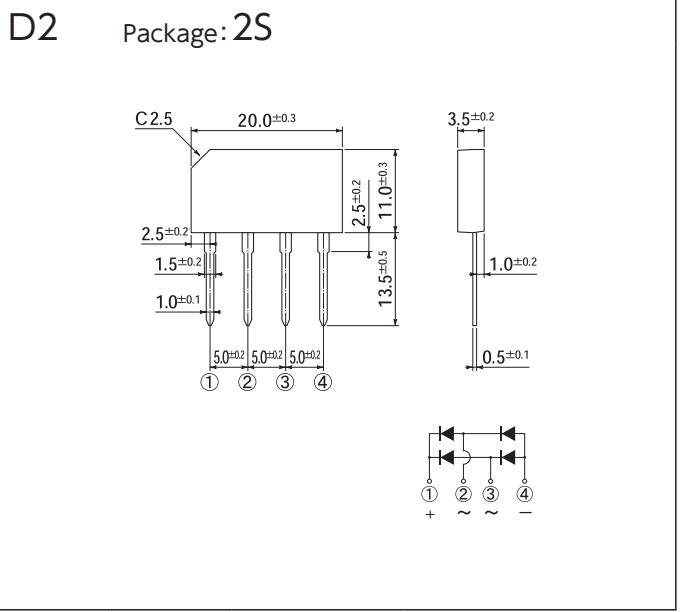
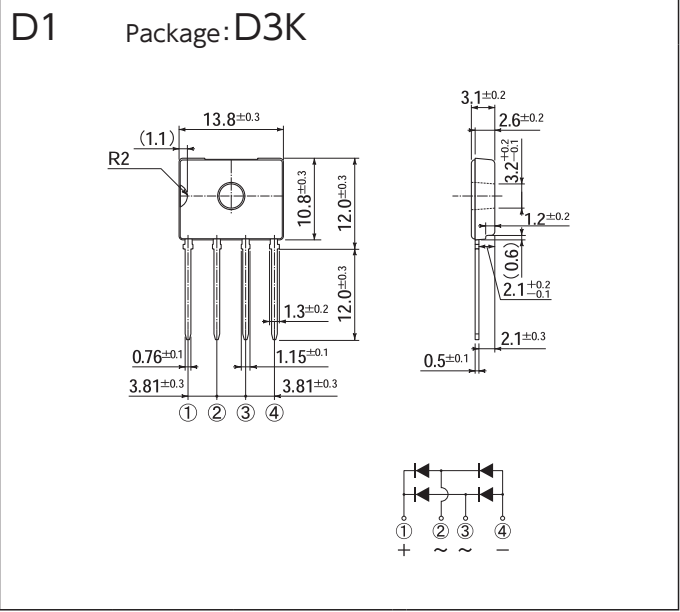
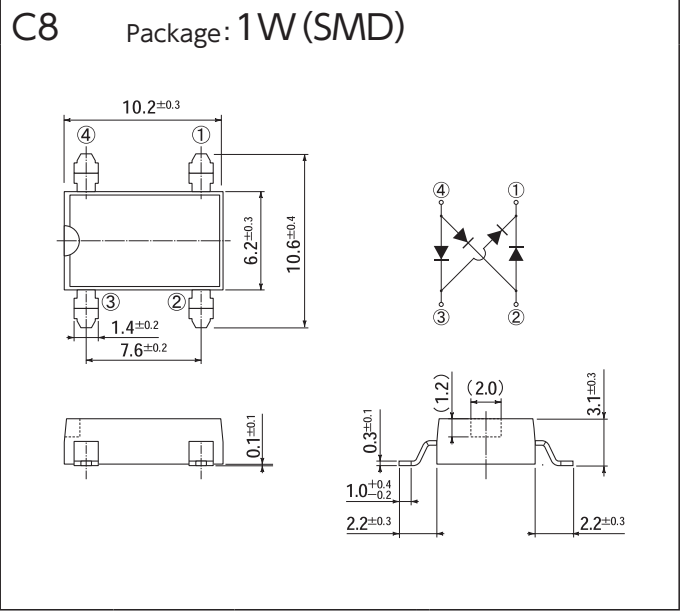
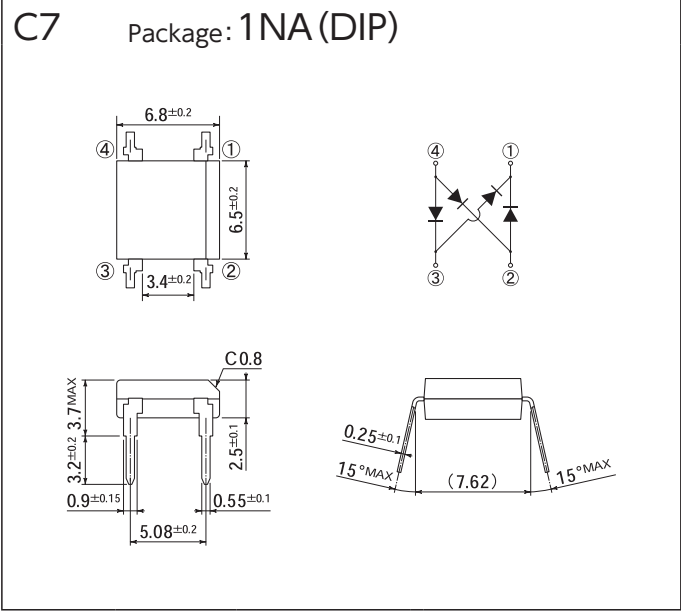
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OUTLINE DIMENSIONS

# OUTLINE DIMENSIONS

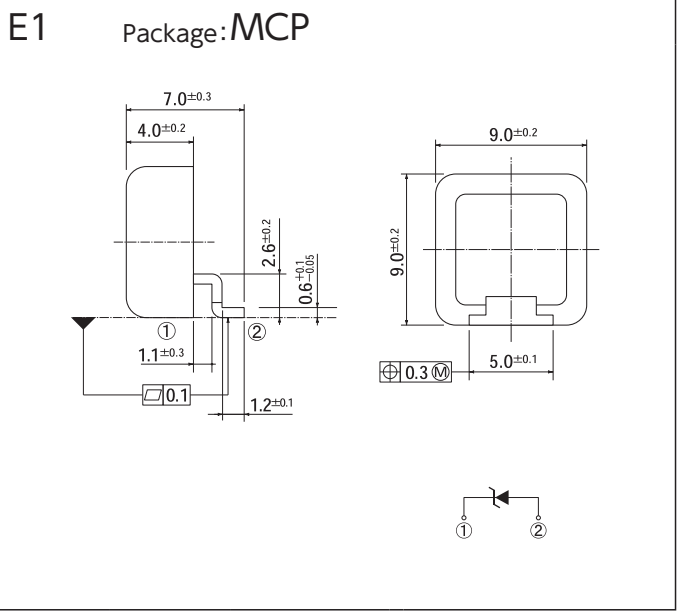
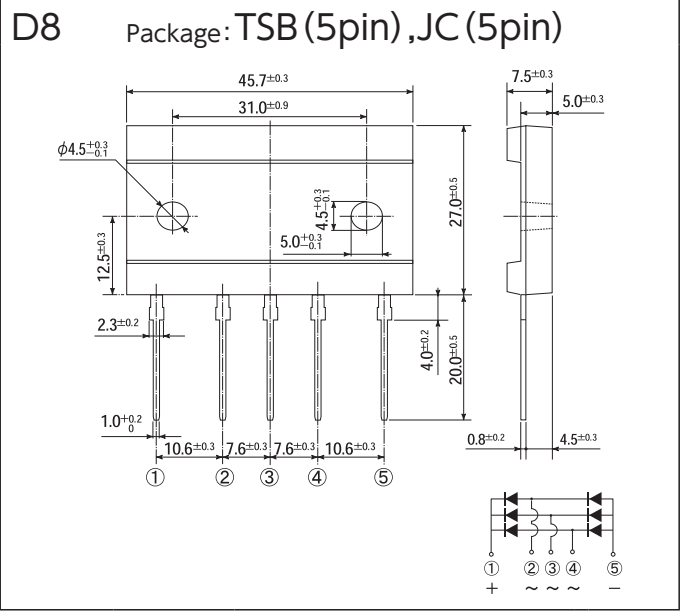
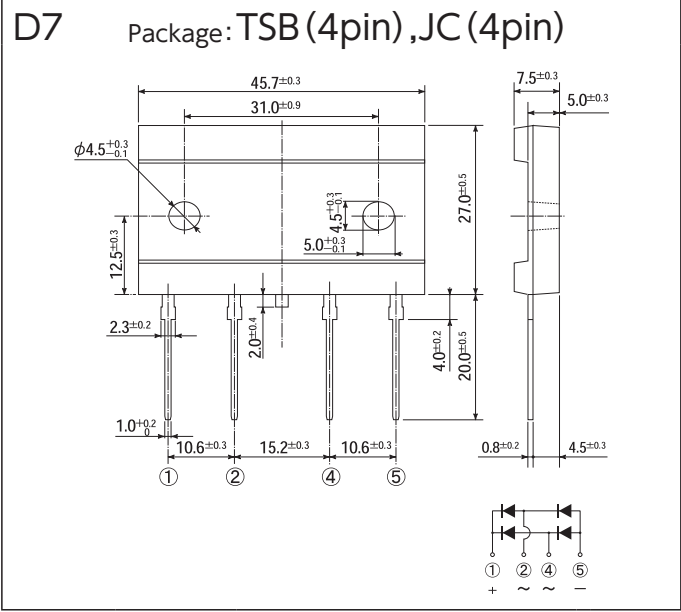
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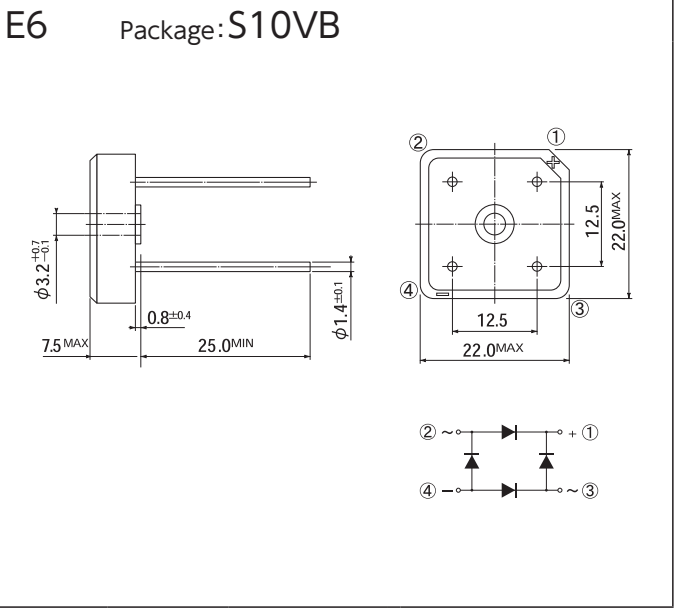
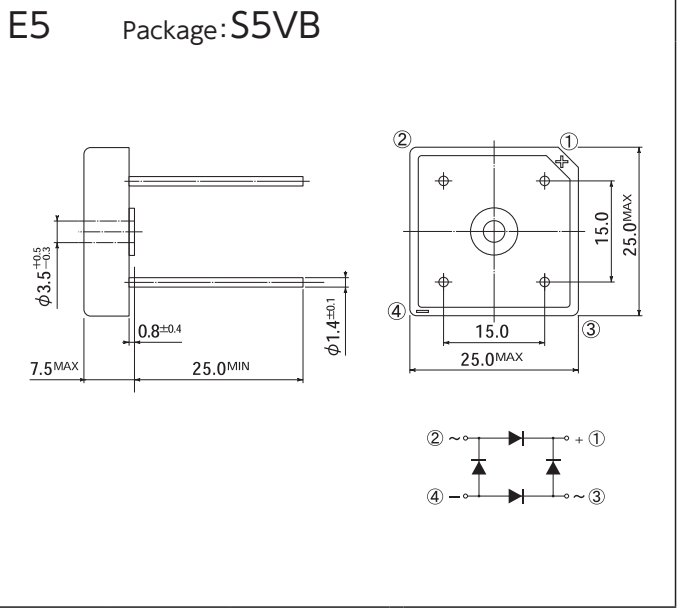
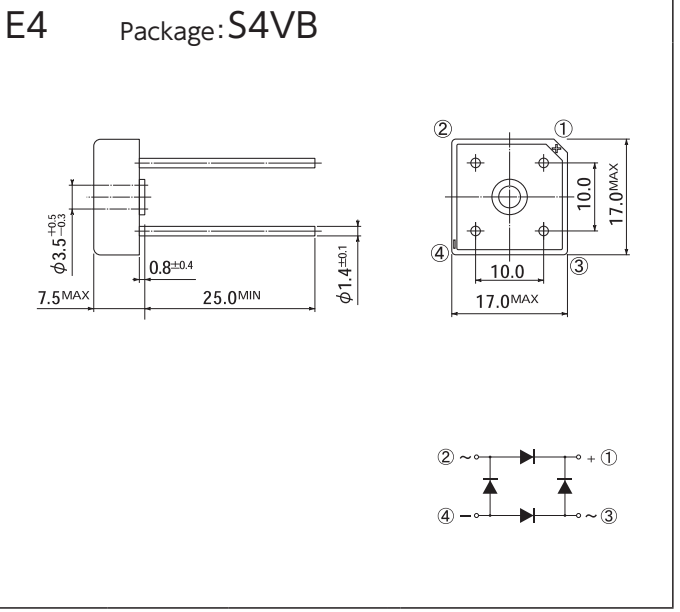
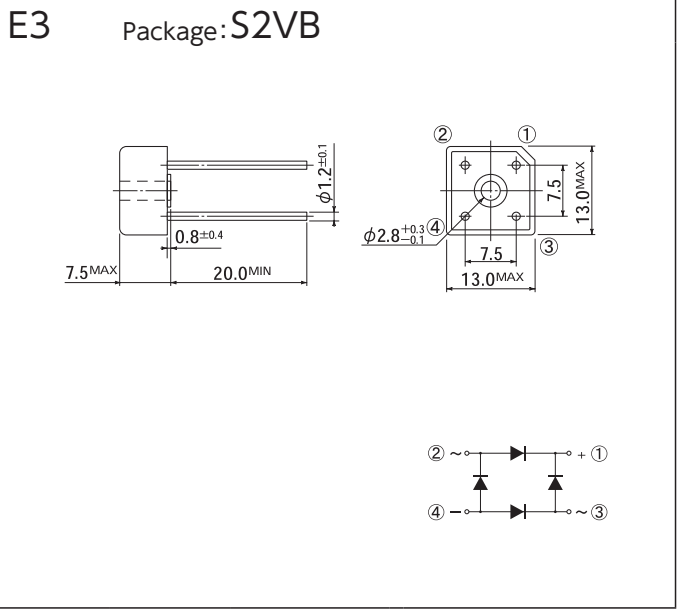
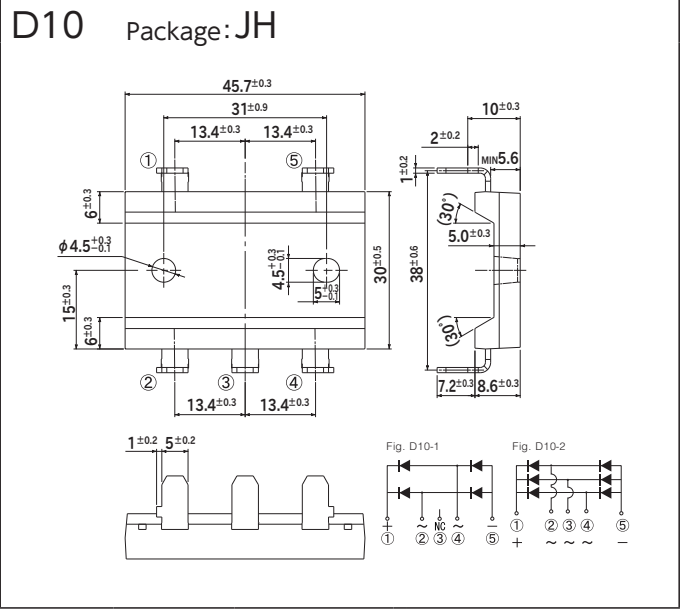
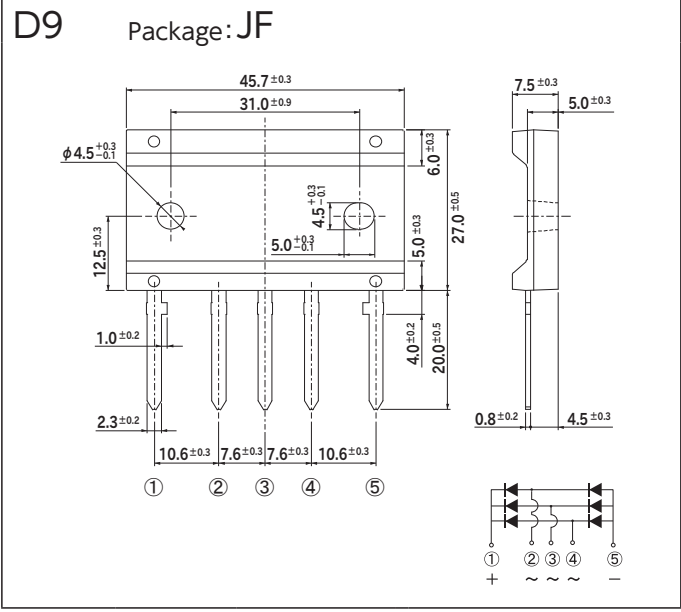
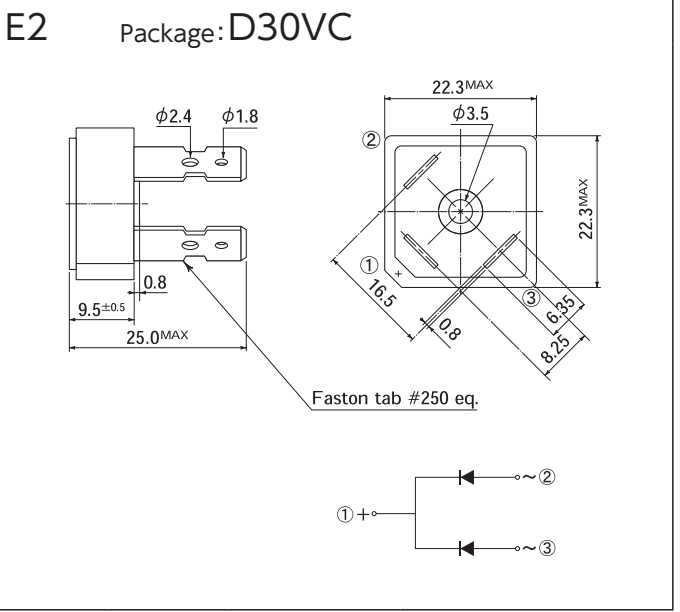
OUTLINE DIMENSIONS

# OUTLINE DIMENSIONS

[Unit:mm]



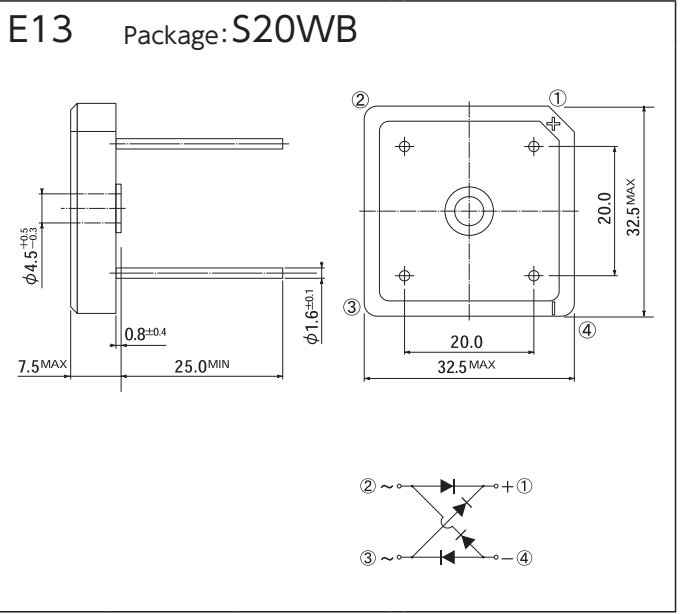
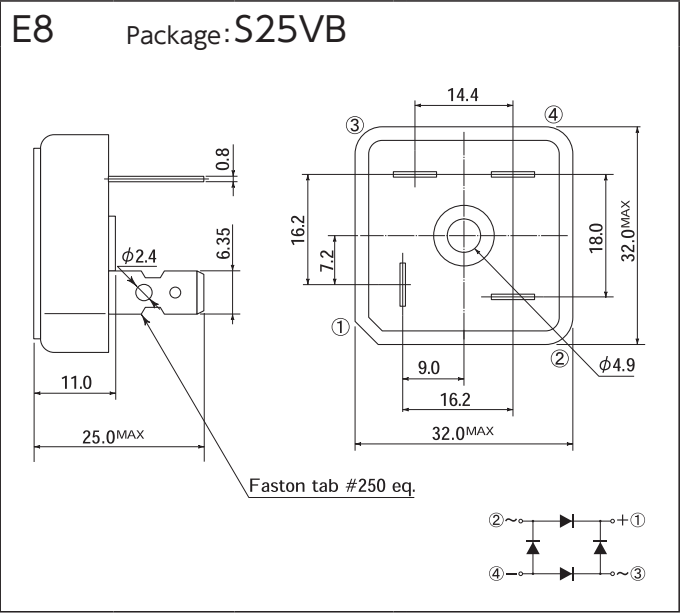
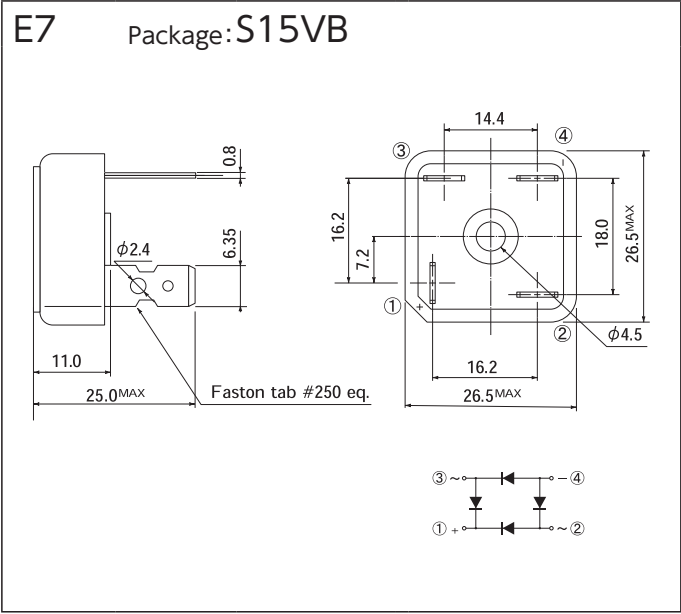
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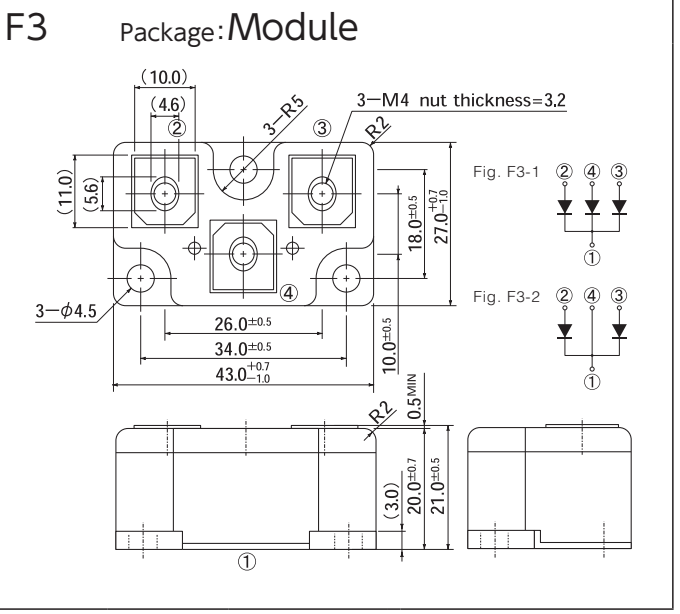
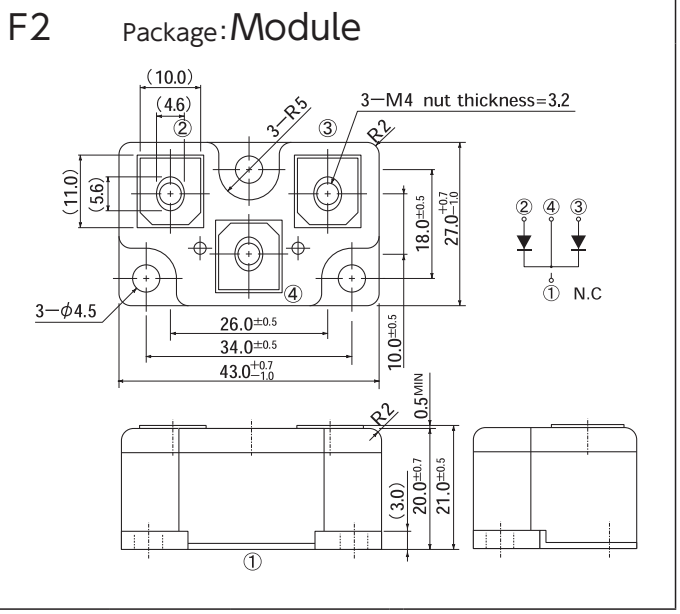
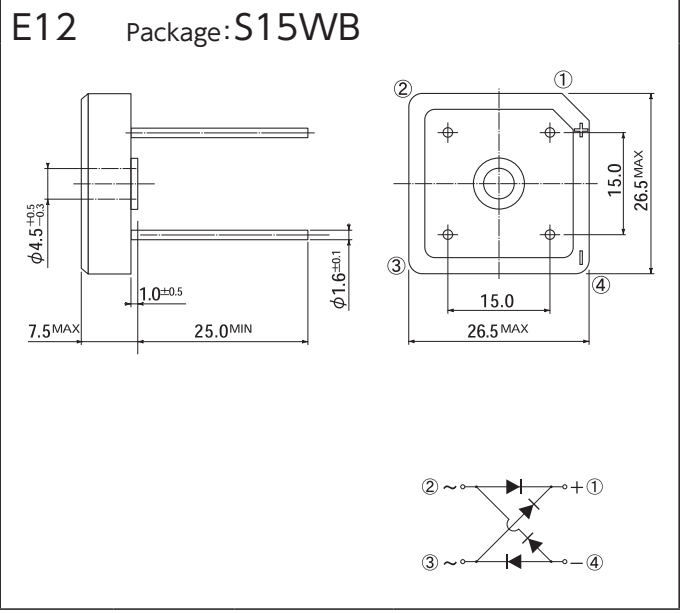
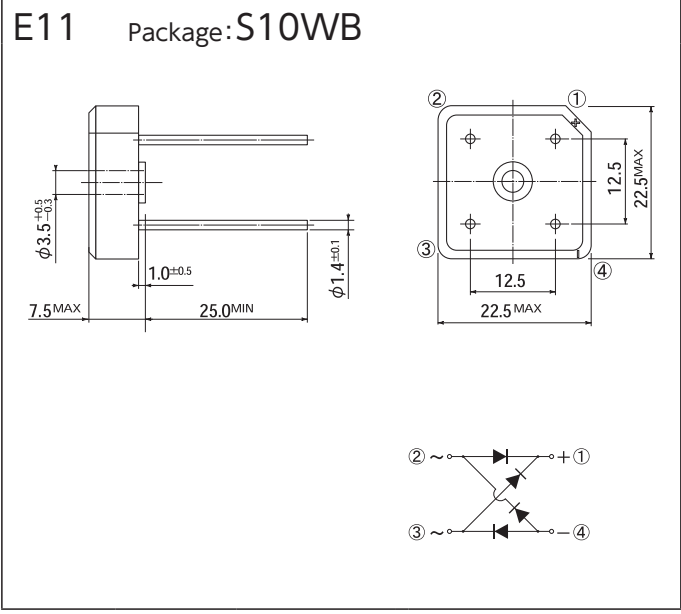
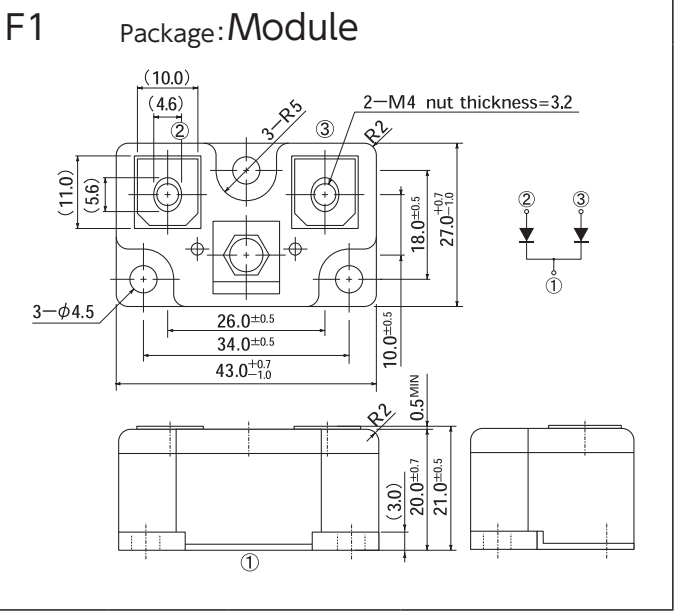
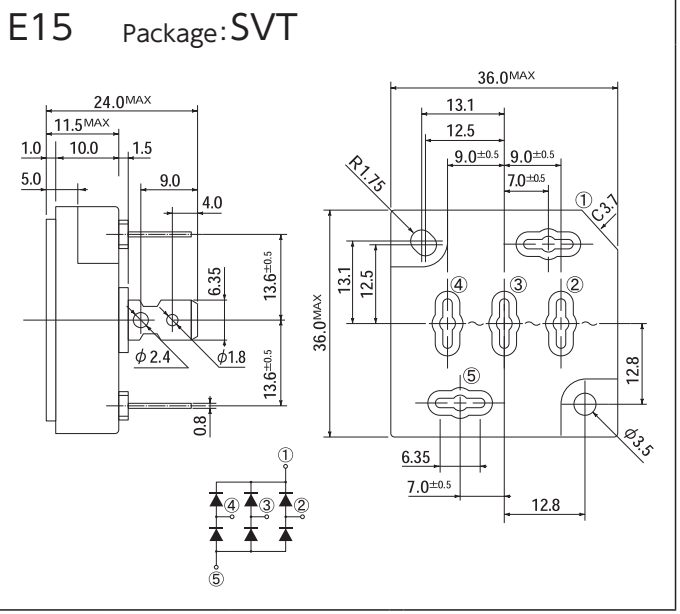
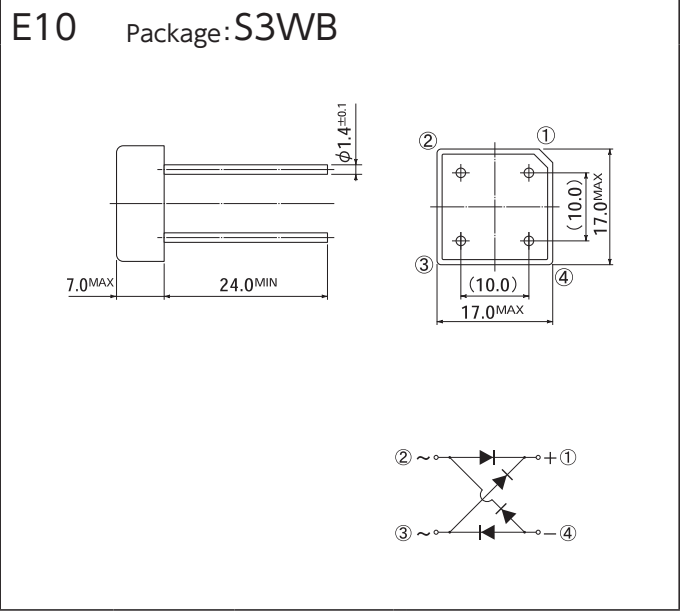
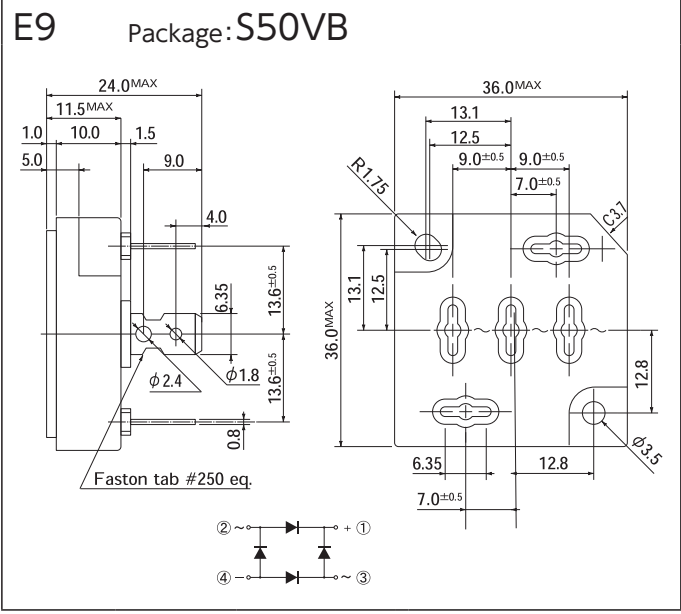
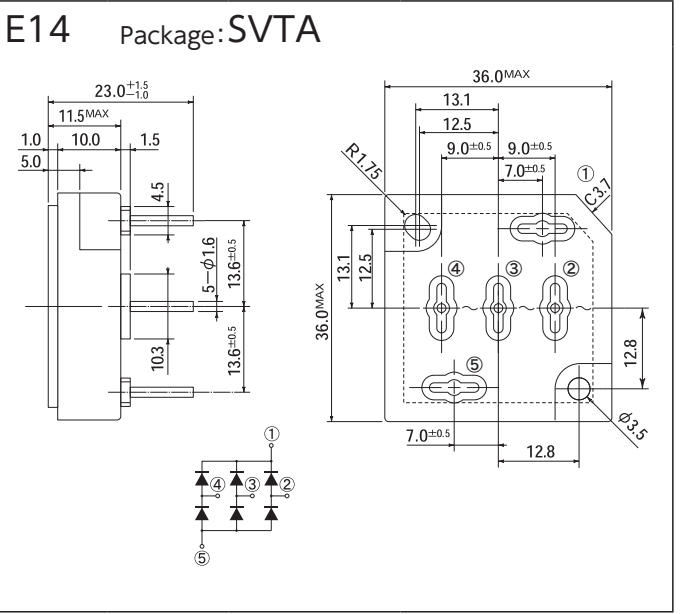
OUTLINE DIMENSIONS

# OUTLINE DIMENSIONS

[Unit:mm]



[Unit:mm]



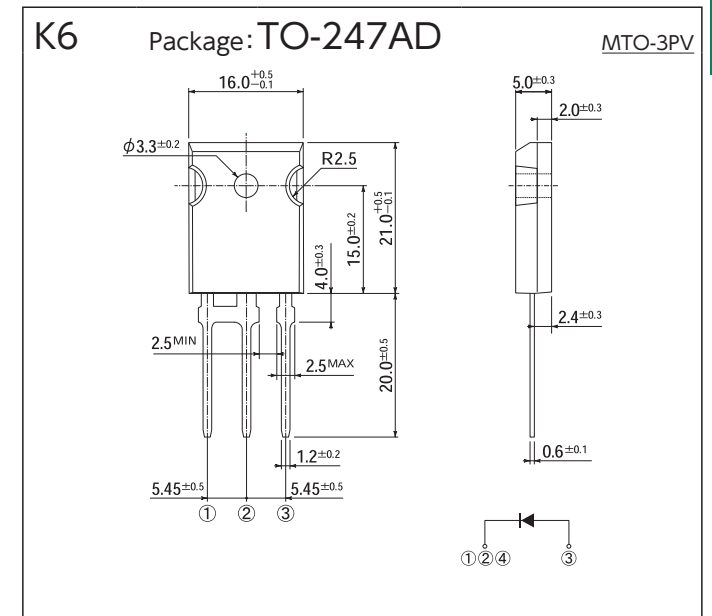
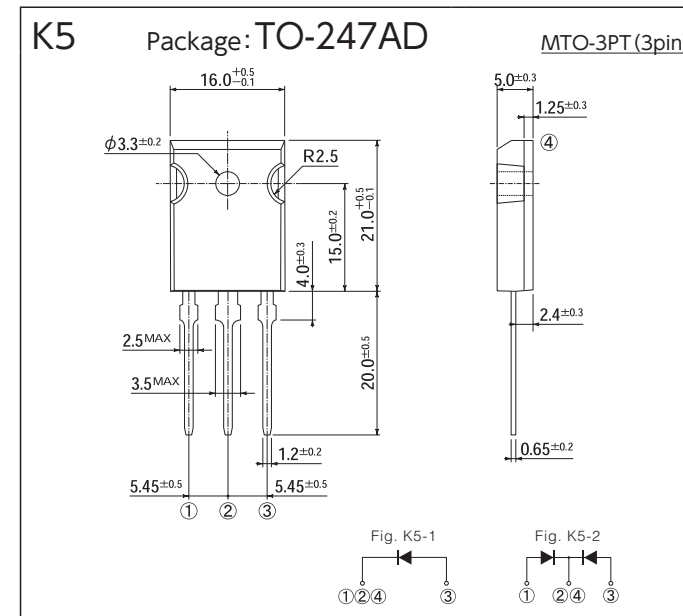
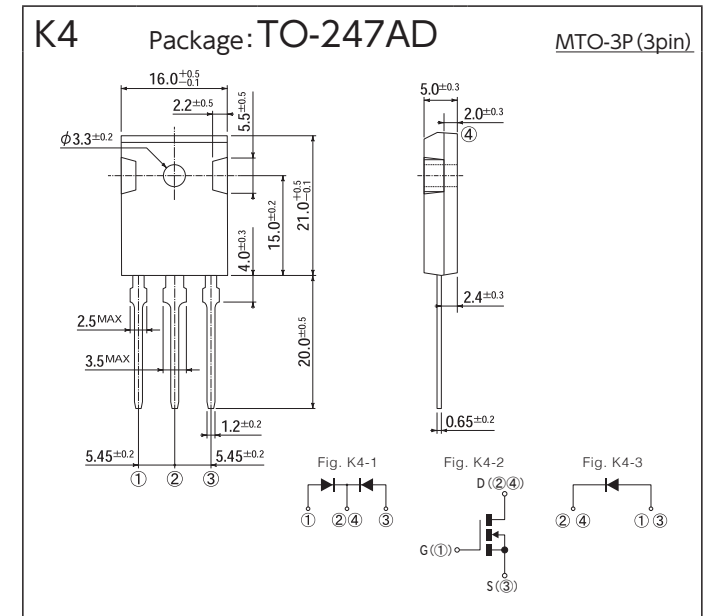
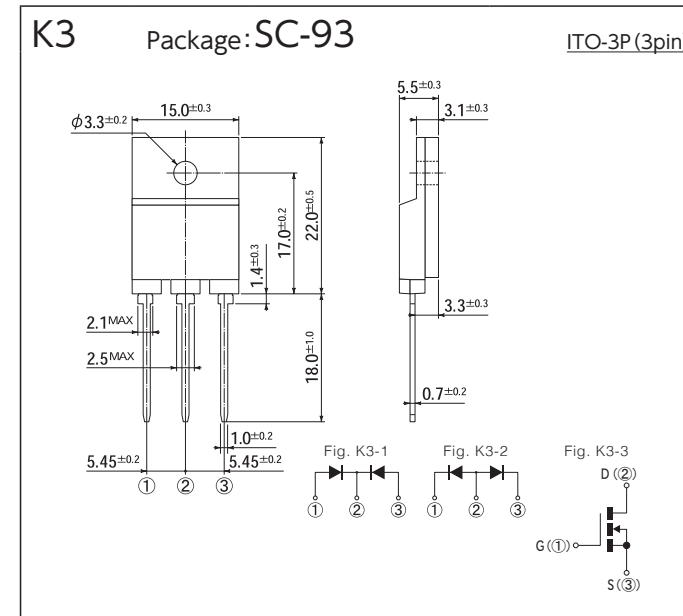
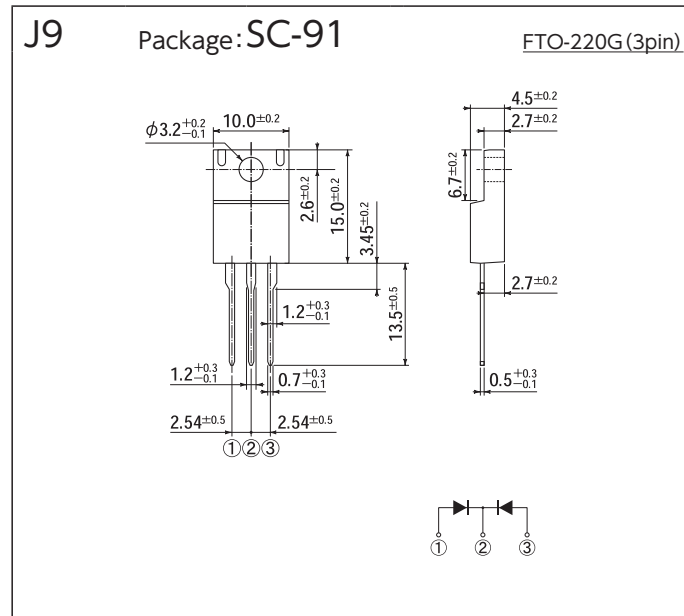
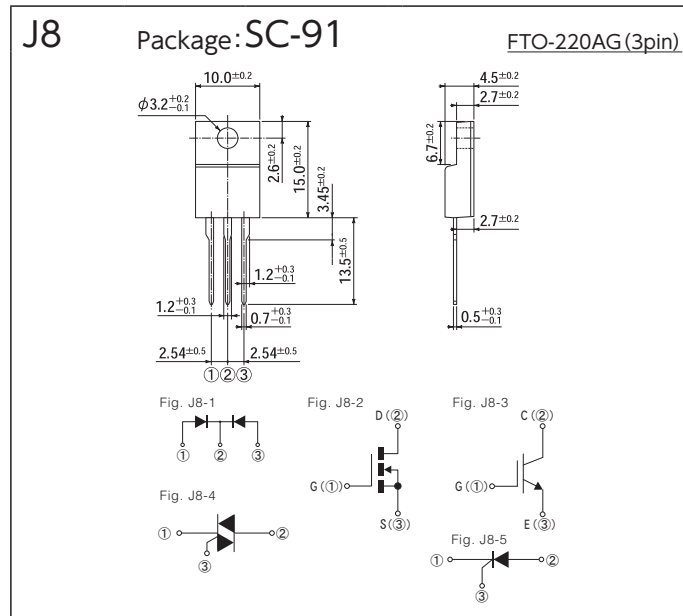
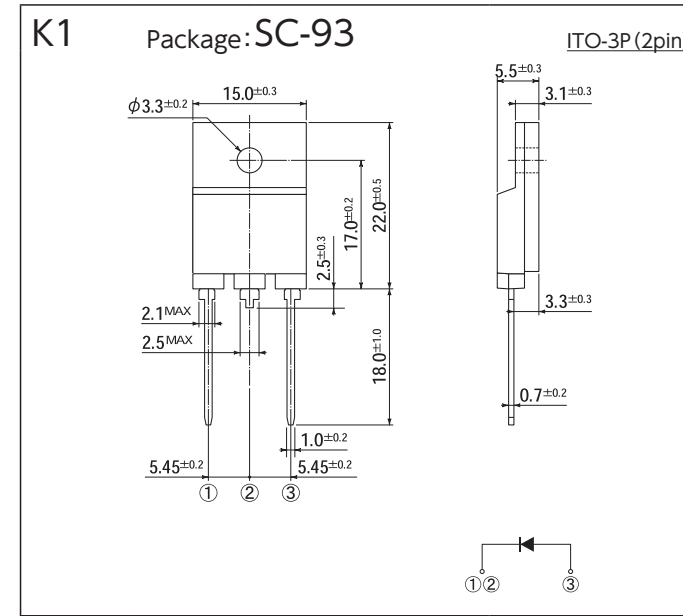
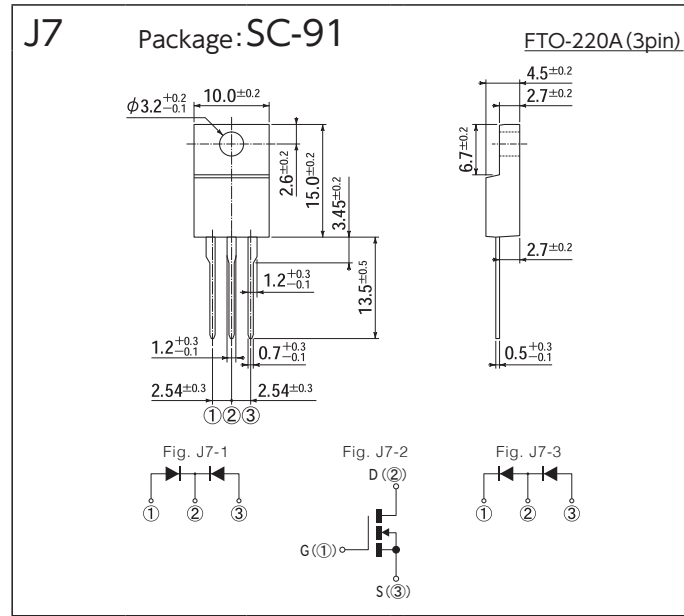
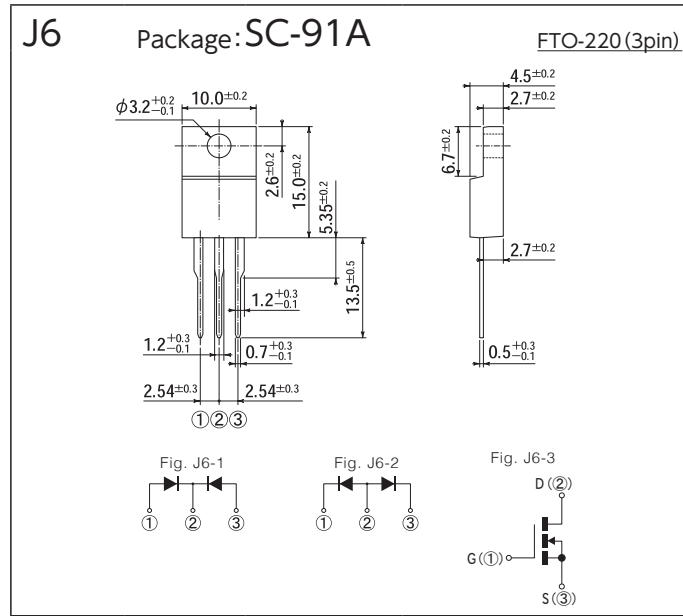






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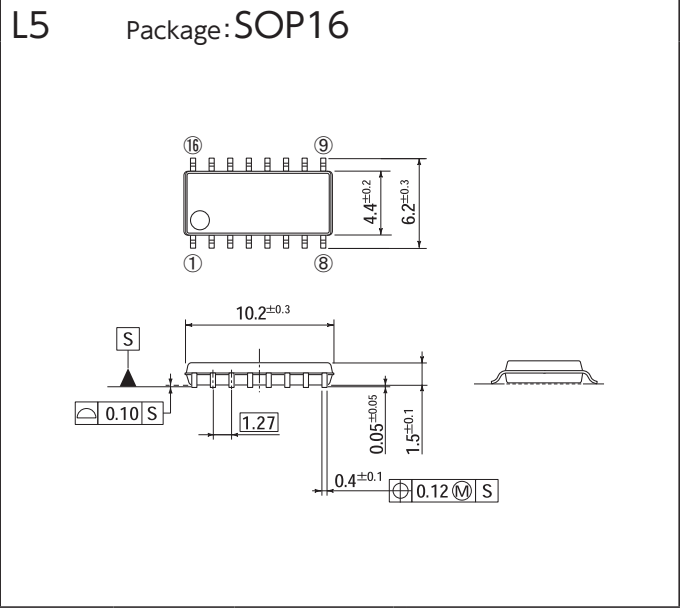
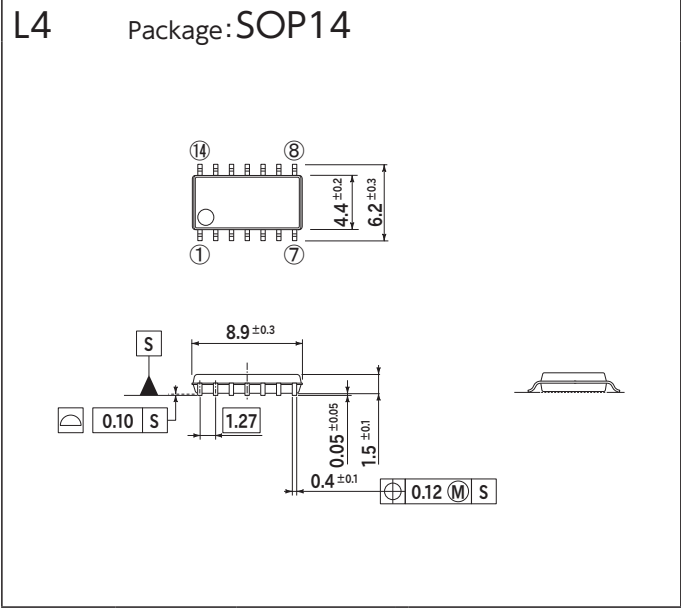
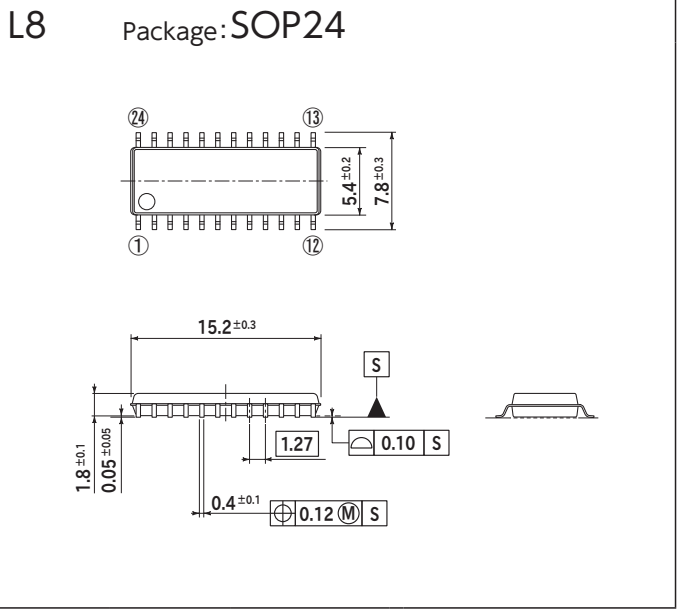
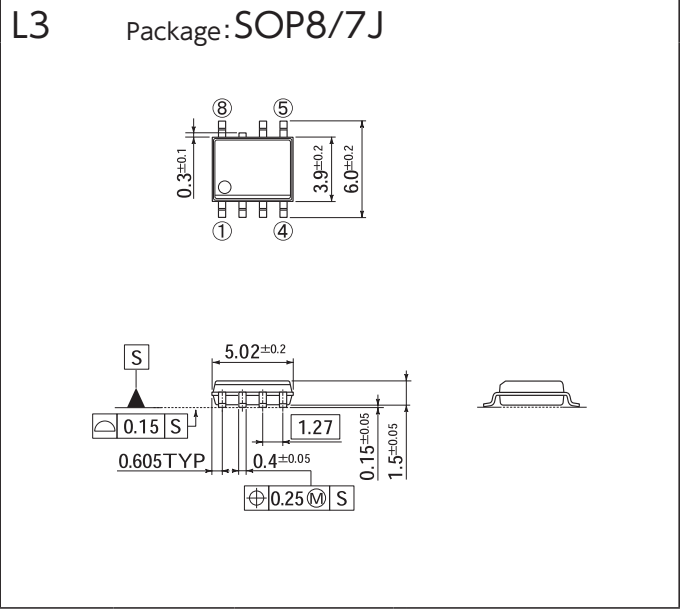
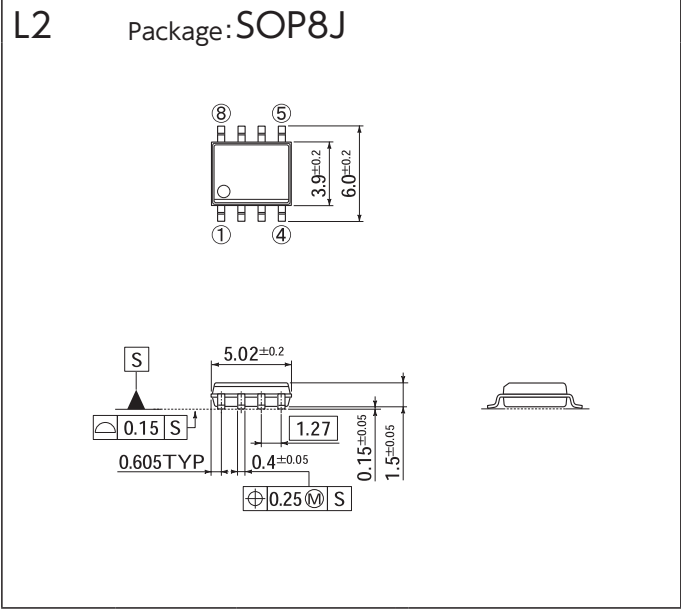
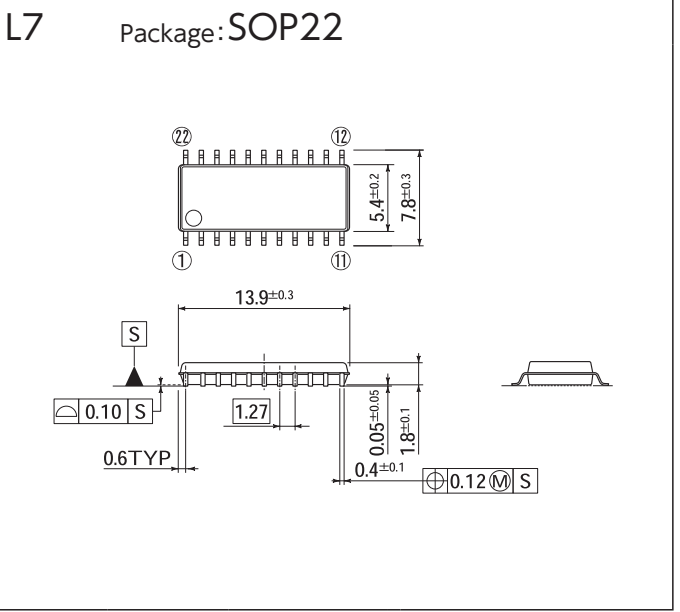
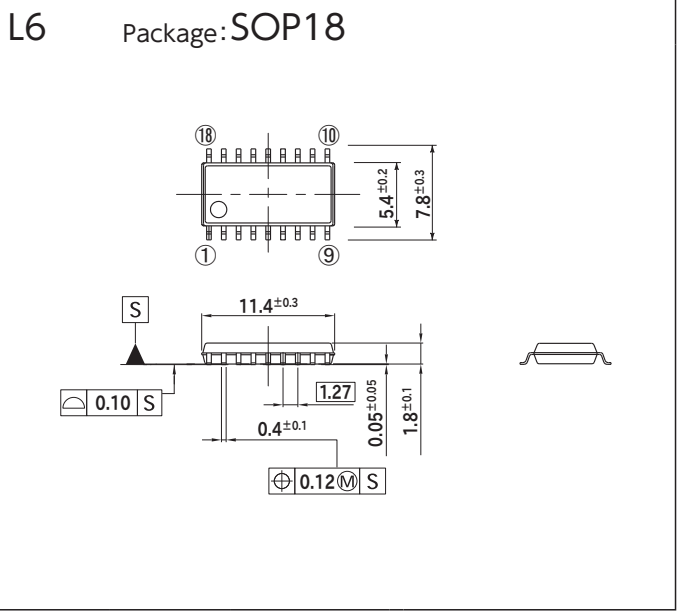
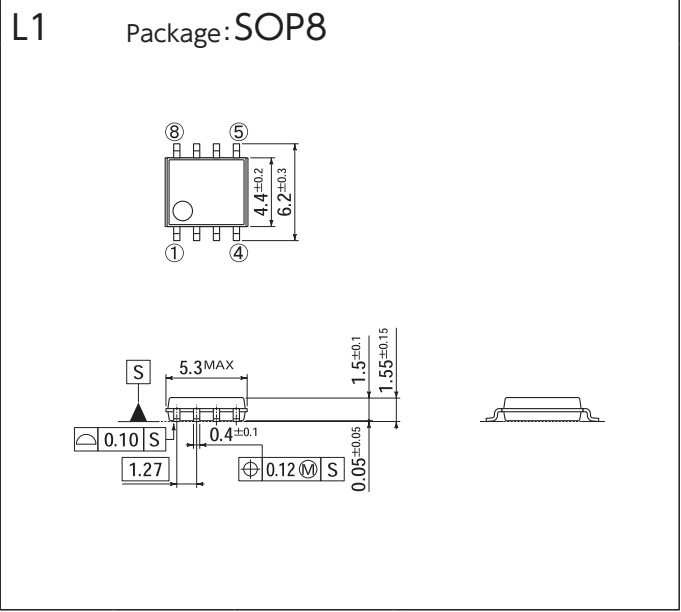
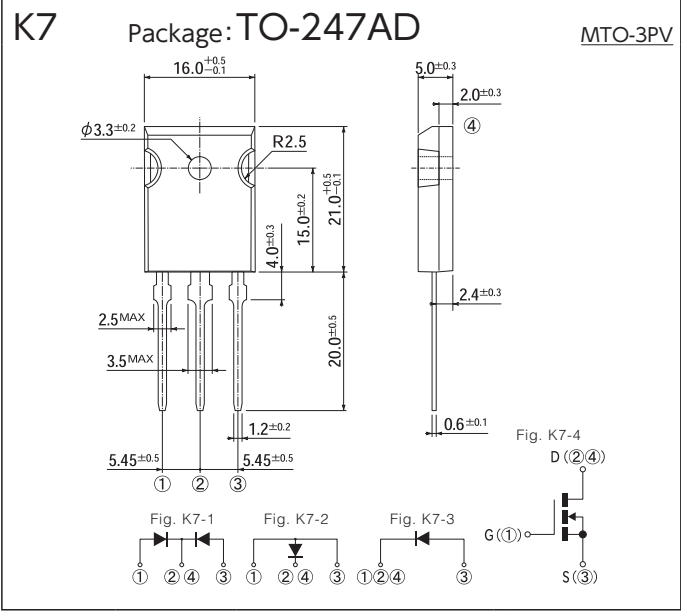
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OUTLINE DIMENSIONS

# OUTLINE DIMENSIONS

[Unit:mm]



# PACKING SPECIFICATION

Please make your order: 'more than Inner Box Quantities' and 'a multiple of each Packing Unit'

## Order Quantity & Packing Dimensions List

Please make your order: 'more than Inner Box Quantities' and 'a multiple of each Packing Unit'

| Package            |            |            | Fig. | Spec Code | Terminal Plating | Weight (aprx.) | MSL | Remarks | Quantity | Inner Box                      |                     |          | Standard Packing |     | Packing Box (mm) |     |  |
|--------------------|------------|------------|------|-----------|------------------|----------------|-----|---------|----------|--------------------------------|---------------------|----------|------------------|-----|------------------|-----|--|
| JEDEC Package Code | JEITA Code | House Name |      |           |                  |                |     |         |          | Method                         | Quantity (Pcs./Box) | Pcs./Box | Weight (kg)      | L   | W                | H   |  |
| -                  | -          | AX057      | A1   | -5060     | Sn               | 190mg          | -   |         | 4,000    | Tape, Ammo-Pack 52mm           | 4,000               | 32,000   | 7.5              | 330 | 280              | 270 |  |
| -                  | -          | AX06       | A2   | -7000     | Sn-Bi            | 210mg          | -   |         | 200      | Bulk                           | 200                 | 20,000   | 5.9              | 480 | 355              | 230 |  |
| -                  | -          | AX078      | A4   | -7060     | Sn-Bi            | 390mg          | -   |         | 4,000    | Tape, Ammo-Pack 52mm           | 4,000               | 64,000   | 14.0             | 325 | 325              | 420 |  |
| -                  | -          | AX10       | A5   | -7061     | Sn-Bi            | 640mg          | -   |         | 4,000    | Tape&Reel, Diameter 300 φ 52mm | 4,000               | 20,000   | 6.3              | 325 | 325              | 420 |  |
| -                  | -          | AX14       | A7   | -5060     | Sn               | 1.1g           | -   |         | 3,000    | Tape, Ammo-Pack 26mm           | 3,000               | 72,000   | 15.7             | 325 | 325              | 420 |  |
| DO-219AB similar   | SC-109     | G1F        | B1   | -5063R    | Sn               | 12mg           | 1   |         | 200      | Bulk                           | 200                 | 16,000   | 7.9              | 480 | 355              | 230 |  |
| DO-219AA similar   | -          | M1F        | B2   | -6063     | Sn               | 25mg           | 1   |         | 2,000    | Tape, Ammo-Pack 52mm           | 2,000               | 32,000   | 14.7             | 325 | 325              | 420 |  |
| DO-214AC           | -          | 1F         | B3   | -5103     | Sn               | 60mg           | 1   |         | 1,500    | Tape, Ammo-Pack 26mm           | 1,500               | 18,000   | 7.2              | 325 | 325              | 260 |  |
| -                  | SC-110B    | CE         | B5   | -5063R    | Sn               | 30mg           |     |         | 200      | Bulk                           | 200                 | 16,000   | 7.9              | 480 | 355              | 230 |  |
| DO-214AA similar   | -          | M2F        | B6   | -5063     | Sn               | 75mg           | 1   |         | 2,000    | Tape, Ammo-Pack 52mm           | 2,000               | 16,000   | 7.5              | 325 | 325              | 260 |  |
| -                  | -          | 2F         | B9   | -5073     | Sn               | 180mg          | 1   |         | 1,500    | Tape, Ammo-Pack 26mm           | 1,500               | 18,000   | 7.2              | 325 | 325              | 260 |  |
| -                  | -          | SOPA-4     | C1   | -7062     | Sn-Bi            | 90mg           | 1   |         | 2,500    | Tape&Reel, Diameter 300 φ 52mm | 2,500               | 12,500   | 10.8             | 325 | 325              | 420 |  |
| TO-269AA           | -          | 1Z         | C2   | -7102     | Sn-Bi            | 130mg          | 1   |         | 200      | Bulk                           | 200                 | 16,000   | 11.1             | 480 | 355              | 230 |  |
| -                  | -          | 1N         | C4   | -7062     | Sn-Bi            | 290mg          | 1   |         | 1,200    | Tape, Ammo-Pack 52mm           | 1,200               | 18,000   | 14.4             | 325 | 325              | 420 |  |
| -                  | -          | 1NA        | C6   | -7102     | Sn-Bi            | 290mg          | 1   |         | 2,500    | Tape&Reel, Diameter 300 φ 52mm | 2,500               | 12,500   | 10.8             | 325 | 325              | 420 |  |
| -                  | -          | 1W         | C8   | -7062     | Sn-Bi            | 500mg          | 1   |         | 200      | Bulk                           | 200                 | 16,000   | 11.1             | 480 | 355              | 230 |  |
| -                  | -          | D3K        | D1   | -7000     | Sn-Bi            | 1.5g           | -   |         | 1,200    | Tape, Ammo-Pack 52mm           | 1,200               | 9,600    | 7.3              | 325 | 325              | 260 |  |
| -                  | -          | 2S         | D2   | -7000     | Sn-Bi            | 2.1g           | -   |         | 2,500    | Tape&Reel, Diameter 300 φ 52mm | 2,500               | 12,500   | 10.8             | 325 | 325              | 420 |  |
| -                  | -          | 3S         | D3   | -7000     | Sn-Bi            | 3.9-4.5g       | -   |         | 200      | Bulk                           | 200                 | 16,000   | 17.5             | 480 | 355              | 230 |  |
| -                  | -          | 5S         | D4   | -7000     | Sn-Bi            | 6.3-7.5g       | -   |         | 1,200    | Tape, Ammo-Pack 52mm           | 1,200               | 9,600    | 7.3              | 325 | 325              | 260 |  |
| -                  | -          | JB         | D5   | -7000     | Sn-Bi            | 2.7g           | -   |         | 2,500    | Tape&Reel, Diameter 300 φ 52mm | 2,500               | 12,500   | 10.8             | 325 | 325              | 420 |  |
| -                  | -          | JA         | D6   | -7000     | Sn-Bi            | 4.5g           | -   |         | 200      | Bulk                           | 200                 | 16,000   | 17.5             | 480 | 355              | 230 |  |
| -                  | -          | TSB        | D7   | -7000     | Sn-Bi            | 20g            | -   |         | 1,200    | Tape, Ammo-Pack 52mm           | 1,200               | 9,600    | 7.3              | 325 | 325              | 260 |  |
| -                  | -          | JC         | D8   | -7500     | Sn-Bi            | 20g            | -   |         | 2,500    | Tape&Reel, Diameter 300 φ 52mm | 2,500               | 12,500   | 10.8             | 325 | 325              | 420 |  |
| -                  | -          | JF         | D9   | -7500     | Sn-Bi            | 25g            | -   |         | 200      | Bulk                           | 200                 | 16,000   | 17.5             | 480 | 355              | 230 |  |
| -                  | -          | JH         | D10  | -7501     | Sn-Bi            | 31g            | -   |         | 1,200    | Tape, Ammo-Pack 52mm           | 1,200               | 9,600    | 7.3              | 325 | 325              | 260 |  |
| -                  | -          | MCP        | E1   | -4062     | Ni               | 1.9g           | 1   |         | 300      | Tape&Reel, Diameter 255 φ      | 300                 | 1,500    | 5.0              | 280 | 275              | 190 |  |
| -                  | -          |            |      | -4072     |                  |                |     |         | 600      | Tape&Reel, Diameter 330 φ      | 600                 | 1,800    | 5.5              | 335 | 345              | 110 |  |

Exterior packaging is an example. Depending on the quantity ordered, the number of incoming, outline and weight may change.

| Package            |               |            | Fig.          | Spec Code    | Terminal Plating | Weight (aprx.) | MSL    | Remarks | Quantity         | Inner Box |                           |          | Standard Packing |      | Packing Box (mm) |     |     |
|--------------------|---------------|------------|---------------|--------------|------------------|----------------|--------|---------|------------------|-----------|---------------------------|----------|------------------|------|------------------|-----|-----|
| JEDEC Package Code | JEITA Code    | House Name |               |              |                  |                |        |         |                  | Method    | Quantity (Pcs./Box)       | Pcs./Box | Weight (kg)      | L    | W                | H   |     |
| -                  | -             | D30VC      | THD           | E2           | -4000            | Ag             | 12g    | -       | 100              | Tray      | 100                       | 500      | 7.0              | 375  | 285              | 160 |     |
| -                  | -             | S2VB       | THD           | E3           | -5000            | Sn-Ag-Cu       | 3.0g   | -       | 100              | Tray      | 100                       | 1,000    | 3.6              | 265  | 255              | 170 |     |
| -                  | -             | S4VB       | THD           | E4           | -5000            | Sn-Ag-Cu       | 5.2g   | -       | 100              | Tray      | 100                       | 1,000    | 5.9              | 315  | 285              | 220 |     |
| -                  | -             | S5VB       | THD           | E5           | -5000            | Sn-Ag-Cu       | 9.1g   | -       | 100              | Tray      | 100                       | 1,000    | 10.4             | 415  | 285              | 300 |     |
| -                  | -             | S10VB      | THD           | E6           | -5000            | Sn-Ag-Cu       | 8.0g   | -       | 100              | Tray      | 100                       | 1,000    | 9.3              | 375  | 285              | 270 |     |
| -                  | -             | S15VB      | THD           | E7           | -4000            | Ag             | 16g    | -       | 100              | Tray      | 100                       | 500      | 9.0              | 415  | 285              | 180 |     |
| -                  | -             | S25VB      | THD           | E8           | -4000            | Ag             | 21g    | -       | 60               | Bulk      | 60                        | 300      | 7.0              | 335  | 205              | 165 |     |
| -                  | -             | S50VB      | THD           | E9           | -4000            | Ag             | 28g    | -       | 50               | Tray      | 50                        | 200      | 6.2              | 335  | 205              | 165 |     |
| -                  | -             | S3WB       | THD           | E10          | -5000            | Sn-Ag-Cu       | 5.1g   | -       | 100              | Tray      | 100                       | 1,000    | 6.1              | 315  | 285              | 220 |     |
| -                  | -             | S10WB      | THD           | E11          | -5000            | Sn-Ag-Cu       | 9.0g   | -       | 100              | Tray      | 100                       | 1,000    | 9.3              | 375  | 285              | 270 |     |
| -                  | -             | S15WB      | THD           | E12          | -5000            | Sn-Ag-Cu       | 16g    | -       | 100              | Tray      | 100                       | 1,000    | 15.1             | 415  | 285              | 300 |     |
| -                  | -             | S20WB      | THD           | E13          | -5000            | Sn-Ag-Cu       | 20g    | -       | 100              | Tray      | 100                       | 700      | 15.0             | 415  | 285              | 300 |     |
| -                  | -             | SVTA       | THD           | E14          | -5000            | Sn-Ag-Cu       | 30g    | -       | 50               | Tray      | 50                        | 250      | 8.7              | 460  | 295              | 240 |     |
| -                  | -             | SVT        | THD           | E15          | -4000            | Ag             | 31g    | -       | 45               | Bulk      | 200                       | 200      | 13.6             | 335  | 205              | 165 |     |
| -                  | -             | MODULE     | -             | F1           | -4000            | Ni             | 42-66g | -       | 25               | Tray      | 100                       | 200      | 13.4             | 480  | 330              | 210 |     |
| -                  | -             | MG001      | THD           | F4           | -7101            | Sn-Bi          | 10g    | -       | 15               | Magazine  | 15                        | 450      | 7.1              | 623  | 232              | 144 |     |
| -                  | -             | MG031      | THD           | F5           | -7101            | Sn-Bi          | 7.7g   | -       | 12               | Magazine  | 12                        | 600      | 8.5              | 573  | 281              | 127 |     |
| -                  | -             | MG032      | -             | F6           | -4500            | Ni             | 340g   | -       | 24               | Tray      | 24                        | 24       | 8.0              | 610  | 315              | 140 |     |
| -                  | -             | MG038      | -             | F7           | -4500            | Ni             | 180g   | -       | 40               | Tray      | 40                        | 40       | 9.0              | 425  | 360              | 155 |     |
| -                  | -             | MG048      | THD           | F8           | -7101            | Sn-Bi          | 7.7g   | -       | 9                | Magazine  | 9                         | -        | -                | -    | -                | -   |     |
| -                  | -             | SC-63      | E-pack        | Only DE5VE40 | -5101            | Sn             | 310mg  | 1       | Standard         | 80        | Magazine                  | 80       | 10,000           | 6.9  | 560              | 130 | 109 |
| -                  | -             |            |               |              | -5061            | Sn             |        | 1       | Standard         | 1,500     | Tape&Reel, Diameter 250 φ | 1,500    | 6,000            | 2.9  | 260              | 260 | 99  |
| -                  | -             |            |               |              | -5071            | Sn             |        | 1       | Standard         | 3,000     | Tape&Reel, Diameter 330 φ | 3,000    | 12,000           | 5.5  | 335              | 335 | 99  |
| -                  | -             |            |               |              | -7101            | Sn-Bi          |        | 1       | Standard         | 80        | Magazine                  | 80       | 10,000           | 6.9  | 560              | 130 | 109 |
| -                  | -             |            |               |              | -7061            | Sn-Bi          |        | 1       | Standard         | 1,500     | Tape&Reel, Diameter 250 φ | 1,500    | 6,000            | 2.9  | 260              | 260 | 99  |
| -                  | -             |            |               |              | -7071            | Sn-Bi          |        | 1       | Standard         | 3,000     | Tape&Reel, Diameter 330 φ | 3,000    | 12,000           | 5.5  | 335              | 335 | 99  |
| TO-252AA           | -             | FB         | SMD           | G2           | -5071            | Sn             | 320mg  | 1       | Standard         | 3,000     | Tape&Reel, Diameter 330 φ | 6,000    | 36,000           | 18.2 | 380              | 365 | 390 |
| TO-252AB similar   | SC-63         | FE         | SMD           | G3           | -5061            | Sn             | 320mg  | 1       | Only Di (Di,MOS) | 1,500     | Tape&Reel, Diameter 254 φ | 1,500    | 6,000            | 2.9  | 260              | 260 | 99  |
| TO-277A similar    | -             | FY         | SMD           | G4           | -5063R           | Sn             | 110mg  | 1       | Standard         | 3,000     | Tape&Reel, Diameter 330 φ | 3,000    | 12,000           | 5.5  | 335              | 335 | 99  |
| TO-252AA similar   | -             | FR         | SMD           | G5           | -5071            | Sn             | 350mg  | 1       | Standard         | 1,500     | Tape&Reel, Diameter 180 φ | 6,000    | 30,000           | 5.0  | 405              | 210 | 220 |
| -                  | -             | LA         | SMD           | G6           | -5070            | Sn             | 100mg  | 1       | Standard         | 3,000     | Tape&Reel, Diameter 330 φ | 3,000    | 12,000           | 3.0  | 350              | 350 | 135 |
| MO-235B similar    | -             | LF         | SMD           | G7           | -5071            | Sn             | 100mg  | 1       | Standard         | 5,000     | Tape&Reel, Diameter 330 φ | 5,000    | 25,000           | 11.6 | 385              | 370 | 248 |
| -                  | SC-83 similar | STO-220    | SMD           | H1           | -7102            | Sn-Bi          | 1.4g   | 1       | Standard         | 50        | Magazine                  | 50       | 4,500            | 9.5  | 555              | 145 | 110 |
| -                  | SC-83 similar | FD         | SMD           | H2           | -5072            | Sn             | 1.5g   | 1       | Standard         | 1,000     | Tape&Reel, Diameter 330 φ | 1,000    | 3,000            | 6.0  | 336              | 336 | 119 |
| TO-263AB-1         | -             | FH         | SMD           | H3           | -7071            | Sn-Bi          | 1.5g   | 1       | Standard         | 1,000     | Tape&Reel, Diameter 330 φ | 1,000    | 3,000            | 6.4  | 336              | 336 | 119 |
| TO-263AB           | -             | FG         | SMD           | H4           | -5071            | Sn             | 1.5g   | 1       | Standard         | 1,000     | Tape&Reel, Diameter 330 φ | 1,000    | 5,000            | 11.0 | 375              | 360 | 250 |
| -                  | SC-83 similar | FP         | SMD           | H5           | -5071            | Sn             | 1.6g   | 1       | Standard         | 1,000     | Tape&Reel, Diameter 330 φ | 1,000    | 3,000            | 6.4  | 336              | 336 | 119 |
| TO-263AB           | -             | FZ         | SMD           | H6           | -5071            | Sn             | 1.5g   | -       | Standard         | 1,000     | Tape&Reel, Diameter 330 φ | 1,000    | 3,000            | 7.0  | 375              | 360 | 165 |
| TO-263SC           | -             | FZ-7p      | SMD           | H7           | -5071            | Sn             | 1.5g   | -       | Standard         | 1,000     | Tape&Reel, Diameter 330 φ | 1,000    | 3,000            | 7.0  | 375              | 360 | 165 |
| -                  | SC-91A        | FTO-220    | THD           | J1           | -7600            | Sn-Bi          | 1.9g   | -       | Standard         | 100       | Bulk                      | 2,000    | 4,000            | 8.3  | 365              | 220 | 335 |
| -                  | SC-91         | FTO-220A   | THD           | J2           | -7600            | Sn-Bi          | 1.9g   | -       | Standard         | 100       | Bulk                      | 2,000    | 4,000            | 8.3  | 365              | 220 | 335 |
| -                  | SC-91         | FTO-220AG  | THD           | J3           | -5600            | Sn             | 1.6g   | -       | Standard         | 100       | Bulk                      | 2,000    | 4,000            | 8.3  | 365              | 220 | 335 |
| -                  | SC-91         | FTO-220G   | THD           | J4           | -5600            | Sn             | 1.6g   | -       | Standard         | 100       | Bulk                      | 2,000    | 4,000            | 8.3  | 365              | 220 | 335 |
| TO-220AB           | SC-46         | FA         | THD           | J5           | -5100            | Sn             | 2.0g   | -       | Standard         | 50        | Magazine                  | 1,000    | 6,000            | 17.4 | 303              | 598 | 172 |
| -                  | SC-93         | ITO-3P     | MOSFET Diodes | K1           | -7100            | Sn-Bi          | 4.3g   | -       | Standard         | 40        | Magazine                  | 40       | 1,200            | 8.0  | 624              | 151 | 92  |
| TO-247AD           | -</           |            |               |              |                  |                |        |         |                  |           |                           |          |                  |      |                  |     |     |

# NOTES

## How to Order

### 1. Indication of Spec. Code when ordering

Please specify the Spec. Code when ordering semiconductors.  
For the Spec. Code, Please refer to as follows and "PACKING SPECIFICATION".

**Example** Ordering THD type of S1ZB60  
S1ZB60-7101

### 2. Spec Code

The code specifies each packing form, lead forming and terminal plate material.

Please refer to "PACKING SPECIFICATION".

**Example** 5 0 0 0

- Terminal forming
  - 0 : Straight terminal
  - 1 to 9 : Each number shows type of form
- Packing form
  - 0 : Standard
  - In case of surface mounting devices
    - 5, 6 : Small reel
    - 7 : Large reel
  - In case of axial device
    - 6 : Lead length 52mm (T52)
    - 7 : Lead length 26mm (T26)
- Minimum packing unit
  - 0 : Bulk, tray or taping
  - 1 : Magazine
  - 5 : Tray
  - 6 : Packed (FTO-220 Package)
- Terminal plate material
  - 3 : Ni/Pd/Au, Sn-Ag
  - 4 : Ni, Ag
  - 5 : Sn-Ag-Cu, Sn, Ag, Sn-Cu
  - 6 : Sn
  - 7 : Sn-Bi

## Outline of Packing Form

### 1. Minimum packing unit

- Bulk : The form in which parts are inserted into plastic bags or cardboard boxes.
- Tray : The form in which parts are inserted in to containers made of resin.



- Magazine : The form in which parts are inserted into resin cartridges designated for automatic inserters.



- Taping
  - Reel (Surface mounting devices)

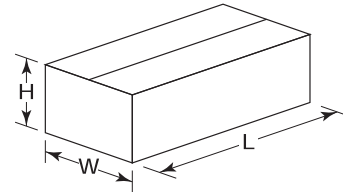


- Box (Axial devices)



### 2. Packing Box Dimensions

See the following pages for the dimensions of each cardboard box.



## About AEC-Q101 & Automotive Grade

### 1. AEC-Q101

These products are AEC-Q101 compliant.

### 2. Automotive Grade

These products are produced on a designated production line qualified for internal automotive standards.



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- All specifications are subject to change without notice.
- Please consult us for the latest specifications before you order.
- Please use this products after reading manual well.

• Printed January 2020

This catalog includes the products which might be subject to the foreign exchange and foreign trade laws.

# Package Outline

\* = Similar Package



DO-219AB\*  
G1F



DO-219AA\*  
M1F



DO-214AC  
1F



SC-110B  
CE



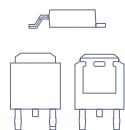
DO-214AA\*  
M2F



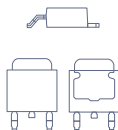
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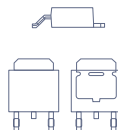
MCP



TO-252AA  
FB



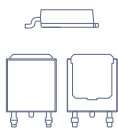
SC-63  
E-pack



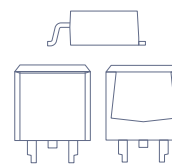
TO-252AB\*  
FE



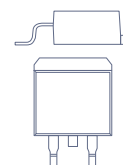
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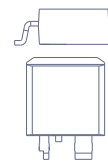
TO-252AA\*  
FR



SC-83\*  
STO-220, FD



TO-263AB  
FG



SC-83\*  
FP



SOP8  
SOP8J



SOP14



SOP16



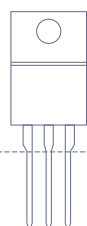
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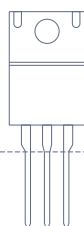
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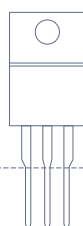
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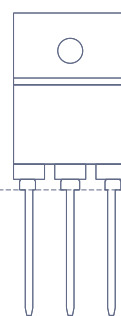
SC-91  
FTO-220A, 220AG



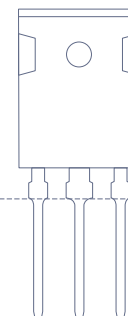
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FTO-220G



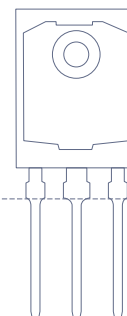
SC-91A  
FTO-220



SC-93  
ITO-3P



TO-247AD  
MTO-3P, 3PT, 3PV



SOPA-4



TO-269AA  
1Z



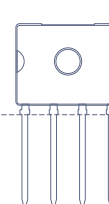
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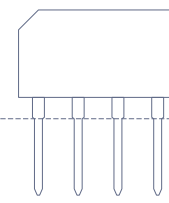
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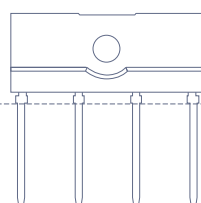
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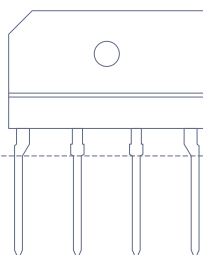
D3K



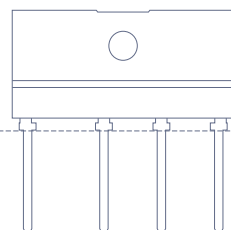
2S



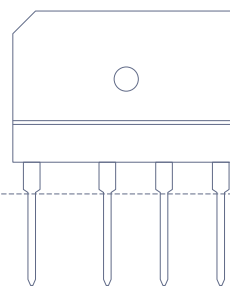
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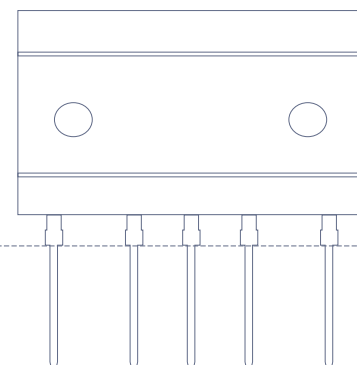
3S



JA



5S



TSB, JC

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