

## LED lighting controll ICs **MV2002SG**

**Rectification method : current critical (low-side switch)**

**Input voltage : DC 400V**

Output specification			
	Output voltage	Output current (peak) *1	Frequency (at lo_peak) *2
LED 1	DC 140V	300mA	50kHz
LED 2	DC 140V	300mA	90kHz

\*1 :  $V_{REF}=2.7V$

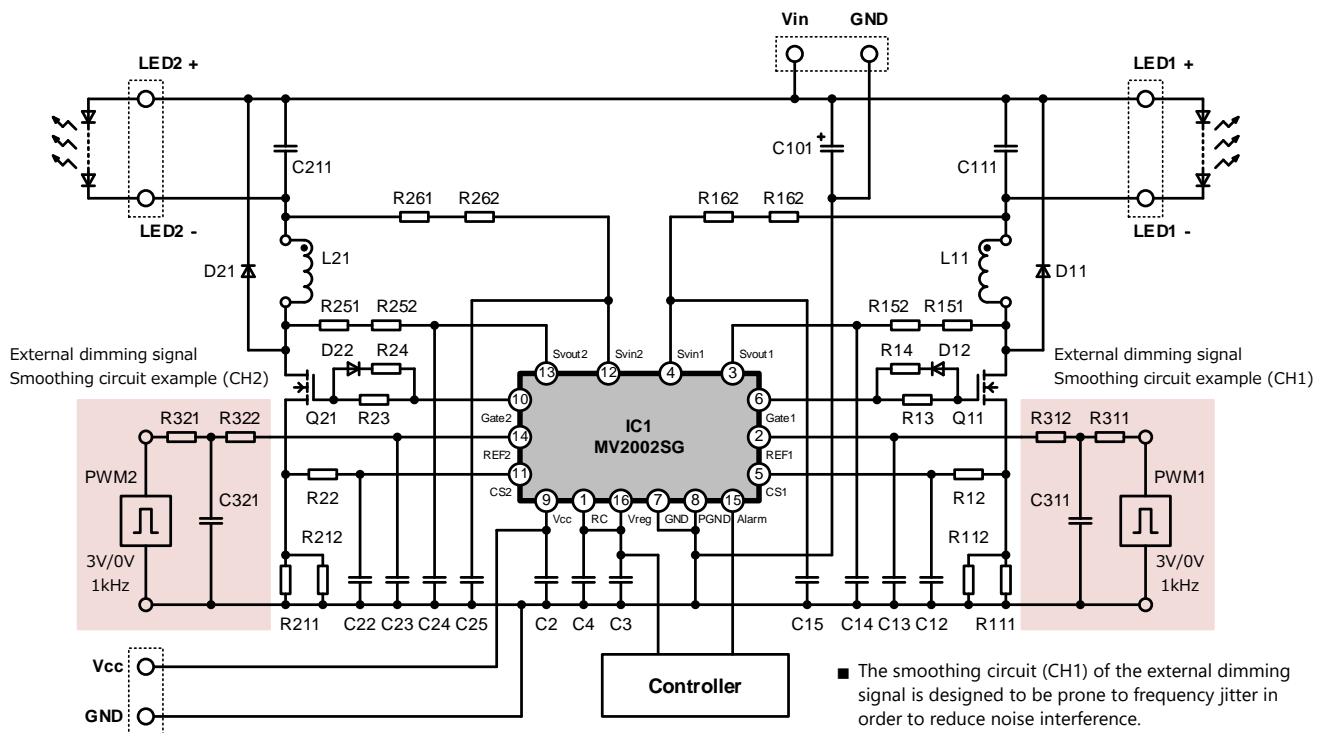
\*2 : Average frequency during lo\_peak

Frequency difference between LED1 and LED2 to avoid noise interference.

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**Reference circuit diagram**



**Bill Of Material**

No.	Type	Qt'y	Spec	Model Name	Vendor	Remarks
C101	Electrolytic Capacitor	1	450 V 10 uF	450PX10M	Rubycon	-
C2	Ceramic Capacitor	1	50 V 1 uF	C2012X7R1H105K	TDK	-
C3	Ceramic Capacitor	1	50 V 0.1 uF	C1608X7R1H104K	TDK	-
C4	Ceramic Capacitor	1	50 V 1000 pF	C1608X7R1H102K	TDK	-
C111	Film Capacitor	1	450 V 2.2 uF	450MPK225K	Rubycon	-
C12	Ceramic Capacitor	1	50 V 100 pF	C1608CH1H101J	TDK	-
C13	Ceramic Capacitor	1	50 V 0.1 uF	C1608X7R1H104K	TDK	-
C14	Ceramic Capacitor	1	50 V 22 pF	C1608CH1H220J	TDK	-
C15	Ceramic Capacitor	1	50 V 1000 pF	C1608X7R1H102K	TDK	-
C211	Film Capacitor	1	450 V 2.2 uF	450MPK225K	Rubycon	-
C22	Ceramic Capacitor	1	50 V 100 pF	C1608CH1H101J	TDK	-
C23	Ceramic Capacitor	1	50 V 0.1 uF	C1608X7R1H104K	TDK	-
C24	Ceramic Capacitor	1	50 V 22 pF	C1608CH1H220J	TDK	-
C25	Ceramic Capacitor	1	50 V 1000 pF	C1608X7R1H102K	TDK	-
C311	Ceramic Capacitor	1	50 V 0.1 uF	C1608X7R1H104K	TDK	-
C321	Ceramic Capacitor	1	50 V 1 uF	C2012X7R1H105K	TDK	-
D11	FRD	1	600 V 0.8 A	D1FK60	SHINDENGEN	-
D12	SBD	1	30 V 3 A	M1FM3	SHINDENGEN	-
D21	FRD	1	600 V 0.8 A	D1FK60	SHINDENGEN	-
D22	SBD	1	30 V 3 A	M1FM3	SHINDENGEN	-

**Bill Of Material**

No.	Type	Qt'y	Spec	Model Name	Vendor	Remarks
IC1	Control IC	1	-	MV2002SG	SHINDENGEN	-
L11	Choke Coil	1	2.6 mH	PQ2016		-
L21	Choke Coil	1	1.3 mH	PQ2016		-
Q11	Power MOSFET	1	525 V 5 A	P5B52HP2	SHINDENGEN	-
Q21	Power MOSFET	1	525 V 5 A	P5B52HP2	SHINDENGEN	-
R111	Chip Resistor	1	1/8 W 0.91 Ω	SR73 1E T TD R910 F	KOA	1%
R112	Chip Resistor	1	1/8 W 39 Ω	RK73H 2A T TD 39R0 F	KOA	1%
R12	Chip Resistor	1	1/8 W 1.5 kΩ	RK73H 2A T TD 1501 F	KOA	1%
R13	Chip Resistor	1	1/8 W 330 Ω	RK73B 2A T TD 331	KOA	-
R14	Chip Resistor	1	1/8 W 22 Ω	RK73B 2A T TD 22R	KOA	-
R151	Chip Resistor	1	1/8 W 1.8 MΩ	RK73H 2A T TD 1804 F	KOA	1%
R152	Chip Resistor	1	1/8 W 1.5 MΩ	RK73H 2A T TD 1504 F	KOA	1%
R161	Chip Resistor	1	1/8 W 1.8 MΩ	RK73H 2A T TD 1804 F	KOA	1%
R162	Chip Resistor	1	1/8 W 1.5 MΩ	RK73H 2A T TD 1504 F	KOA	1%
R211	Chip Resistor	1	1/8 W 1 Ω	SR73 1E T TD 1R00 F	KOA	1%
R212	Chip Resistor	1	1/8 W 12 Ω	RK73H 2A T TD 12R0 F	KOA	1%
R22	Chip Resistor	1	1/8 W 1.5 kΩ	RK73H 2A T TD 1501 F	KOA	1%
R23	Chip Resistor	1	1/8 W 330 Ω	RK73B 2A T TD 331	KOA	-
R24	Chip Resistor	1	1/8 W 22 Ω	RK73B 2A T TD 22R	KOA	-
R251	Chip Resistor	1	1/8 W 1.8 MΩ	RK73H 2A T TD 1804 F	KOA	1%
R252	Chip Resistor	1	1/8 W 1.5 MΩ	RK73H 2A T TD 1504 F	KOA	1%
R261	Chip Resistor	1	1/8 W 1.8 MΩ	RK73H 2A T TD 1804 F	KOA	1%
R262	Chip Resistor	1	1/8 W 1.5 MΩ	RK73H 2A T TD 1504 F	KOA	1%
R311	Chip Resistor	1	1/8 W 10 kΩ	RK73B 2A T TD 103	KOA	-
R312	Chip Resistor	1	1/8 W 1 kΩ	RK73B 2A T TD 102	KOA	-
R321	Chip Resistor	1	1/8 W 10 kΩ	RK73B 2A T TD 103	KOA	-
R322	Chip Resistor	1	1/8 W 1 kΩ	RK73B 2A T TD 102	KOA	-

### Choke Coil 1 (L11)

Vin= DC 400V  
Po= 42W

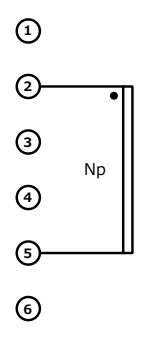
fmin= 50kHz

Inductance (Np)      2-5pin    2.6mH    1kHz

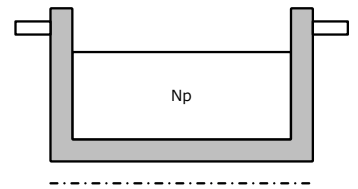
Core  
PQ2016      Material : -      Manufacturer : -

Bobbin  
PQ2016      Pin Number : 14      Manufacturer : -

< Pin assignment >



< Structure drawing >



< Winding Specifications >

Winding Order	Current Name	Pin Number		Turn [T]	diameter [mm dia]	Material	Output		Notes
		Start	End				Voltage	Current	
1	Np	2	5	100	0.32	1UEW	-	-	

### Choke Coil 2 (L21)

Vin= DC 400V  
Po= 42W

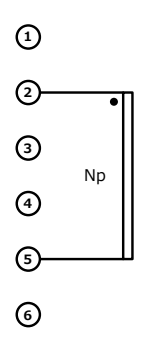
fmin= 90kHz

Inductance (Np)      2-5pin    1.3mH    1kHz

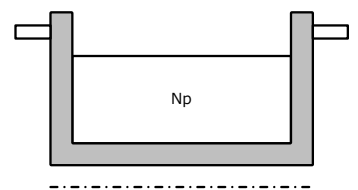
Core  
PQ2016      Material : -      Manufacturer : -

Bobbin  
PQ2016      Pin Number : 14      Manufacturer : -

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< Structure drawing >



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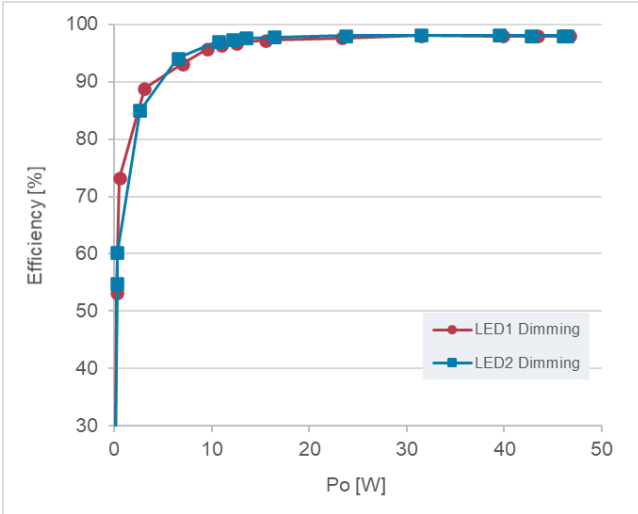
Winding Order	Current Name	Pin Number		Turn [T]	diameter [mm dia]	Material	Output		Notes
		Start	End				Voltage	Current	
1	Np	2	5	60	0.32	1UEW	-	-	

## Efficiency

$V_{in} = 400V$ ,  $V_{cc} = 15V$ ,  $V_{reg} = \text{open}$ ,  $T_a = \text{Room temperature}$   
 $V_{REF} = 2.7V$ , rated current (300 mA)

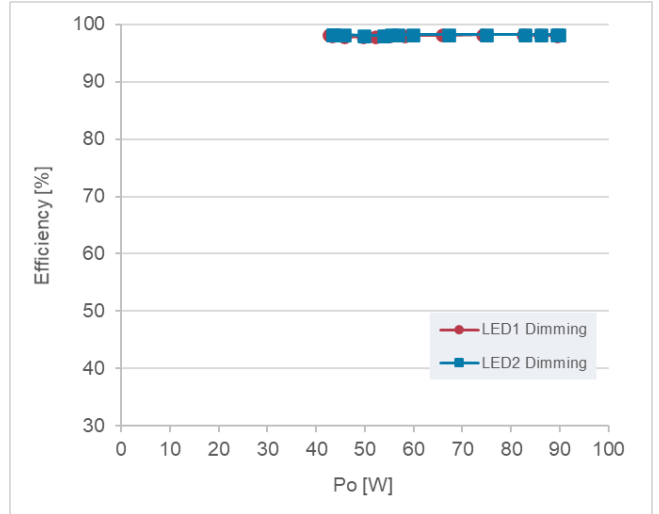
### One side off

	LED1	LED2
LED1 Dimming	Dimming ( $V_{REF1} = 0 \sim 3V$ )	OFF ( $V_{REF2} = 0V$ )
LED2 Dimming	OFF ( $V_{REF1} = 0V$ )	Dimming ( $V_{REF2} = 0 \sim 3V$ )



### One side PEAK load fixed

	LED1	LED2
LED1 Dimming	Dimming ( $V_{REF1} = 0 \sim 3V$ )	Peak Load ( $V_{REF2} = 2.7V$ )
LED2 Dimming	Peak Load ( $V_{REF1} = 2.7V$ )	Dimming ( $V_{REF2} = 0 \sim 3V$ )

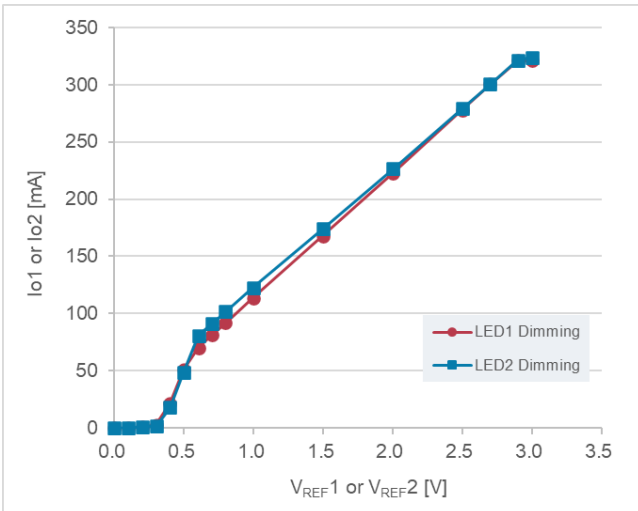


## Dimming characteristics

$V_{in} = 400V$ ,  $V_{cc} = 15V$ ,  $V_{reg} = \text{open}$ ,  $T_a = \text{Room temperature}$   
 $V_{REF} = 2.7V$ , rated current (300 mA)

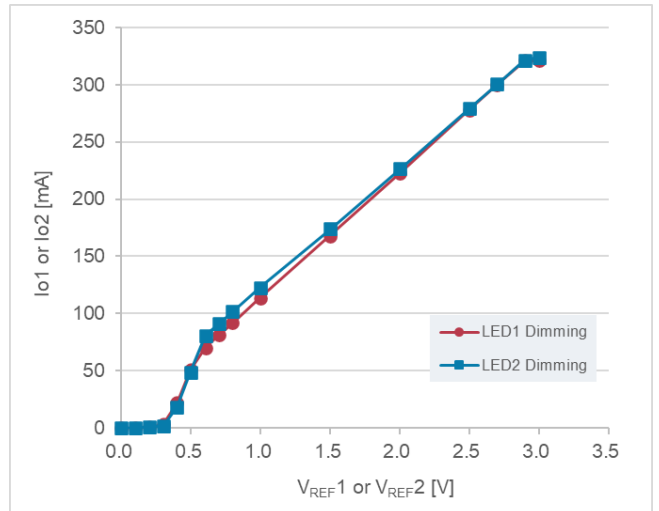
### One side off

	LED1	LED2
LED1 Dimming	Dimming ( $V_{REF1} = 0 \sim 3V$ )	OFF ( $V_{REF2} = 0V$ )
LED2 Dimming	OFF ( $V_{REF1} = 0V$ )	Dimming ( $V_{REF2} = 0 \sim 3V$ )



### One side PEAK load fixed

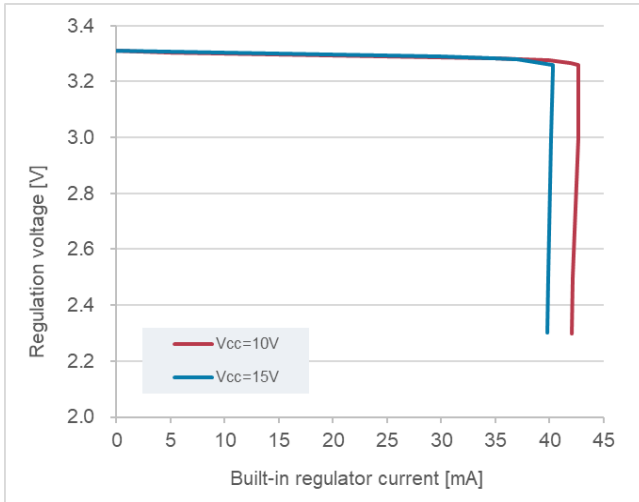
	LED1	LED2
LED1 Dimming	Dimming ( $V_{REF1} = 0 \sim 3V$ )	Peak Load ( $V_{REF2} = 2.7V$ )
LED2 Dimming	Peak Load ( $V_{REF1} = 2.7V$ )	Dimming ( $V_{REF2} = 0 \sim 3V$ )



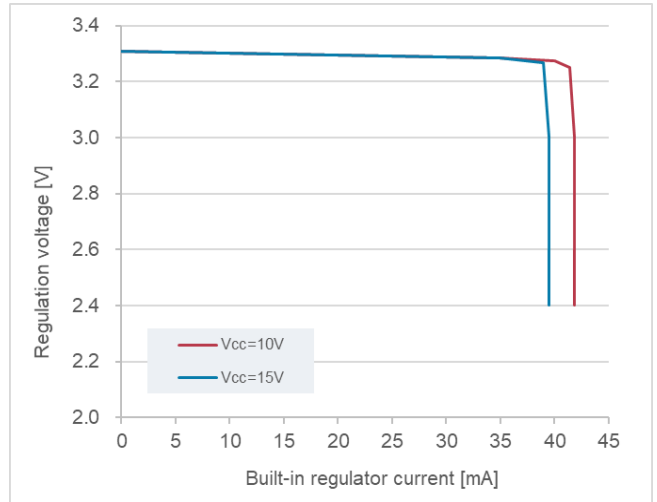
## Built-in regulator characteristics

$V_{in} = 400V$ ,  $V_{cc} = 15V$ ,  $V_{reg} = \text{open}$ ,  $T_a = \text{Room temperature}$

$V_{REF1} = V_{REF2} = 0V$



$V_{REF1} = V_{REF2} = 2.7V$



## Temperature

$V_{in} = 400V$ ,  $V_{cc} = 15V$ ,  $V_{reg} = \text{open}$ ,  $T_a = \text{Room temperature}$

