EV4689DN-00A

100V Input
1A High Power LED Driver

The Future of Analog IC Technology

DESCRIPTION

The EV4689DN-00A is an evaluation board for high power LED driver. It is implemented by MP4689DN, an integrated Buck white LED driver which is suitable for automotive, industry and general lighting applications with MPS patented pending technology.

The EV4689DN-00A is recommended to drive a single-string LEDs. It can drive up to 19 LEDs in one string. It regulates the LED current at about 730mA.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	VIN	4.5 to 95	V
Enable/Dimming	EN/DIM	5	V
LED Current	I_{LED}	730	mA
Over Current Protection	OCP	2.5	A

FEATURES

- Wide 4.5V to 100V Operating Input Range
- No Output Capacitor Required
- ±5% LED Current Accuracy
- Hysteretic Control: No Compensation
- Up to 2MHz Switching Frequency
- Up to 20kHz Dimming Frequency
- Dedicated PWM Dimming Control Input
- Short circuit protection with integrated high side MOSFET
- Optional Output Voltage Limitation
- Thermal shut down
- 200mV reference voltage for high efficiency
- Up to 95% Efficiency
- 120μA Quiescent Current
- Available in SOIC8 with Exposed Pad Packages

APPLICATIONS

- High Power LED Driver
- Automotive, Industry and General Lighting
- Constant Current Source

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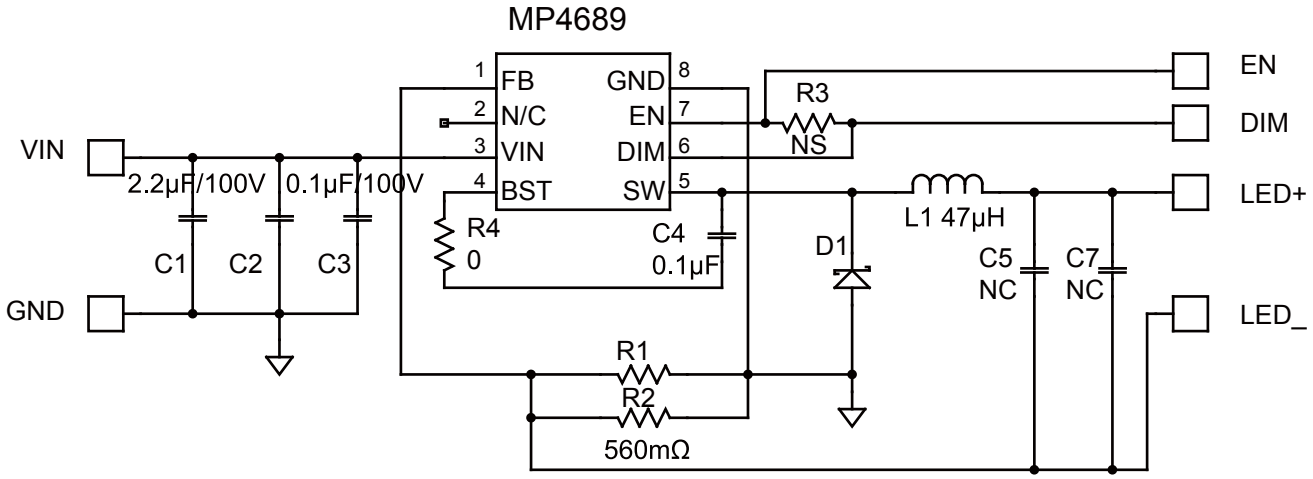
EV4689DN-00A EVALUATION BOARD

Components Area: 0.66" x 1.17" (1.7cm x 3cm)

Board Number	MPS IC Number
EV4689DN-00A	MP4689

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EVALUATION BOARD SCHEMATIC



EV4689DN-00A BILL OF MATERIALS

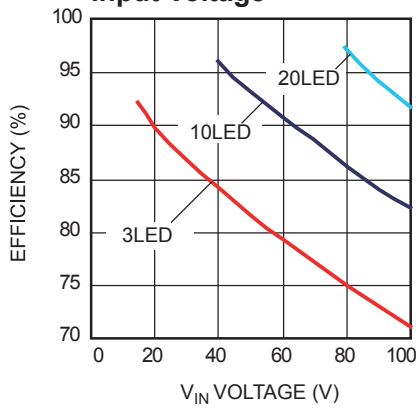
Qty	RefDes	Value	Description	Package	Manufacturer	Manufacturer P/N
2	C1,C2	2.2μF	Ceramic Cap., 100V, 10%, X7R	1210	muRata	GRM32ER72A225K
1	C3	0.1μF	Ceramic Cap., 100V, 10%, X7R	0805	muRata	GCM21BR72A104K
2	C4	0.1μF	Ceramic Cap., 50V, 10%, X7R	0603	muRata	GRM188R71H104K
0	C5,C7	NS		0603		
1	D1	1A	Schottky Rect., 150V, 1A	SMA	Diodes	STPS1150A
1	L1	47μH	Inductor, Rdc 100mΩ, Isat 2.7A	SMD	Wurth Elektronik	744770147
2	R1,R2	560mΩ	Film Res., 1/8W, 1%	0805	Panasonic	ERJ-6RQFR56V
0	R3	NS		0603		
1	R4	0Ω	Film Res., 5%	0603	Yageo	RC0603JR-070RL
1	U1		Power Led Driver	SO8E	MPS	MP4689DN(R0)
1	EN,DIM,GND		4 Pin Header, 2.54mm	2.54mm	Sullins	PCC04SAAN
4	LED+,LED-,VIN,GND		2.3 pillar	W200D100	HZ	China

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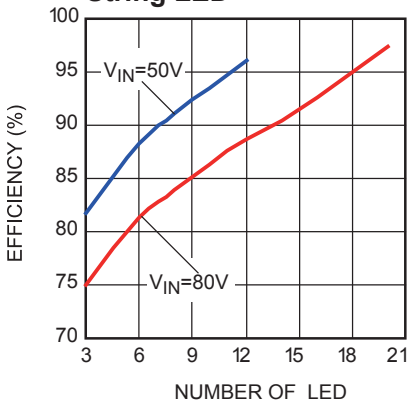
TYPICAL PERFORMANCE CHARACTERISTICS

V_{IN}=20V to 90V, V_{OUT}=3.5V to 70V, L=33µH, T_A=25ºC, Unless otherwise noted.

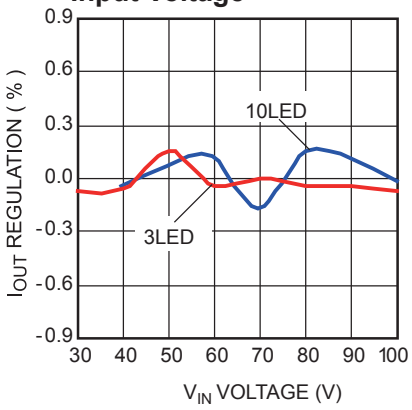
Efficiency vs. Input Voltage



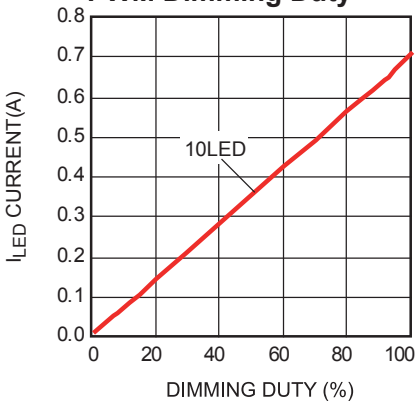
Efficiency vs. String LED



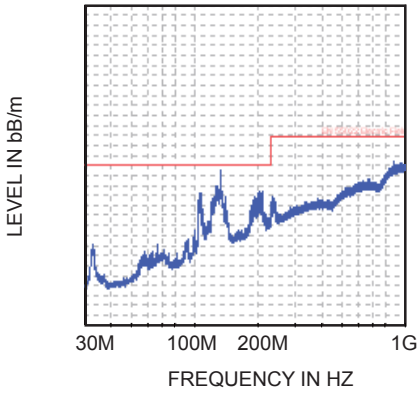
ILED Regulation vs. Input Voltage



ILED Current vs. PWM Dimming Duty

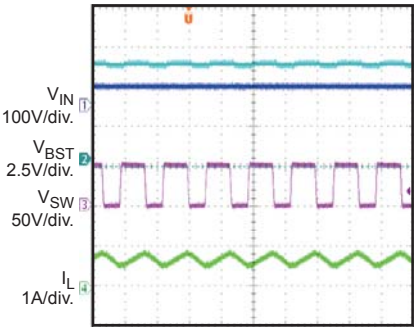


Radiation EMI



Steady State Waveform

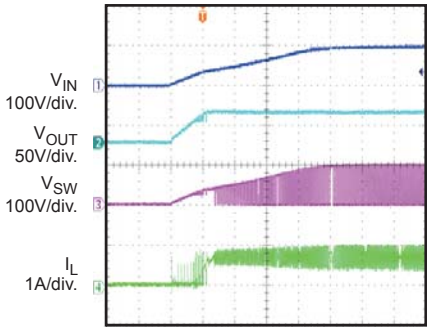
V_{IN}=50V, I_{OUT}=0.7A



400ns/div.

Power Ramp Up

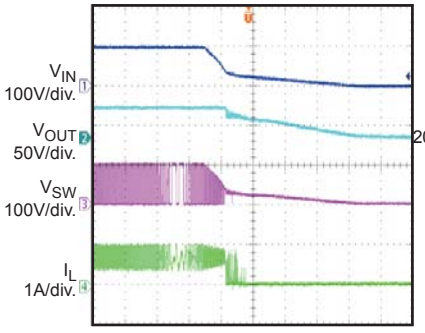
V_{IN}=100V, I_{OUT}=0.7A



10ms/div.

Power Ramp Down

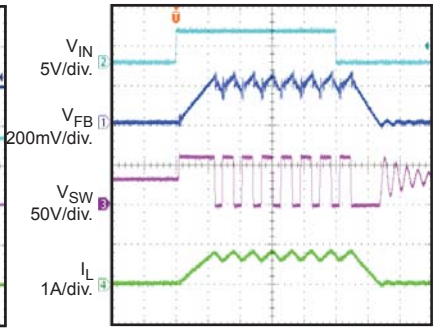
V_{IN}=100V, I_{OUT}=0.7A



40ms/div.

PWM Dimming

V_{IN}=60V, I_{OUT}=0.7A



1µs/div.

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PRINTED CIRCUIT BOARD LAYOUT

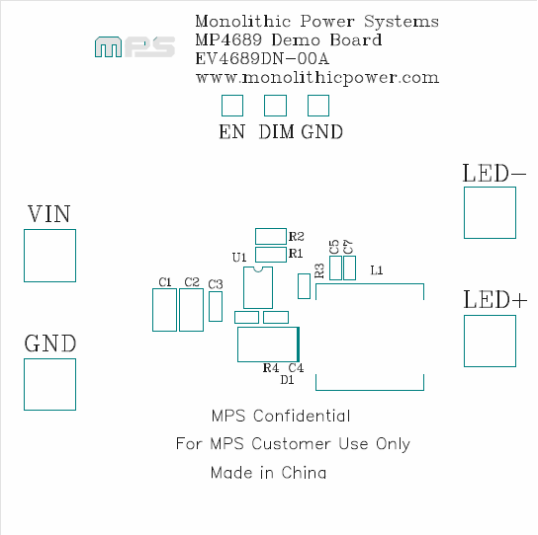


Figure 1—Top Silk Layer

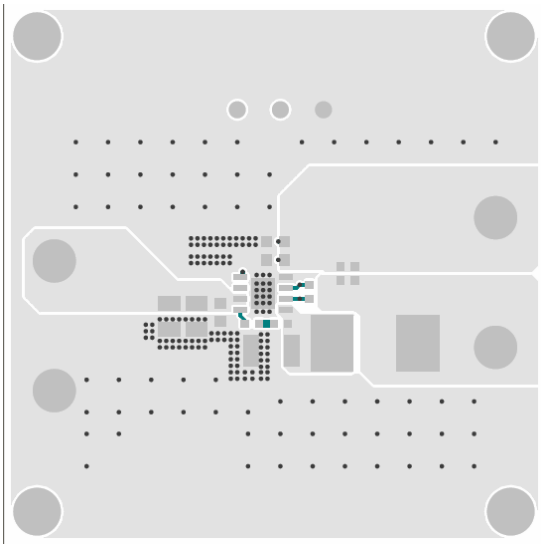


Figure 2—Top Layer

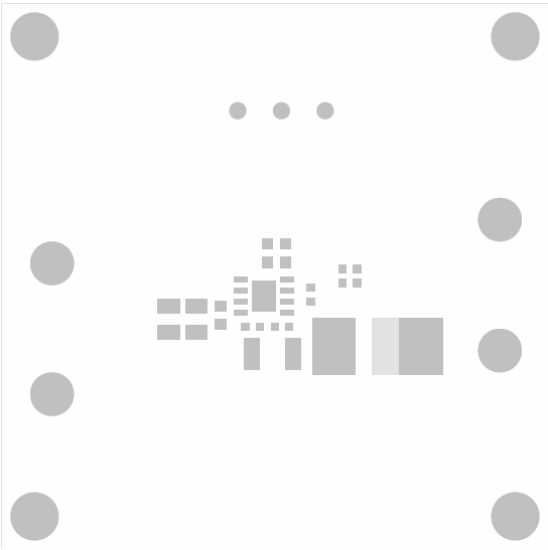


Figure 3—Top Mask Layer

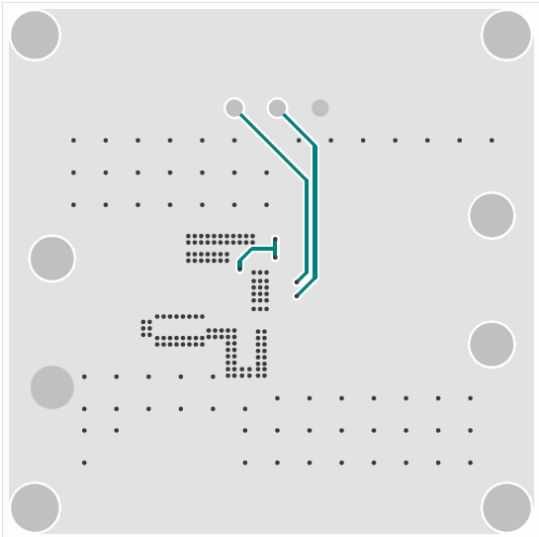


Figure 4—Bottom Layer

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QUICK START GUIDE

1. Check the LED string voltage and preset the power supplies' Voltage for input. For example, 10 LEDs have about 32V forward voltage drop. So the power supply should be set higher than 32V, say set it to 60V. Set a second power supply to 5V for enable signal. Setup a signal generator to generate PWM signal with 5V amplitude, 20kHz frequency and 50% duty cycle.
2. Turn-off all power supplies.
3. Connect the LED+ to the anode of the string and LED- to the cathode of the string. Connect the VIN to the first power supply (60V). Connect the EN to the 5V power supply. Connect the DIM to signal generator.
4. Turn on the high voltage power supply (60V).
5. Turn on the signal generator.
6. Turn on the 5V power supply.

Note: If do not need dimming function, place a 0Ω resistor at R3, which will connect DIM to EN.

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