EV4000DS-00C

350mA Off-Line WLED Driver
Evalvation Board For 180-260VAC Input

DESCRIPTION

The EV4000DS-00C is an evaluation board for the MP4000. The EV4000DS-00C is a high efficiency step-down converter designed for driving high brightness Light Emitting Diodes (LEDs).

The EV4000DS-00C can supply a maximum output current of 350mA to drive 10 to 40V LED strings from a wide input voltage 180 to 260VAC with 50/60Hz.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	VAC	180 – 260	V
Output Voltage	V_{OUT}	10 – 40	V
Output Current	I_{OUT}	350	mA

FEATURES

- Constant-current LED Driver
- Power MOSFET Zero-Current Turn On
- High Efficiency and Reliability in Boundary Mode Operation
- Low 0.9mA Operation Current
- PWM or DC Input Burst Dimming Control
- Hiccup Short Circuit Protection
- UVLO, Thermal Shutdown
- Maximum Frequency is Limited to 110kHz
- Available in SOIC8 Package

APPLICATIONS

- DC/DC or AC/DC LED Driver Application
- General Illumination
- Industrial LED Lighting
- LED Light

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Warning: Although this board is designed to satisfy safety requirements, the engineering prototype has not been agency approved. Therefore, all testing should be performed using an isolation transformer to provide the AC input to the prototype board.

EV4000DS-00C EVALUATION BOARD

FRONT

BACK

(L x W x H) 2.4" x 1.2" x 0.5"

Board Number	MPS IC Number
EV4000DS-00C	MP4000DS

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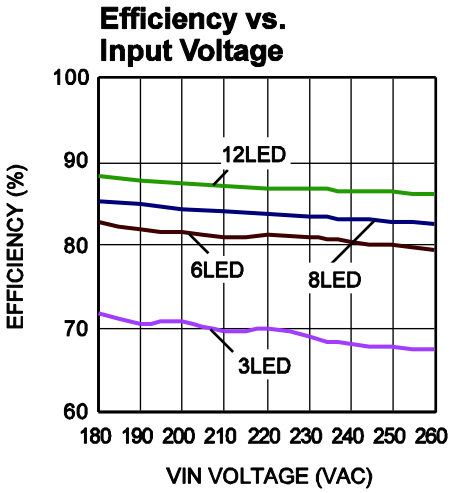
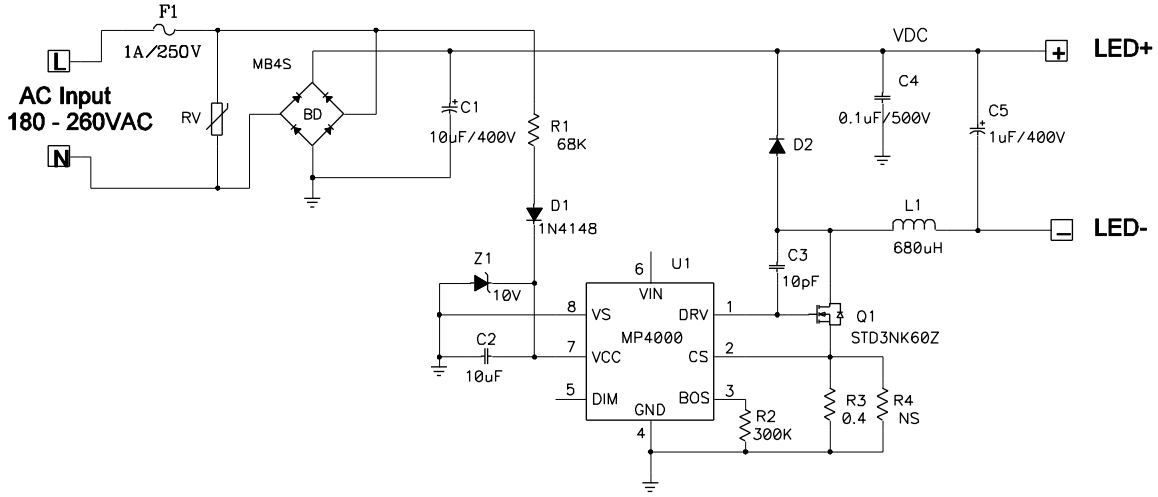


EVALUATION BOARD SCHEMATIC



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EV4000-00C BILL OF MATERIALS

Qty	RefDes	Value	Description	Package	Reference	Manufacturer P/N
1	C1	10µF	CAP., Alum., 10µF 400V	12.5x20x5	Nichicon	UVR2G100MHD
1	C2	10µF	Ceramic Cap., 16V, X5R	0805	TDK	C2012X5R1C106M
1	C3	10pF	Ceramic Cap., 630V, X7R	0805	Kemet	C0805C100KBRACTU
1	C4	0.1µF	Ceramic Cap., 500V, X7R	1812	Johanson Dielectrics	501S43W104KV4E
1	C5	1µF	1µF Cap., 400V, 10%	6.3x11x2.5	United Chemi-Con	EKMG401ELL1R0 MF11D
1	D2	1A	600V 1A fast Diode	Through Hold	STmicroelectronics	STTH2R06
1	D1	Diode	1N4148, 80V, 0.1A	SOD-523	Rohm Semi	1SS400TE61CT-ND
1	BD	0.5A	Bridg Diode, SMD, 400V, 0.5A	SOIC-4	Fairchile Semi	MB4S
1	Z1	10V	Zener diode	SOD-123	Diode	DDZ9697-7
1	F1	2A	Fuse 2A/250V	Through Hold	LittlelFuse	0263002.MAT1L
1	L1	680µH	Inductor, 680µH/1.3A	12x12x10	WURTH Elektronik	7447709681
1	R1	68k	1/4W Res., 5%	Through Hold	Digikey	
1	R2	300k	Film Res., 1%	0603	Digikey	
1	R3	0.4Ω	1/3W Film Res., 1%	0805	Cyntec	
1	R4	NS				
1	RV	ZNR	430V Transient Absorbers	Through Hold	Panasonic	ERZ-V10D431
1	Q1		N_C MOSFET 600V	D Pak	ST Microelectr	STD3NK60ZT4
1	U1		DC-DC Converter	SOIC8	MPS	MP4000DS

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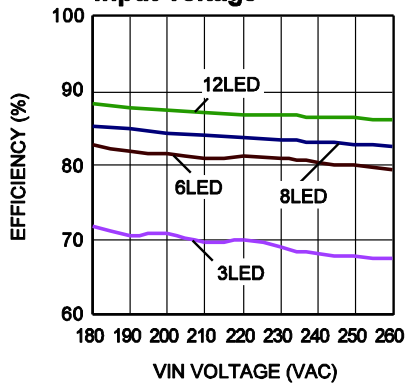
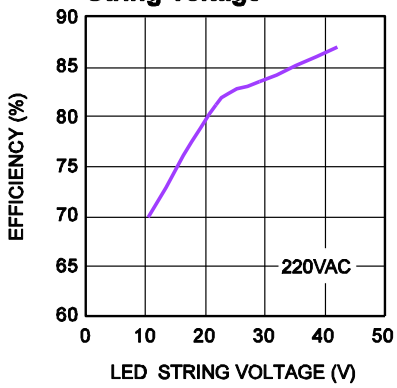
EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.
V_{IN} = 180V_{AC} to 260V_{AC}, V_{OUT} = 10V to 40V, L = 680µH, T_A = 25°C, unless otherwise noted.

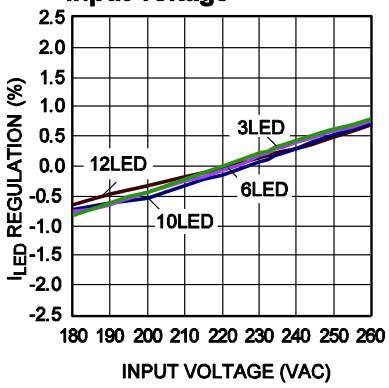
Efficiency vs. Input Voltage



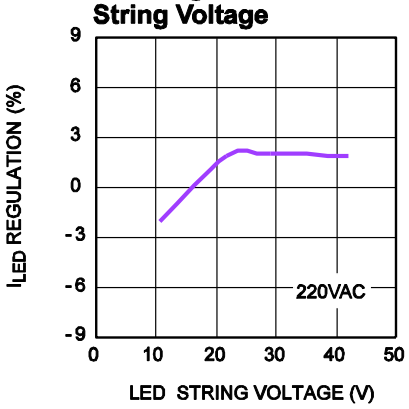
Efficiency vs. String Voltage



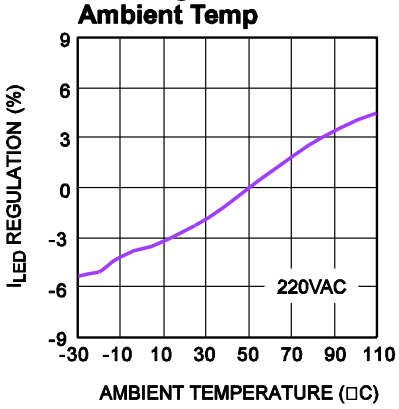
I_{LED} Regulation vs. Input Voltage



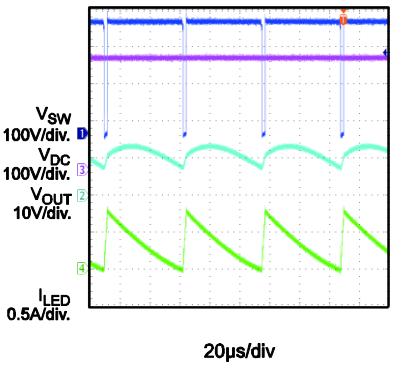
I_{LED} Regulation vs. String Voltage



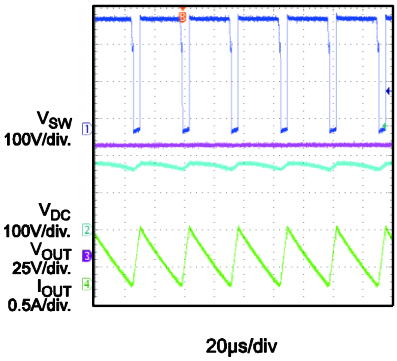
I_{LED} Regulation vs. Ambient Temp



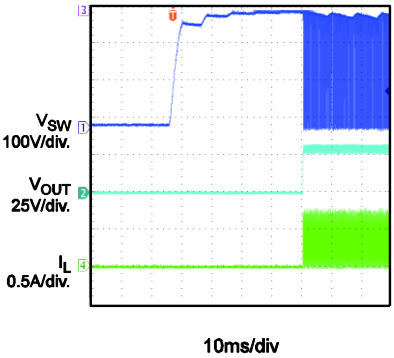
Steady State Waveform
V_{IN} =220V_{AC} V_{OUT}=10V



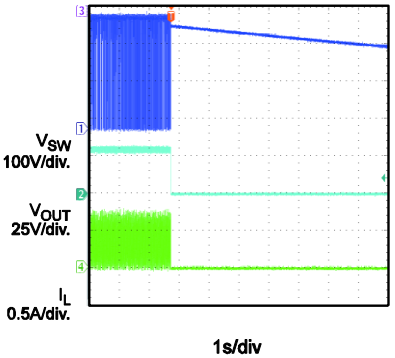
Steady State Waveform
V_{IN} =220V_{AC} V_{OUT}=40V



Startup Waveform
V_{IN} =220V_{AC} V_{OUT}=28V



Shutdown Waveform
V_{IN} =220V_{AC} V_{OUT}=28V



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PRINTED CIRCUIT BOARD LAYOUT

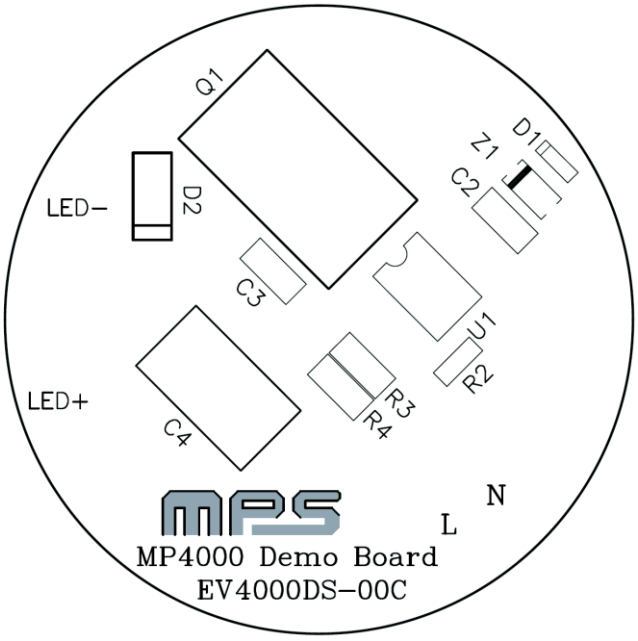

Figure 1—Top Silk Layer

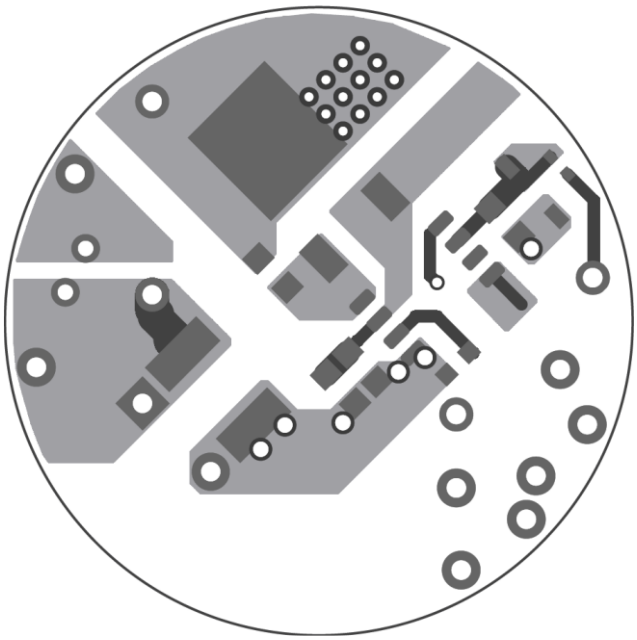

Figure 2—Top Layer

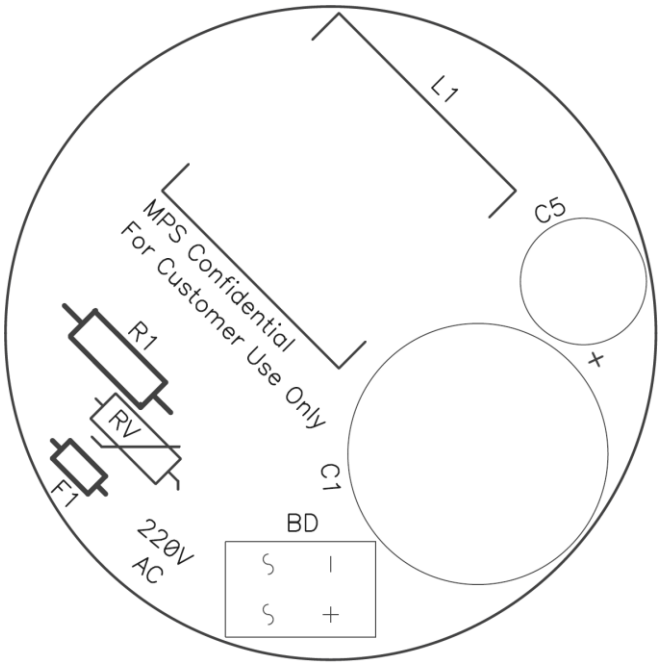

Figure 3—Bottom Silk Layer

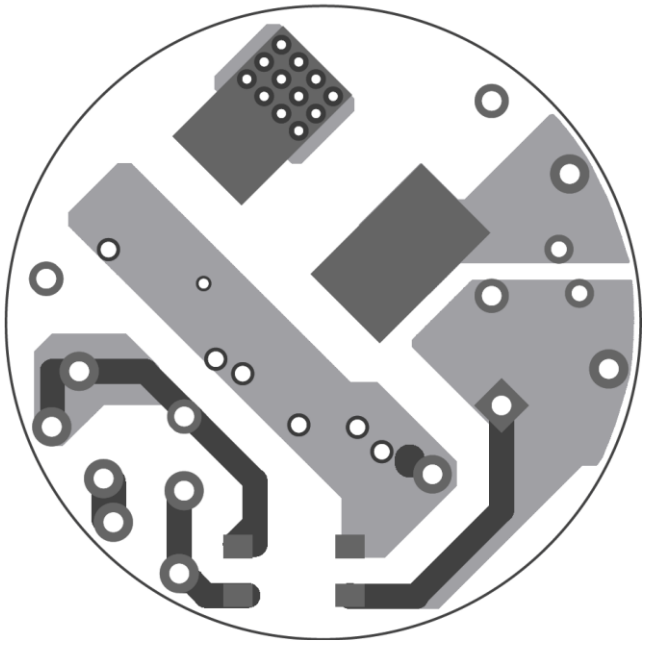

Figure 4—Bottom Layer

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QUICK START GUIDE

1. Turn off the AC Power Supply.
2. Connect the LED string between “+” (anode of LED string) and “-“ (cathode of LED string).
3. Connect the AC input voltage between the AC terminals (“N” and “L”) as shown on the board.
4. Set AC Power Supply to 180V ≤ AC input ≤ 260V.
5. Turn on the AC Power Supply.

CAUTION:

There is no galvanic isolation on the EVB board. Be careful when doing the test. To prevent damage to equipments and EVB board, isolation is suggested to either the test equipments or the EVB board.

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