

## DESCRIPTION

The EV24833-N-00A Evaluation Board is designed to demonstrate the capabilities of MP24833GN. The MP24833 is a 55V, 3A, white LED driver suitable for step down, inverting step up/down and step up application.

EV24833-N-00A is compatible with step-down (Buck) and inverting step-up/down (Buck-boost) applications.

- For step-down application, short “JP1”, open “JP2”, connect LED load to “LED+” and “LED-”
- For step-up/down application, short “JP2”, open “JP1”, connect LED load to “LED+” and “LED-”

## ELECTRICAL SPECIFICATION

	Parameter	Symbol	Value	Units
Buck-boost	Input Voltage	VIN	24	V
	LED Voltage	VLED	24	V
	LED Current	ILED	1	A
Buck	Input Voltage	VIN	28-50	V
	LED Voltage	VLED	24	V
	LED Current	ILED	1	A

## FEATURES

- 3A Maximum Output Current
- Unique Step-Up/Down Operation (Buck-Boost Mode)
- Wide 4.5V-to-55V Operating Input Range for Step-Down Applications (Buck Mode)
- 0.19Ω Internal Power MOSFET Switch
- Fixed 200kHz Switching Frequency
- Analog and PWM Dimming
- 0.198V Reference Voltage
- 6μA Shutdown Mode
- No Minimum Number of LEDs Required
- Stable with Low ESR Output Ceramic Capacitors
- Cycle-by-Cycle Over-Current Protection
- Thermal Shutdown Protection
- Open Strings Protection
- Output Short-Circuit Protection
- Available in an SOIC8E Package

## APPLICATIONS

- General LED Illumination
- LCD Backlight Panels
- Notebook Computers
- Automotive Internal Lighting
- Portable Device

## EV24833-N-00A EVALUATION BOARD

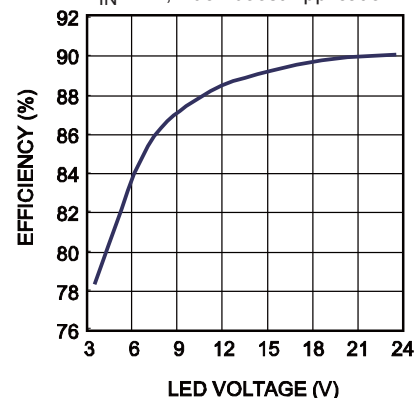


(L x W x H) 5cm x 4.6cm x 1cm

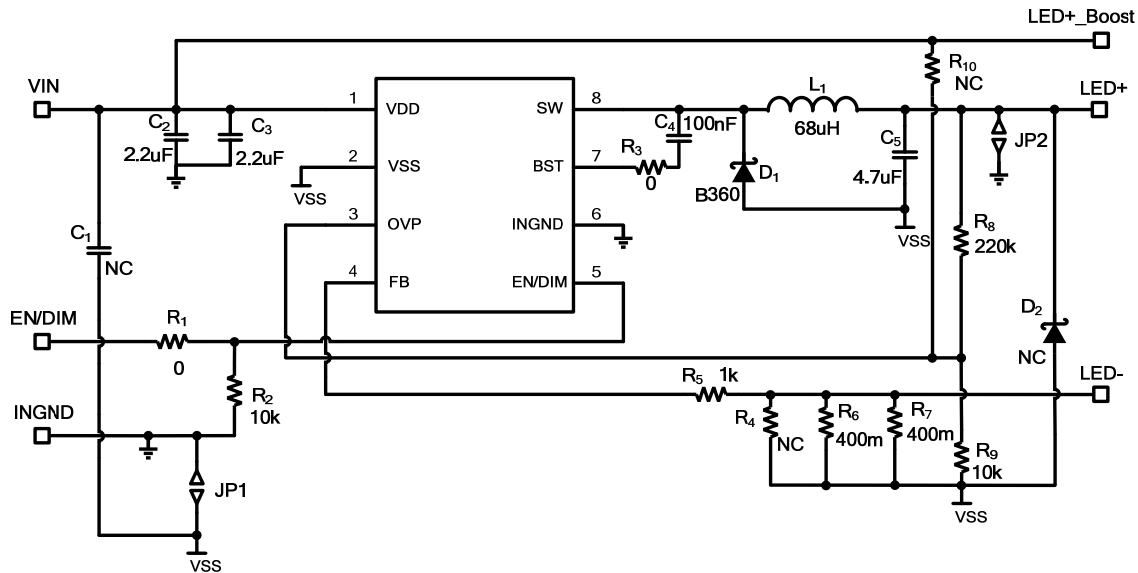
Board Number	MPS IC Number
EV24833-N-00A	MP24833GN

### Efficiency vs. LED Voltage

V<sub>IN</sub>=24V, Buck-boost Application



## EVALUATION BOARD SCHEMATIC



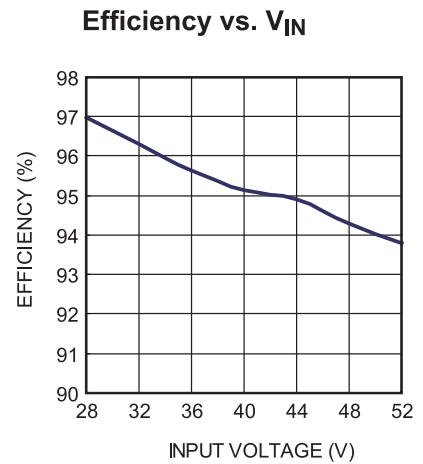
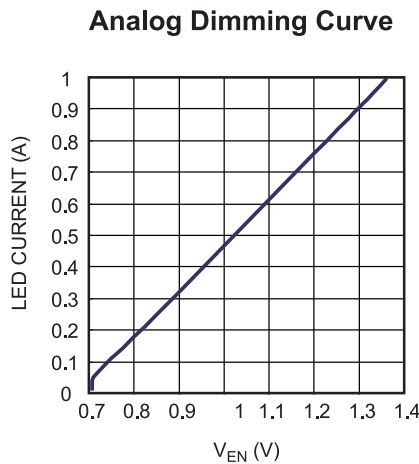
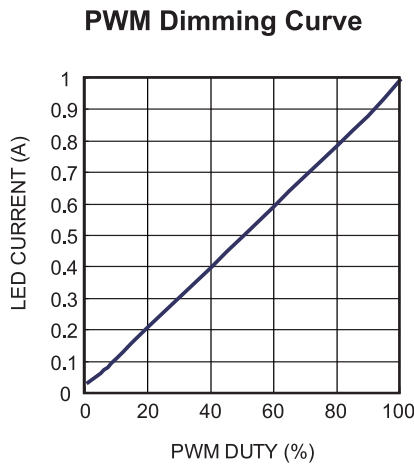
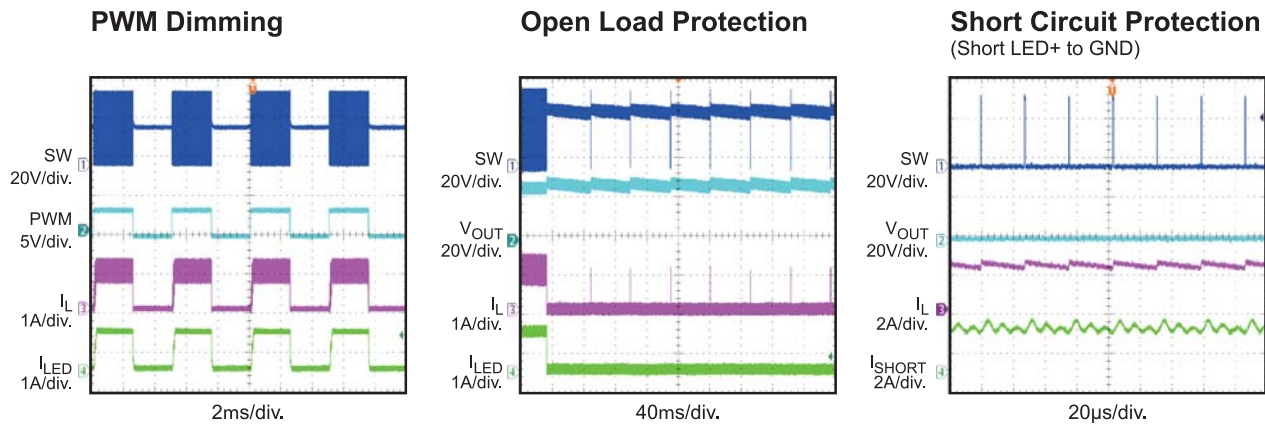
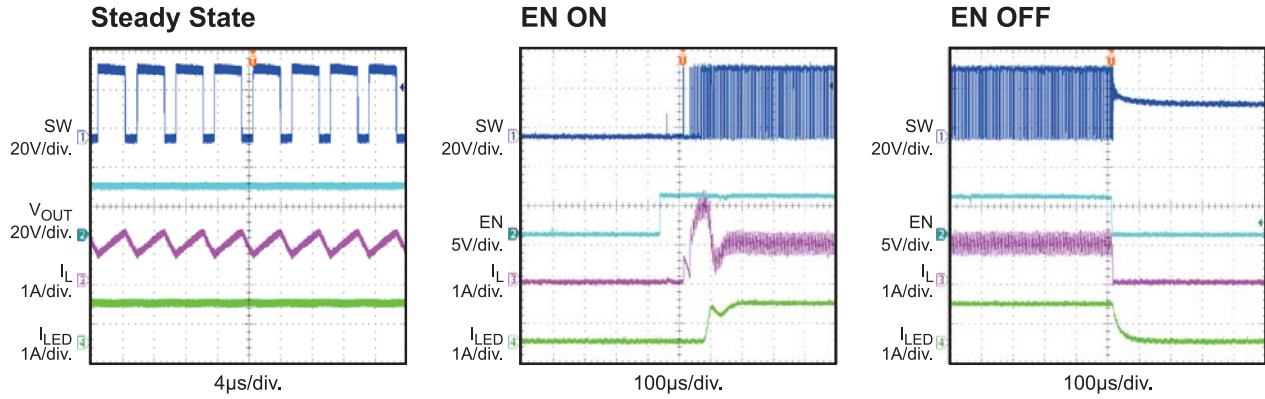
## EV24833-N-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacture	Manufacture_PN
1	C1	NC		1210		
2	C2, C3	2.2µF	Ceramic Capictor,50V, X7R, 1210	1210	TDK	C3225X7R1H225K
1	C4	100n	Ceramic Capictor,50V, X7R, 0603	0603	muRata	GRM188R71H104KA93D
1	C5	4.7µF	Ceramic Capictor,50V, X7R, 1210	1210	muRata	CRM32ER71H475KA88L
1	D1	B360A	Schottky Doide, 60V, 3A, SMA	SMA	Diode	B360A
1	D2	NC		SMA		
1	L1	68µH/3.2A	Inductor, 68µH, 88.5mΩ, 3.2A	SMD	WURTH	7447709680
2	R1, R3	0	Film Resistor;5%	0603	Yageo	RC0603JR-070RL
2	R2, R9	10k	Film Resistor;1%	0603	Yageo	RC0603FR-0710KL
1	R4	NC		0805		
1	R5	1k	Film Resistor;1%	0603	Ralec	RF0603-1K
2	R6, R7	400m	Film Resistor;1%	0805	ROYALOHM	0805F400LT5E
1	R8	226k	Film Resistor;1%	0603	Yageo	RC0603FR-07226KL
1	R10	NC		0603		
1	U1	MP24833	MP24833	SOIC8E	MPS	MP24833

### EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.

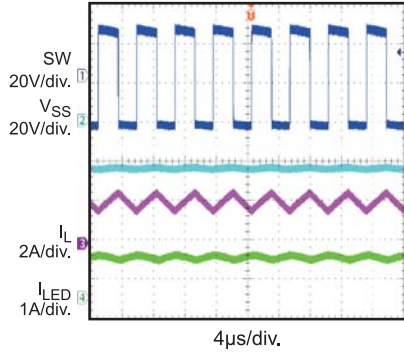
VIN = 36V, ILED = 1A, 7 LEDs in series, TA = 25°C, Buck Application, unless otherwise noted.



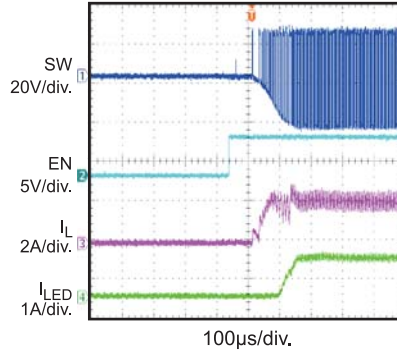
**EVB TEST RESULTS (continued)**

$V_{IN} = 24V$ ,  $I_{LED} = 1A$ , 7WLEDs in series,  $T_A = 25^{\circ}C$ , Buck-boost Application, Refer to INGND, unless otherwise noted.

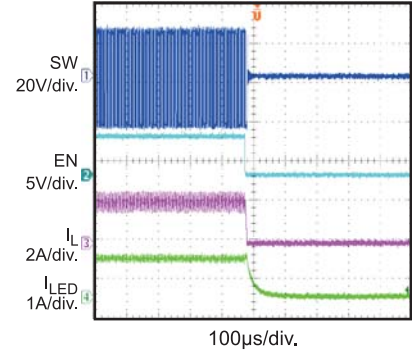
**Steady State**



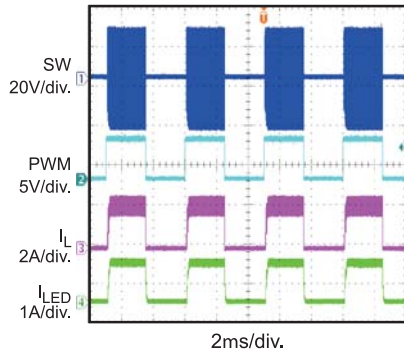
**EN ON**



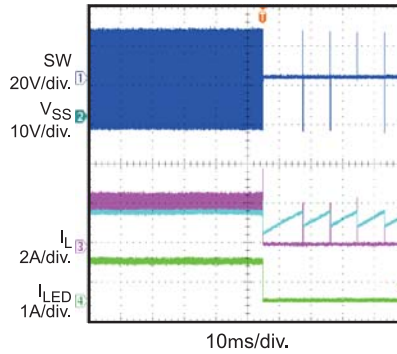
**EN OFF**



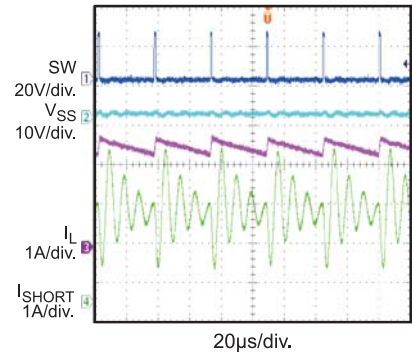
**PWM Dimming**



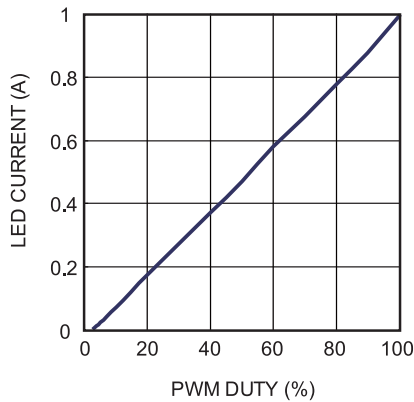
**Open Load Protection**



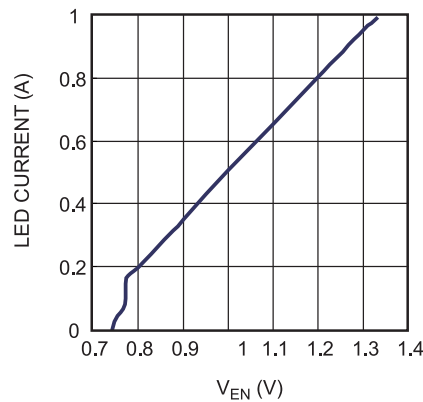
**Short Circuit Protection**  
Short LED+ to VSS



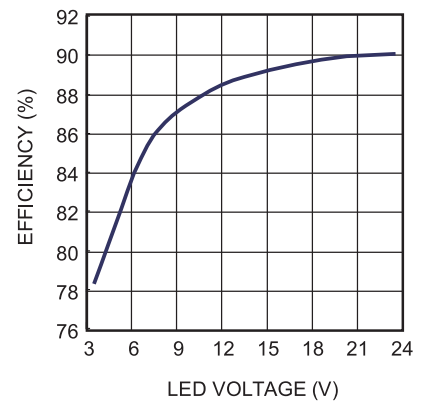
**PWM Dimming Curve**



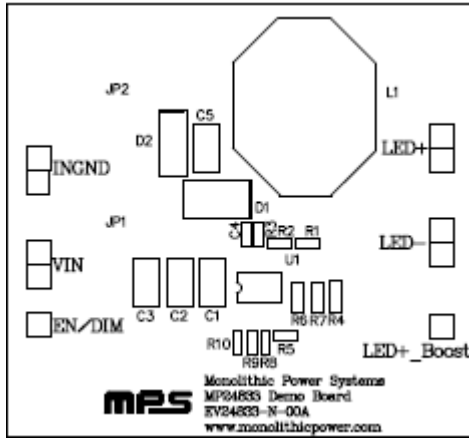
**Analog Dimming Curve**



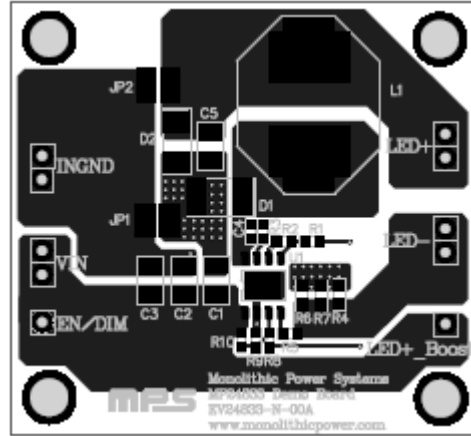
**Efficiency vs. LED Voltage**



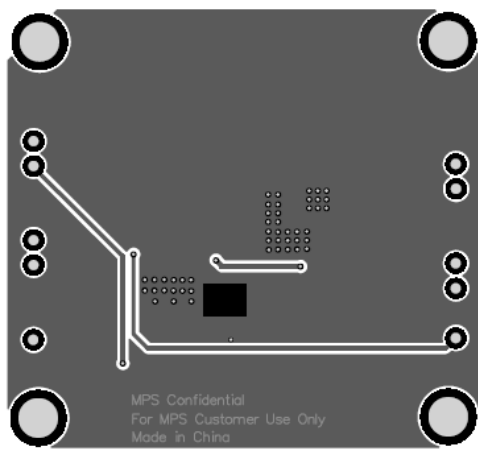
**PRINTED CIRCUIT BOARD LAYOUT**



**Figure 1—Top Silk Layer**



**Figure 2—Top Layer**



**Figure 3—Bottom Layer**

## QUICK START GUIDE

1. Confirm the jumpers are connected correctly. For Buck applications short “JP1”, open “JP2”; and for Buck-boost applications, short “JP2”, and open “JP1”.
2. Check the LED string voltage and preset the input voltage power supply.
3. Set a second power supply to 2- 5V as the power supply for “EN/DIM”.
4. Turn-off all power supplies. Connect all the power supply.
5. Connect the anode of the LED string to LED+, and the cathode to LED-.
6. Turn on the power supplies. The LED string should be lighten
7. To demo analog dimming function, adjust the second power supply which connects to “EN/DIM” connector from 0.67V to 1.36V, the amplitude of LED current is from 0% to 100% of maximum LED current.
8. To demo the PWM dimming function: apply a 100Hz-to-2kHz square wave signal with amplitude greater than 1.5V to ”EN/DIM”
9. For combined analog and PWM dimming, apply a 100HZ to 2kHz square wave signal with amplitude from 0.67V to 1.36V.
10. To demo LED+ short to VSS protection in Buck-boost applications, please solder “D2” with a schottky diode as B160.
11. The EVB is also compatible with step-up application. For step-up application, short “JP2”, open “JP1”, connect LED load to “LED+ \_Boost” and “LED-”.

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