EV2481-H-00A

1.2A, 36V, 1.4MHz
White LED Driver Buck/Boost Halogen Replacement Evaluation Board

The Future of Analog IC Technology

DESCRIPTION

The EV2481-H-00A is a Buck converter evaluation board for the MP2481, a wide input step-down converter designed for driving high-power white LEDs with up to 1A capability.

The MP2481 is a 1.2A output, 36V white LED driver suitable for either step-down or inverting step-up/down applications. It achieves 1.2A peak output current over a wide input supply range with excellent load and line regulation. Current mode operation provides fast transient response and eases loop stabilization. Fault condition protection includes thermal shutdown, cycle-by-cycle peak current limiting, open LED protection and output short circuit protection.

The MP2481 incorporates both DC and PWM dimming onto a single control pin. The separate input reference ground pin allows for direct enable and/or dimming control for a positive to negative power conversion.

The MP2481 requires a minimum number of readily available standard external components and is available in 8-pin MSOP8 packages.

FEATURES

- Wide 6V to 36V Operating Input Range for Step-Down Applications
- Drives one 5W White LED
- Up to 87% Efficiency
- Analog and PWM Dimming
- Cycle-by-Cycle Over Current Protection
- Thermal Shutdown Protection
- Open Strings Protection
- Input Over Voltage Protection
- Output short circuit protection

APPLICATIONS

- General LED Illumination

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	6-36	V
# of WLEDs		1	
LED Current	I_{LED}	1	A

All MPS parts are lead-free and adhere to the RoHS directive. For MPS green status, please visit MPS website under Products, Quality Assurance page.

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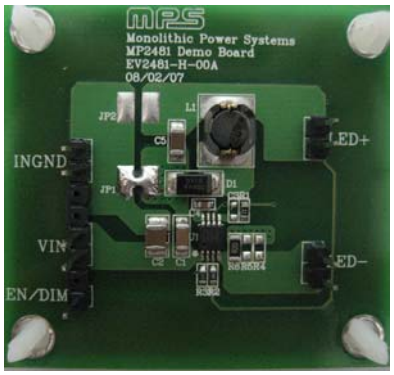
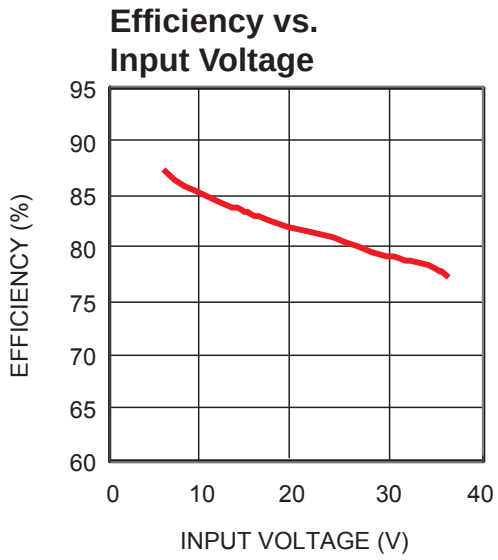
EV2481-H-00A EVALUATION BOARD



(L x W x H)2.0" x1.8" x0.2"
(5.0cm x4.5cm x0.5cm)

Board Number	MPS IC Number
EV2481-H-00A	MP2481DH



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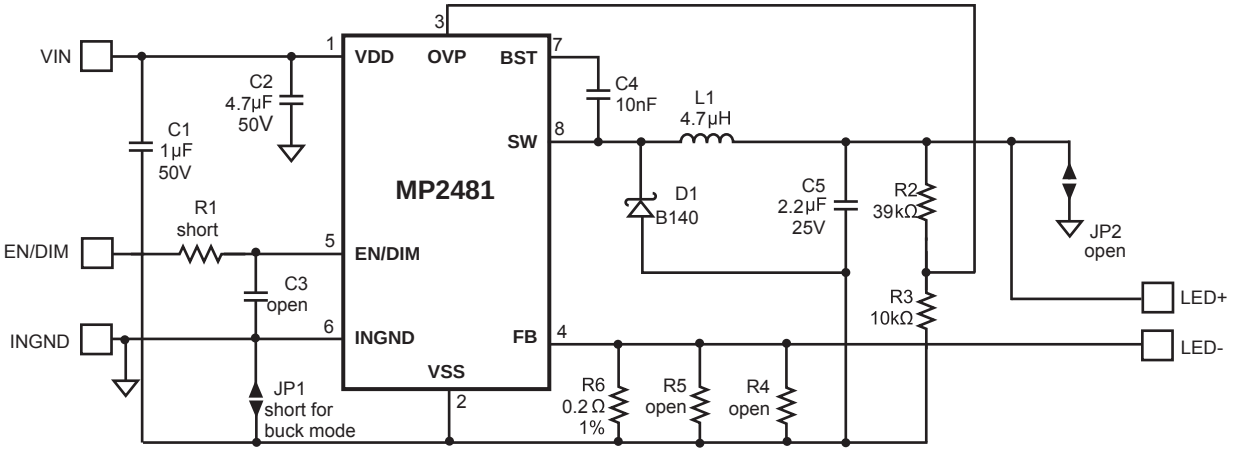
EVALUATION BOARD SCHEMATIC



EV2481-H-00A BILL OF MATERIALS (BUCK)

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	C1	1µF	Ceramic Capacitor,50V,X7R	1206	TDK	C3216X7R1H105K
1	C2	4.7µF	Ceramic Capacitor,50V,X7R	1210	Murata	GRM32ER71H475KA88L
1	C3	open				
1	C4	10n	Ceramic Capacitor,50V,X7R	0603	TDK	C1608X7R1H103K
1	C5	2.2µF	Ceramic Capacitor,25V,X7R	1206	Murata	GRM31MR71E225KA93L
1	D1	B140	Diode Schottky	SMA	Diodes Inc.	B140-13-F
1	L1	4.7µH	Inductor 1.66A	D63LCB	TOKO	D63LCB-#A921CY-4R7M
1	R1	short				
1	R2	39kΩ	5%	0603	Any	
1	R3	10kΩ	5%	0603	Any	
2	R4,R5	open				
1	R6	200mΩ	1%	1206	CYNTEC	RL1632H-R200-FN
1	U1	MP2481	MPS WLED Driver	MSOP8EP	MPS	MP2481DH-LF-Z

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PRINTED CIRCUIT BOARD LAYOUT

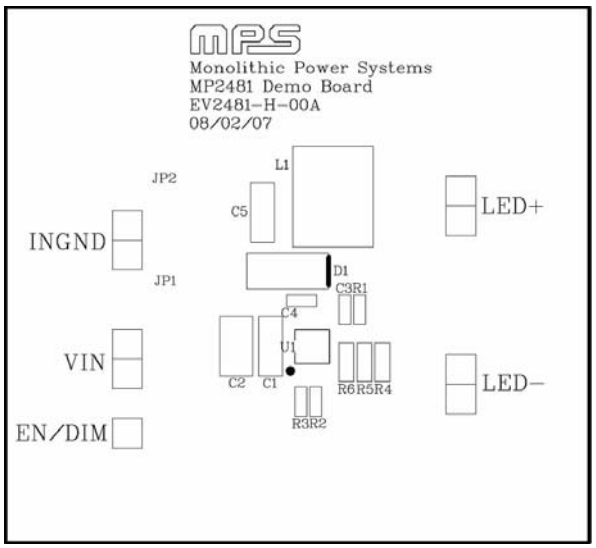

Figure 1—Top Silk Layer

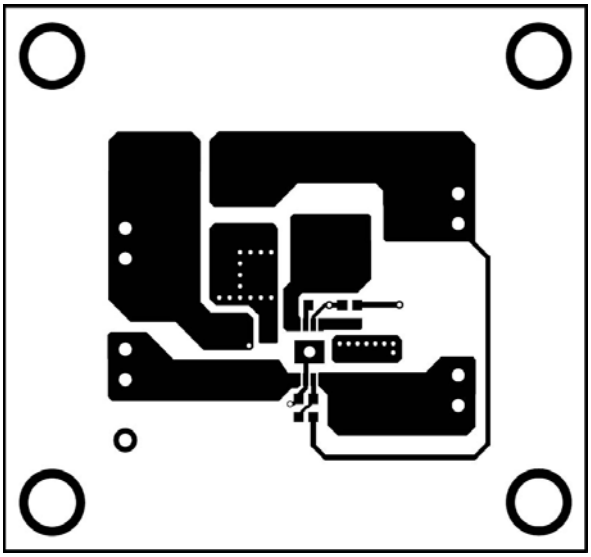

Figure 2—Top Layer

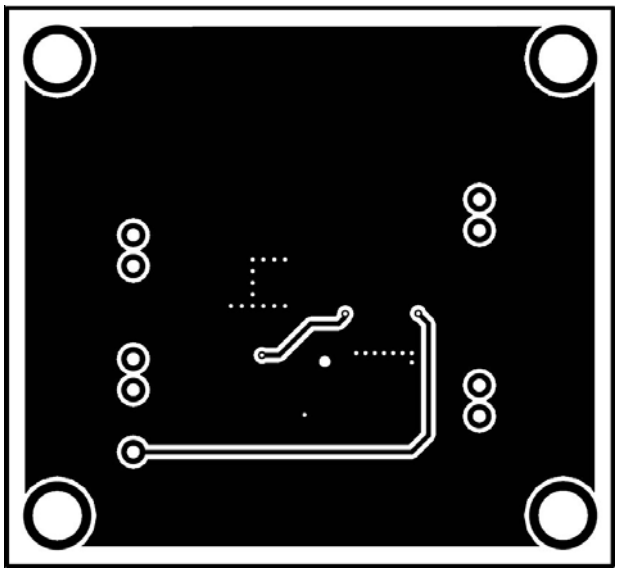

Figure 3—Bottom Layer

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QUICK START GUIDE

1. Connect the positive and negative terminals of the WLED load to the LED+ and LED- pins on the EV board, respectively.
2. Preset Power Supply 1 output to between 6V and 36V (the maximum input voltage with respect to INGND should vary with the output load voltage and the maximum voltage stress applied from VIN to VSS is limited to 36V) and turn off Power Supply 1.
3. Connect the positive terminal of Power Supply 1 output to the VIN pin and the negative terminal to the INGND pin.
4. Turn on Power Supply 1.
5. Apply the Enable voltage (with respect to INGND) to the EN/DIM pin and drive Enable high to turn on the chip. When Enable voltage is less than 0.6V, the chip is turned off.
6. To use analog dimming, a variable Power Supply 2 (0.7V to 1.4V) is required. Connect the positive and negative terminals of Power Supply 2 to the EN/DIM and INGND pins, respectively. By adjusting the voltage level from 0.7V to 1.4V, the LED current will change from 0% to 100% of the maximum LED current. If the dimming voltage is higher than 1.4V, the maximum LED current will be generated.
7. To use PWM dimming, apply a PWM signal with high level greater than 1.4V and low level lower than 0.5V to the EN/DIM pin. The PWM frequency should be lower than 1 kHz. The WLED brightness can be linearly controlled by the PWM dimming duty cycle.

For different applications, adjust the related parameters using the following equations:
To adjust the maximum LED current, change the current sensing resistors (R4, R5 and R6 paralleled net) as:

$$R_{SENSE} = \frac{0.200}{I_{LED}}$$

To adjust the Over Voltage Protection (OVP) point, change R2 as:

$$R_2 = \left[\frac{(1.3 \sim 1.5) \times V_{OUT}}{1.23} - 1 \right] \times R_3$$

To make sure that the OVP voltage is approximately 1.3~1.5 times higher than the output voltage at normal operation.

The MP2481 can work in both step down and step up/down mode. There are two jumpers (JP1 and JP2) on the EV board to change circuit configuration:

JP1	JP2	Mode	Feature	EVB Version
Short	Open	Step Down	Wide input voltage with larger output current, input voltage is larger than output LED voltage.	EV2481-H-00A
Open	Short	Step Up/Down	Input voltage can be smaller, larger than or equal to the output LED voltage.	EV2481-H-01A

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