

DESCRIPTION

The MP24183 is a 55V, 1A, white LED driver suitable for either step-down or inverting step-up/down applications. It achieves 1A 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, input over voltage protection, open strings protection and output short circuit protection.

The MP24183 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 MP24183 requires a minimum number of readily available standard external components and is available in 10-pin 3mm x 3mm QFN packages.

MP24183DQ DEMO BOARDS

| Board number | Operating Mode | Input (V) | LED# | I _{LED} (mA) |
|---------------|----------------|-----------|------|-----------------------|
| EV24183DQ-00A | Buck | 15~50 | 3 | 700 |
| EV24183DQ-00B | Buck-boost | 12 | 3~5 | 500 |
| EV24183DQ-00C | Boost | 12 | 6~9 | 500 |

ELECTRICAL SPECIFICATIONS

| Parameter | Symbol | Value | Units |
|---------------|------------------|-------|-------|
| Input Voltage | V _{IN} | 15~50 | V |
| LEDs # | | 3 | |
| LED Current | I _{LED} | 700 | mA |

FEATURES

- 1A 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)
- 0.28Ω Internal Power MOSFET Switch
- Adjustable Switching Frequency
- Analog and PWM Dimming
- 0.198V Reference Voltage
- 5μA Shutdown Mode
- No minimum LED required
- Stable with Low ESR Output Ceramic Capacitors
- Cycle-by-Cycle Over Current Protection
- Thermal Shutdown Protection
- Open Strings Protection
- Input Over Voltage Protection
- Output Short Circuit Protection
- Available in 10-Pin 3x3 QFN Package

APPLICATIONS

- General LED Illuminations
- LCD Backlight Panels
- Handheld Computers
- Automotive Internal Lighting
- Portable Multimedia Players
- Portable GPS Devices

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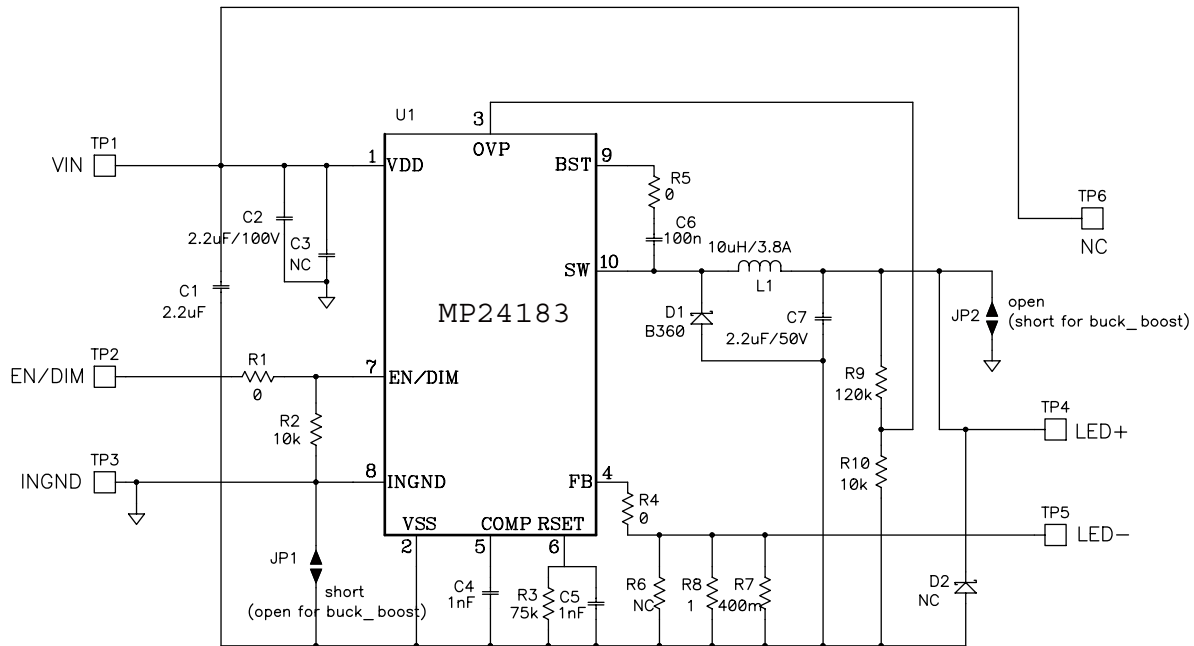
EV24183DQ-00A EVALUATION BOARD



(L x W x H) 5cm x 4.5cm x 0.7cm

| Board Number | MPS IC Number |
|---------------|---------------|
| EV24183DQ-00A | MP24183DQ |

EVALUATION BOARD SCHEMATIC



EV24183DQ-00A BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer P/N |
|-----|----------|-----------|--------------------------------------------------|---------|--------------|---------------------|
| 1 | C3 | NC | | 1210 | | |
| 2 | C2,C1 | 2.2µF | Ceramic Capacitor, 100V, X7R | 1210 | Murata | GRM32ER72A225KA35L |
| 2 | C4,C5 | 1n | Ceramic Capacitor, 50V, X7R | 0603 | TDK | C1608X7R1H102K |
| 1 | C6 | 100n | Ceramic Capacitor, 50V, X7R | 0603 | TDK | C1608X7R1H104K |
| 1 | C7 | 2.2µF | Ceramic Capacitor, 50V, X7R | 1210 | TDK | C3225X7R1H225K |
| 1 | D1 | B360 | Diode Schottky | SMA | Diodes Inc. | B360A |
| 1 | D2 | NC | | SMA | | |
| 1 | L1 | 10µH | Inductor 3.7A, 22mΩ | SM | TOKO | DH124C-1010ASW-100M |
| | | 10µH | Inductor 3.8A, 35mΩ | SM | Cooper | DR1040-100-R |
| | | 10µH | inductor 3.8A, 28mΩ | SM | TDK | VLF10040-100M3R8 |
| 3 | R1,R4,R5 | 0 | resistor, 1% | 0603 | Yageo | RC0603JR-070RL |
| 2 | R2,R10 | 10kΩ | resistor, 1% | 0603 | Yageo | RC0603FR-0710kL |
| 1 | R3 | 75kΩ | resistor, 1% | 0603 | Yageo | RC0603FR-0775kL |
| 1 | R6 | NC | | 0805 | | |
| 1 | R7 | 400m | resistor, 1% | 0805 | ROYALOHM | 0805F400LT5E |
| 1 | R8 | 1 | resistor, 1% | 0805 | Yageo | RC0805FR-071RL |
| 1 | R9 | 120kΩ | resistor, 1% | 0603 | Yageo | RC0603FR-07120kL |
| 1 | U1 | MP24183DQ | MPS WLED Driver, 1A, 55V, frequency programmable | QFN3*3 | MPS | MP24183DQ |

PRINTED CIRCUIT BOARD LAYOUT

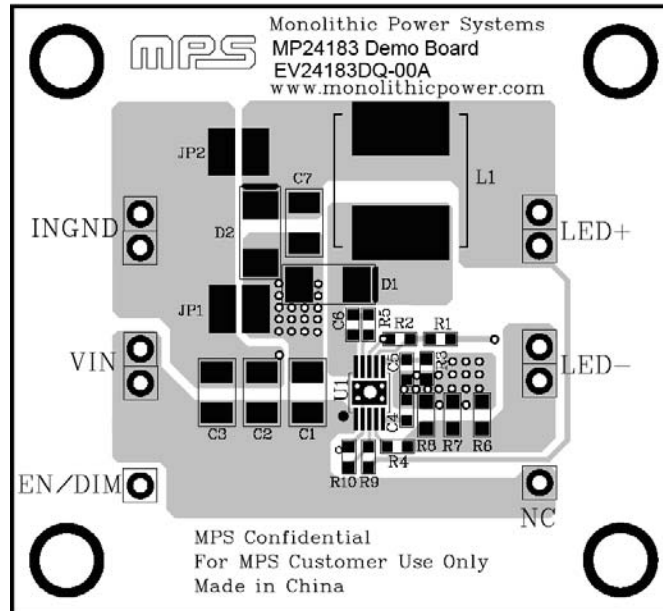


Figure 1—Top Layer

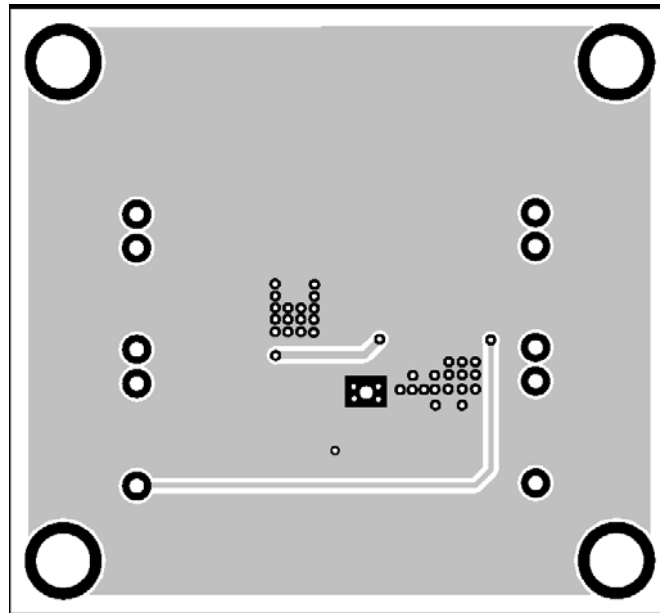


Figure 2—Bottom Layer

QUICK START GUIDE

1. Connect the load (3LEDs or less) to the output. The Anode of the load to “LED+” and the Cathode of the load to “LED -”.
2. Connect the input voltage source to the input V_{IN} and INGND. The input voltage source should be initiated 15V~50V.
3. Connect the EN or dimming signal to EN/Dim pin.

For PWM dimming, connect the PWM signal to EN/Dim pin, the high level should be higher than 1.4V, the low level should be lower than 0.7V.

For analog dimming, connect a DC dimming signal in range of 0.7V~1.4V to EN/Dim pin.

4. Power up the input voltage source, and then power up the EN/Dim signal, the LEDs should be ignited.

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