



EVQ3362-J-00A

Single-String, 3V V_{IN-MIN} , 36V V_{OUT} Boost LED Driver Evaluation Board, AEC-Q100

DESCRIPTION

The EVQ3362-J-00A is designed for the MPQ3362, a boost LED driver that is well-suited for low-to-high current boost applications. The device's low 0.2V feedback voltage offers higher efficiency in white LED driver applications.

The MPQ3362 regulates the output voltage up to 36V, with up to 95% efficiency. Current mode regulation and external compensation components allow the MPQ3362 control loop to be optimized across a wide input voltage range.

The MPQ3362 supports analog dimming and PWM dimming on the same pin (the EN/DIM pin). A <2kHz input dimming frequency initiates PWM dimming, while a >5kHz input dimming frequency initiates analog dimming.

Soft start, cycle-by-cycle current limiting, and V_{IN} under-voltage lockout (UVLO) prevent the device from overstress or damage. This protects the sensitive external circuitry during start-up, and under overload conditions.

The MPQ3362 is available in a TSOT23-8 package.

ELECTRICAL SPECIFICATIONS

| Parameter | Symbol | Value | Units |
|----------------|-----------|---------|--------|
| Input voltage | V_{IN} | 3 to 36 | V |
| Output voltage | V_{OUT} | <40 | V |
| LED string | - | 1 | string |
| LED current | I_{LED} | 200 | mA |

FEATURES

- 3V to 36V Input Voltage Range
- 4A Peak Current Limit
- 0.3 μ A Shutdown Current
- Low 200mV Feedback Voltage
- Configurable 200kHz to 2.2MHz Switching Frequency
- Internal 80m Ω , 40V Power Switch
- High Efficiency
- Analog and PWM Dimming
- Under-Voltage Lockout (UVLO)
- Open/Short LED Protection
- Short FB Protection
- Soft Start
- Thermal Shutdown
- Available in a TSOT23-8 Package
- AEC-Q100 Grade 1

APPLICATIONS

- Automotive Display Backlighting
- Medium-Sized LCD Backlighting
- General Lighting

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EVQ3362-J-00A EVALUATION BOARD



LxWxH (6.35cmx6.35cmx1.0cm)

| Board Number | MPS IC Number |
|---------------|---------------|
| EVQ3362-J-00A | MPQ3362GJ |



QUICK START GUIDE

1. Preset the DC power supply to be between 2.5V to 36V, then turn the power supply off.
2. Connect the power supply output terminals to:
 - a. Positive (+): VIN
 - b. Negative (-): GND
3. Connect the LED load between the anode of the LED string (LED+) and the cathode of the LED string (LED-).
4. Turn the power supply on.
5. To turn on the chip, apply a voltage to the EN/DIM pin to pull the pin high. For dimming, apply a PWM signal to the EN/DIM pin. Analog dimming requires a PWM frequency (f_{PWM}) above 5kHz. For PWM dimming, f_{PWM} must be below 2kHz.

EVALUATION BOARD SCHEMATIC

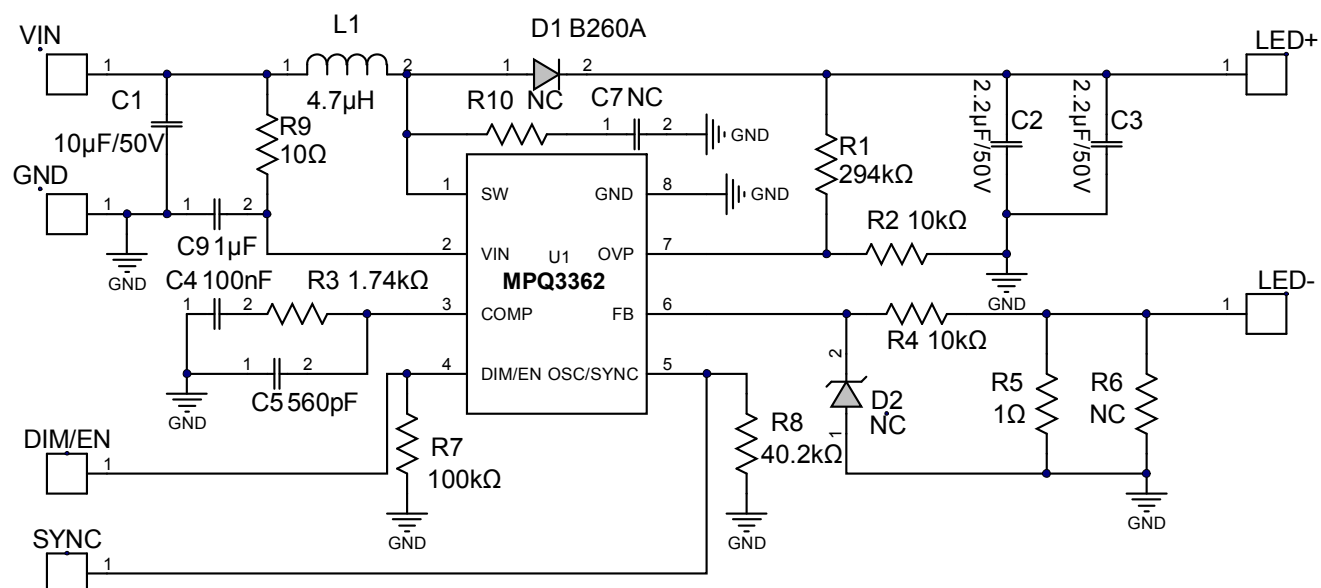


Figure 1: Evaluation Board Schematic

EVQ3362-J-00A BILL OF MATERIALS

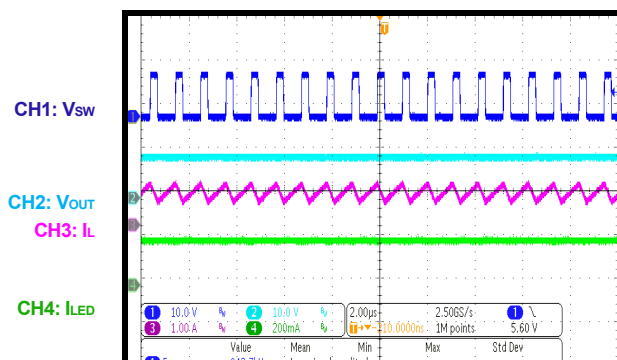
| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer P/N |
|-----|---|----------------|---|----------|--------------|--------------------|
| 1 | C1 | 10 μ F | Ceramic capacitor, 50V, X7R, 1210 | 1210 | TDK | C3225X7R1H106M |
| 2 | C2, C3 | 2.2 μ F | Ceramic capacitor, 50V, X7R, 1210 | 1210 | Murata | GJ8319R61H225K |
| 1 | C4 | 100nF | Ceramic capacitor, 25V, X7R, 0603 | 0603 | Würth | 885012206071 |
| 1 | C5 | 560pF | Ceramic capacitor, 50V, X7R, 0603 | 0603 | Murata | GRM1885C1H561JA01 |
| 1 | C7 | NC | | | | |
| 1 | C9 | 1 μ F | Ceramic capacitor, 50V, X7R, 0805 | 0805 | Murata | GRM21BR71H105KA12L |
| 1 | D1 | B260A | 60V/2A | SMA | Diodes | B260A-13-F |
| 1 | D2 | NC | | | | |
| 1 | L1 | 4.7 μ H | Inductor, 4.7 μ H, 9.5m Ω , 6.7A | SMD | Cooper | DR1050-4R7 |
| 1 | R1 | 294k Ω | Film resistor, 1% | 0603 | Yageo | RC0603FR-07294KL |
| 2 | R2, R4 | 10k Ω | Film resistor, 1% | 0603 | Yageo | RC0603FR-0710KL |
| 1 | R3 | 1.74k Ω | Film resistor, 1% | 0603 | Yageo | RC0603FR-071K74RL |
| 1 | R5 | 1 Ω | Film resistor, 1% | 0603 | Yageo | RC0603FR-07100KL |
| 2 | R6, R10 | NC | | | | |
| 1 | R7 | 100k Ω | Film resistor, 1% | 0603 | Yageo | RC0603FR-07100KL |
| 1 | R8 | 40.2k Ω | Film resistor, 1% | 0603 | Yageo | RC0603FR-0740K2L |
| 1 | R9 | 10 Ω | Film resistor, 5% | 0603 | Yageo | RC0603JR-0710RL |
| 6 | VIN, GND, LED+, LED-, DIM/EN, SYNC | 2.54mm | Connector, 2.54mm 180 degree pin header | CONN/TP | Any | |
| 1 | U1 | MPQ3362 | Single-string boost LED driver | TSOT23-8 | MPS | MPQ3362GJ |

EVB TEST RESULTS

Performance waveforms are tested on the evaluation board. $V_{IN} = 10V$, Load: 10 LEDs, $I_{LED} = 200mA$, $L = 4.7\mu H$, $T_A = 25^\circ C$, unless otherwise noted

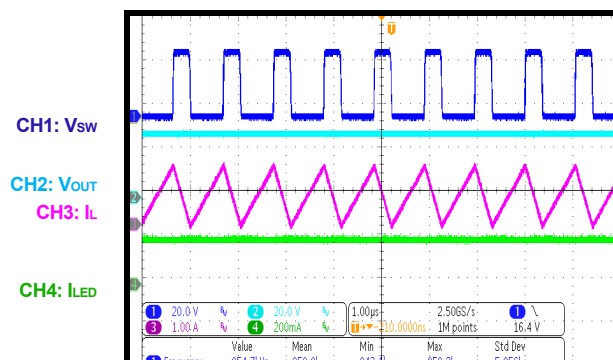
Steady State

$V_{IN} = 3V$, Load: 3 LEDs

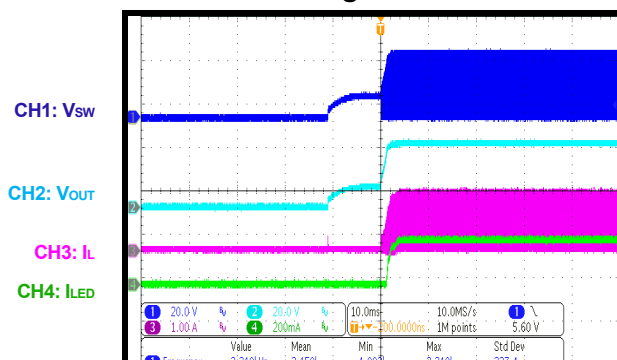


Steady State

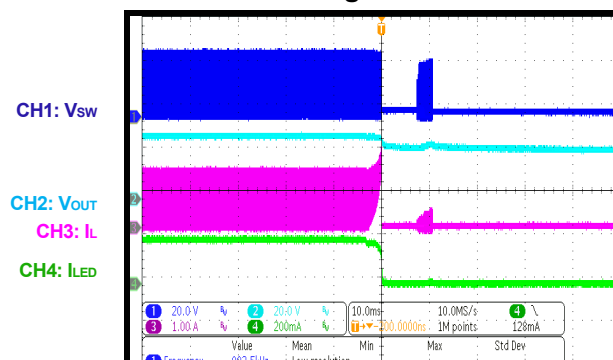
$V_{IN} = 10V$, Load: 10 LEDs



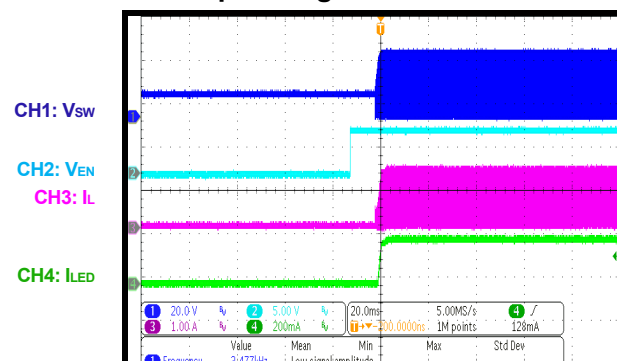
Shutdown through VIN



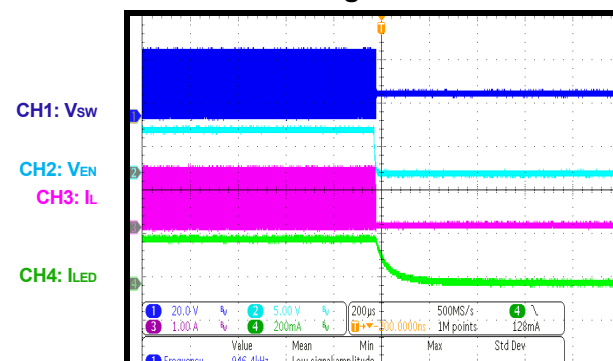
Shutdown through VIN



Start-Up through EN/DIM



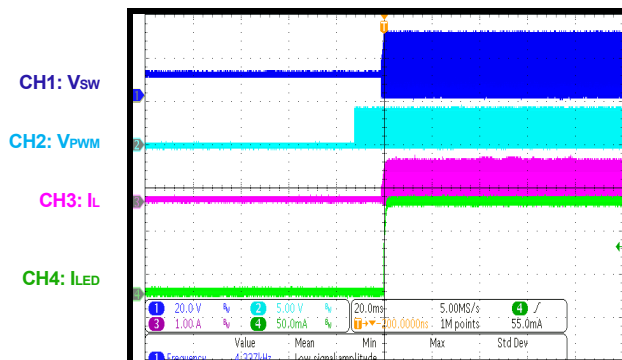
Shutdown through EN/DIM



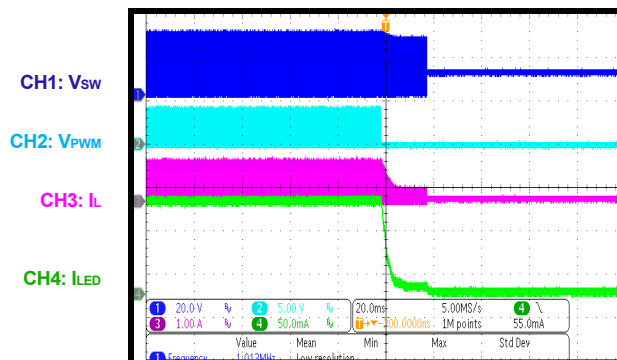
TYPICAL PERFORMANCE CHARACTERISTICS *(continued)*

$V_{IN} = 10V$, Load: 10 LEDs, $I_{LED} = 200mA$, $L = 4.7\mu H$, $T_A = 25^\circ C$, unless otherwise noted

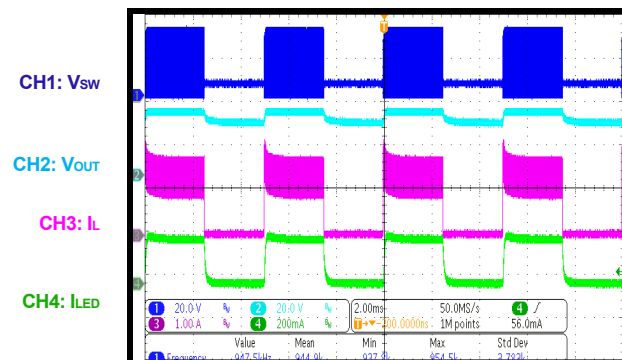
PWM Power On
 $f_{PWM} = 10kHz$ ($D = 0.5$)



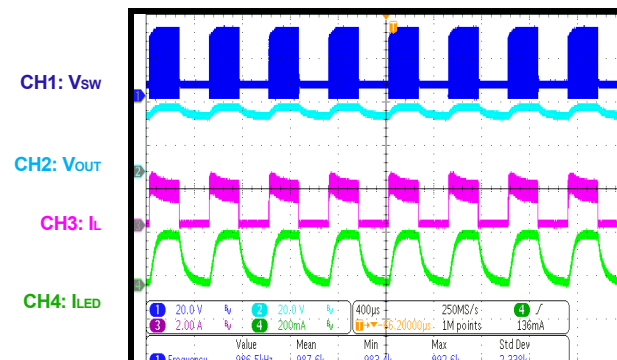
PWM Power Off
 $f_{PWM} = 10kHz$ ($D = 0.5$)



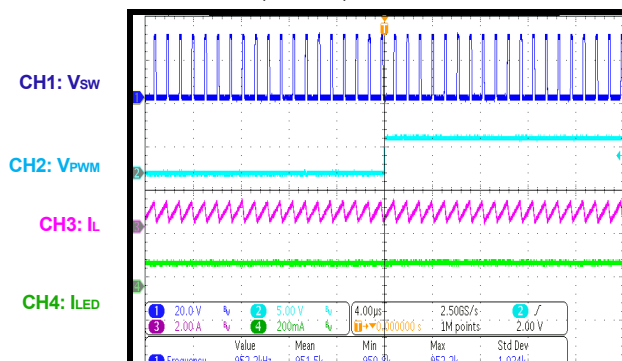
PWM Dimming
 $f_{PWM} = 200Hz$ ($D = 0.5$)



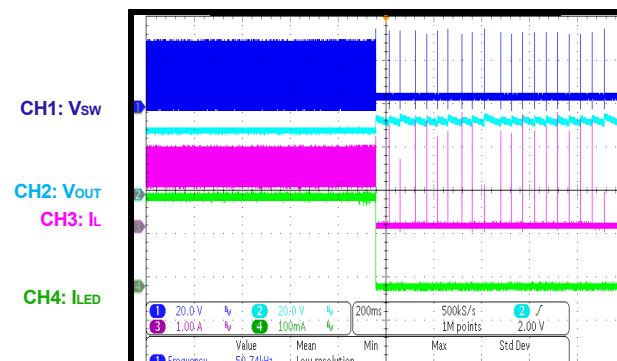
PWM Dimming
 $f_{PWM} = 2kHz$ ($D = 0.5$)



Analog Dimming
 $f_{PWM} = 5kHz$ ($D = 0.5$)



OVP during Normal Operation

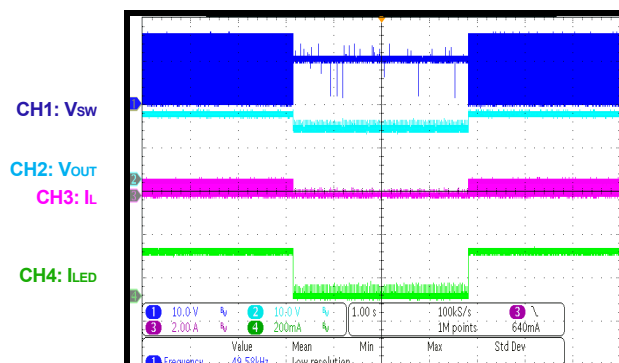


TYPICAL PERFORMANCE CHARACTERISTICS *(continued)*

$V_{IN} = 10V$, Load: 10 LEDs, $I_{LED} = 200mA$, $L = 4.7\mu H$, $T_A = 25^\circ C$, unless otherwise noted

Inductor Short during Normal Operation and Recovery

Load: 5 LEDs



PCB LAYOUT

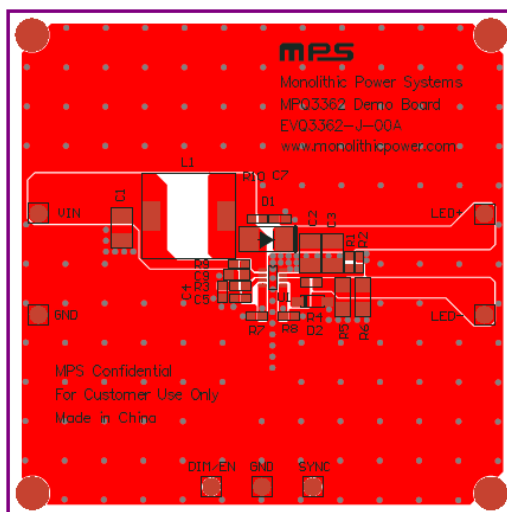


Figure 2: Top Layer

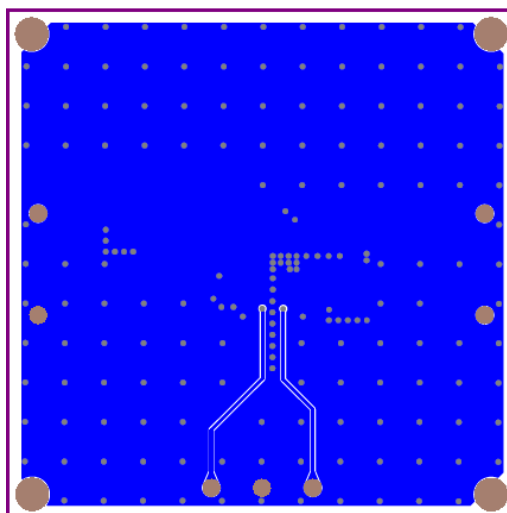


Figure 3: Bottom Layer



REVISION HISTORY

| Revision # | Revision Date | Description | Pages Updated |
|------------|---------------|-----------------|---------------|
| 1.0 | 04/08/2020 | Initial Release | - |
| 1.1 | 05/24/2021 | Technical edit | All pages |

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