DESCRIPTION

The MP3336 is a dual-channel and high-power flash LED driver with very compact package. It can drive up to 2A in flash mode for each LED. It is usually applied for camera phones to improve image and video quality in low light environment. The device operates in 1/2/3/4MHz synchronous, current-mode PWM boost converter to regulate the LED current with two high current source. The MP3336 provides an optimized solution for smaller PCB space and higher efficiency.

The MP3336 features standard I²C interface, dual LED channels, rich protection modes and high power density and performances. It supports flash/assist/torch/indicator/5V DC modes.

The cathodes of the dual flash LED are referenced to GND, which is better for layout to improve thermal performance. It is available in WLCSP20-1.6X2.0mm package.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	2.7-5.5	V
Output Voltage	Vout	<5.5	V
LEDs #		2	
LED Current/Ch	I_{LED}	Max.2	A

FEATURES

- 2.7V~5.5V Input Voltage
- 1/2/3/4MHz Selectable Max Switching Frequency
- Switching Frequency Fold-Back Function
- 400kHz I²C Compatible Interface
- Standby/Flash/Assist/Torch/Indicator/5V DC Modes
  Flash Mode:
  Up to 2A/Ch Programmable Current with +/-7% Accuracy for Each LED, 7.84mA/Step
  Assist/Torch Mode:
  Up to 319mA/Ch Programmable Current with +/-7% Accuracy for Each LED, 1.25mA/Step
  Indicator Mode:
  Work In 31.5kHz PWM Dimming Mode With 2/16, 3/16, 4/16, 5/16 Duty Cycle
  Used for Blinking and 128/256/512ms Selectable Blinking Time
  5V DC Mode:
  Output Constant 5V DC Voltage
- 1A to 4.2A Programmable Input DC Current Limit Protection
- External Torch/Strobe/TX Pin
- LED Forward Voltage Balance to Improve Efficiency
- VIN to VOUT Disconnection Function
- Low Battery Voltage Protection
- LED Short/Open Protection
- VOUT-GND Short Protection
- Over Voltage Protection
- Over Temperature Protection
- Input Under Voltage Lockout Protection
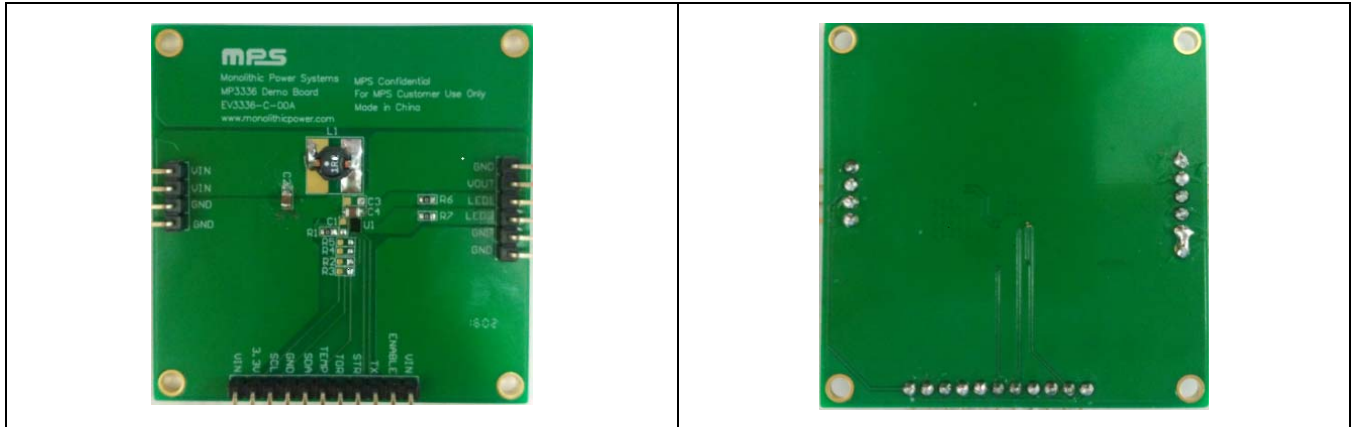- Available In WLCSP20-1.6X2.0mm

APPLICATIONS

- Smart Phone Flash LED Application
- Cameras for Tablet
- Digital Still Camera

EV3336-C-00A EVALUATION BOARD

(L x W x H) 5.5cm x 5.5cm x 1cm

Board Number	MPS IC Number
EV3336-C-00A	MP3336GC

EVALUATION BOARD SCHEMATIC
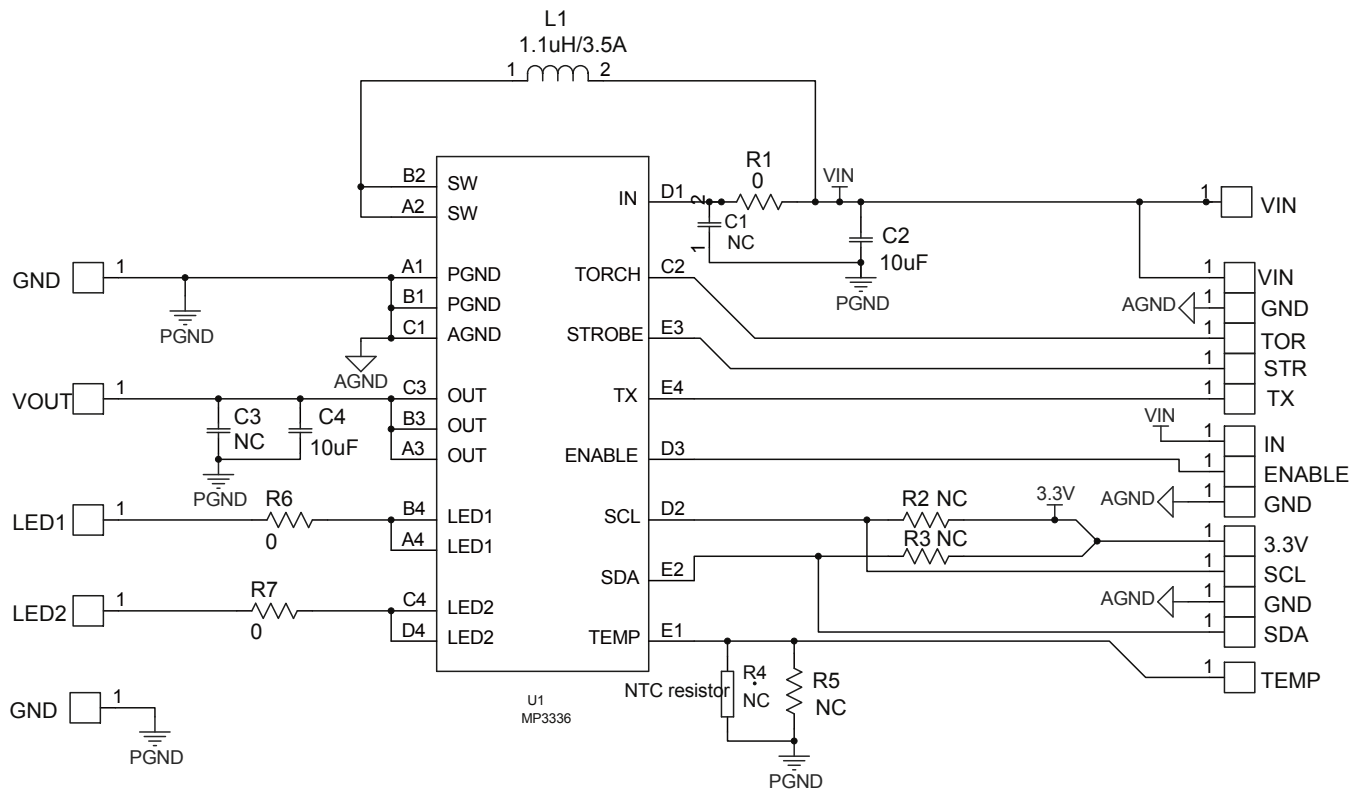
EV3336-C-00A BILL OF MATERIALS

Item	Ref	Value	Description	Footprint	Manufacturer	Manufacturer P/N
1	C1	NC		0603		
1	C2,C4	10μF	ceramic capacitor,10V,X5R	0805	muRata	GRM21BR61A106KE19L
2	C3	NC		0805		
1	R1,R6,R7	0	res,1%	0603	Yageo	RC0603FR-070RL
1	R2,R3,R4,R5	NC		0603		
1	L1	1.1μH	1.1uA, 20m,3.46A		TDK	D53LC-#A915AY-1R1M
1	U1		MP3336	CSP20 1.6*2mm	MPS	MP3336

EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.

V_{IN} = 3.6V, L = 1.1μH, I1/2_TOR = 300mA, I1/2_FL = 400mA, I1/2_TX = 400mA, FL_TIM = 200ms, 2 Channel. Unless otherwise noted.
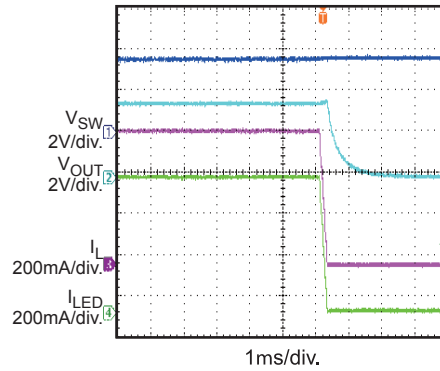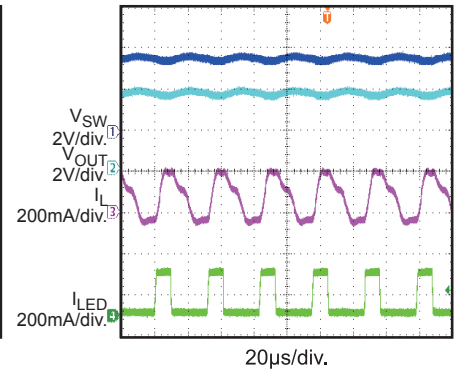
Torch/Assist Mode
LED_EN Bit Enable

V_{SW} 2V/div.
V_{OUT} 2V/div.
I_L 200mA/div.
I_{LED} 200mA/div.

1ms/div.
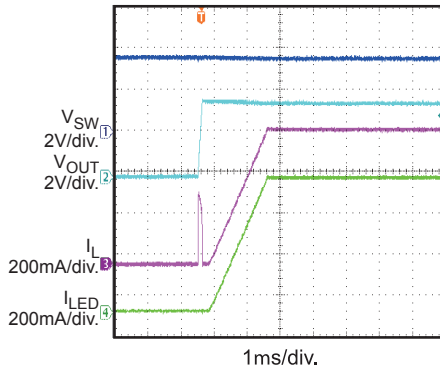
Torch/Assist Mode
LED_EN Bit Disable

V_{SW} 2V/div.
V_{OUT} 2V/div.
I_L 200mA/div.
I_{LED} 200mA/div.

1ms/div.

Indicator Mode
I_{LED} Duty = 5/16,
$I_{LED\_AMPLITUDE/Ch}$ = 100mA

V_{SW} 2V/div.
V_{OUT} 2V/div.
I_L 200mA/div.
I_{LED} 200mA/div.

20μs/div.

Blinking Mode
Blinking Time = 128ms

V_{SW} 2V/div.
V_{OUT} 2V/div.
I_L 200mA/div.
I_{LED} 200mA/div.

100ms/div.
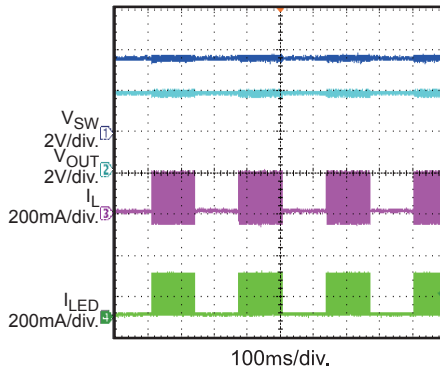
Flash Mode
with Level Trigger Way

V_{SW} 2V/div.
V_{STR} 2V/div.
I_L 500mA/div.
I_{LED} 500mA/div.

40ms/div.
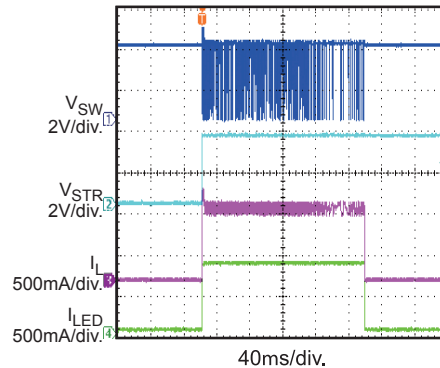
Flash Mode
with Edge Trigger Way

V_{SW} 2V/div.
V_{STR} 2V/div.
I_L 500mA/div.
I_{LED} 500mA/div.

40ms/div.
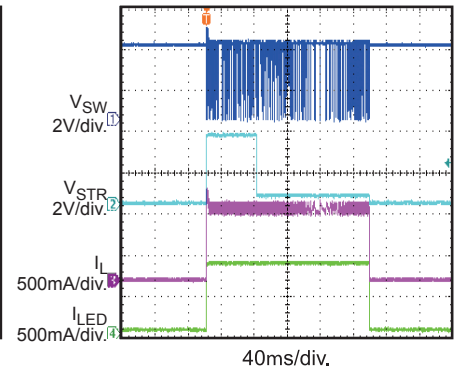
Flash Mode
FL_TIM = 1600ms, I1_FL = 2A,
LED2_EN = 0

V_{SW} 2V/div.
V_{OUT} 5V/div.
I_L 2A/div.
I_{LED1} 1A/div.

200ms/div.
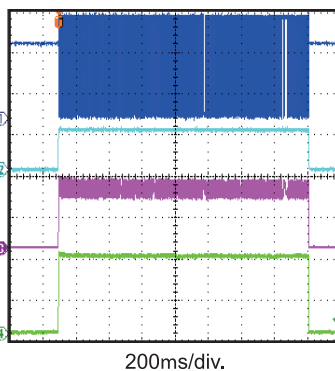
Flash Mode
TX pin with 2Hz, 50% pulse ,
I1/2_FL = 1A

V_{SW} 2V/div.
V_{TX} 5V/div.
I_L 1A/div.
I_{LED} 1A/div.

200ms/div.
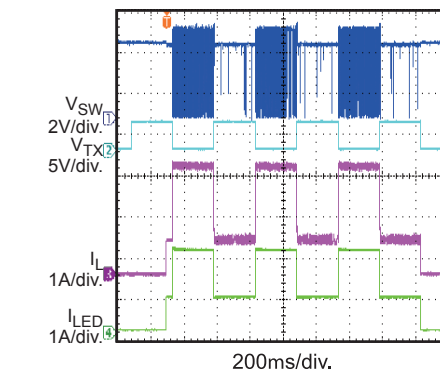
Torch/Assist Mode to Flash Mode
I1/2_TOR = 120mA
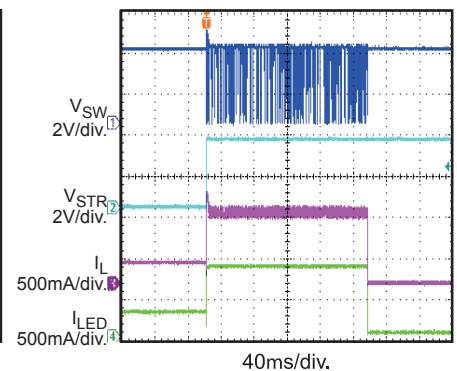
V_{SW} 2V/div.
V_{STR} 2V/div.
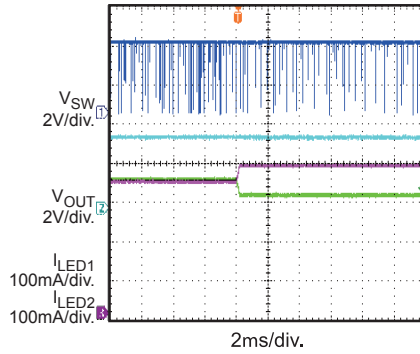I_L 500mA/div.
I_{LED} 500mA/div.

40ms/div.

EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.
V_{IN} = 3.6V, L = 1.1µH, I1/2_TOR = 300mA, I1/2_FL = 400mA, I1/2_TX = 400mA, FL_TIM = 200ms, 2 Channel. Unless otherwise noted.
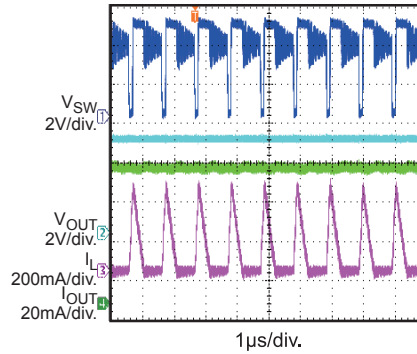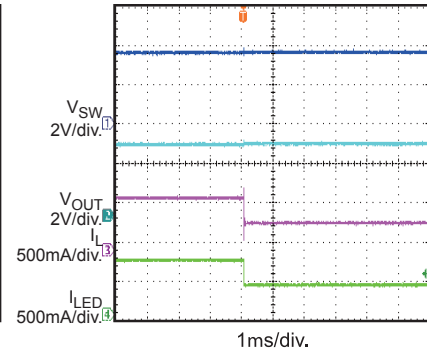
Load Balance
Set BAL_ON Bit from 0 to 1
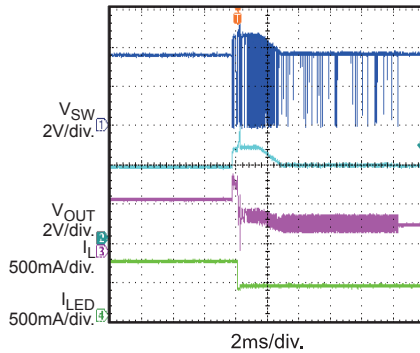

2ms/div.

5V_DC Mode
VOUT to GND with 75Ω Resistor

1µs/div.

Short LED to GND Protection
Short One Channel when Working

1ms/div.

Open LED Protection
Open one Channel when Working

2ms/div.

VOUT to GND Short Protection
when Working

400µs/div.
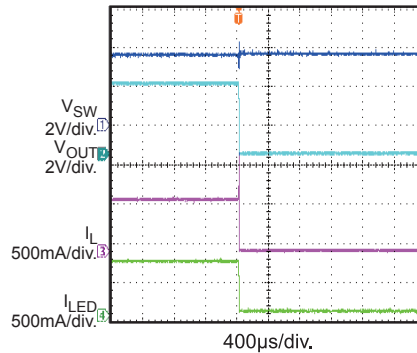
Thermal Protection
Flash Mode, Set LED OTAD=1,
I1/2_FL = 600mA, FL_TIM = 1600ms

400ms/div.
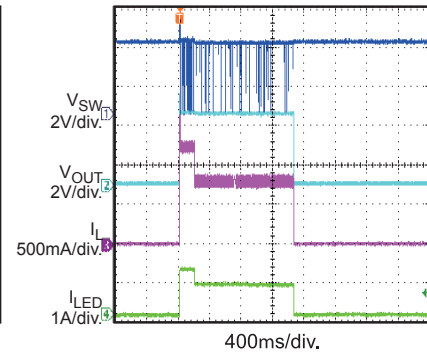
Thermal Protection
Assist Mode, Set LED OTAD=0

40ms/div.
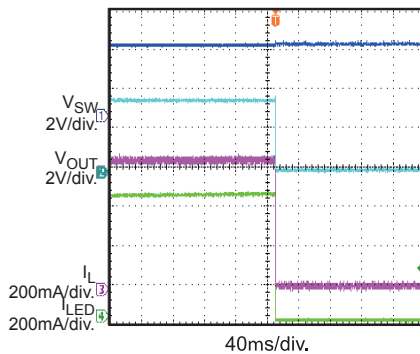
NTC Detection
Set NTC_WD =0.88V,
Set LED T_SD=1

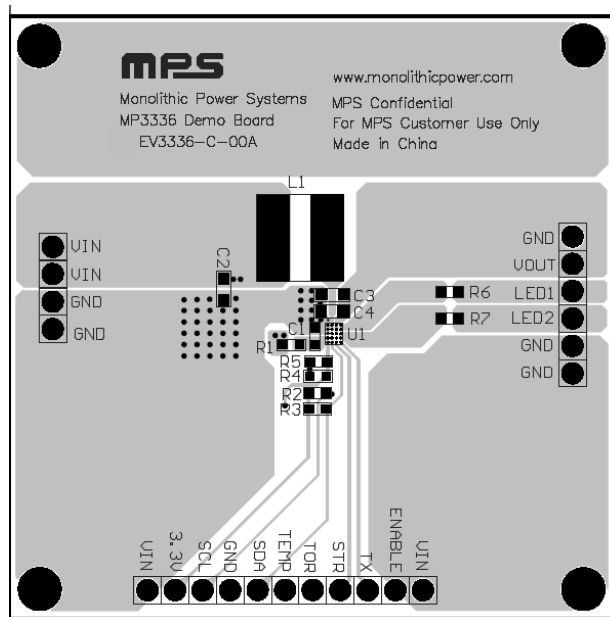100ms/div.
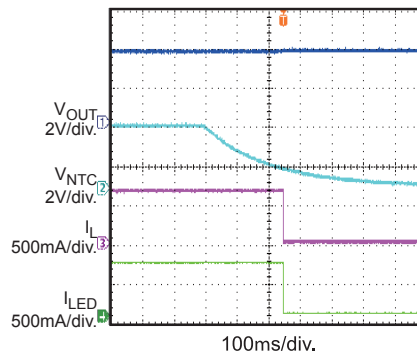
PRINTED CIRCUIT BOARD LAYOUT
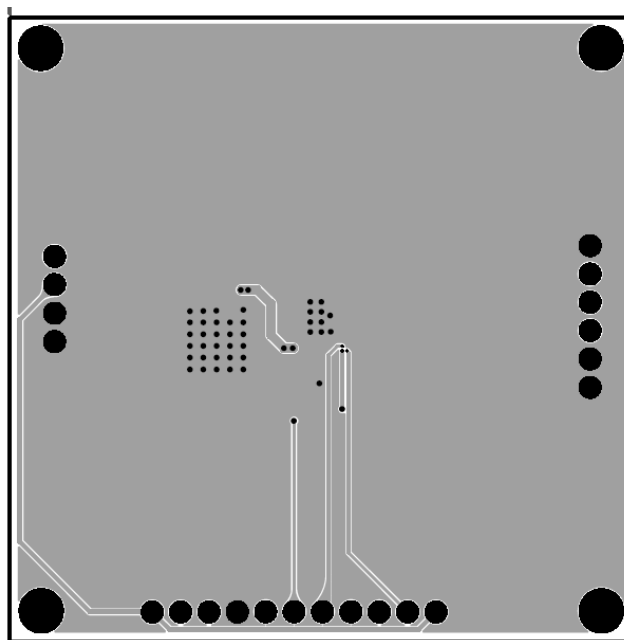

Figure 1—Top Layer

Figure 2—Bottom Layer

QUICK START GUIDE

1. Connect the positive and negative terminals of the power supply (2.7V ~ 5.5V) to the VIN and GND pins on the EV board, respectively.

2. Supply the EN terminal with logical signal.

3. Connect the positive and negative terminals of the LED to the LED1/2 pin and GND on the EV board, respectively.

4. Please connect SCL, SDA and GND of EV board to SCL, SDA and GND of a programmable kit with I^{2}C interface, respectively.

5. When work in Torch mode, please pull torch terminal to high. When work in flash mode with hardware trigger mode, please give a level or pulse signal to STR pin.

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