EV3388DR-01A

8 strings White LED Driver Evaluation Board

This board can be used for MP3388S w/o external component change

The Future of Analog IC Technology

DESCRIPTION

The EV3388DR-01A is an evaluation board for the MP3388DR, a step-up converter designed for large liquid-crystal displays that employ an array of LEDs as the light source. It can drive up to 8 strings in parallel and 10 LEDs per string.

The MP3388 uses internal switch current mode, fixed frequency architecture and includes current ballast in each string terminal, which achieves ±3% current regulation accuracy between strings. Low feedback voltage at each LED string help reduce power loss and improve efficiency.

The MP3388 has multiple features to protect the converter from fault conditions, including under-voltage lockout, current limiting, over voltage, short LED, open LED and thermal shut-down protection.

The MP3388 is available in small QFN24 (4mmx 4mm)，TSSOP28 and SOIC28 package.

FEATURES

- 4.5V to 25V Input Voltage Range
- Up to 89% Efficiency
- Programmable Over Voltage Protection
- Drives up to 8 Strings Parallel and 10 LEDs in Series.
- ±3% Current Regulation Accuracy Between Strings
- Selectable Switching Frequency: 1.25MHz and 625kHz
- Open and Short LED Load Protection
- Thermal Shutdown

APPLICATIONS

- Notebook PC
- Small LCD TV
- Handy Terminals Display
- Automotive Systems and Tablet Computer

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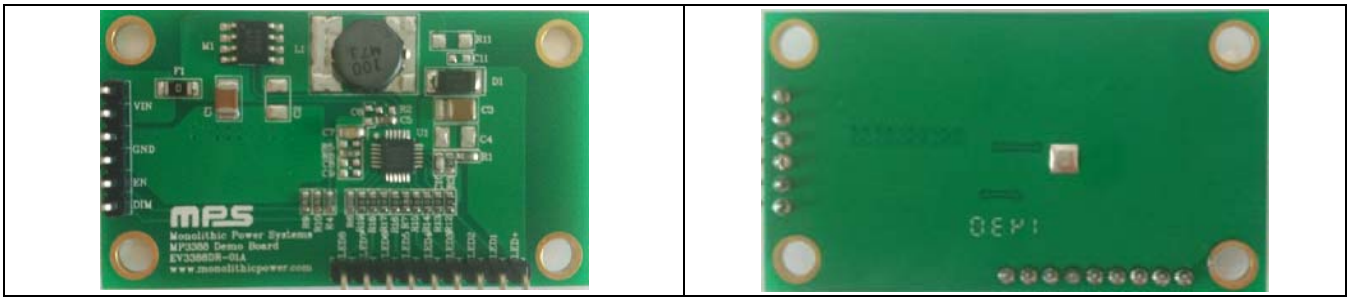
ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	4.5 – 25	V
LEDs #		8 strings parallel and 10 LEDs each string	
LED Current /String	I_{LED}	20	mA

EV3388DR-01A EVALUATION BOARD



(L x W x H) 5.7cm x 3.2cm x 1.0cm

Board Number	MPS IC Number
EV3388DR-01A	MP3388DR

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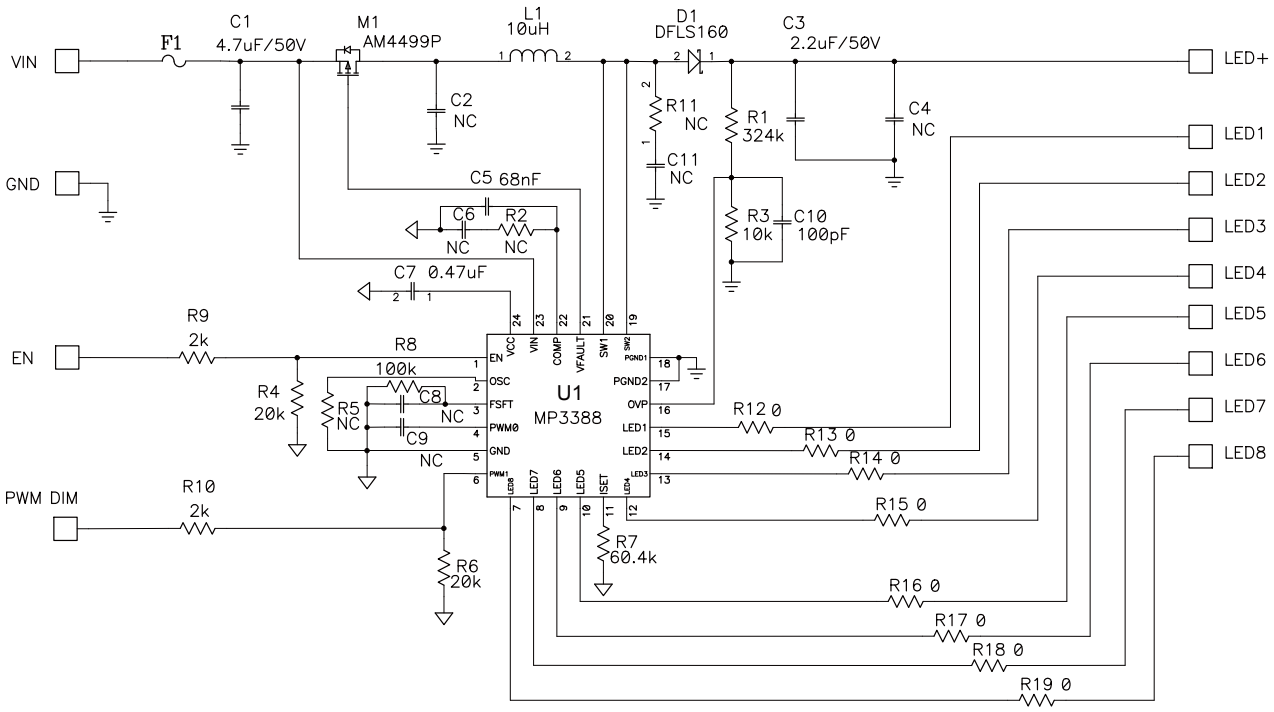
EVALUATION BOARD SCHEMATIC



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EV3388DR-01A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Part Number
1	C1	4.7μF	Ceramic Capacitor, 50V, X7R	1210	Murata	GRM32ER71H475KA88L
1	C2	NC		1210		
1	C3	2.2μF	Ceramic Capacitor, 50V, X7R	1210	TDK	C3225X7R1H225
1	C4	NC		1210		
1	C5	68nF	Ceramic Capacitor, 50V, X7R	0603	Murata	GRM188R71H683KA01D
4	C6,C8, C9,C11	NC		0603		
1	C7	0.47μF	Ceramic Capacitor, 16V, X5R	0805	Murata	GRM21BR61C474KA88
1	C10	100pF	Ceramic Capacitor, 50V, COG	0603	Murata	GRM1885C1H101JA01D
1	D1		Diode Schottky, 60V, 1A	SMA	Diodes Inc	DFLS160-F
1	F1		Fuse, 2.5A	1206		
1	L1	10μH	Inductor,2.47A	SMD	Cooper	DR73-100
		10μH	Inductor,2.5A	SMD	TDK	SLF10145T-100M2R5-H
1	M1		P- channel MOSFET	SO8		AM4499P
1	R1	324kΩ	Resistor, 1%	0603	Yageo	RC0603FR-07324KL
3	R2,R5, R11	NC		0603		
1	R3	10kΩ	Resistor, 1%	0603	Yageo	RC0603FR-0710KL
2	R4,R6	20kΩ	Resistor, 5%	0603	Yageo	RC0603JR-0720KL
1	R7	60.4kΩ	Resistor, 1%	0603	Yageo	RC0603FR-0760K4L
1	,R8	100kΩ	Resistor, 5%	0603	Yageo	RC0603JR-07100KL
2	R9,R10	2kΩ	Resistor, 5%	0603	Yageo	RC0603JR-072KL
8	R12~R19	0Ω	Resistor, 5%	0603	Yageo	RC0603JR-070RL
1	U1		LED Driver IC	QFN24	MPS	MP3388DR

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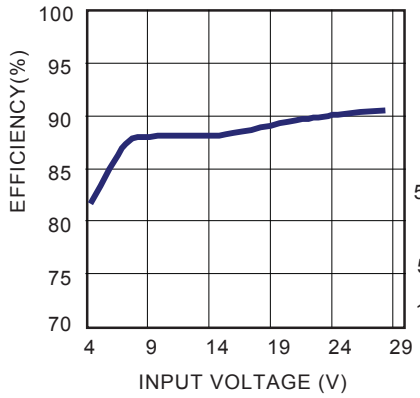
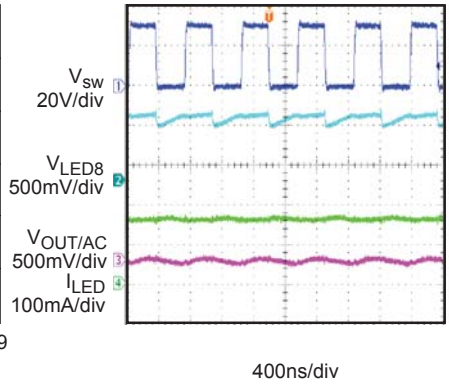
EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.
V_{IN} =15V, 10 LEDs in series, 8 strings parallel, 20mA/string, unless otherwise noted.

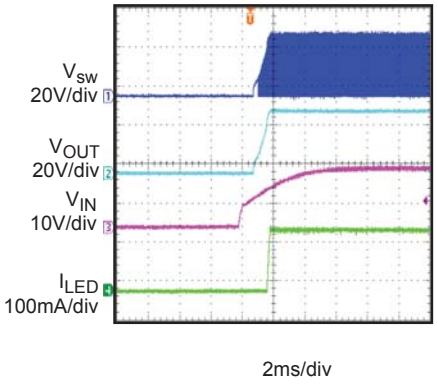
Efficiency vs. Input Voltage



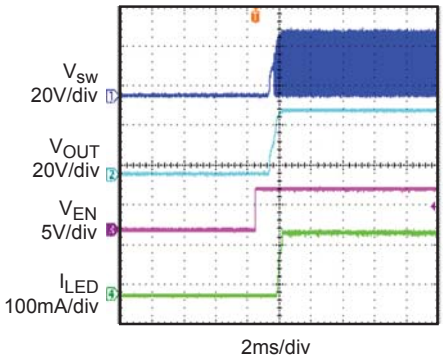
Steady State



Vin Startup

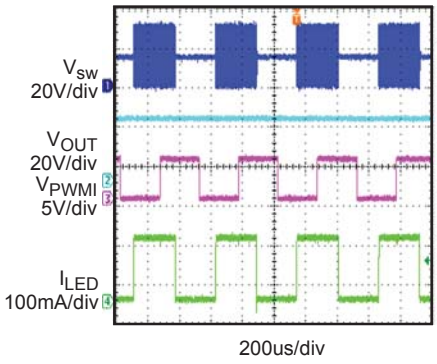


Ven Startup



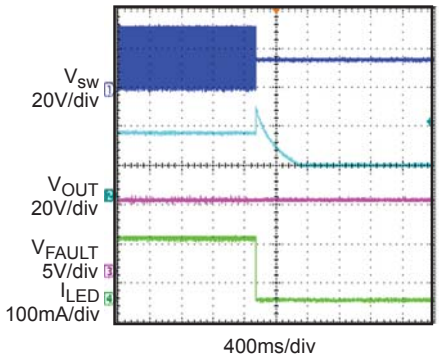
PWM Dimming

f_{PWM}=2kHz, D_{PWM}=50%



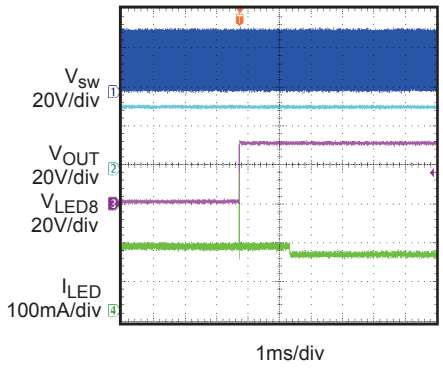
Open LED Protection

open all LED strings at working



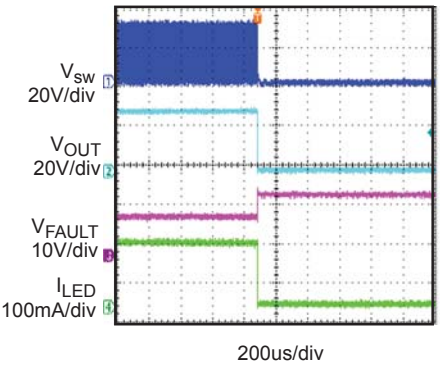
Short LED Protecton

short Vout to LEDx at working



Short LED Protection

short Vout to GND at working



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PRINTED CIRCUIT BOARD LAYOUT

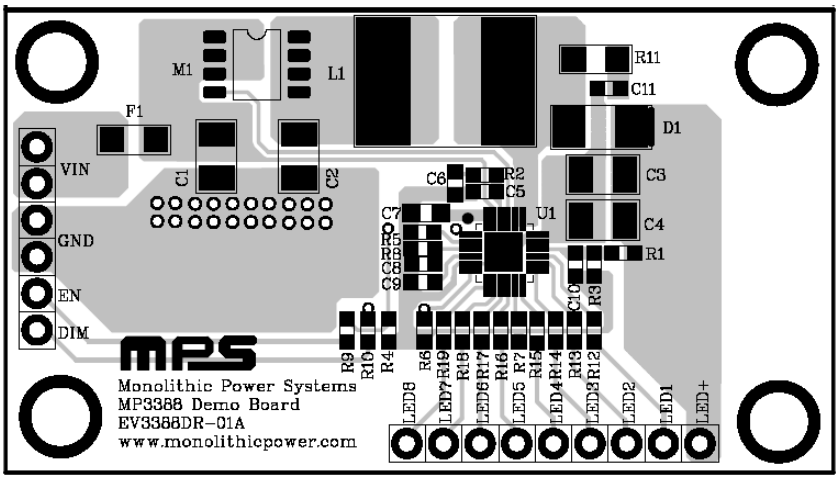

Figure 1—Top Layer

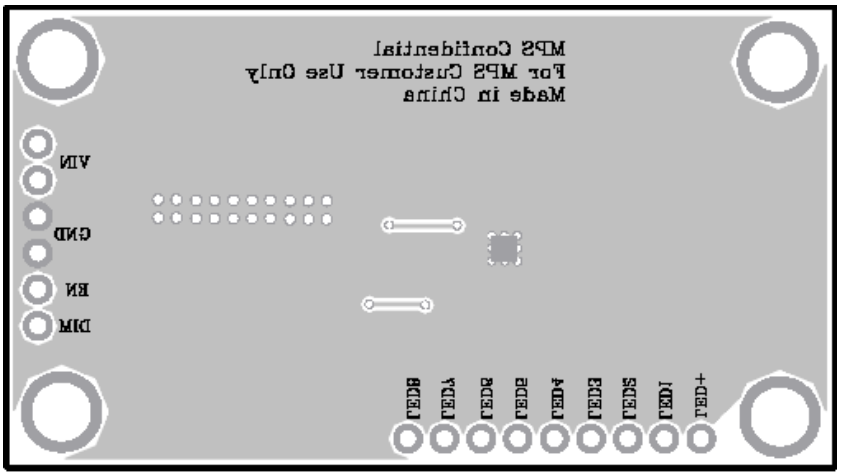

Figure 2—Bottom Layer

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QUICK START GUIDE

1. Connect the positive and negative terminals of the load panel (10 white LEDs in series, 8 strings paralleled) to the LED+ and LED1~8 pins on the EV board, respectively.
2. Connect the positive and negative terminals of the power supply (4.5V ~ 25V) to the VIN and GND pins on the EV board, respectively.
3. Drive EN pin high (2.5V < Ven < 5V) to enable the MP3388.
4. For PWM dimming, apply a PWM rectangular waveform with a minimum voltage less than 0.5V and a maximum greater than 2.5V on PWM DIM pin. The frequency of the PWM signal is recommended between 200Hz to 2kHz.and Duty of PWM range from 10% to 100%.

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