EV8843-G-00A

6V, 3A, Synchronous, Step-Down Switcher With I²C Interface

The Future of Analog IC Technology

DESCRIPTION

The EV8843-G-00A is used for demonstrating the performance of MP8843, a highly integrated, high frequency, synchronous, step-down switcher with I²C control interface.

MP8843 supports up to 3A current from a wide input supply range of 2.5V to 6V with excellent load and line regulation. Constant-on-time (COT) control provides fast transient response, high light-load efficiency and easy loop stabilization. The I²C interface allows for communication interface speed up to 3.4Mbps. It controls the output voltage on the fly from 0.6V to 1.1V with 3.9mV voltage steps and it also controls the output voltage transition slew rate. The interface also allows for the selection of power-save mode to meet different application requirements. Protection features include internal soft-start, over-current protection, and over-temperature protection. MP8843 is available in 2mmx2mm 12-pin QFN package.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	2.5—6	V
Output Voltage	V_{OUT}	0.6—1.1	V
Output Current	I_{OUT}	3	A

Notes:
1) V_{IN}<3.3V, may need more input capacitors.
2) V_{OUT} default value is 0.9031V.

FEATURES

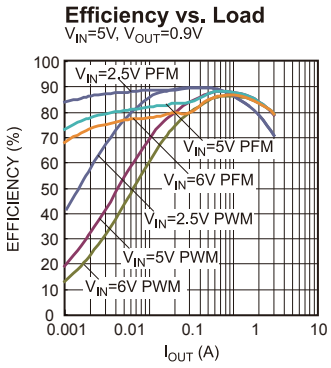
- Wide 2.5V to 6V Operating Input Range
- Up to 3A Output Current
- 55mΩ and 35mΩ Internal Power MOSFET
- High Speed I²C Communication Interface up to 3.4MHz
- I²C Selectable Power Saving Mode
- Programmable Output Voltage from 0.6V to 1.1V with 3.9mV Steps
- Programmable Switching Frequency 1MHz to 2.5MHz
- Programmable Voltage Transition Slew Rate
- External and I²C-Controlled Power Good Indicator
- Short Circuit Protection with Latch-off
- Thermal Shutdown
- Internal Soft-Start Time
- Available in QFN-12 (2mmx2mm) Package

APPLICATIONS

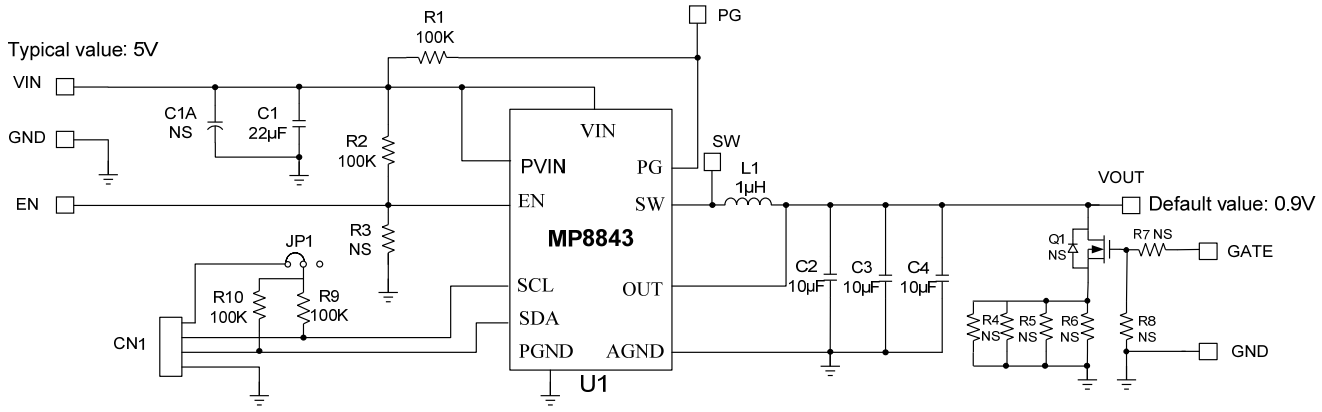
- Small/Handheld Devices
- Storage Drives
- Portable Instruments
- Battery-Powered Devices

EV8843-G-00A EVALUATION BOARD

Board Number	MPS IC Number
EV8843-G-00A	MP8843GG



EVALUATION BOARD SCHEMATIC



Notes:

3) V_{IN}<3.3V, may need more input capacitors.

4) V_{OUT} default value is 0.9031V.

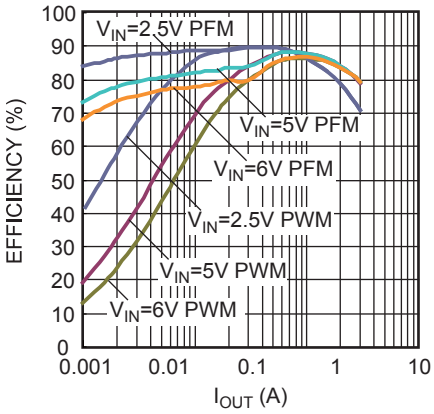
EV8843-G-00A BILL OF MATERIALS

Qty	RefDes	Value	Description	Package	Manufacturer	Manufacturer P/N
4	R1, R2, R9, R10	100k	Film Res, 1%	SM0603	ROYAL	RL0603FR-07100KL
0	R3, R4, R5, R6, R7, R8	NS				
0	Q1	NS				
0	C1A	NS				
1	C1	22µF	Ceramic Cap., 10V, X5R	SM0805	Murata	GRM21BR61A226ME51L
3	C2, C3, C4	10µF	Ceramic Cap., 10V, X5R	SM0805	Murata	GRM21BR61A106KE19L
1	L1	1µH	Inductor, DCR=22mΩ, 4.0x4.0mm, Isat=9A	SMD	Wurth	74437324010
1	U1	MP8843GG	Synchronous Step-down Converter	QFN12 (2mmx2mm)	MPS	MP8843GG

EVB TEST RESULTS

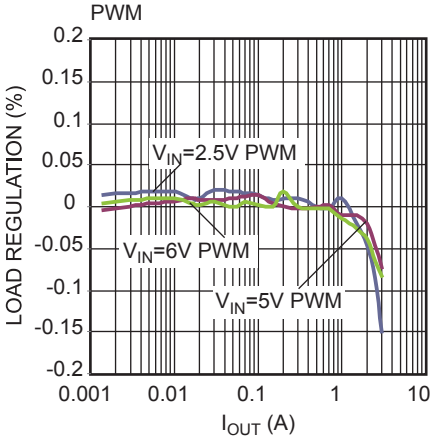
Performance waveforms are tested on the evaluation board.
V_{IN}=5V, V_{OUT}=0.9V, L=1µH, T_A=25°C, unless otherwise noted.

Efficiency vs. Load



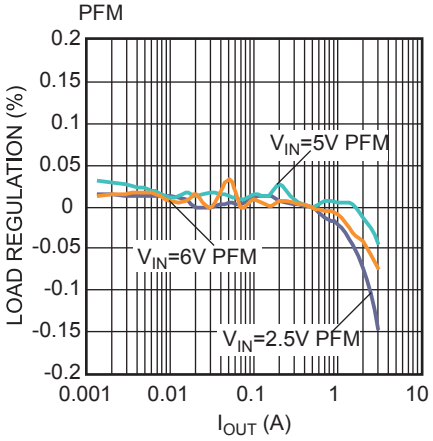
Load Regulation

PWM



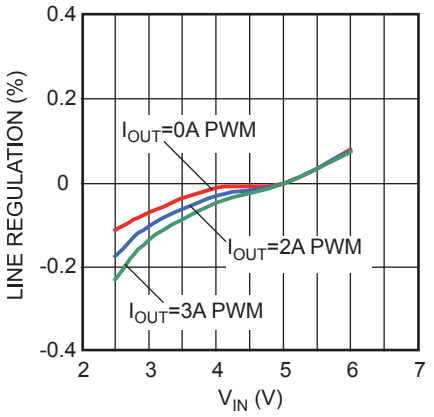
Load Regulation

PFM



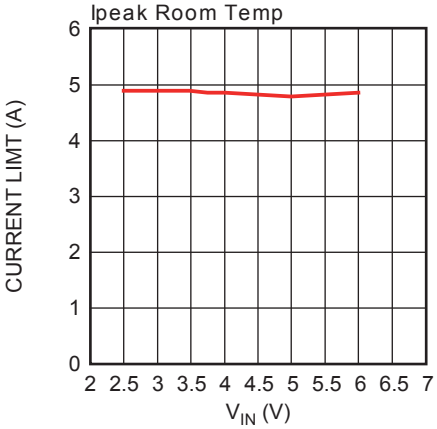
Line Regulation

PWM

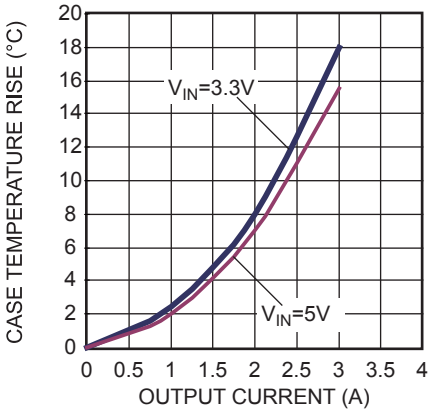


Current Limit vs. Input Voltage

Ipeak Room Temp



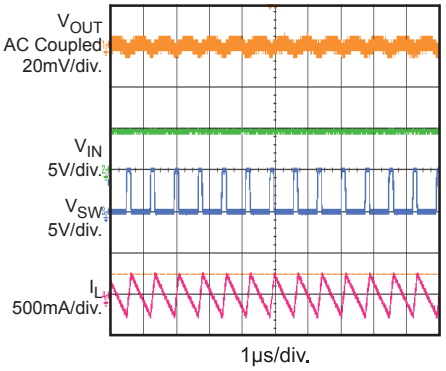
Thermal Rise vs. Load



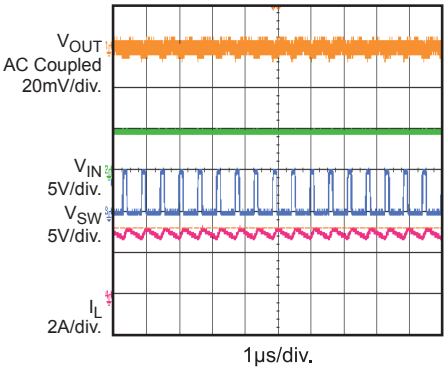
EVB TEST RESULTS *(Continued)*

Performance waveforms are tested on the evaluation board.
V_{IN}=5V, V_{OUT}=0.9V, L=1µH, T_A=25°C, unless otherwise noted.

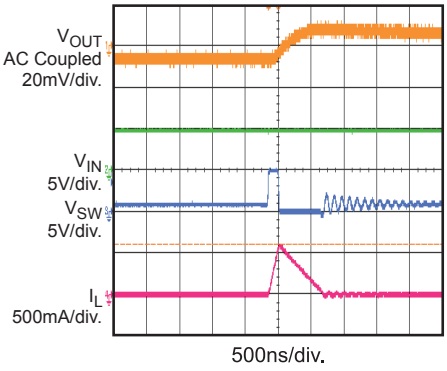
Steady State
PWM I_{OUT}=0A



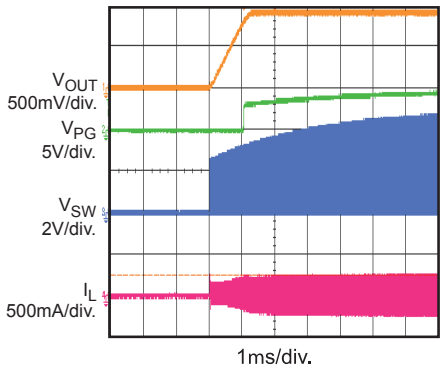
Steady State
PWM I_{OUT}=3A



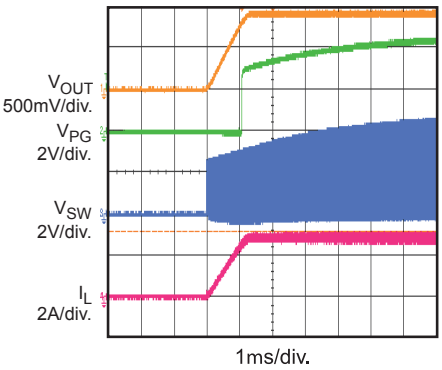
Steady State
PFM I_{OUT}=0A



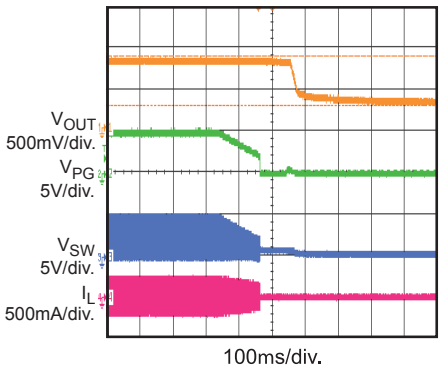
Vin Startup
PWM I_{OUT}=0A



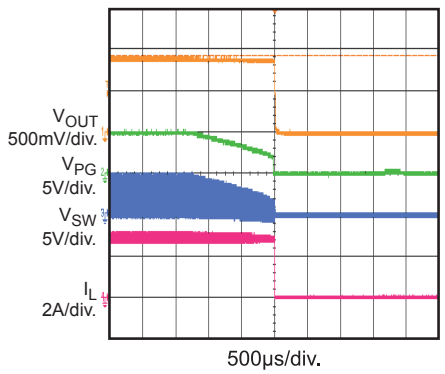
Vin Startup
PWM I_{OUT}=3A



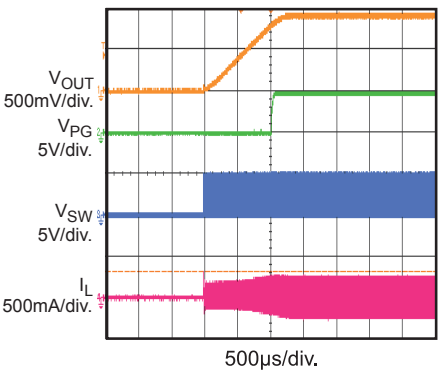
Vin Shutdown
PWM I_{OUT}=0A



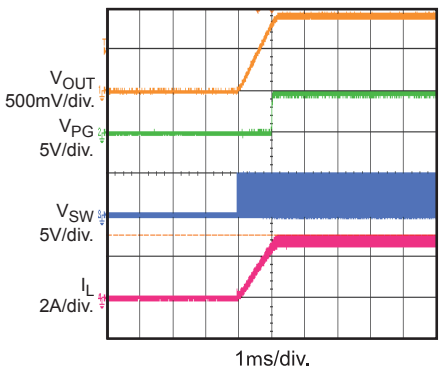
Vin Shutdown
PWM I_{OUT}=3A



EN Startup
PWM I_{OUT}=0A



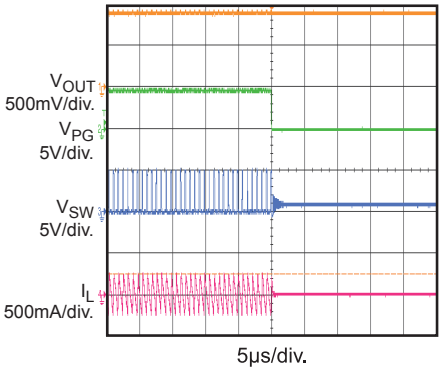
EN Startup
PWM I_{OUT}=3A



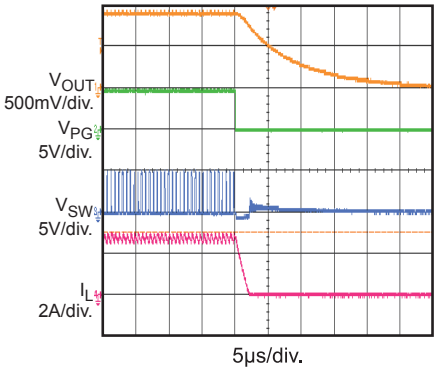
EVB TEST RESULTS *(Continued)*

Performance waveforms are tested on the evaluation board.
V_{IN}=5V, V_{OUT}=0.9V, L=1µH, T_A=25°C, unless otherwise noted.

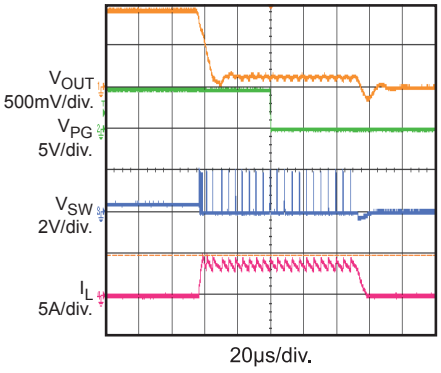
EN Shutdown
PWM I_{OUT}=0A



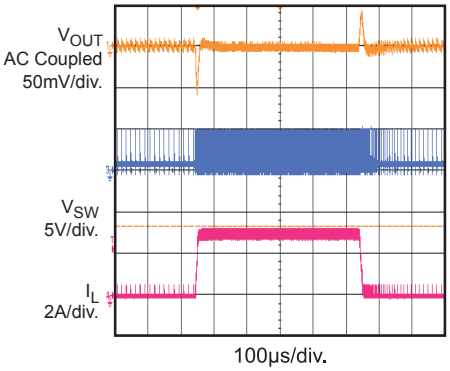
EN Shutdown
PWM I_{OUT}=3A



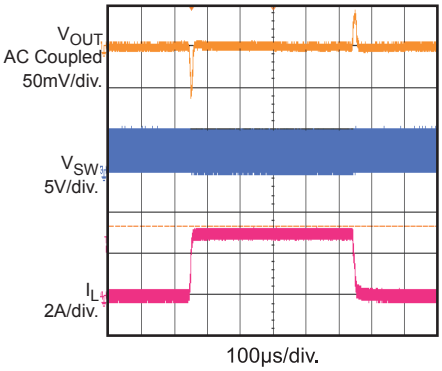
SCP
PFM



Load Transient
PFM I_{OUT}=0A to 3A



Load Transient
PWM I_{OUT}=0A to 3A



PRINTED CIRCUIT BOARD LAYOUT

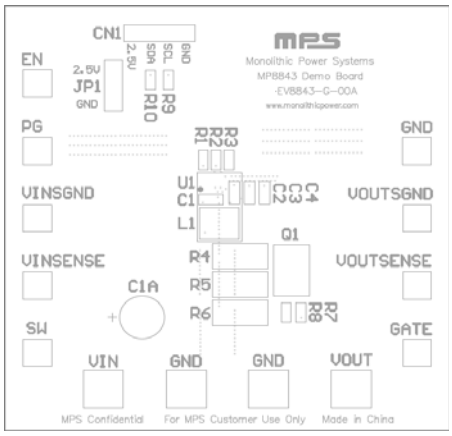


Figure 1—Top Silk Layer

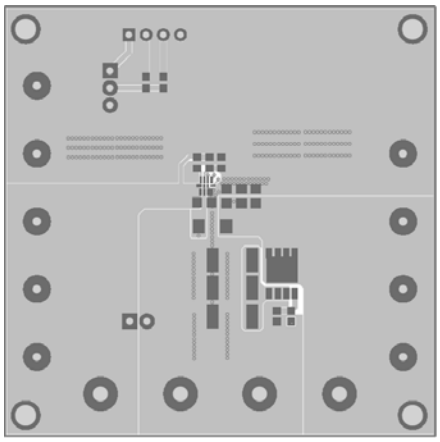


Figure 2—Top Layer

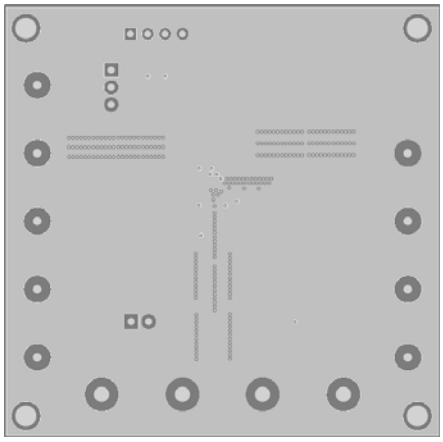


Figure 3 — Inner Layer1

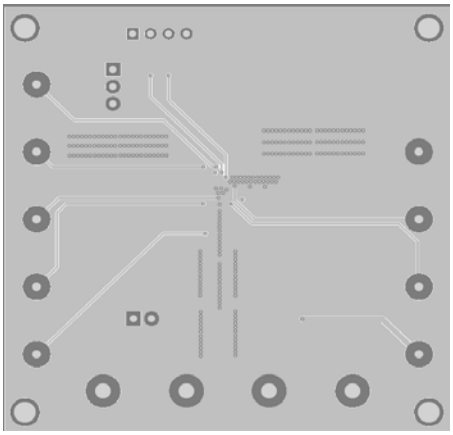


Figure 4 — Inner Layer2

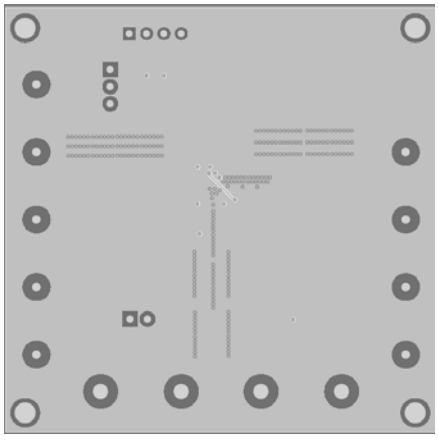


Figure 5 — Bottom Layer

QUICK START GUIDE

1. Connect the positive and negative terminals of the load to the VOUT and GND pins, respectively.
2. Preset the power supply output between 2.5V and 6V, and then turn off the power supply.
3. Connect the positive and negative terminals of the power supply output to the VIN and GND pins, respectively.
4. Turn the power supply on. The board will automatically start up.
5. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 1.2V to turn on the regulator or less than 0.4V to turn it off.

LAYOUT RECOMMENDATION OF MP8843

Proper layout of the switching power supplies is very important, and sometimes critical for proper function. Poor layout design can result in poor line or load regulation and stability issues. Please follow these guidelines and take page 6 as reference:

1. The high current paths (GND, VIN and SW) should be placed very close to the device with short, direct and wide traces.
2. The input capacitor needs to be as close as possible to the VIN and GND pins.
3. The Mode/Frequency circuit should be placed closed to the part.
4. The external feedback resistors should be placed next to the FB pin.
5. Keep the switching node SW short and away from the feedback network.

In order to have better performances, it is better to use four layer boards. The inner 1 and 2 layers are Ground.