EVM3804-G-00A

High Efficiency, 0.6A, 5.5V, 2.4 MHz Synchronous Step-down Switcher with Integrated Inductor

The Future of Analog IC Technology

DESCRIPTION

The MPM3804 is a monolithic step-down switch mode converter with built-in internal power MOSFETs and inductor. The DC-DC module has a small surface mount 2mm x 2mm QFN package. It achieves 0.6A continuous output current from a 2.3V to 5.5V input voltage with excellent load and line regulation. The MPM3804 is ideal for a wide range of applications including high performance DSPs, wireless power, portable and mobile Devices, and other low-power systems. The output voltage can be regulated as low as 0.6V. Only input, output capacitors and FB resistors are needed to complete the design.

The Constant-On-time (COT) control scheme provides fast transient response high light-load efficiency and easy loop stabilization.

Fault condition protection includes cycle-by-cycle current limit and thermal shutdown.

The MPM3804 requires a minimum number of readily available standard external components and is available in an ultra-small QFN10 (2x2mm) package.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	2.3 – 5.5	V
Output Voltage	V_{OUT}	1.2	V
Output Current	I_{OUT}	0.6	A

Note: V_{IN}<3.3V may need more input capacitor.

FEATURES

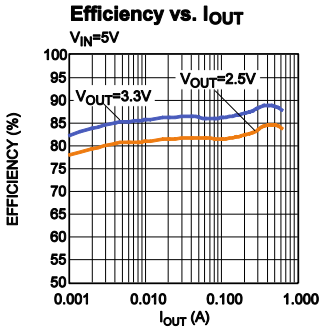
- Up to 91% Peak Efficiency
- Wide 2.3V to 5.5V Operating Input Range
- Fixed and Adjustable output from 0.6V
- 2mm x 2mm x 0.9mm QFN Package
- Total Solution Size 3.7mm x 3.7mm
- Up to 0.6A Peak Output Current
- 100% Duty Cycle in Dropout
- Ultra Low IQ: 11μA
- EN and Power Good for Power Sequencing
- Cycle-by-Cycle Over-Current Protection
- Output Discharge
- Short Circuit Protection with Hiccup Mode
- Adjustable Output Only Needs 4 External Components - 2 Ceramic Capacitors and FB Divider Resistors
- Fixed Output Only Needs Input and Output Capacitors

APPLICATIONS

- Wireless/Networking Cards
- Portable and Mobile Devices
- Battery Powered Devices
- Low Voltage I/O System Power

EVM3804-G-00A EVALUATION BOARD

Board Number	MPS IC Number
EVM3804-G-00A	MPM3804GG



EVALUATION BOARD SCHEMATIC

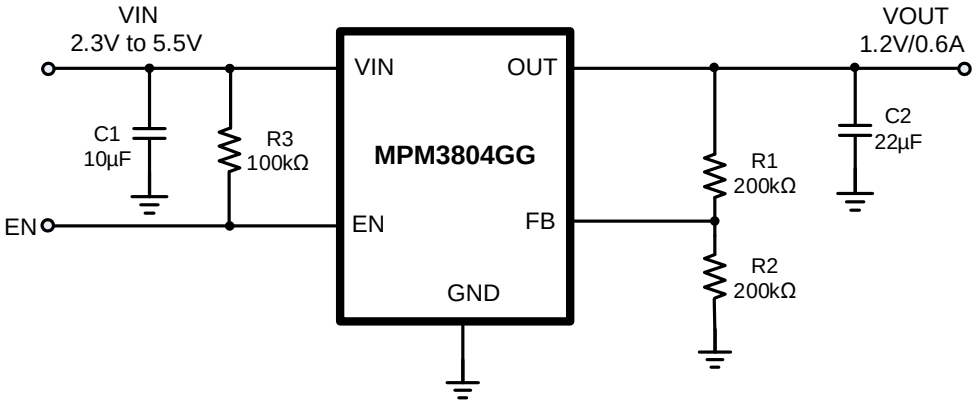


Figure 1—Typical Application Circuit for EVM3804GG

Note: V_{IN}<3.3V may need more input capacitor.

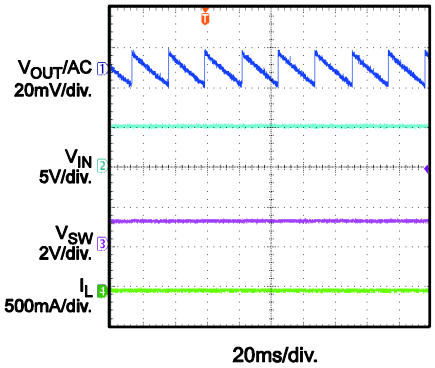
EVM3804-G-00A BILL OF MATERIALS

Qty	RefDes	Value	Description	Package	Manufacturer	Manufacturer P/N
2	R1,R2	200kΩ	Film Res,1%	0402	Any	Any
1	R3	100kΩ	Film Res,1%	0402	Any	Any
1	C1	10µF	Ceramic Cap,6.3V,X5R	0603	muRata	GRM188R60J475KE19D
1	C2	22µF	Ceramic Cap,6.3V,X5R	0603	TDK	C1608X5R0J226M
1	U1	MPM3804		2mmx2mm	MPS	MPM3804GG

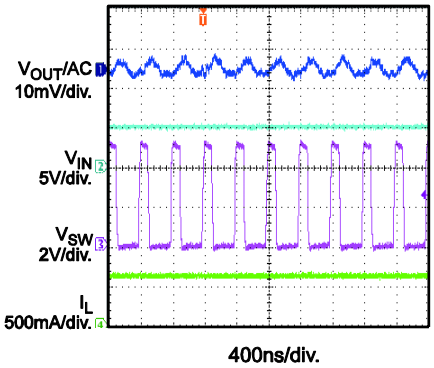
EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.
V_{IN} = 5V, V_{OUT} = 1.2V, L =1.0μH, Co=22μF, T_A = +25ºC, unless otherwise noted.

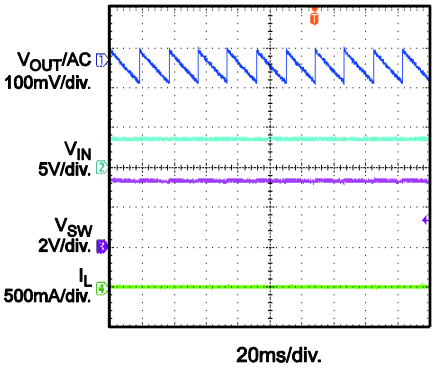
Steady State
I_{OUT}=0A



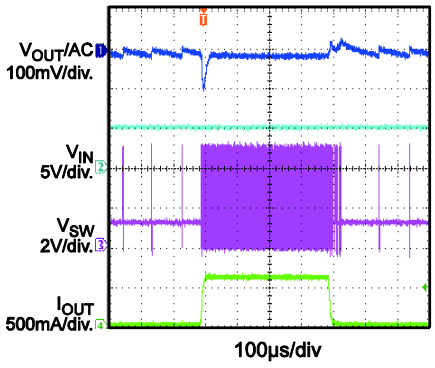
Steady State
I_{OUT}=0.6A



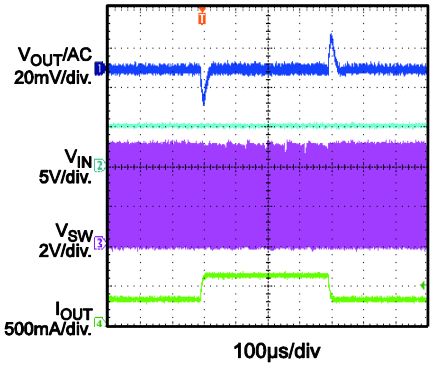
Steady State
V_{IN}=3.6V, V_{OUT}=3.3V, I_{OUT}=0A



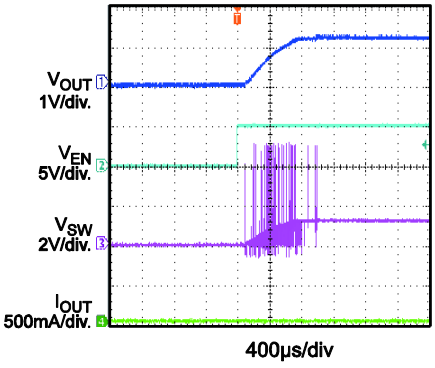
Load Transient Response
I_{OUT}=0A-0.6A



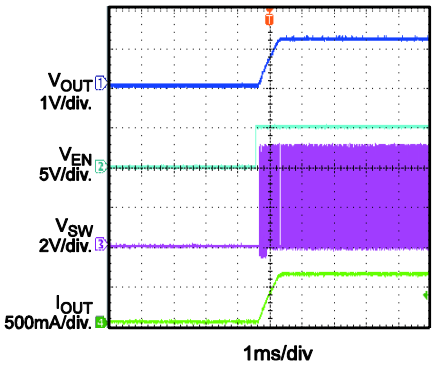
Load Transient Response
I_{OUT}=0.3A-0.6A



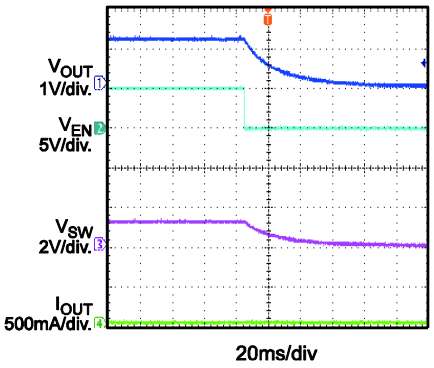
EN ON
I_{OUT}=0A



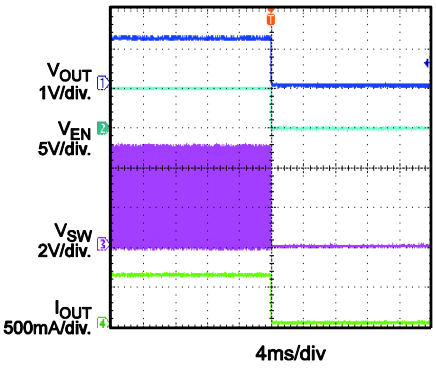
EN ON
I_{OUT}=0.6A



EN OFF
I_{OUT}=0A



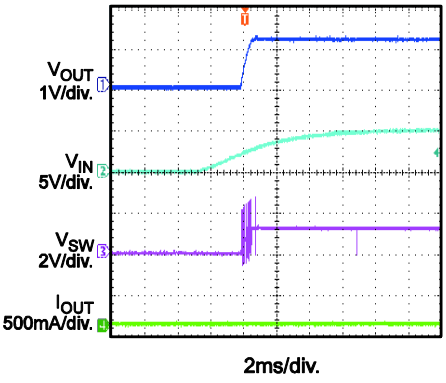
EN OFF
I_{OUT}=0.6A



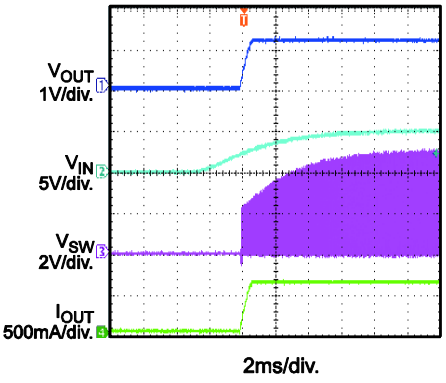
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.
V_{IN} = 5V, V_{OUT} = 1.2V, L =1.0μH, Co=22μF, T_A = +25ºC, unless otherwise noted.

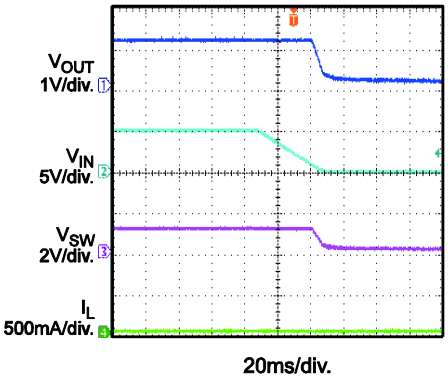
Power ON
I_{OUT}=0A



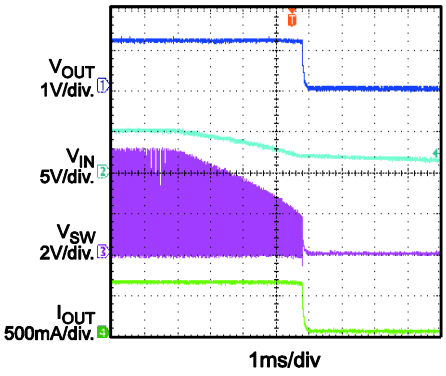
Power ON
I_{OUT}=0.6A



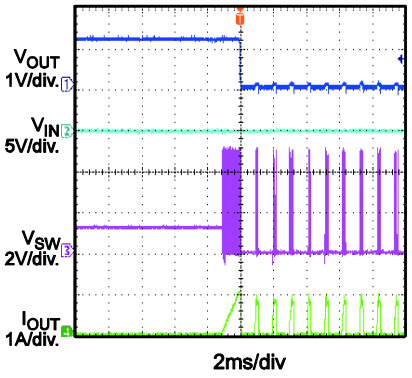
Power OFF
I_{OUT}=0A



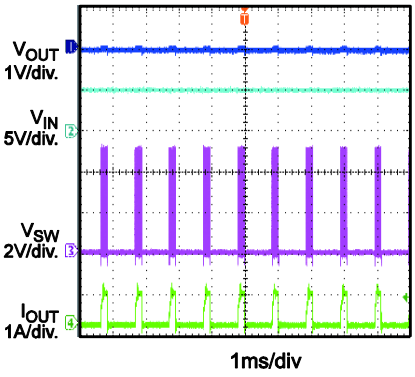
Power OFF
I_{OUT}=0.6A



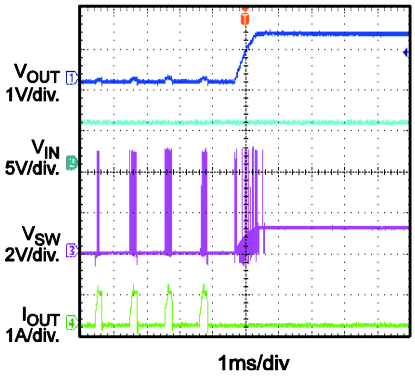
Short Circuit Entry



Short Circuit Steady



Short Circuit Recovery



PRINTED CIRCUIT BOARD LAYOUT

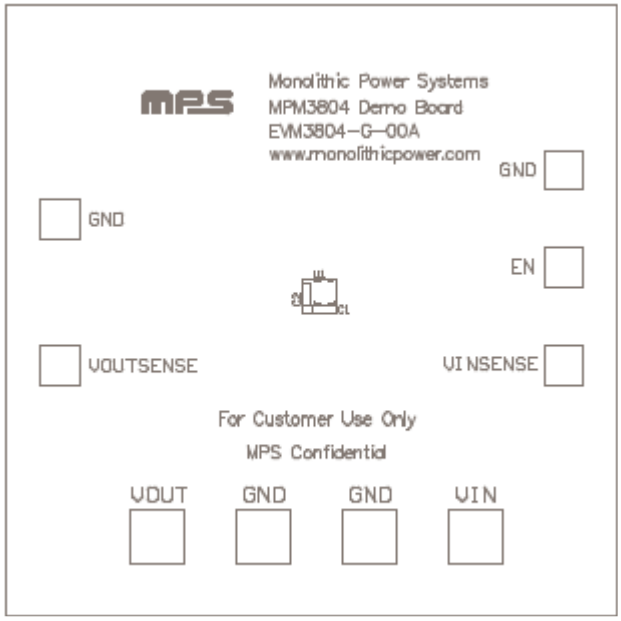


Figure 2—Top Silk Layer

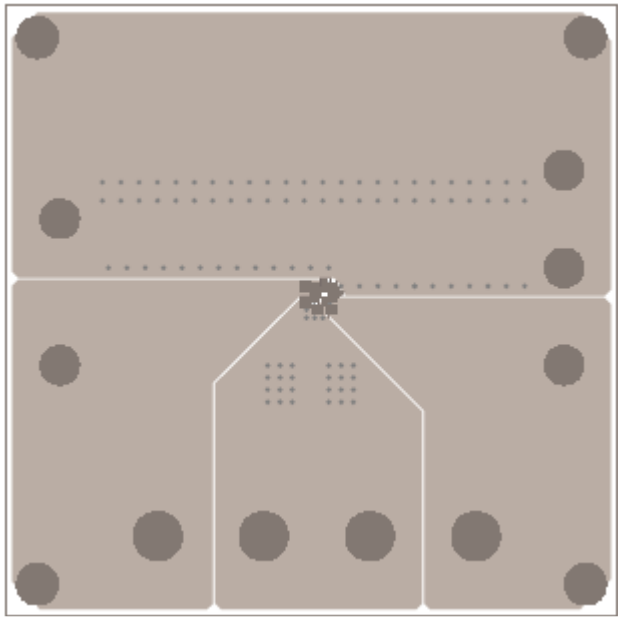


Figure 3—Top Layer

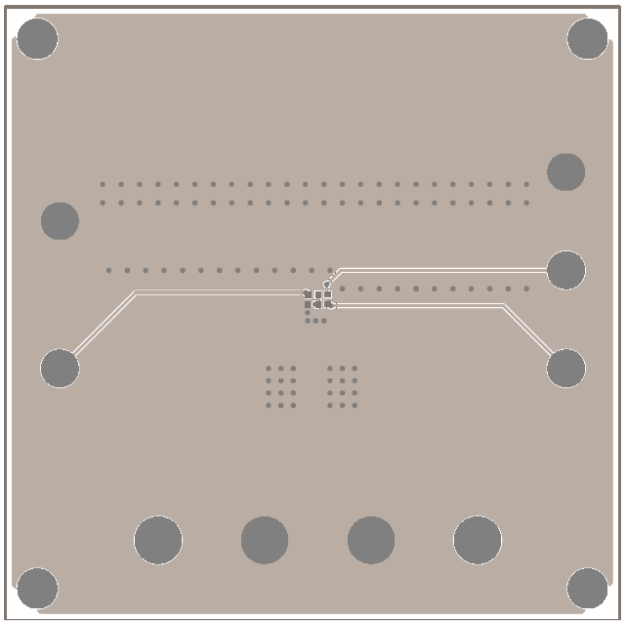


Figure 4—Bottom Layer