EV2388-QE-00A

High Efficiency,21V,1A,2MHz,Synchronous Step-Down Converter Evaluation Board

The Future of Analog IC Technology

DESCRIPTION

The EV2388-QE-00A is an evaluation board for MP2388, a high frequency, synchronous, rectified, step-down converter with built-in Power MOSFETs. The MP2388 offers a very compact solution to achieve 1A continuous output current with excellent load and line regulation over a wide input supply range.

Current-mode operation provides fast transient response and eases loop stabilization.

Full protection features include over-current protection and thermal shutdown.

The MP2388 requires a minimum number of readily available standard external components and is available in a space saving QFN-8 (1.5mmx2.5mm) package.

ELECTRICAL SPECIFICATION (1)

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	19	V
Output Voltage	V_{OUT}	3.3	V
Output Current	I_{OUT}	1	A

1). For different input, output spec, please refer to TYPICAL APPLICATION CIRCUIT section on datasheet to choose proper parameters.

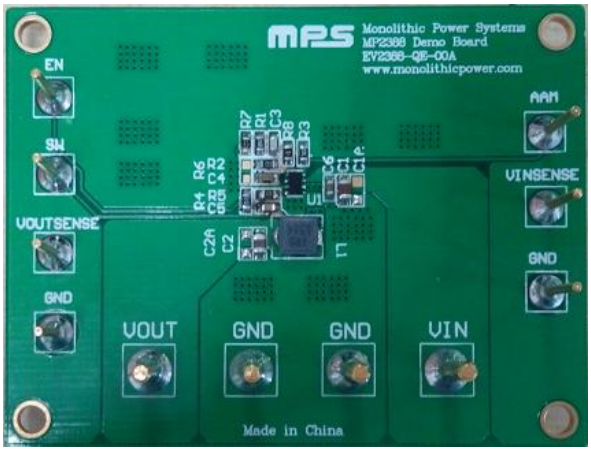
FEATURES

- 1A Continuous Load Current
- 110mΩ/50mΩ Low $R_{DS(ON)}$ Internal Power MOSFETs
- Fixed 2MHz Switching Frequency
- High Efficiency Synchronous Mode Operation
- External AAM pin for Power-Save Mode Programming
- Internal Soft-Start
- Over Current Protection and Hiccup Mode
- Thermal Shutdown
- Output Adjustable from 0.8V
- Available in a QFN-8(1.5mm x 2.5mm) Package

APPLICATIONS

- Notebook System and I/O Power
- Digital Set-Top Boxes
- Flat-Panel Television and Monitors

EV2388-QE-00A EVALUATION BOARD



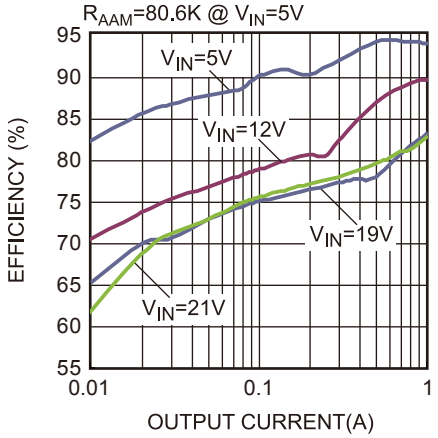
Board Number	MPS IC Number
EV2388-QE-00A	MP2388GQEU

Efficiency vs. Output Current

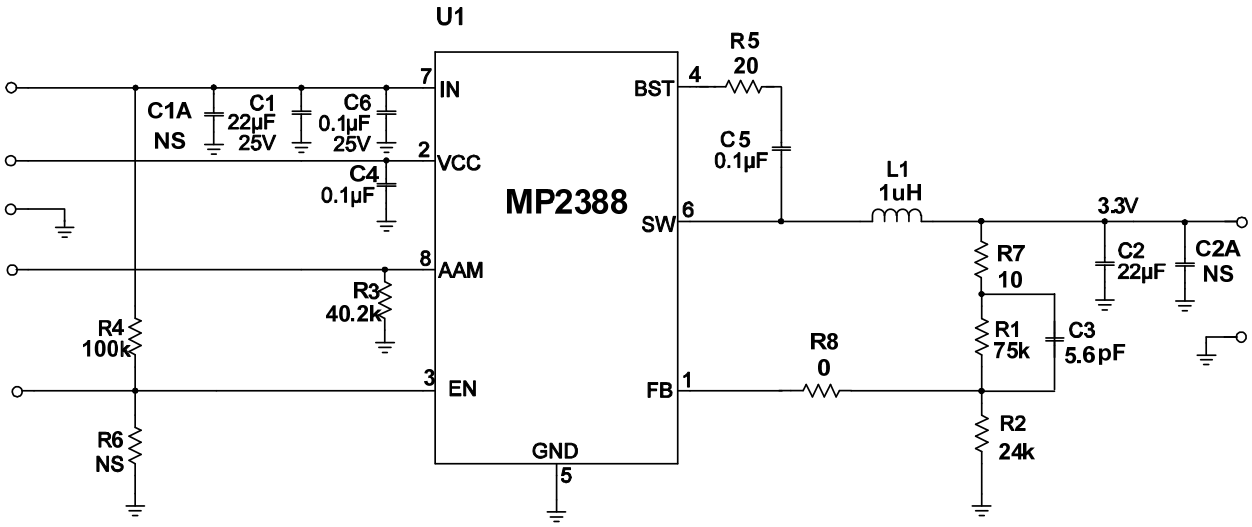
V_{OUT}=3.3V, L=1μH, I_{OUT}=0.01A to 1A

R_{AAM}=40.2k @ V_{IN}=12V to 21V,

R_{AAM}=80.6K @ V_{IN}=5V



EVALUATION BOARD SCHEMATIC



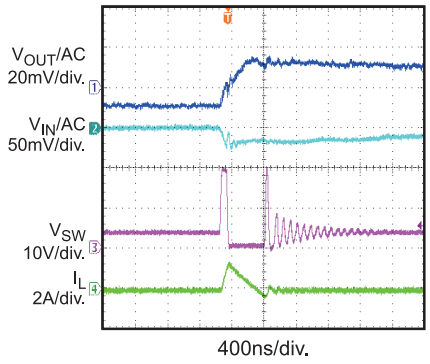
EV2388-QE-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
0	C1A,C2A	NS				
1	C1	22µF	Ceramic Cap., 25V, X5R	0805	Murata	GRM21BR61E226ME44L
1	C2	22µF	Ceramic Cap., 16V, X5R	0805	Murata	GRM219R61C226ME15L
1	C3	5.6pF	Ceramic Cap., 50V, C0G	0603	Murata	GRM1885C1H5R6DA01D
2	C4.C5	0.1µF	Ceramic Cap., 16V, X7R	0603	Murata	GRM188R71C104KA01D
1	C6	0.1µF	Ceramic Cap., 25V, X7R	0603	Murata	GRM188R71E104KA01D
1	R1	75kΩ	Film Res., 1%	0603	Yageo	RC0603FR-0775KL
1	R2	24kΩ	Film Res., 1%	0603	Yageo	RC0603FR-0724KL
1	R3	40.2KΩ	Film Res., 1%	0603	Yageo	RC0603FR-0740K24L
1	R4	100KΩ	Film Res., 1%	0603	Yageo	RC0603FR-07100KL
1	R5	20Ω	Film Res., 1%	0603	Yageo	RC0603FR-0720RL
0	R6	NS				
1	R7	10Ω	Film Res., 1%	0603	Yageo	RC0603FR-0710RL
1	R8	0Ω	Film Res., 1%	0603	Yageo	RC0603FR-070RL
1	L1	1µH	Inductor, DCR=27mΩ, Isat=9A	SMD	Wurth	74437324010
1	U1	MP2388	Step-Down Converter	QFN-8	MPS	MP2388GQEU

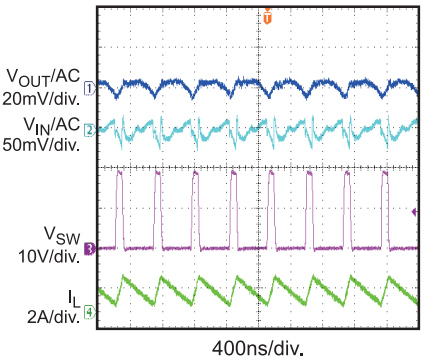
EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.
V_{IN} = 19V, V_{OUT} = 3.3V, L=1μH, T_A=25°C, unless otherwise noted.

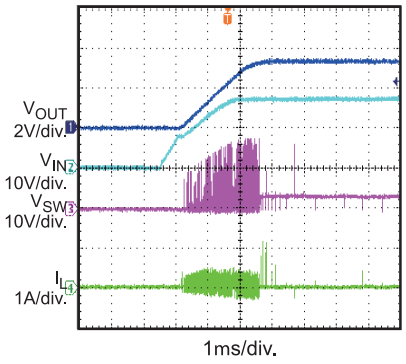
Input/Output Ripple
I_{OUT} = 0A



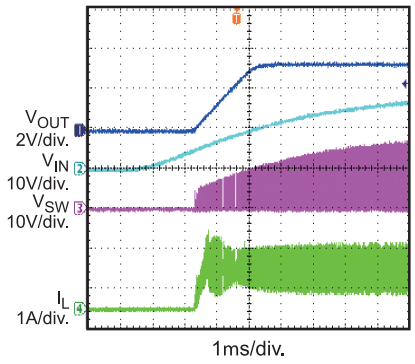
Input/Output Ripple
I_{OUT} = 1A



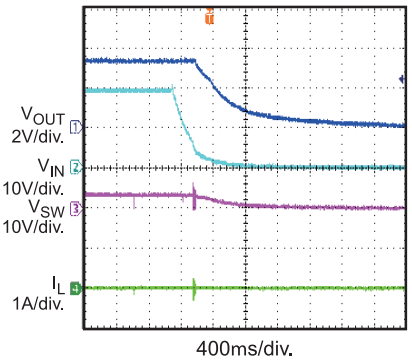
Startup through Input Voltage
I_{OUT} = 0A



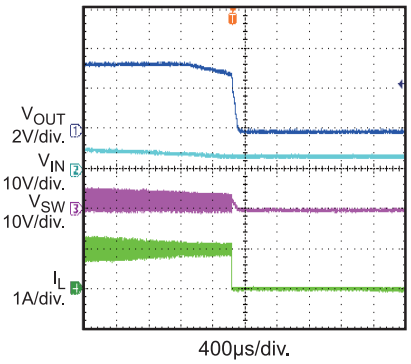
Startup through Input Voltage
I_{OUT} = 1A



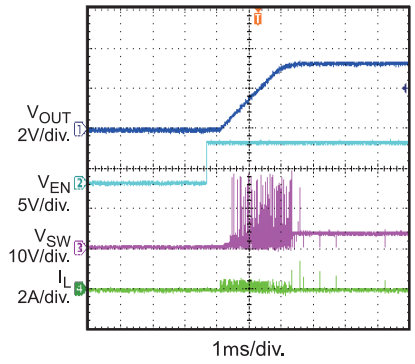
Shutdown through Input Voltage
I_{OUT} = 0A



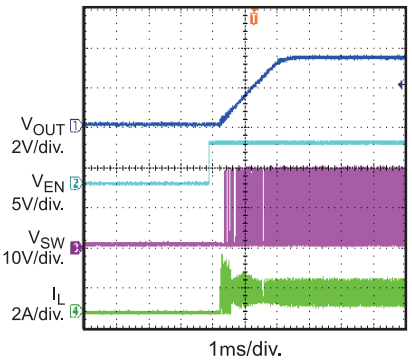
Shutdown through Input Voltage
I_{OUT} = 1A



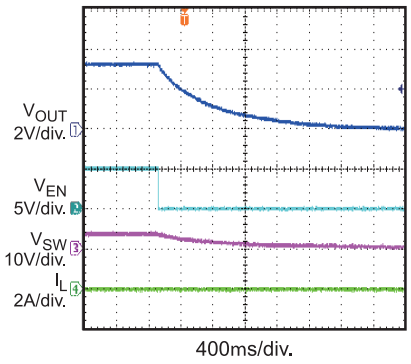
Startup through Enable
I_{OUT} = 0A



Startup through Enable
I_{OUT} = 1A



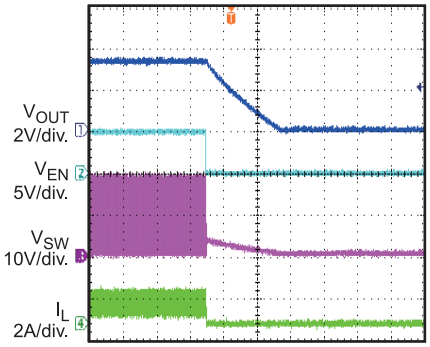
Shutdown through Enable
I_{OUT} = 0A



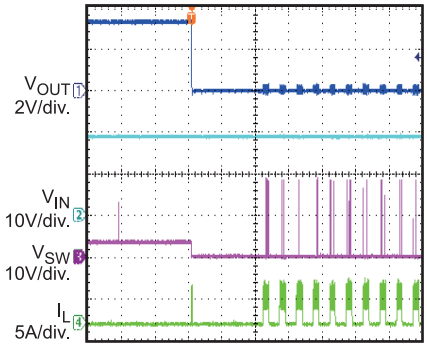
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.
V_{IN} = 19V, V_{OUT} = 3.3V, L=1μH, T_A=25°C, unless otherwise noted.

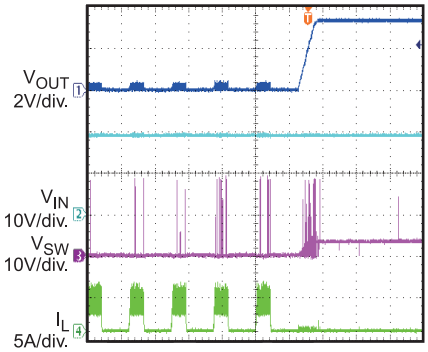
Shutdown through Enable
I_{OUT} = 1A



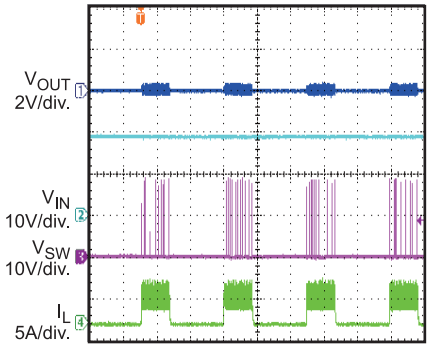
Short Circuit Entry
I_{OUT} = 0A



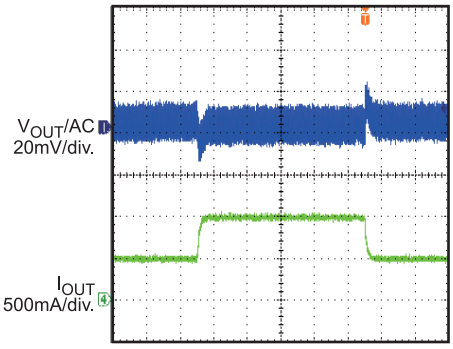
Short Circuit Recovery
I_{OUT} = 0A



Short Circuit Steady
I_{OUT} = 0A



Load Transient
I_{OUT} = 0.5A to 1A, 2.5A/μs



PRINTED CIRCUIT BOARD LAYOUT

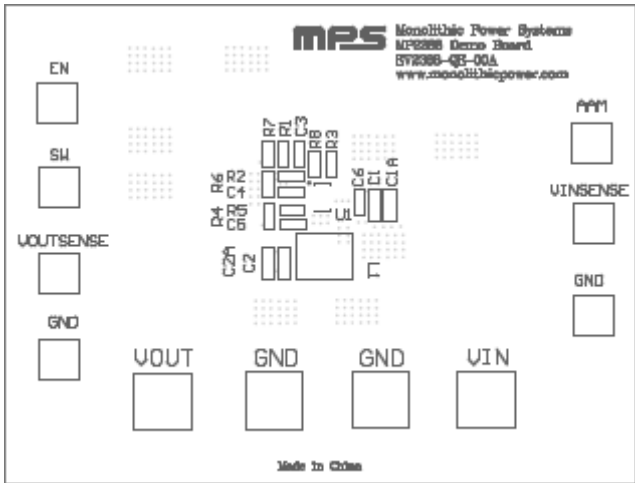


Figure 1—Top Silk Layer

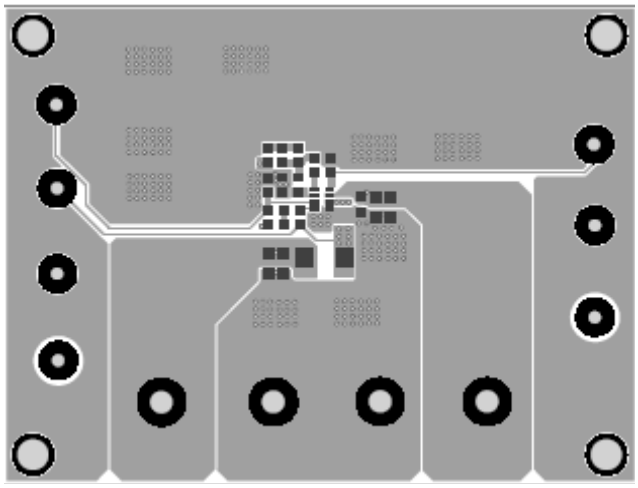


Figure 2—Top Layer

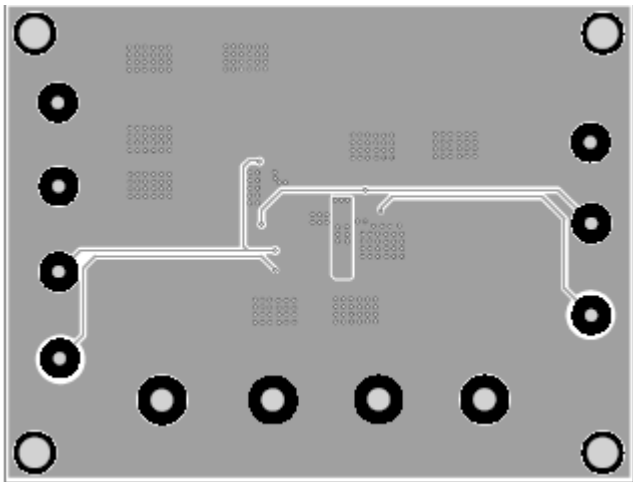


Figure 3—Bottom Layer

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 4.5V and 21V, 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 1.6V to turn on the regulator, or less than 0.9V to turn it off.
6. Float AAM pin or drive AAM to a high level voltage to set MP2388 work at forced PWM mode.