



EVM3805B-12-QB-00A

6V, 0.6A Peak Synchronous Step-Down Switcher Evaluation Board

DESCRIPTION

The EVM3805B-12-QB-00A is used for demonstrating the performance of MPS's EVM3805B-12 a low voltage high switching frequency step-down switcher with built-in power MOSFETs and power inductor. MPM3805A provides up to 0.6A peak highly efficient output with constant-on-time control for fast loop response.

The constant-on-time control (COT) scheme provides fast, transient response loop stabilization. Fault condition protection includes cycle-by-cycle current limiting and thermal shutdown TSD.

The EVM3805B-12-QB-00A is available in QFN 3.0x2.5x0.9mm package.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	2.5– 6	V
Output Voltage	V_{OUT}	1.2	V
Output Current	I_{OUT}	0.6	A

FEATURES

- Wide 2.5V to 6V Operating Input Range
- Fixed output voltage 1.2V
- 3mm x 2.5mm x 0.9mm QFN Package
- Total Solution Size 6mm x 3.8mm
- Up to 0.6A Peak Output Current
- 100% Duty Cycle in Dropout
- Force CCM Mode
- EN and Power Good for Power Sequencing
- Cycle-by-Cycle Over-Current Protection
- Short Circuit Protection with Hiccup Mode
- Only Needs 2 External Ceramic Capacitors

APPLICATIONS

- Automotive ECU
- Low Voltage I/O System Power
- LDO Replacement
- Power for Portable Products
- Telematics
- Space-limited Applications

All MPS parts are lead-free, halogen free, and adhere to the RoHS directive. For MPS green status, please visit MPS website under Quality Assurance. "MPS" and "The Future of Analog IC Technology" are Registered Trademarks of Monolithic Power Systems, Inc.

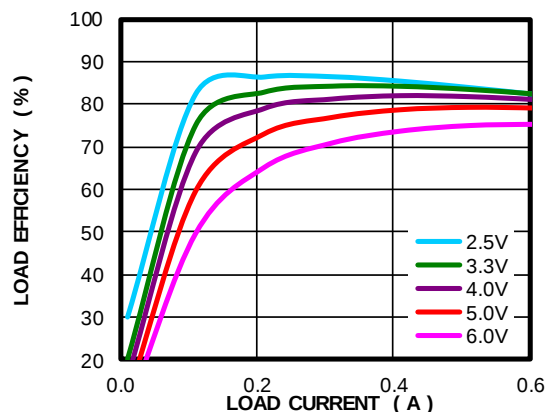
EVM3805B-12-QB-00A EVALUATION BOARD



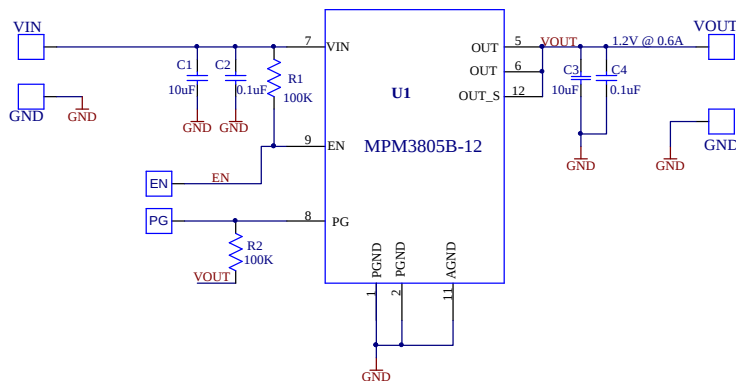
Board Number	MPS IC Number
EVM3805B-12-QB-00A	MPM3805B-12

Efficiency vs. Load

$V_{OUT}=1.2V$



EVALUATION BOARD SCHEMATIC



EVM3805B-12-QB-00A BILL OF MATERIALS

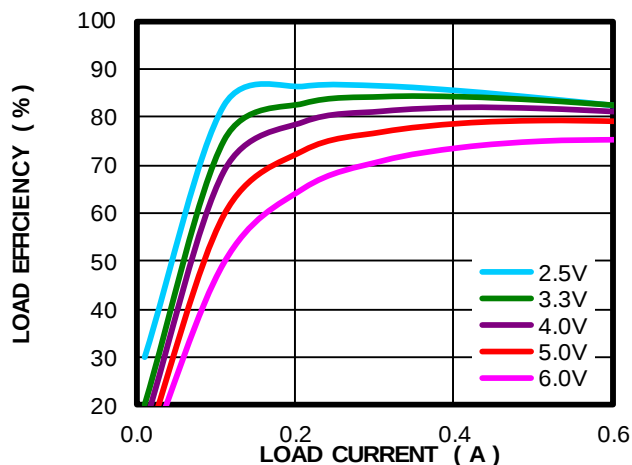
Qty	Refdes	Value	Description	Package	Manufacturer	Manufacturer_P/N
2	C ₂ , C ₄	0.1uF	Ceramic Capacitor;16V;X7R	0603	muRata	GRM188R71C104KA01D
2	C ₁ , C ₃	10uF	Ceramic Capacitor;16V;X5R	0805	muRata	GRM21BR61C106KE15L
2	R1, R2	100K	Film Res.,1%	0603	Any	
1	U1	MPM3805B-12	COT Buck	QFN3.0*2.5	MPS	MPM3805B-12-GQB
2	PG, EN	Test Point	TP1mm	Any	HZ	
4	VIN, GND, VOUT, GND	Test Point	2.0 Golden Pin	Any	HZ	

EVB TEST RESULTS

Performance waveforms are tested on the evaluation board. $T_A = 25^\circ\text{C}$, unless otherwise noted.

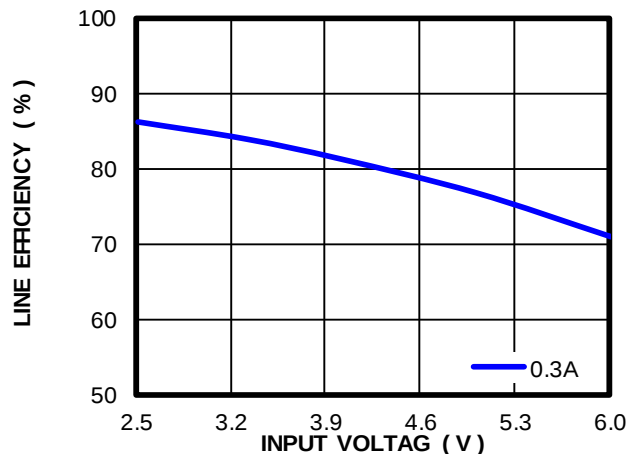
Efficiency vs. Load

$V_{OUT}=1.2\text{V}$



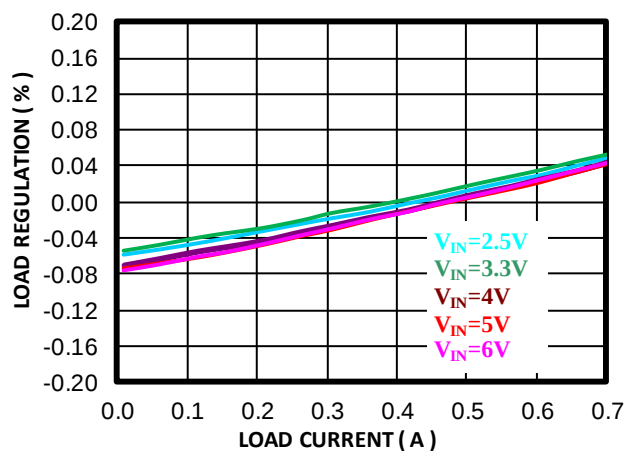
Efficiency vs. Input

$V_{OUT}=1.2\text{V}$



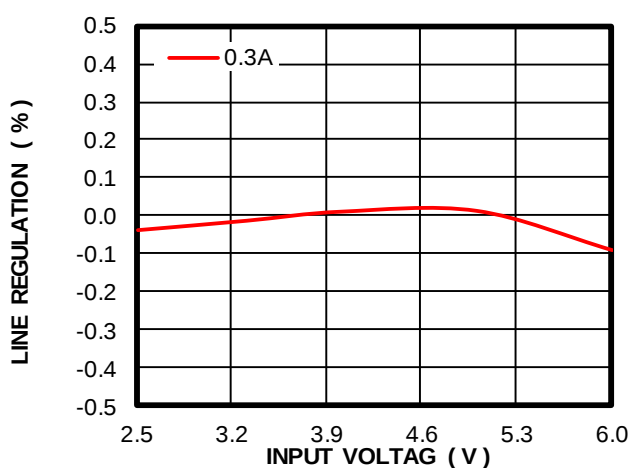
Load regulation

$V_{OUT}=1.2\text{V}$

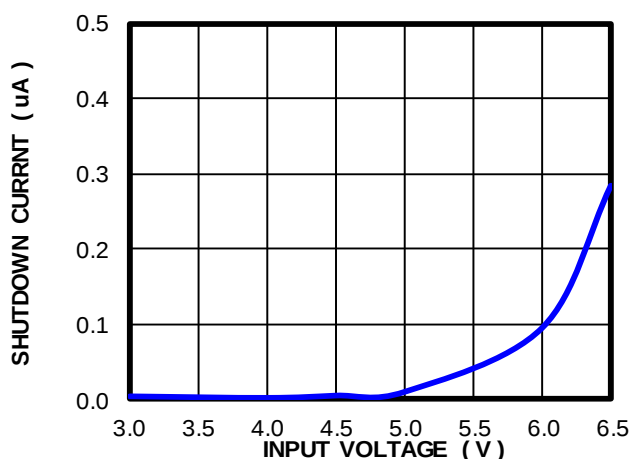


Line Regulation

$V_{OUT}=1.2\text{V}$



Shut Down Current vs. VIN

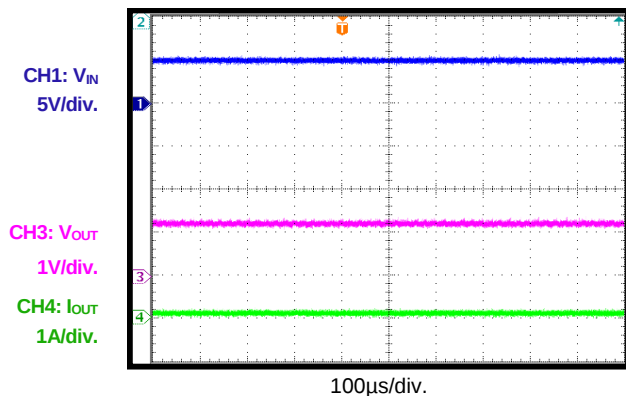


EVB TEST RESULTS

Performance waveforms are tested on the evaluation board. $T_A = 25^\circ\text{C}$, unless otherwise noted.

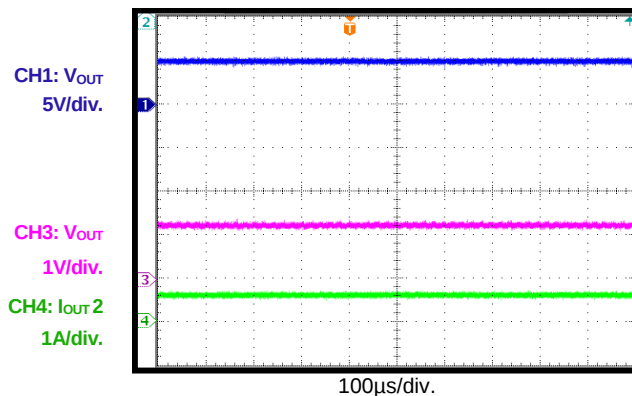
Steady State

$V_{IN}=5\text{V}$, $V_{OUT}=1.2\text{V}$, $I_{OUT}=0.1\text{A}$



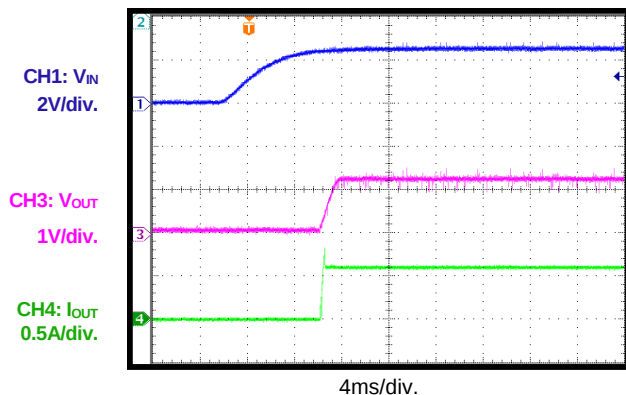
Steady State

$V_{IN}=5\text{V}$, $V_{OUT}=1.2\text{V}$, $I_{OUT}=0.6\text{A}$



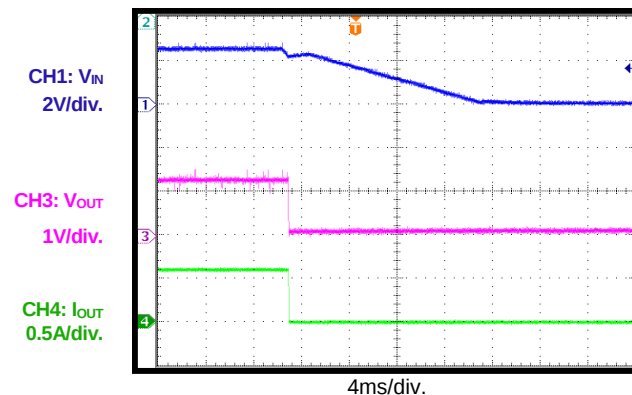
Power Up

$V_{IN}=2.5\text{V}$, $V_{OUT}=1.2\text{V}$, $I_{OUT}=0.6\text{A}$



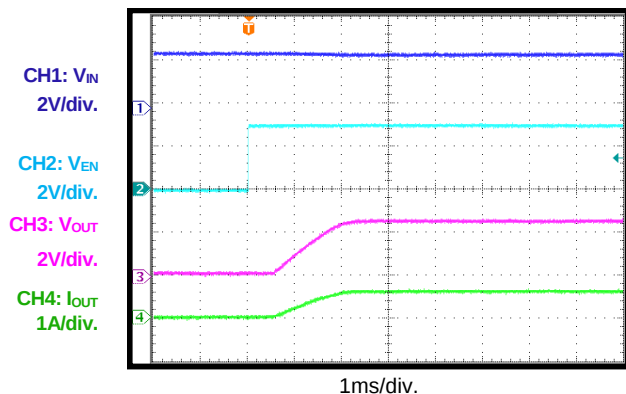
Power Down

$V_{IN}=2.5\text{V}$, $V_{OUT}=1.2\text{V}$, $I_{OUT}=0.6\text{A}$



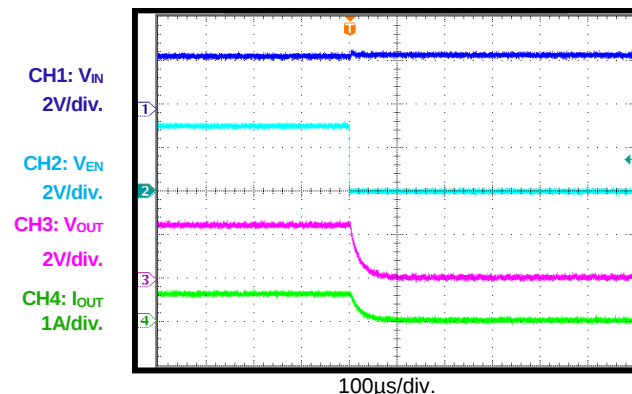
Enable On

$V_{IN}=2.5\text{V}$, $V_{OUT}=1.2\text{V}$, $I_{OUT}=0.6\text{A}$



Enable Off

$V_{IN}=2.5\text{V}$, $V_{OUT}=1.2\text{V}$, $I_{OUT}=0.6\text{A}$

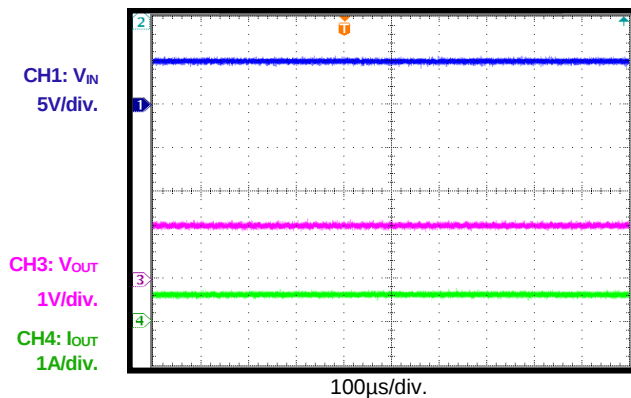


EVB TEST RESULTS (continued)

Performance waveforms are tested on the evaluation board. $T_A = 25^\circ\text{C}$, unless otherwise noted.

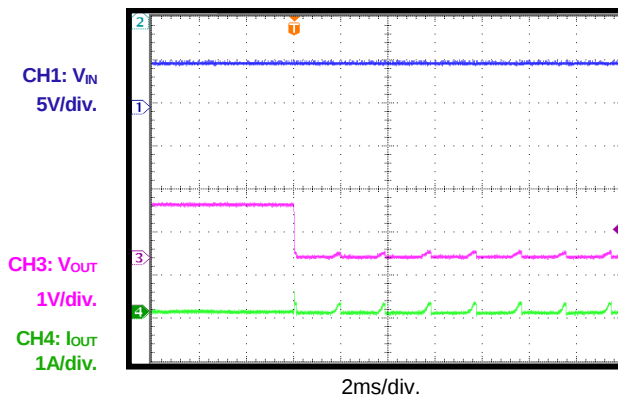
Steady State

$V_{IN}=5\text{V}$, $V_{OUT}=1.2\text{V}$, $I_{OUT}=0.6\text{A}$



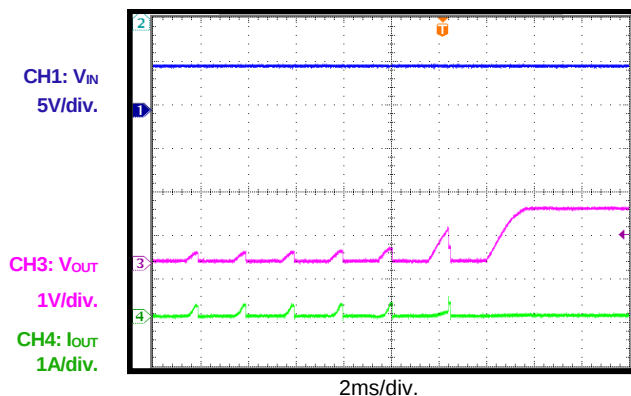
Short Circuit

$V_{IN}=5\text{V}$, $V_{OUT}=1.2\text{V}$



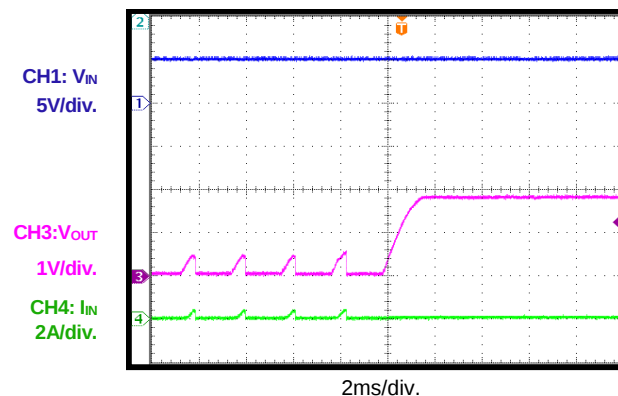
Short Circuit Recovery

$V_{IN}=5\text{V}$, $V_{OUT}=1.2\text{V}$



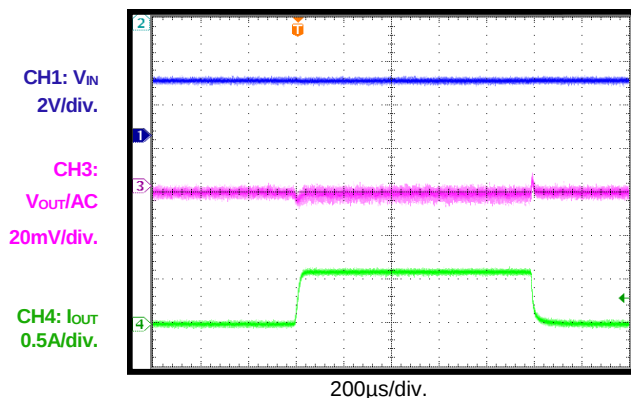
Short Circuit Recovery

$V_{IN}=5\text{V}$, $V_{OUT}=1.2\text{V}$



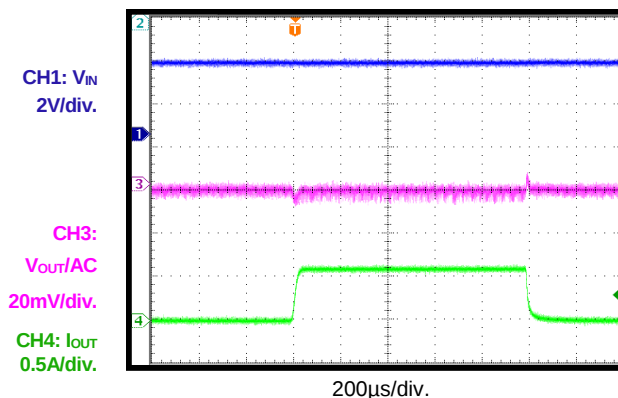
Transient Response

$V_{IN}=2.5\text{V}$, $V_{OUT}=1.2\text{V}$, $I_{OUT}=0\text{A}-0.6\text{A}$, $0.25\text{A}/\mu\text{s}$



Transient Response

$V_{IN}=3.3\text{V}$, $V_{OUT}=1.2\text{V}$, $I_{OUT}=0\text{A}-0.6\text{A}$, $0.25\text{A}/\mu\text{s}$

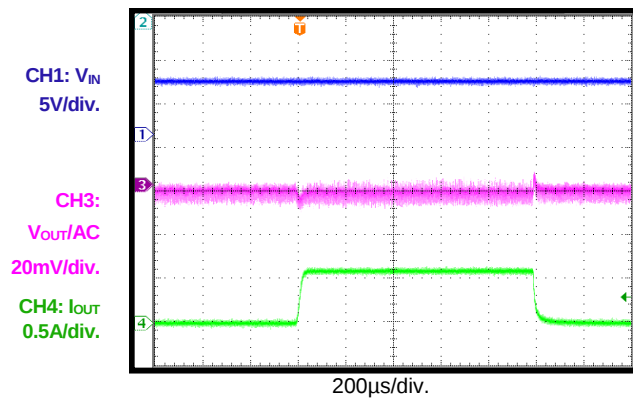


EVB TEST RESULTS *(continued)*

$T_A = 25^\circ\text{C}$, unless otherwise noted.

Transient Response

$V_{IN}=6\text{V}$, $V_{OUT}=1.2\text{V}$, $I_{OUT}=0\text{A}-0.6\text{A}$, $0.25\text{A}/\mu\text{s}$



PRINTED CIRCUIT BOARD LAYER

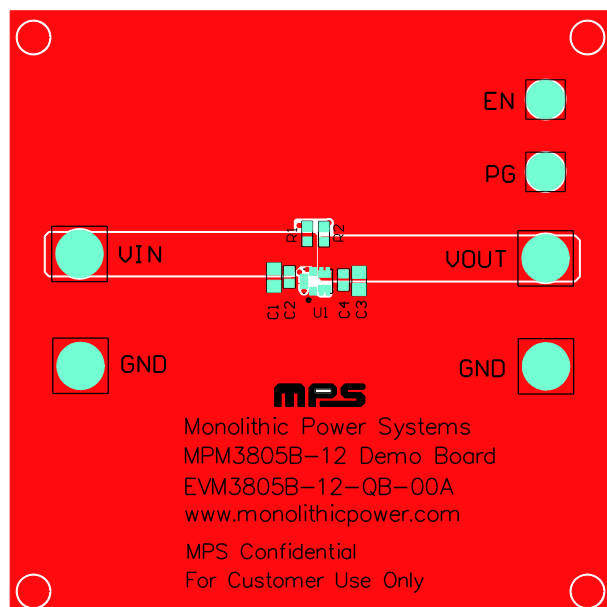


Figure 1: Top Silk Layer

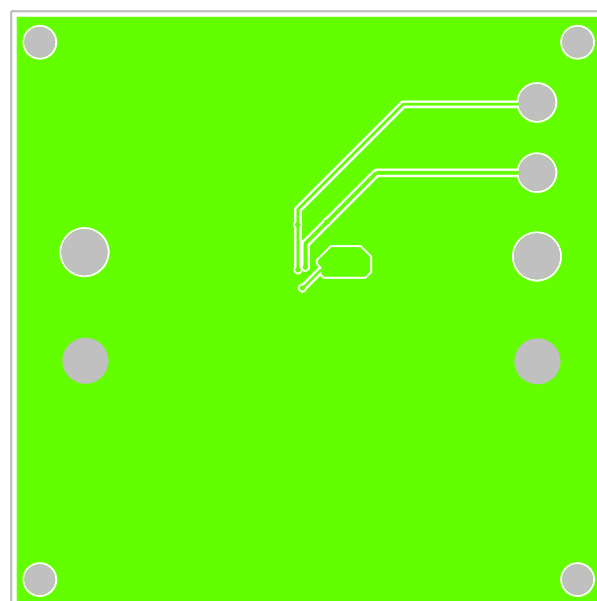


Figure 2: Bottom Layer

QUICK START GUIDE

The output voltage of this board is fixed to 1.2V.

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. The Output Voltage V_{OUT} is fixed 1.2V.

NOTICE: The information in this document is subject to change without notice. Please contact MPS for current specifications. Users should warrant and guarantee that third party Intellectual Property rights are not infringed upon when integrating MPS products into any application. MPS will not assume any legal responsibility for any said applications.