EV5083-G-00A

5.5V, 2A Low R_{DSON} Load Switch with Current Monitoring

The Future of Analog IC Technology

DESCRIPTION

The EV5083-G-00A is an evaluation board for the MP5083, a low R_{DSON} load switch with current monitoring.

The MP5083 is a load switch, designed to provide 2A load protection covering 0.5V to 5.5V voltage range. With low R_{DSON} in tiny package, the MP5083 provides very high efficiency and space-saving solution for notebook, tablet and other portable applications.

The MP5083 is equipped with the very accurate current monitoring function. The gain of the current monitor can be scaled to different applications. With the soft start function, the MP5083 can avoid inrush current during circuit start-up. The MP5083 also provides other features, like power good, output discharge function, and fast short-circuit response time.

The EV board can deliver a continuous 2A load current over 0.8V-to-5.5V operating input range.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage(1)	V_{IN}	0.8-5.5	V
Vcc Voltage	Vcc	3-5.5	V
Output Current	I_{OUT}	2	A

Note:

1) For specifications of lower voltage, please contact factory.

FEATURES

- Output Current Monitoring Accurate as High as 3%
- Wide V_{IN} Range: 0.5V to 5.5V
- <1uA Shutdown Current
- Integrated 50mΩ Low R_{DSON} FET
- Typical 2A Load Current Range
- Push-pull PG Indicator
- Adjustable Start Up Slew Rate
- Output Discharge Function
- <200ns Short-Circuit Response Protection
- Thermal Protection
- Small 2mmx2mm QFN Package

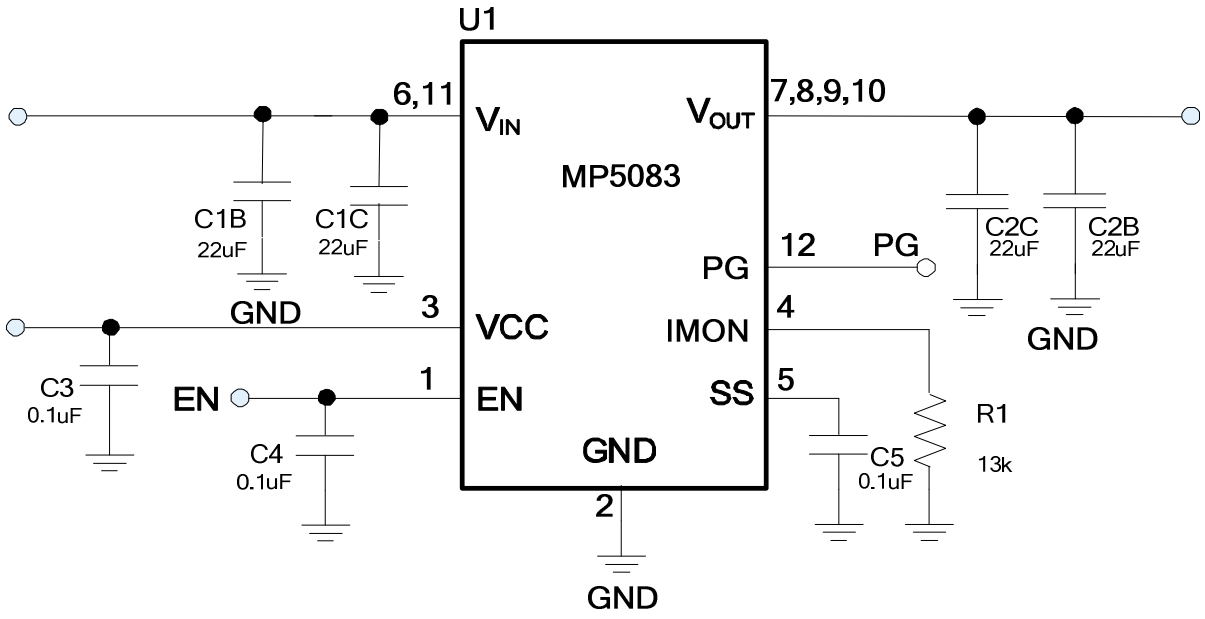
APPLICATIONS

- Notebook and Tablet Computers
- Portable Devices
- Solid State Drives
- Handheld Devices

EV5083-G-00A EVALUATION BOARD

Board Number	MPS IC Number
EV5083-G-00A	MP5083GG

EVALUATION BOARD SCHEMATIC



EV5083 BILL OF MATERIALS

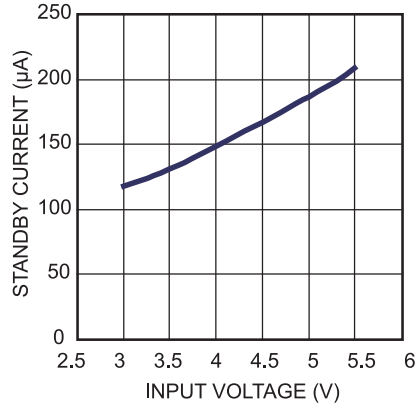
Qty	Ref	Value	Description	Package	Manufacturer	Part Number
4	C1B, C1C C2B, C2C	22µF	Ceramic Cap, 10V, X5R	1206	muRata	GRM31CR61A226ME19L
3	C3, C4, C5	0.1µF	Ceramic Cap, 16V, X7R	0603	muRata	GRM188R71C104KA01D
1	R1	13k	Film Res,1%	0603	ROYAL	RL0603FR-0713KL
1	U1		2A Load Switch	QFN 2x2	MPS	MP5083GG

EVB TEST RESULTS

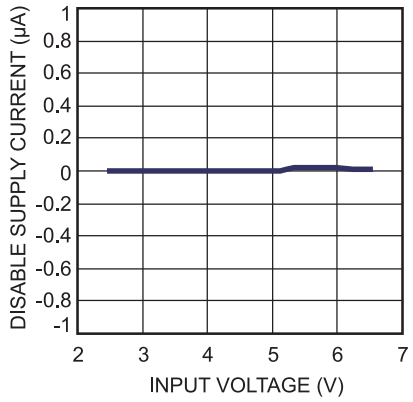
Performance waveforms are tested on the evaluation board.

V_{IN} = 3.6V, V_{CC} = 3.6V, EN=2.5V, R_{IMON} = 13k, T_A = 25°C, unless otherwise noted.

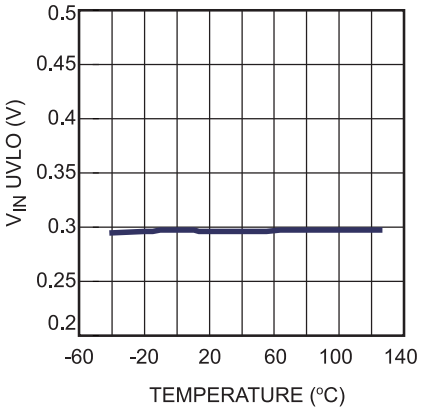
Quiescent Current



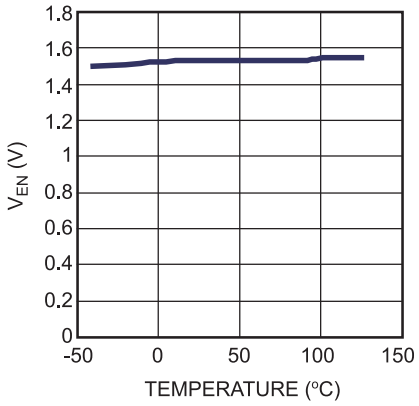
Disabled Supply Current vs. Input Voltage



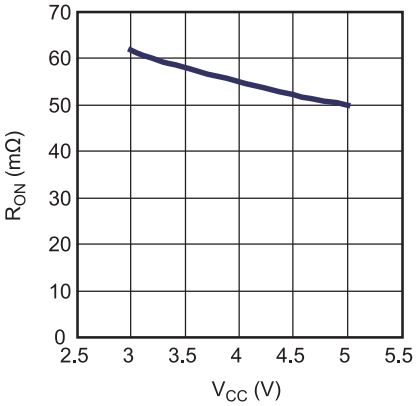
V_{IN} UVLO vs. Temperature



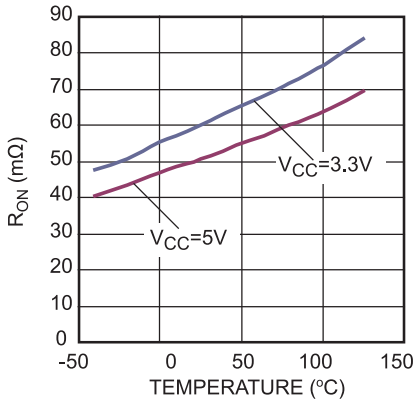
EN Rising Threshold vs. Temperature



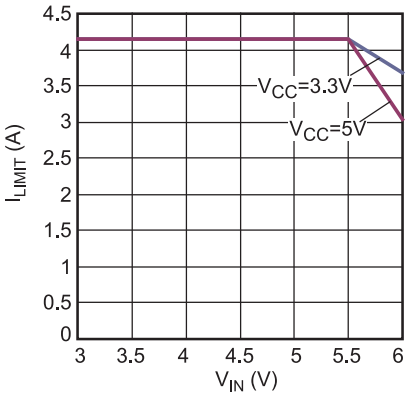
R_{DS_ON} vs. V_{CC}



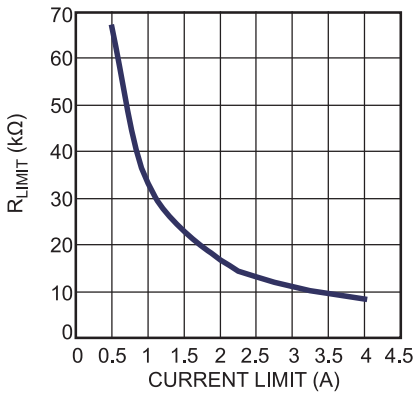
R_{DS_ON} vs. Temperature



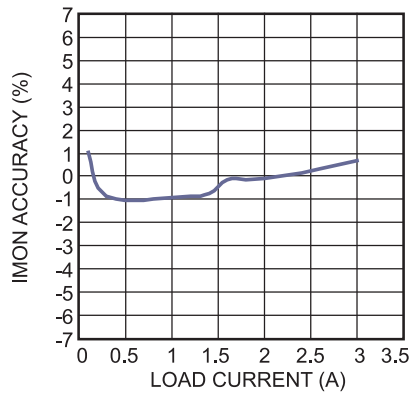
The Maximum Current Limit vs.V_{IN}



Current Limit vs. R_{LIMIT}



IMON Accuracy vs. I_{OUT}



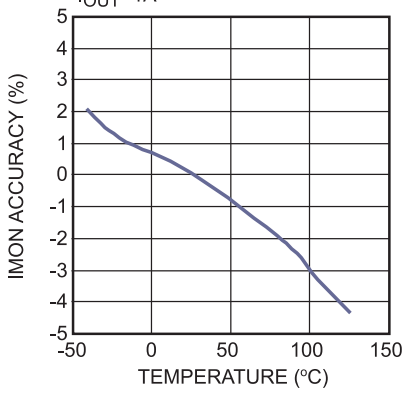
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.

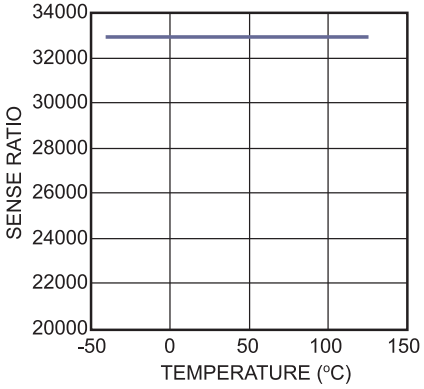
V_{IN} = 3.6V, V_{CC} = 3.6V, EN=2.5V, R_{IMON} = 13k, T_A = 25°C, unless otherwise noted.

IMON Accuracy vs. Temperature

I_{OUT}=1A

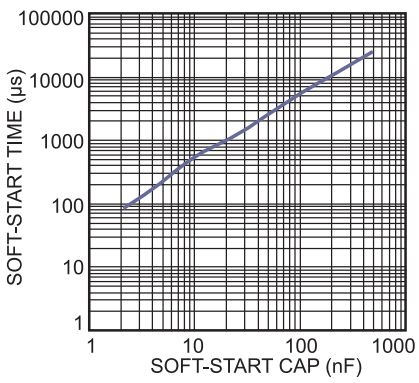


Sense Ratio vs. Temperature

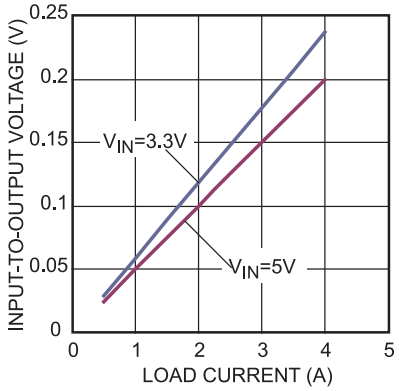


Soft-Start vs. Cap

V_{IN}=3.6V

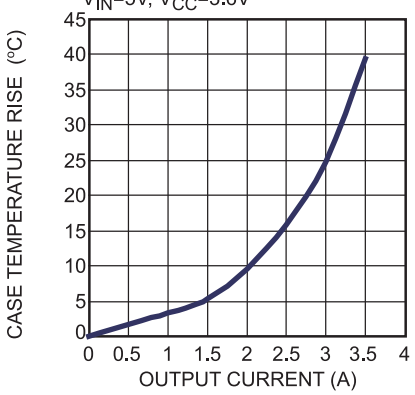


Input-to-Output Voltage vs. Load Current



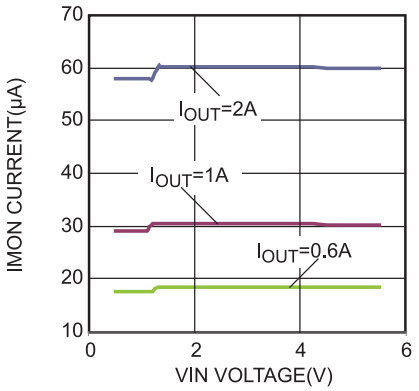
Case Temperature Rise vs. Output Current

V_{IN}=5V, V_{CC}=3.6V



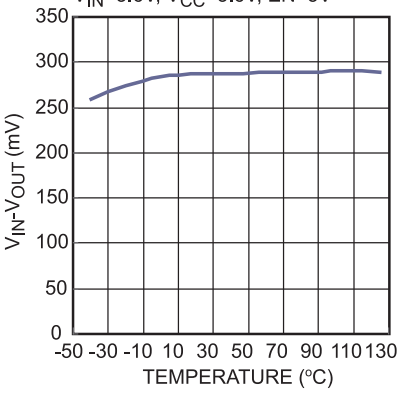
IMON Current vs. VIN

V_{CC}=3.6V, EN=5V



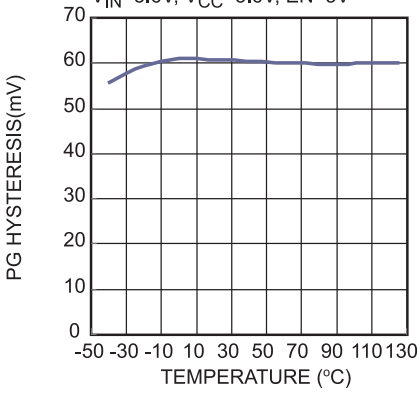
PG Rising Threshold vs. Temperature

V_{IN}=3.6V, V_{CC}=3.6V, EN=5V



PG Hysteresis vs. Temperature

V_{IN}=3.6V, V_{CC}=3.6V, EN=5V

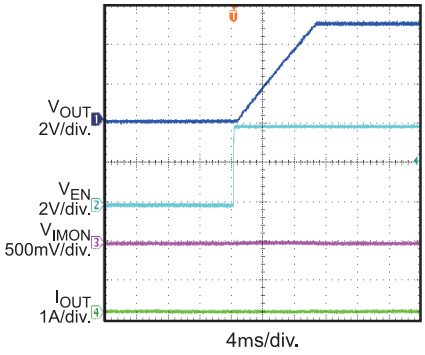


EVB TEST RESULTS *(continued)*

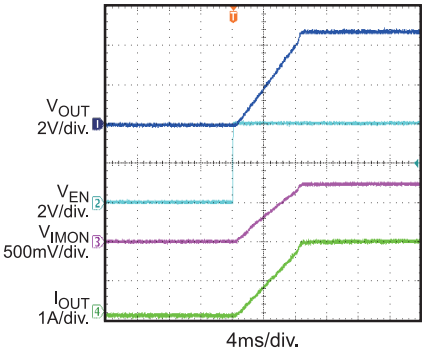
Performance waveforms are tested on the evaluation board.

V_{IN} = 3.6V, V_{CC} = 3.6V, EN=2.5V, R_{IMON} = 13k, T_A = 25°C, unless otherwise noted.

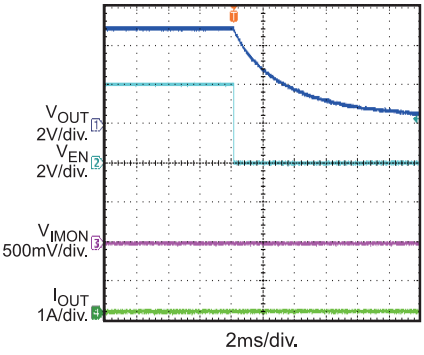
Enable Startup
V_{IN} = 5V, V_{CC} = 3.6V, No Load



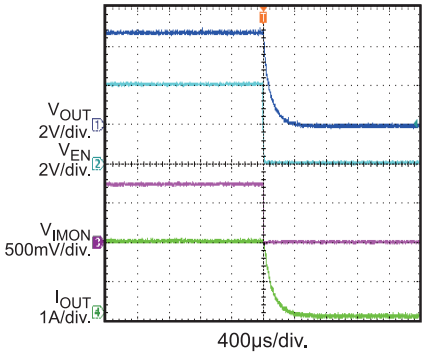
Enable Startup
V_{IN} = 5V, V_{CC} = 3.6V, 2A Load



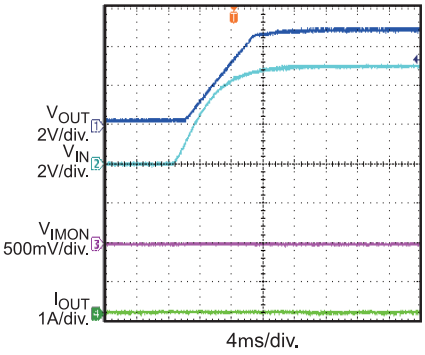
Enable Shutdown
V_{IN} = 5V, V_{CC} = 3.6V, No Load



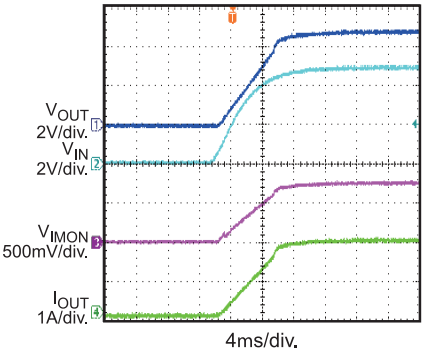
Enable Shutdown
V_{IN} = 5V, V_{CC} = 3.6V, 2A Load



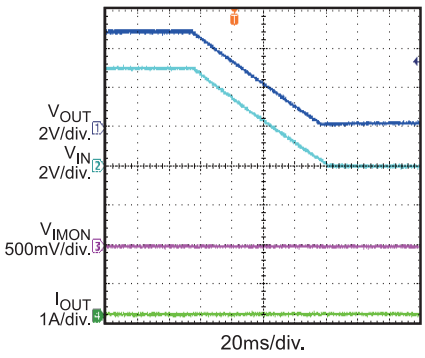
Power Up
V_{IN} = 5V, V_{CC} = 3.6V, I_{OUT} = 0A



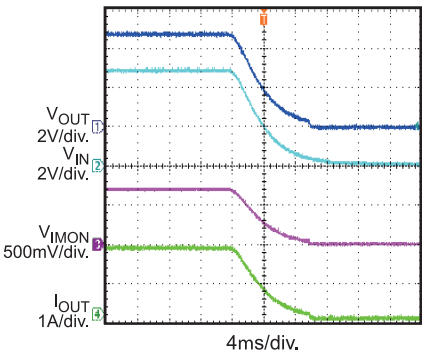
Power Up
V_{IN} = 5V, V_{CC} = 3.6V, I_{OUT} = 2A



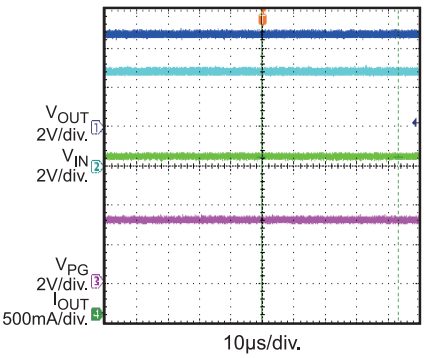
Power Down
V_{IN} = 5V, V_{CC} = 3.6V, I_{OUT} = 0A



Power Down
V_{IN} = 5V, V_{CC} = 3.6V, I_{OUT} = 2A



Steady State
V_{IN} = 5V, V_{CC} = 3.6V, I_{OUT} = 2A



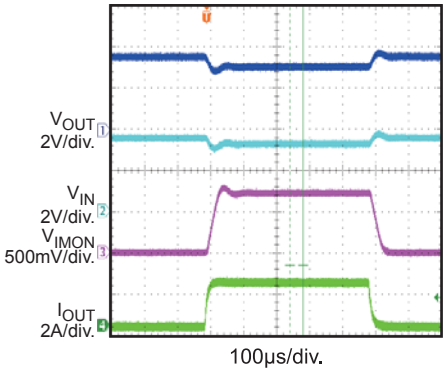
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.

V_{IN} = 3.6V, V_{CC} = 3.6V, EN=2.5V, R_{IMON} = 13k, T_A = 25°C, unless otherwise noted.

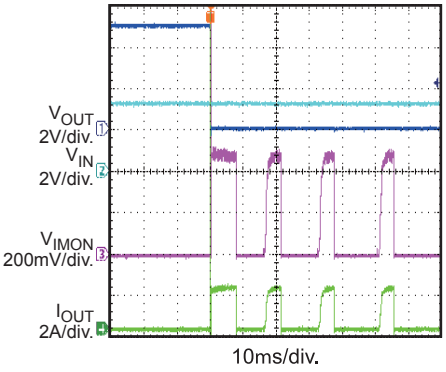
Load Transient Response

V_{IN} = 3.6V, V_{CC} = 3.6V, I_{OUT} = 0A-2.5A



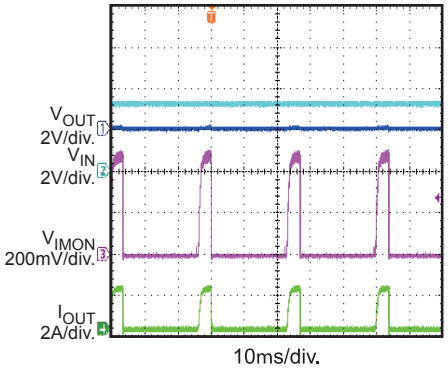
SCP Enter

V_{IN} = 5V, V_{CC} = 3.6V



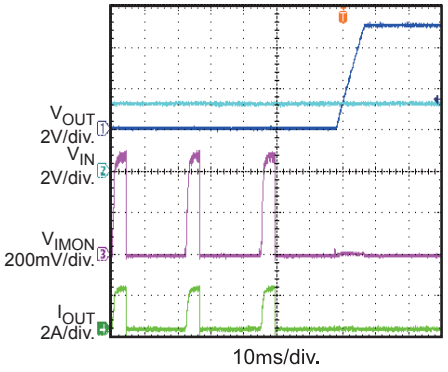
SCP Steady State

V_{IN} = 5V, V_{CC} = 3.6V



SCP Recovery

V_{IN} = 5V, V_{CC} = 3.6V



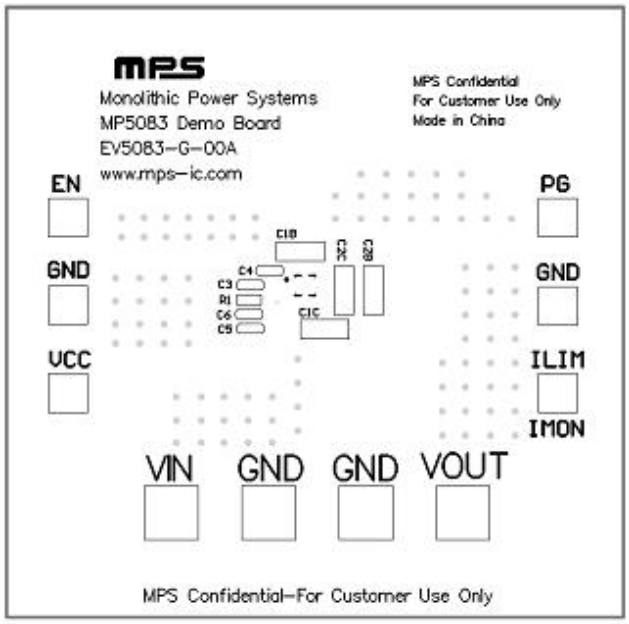


Figure1: Top Layer Silkscreen

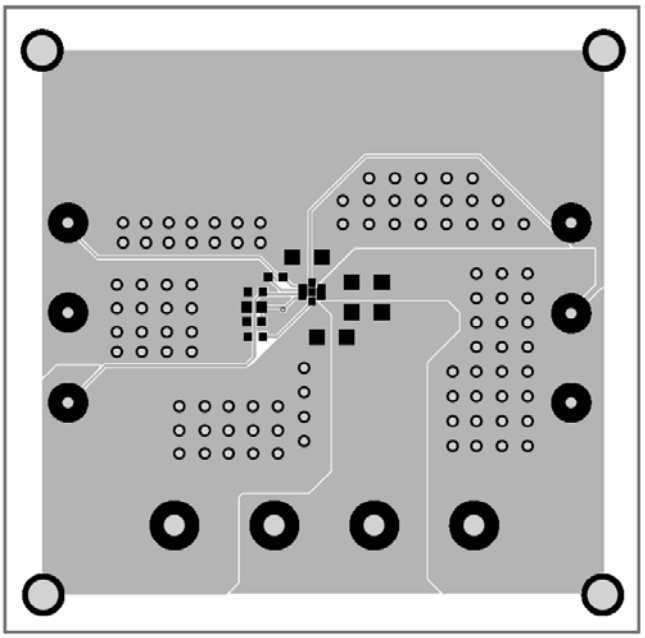


Figure2: Top Layer

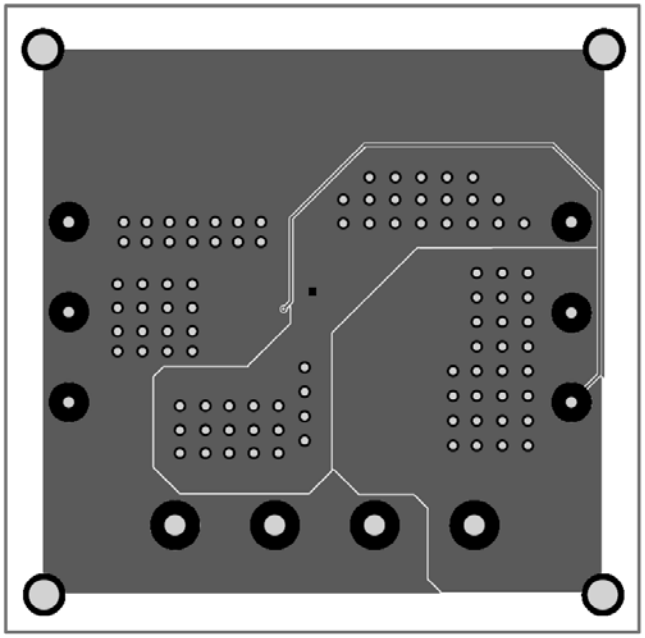


Figure3: Bottom Layer

QUICK START GUIDE

1. Connect the positive and negative terminals of the load to the V_{OUT} and GND pins, respectively.
2. Preset the power supply output between 0.8V and 5.5V, and then turn off the power supply.
3. Connect the positive and negative terminals of the power supply output to the V_{IN} and GND pins, respectively.
4. Follow the step 1-3 to set the Vcc voltage between 3V and 5.5V.
5. Turn the power supply on. The MP5083 will automatically startup.
6. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 1.5V to turn on the regulator or less than 1.3V to turn it off.
7. Use R1 to set the output current limit. C5 to set the SS time, Follow the Application Information section in the device datasheet to select appropriate R1, C5.