

### DESCRIPTION

The EV5077-G-00B is an evaluation board for the MP5077, a low R<sub>DS(ON)</sub> load switch with current limit.

The MP5077 provides up to 7A load protection over a 0.5V to 5.5V voltage range. With the small R<sub>DS(ON)</sub> in tiny package, MP5077 is a very high efficiency and space saving solution for notebooks, tablets, and other portable/battery-operated applications.

The max load at the output (source) is current limited. This is accomplished by utilizing a sense FET topology. The magnitude of the current limit is controlled by an external resistor from the ILIM pin to ground.

The EV board can deliver a continuous 7A load current over 0.8V-to-5.5V operating input range.

### ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage <sup>(1)</sup>	V <sub>IN</sub>	0.8-5.5	V
VCC Voltage	V <sub>CC</sub>	3-5.5	V
Output Current	I <sub>OUT</sub>	7	A

**Note:**

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

### FEATURES

- Integrated 10mΩ Low RDSON FETs
- Adjustable Start Up Slew Rate
- Wide VIN Range from 0.5V to 5.5V
- <1μA Shutdown Current
- Programmable 7A Current Limit Range
- Output Discharge Function
- Enable Pin
- <200ns Short-Circuit Protection Response Time
- Thermal Protection
- Small 2mmx2mm QFN Package for Space Saving

### APPLICATIONS

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

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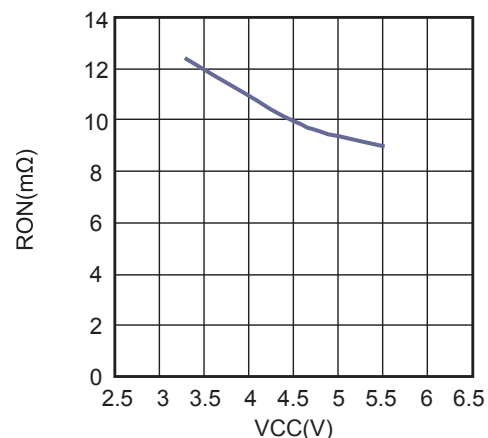
### EV5077-G-00B EVALUATION BOARD



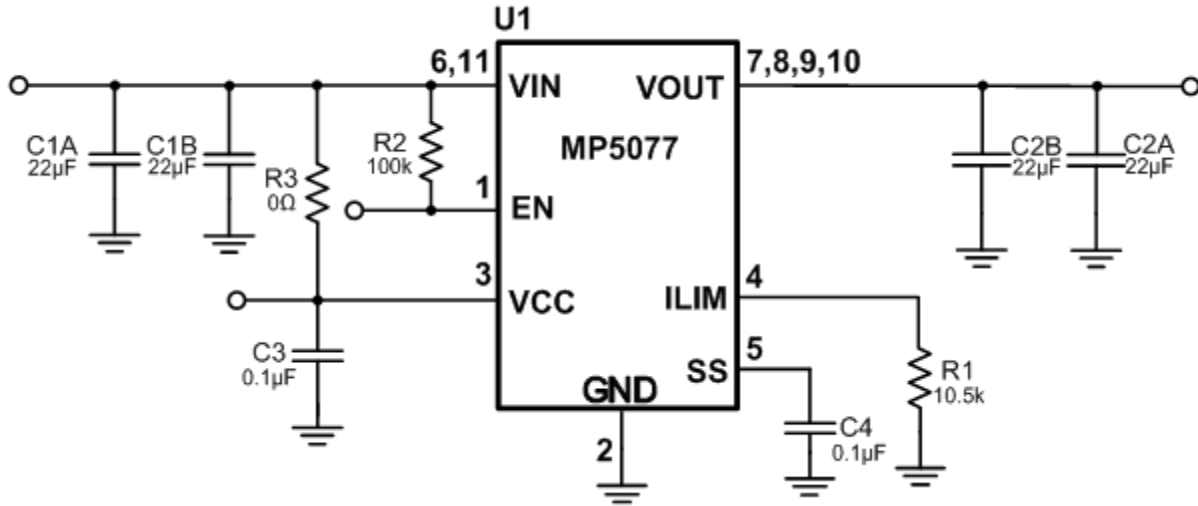
(L x W x H) 6.4cm x 6.4cm x 1.3cm

Board Number	MPS IC Number
EV5077-G-00B	MP5077GG

R<sub>ds\_on</sub> vs. V<sub>CC</sub>



## EVALUATION BOARD SCHEMATIC



## EV5077-G-00B BILL OF MATERIALS

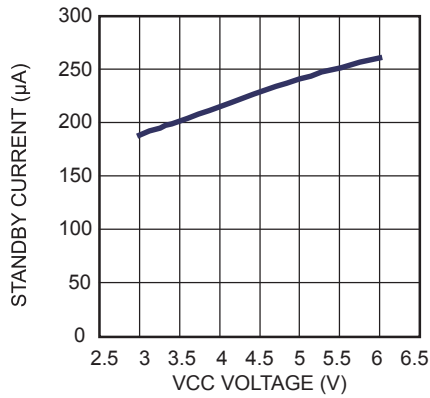
Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	R1	10.5kΩ	Film Res,1%	0603	ROYAL	RL0603FR-0710K5L
1	R2	100kΩ	Film Res,1%	0603	ROYAL	RL0603FR-07100KL
1	R3	0Ω	Film Res,1%	0603	ROYAL	RC0603FR-070RL
4	C1A,C1B, C2A,C2B	22µF	Ceramic Cap,10V,X5R	0805	muRata	GRM21BR61A226ME51L
2	C3,C4	0.1µF	Ceramic Cap,16V,X7R	0603	muRata	GRM188R71C104KA01D
1	U1	MP5077	7A Load Switch	QFN 2mmx2mm	MPS	MP5077GG

## EVB TEST RESULTS

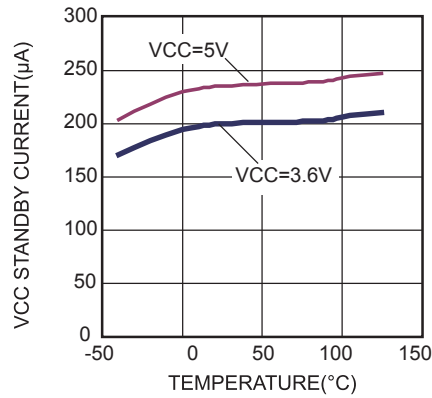
Performance waveforms are tested on the evaluation board.

$V_{IN} = 3.6V$ ,  $V_{CC} = 3.6V$ ,  $EN=2.5V$ ,  $R_{LIM} = 10.5k$ ,  $T_A = 25^\circ C$ , unless otherwise noted.

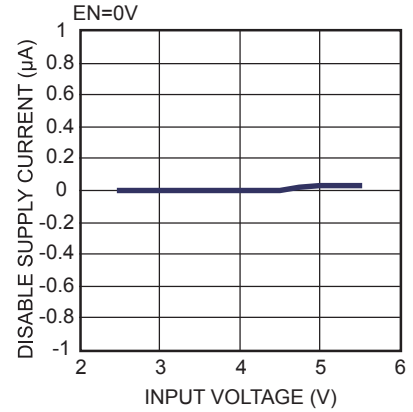
Vcc Standby Current vs. Vcc



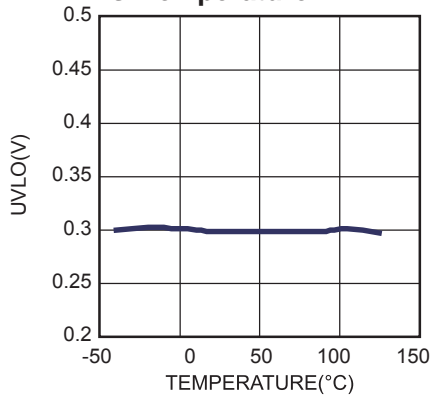
Vcc Standby Current vs. Temperature



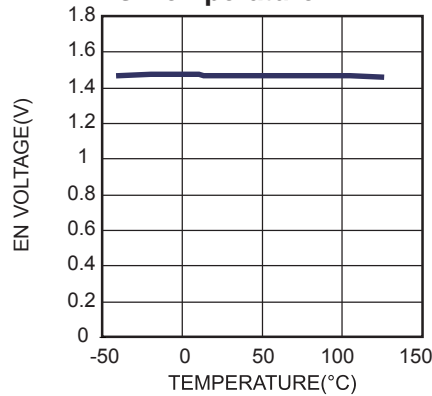
Disabled Supply Current vs. Input Voltage



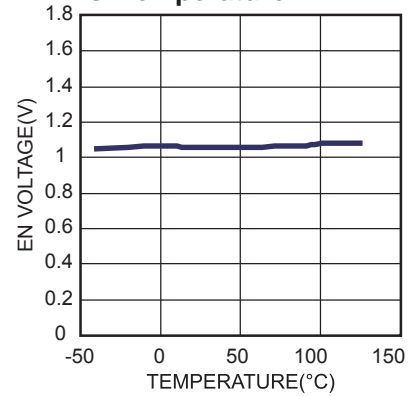
VIN UVLO Rising Threshold vs. Temperature



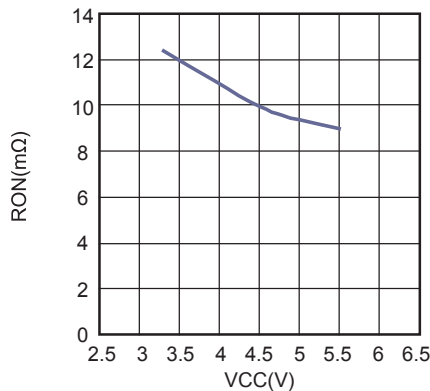
EN Rising Threshold vs. Temperature



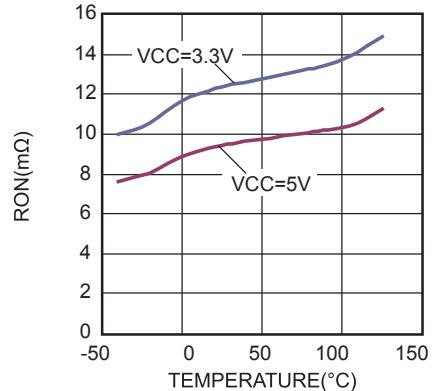
EN Falling Threshold vs. Temperature



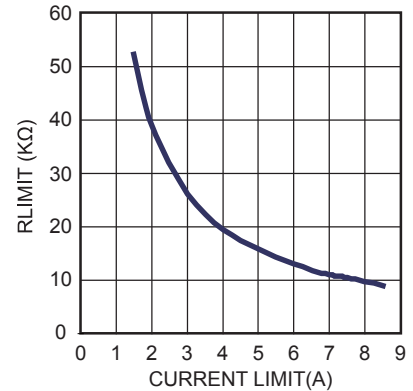
Rds\_on vs. Vcc



Rds\_on vs. Temperature



Current Limit vs Rlimit

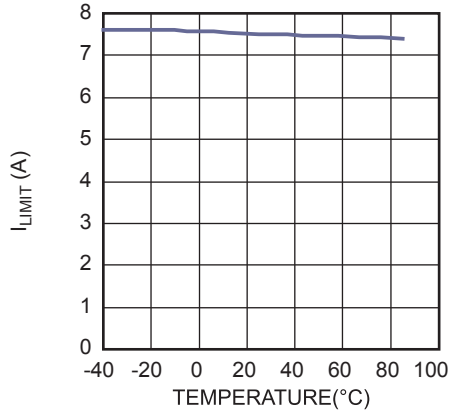


## EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.

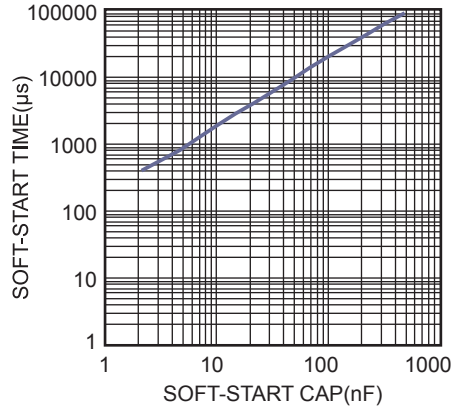
$V_{IN} = 3.6V$ ,  $V_{CC} = 3.6V$ ,  $EN=2.5V$ ,  $R_{LIM} = 10.5k$ ,  $T_A = 25^\circ C$ , unless otherwise noted.

**I<sub>LIMIT</sub> vs. Temperature**

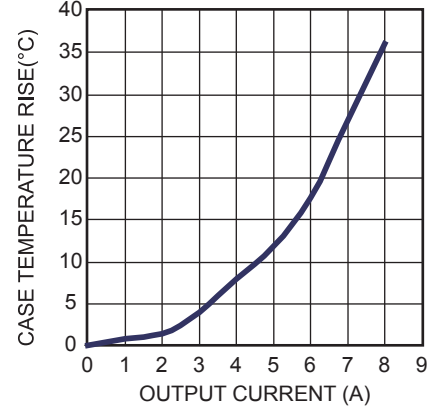


**Soft-Start vs.Cap**

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



**Case Temperature Rise vs. Output Current**



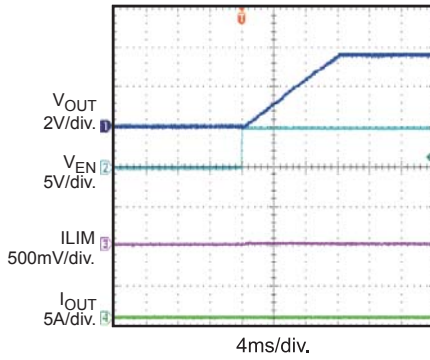
## EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.

$V_{IN} = 3.6V$ ,  $V_{CC} = 3.6V$ ,  $EN=2.5V$ ,  $R_{LIM} = 10.5k$ ,  $T_A = 25^\circ C$ , unless otherwise noted.

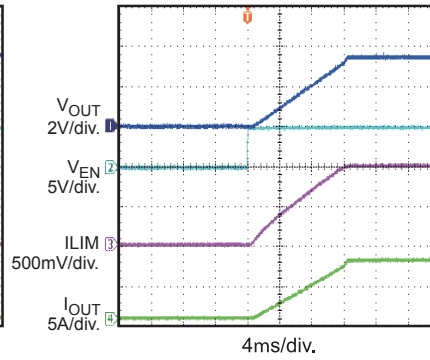
### Enable Startup

$V_{IN} = 3.6V$ ,  $V_{CC} = 3.6V$ , No Load



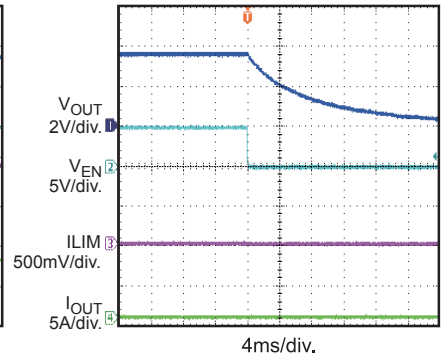
### Enable Startup

$V_{IN} = 3.6V$ ,  $V_{CC} = 3.6V$ , 7A Load



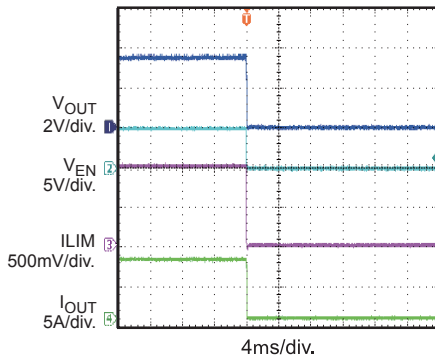
### Enable Shutdown

$V_{IN} = 3.6V$ ,  $V_{CC} = 3.6V$ , No Load



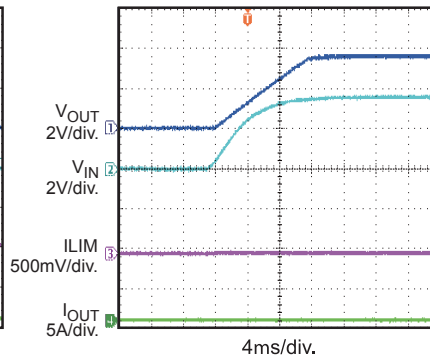
### Enable Shutdown

$V_{IN} = 3.6V$ ,  $V_{CC} = 3.6V$ , 7A Load



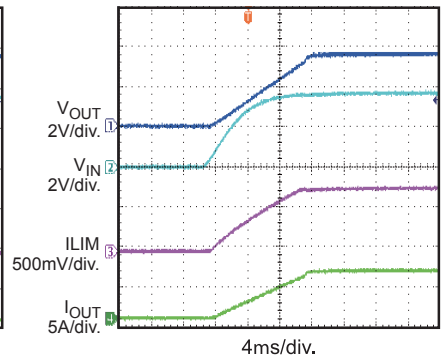
### Power Up

$V_{IN} = 3.6V$ ,  $V_{CC} = 3.6V$ , No Load



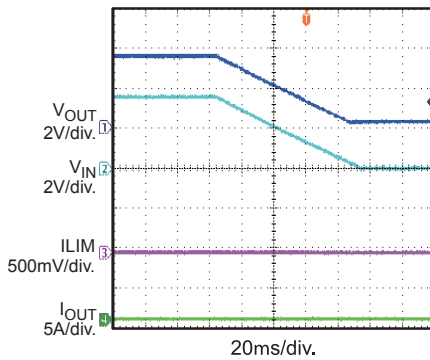
### Power Up

$V_{IN} = 3.6V$ ,  $V_{CC} = 3.6V$ , 7A Load



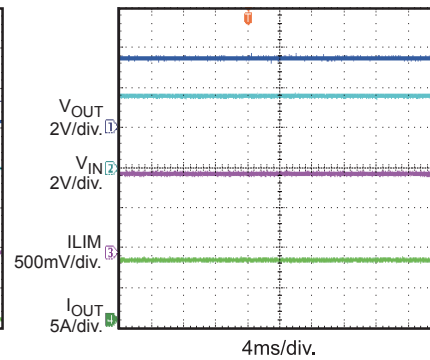
### Power Down

$V_{IN} = 3.6V$ ,  $V_{CC} = 3.6V$ , No Load



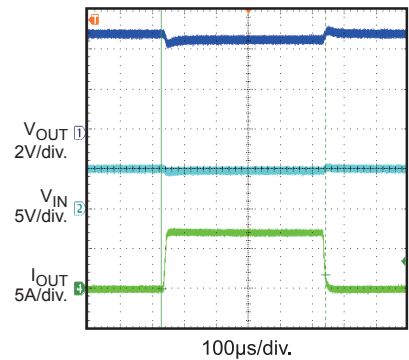
### Steady State

$V_{IN} = 3.6V$ ,  $V_{CC} = 3.6V$ , 7A Load



### Load Transient Response

$V_{IN} = 5V$ ,  $V_{CC} = 3.3V$ ,  $I_{OUT} = 0A-7A$



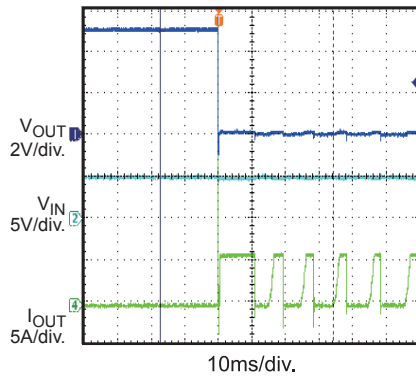
## EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.

$V_{IN} = 3.6V$ ,  $V_{CC} = 3.6V$ ,  $EN=2.5V$ ,  $R_{LIM} = 10.5k$ ,  $T_A = 25^{\circ}C$ , unless otherwise noted.

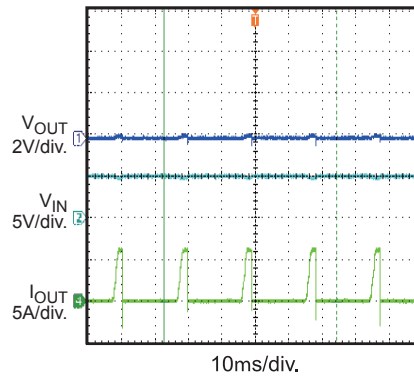
### SCP Enter

$V_{IN} = 5V$ ,  $V_{CC} = 3.3V$ ,  $R_{LIM} = 10.5k$



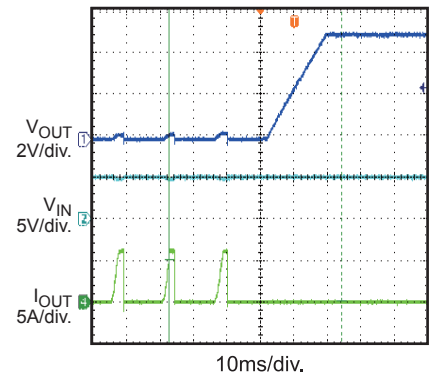
### SCP Steady State

$V_{IN} = 5V$ ,  $V_{CC} = 3.3V$ ,  $R_{LIM} = 10.5k$



### SCP Recover

$V_{IN} = 5V$ ,  $V_{CC} = 3.3V$ ,  $R_{LIM} = 10.5k$



## PRINTED CIRCUIT BOARD LAYOUT

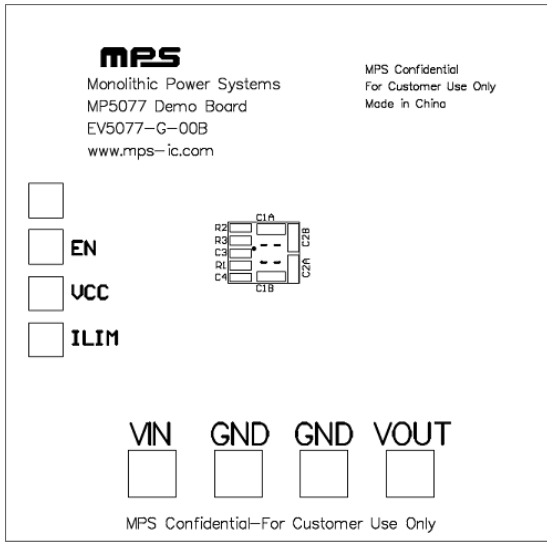


Figure1: Top Layer Silkscreen

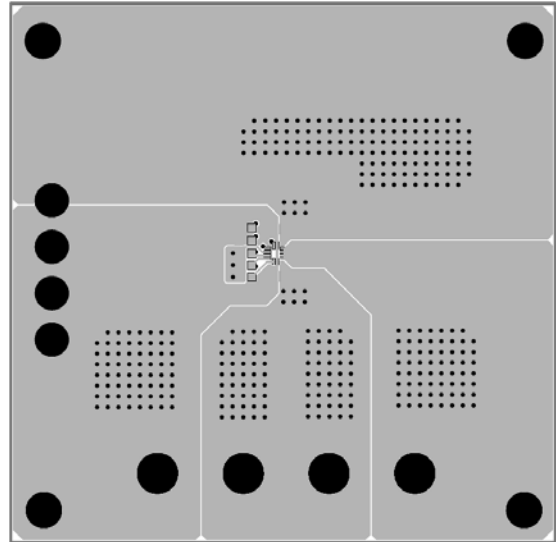


Figure2: Top Layer

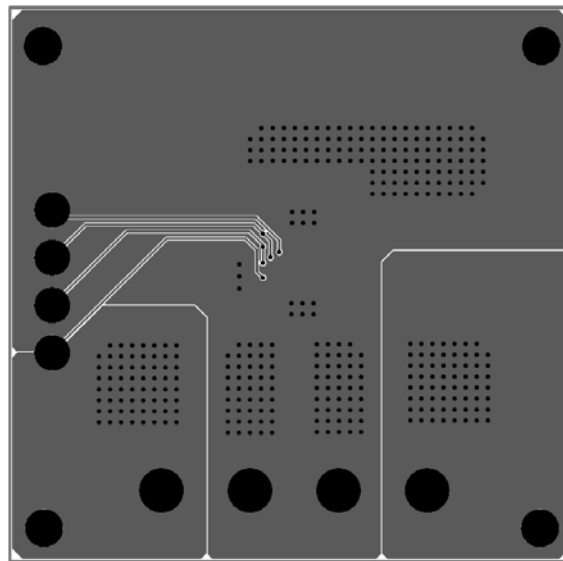


Figure3: Bottom Layer

## QUICK START GUIDE

1. Connect the positive and negative terminals of the load to the VOUT 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 VIN and GND pins, respectively.
4. Turn the power supply on. The MP5077 will automatically startup.
5. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 2.6V to turn on the regulator or less than 0.4V to turn it off.
6. Use R1 to set the output current limit. C4 to set the SS time, Follow the Application Information section in the device datasheet to select appropriate R1, C4.

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