EV5077-G-00A

5.5V, 7.5A Low R_{DSON} Load Switch With Programmable Current Limit

The Future of Analog IC Technology

DESCRIPTION

The EV5077-G-00A is an evaluation board for the MP5077, a low R_{DSON} load switch with current limit.

The MP5077 provides up to 7.5A load protection over a 0.5V to 5.5V voltage range. With the small RDSON 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 0.5V-to-5.5V operating input range.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	0.5-5.5	V
Output Voltage	V_{cc}	3-5.5	V
Output Current	I_{OUT}	7	A

FEATURES

- Integrated 10mΩ Low RDSON FETs
- Adjustable Start Up Slew Rate
- Wide VIN Range from 0.5V to 5.5V
- <1μA Shutdown Current
- Programmable 7.5A Current Limit Range
- Output Discharge Function
- Enable Pin
- <200ns Short-Circuit Protection Response Time
- Thermal Protection
- Small 2mmx2mm QFN Package for Space Saving

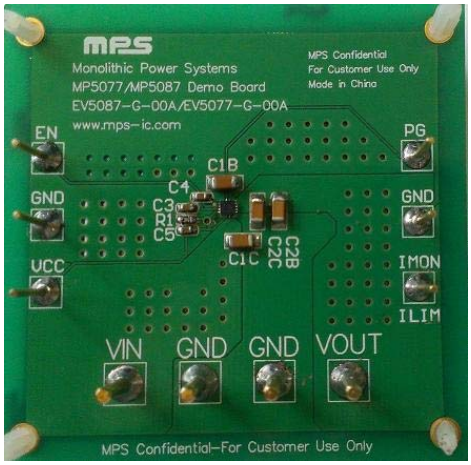
APPLICATIONS

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

All MPS parts are lead-free and adhere to the RoHS directive. For MPS green status, please visit MPS website under Products, Quality Assurance page.

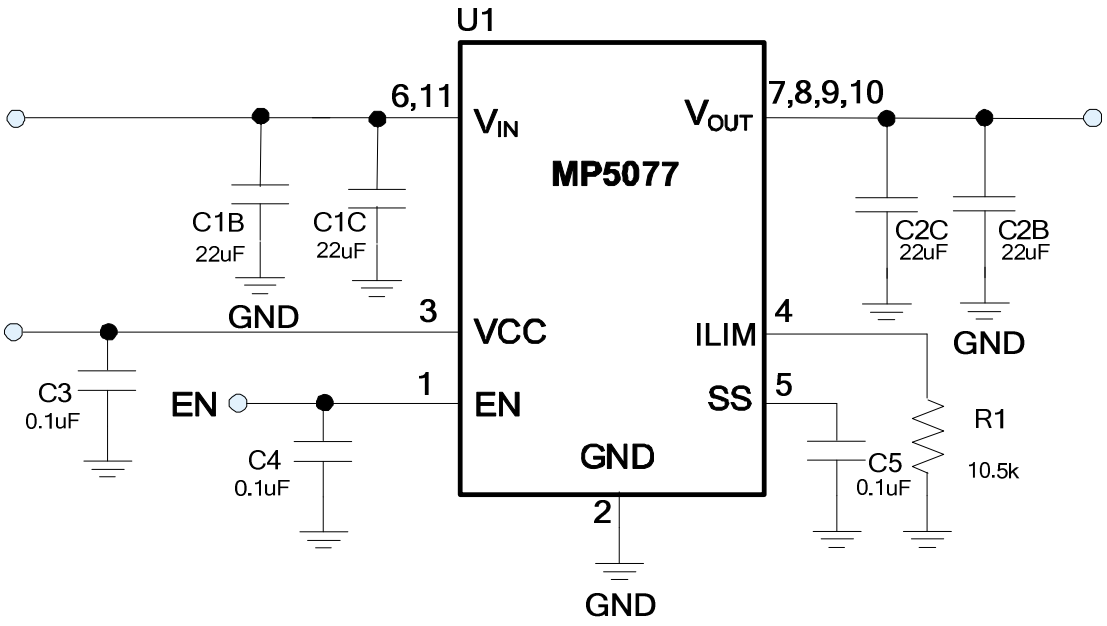
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TYPICAL APPLICATION



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EVALUATION BOARD SCHEMATIC



EV5077 BILL OF MATERIALS

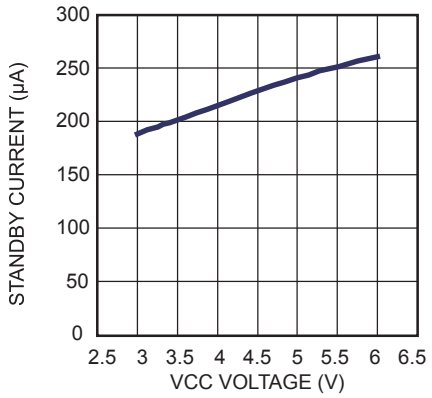
Qty	Ref	Value	Description	Package	Manufacturer	Part Number
4	C1B, C1C C2B, C2C	22µF	Ceramic Cap, 10V, X5R	1206	muRata	GRM31CR61A226ME19L
3	C3, C4, C5	0.1µF	Ceramic Cap, 16V, X7R	0603	muRata	GRM188R71C104KA01D
1	R1	10.5k	Film Res,1%	0603	ROYAL	RL0603FR-0710K5L
1	U1		7A Load Switch	QFN 2x2	MPS	MP5077

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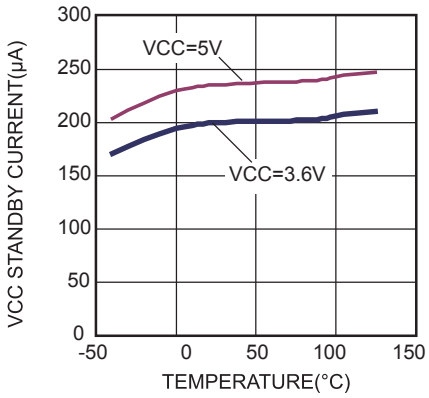
TYPICAL PERFORMANCE CHARACTERISTICS

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

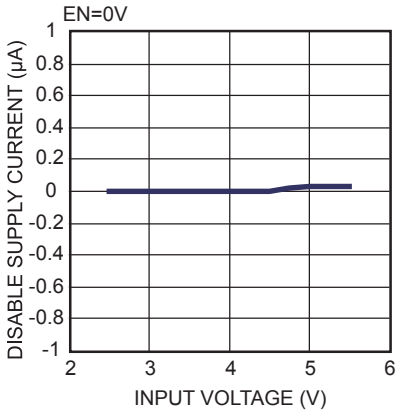
Vcc Standby Current vs. Vcc



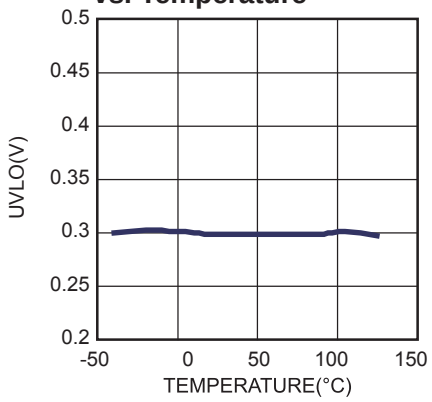
Vcc Standby Current vs. Temperature



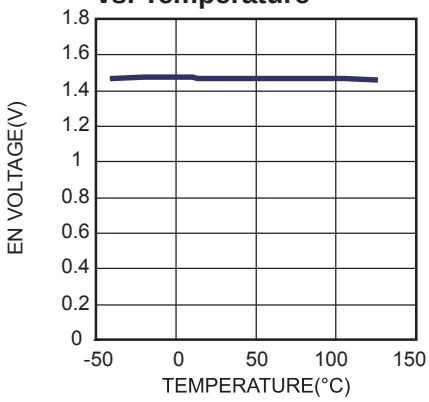
Disabled Supply Current vs. Input Voltage



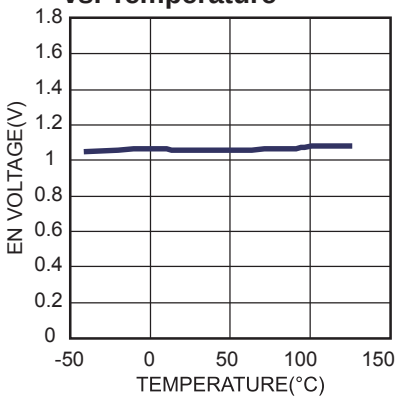
VIN UVLO Rising Threshold vs. Temperature



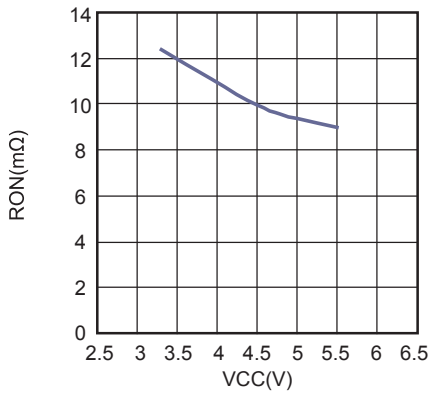
EN Rising Threshold vs. Temperature



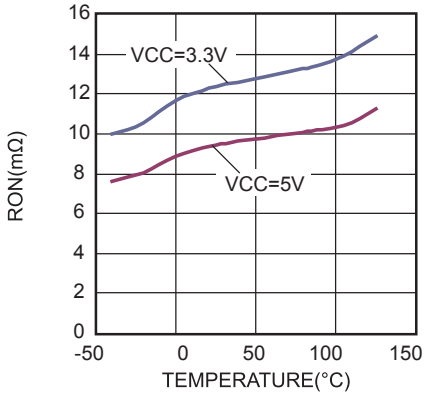
EN Falling Threshold vs. Temperature



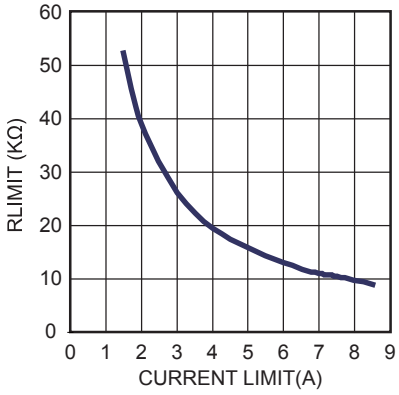
Rds_on vs.Vcc



Rds_on vs. Temperature



Current Limit vs Rlimit

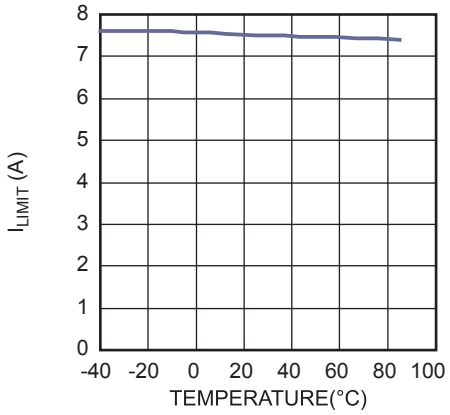


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TYPICAL PERFORMANCE CHARACTERISTICS *(continued)*

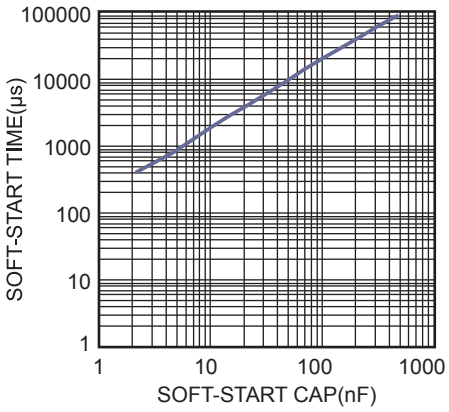
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Ilimit vs. Temperature

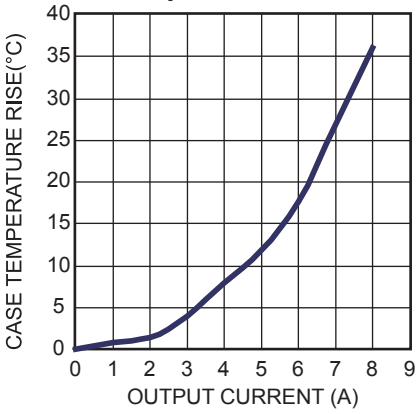


Soft-Start vs.Cap

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



Case Temperature Rise vs. Output Current

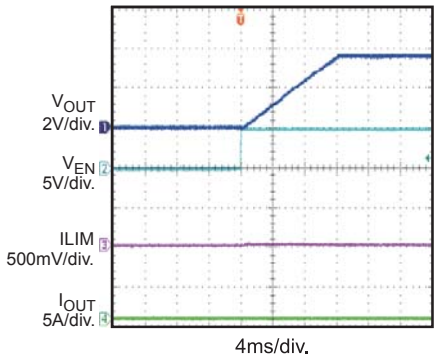


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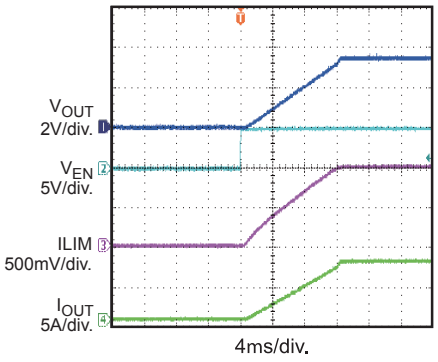
TYPICAL PERFORMANCE CHARACTERISTICS *(continued)*

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

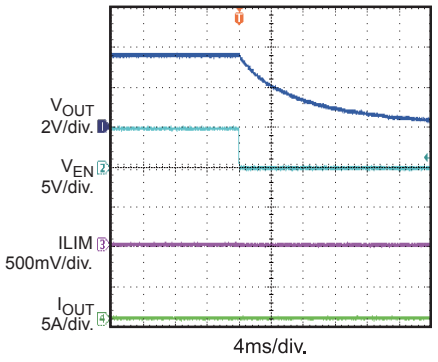
Enable Startup
V_{IN} =3.6V, V_{CC}=3.6V, No Load



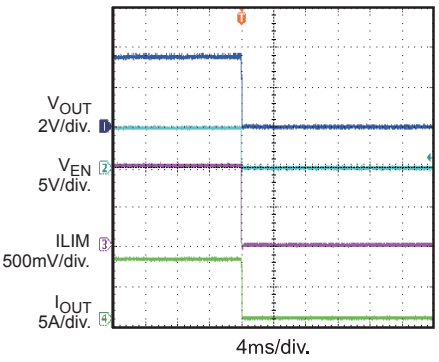
Enable Startup
V_{IN} =3.6V, V_{CC}=3.6V, 7A Load



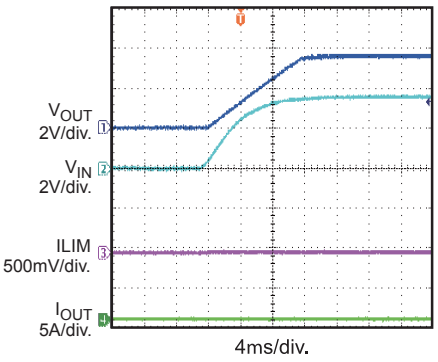
Enable Shutdown
V_{IN} =3.6V, V_{CC}=3.6V, No Load



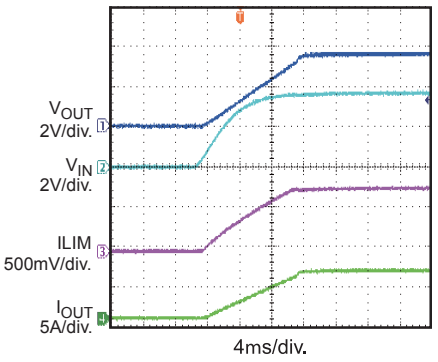
Enable Shutdown
V_{IN} =3.6V, V_{CC}=3.6V, 7A Load



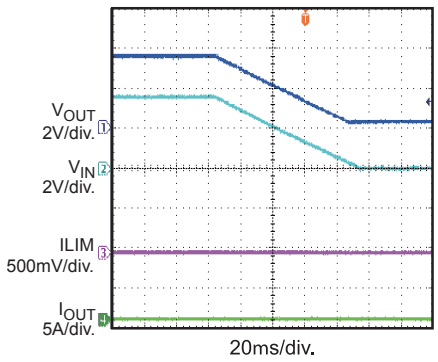
Power Up
V_{IN} =3.6V, V_{CC}=3.6V, No Load



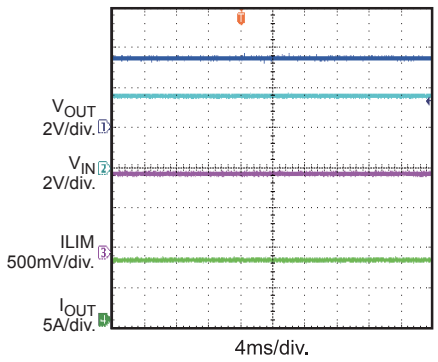
Power Up
V_{IN} =3.6V, V_{CC}=3.6V, 7A Load



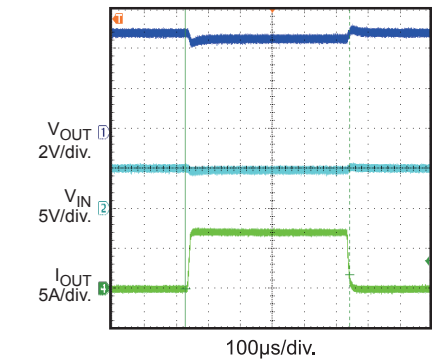
Power Down
V_{IN} =3.6V, V_{CC}=3.6V, No Load



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



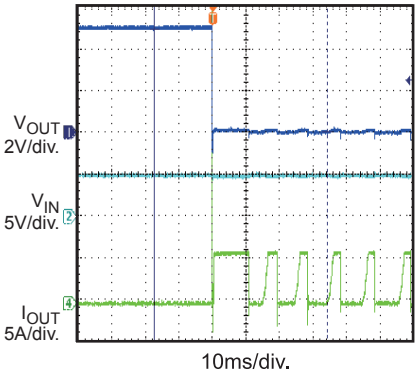
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TYPICAL PERFORMANCE CHARACTERISTICS *(continued)*

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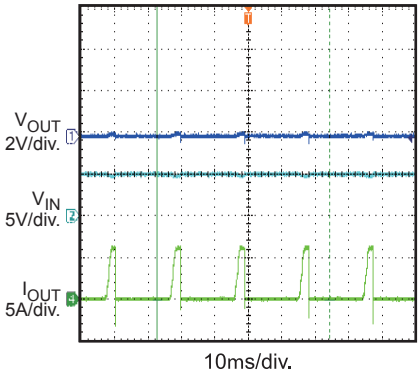
SCP Enter

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



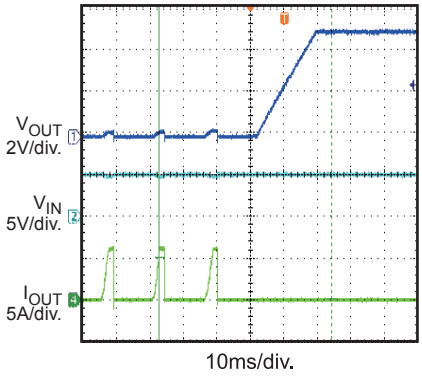
SCP Steady State

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



SCP Recover

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



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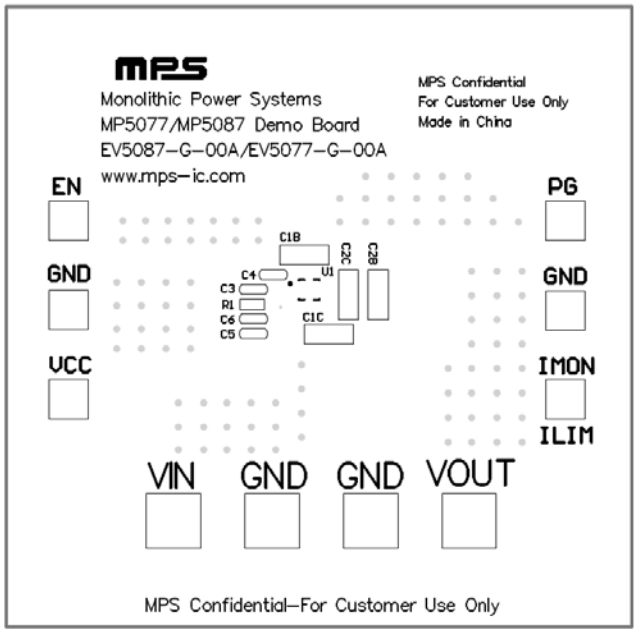


Figure1: Top Layer Silkscreen

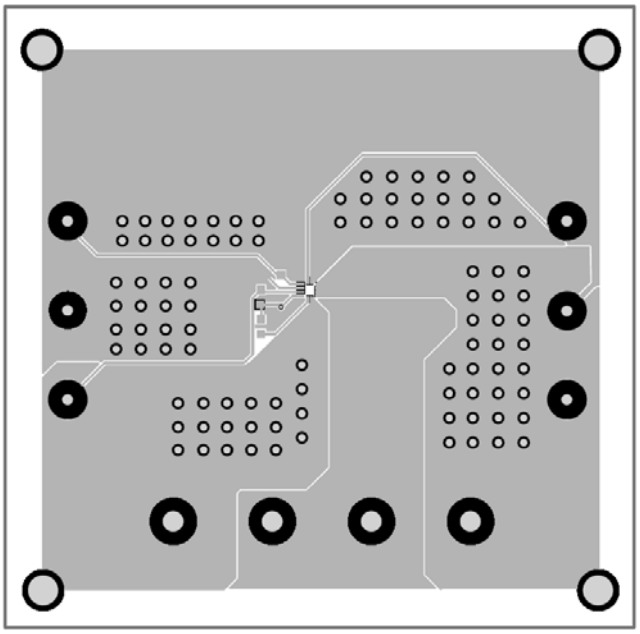


Figure2: Top Layer

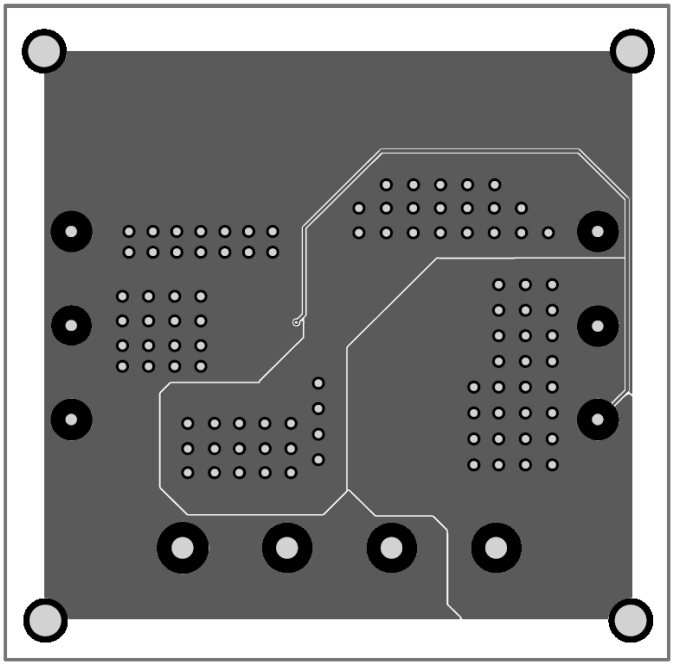


Figure3: Bottom Layer

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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 0.5V 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. Follow the step 1-3 to set the Vcc voltage between 3V and 5.5V.
5. Turn the power supply on. The MP5077 will automatically startup.
6. 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.
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.

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