EVQ5073-G-00A

5.5V, 2A, Programmable Current, Low $R_{DS(ON)}$ Load Switch, AEC-Q100 Qualified Evaluation Board

DESCRIPTION

The EVQ5073-G-00A is an evaluation board for the MPQ5073, a low $R_{DS(ON)}$ load switch with current limit. The MPQ5073 is a load switch that provides 2A of load protection, covering a 0.5V to 5.5V voltage range. With a small $R_{DS(ON)}$ in a tiny package, the MPQ5073 provides a highly efficient, space-saving solution in notebook, tablet, and other portable device 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 EVQ5073-G-00A board can deliver a continuous 2A load current across a 0.5V to 5.5V operating input range.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input voltage (1)	V_{IN}	3 to 5.5	V
Output voltage	V_{OUT}	3 to 5.5	V
Output current	I_{OUT}	2	A

Note:

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

FEATURES

- Integrated 50mΩ Low $R_{DS(ON)}$ FETs
- Adjustable Start-Up Slew Rate
- Wide V_{IN} Range: 0.5V to 5.5V
- <1μA Shutdown Current
- Programmable 2.5A Current Limit Range
- Power Good Indicator
- Output Discharge function
- Enable Pin
- <200ns Short-Circuit Protection Response Time
- Thermal Protection
- Available in a Small, Space-Saving QFN-12 (2mmx2mm) Package

APPLICATIONS

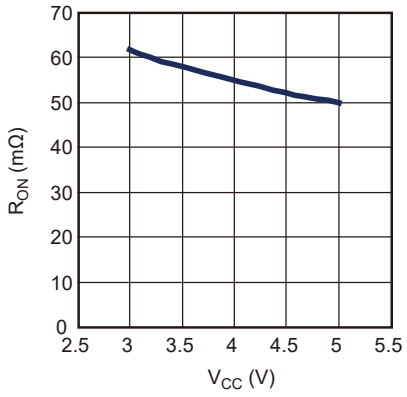
- Notebook and Tablet Computers
- Portable Devices
- Solid State Drives (SSDs)
- Handheld Devices

EVQ5073-G-00A EVALUATION BOARD

(LxWxH) 6.4cmx6.4cmx1.3cm

Board Number	MPS IC Number
EVQ5073-G-00A	MPQ5073GG

R_{ON} vs. V_{CC}



QUICK START GUIDE

1. Connect the load terminals to:
   a. Positive (+): VOUT
   b. Negative (-): GND
2. Preset the power supply output between 3V to 5.5V, then turn off the power supply.
3. Connect the power supply output terminals to:
   a. Positive (+): VIN
   b. Negative (-): GND
4. Turn the power supply on. The board should automatically start up.
5. To use the enable function, apply a digital input to the EN pin. Drive EN above 2.6V to turn the regulator on; drive it below 0.4V to turn it off.
6. Use R1 to set the output current limit. Use C4 to set the soft-start time. Refer to the Application Information section MPQ5073's datasheet to select appropriate values for R1 and C4.

EVALUATION BOARD SCHEMATIC

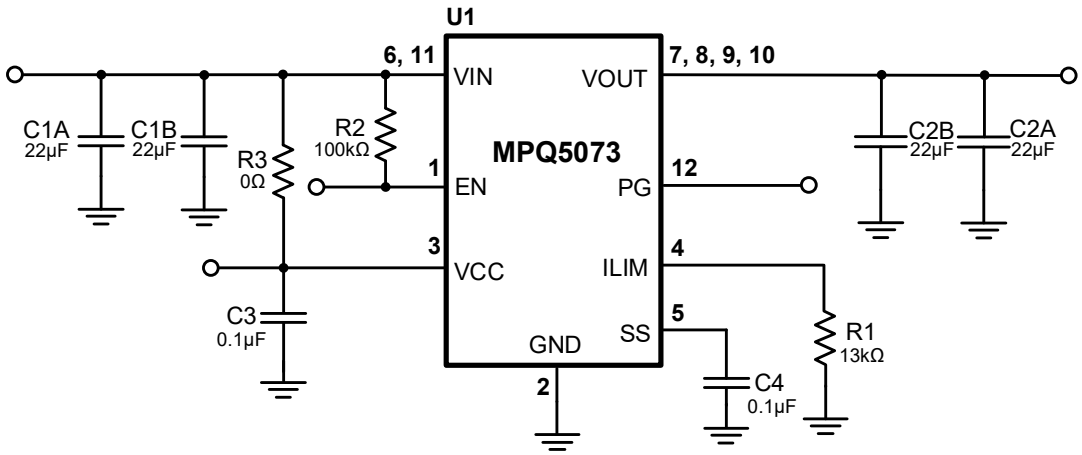


Figure 1: Evaluation Board Schematic

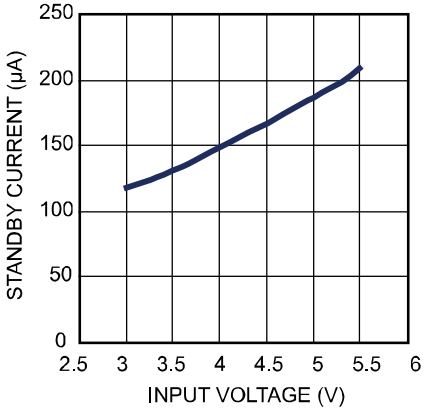
EVQ5073-G-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	R1	13kΩ	Film resistor, 1%	0603	Royal Ohm	RL0603FR-0713KL
1	R2	100kΩ	Film resistor, 1%	0603	Royal Ohm	RL0603FR-07100KL
1	R3	0Ω	Film resistor, 1%	0603	Royal Ohm	RC0603FR-070RL
4	C1A, C1B, C2A, C2B	22 µ F	Ceramic capacitor, 10V, X5R	0805	Murata	GRM21BR61A226ME51L
2	C3,C4	0.1µF	Ceramic capacitor, 16V, X7R	0603	Murata	GRM188R71C104KA01D
1	U1	MPQ5073	2A load switch	QFN-12 (2mmx2mm)	MPS	MPQ5073GG

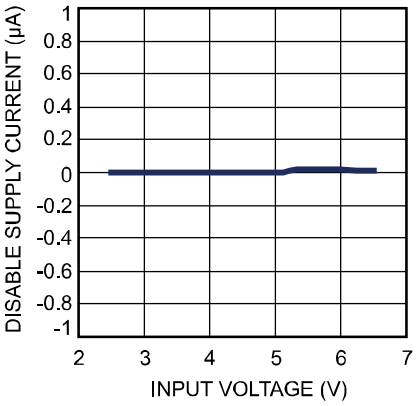
EVB TEST RESULTS

Performance waveforms are tested on the evaluation board. V_{IN} = 3.6V, V_{CC} = 3.6V, EN = 2.5V, R_{LIM} = 13kΩ, T_A = 25°C, unless otherwise noted.

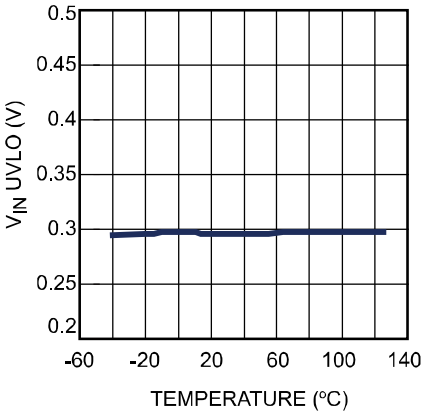
Quiescent Current



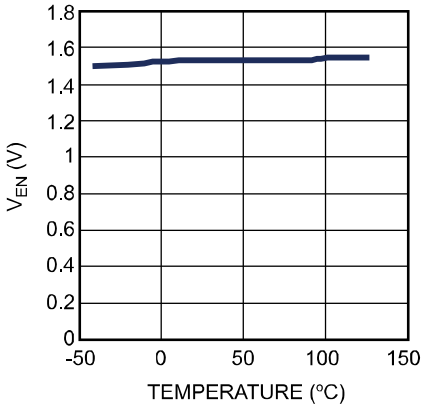
Disabled Supply Current vs. Input Voltage



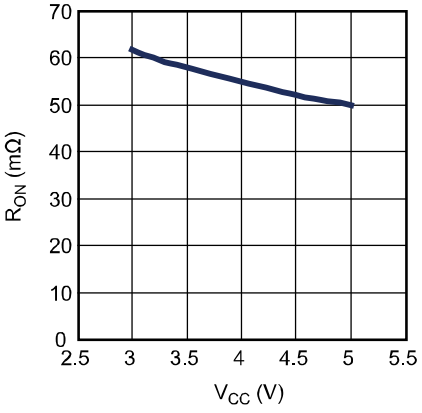
V_{IN} UVLO vs. Temperature



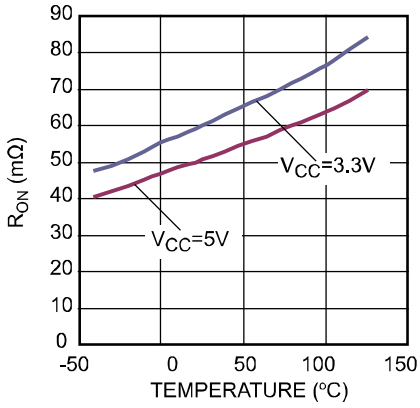
EN Rising Threshold vs. Temperature



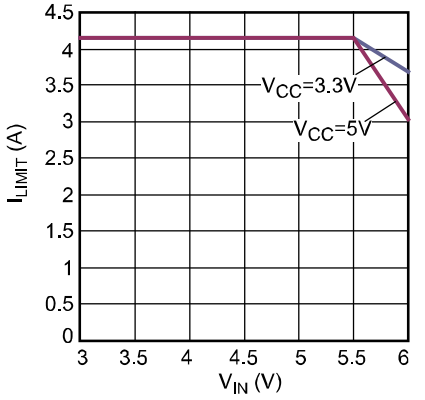
R_{ON} vs. V_{CC}



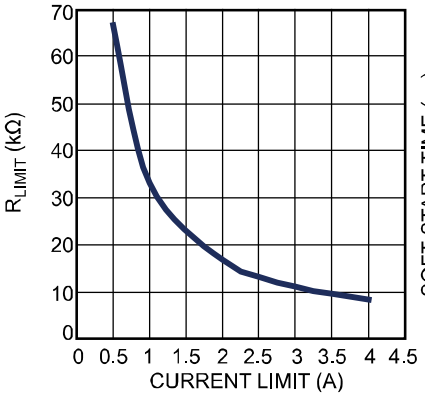
R_{ON} vs. Temperature



Maximum Current Limit vs.V_{IN}

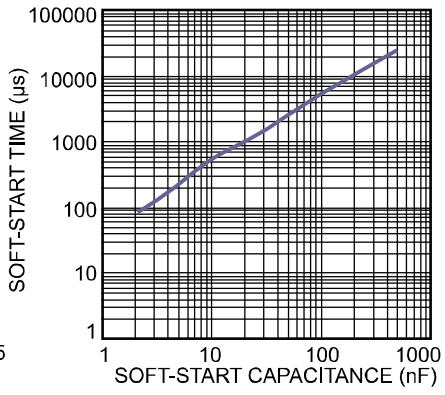


R_{LIMIT} vs. Current Limit



Soft-Start Time vs. Soft-Start Capacitance

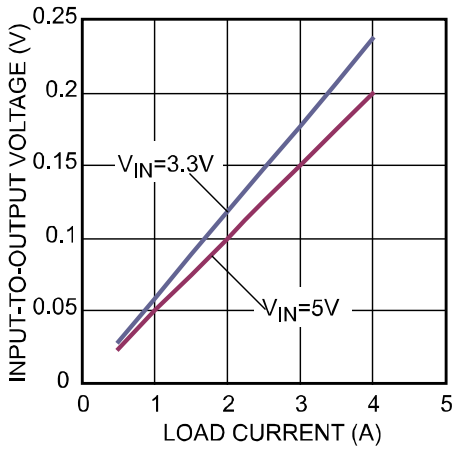
V_{IN} = 3.6V



EVB TEST RESULTS *(continued)*

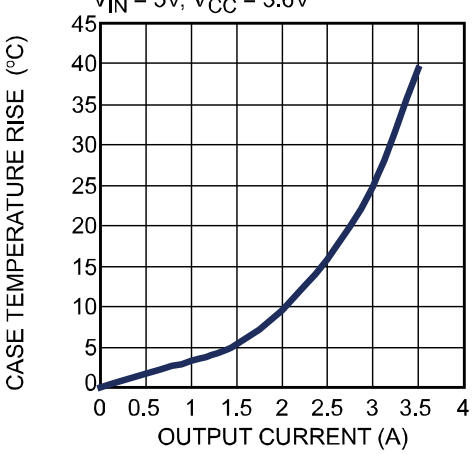
Performance waveforms are tested on the evaluation board. V_{IN} = 3.6V, V_{CC} = 3.6V, EN = 2.5V, R_{LIM} = 13kΩ, T_A = 25°C, unless otherwise noted.

Input-to-Output Voltage vs. Load Current



Case Temperature Rise vs. Output Current

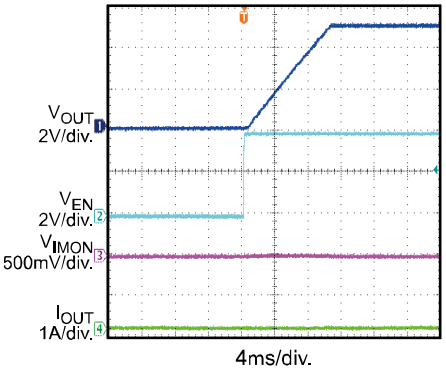
V_{IN} = 5V, V_{CC} = 3.6V



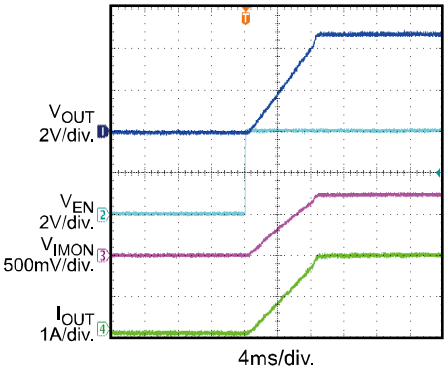
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board. V_{IN} = 3.6V, V_{CC} = 3.6V, EN = 2.5V, R_{LIM} = 13kΩ, T_A = 25°C, unless otherwise noted.

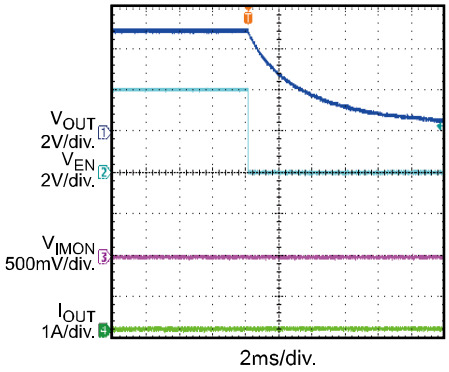
Start-Up through EN
V_{IN} = 5V, V_{CC} = 3.6V, no load



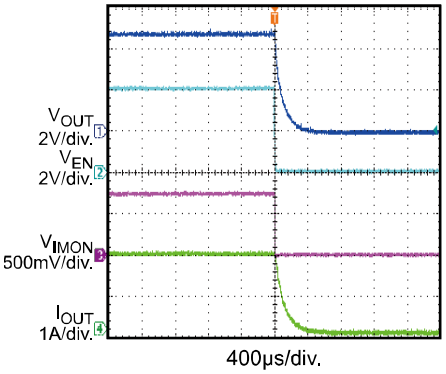
Start-Up through EN
V_{IN} = 5V, V_{CC} = 3.6V, 2A load



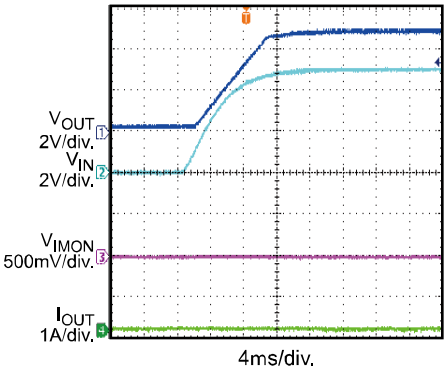
Shutdown through EN
V_{IN} = 5V, V_{CC} = 3.6V, no load



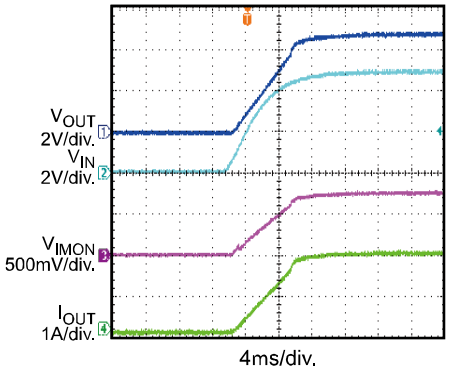
Shutdown through EN
V_{IN} = 5V, V_{CC} = 3.6V, 2A load



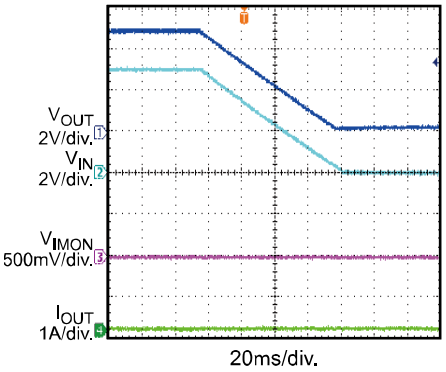
Start-Up
V_{IN} = 5V, V_{CC} = 3.6V, I_{OUT} = 0A



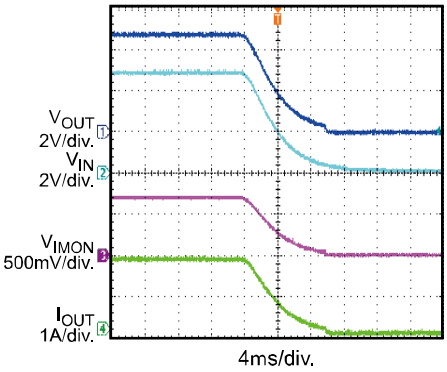
Start-Up
V_{IN} = 5V, V_{CC} = 3.6V, I_{OUT} = 2A



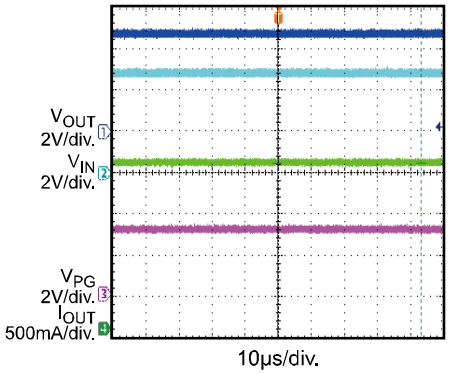
Shutdown
V_{IN} = 5V, V_{CC} = 3.6V, I_{OUT} = 0A



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



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

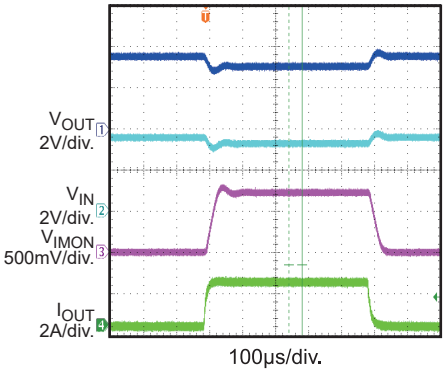


EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board. V_{IN} = 3.6V, V_{CC} = 3.6V, EN = 2.5V, R_{LIM} = 13kΩ, T_A = 25°C, unless otherwise noted.

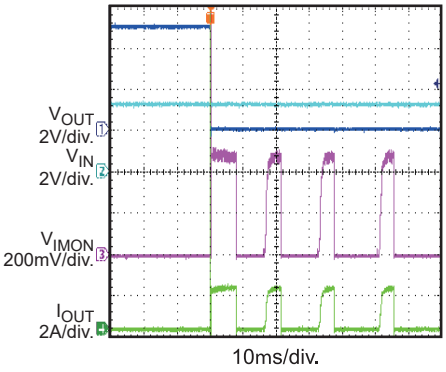
Load Transient Response

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



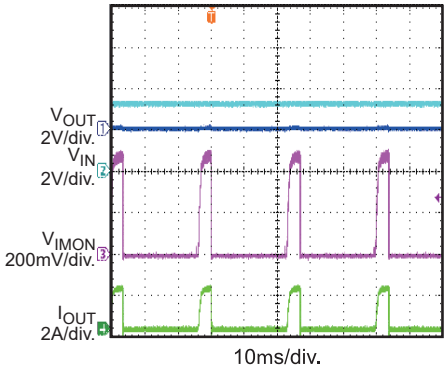
SCP Entry

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



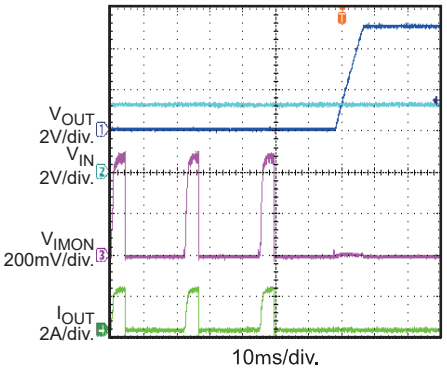
SCP Steady State

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



SCP Recovery

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



PCB LAYOUT

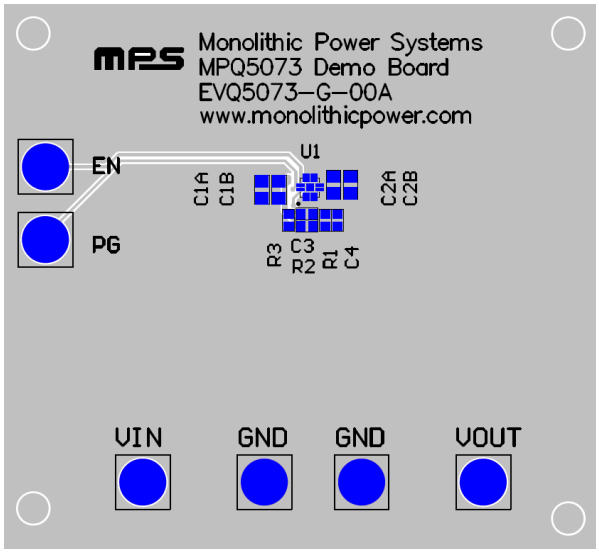


Figure 2: Top Silk Layer

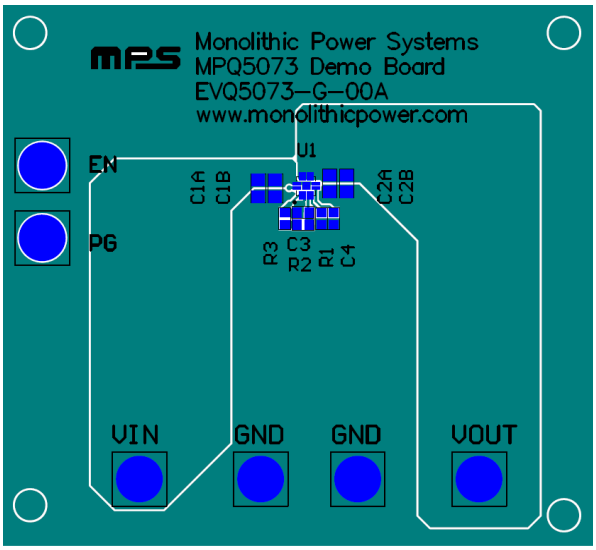


Figure 3: Top Layer

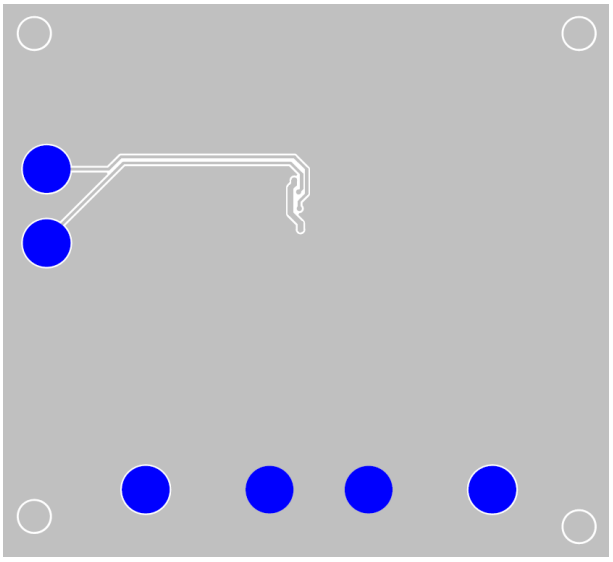


Figure 4: Bottom Layer

REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	2/25/2021	Initial Release	-