EVM3612-33-LQ-00A

3V to 22V, Input, 1A, Ultra-Low 5µA I_Q, Power Module Evaluation Board

DESCRIPTION

The EVM3612-33-LQ-00A evaluation board is designed to demonstrate the capabilities of the MPM3612-33, a synchronous, rectified, step-down, switch-mode converter with built-in internal power MOSFETs and high light-load efficiency. The MPM3612-33 has an ultra-low 5µA I_Q. The MPM3612-33 offers a very compact solution that achieves 1A of continuous output current, with excellent load and line regulation across a wide input supply range.

The MPM3612-33 switching edge is optimized for EMI reduction. Constant-on-time (COT) control provides seamless mode transition and a fast load transient response. Full protection features include over-current protection (OCP), over-voltage protection (OVP), and thermal shutdown.

The MPM3612-33 requires a minimal number of readily available, standard external components, and is available in a space-saving LGA (3mmx3mmx2mm) package.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input voltage	V_{IN}	12	V
Output voltage	V_{OUT}	3.3	V
Output current	I_{OUT}	1	A

FEATURES

- Wide 3V to 22V Operating Input Range
- 5µA Low I_Q
- 1A Load Current
- High Efficiency from 100µA to 1A Load within a 4V to 22V V_{IN} Range
- Power-Save Mode (PSM)
- 1.25MHz Fixed Switching Frequency during CCM
- t_{ON} Extension to Support Large Duty Cycles
- Power Good (PG) Indication
- EN Shutdown Output Discharge
- Over-Current Protection (OCP), Over-Voltage Protection (OVP), and Hiccup Mode
- Fixed V_{OUT}
- Available in an LGA (3mmx3mmx2mm) Package

APPLICATIONS

- Internet of Things (IoT)
- Home Automation, Home Security
- Single-Cell or Multi-Cell Li-Ion Battery Systems
- Multi-Cell Dry Battery Systems
- Server Power

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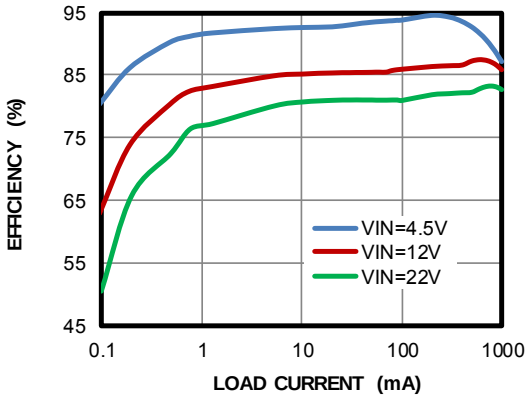
EVALUATION BOARD

(LxWxH) 64mmx64mmx1.6mm

Board Number	MPS IC Number
EVM3612-33-LQ-00A	MPM3612GLQ-33

Efficiency vs. Load Current

V_{OUT} = 3.3V



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QUICK START GUIDE

1. Preset the power supply (V_{IN}) between 3V and 22V.
2. Turn the power supply off.
3. Connect the power supply terminals to:
   a. Positive (+): VIN
   b. Negative (-): GND
4. Connect the load to:
   a. Positive (+): VOUT
   b. Negative (-): GND
5. Turn the power supply on after making the conditions. The board should automatically start up.

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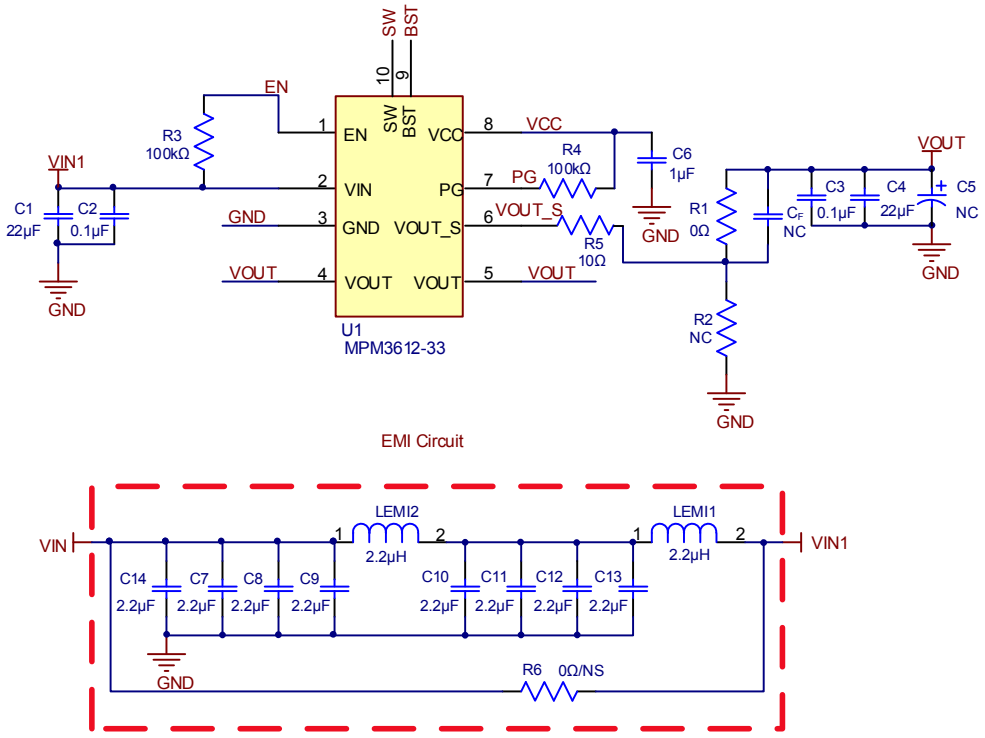
EVALUATION BOARD SCHEMATIC



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BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
2	C2, C3	100nF	Ceramic capacitor, 25V, X7R	0603	Murata	GRM188R71E104KA01D
2	C1, C4	22µF	Ceramic capacitor, 25V, X5R	0805	SAMSUNG	CL21A226MAQNNNE
1	C6	1µF	Ceramic capacitor, 25V, X5R	0402	Murata	GRM155R61E105KA12D
1	R1	0Ω	Film resistor, 1%, 0Ω	0402	YAGEO	RC0402FR-070RL
1	R3	100kΩ	Film resistor, 1%, 100kΩ	0402	YAGEO	RC0402FR-07100KL
1	R4	100kΩ	Film resistor, 1%, 100kΩ	0402	YAGEO	RC0402FR-07100KL
1	R5	10Ω	Film resistor, 1%, 10Ω	0402	YAGEO	RC0402FR-0710RL

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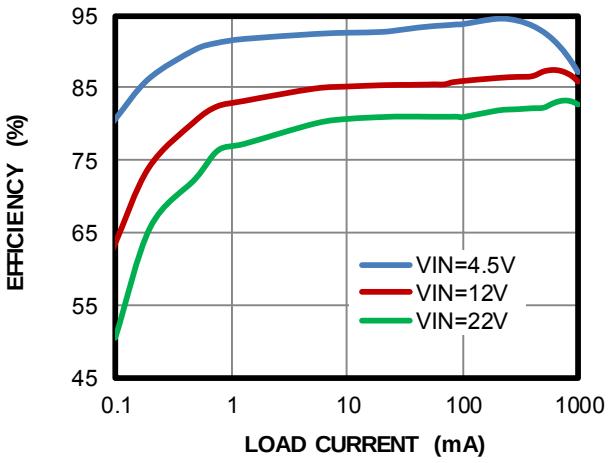
EVB TEST RESULTS

Performance waveforms are tested on the evaluation board. V_{IN} = 12V, V_{OUT} = 3.3V, T_A = 25°C, unless otherwise noted.

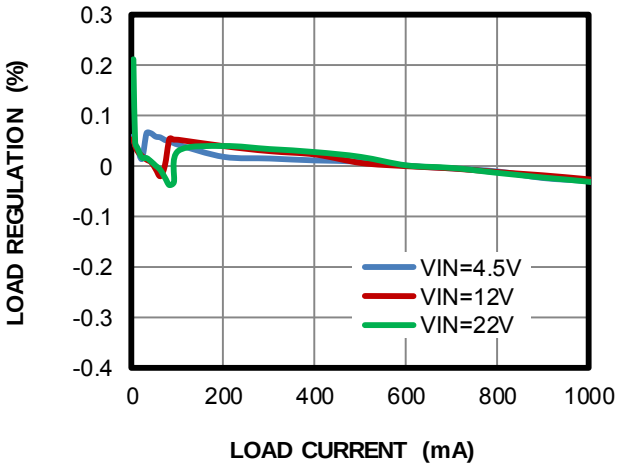
Efficiency vs. Load Current

V_{OUT} = 3.3V



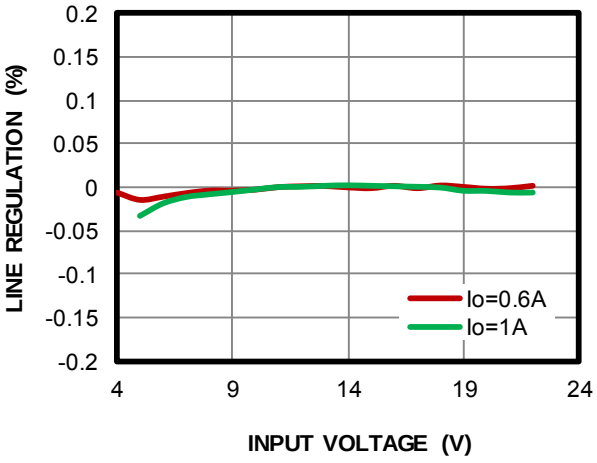
Load Regulation vs. Load Current

V_{OUT} = 3.3V



Line Regulation vs. Load Current

V_{OUT} = 3.3V



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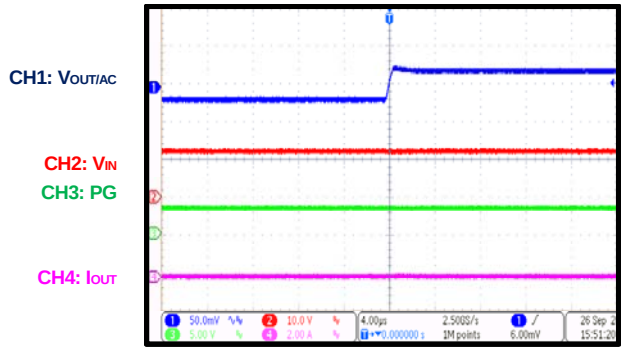
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board. V_{IN} = 12V, V_{OUT} = 3.3V, T_A = 25°C, unless otherwise noted.

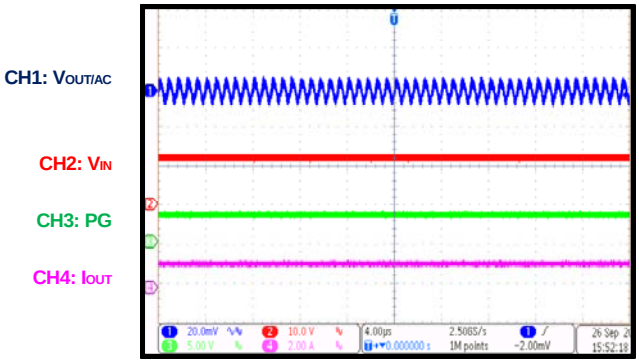
Steady State

V_{IN} = 12V, V_{OUT} = 3.3V, I_{OUT} = 0A



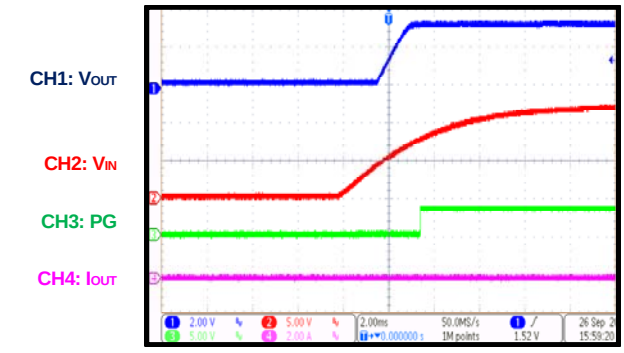
Steady State

V_{IN} = 12V, V_{OUT} = 3.3V, I_{OUT} = 1A



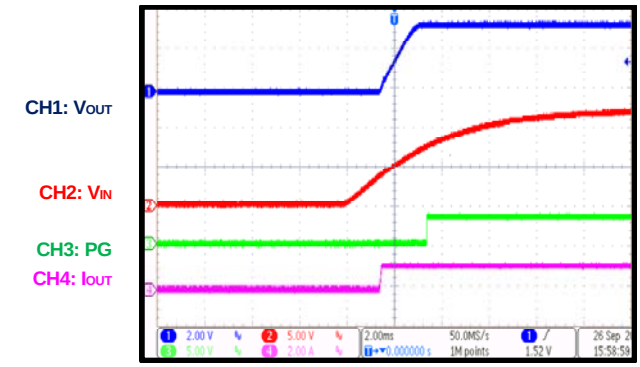
VIN On

V_{IN} = 12V, V_{OUT} = 3.3V, I_{OUT} = 0A



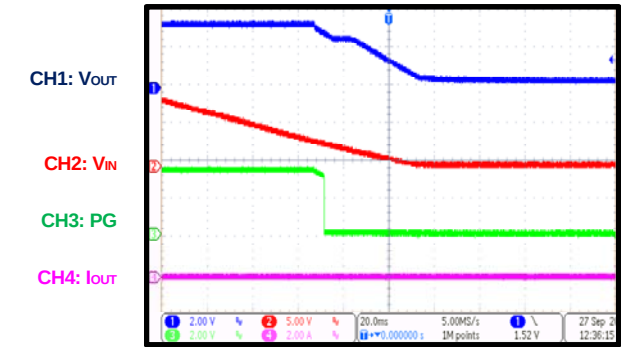
VIN On

V_{IN} = 12V, V_{OUT} = 3.3V, I_{OUT} = 1A



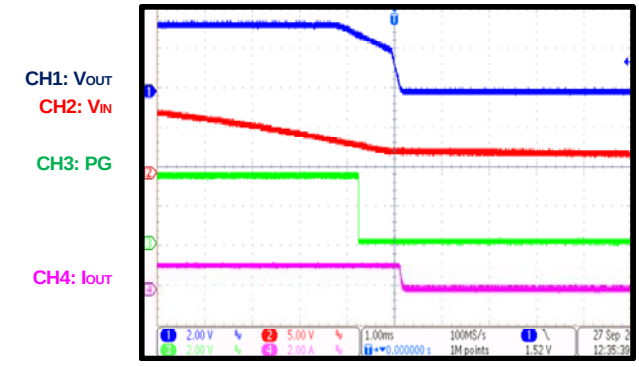
VIN Off

V_{IN} = 12V, V_{OUT} = 3.3V, I_{OUT} = 0A



VIN Off

V_{IN} = 12V, V_{OUT} = 3.3V, I_{OUT} = 1A



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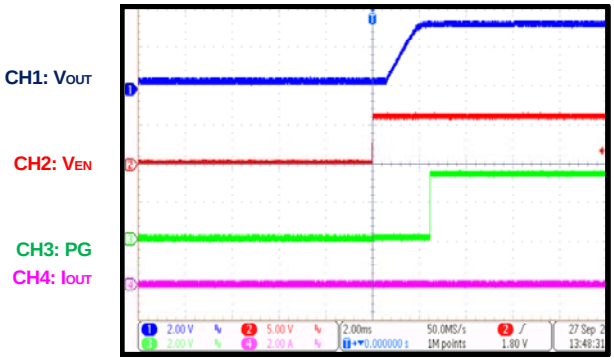
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board. V_{IN} = 12V, V_{OUT} = 3.3V, T_A = 25°C, unless otherwise noted.

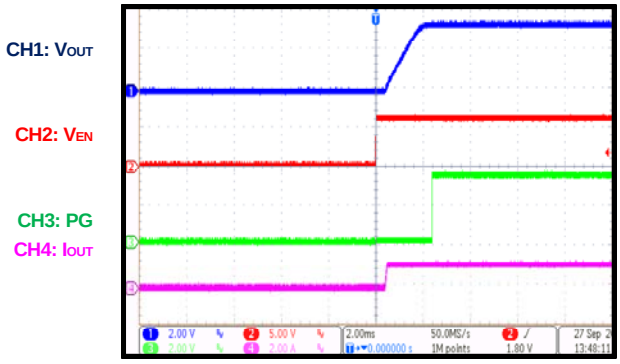
EN On

V_{IN} = 12V, V_{OUT} = 3.3V, I_{OUT} = 0A



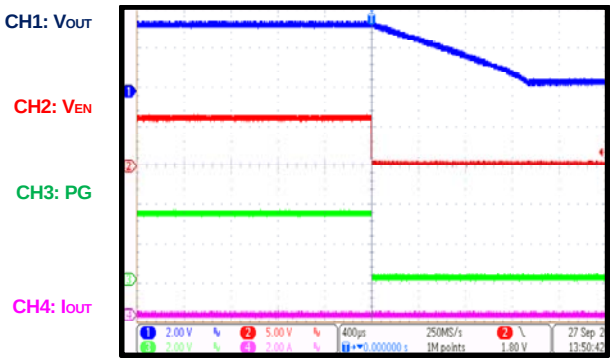
EN On

V_{IN} = 12V, V_{OUT} = 3.3V, I_{OUT} = 1A



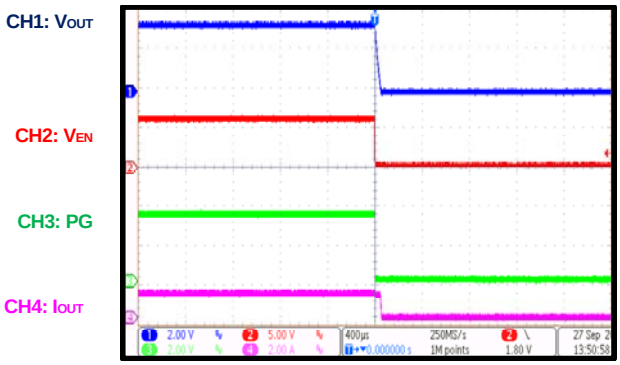
EN Off

V_{IN} =12V, V_{OUT} = 3.3V, I_{OUT} = 0A



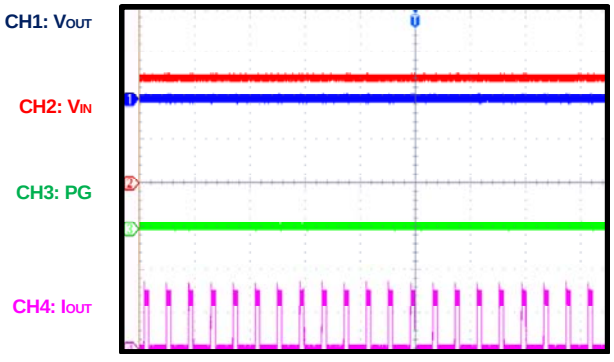
EN Off

V_{IN} = 12V, V_{OUT} = 3.3V, I_{OUT} = 1A



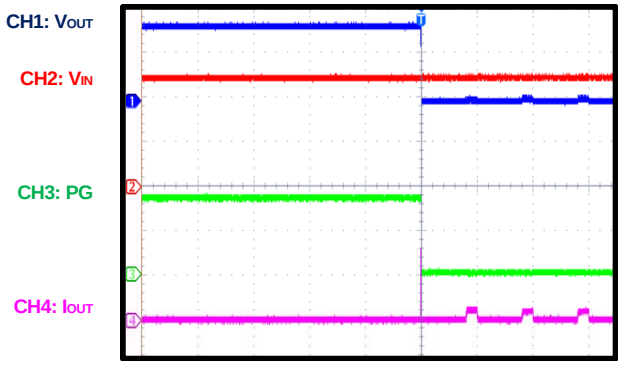
SCP Steady State

V_{IN} = 12V, V_{OUT} = 3.3V, I_{OUT} = 0A



SCP Entry

V_{IN} = 12V, V_{OUT} = 3.3V, I_{OUT} = 0A



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EVB TEST RESULTS *(continued)*

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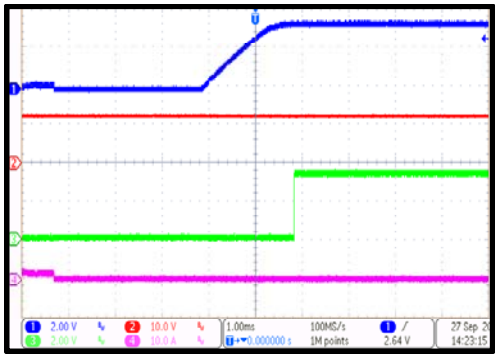
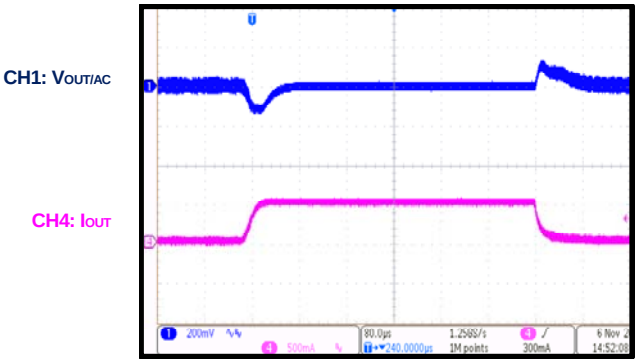
SCP Recovery

V_{IN} = 12V, V_{OUT} = 3.3V, I_{OUT} = 0A



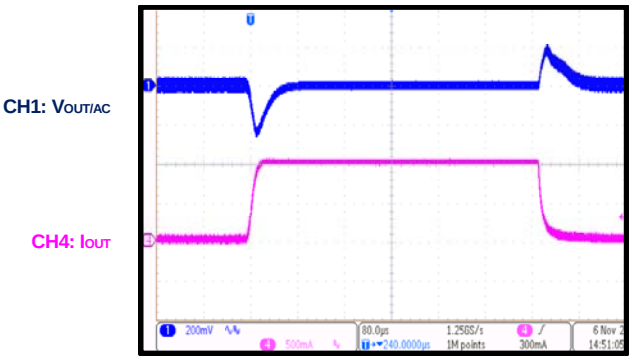
Load Transient

0.8A/μs, 0A to 0.5A, V_{IN} = 12V, V_{OUT} = 3.3V



Load Transient

0.8A/μs, 0A to 1A, V_{IN} = 12V, V_{OUT} = 3.3V



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PCB LAYOUT

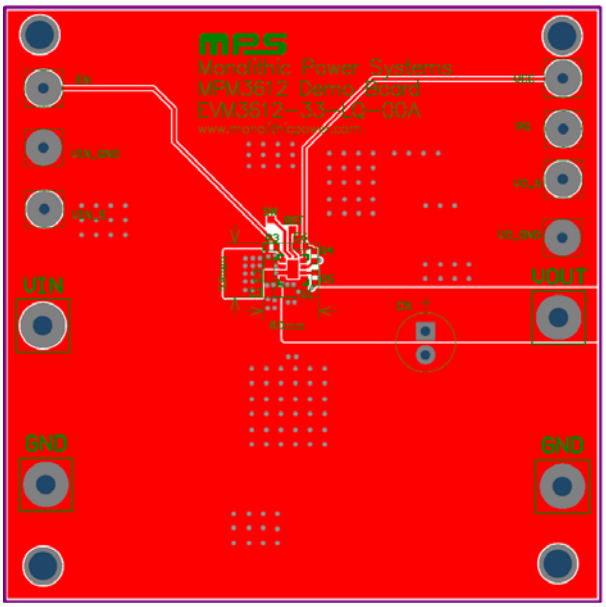

Figure 1: Top Layer

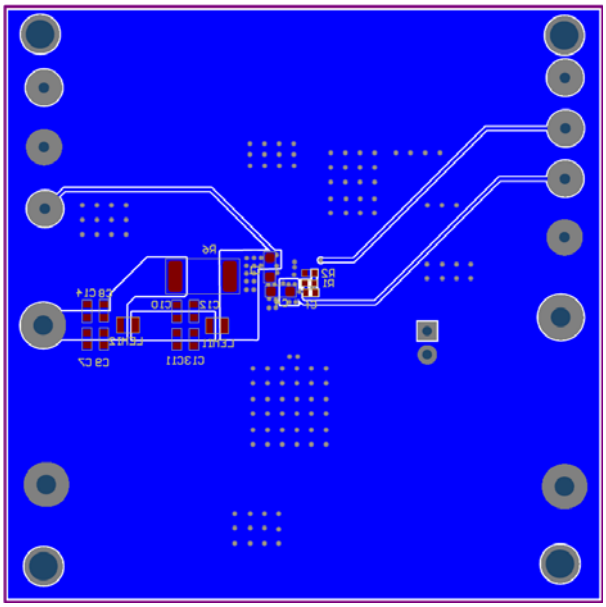

Figure 2: Bottom Layer

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