



EVL2460-J-00A

45V, 0.6A, 1.7MHz, Synchronous, Step-Down Converter Evaluation Board

DESCRIPTION

The EVL2460-J-00A evaluation board is designed to demonstrate the capabilities of MPS's MP2460, a high-frequency, step-down switching regulator with integrated high-side and low-side power MOSFETs. The MP2460 can provide up to 0.6A of output current with current mode control for fast loop response.

The wide 4.5V to 45V input range accommodates a variety of step-down applications, and the 1 μ A shutdown mode quiescent current allows the device to be used in battery-powered applications. The MP2460 uses high duty cycle and low-dropout mode for low input voltage conditions.

The MP2460 has built-in protection features, such as cycle-by-cycle current limiting, hiccup mode, short-circuit protection, and thermal shutdown. It is available in a cost-effective TSOT23-6 package.

ELECTRICAL SPECIFICATIONS ⁽¹⁾

Parameter	Symbol	Value	Units
Input voltage	V _{IN}	12.5 to 45	V
Output voltage	V _{OUT}	12	V
Output current	I _{OUT}	0.6	A

Notes:

1) For different input/output voltage specifications with different output capacitors/inductors, the application circuit parameters may require changes.

FEATURES

- Meets 0.1% Output Voltage Ripple
- Low-Dropout Mode
- Wide 4.5V to 45V Operating Input Range
- 50V Absolute Maximum Rating
- 2% to 98% Large Range Duty Cycle
- Light-Load Mode
- >90% Efficiency
- Dedicated Internal Compensation
- Stable with Ceramic/Electrolytic Output Capacitors
- 420m Ω /220m Ω Internal Power MOSFETs
- 1.7MHz Fixed Switching Frequency
- Internal Soft Start (SS)
- Precision Current Limit without Current-Sensing Resistor
- Short-Circuit Protection with Hiccup Mode
- Output Adjustable from 0.8V to 98% of V_{IN}
- Over-Temperature Protection
- Available in a TSOT23-6 Package



Optimized Performance with
MPS Inductor

APPLICATIONS

- High-Voltage Power Conversions
- Industrial Power Systems
- Battery-Powered Systems
- Power Meters

All MPS parts are lead-free, halogen-free, and adhere to the RoHS directive. For MPS green status, please visit the MPS website under Quality Assurance. "MPS", the MPS logo, and "Simple, Easy Solutions" are registered trademarks of Monolithic Power Systems, Inc. or its subsidiaries.

EVL2460-J-00A EVALUATION BOARD

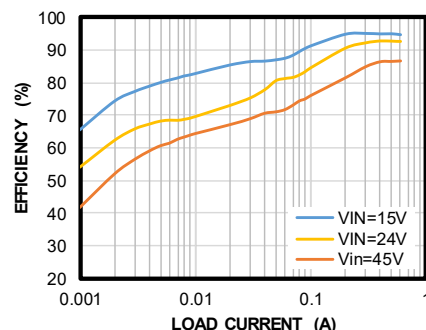


LxW (50.8mmx50.8mm)

Board Number	MPS IC Number	MPS Inductor
EVL2460-J-00A	MP2460GJ	MPL-SE6040-220

Efficiency vs. Load Current

V_{OUT} = 12V



QUICK START GUIDE

1. Preset the power supply (V_{IN}) between 12.5V and 45V.
2. Turn the power supply off.
3. Connect the power supply terminals to:
 - a. Positive (+): V_{IN}
 - b. Negative (-): GND
4. Connect the load to:
 - a. Positive (+): V_{OUT}
 - b. Negative (-): GND
5. Turn the power supply on after making the connections. The board should automatically start up.
6. To use the enable function, apply a digital input to the EN pin. Drive EN above 2V to turn the regulator on; drive EN below 1V to turn it off.

EVALUATION BOARD SCHEMATIC

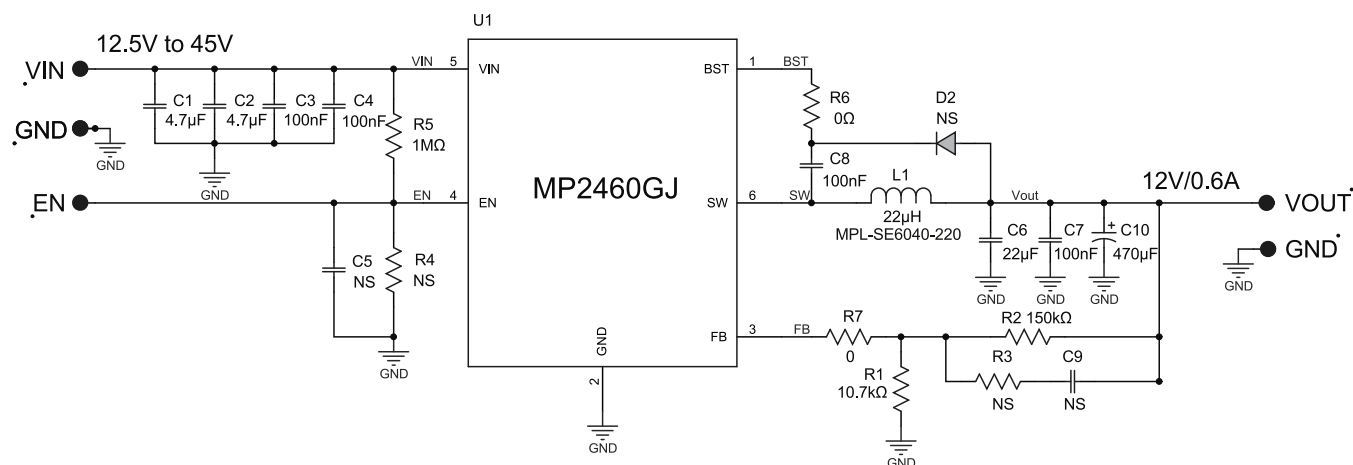


Figure 1: Evaluation Board Schematic

EVL2460-J-00A BILL OF MATERIALS

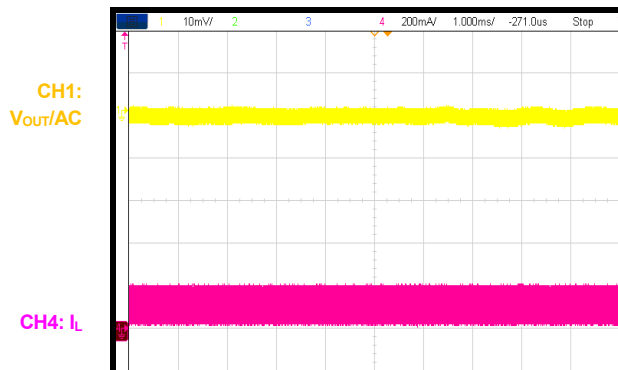
Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	L1	22 μ H	Inductor, DCR = 97m Ω , I _{SAT} = 2.35A	SMD	MPS	MPL-SE6040-220
2	C1,C2	4.7 μ F	Ceramic capacitor, 100V, X7S	1210	Murata	GRM32DC72A475KE01L
4	C3, C4, C7, C8	0.1 μ F	Ceramic capacitor, 100V, X7R	0603	Murata	GRM188R72A104KA35D
1	C6	22 μ F	Ceramic capacitor, 25V, X7R	1210	Murata	GRM32ER71E226KE15L
1	C10	470 μ F	Electrolytic capacitor, 25V	DIP	Jianghai	CD284
1	R1	10.7k Ω	Thick film resistor, 1%	0603	Yageo	RC0603FR-0710K7L
1	R2	150k Ω	Thick film resistor, 1%	0603	Yageo	RC0603FR-07150KL
2	R6,R7	0 Ω	Thick film resistor, 5%	0603	Yageo	RC0603FR-070RL
1	R5	1M Ω	Thick film resistor, 5%	0603	Yageo	RC0603JR-071ML
0	D2	NS				
0	R3, R4	NS				
0	C5, C9	NS				
1	U1	MP2460	Synchronous step-down converter	TSOT23-6	MPS	MP2460GJ

EVB TEST RESULTS

Performance curves and waveforms are tested on the evaluation board. $V_{IN} = 24V$, $V_{OUT} = 12V$, $C6 = 22\mu F$, $C10 = 470\mu F$, $L1 = 22\mu H$, $T_A = 25^\circ C$, unless otherwise noted.

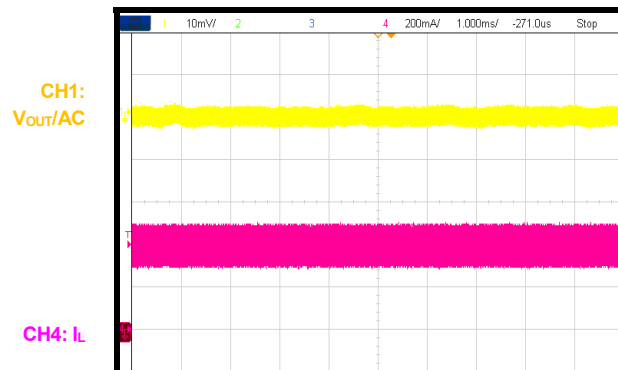
Output Voltage Ripple

$I_{OUT} = 0.125A$



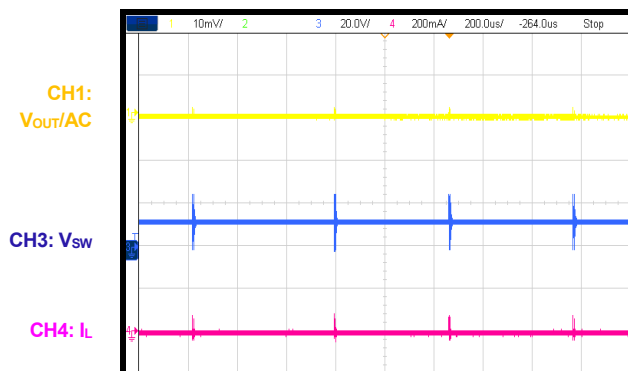
Output Voltage Ripple

$I_{OUT} = 0.4A$



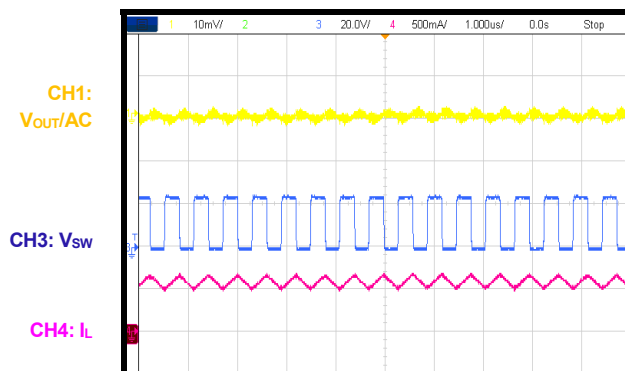
Steady State

$I_{OUT} = 0A$



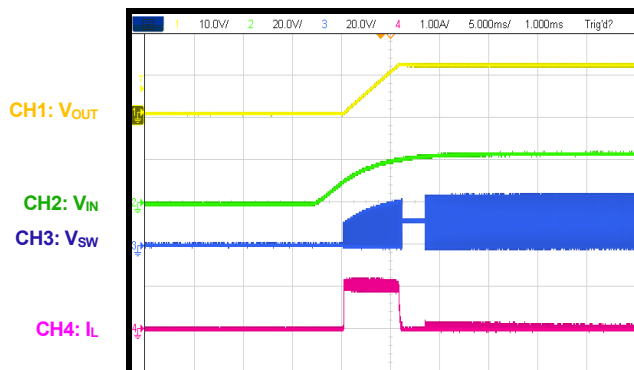
Steady State

$I_{OUT} = 0.6A$



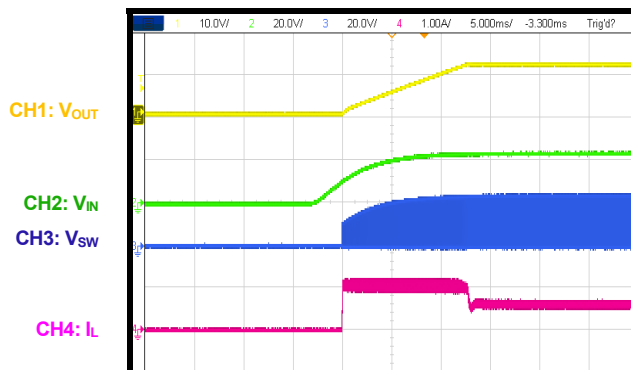
Start-Up through VIN

$I_{OUT} = 0A$



Start-Up through VIN

$I_{OUT} = 0.6A$

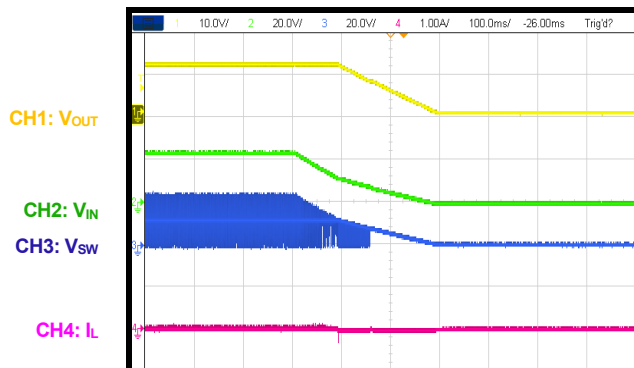


EVB TEST RESULTS *(continued)*

Performance curves and waveforms are tested on the evaluation board. $V_{IN} = 24V$, $V_{OUT} = 12V$, $C6 = 22\mu F$, $C10 = 470\mu F$, $L1 = 22\mu H$, $T_A = 25^\circ C$, unless otherwise noted.

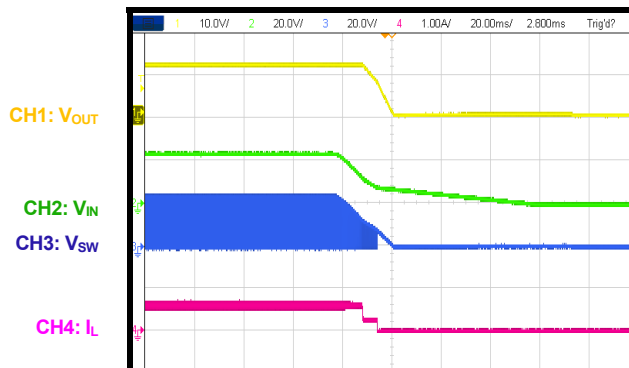
Shutdown through VIN

$I_{OUT} = 0A$



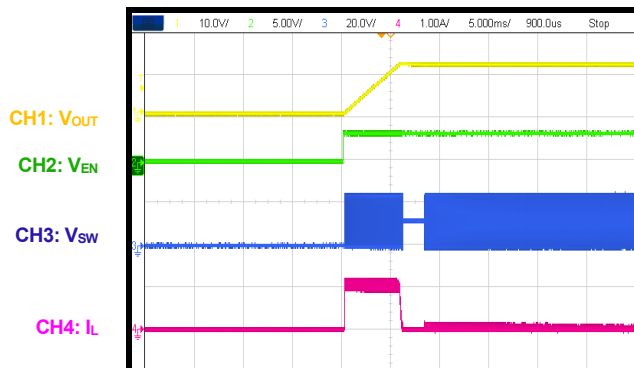
Shutdown through VIN

$I_{OUT} = 0.6A$



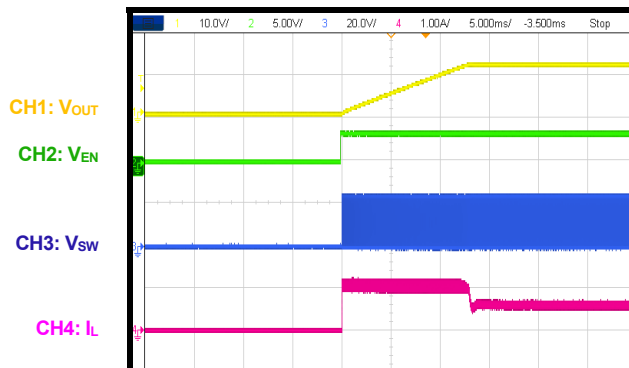
Start-Up through EN

$I_{OUT} = 0A$



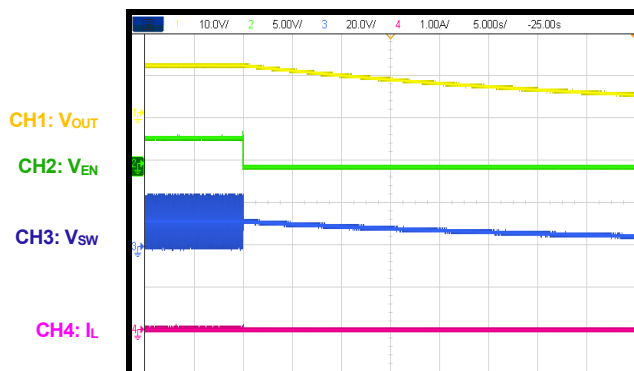
Start-Up through EN

$I_{OUT} = 0.6A$



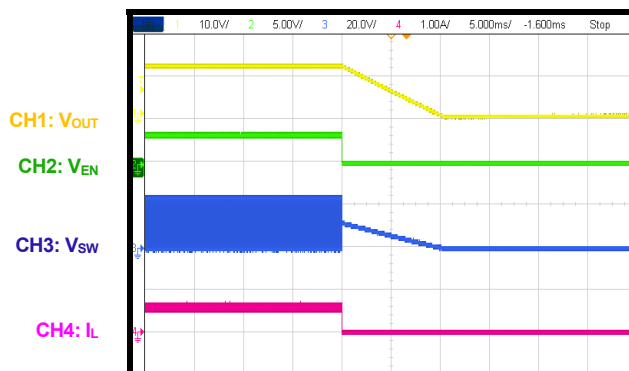
Shutdown through EN

$I_{OUT} = 0A$



Shutdown through EN

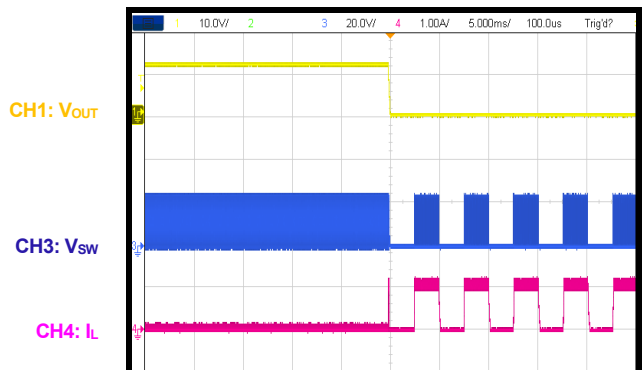
$I_{OUT} = 0.6A$



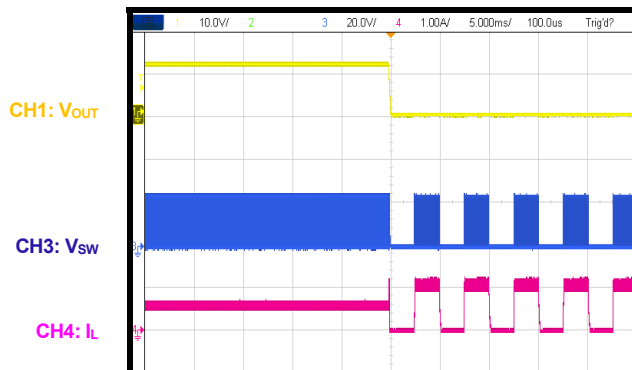
EVB TEST RESULTS *(continued)*

Performance curves and waveforms are tested on the evaluation board. $V_{IN} = 24V$, $V_{OUT} = 12V$, $C6 = 22\mu F$, $C10 = 470\mu F$, $L1 = 22\mu H$, $T_A = 25^\circ C$, unless otherwise noted.

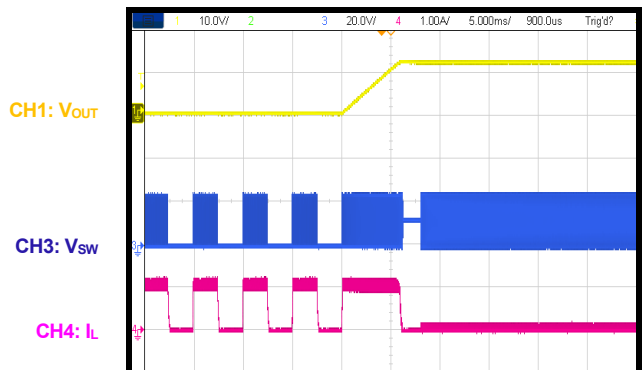
Short-Circuit Protection Entry

 $I_{OUT} = 0A$


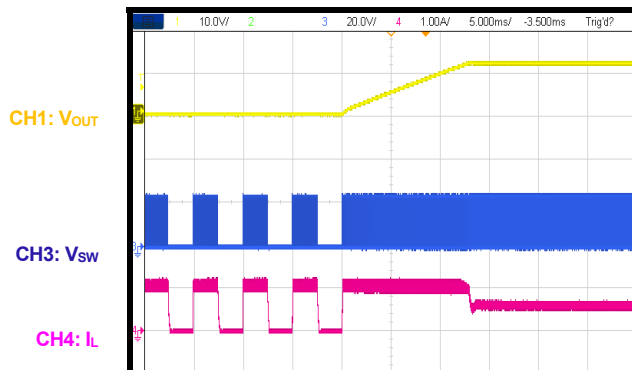
Short-Circuit Protection Entry

 $I_{OUT} = 0.6A$


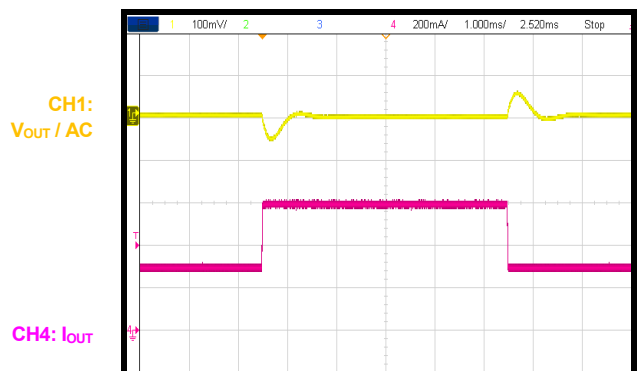
Short-Circuit Protection Recovery

 $I_{OUT} = 0A$


Short-Circuit Protection Recovery

 $I_{OUT} = 0.6A$


Load Transient

 $I_{OUT} = 0.3A \text{ to } 0.6A, 100mA/\mu s$


PCB LAYOUT

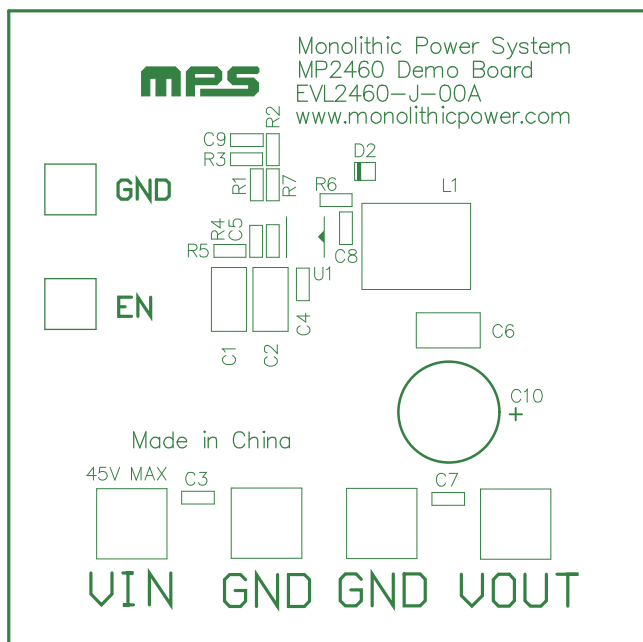


Figure 2: Top Silkscreen Layer

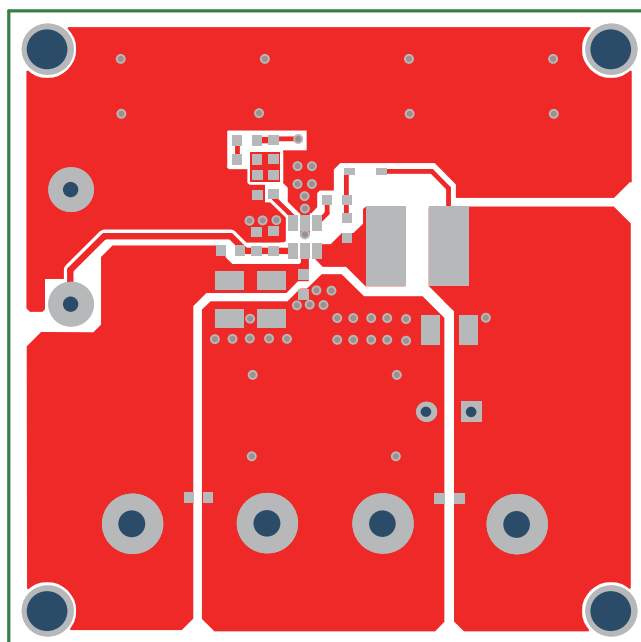


Figure 3: Top Layer

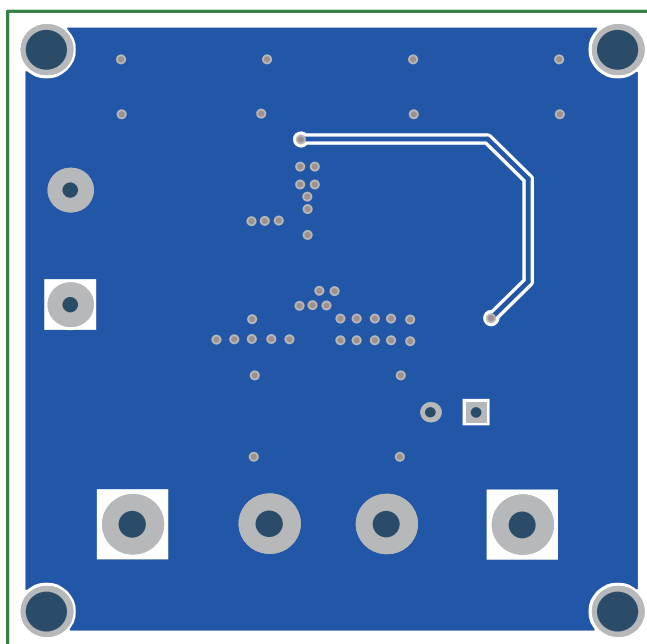


Figure 4: Bottom Layer



REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	2/22/2021	Initial Release	-

Notice: The information in this document is subject to change without notice. Please contact MPS for current specifications. Users should warrant and guarantee that third-party Intellectual Property rights are not infringed upon when integrating MPS products into any application. MPS will not assume any legal responsibility for any said applications.