



# EV3910-K-00B

## Peak Current Mode PWM Controller Boost Evaluation Board

### DESCRIPTION

The EV3910-K-00B evaluation board is designed to demonstrate the capabilities of the MP3910, a peak current mode PWM controller that can drive an external MOSFET capable of handling over 10A of current. The device can accommodate offline, telecom, and non-isolated and isolated applications.

When designed for boost applications, the 1A gate driver minimizes the power loss of the external MOSFET while allowing the use of a wide variety of standard threshold devices. Additionally, MP3910 has pulse-skip mode to improve efficiency under light-load or no-load conditions.

The MP3910 is available in an MSOP-10 package.

### ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input voltage	$V_{IN}$	10 to 20	V
Output voltage	$V_{OUT}$	24	V
Output current	$I_{OUT}$	2	A

### FEATURES

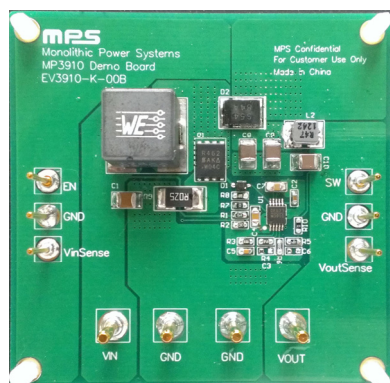
- Wide 5V to 35V Supply Voltage Range
- 1A, 12V MOSFET Gate Driver
- External Soft-Start
- Pulse-Skip Operation under Light Loads
- Configurable Switching Frequency (30kHz to 400kHz)
- Synchronizable from 80kHz to 400kHz
- Cycle-by-Cycle Current Limit
- Over-Voltage Protection (OVP)
- Available in an MSOP-10 Package

### APPLICATIONS

- Telecom Isolated Power
- Brick Modules
- Offline Controllers
- General Step-Up Applications

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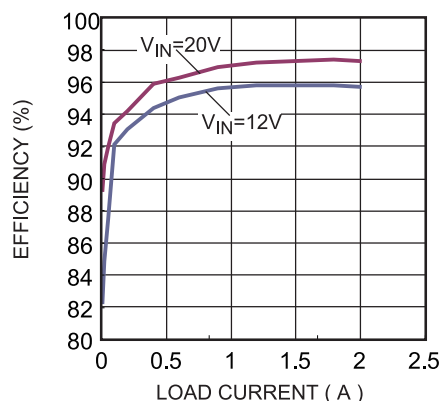
## EV3910-K-00B EVALUATION BOARD



LxWxH (6.35cmx6.35cmx1.2cm)

Board Number	MPS IC Number
EV3910-K-00B	MP3910GK

### Efficiency vs. Load Current





## QUICK START GUIDE

1. Connect the load terminals to:
  - a. Positive (+): VOUT
  - b. Negative (-): GND
2. Preset the power supply output between 10V and 20V, and then turn the power supply off.
3. Connect the power supply output terminals to:
  - a. Positive (+): VIN
  - b. Negative (-): GND
4. Turn the power supply on. The EV3910-K-00B should automatically start up.
5. 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

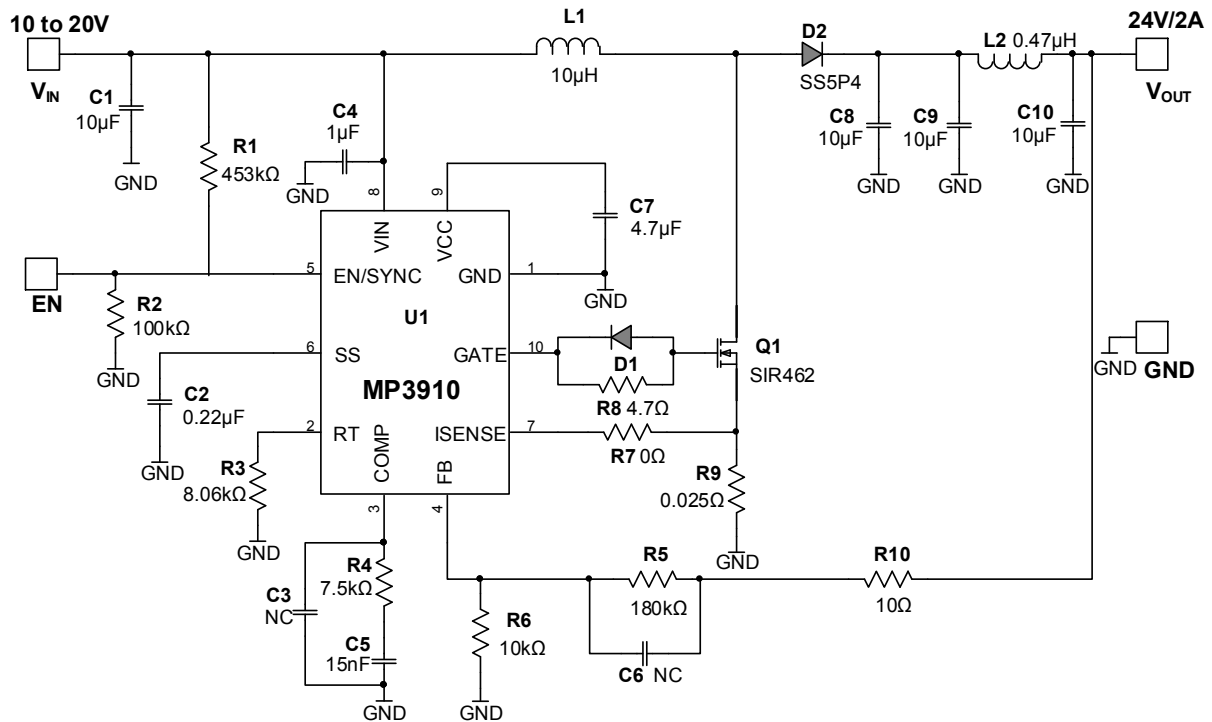


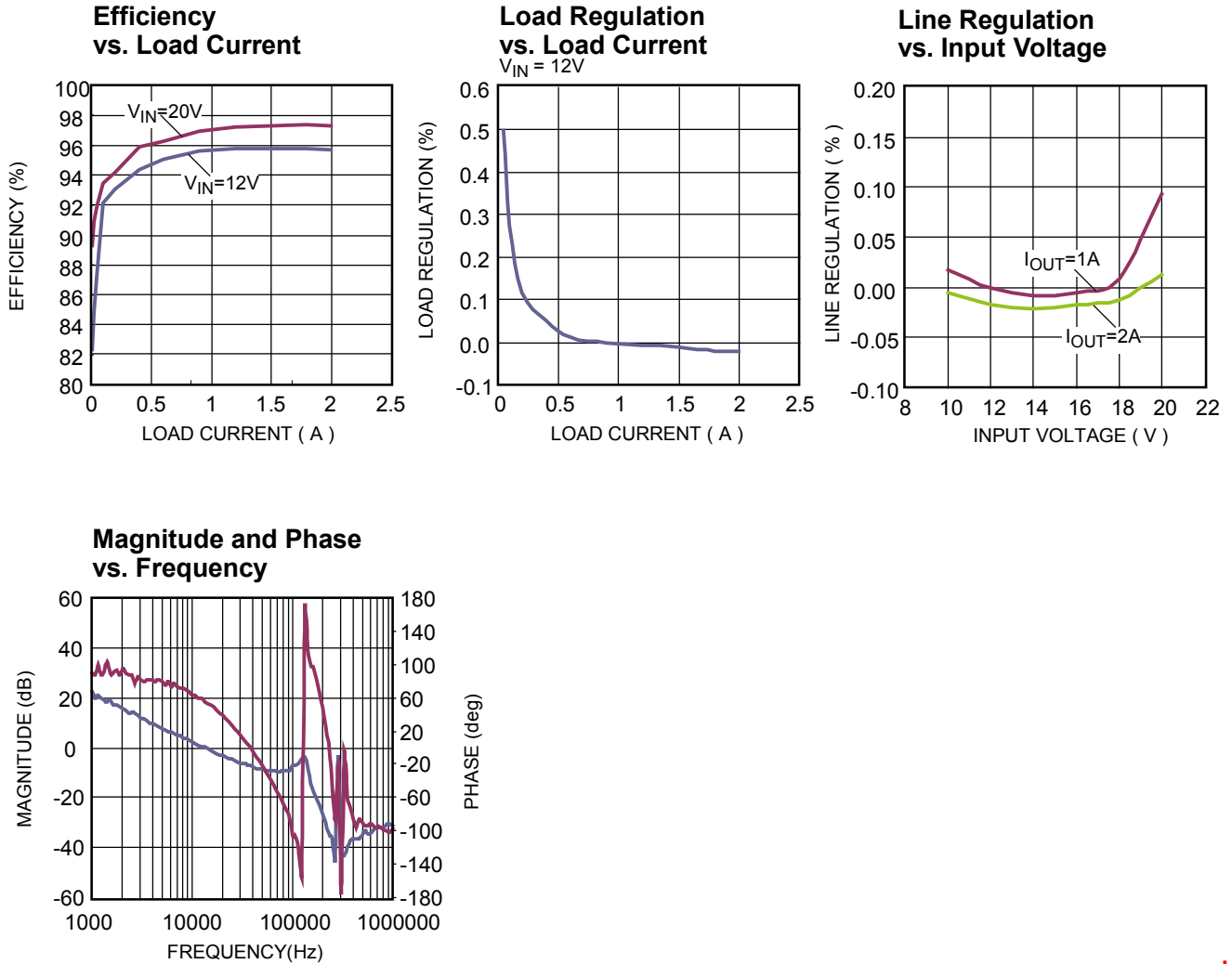
Figure 1: Evaluation Board Schematic

**EV3910-K-00B BILL OF MATERIALS**

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
1	C1	10 $\mu$ F	Ceramic capacitor, 25V, X7R	1210	Murata	GRM32DR71E106KA12L
1	C2	0.22 $\mu$ F	Ceramic capacitor, 16V, X7R	0603	Murata	GRM188R71C224KA01D
2	C3, C6	NC				
1	C4	1.0 $\mu$ F	Ceramic capacitor, 25V, X7R	0805	Murata	GRM21BR71E105KA99L
1	C5	15nF	Ceramic capacitor, 50V, X7R	0603	Murata	GRM188R71H153KA01D
1	C7	4.7 $\mu$ F	Ceramic capacitor, 16V, X7R	0805	Murata	GRM21BR71C475KA73L
3	C8, C9, C10	10 $\mu$ F	Ceramic capacitor, 50V, X5R	1210	Murata	GRM32ER61H106KA12L
1	R1	453k $\Omega$	Film resistor, 1%	0603	Royal	RL0603FR-07453KL
1	R2	100k $\Omega$	Film resistor, 1%	0603	Royal/Lizhi	RL0603FR-07100KL
1	R3	8.06k $\Omega$	Film resistor, 1%	0603	Royal	RL0603FR-078K06L
1	R4	7.5k $\Omega$	Film resistor, 1%	0603	Royal	RL0603FR-077K5L
1	R5	180k $\Omega$	Film resistor, 1%	0603	Royal	RL0603FR-07180KL
1	R6	10k $\Omega$	Film resistor, 1%	0603	Royal	RL0603FR-0710KL
2	R7, R10	0 $\Omega$	Film resistor, 1%	0603	Yageo	RC0603FR-070RL
1	R8	4.7 $\Omega$	Film resistor, 1%	0603	Royal	RL0603FR-074R7L
1	R9	0.025 $\Omega$		2512	Yageo	RL2512FK-070R025L
1	D1	75V	Diode, 75V, 250mW	SOD-323	Diodes Inc	1N4148WS-7
1	D2	40V	Switching diode, 40V, 5A	TO-277A	Vishay	SS5P4
1	L1	10 $\mu$ H	L = 10 $\mu$ H, I <sub>R</sub> = 7.8A, R <sub>DC</sub> = 19m $\Omega$	SMD	MPS	MPL-AY1050-100
			L = 10 $\mu$ H, I <sub>R</sub> = 9A, R <sub>DC</sub> = 14.4m $\Omega$	SMD	Würth	744 332 100 0
1	L2	0.47 $\mu$ H	L = 0.47 $\mu$ H, I <sub>R</sub> = 9.2A, R <sub>DC</sub> = 6.2m $\Omega$	SMD	MPS	MPL-AL4020-R47
			L = 0.47 $\mu$ H, I <sub>R</sub> = 6.8A, R <sub>DC</sub> = 11.2m $\Omega$	SMD	Würth	744 373 240 047
1	Q1	30V	V <sub>DS</sub> = 30V, R <sub>DS(ON)</sub> = 7.9m $\Omega$	PowerPAK® SO-8	Vishay	SiR462DP
1	U1	MP3910	Controller	MSOP-10	MPS	MP3910GK

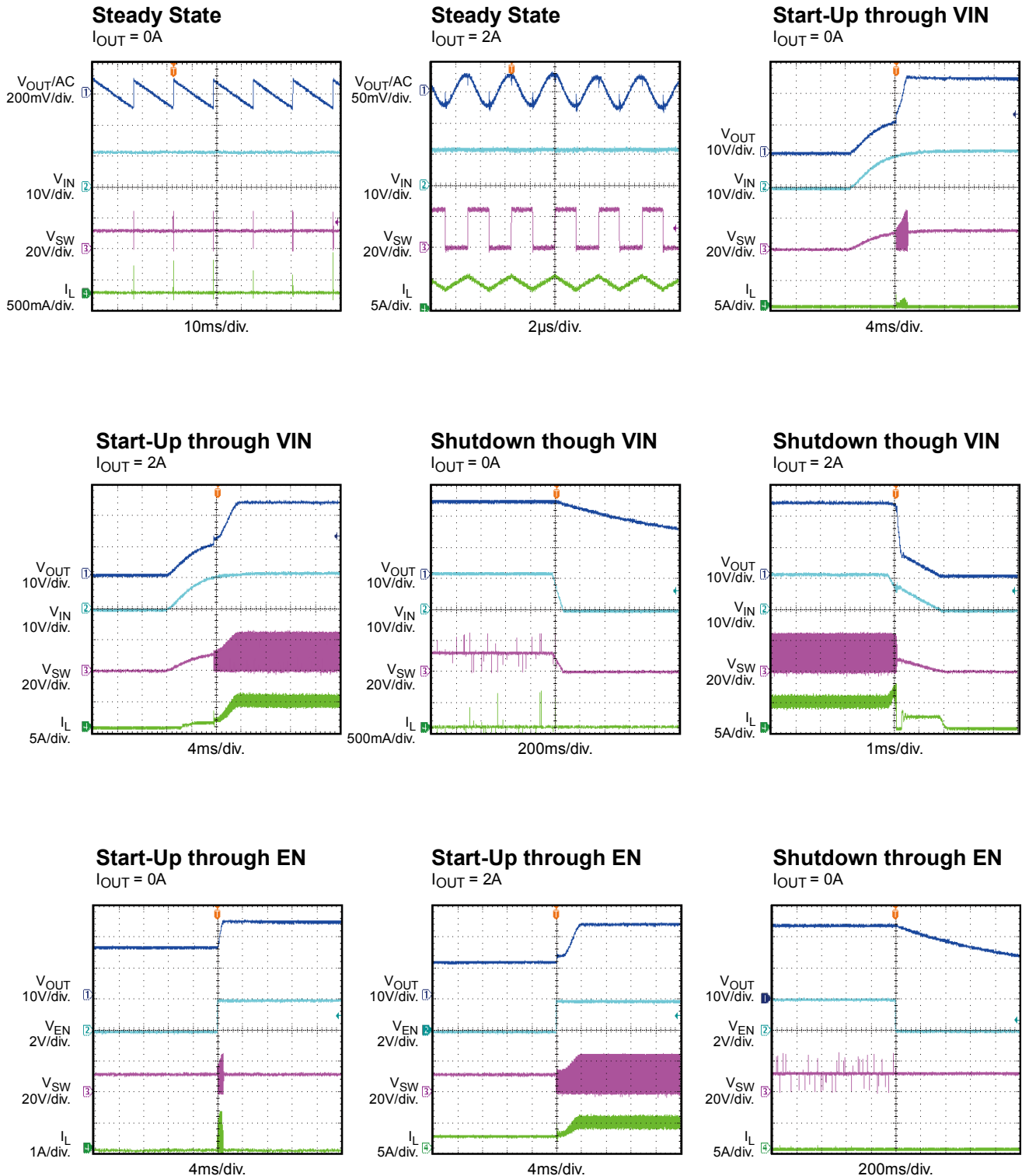
## EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.  $V_{IN} = 12V$ ,  $V_{OUT} = 24V$ ,  $I_{OUT} = 2A$ ,  $T_A = 25^\circ C$ , unless otherwise noted.



## EVB TEST RESULTS *(continued)*

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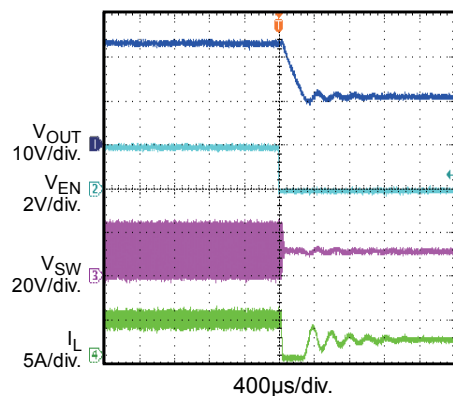


## EVB TEST RESULTS *(continued)*

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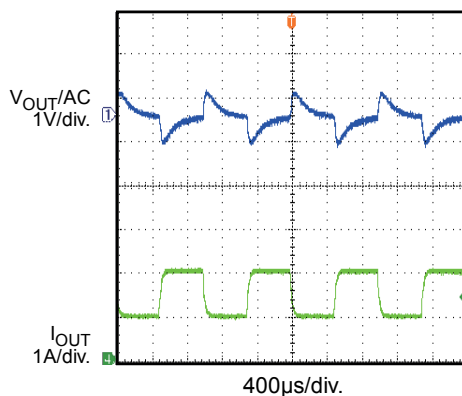
### Shutdown through EN

$I_{OUT} = 2A$



### Load Transient

$I_{OUT} = 1A$  to  $2A$ ,  $I_{RAMP} = 25mA/\mu s$



## PCB LAYOUT

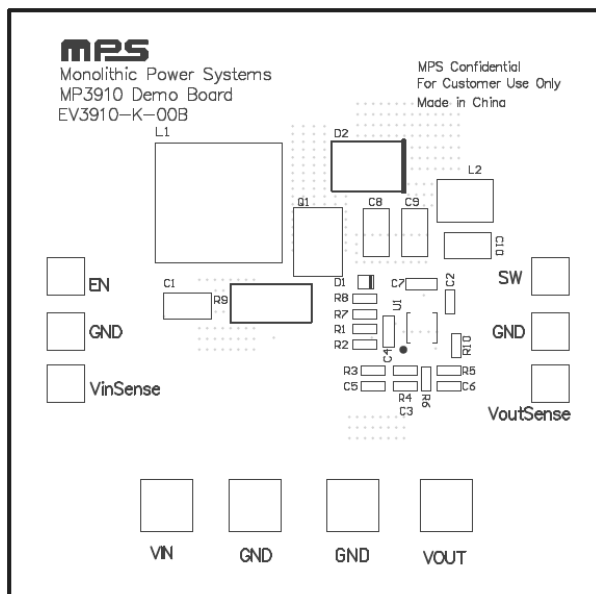


Figure 2: Top Silk Layer

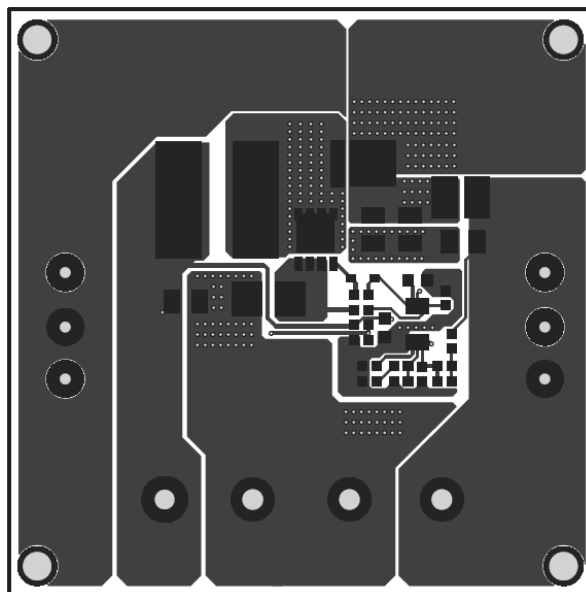


Figure 3: Top Layer

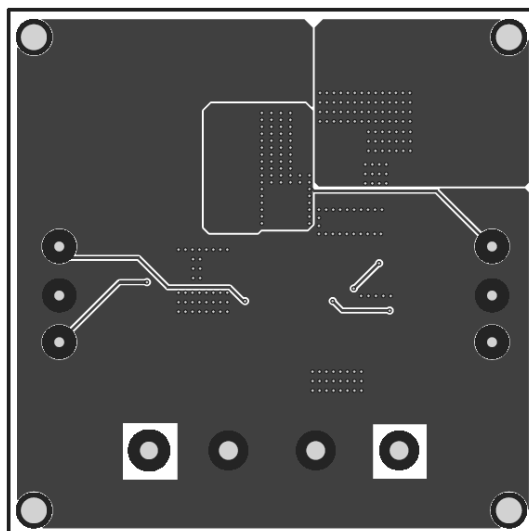


Figure 4: Bottom Layer





## REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	4/5/2014	Initial Release	-
1.1	6/28/2021	Add MPS inductor information.	4

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