EV4470/4470A-L-01A

High-Efficiency, Fast-Transient, 5A, 36V Step-Down Converter Evaluation Board

The Future of Analog IC Technology

DESCRIPTION

The EV4470-L-01A is an evaluation board for the MP/MPQ4470, while EV4470A-L-01A is an evaluation board for the MP/MPQ4470A.

MP/MPQ4470 and MP/MPQ4470A are high-efficiency step-down regulator with integrated power MOSFETs. They offer a very compact solution to achieve a 5A, continuous-output current over a wide input-supply range with excellent load and line regulation. They also provide fast transient response and good stability for wide input-supply and load range. MP/MPQ4470 have OVP latch while MP/MPQ4470A have no this function.

The EV4470-L-01A and EV4470A-L-01A are fully assembled and tested evaluation boards. They generate +3.3V output voltage at load current up to 5A from a 4.5V to 36V input range. Switching frequency of both boards are set at 500kHz.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	4.5 – 36	V
Output Voltage	V_{OUT}	3.3	V
Output Current	I_{OUT}	5	A

FEATURES

- Wide 4.5V-to-36V Operating Input Range
- Guaranteed 5A, Continuous Output Current
- Internal 40mΩ High-Side, 20mΩ Low-Side Power MOSFETs
- Proprietary Switching-Loss-Reduction Technology
- 1% Reference Voltage
- Programmable Soft-Start Time
- Low Drop-out Mode
- SCP, OCP, OVP latch (EV4470 only), UVP and Thermal Shutdown

APPLICATIONS

- Notebook Systems and I/O Power
- Automotive Systems
- Networking Systems
- Industrial Supplies
- Optical Communications Systems
- Distributed Power and POL Systems

EVALUATION BOARD

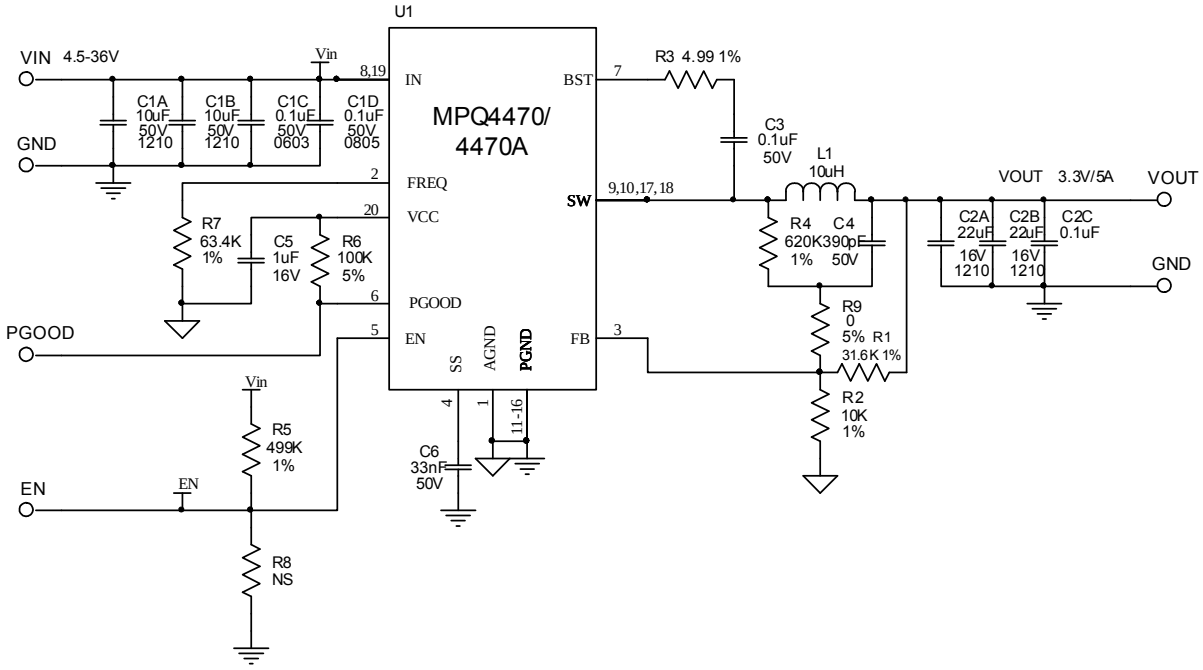
(L x W x H) 2.5" x 2.5" x 0.4"
(6.4cm x 6.4cm x 1.0cm)

Board Number	MPS IC Number
EV4470-L-01A	MPQ4470GL

(L x W x H) 2.5" x 2.5" x 0.4"
(6.4cm x 6.4cm x 1.0cm)

Board Number	MPS IC Number
EV4470A-L-01A	MPQ4470AGL

EVALUATION BOARD SCHEMATIC



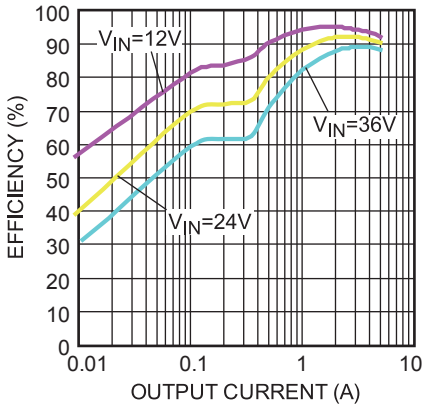
EV4470/4470A-L-01A BILL OF MATERIALS

Qty	RefDes	Value	Description	Package	Manufacturer	Manufactuer_P/N
2	C1A,C1B	10uF	Ceramic Cap., 50V, X7R	1210	muRata	GRM32ER71H106KA12L
3	C1C,C2C, C3	0.1uF	Ceramic Cap., 50V, X7R	0603	TDK	C1608X7R1H104K
1	C1D	0.1uF	Ceramic Cap., 50V, X7R	0805	muRata	GRM21BR72A104KAC4L
2	C2A,C2B	22uF	Ceramic Cap., 16V, X7R	1210	muRata	GRM32ER71C226KE79
1	C4	390pF	Ceramic Cap., 50V, C0G	0603	muRata	GRM1885C1H391JA01D
1	C5	1uF	Ceramic Cap., 16V, X7R	0603	muRata	GRM188R71C105KA12D
1	C6	33nF	Ceramic Cap., 50V, X7R	0603	muRata	GRM188R71H333KA61D
1	L1	10uH	Inductor, 16.3mOhm, 7.2A	SMD	Wurth	7443251000
1	R1	31.6k	Film Res., 1%	0603	Yageo	RC0603FR-0731K6L
1	R2	10k	Film Res., 1%	0603	Yageo	RC0603FR-0710KL
1	R3	4.99Ω	Film Res., 1%	0603	Yageo	RC0603FR-074R99L
1	R4	620k	Film Res., 1%	0603	Yageo	RC0603FR-07620KL
1	R5	499k	Film Res., 1%	0603	Yageo	RC0603FR-07499KL
1	R6	100k	Film Res., 5%	0603	Yageo	RC0603JR-07100KL
1	R7	63.4k	Film Res., 1%	0603	Yageo	RC0603FR-0763K4L
1	R9	0Ω	Film Res., 5%	0603	Yageo	RC0603JR-070RL
1	R8	NS				
1	U1		Step-Down Regulator	QFN20-3x4	MPS	MPQ4470GL (for EV4470) MPQ4470AGL (for EV4470A)

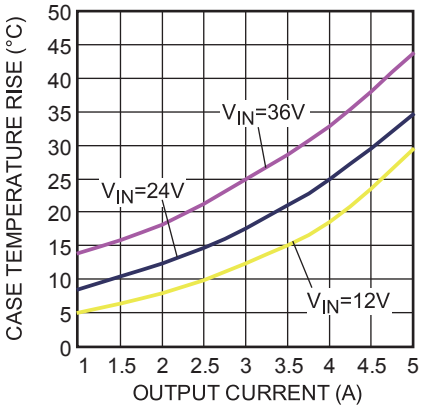
EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.
V_{IN} = 24V, V_{OUT} = 3.3V, T_A = 25°C, unless otherwise noted.

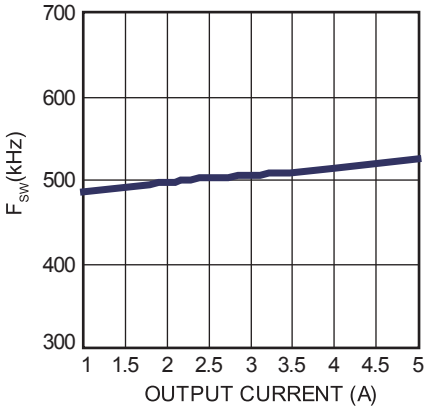
Efficiency vs. Load Current



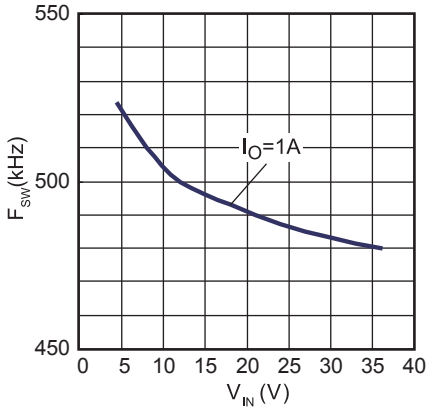
Case Temperature Rise vs. Output Current



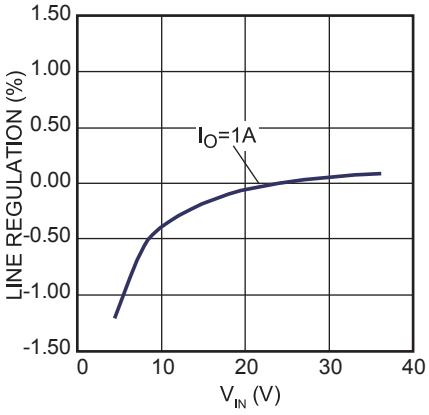
F_{SW} vs. Output Current



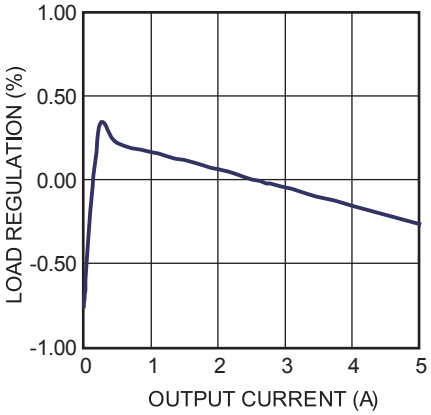
F_{SW} vs. V_{IN}



Line Regulation



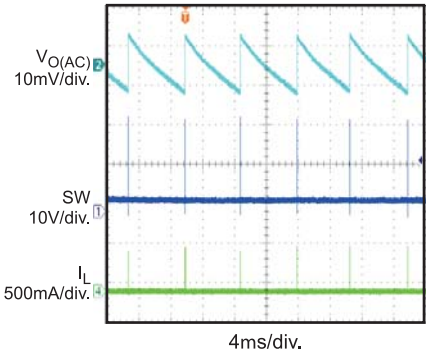
Load Regulation



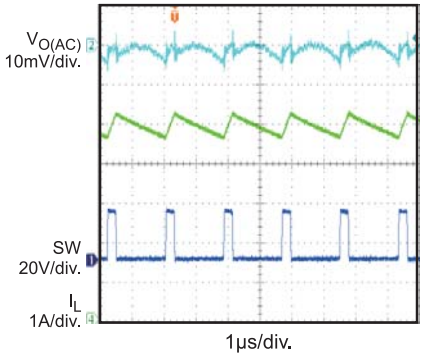
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.
V_{IN} = 24V, V_{OUT} = 3.3V, T_A = 25°C, unless otherwise noted.

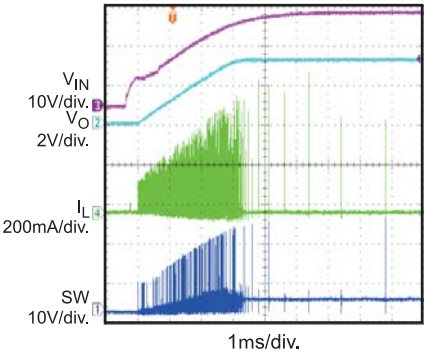
Output Voltage Ripple
I_O = 0A



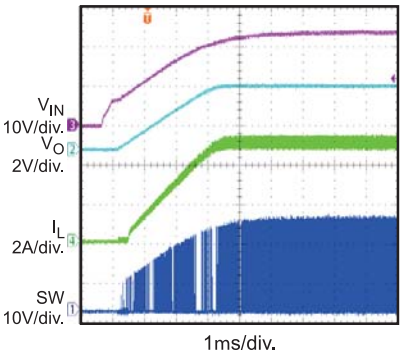
Output Voltage Ripple
I_O = 5A



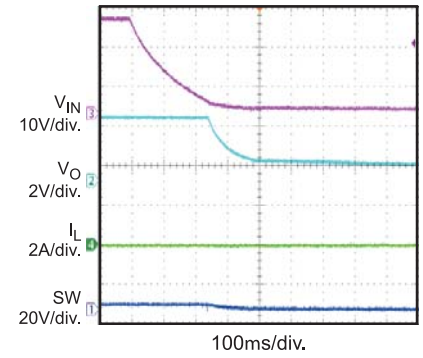
Start-up Through V_{IN}
I_O = 0A



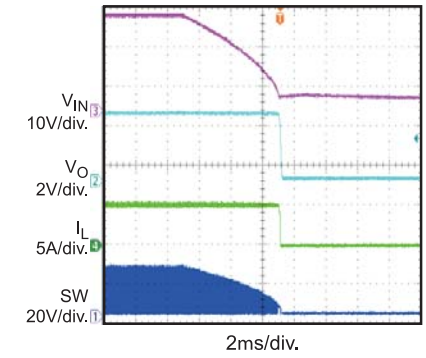
Start-up Through V_{IN}
I_O = 5A



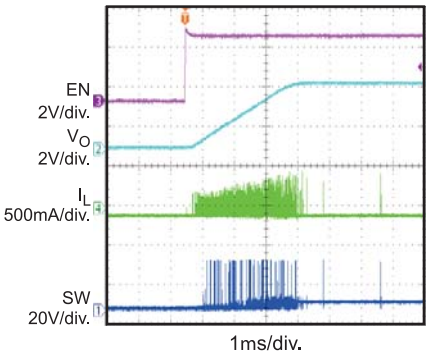
Shutdown Through V_{IN}
I_O = 0A



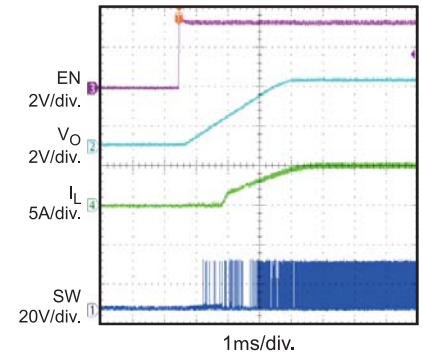
Shutdown Through V_{IN}
I_O = 5A



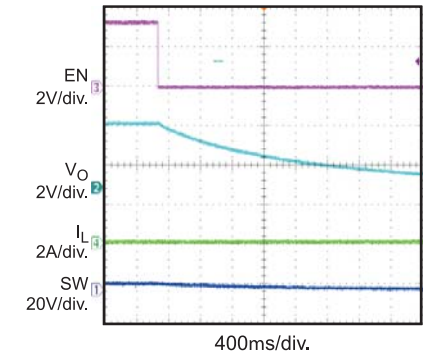
Start-up Through EN
I_O = 0A



Start-up Through EN
I_O = 5A



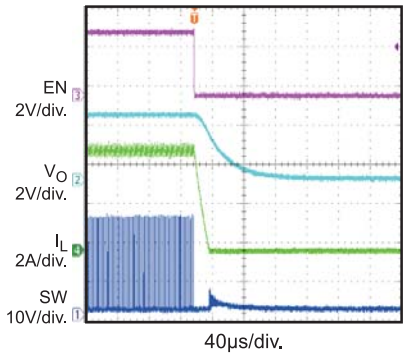
Shutdown Through EN
I_O = 0A



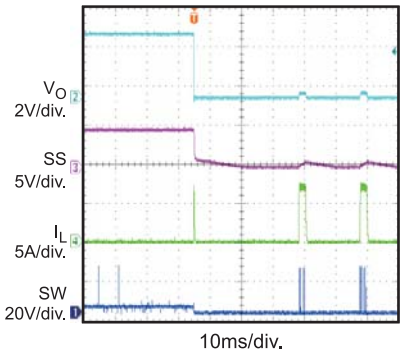
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.
V_{IN} = 24V, V_{OUT} = 3.3V, T_A = 25°C, unless otherwise noted.

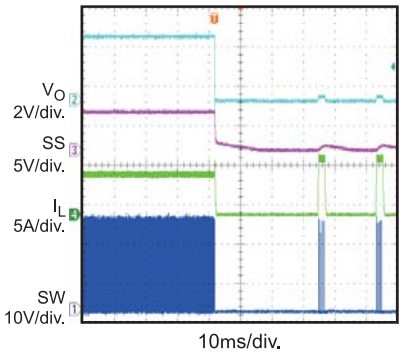
Shutdown Through EN
I_O = 5A



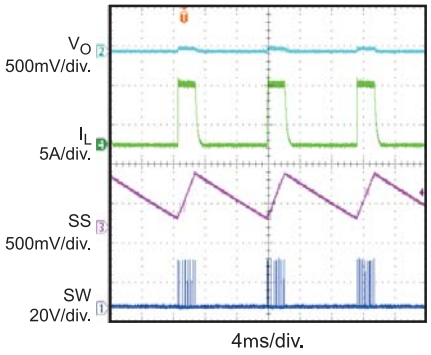
Short Circuit Entry
I_O = 0A



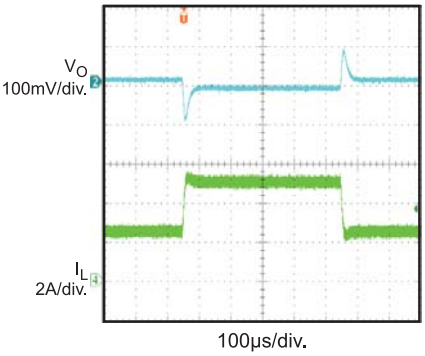
Short Circuit Entry
I_O = 5A



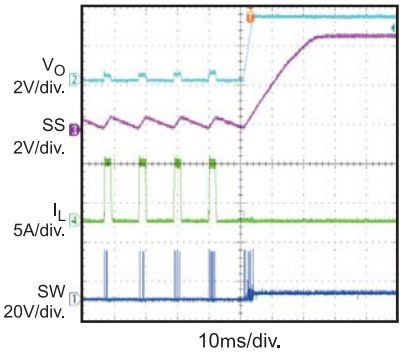
Short Circuit Steady State



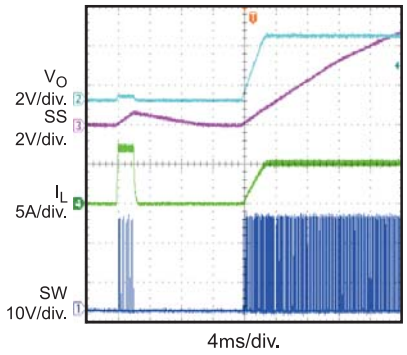
Load Transient
I_O = 2.5A-5A@1.6A/µs



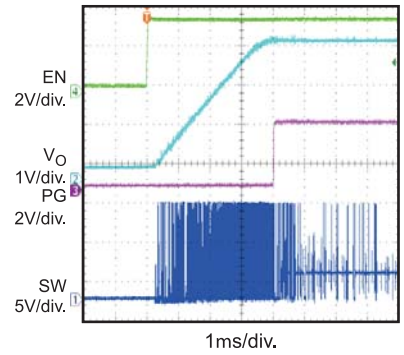
Short Circuit Recovery
I_O = 0A



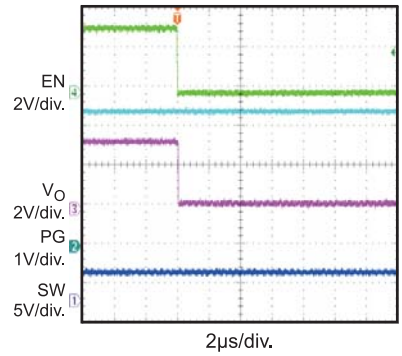
Short Circuit Recovery
I_O = 5A



Power Good Through EN Start-up



Power Good Through EN Shutdown



PRINTED CIRCUIT BOARD LAYOUT

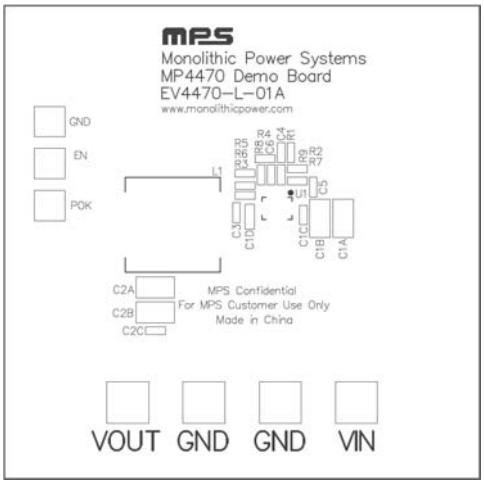


Figure 1—Top Silk Layer

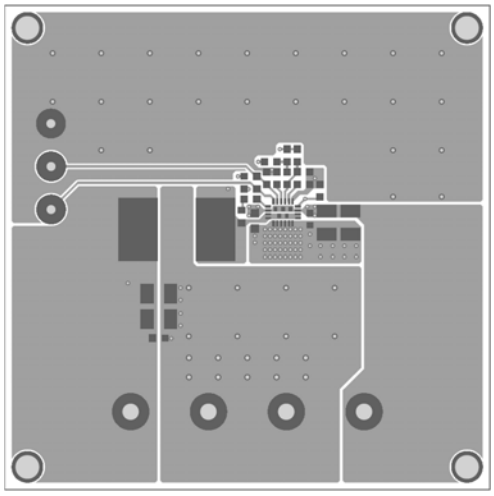


Figure 2—Top Layer

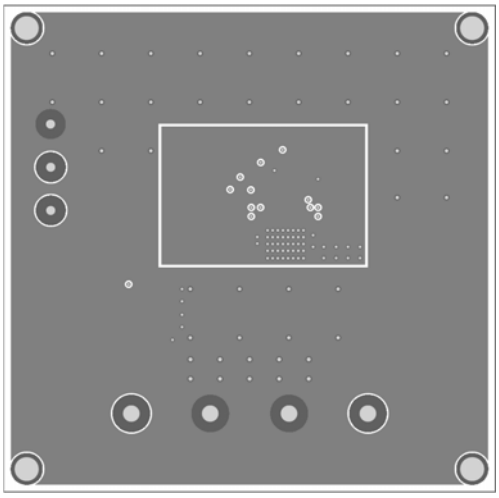


Figure 3—Inner1 Layer

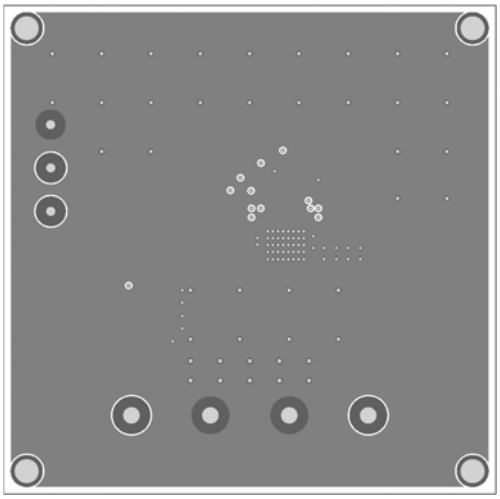


Figure 4—Inner2 Layer

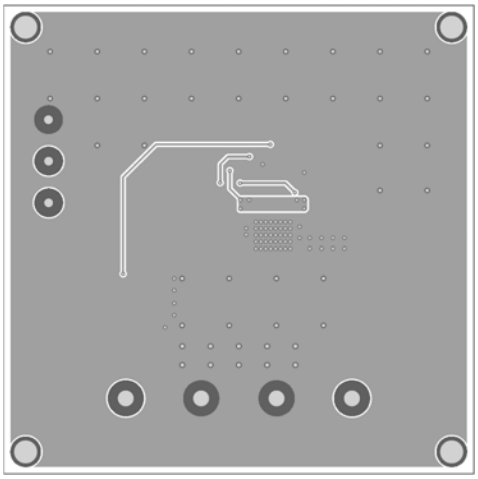


Figure 5—Bottom Layer