EV2276-D-00A

High Efficiency, 8A,16V Synchronous Step-down Converter Evaluation Board

DESCRIPTION

The EV2276-D-00A is an evaluation board for the MP2276, a high efficiency, monolithic, synchronous step-down converter.

The EV board can deliver 8A continuous load current over a wide operating input range. High efficiency can be achieved over a wide output current load range.

The MP2276 adopts internally compensated constant-on-time (COT) control mode that provides fast transient response and eases loop stabilization.

This EV board can be turned on or off via a remote ON/OFF input (EN) that is referenced to ground. This input is compatible with popular logic devices.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	4-16	V
Output Voltage	V_{OUT}	1	V
Output Current	I_{OUT}	8	A

FEATURES

- Wide 4V to 16V input Voltage Range
- 8A Continuous Output Current
- 24mΩ/10mΩ Low R_{DS}(ON) Integrated Power MOSFETs
- Adaptive COT for Ultrafast Transient Response
- Stable with Zero-ESR Output Capacitor
- Programmable Current Limit
- Selectable Forced CCM or Pulse-Skip Operation at Light Load
- Excellent Load Regulation
- Programmable Soft Start Time from 1.7ms and up
- Pre-Bias Start up
- Selectable 600kHz, 1100kHz or 2000kHz Switching Frequency
- Hiccup OCP Protection
- Auto Retry OVP Protection and Thermal Shutdown
- Output Adjustable from 0.8V
- Available in QFN-14 (2x3mm) package

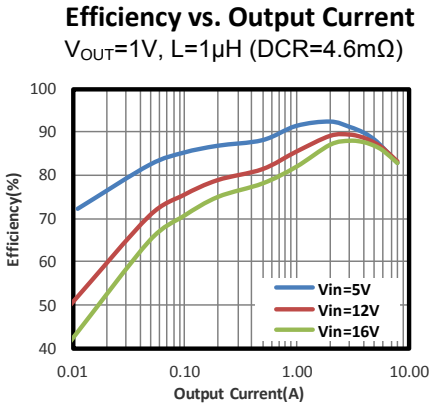
APPLICATIONS

- Digital Set Top Boxes
- Flat panel TV and Monitors
- Distributed Power Systems

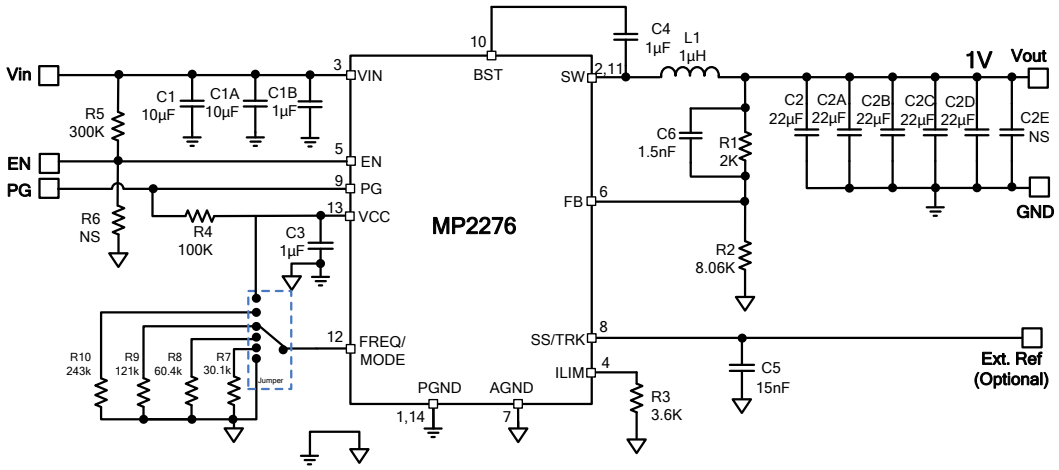
EV2276-D-00A EVALUATION BOARD

(L × W) 78cm × 81cm

Board Number	MPS IC Number
EV2276-D-00A	MP2276GD



EVALUATION BOARD SCHEMATIC



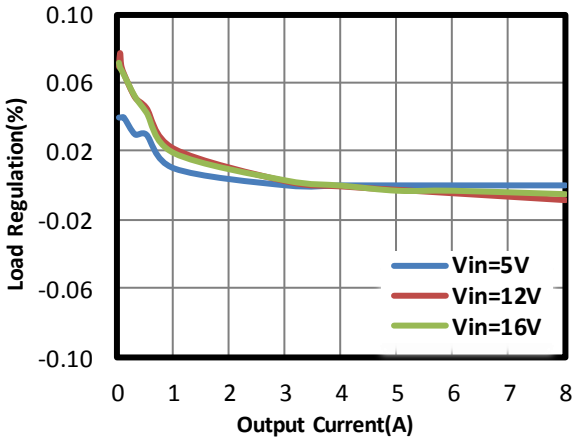
EV2276-D-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Part Number
2	C1, C1A	10µF	Ceramic Cap,25V,X5R	1206	Murata	GRM31CR61E106KA12L
3	C1B, C3, C4	1µF	Ceramic Cap,25V,X7R	0603	Murata	GRM188R71E105KA12D
5	C2, C2A, C2B, C2C, C2D	22µF	Ceramic Cap, 16V, X5R	0805	Murata	GRM219R61C226ME15L
0	C2E	NS				
1	C5	15nF	Ceramic Cap,50V,X7R	0603	Murata	GRM188R71H153KA01D
1	C6	1.5nF	Ceramic Cap,50V,COG	0603	Murata	GRM1885C1H152JA01D
1	R1	2k	Film Res., 1%	0603	Yageo	RC0603FR-072KL
1	R2	8.06k	Film Res., 1%	0603	Yageo	RC0603FR-078K06L
1	R3	3.6k	Film Res., 1%	0603	Yageo	RC0603FR-073K6L
1	R4	100k	Film Res., 1%	0603	Yageo	RC0603FR-07100KL
1	R5	300k	Film Res., 1%	0603	Yageo	RC0603FR-07300KL
0	R6	NS				
1	R7	30.1k	Film Res., 1%	0603	Yageo	RC0603FR-0730K1L
1	R8	60.4k	Film Res., 1%	0603	Yageo	RC0603FR-0760K4L
1	R9	121k	Film Res., 1%	0603	Yageo	RC0603FR-07121KL
1	R10	243k	Film Res., 1%	0603	Yageo	RC0603FR-07243KL
1	L1	1µH	DCR 4.6mΩ,Isat 19A	SMD	Wurth	744311100
1	U1	MP2276GD	16V/8A Step Down Convert	QFN14-2X3mm	MPS	MP2276GD

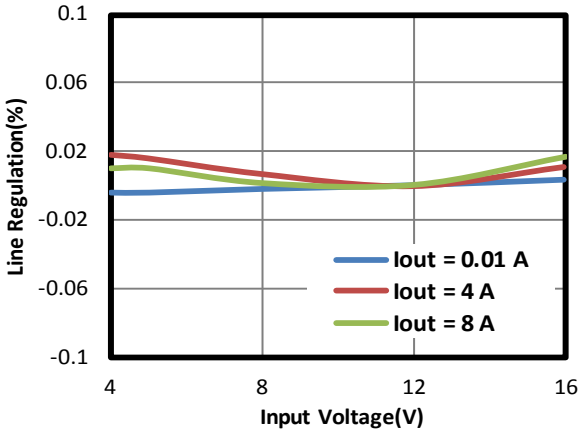
EVB TEST RESULTS

Performance waveforms are tested on the EV2276-D-00A evaluation board.
V_{IN}=12V, V_{OUT}=1V, L=1μH, F_{SW}=600kHz, pulse skip mode. T_A = +25°C, unless otherwise noted.

Load Regulation

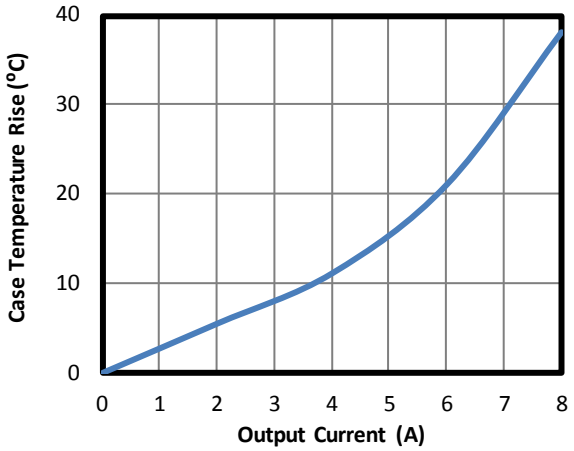


Line Regulation



Case Temperature Rise vs. Output Current

4 Layers PCB, size is 7.75cmx8.13cm.

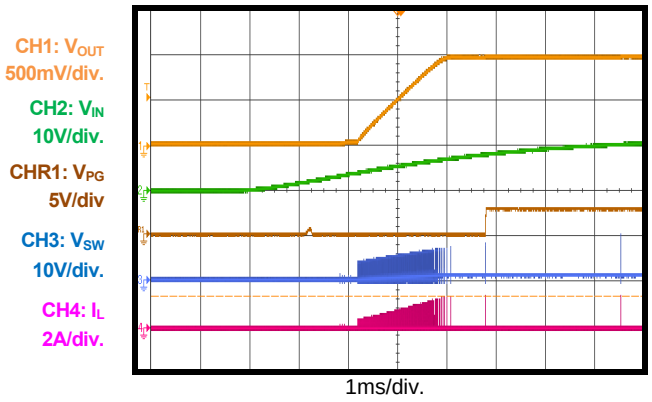


EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the EV2276-D-00A evaluation board.
V_{IN}=12V, V_{OUT}=1V, L=1µH, F_{SW}=600kHz, pulse skip mode. T_A = +25°C, unless otherwise noted.

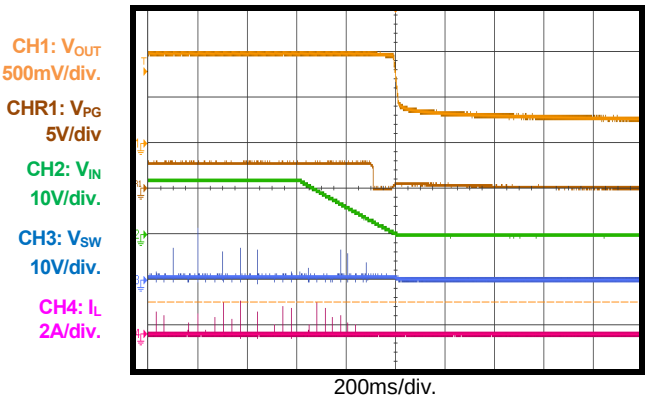
Start-Up through Input Voltage

I_{OUT}=0A



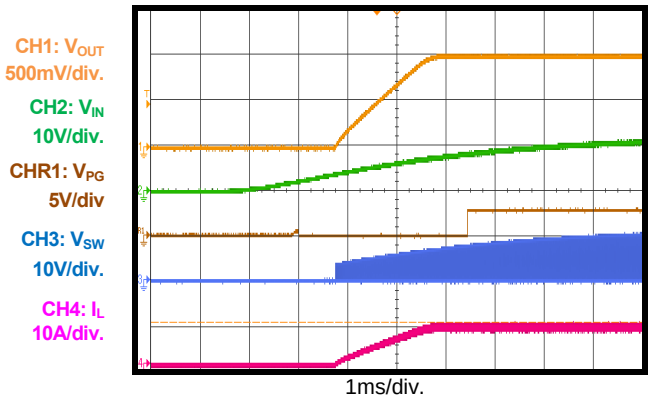
Shutdown through Input Voltage

I_{OUT}=0A



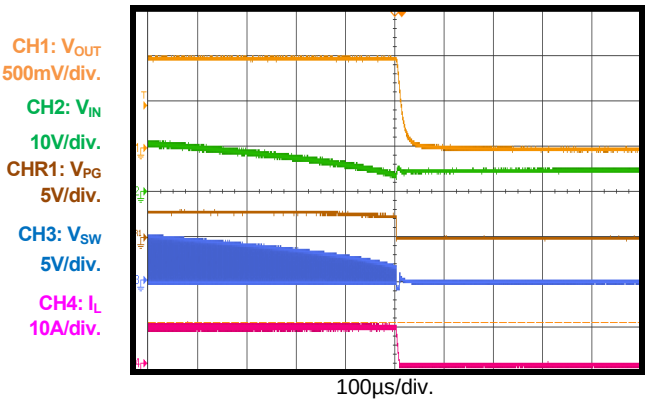
Start-Up through Input Voltage

I_{OUT}=8A



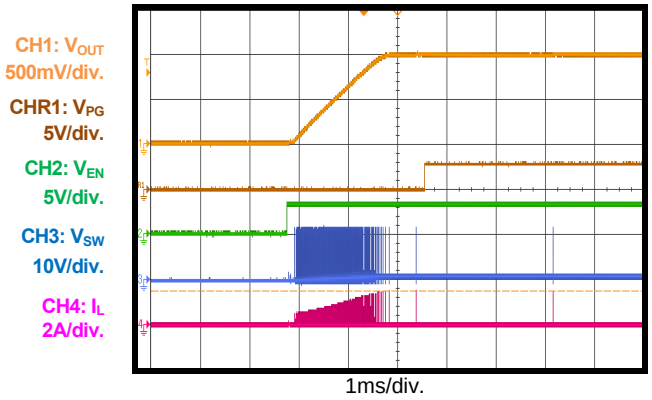
Shutdown through Input Voltage

I_{OUT}=8A



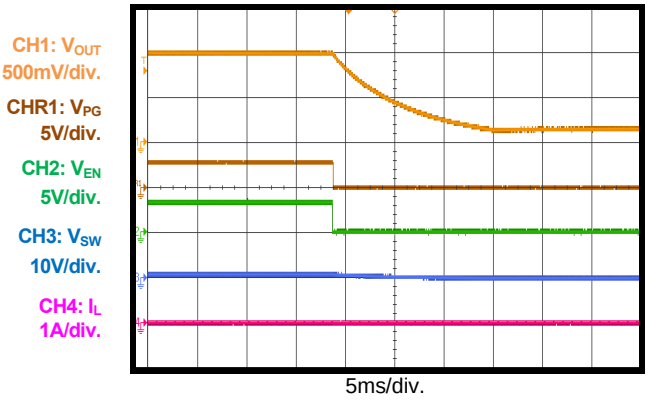
Start-Up through Enable

I_{OUT}=0A



Shutdown through Enable

I_{OUT}=0A

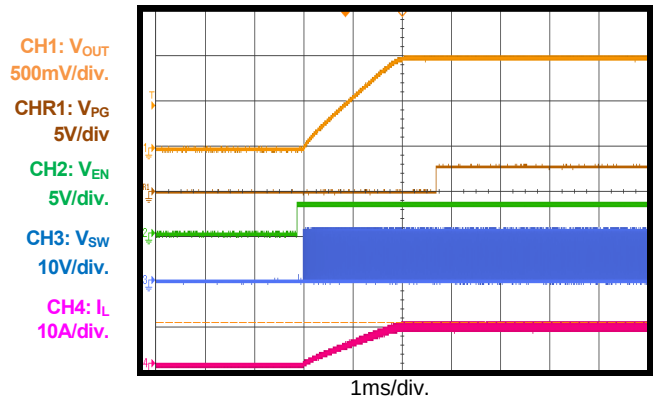


EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the EV2276-D-00A evaluation board.
V_{IN}=12V, V_{OUT}=1V, L=1µH, F_{SW}=600kHz, pulse skip mode. T_A = +25°C, unless otherwise noted.

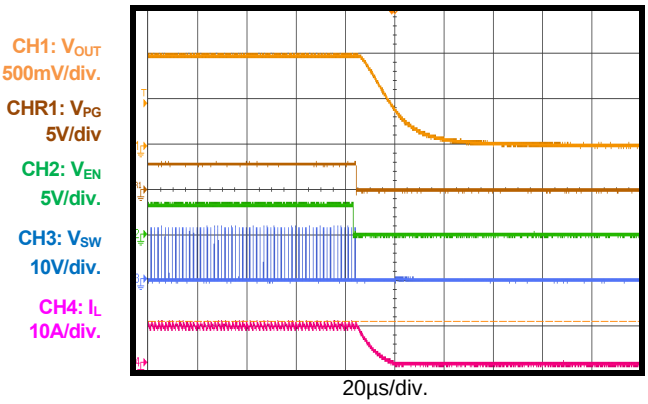
Start-Up through Enable

I_{OUT}=8A



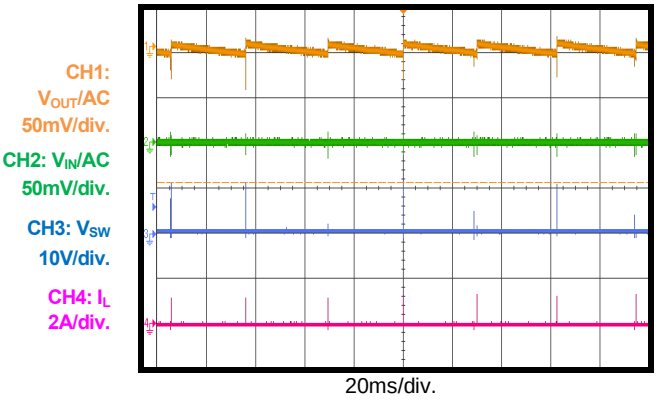
Shutdown through Enable

I_{OUT}=8A



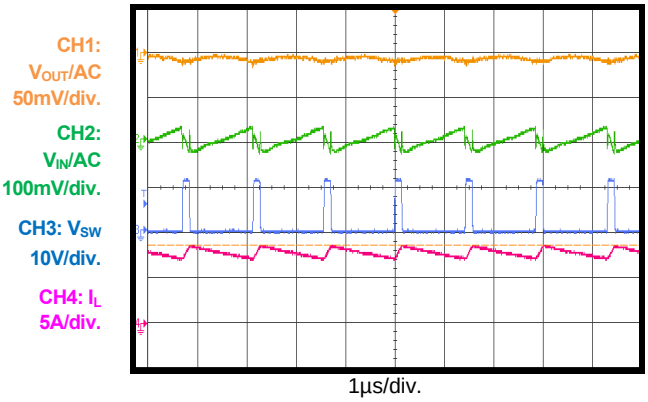
Input / Output Ripple

I_{OUT}=0A



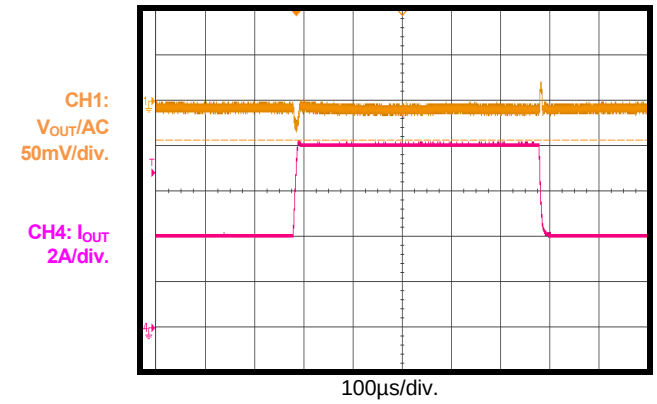
Input / Output Ripple

I_{OUT}=8A



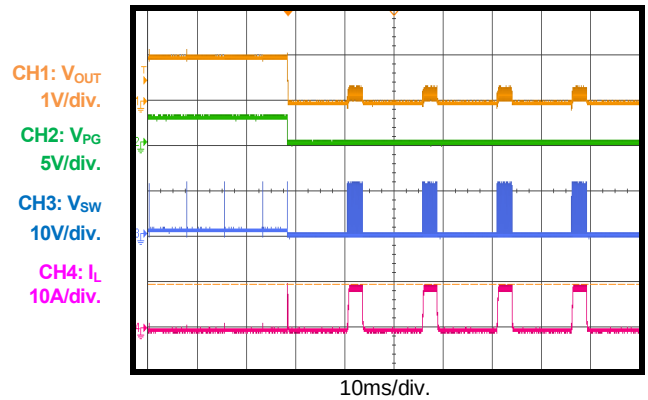
Transient Response

I_{OUT}=4A-8A, Slew Rate=2.5A/µs by Eload



Short-Circuit Entry

I_{OUT}=0A



EVB TEST RESULTS *(continued)*

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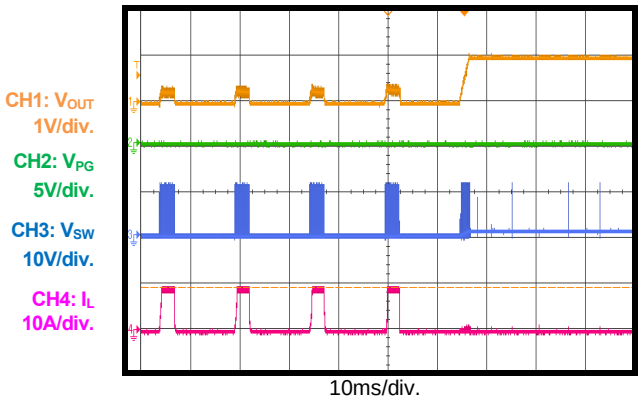
Short Circuit Recovery

I_{OUT}=0A



PRINTED CIRCUIT BOARD LAYOUT

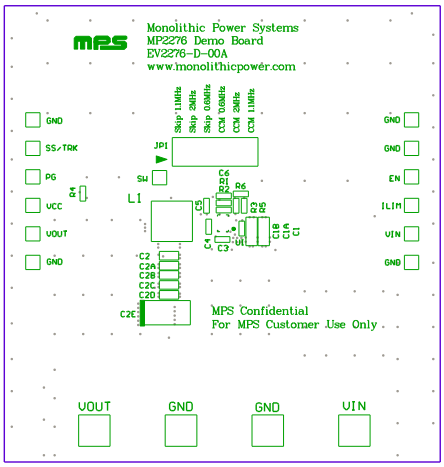


Figure 1—Top Silk Layer

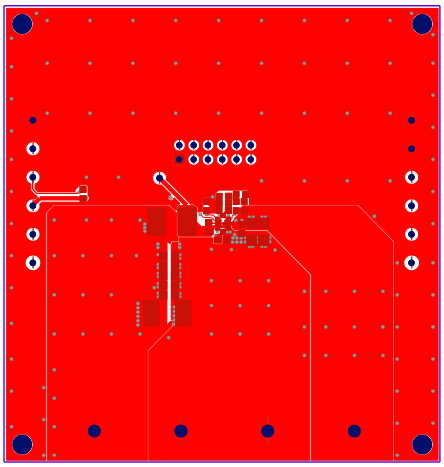


Figure 2—Top Layer

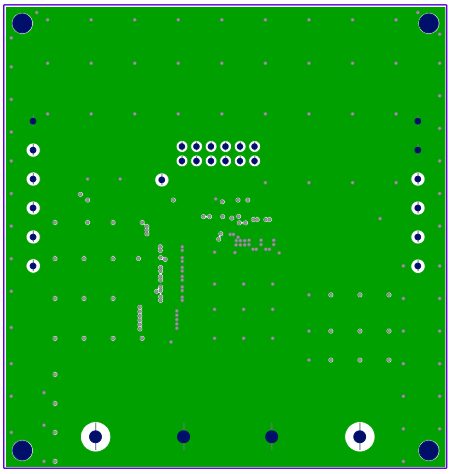


Figure 3—Inner Layer 1

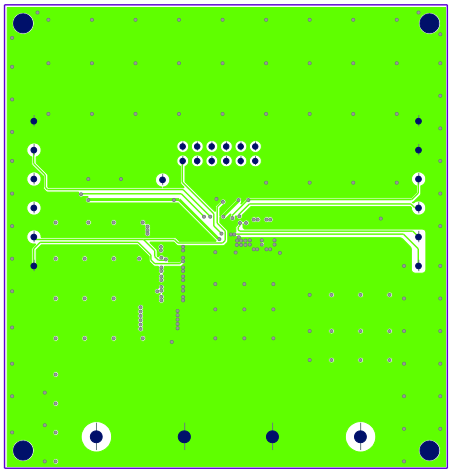


Figure 4— Inner Layer 2

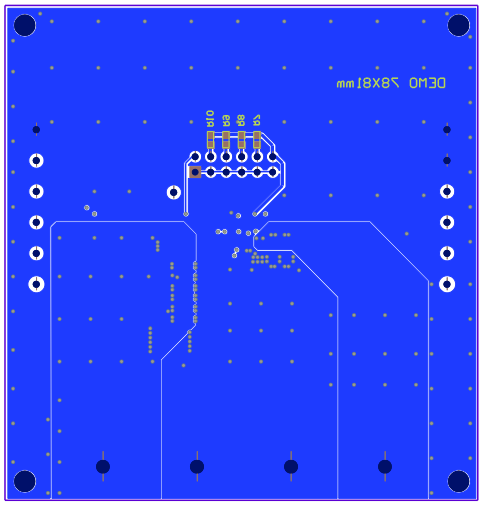


Figure 5—Bottom Layer and Bottom Silk Layer