EV8772C-Q-00A

12A, Wide 3V to 17V Input, 700kHz, Synchronous Step-Down Converter with FCCM Evaluation Board

DESCRIPTION

The EV8772C-Q-00A is an evaluation board designed to demonstrate the capabilities of the MP8772C, a fully integrated, high-frequency, synchronous, rectified, step-down, switch-mode converter with internal power MOSFETs. The MP8772C offers a very compact solution that achieves up to 12A of continuous output current (I_{OUT}), with excellent load and line regulation across a wide input voltage (V_{IN}) range. The converter uses synchronous mode operation for a higher efficiency across the I_{OUT} load range.

Constant-on-time (COT) control operation provides very fast transient response, easy loop design, and very tight output regulation.

Full protection features include short-circuit protection (SCP), over-current protection (OCP), under-voltage protection (UVP), and thermal shutdown.

The MP8772C requires a minimal number of readily available, standard external components, and is available in a space-saving QFN-16 (3mmx3mm) package.

PERFORMANCE SUMMARY

Specifications are at T_A = 25°C, unless otherwise noted.

Parameters	Conditions	Value
Input voltage (V_{IN}) range		3V to 17V
Output voltage (V_{OUT})	V_{IN} = 3V to 17V, I_{OUT} = 0A to 12A	V_{OUT} = 1V
Maximum output current (I_{OUT})	V_{IN} = 3V to 17V	12A
Typical efficiency	V_{IN} = 12V, V_{OUT} = 1V, I_{OUT} = 12A	84.9%
Peak efficiency	V_{IN} = 5V, V_{OUT} = 1V, I_{OUT} = 2A	93.1%
Switching frequency (f_{SW})		700kHz

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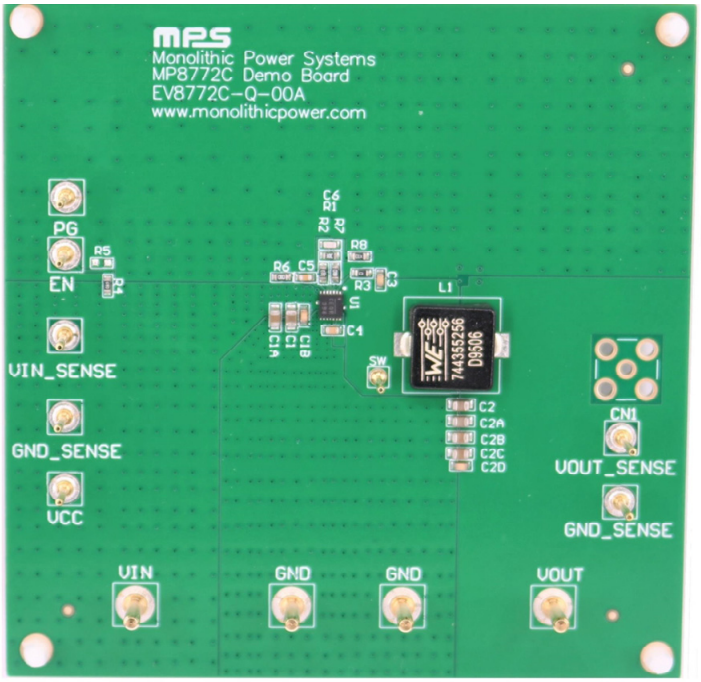
EVALUATION BOARD



LxWxH (8.5cmx8.5cmx1.3cm)

Board Number	MPS IC Number
EV8772C-Q-00A	MP8772CGQ

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QUICK START GUIDE

The EV8772C-Q-00A evaluation board is easy to set up and use to evaluate the performance of the MP8772C. For proper measurement equipment set-up, refer to Figure 1 and follow the steps below:

1. Preset the power supply to 12V, then turn off the power supply. (1)
2. Connect the power supply terminals to:
   a. Positive (+): VIN
   b. Negative (-): GND
3. Connect the load terminals to:
   a. Positive (+): VOUT
   b. Negative (-): GND
4. After making the connections, turn on the power supply. The board should start up automatically.
5. Check for the proper output voltage (V_{OUT}) between the VOUT_SENSE and GND_SENSE terminals. Once the proper V_{OUT} is established, adjust the load within the operating range, then measure the efficiency, V_{OUT} ripple, and other parameters.

Note:

1) Ensure that V_{IN} does not exceed 17V.

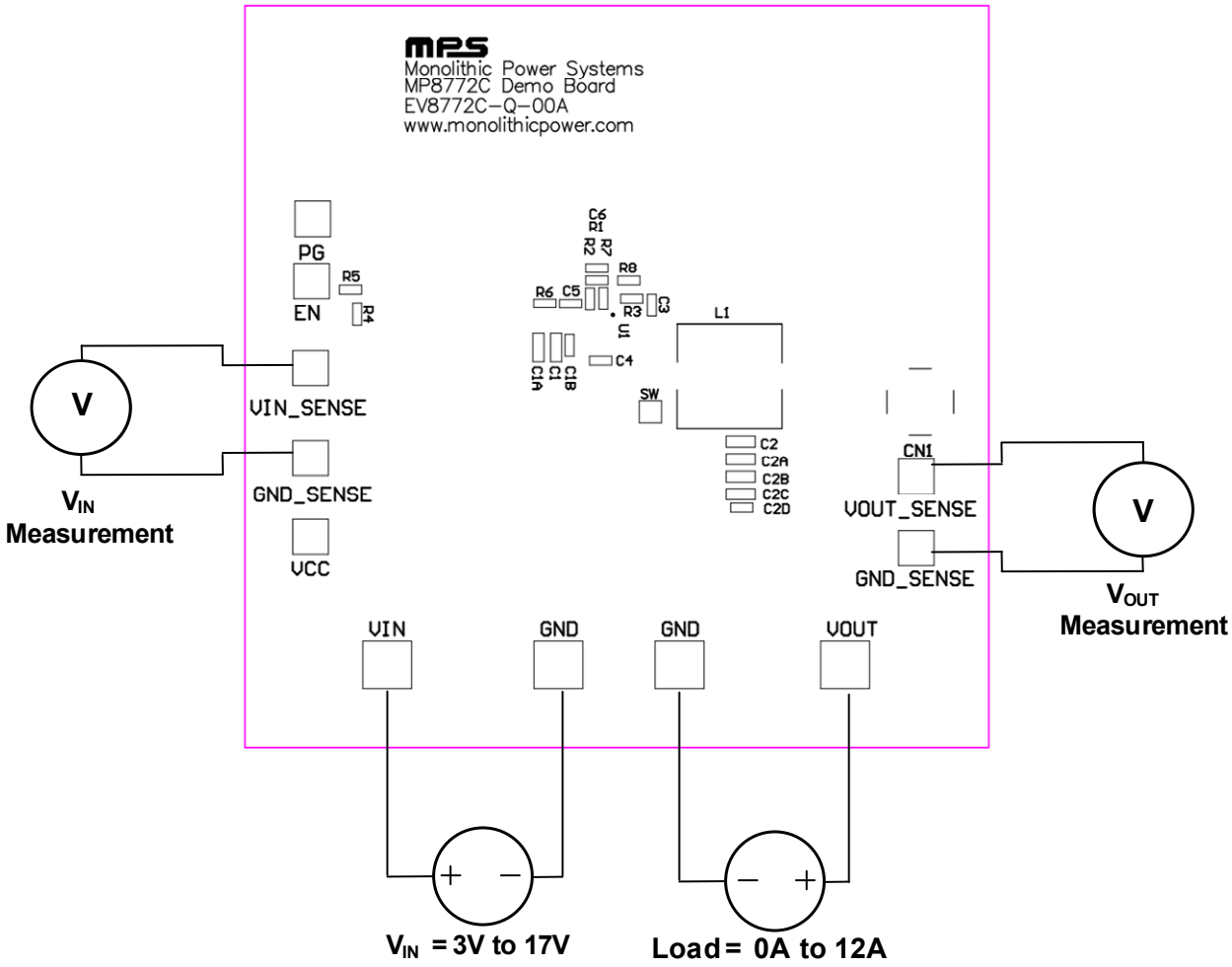

Figure 1: Measurement Equipment Set-Up

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EVALUATION BOARD SCHEMATIC

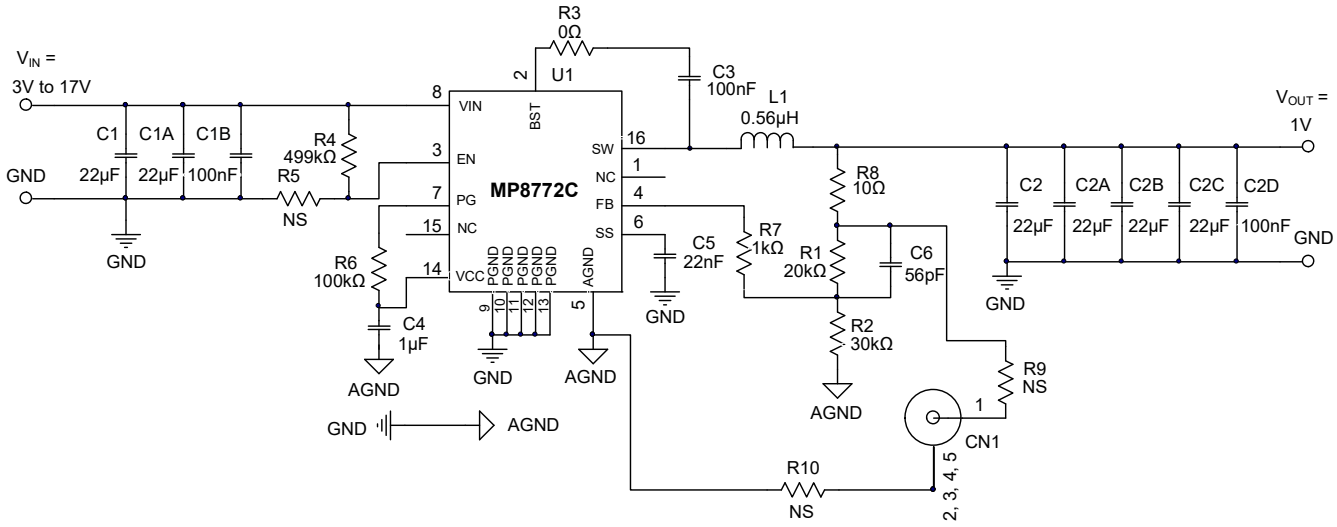

Figure 2: Evaluation Board Schematic

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EV8772C-Q-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Part Number
6	C1, C1A, C2, C2A, C2B, C2C	22µF	Ceramic capacitor, 25V, X5R	0805	Murata	GRM21BR61E226ME44L
3	C1B, C2DC3	0.1µF	Ceramic capacitor, 25V, X7R	0603	Murata	GRM188R71E104KA01D
1	C4	1µF	Ceramic capacitor, 25V, X7R	0603	Murata	GRM188R71E105KA12D
1	C5	22nF	Ceramic capacitor, 16V, X7R	0603	Murata	GRM188R71C223KA01D
1	C6	56pF	Ceramic capacitor, 50V, C0G	0603	Murata	GRM1885C1H560JA01D
1	R1	20kΩ	Thick film resistor, 1%	0603	Yageo	RC0603FR-0720KL
1	R2	30kΩ	Thick film resistor, 1%	0603	Yageo	RC0603FR-0730KL
1	R3	0Ω	Thick film resistor, 1%	0603	Yageo	RC0603FR-070RL
1	R4	499kΩ	Thick film resistor, 1%	0603	Yageo	RC0603FR-07499KL
0	R5, R9, R10	NS		0603		
1	R6	100kΩ	Thick film resistor, 1%	0603	Yageo	RC0603FR-07100KL
1	R7	1kΩ	Thick film resistor, 1%	0603	Yageo	RC0603FR-071KL
1	R8	10Ω	Thick film resistor, 1%	0603	Yageo	RC0603JR-0710RL
1	L1	0.56µH	Inductor, DCR = 1.5mΩ, I_S = 30A	SMD	Wurth	744355256
1	U1	MP8772C	17V, 12A, integrated, high-frequency, synchronous, rectified, step-down, switch-mode converter	QFN-16 (3mmx 3mm)	MPS	MP8772CGQ

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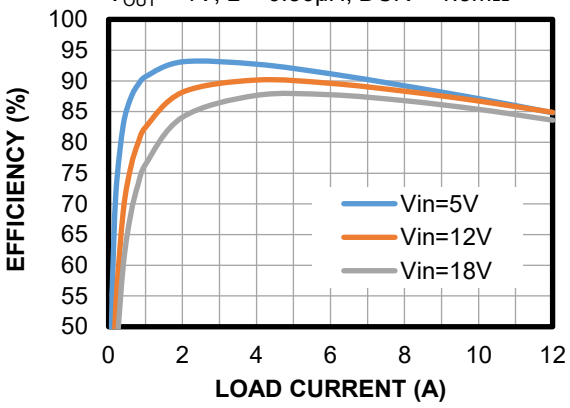
EVB TEST RESULTS

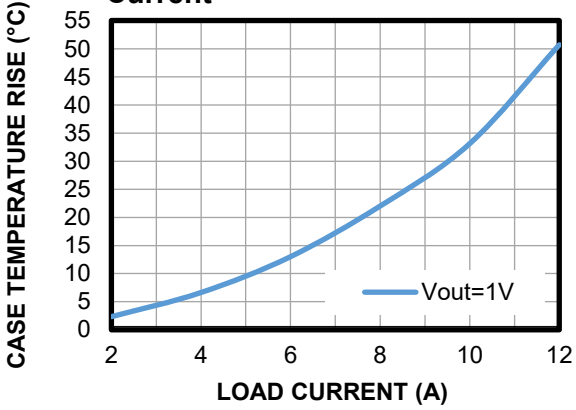
V_{IN} = 12V, V_{OUT} = 1V, L = 0.56µH, f_{SW} = 700kHz, T_A = 25°C, unless otherwise noted.

Efficiency vs. Load Current

V_{OUT} = 1V, L = 0.56µH, DCR = 1.5mΩ



Case Temperature Rise vs. Load Current



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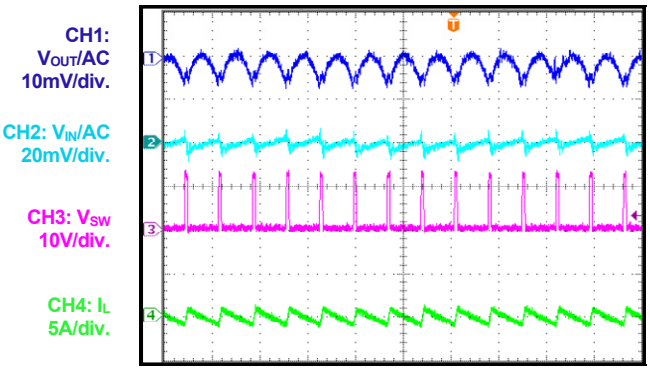
EVB TEST RESULTS *(continued)*

V_{IN} = 12V, V_{OUT} = 1V, L = 0.56µH, f_{SW} = 700kHz, T_A = 25°C, unless otherwise noted.

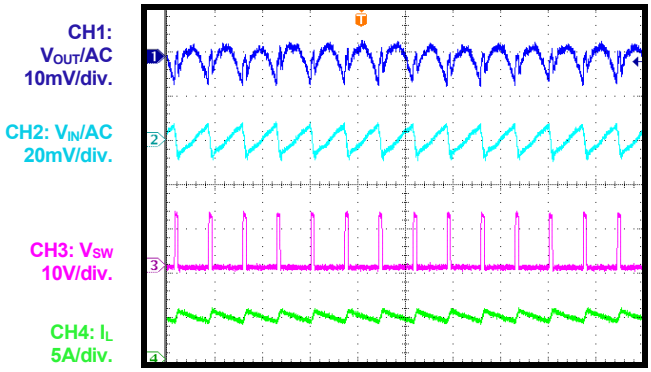
Input and Output Voltage Ripple

I_{OUT} = 0A



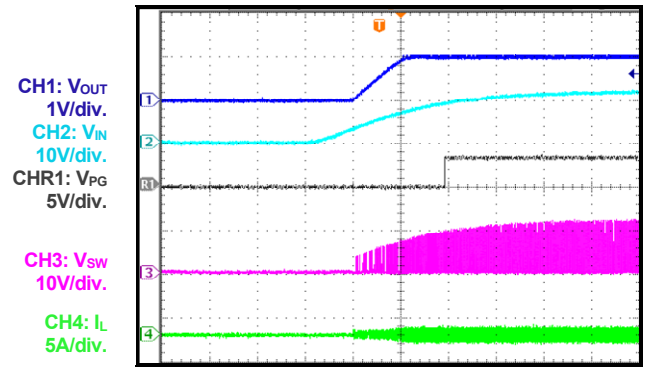
Input and Output Voltage Ripple

I_{OUT} = 12A



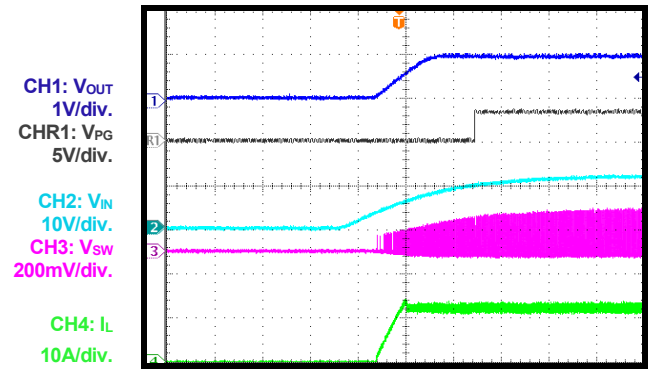
Start-Up through VIN

I_{OUT} = 0A



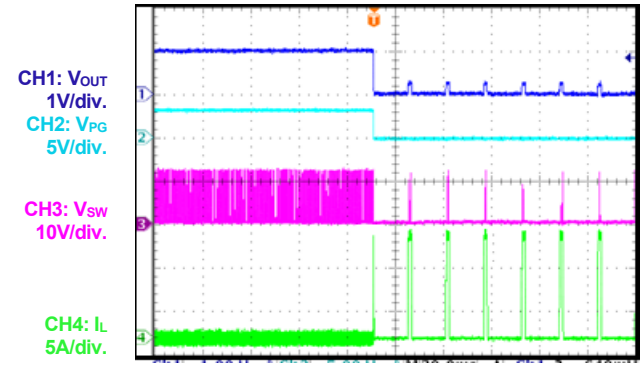
Start-Up through VIN

I_{OUT} = 12A



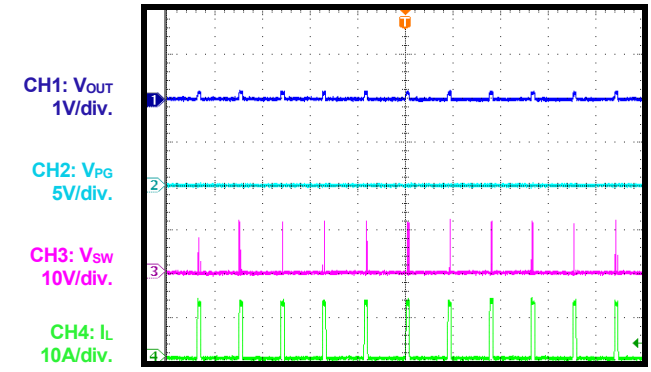
SCP Entry

I_{OUT} = 0A



SCP Steady State

Short output to GND



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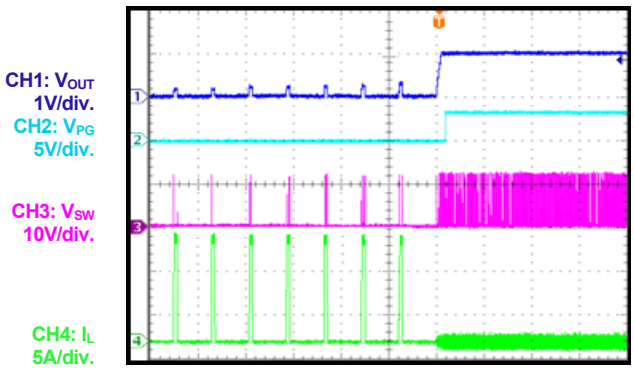
EVB TEST RESULTS *(continued)*

V_{IN} = 12V, V_{OUT} = 1V, L = 0.56µH, f_{SW} = 700kHz, T_A = 25°C, unless otherwise noted.

SCP Recovery

I_{OUT} = 0A



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PCB LAYOUT

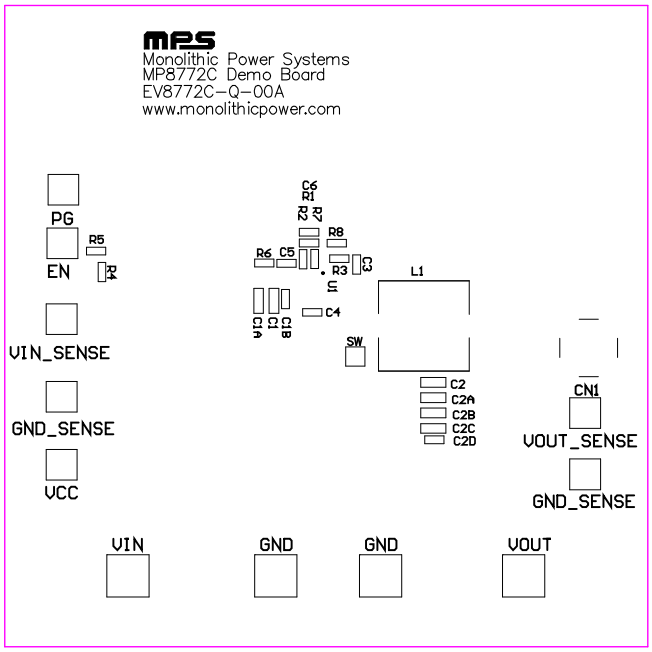

Figure 3: Top Silk

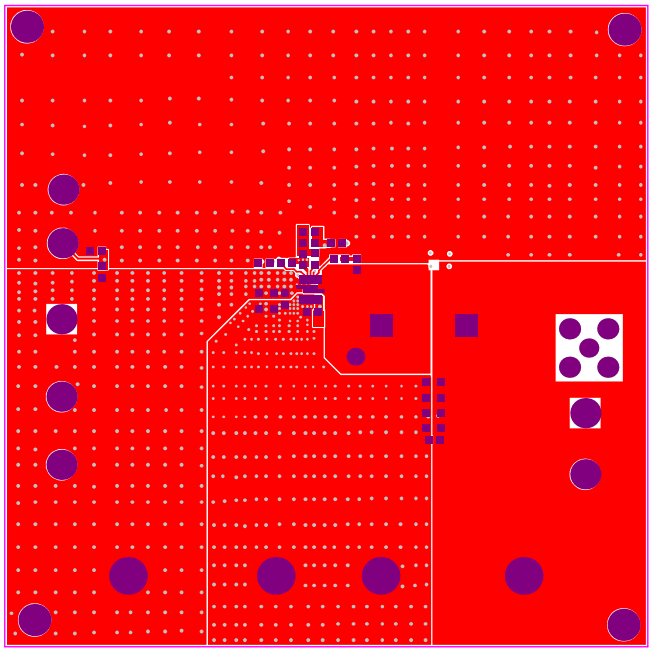

Figure 4: Top Layer

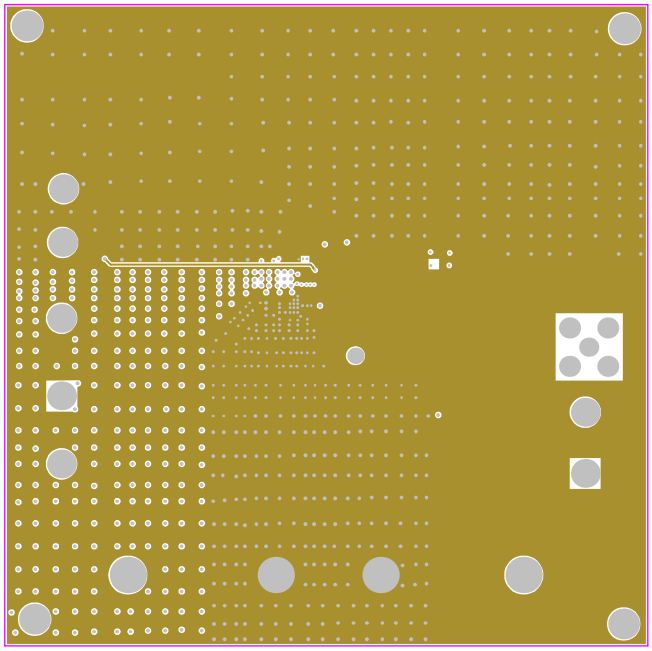

Figure 5: Mid-Layer 1

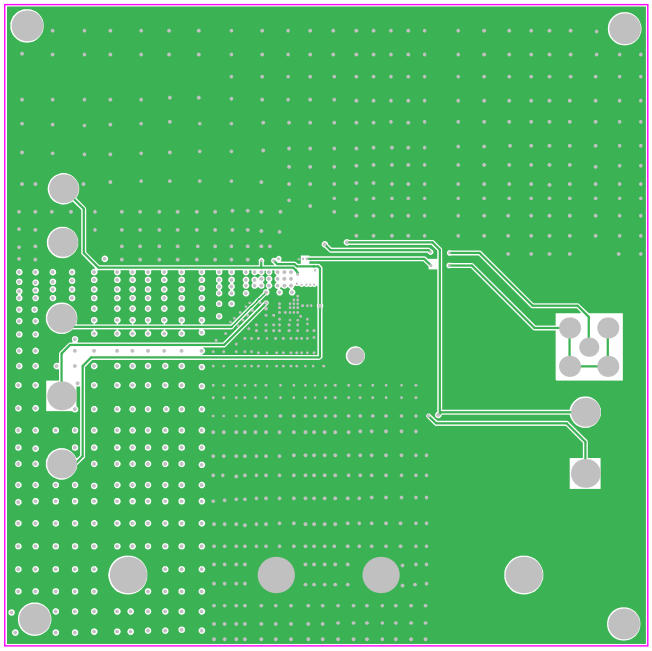

Figure 6: Mid-Layer 2

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PCB LAYOUT *(continued)*

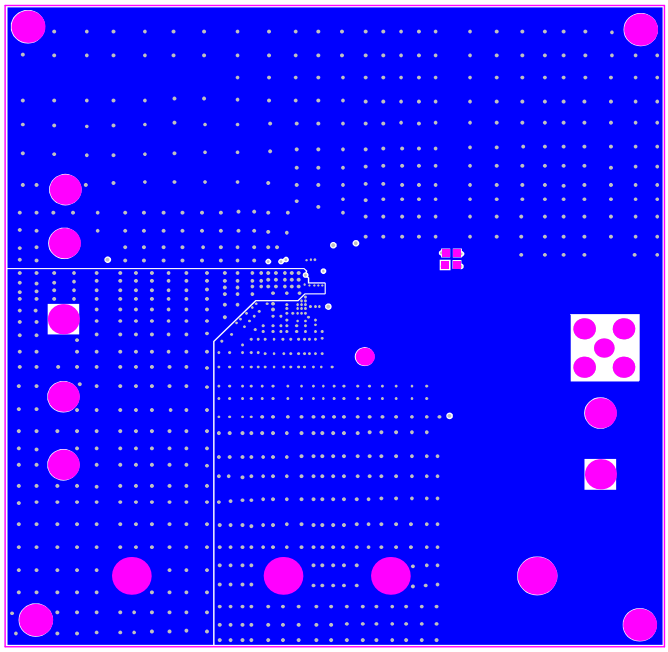

Figure 7: Bottom Layer

Figure 8: Bottom Silk

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REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	7/18/2024	Initial Release	-

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