



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.

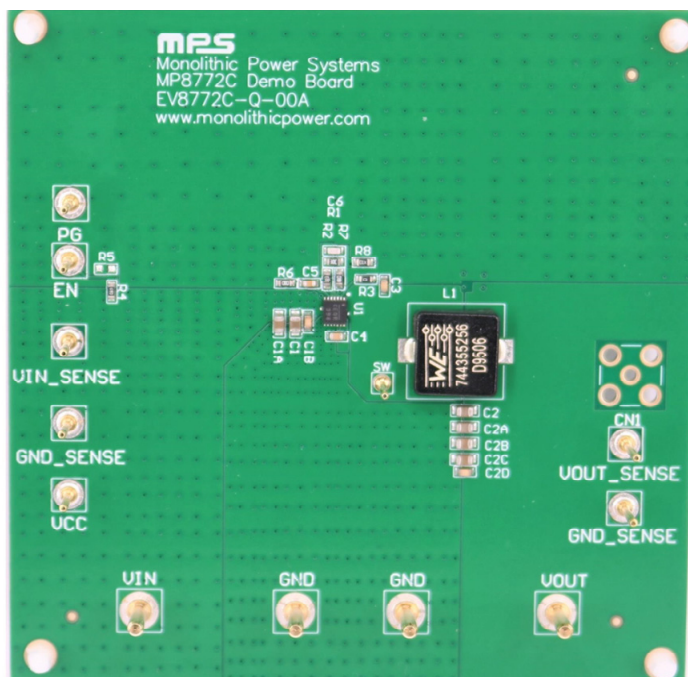
The MP8772C requires a minimal number of readily available, standard external components, and is available in a space-saving QFN-16 (3mmx3mm) package.

PERFORMANCE SUMMARY

Specifications are at $T_A = 25^\circ\text{C}$, unless otherwise noted.

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

EVALUATION BOARD



LxWxH (8.5cmx8.5cmx1.3cm)

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

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.

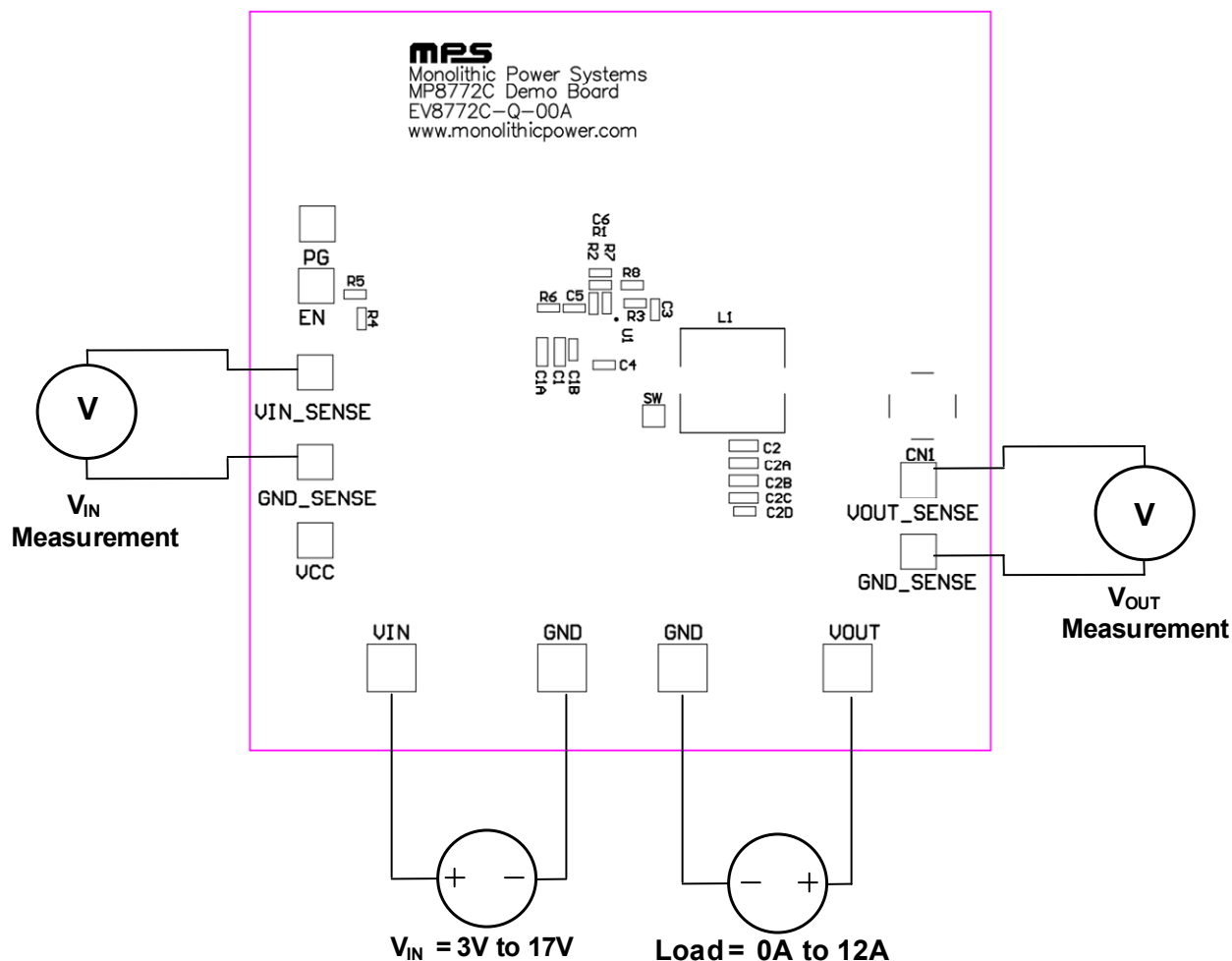


Figure 1: Measurement Equipment Set-Up

EVALUATION BOARD SCHEMATIC

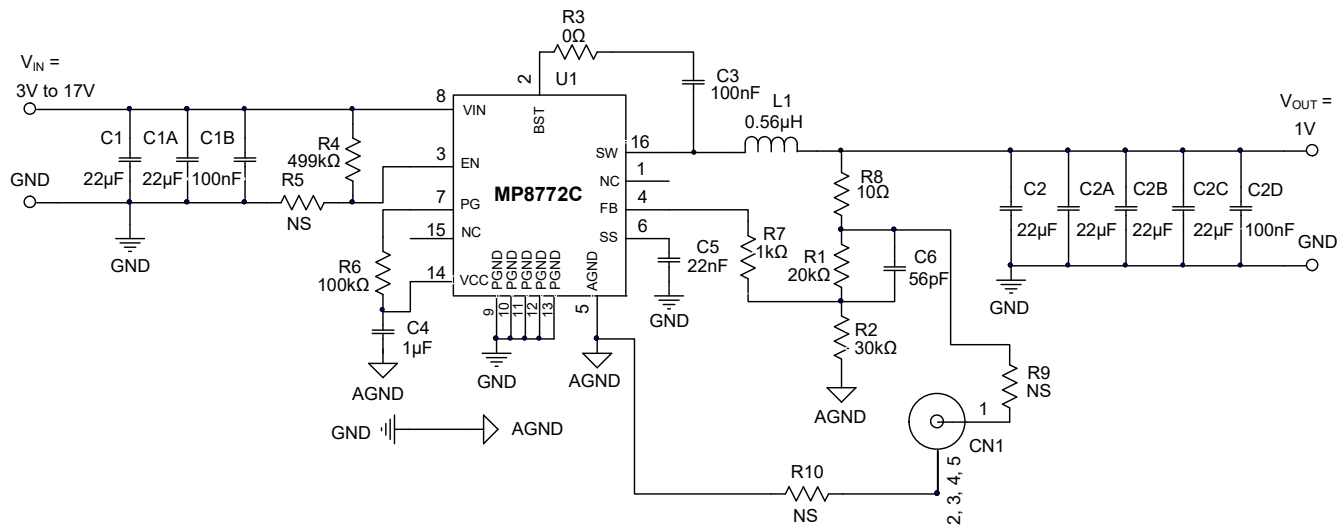


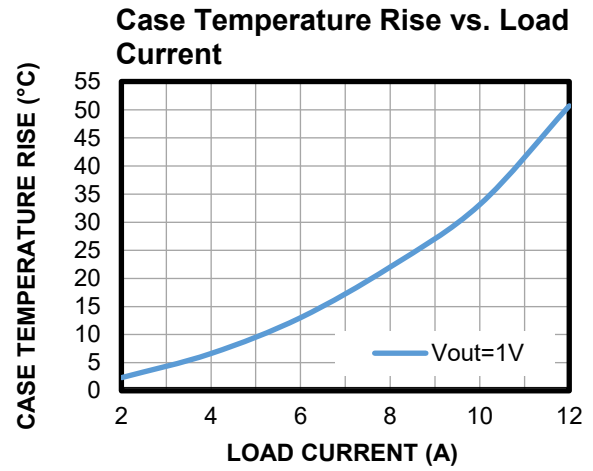
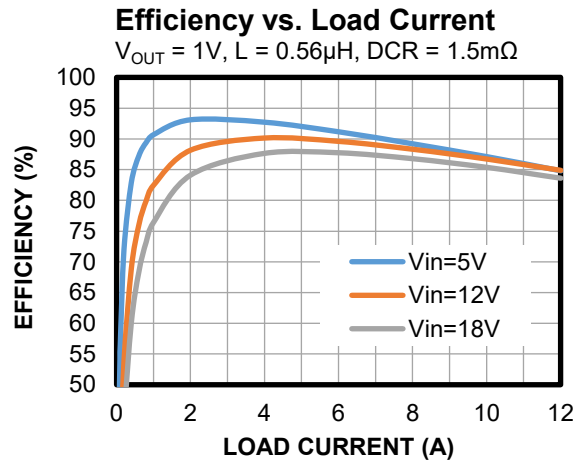
Figure 2: Evaluation Board Schematic

EV8772C-Q-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Part Number
6	C1, C1A, C2, C2A, C2B, C2C	22 μ F	Ceramic capacitor, 25V, X5R	0805	Murata	GRM21BR61E226ME44L
3	C1B, C2DC3	0.1 μ F	Ceramic capacitor, 25V, X7R	0603	Murata	GRM188R71E104KA01D
1	C4	1 μ F	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	20k Ω	Thick film resistor, 1%	0603	Yageo	RC0603FR-0720KL
1	R2	30k Ω	Thick film resistor, 1%	0603	Yageo	RC0603FR-0730KL
1	R3	0 Ω	Thick film resistor, 1%	0603	Yageo	RC0603FR-070RL
1	R4	499k Ω	Thick film resistor, 1%	0603	Yageo	RC0603FR-07499KL
0	R5, R9, R10	NS		0603		
1	R6	100k Ω	Thick film resistor, 1%	0603	Yageo	RC0603FR-07100KL
1	R7	1k Ω	Thick film resistor, 1%	0603	Yageo	RC0603FR-071KL
1	R8	10 Ω	Thick film resistor, 1%	0603	Yageo	RC0603JR-0710RL
1	L1	0.56 μ H	Inductor, DCR = 1.5m Ω , I _S = 30A	SMD	Würth	744355256
1	U1	MP8772C	17V, 12A, integrated, high- frequency, synchronous, rectified, step-down, switch- mode converter	QFN-16 (3mmx 3mm)	MPS	MP8772CGQ

EVB TEST RESULTS

$V_{IN} = 12V$, $V_{OUT} = 1V$, $L = 0.56\mu H$, $f_{SW} = 700kHz$, $T_A = 25^\circ C$, unless otherwise noted.

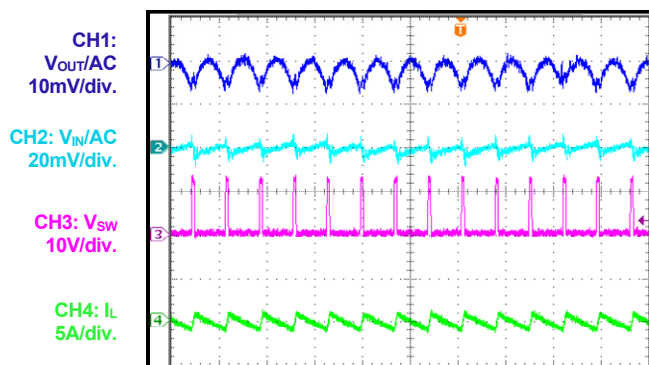


EVB TEST RESULTS *(continued)*

$V_{IN} = 12V$, $V_{OUT} = 1V$, $L = 0.56\mu H$, $f_{SW} = 700kHz$, $T_A = 25^\circ C$, unless otherwise noted.

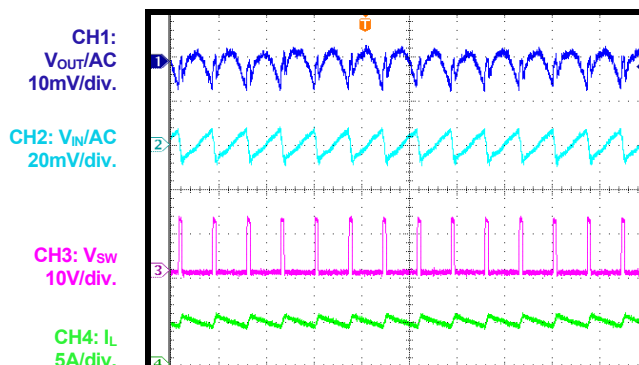
Input and Output Voltage Ripple

$I_{OUT} = 0A$



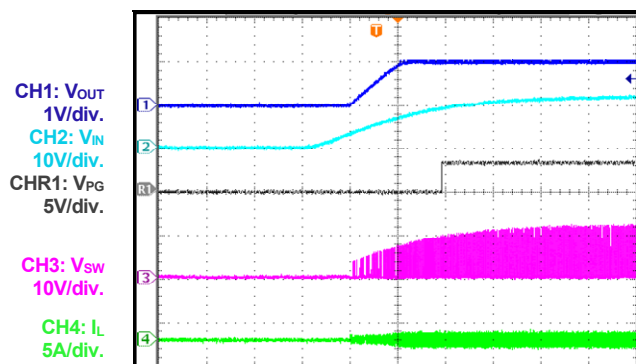
Input and Output Voltage Ripple

$I_{OUT} = 12A$



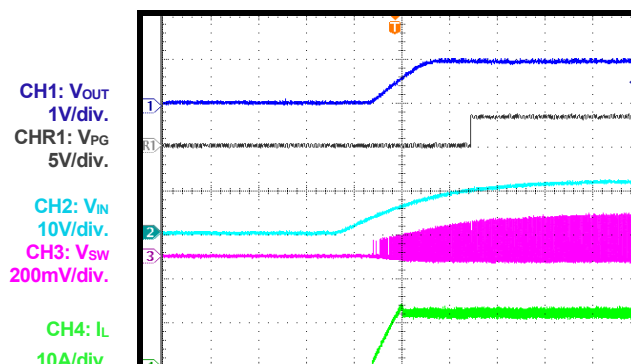
Start-Up through VIN

$I_{OUT} = 0A$



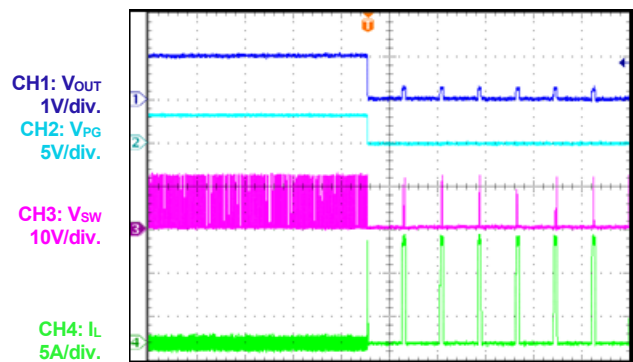
Start-Up through VIN

$I_{OUT} = 12A$



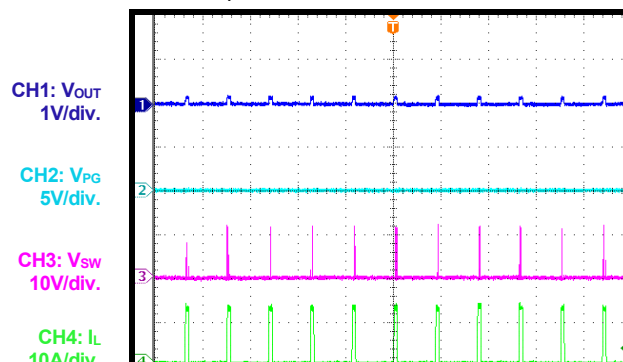
SCP Entry

$I_{OUT} = 0A$



SCP Steady State

Short output to GND

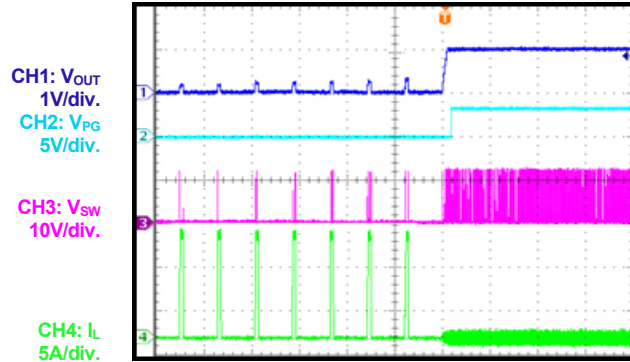


EVB TEST RESULTS *(continued)*

$V_{IN} = 12V$, $V_{OUT} = 1V$, $L = 0.56\mu H$, $f_{SW} = 700kHz$, $T_A = 25^\circ C$, unless otherwise noted.

SCP Recovery

$I_{OUT} = 0A$



PCB LAYOUT

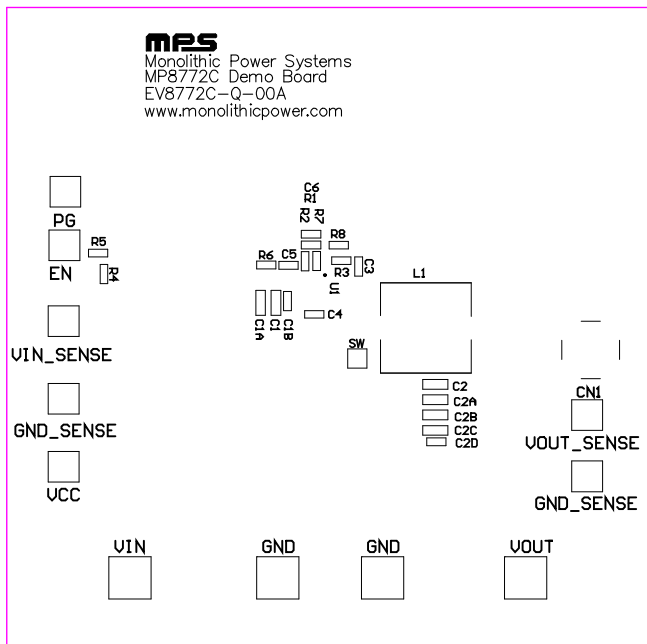


Figure 3: Top Silk

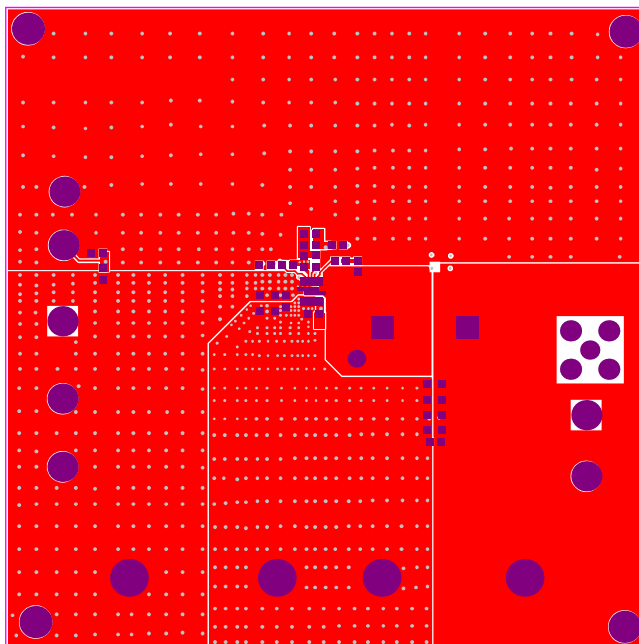


Figure 4: Top Layer

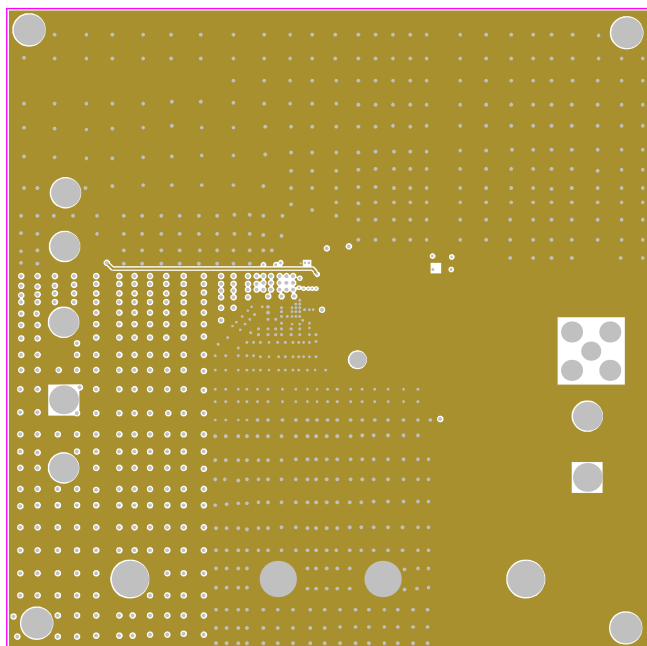


Figure 5: Mid-Layer 1

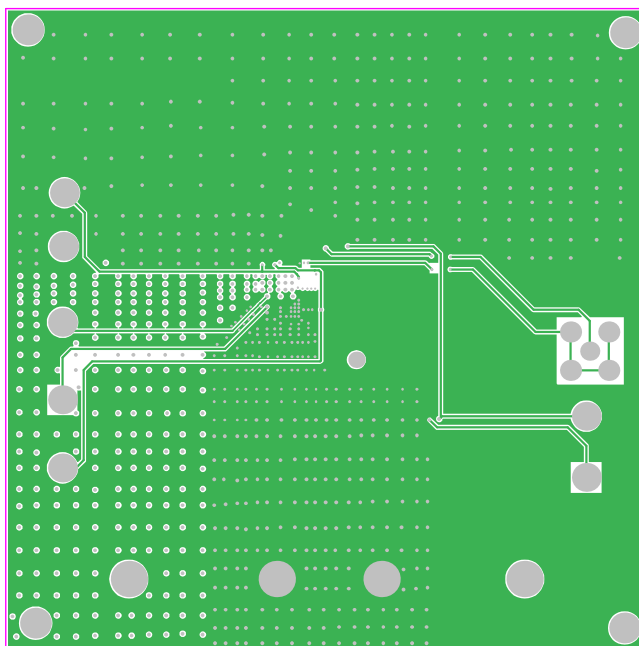


Figure 6: Mid-Layer 2

PCB LAYOUT *(continued)*

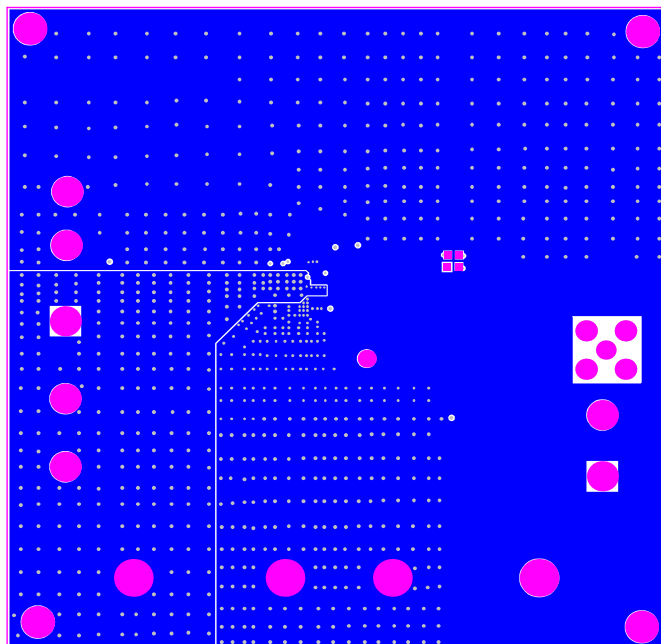


Figure 7: Bottom Layer

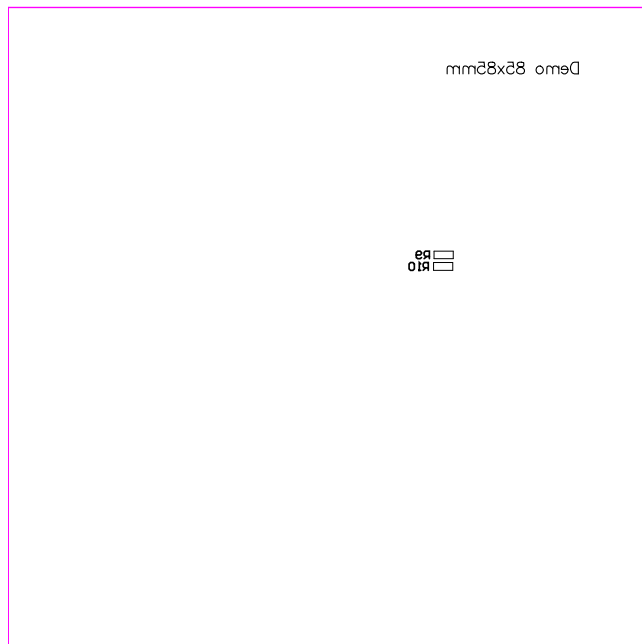


Figure 8: Bottom Silk



REVISION HISTORY

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

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