

DESCRIPTION

The EV4581 Evaluation Board is designed to demonstrate the capabilities of MPS' MP4581.

The MP4581 is a high efficiency synchronous step-down converter with integrated high-side and low-side MOSFETs. It provides 0.8A output in buck topology from up to 100V input power supply.

MP4581 supports high efficiency pulse-skip-mode (PSM) in light load condition. Valley current limit circuits protect against overload and short circuit conditions.

The MP4581 is available in a SOIC8EP packages.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V _{IN}	10 - 100	V
Output Voltage	V _{OUT}	5	V
Output Current	I _{OUT}	0 - 0.8	A

FEATURES

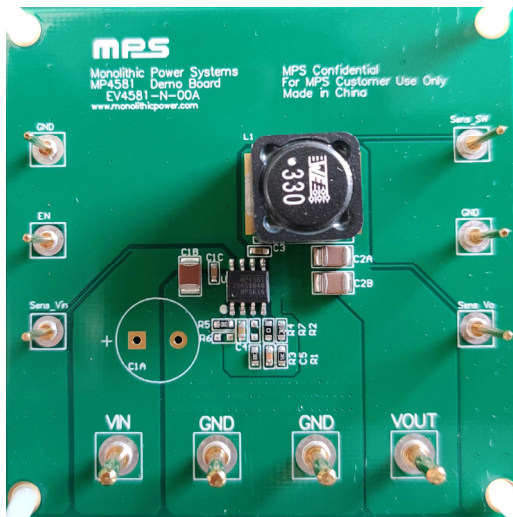
- 10V-to-100V Input Voltage Range
- 1V-to-30V Output Voltage Range
- 90% Maximum Operation Duty Cycle
- 625mΩ / 380mΩ Internal MOSFETs
- Constant On Time Control Mode
- Programmable 100kHz to 1MHz Frequency
- Internal Soft-Start and Loop Compensation
- OCP, SCP with Hiccup
- High Efficiency PSM in Light Load
- Available in SOIC8EP Package

APPLICATIONS

- High Voltage Battery Packs
- Industrial Power Supplies
- Printer Power Board

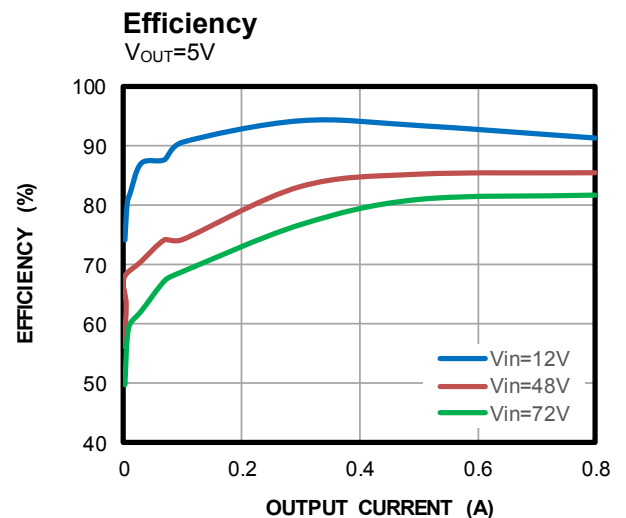
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EV4581-N-00A EVALUATION BOARD

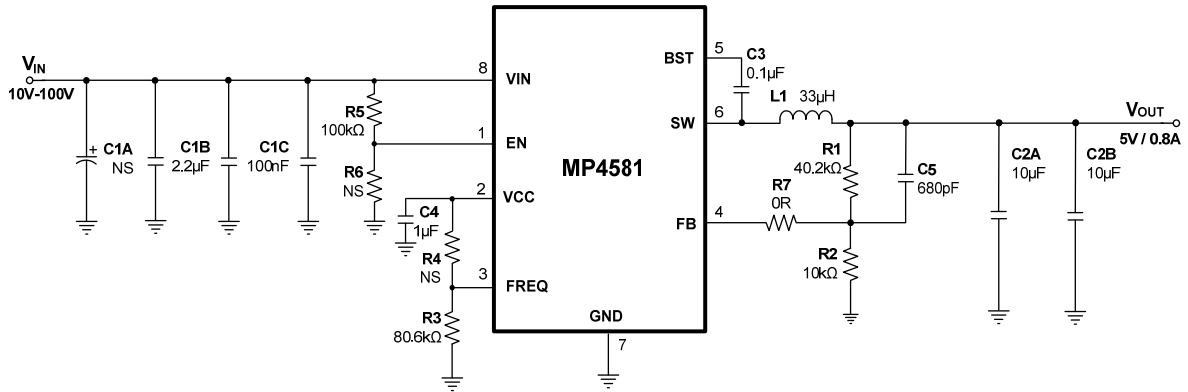


(L × W × H) 6.35cm x 6.35cm x 0.6cm

Board Number	MPS IC Number
EV4581-N-00A	MP4581GN



EVALUATION BOARD SCHEMATIC



EV4581-N-00A BILL OF MATERIALS

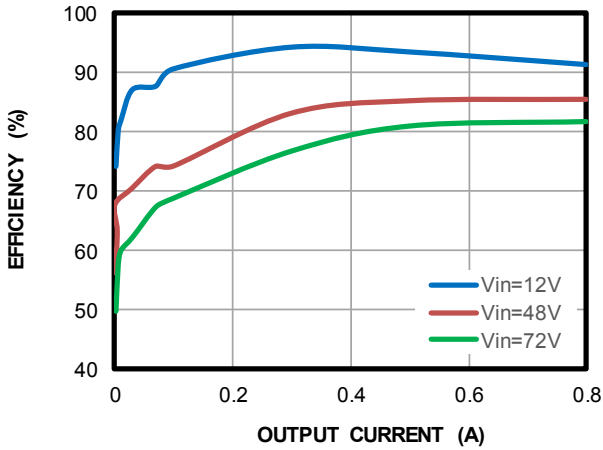
Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
1	C1B	2.2 μ F	Ceramic Cap, 100V, X7R	1210	muRata	GRM32ER72A225KA88L
2	C1C, C3	100nF	Ceramic Cap, 100V, X7R	0603	muRata	GRM188R72A104KA01D
2	C2A, C2B	10 μ F	Ceramic Cap, 25V, X7R	1210	muRata	GRM32DR71E106KA12L
1	C4	1 μ F	Ceramic Cap, 16V, X7R	0603	muRata	GRM188R71C105KA01D
1	C5	680pF	Ceramic Cap, 50V, COG	0603	muRata	GRM1885C1H681JA01D
1	R1	40.2K	Film resistor, 1%	0603	YAGEO	RC0603FR-0740K2L
1	R2	10K	Film resistor, 1%	0603	YAGEO	RC0603FR-0710KL
1	R3	80.6K	Film resistor, 1%	0603	YAGEO	RC0603FR-0780K6L
1	R5	100K	Film resistor, 1%	0603	YAGEO	RC0603FR-07100KL
1	R7	0R	Film resistor, 1%	0603	YAGEO	RC0603FR-070RL
0	C1A, R4, R6	NS				
1	L1	33 μ H	Isat=4.2A, 45m Ω inductor	SMD	Würth	7447709330
1	U1	MP4581	100V, 0.8A Synchronous Buck	SOIC8EP	MPS	MP4581GN

EVB TEST RESULTS

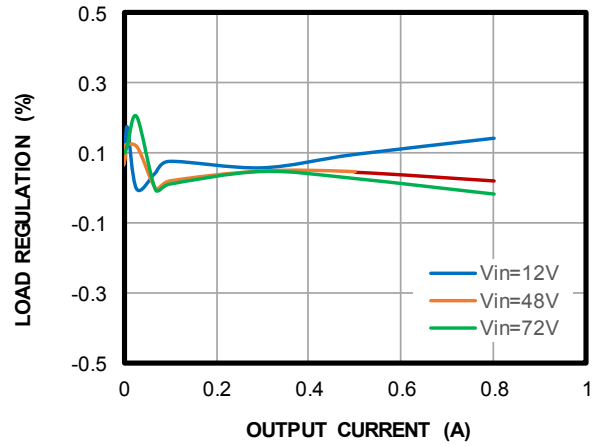
Performance curves and waveforms are tested on the evaluation board.

$V_{IN} = 48V$, $V_{OUT} = 5V$, $L = 33\mu H$, $T_A = 25^\circ C$, unless otherwise noted.

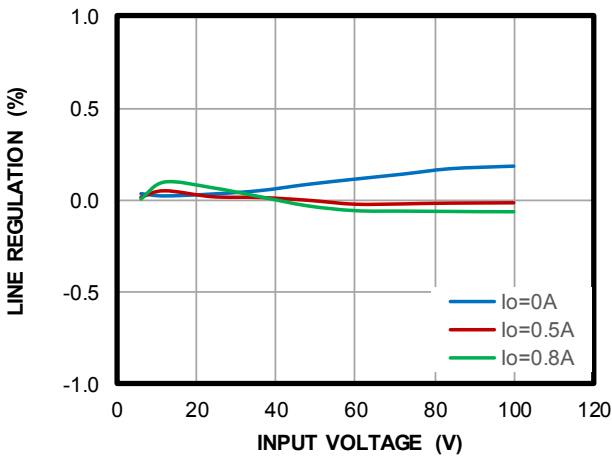
Efficiency vs. I_o



Load Regulation

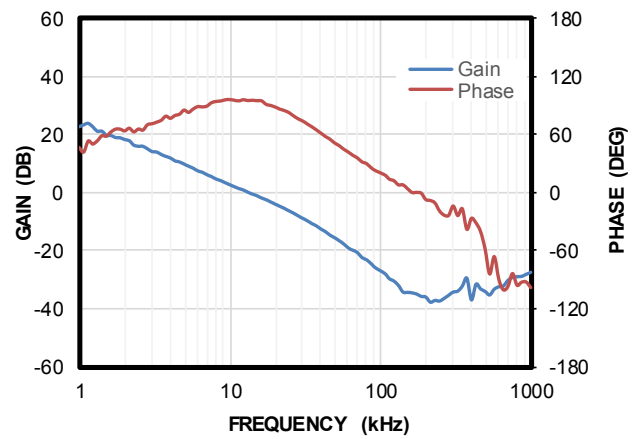


Line Regulation

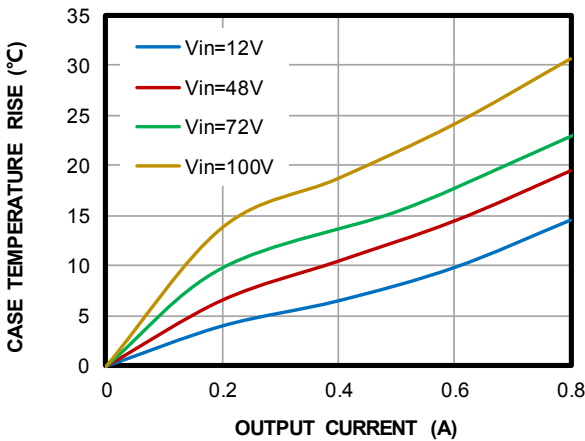


Bode Plot

$I_{OUT}=0.8A$



Case Temperature Rise. vs. Output Current



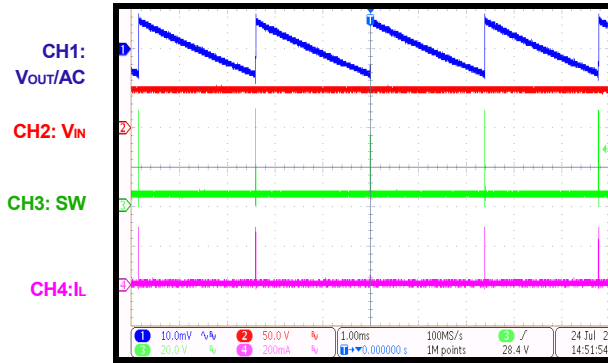
EVB TEST RESULTS (continued)

Performance curves and waveforms are tested on the evaluation board.

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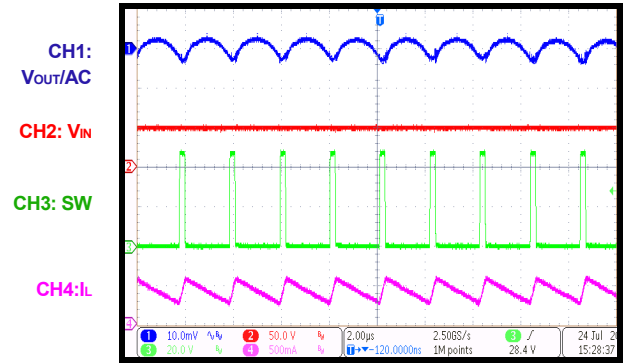
Steady State

$I_{OUT}=0A$



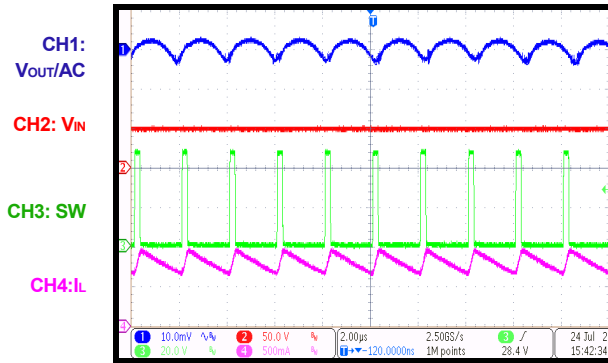
Steady State

$I_{OUT}=0.4A$



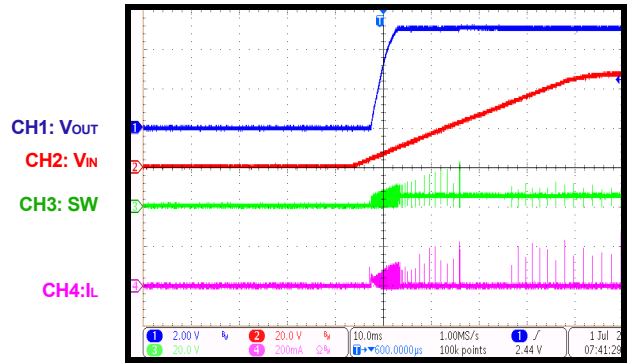
Steady State

$I_{OUT}=0.8A$



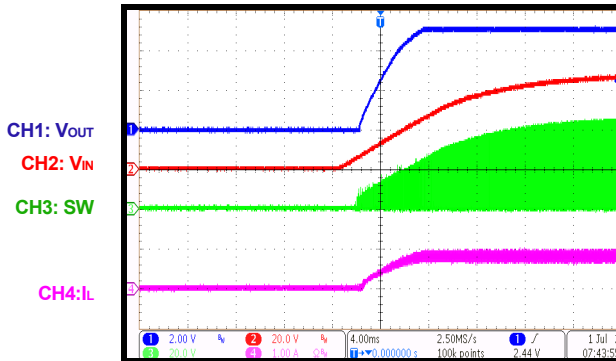
VIN Start-Up

$I_{OUT}=0A$



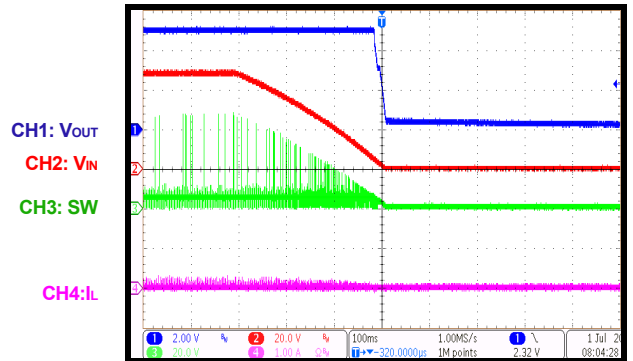
VIN Start-Up

$I_{OUT}=0.8A$



VIN Shutdown

$I_{OUT}=0A$



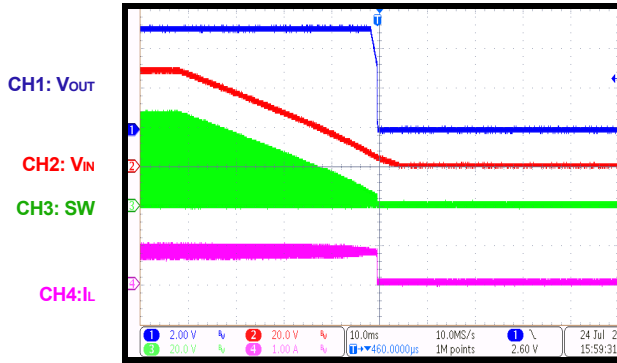
EVB TEST RESULTS (continued)

Performance curves and waveforms are tested on the evaluation board.

$V_{IN} = 48V$, $V_{OUT} = 5V$, $L = 33\mu H$, $T_A = 25^\circ C$, unless otherwise noted.

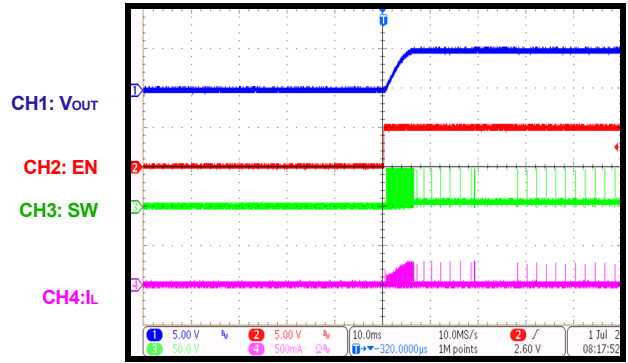
VIN Shutdown

$I_{OUT} = 0.8A$



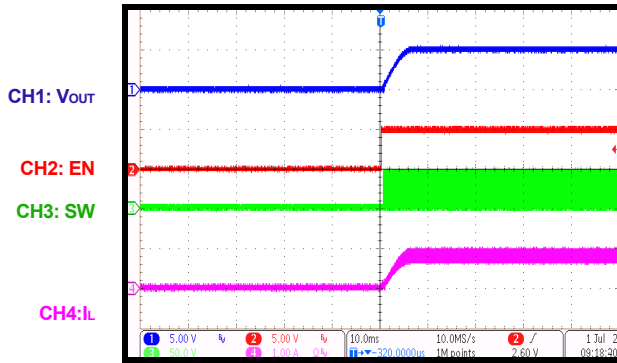
EN ON

$I_{OUT} = 0A$



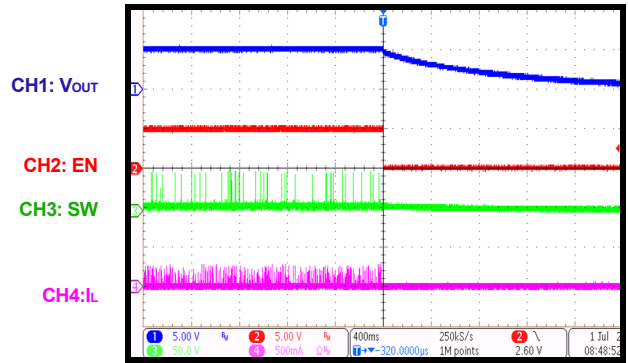
EN ON

$I_{OUT} = 0.8A$



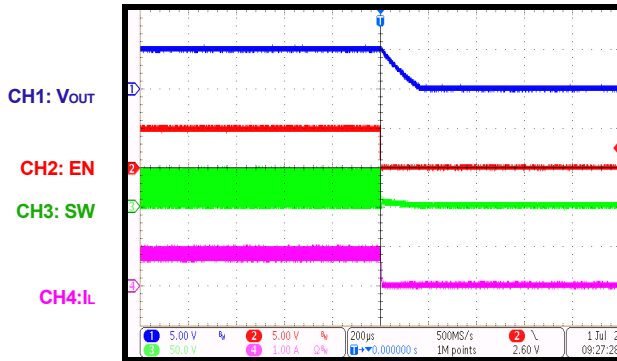
EN OFF

$I_{OUT} = 0A$



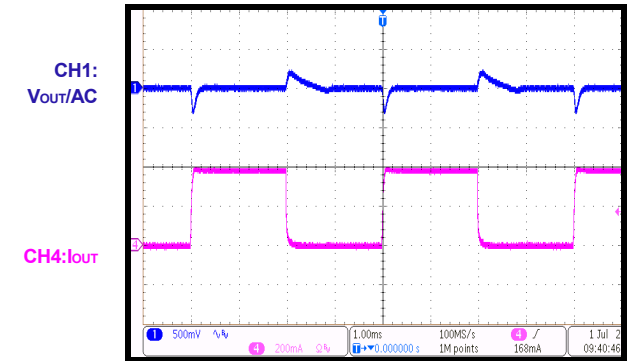
EN OFF

$I_{OUT} = 0.8A$



Load Transient

$I_{OUT} = 0A$ to $0.4A$



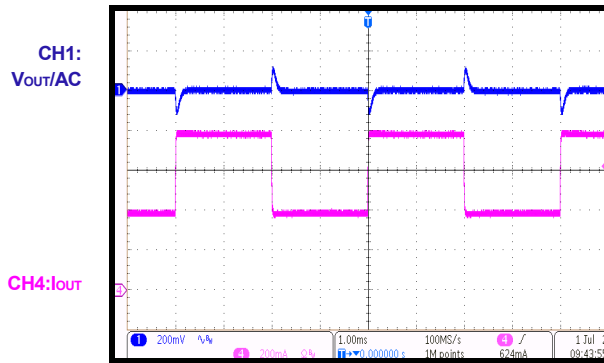
EVB TEST RESULTS (continued)

Performance curves and waveforms are tested on the evaluation board.

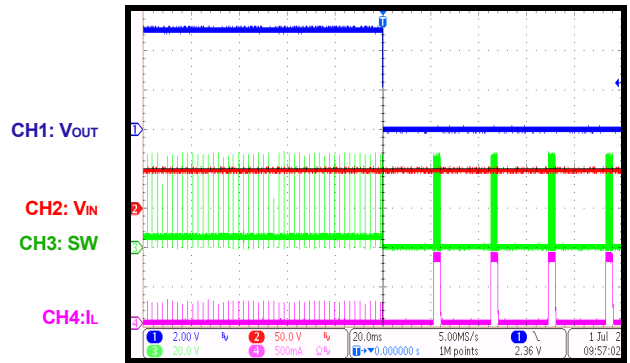
$V_{IN} = 48V$, $V_{OUT} = 5V$, $L = 33\mu H$, $T_A = 25^\circ C$, unless otherwise noted.

Load Transient

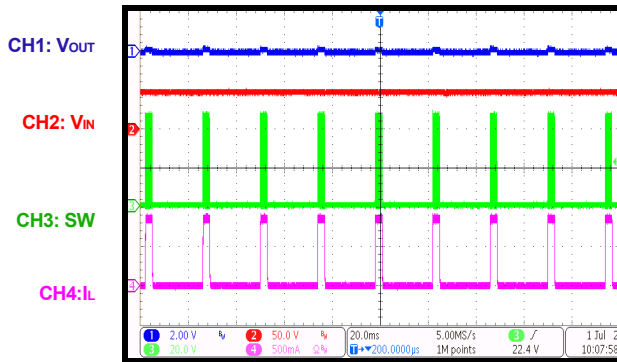
$I_{OUT} = 0.4A$ to $0.8A$



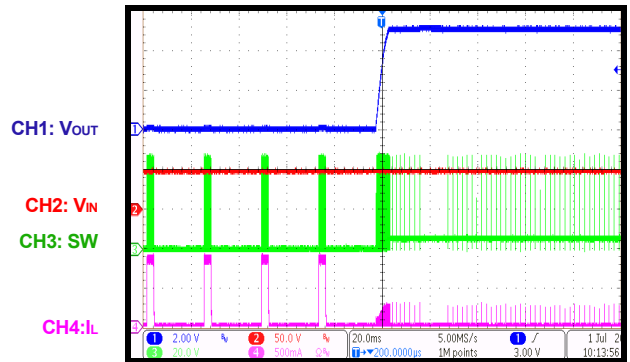
SCP Entry



SCP Steady State



SCP Recovery



PRINTED CIRCUIT BOARD LAYOUT

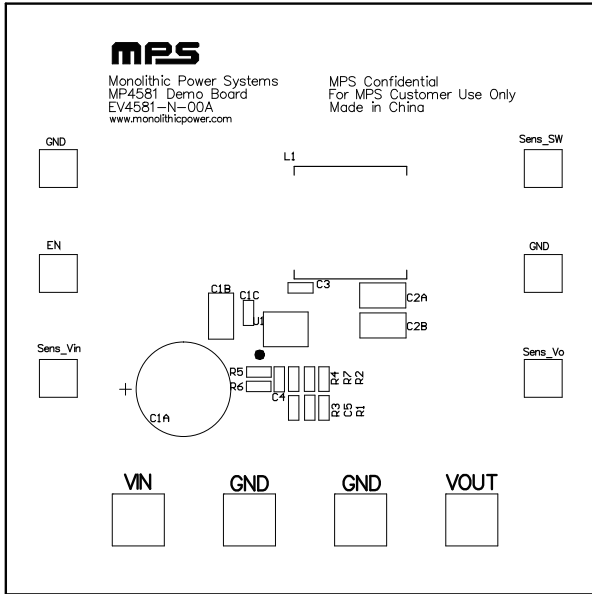


Figure 1: Top Silkscreen Layer

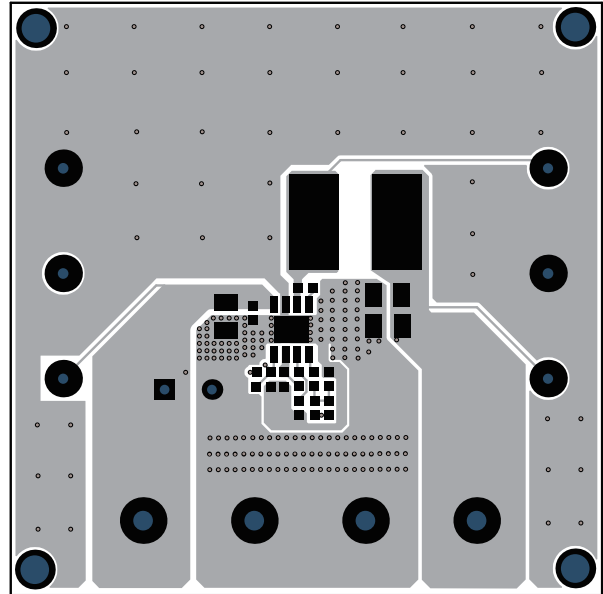


Figure 2: Top Layer

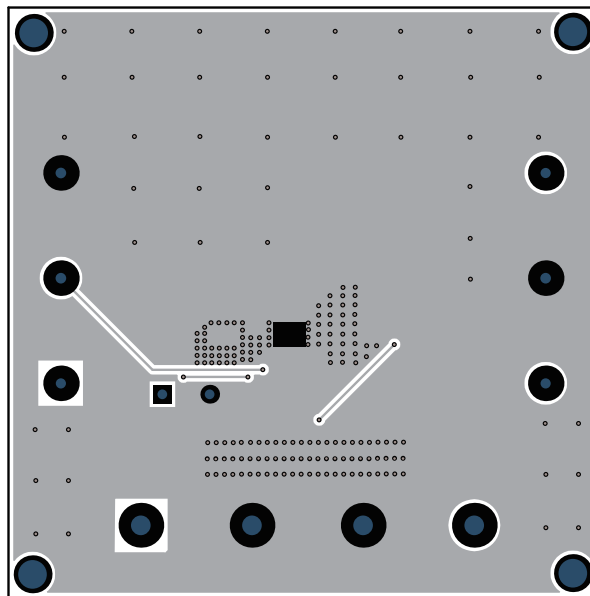


Figure 3: Bottom Layer