EV9486A-N-00A

3.5A Switching Current Limit, 100V Wide Input Buck Converter EV Board

The Future of Analog IC Technology

DESCRIPTION

The EV9486A-N-00A Evaluation Board is designed to demonstrate the performances of MPS' MP9486A which is a 4.5V-to-100V-input step-down converter.

The MP9486A employs hysteresis voltage control method to provide fast response to line or load transient. It integrates a high-side high voltage power MOSFET with a current limit of typical 3.5A. MPS's proprietary feedback control scheme minimizes the number of external components.

This board is configured for 5V step-down application. It can support 1A continuous load or 2A pulse load. The circuit requires only a minimal number of readily-available, standard, external components.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Supply Voltage	V_{IN}	8 – 95	V
Output Voltage	V_{OUT}	5	V
Output Current	I_{OUT}	0-1	A

FEATURES

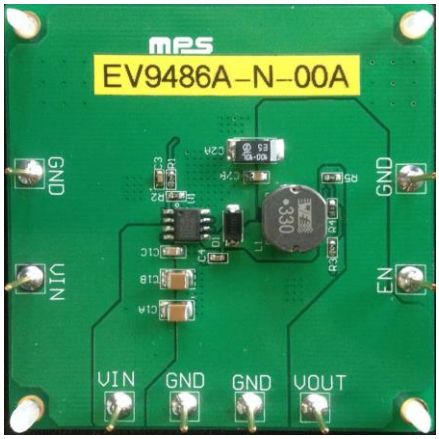
- 8V-to-95V Wide Input Range(1)
- Hysteretic Control: Simple Compensation
- Up to 1MHz Switching Frequency
- Hiccup mode Short Circuit Protection
- Thermal Shut Down
- 170μA Quiescent Current
- Available in SOIC8 with Exposed Pad Package

Note: 1) MP9486A can support 4.5V-to-95V DC input, 8V minimum voltage is needed when V_{OUT} sets to 5V. MP9486A can support up to 100V input spike voltage.

APPLICATIONS

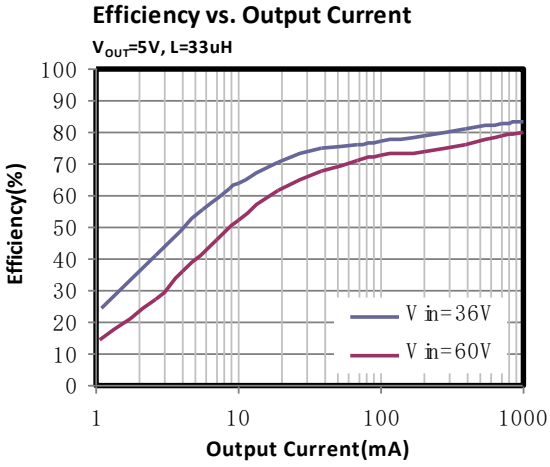
- Scooter, E-bike Control Power Supply
- Solar Energy System
- Automotive System Power
- Industrial Power Supply

EV9486A-N-00A EVALUATION BOARD

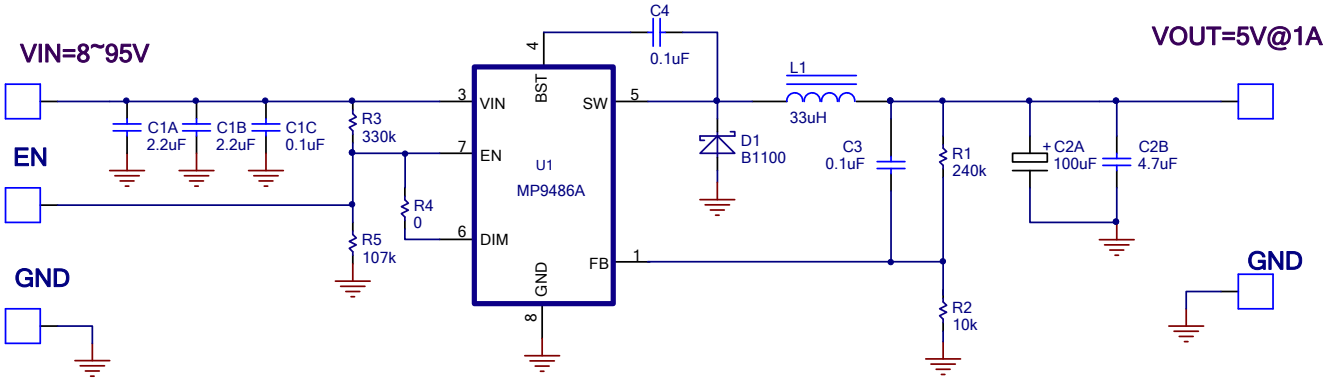


(L × W × H) 6.3cm × 6.3cm × 1.3cm

Board Number	MPS IC Number
EV9486A-N-00A	MP9486AGN



EVALUATION BOARD SCHEMATIC



EV9486A-N-00A BILL OF MATERIALS

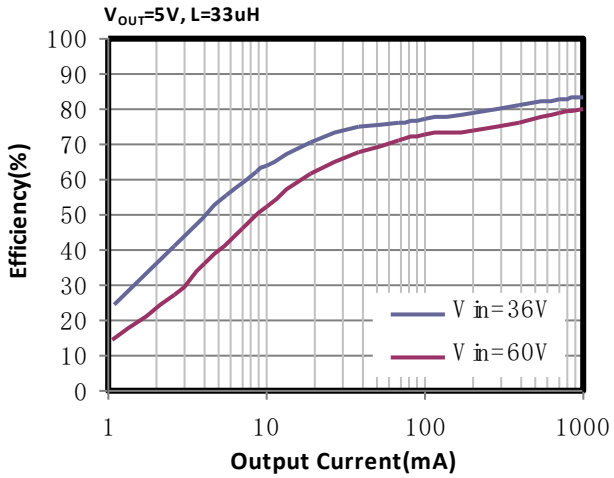
Qty	Ref	Value	Description	Package	Manufacturer	Part Number
2	C1A, C1B	2.2μF	Ceramic Cap., 100V, X7R	1210	muRata	GRM32ER72A225K
1	C1C	0.1μF	Ceramic Cap., 100V, X7R	0805	muRata	GCM21BR72A104K
1	C2A	100μF	10V, 0.74A solid tantalum capacitor, ESR=200mΩ	SMD (3.2x6.0)	VISHAY	TR3C107M010C0200
1	C2B	4.7μF	25V X7R Ceramic Capacitor	0805	muRata	GRM21AR71E475KL
2	C3,C4	0.1μF	25V Ceramic Capacitor	0603	muRata	GRM188R71E104KL
1	D1	B1100	100V,1A,schottky diode	SMA	DIODES	B1100-LS
1	L1	33μH	66 mΩ, Isat=2.9A inductor	SMD (10X10)		744771433
1	R1	240k	Film resistor, 1%	0603	YAGEO	RC0603FR-07240KL
1	R2	10k	Film resistor, 1%	0603	YAGEO	RC0603FR-0710KL
1	R3	330k	Film resistor, 1%	0603	YAGEO	RC0603FR-07330KL
1	R4	0	Film resistor, 5%	0603	YAGEO	RC0603JR-070RL
1	R5	107k	Film resistor, 1%	0603	YAGEO	RC0603FR-07107KL
1	U1	MP9486A	100V INPUT, 3.5A STEP-DOWN CONVERTER	SOIC8	MPS	MP9486AGN

EVB TEST RESULTS

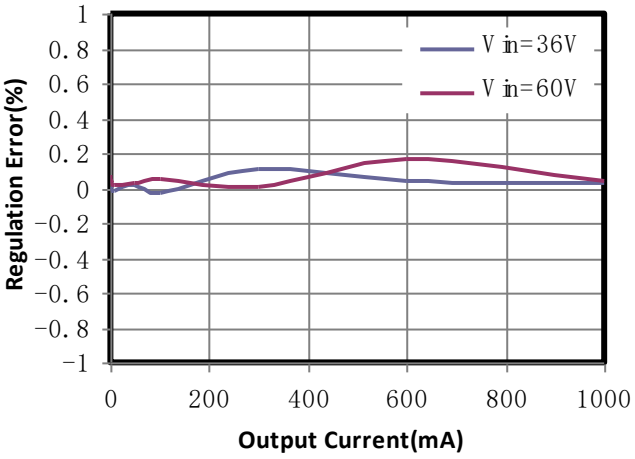
Performance waveforms are tested on the evaluation board.

V_{IN} = 60V, V_{OUT} = 5V, I_{OUT} = 1A, L=33µH, C_{OUT} = 100µF, T_A= +25°C, unless otherwise noted.

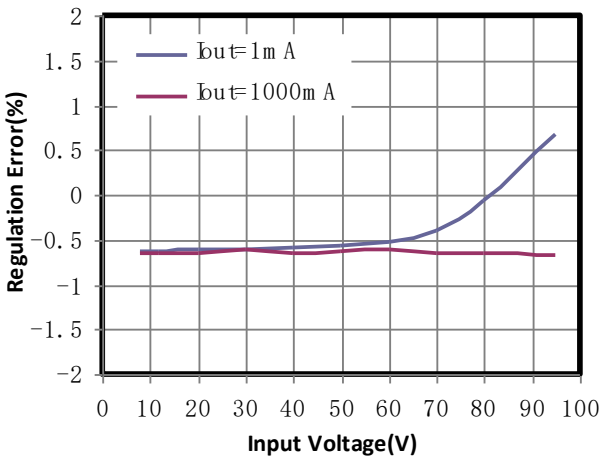
Efficiency vs. Output Current



Load Regulation



Line Regulation



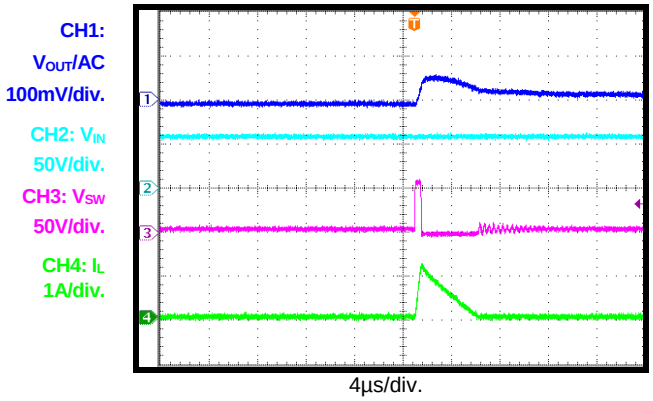
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.

V_{IN} = 60V, V_{OUT} = 5V, I_{OUT} = 1A, L=33µH, C_{OUT} = 100µF, T_A= +25°C, unless otherwise noted.

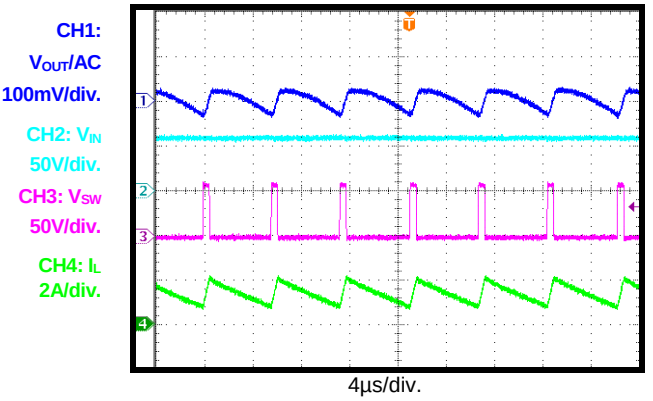
Steady State

I_{OUT}=0A



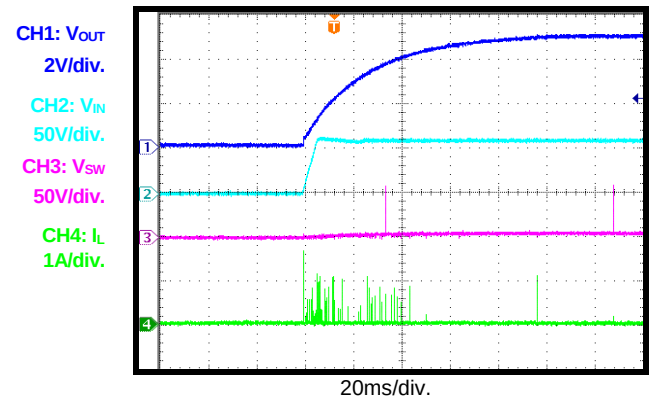
Steady State

I_{OUT}=1A



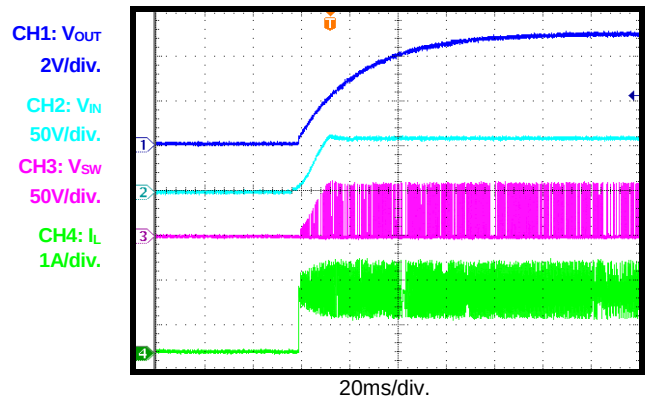
Power On

I_{OUT}=0A



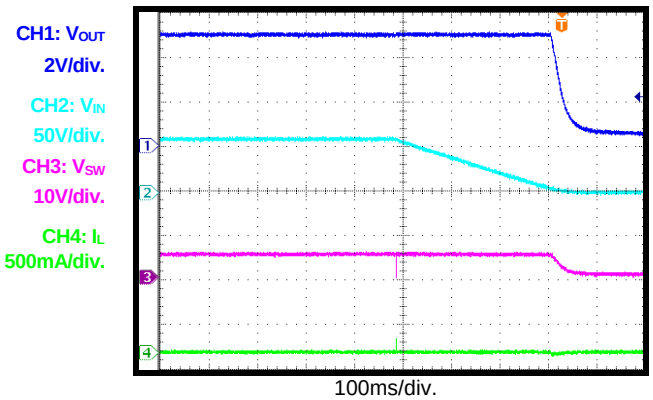
Power On

I_{OUT}=1A



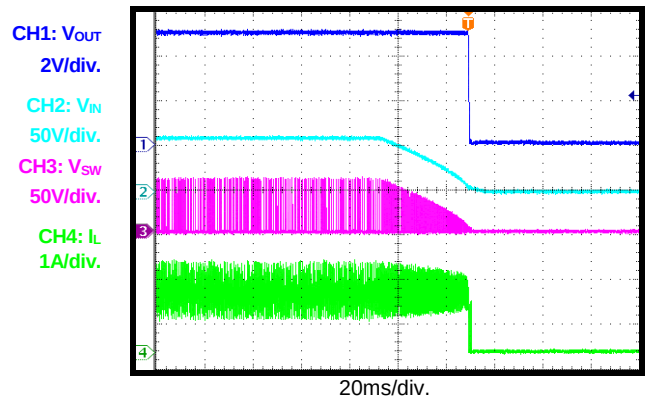
Power Off

I_{OUT}=0A



Power Off

I_{OUT}=1A



EVB TEST RESULTS *(continued)*

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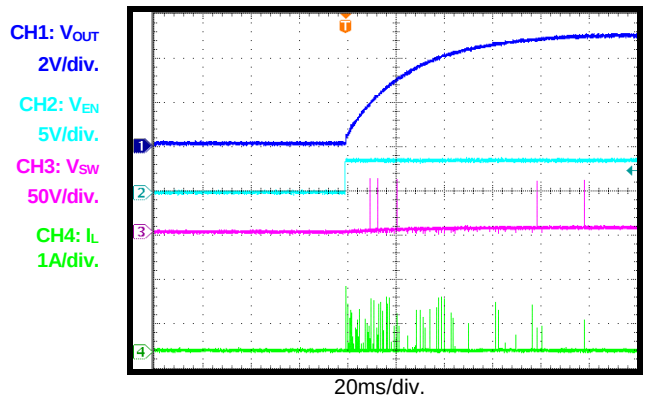
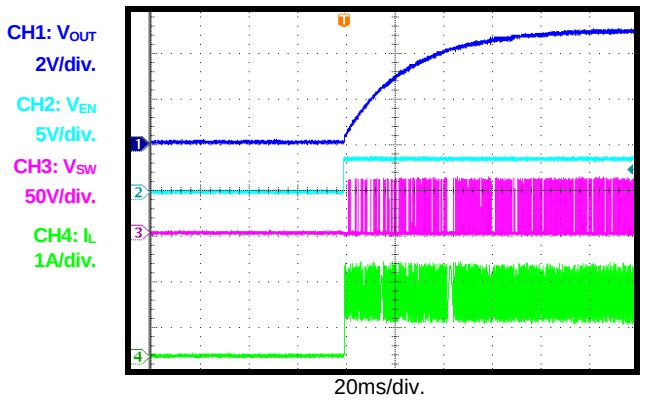
EN Start-Up

I_{OUT}=0A



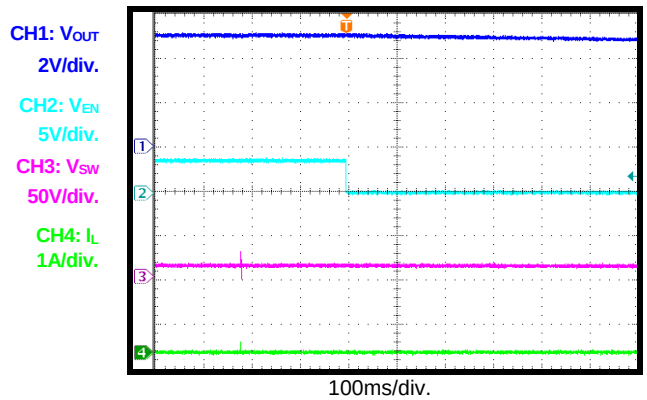
EN Start-Up

I_{OUT}=1A



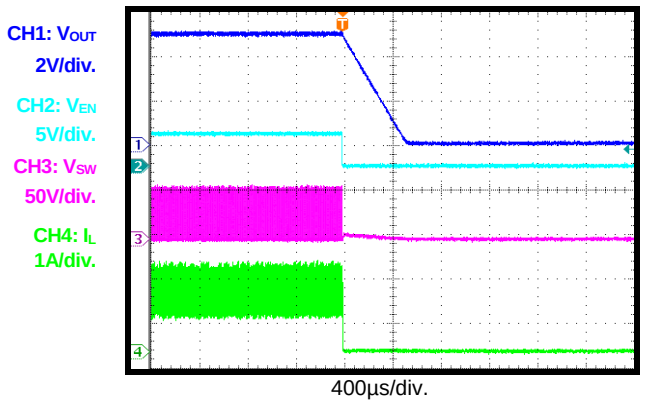
EN Shutdown

I_{OUT}=0A



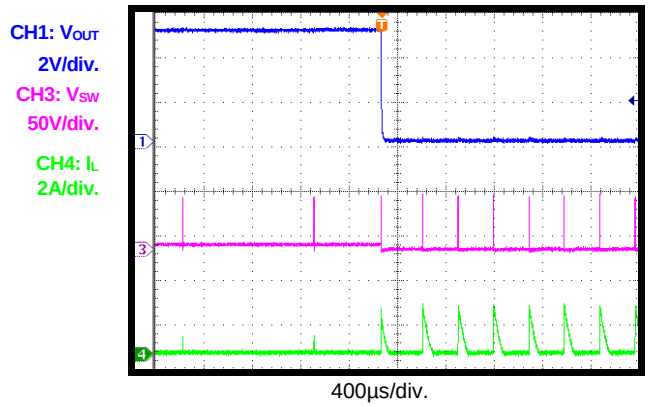
EN Shutdown

I_{OUT}=1A



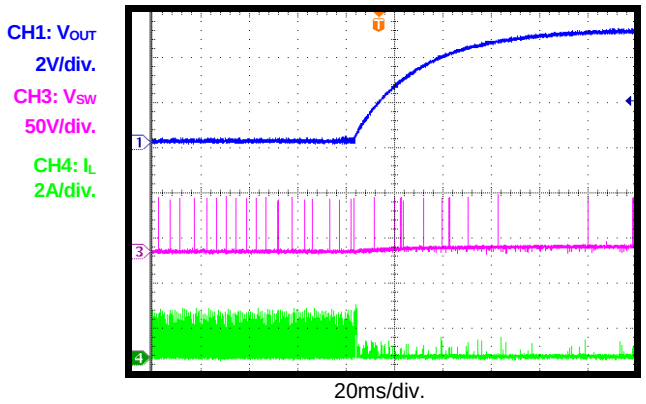
SCP Entry

I_{OUT}=0A



SCP Recovery

I_{OUT}=0A



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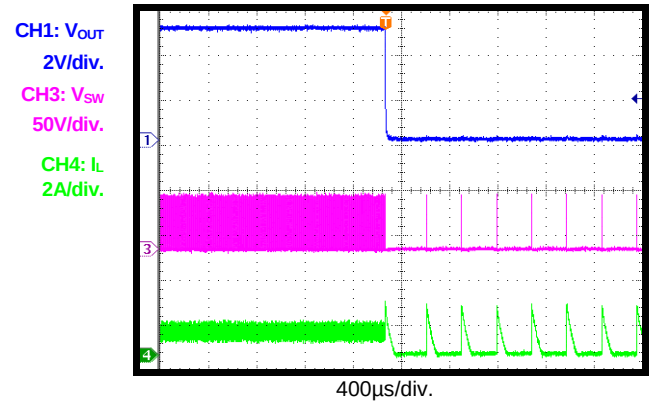
SCP Entry

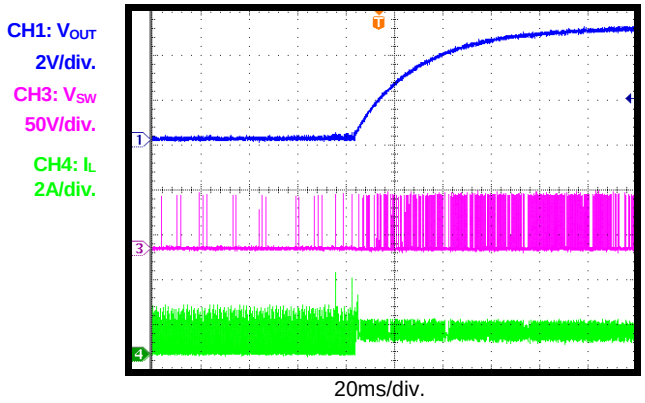
I_{OUT}=1A



400µs/div.

SCP Recovery

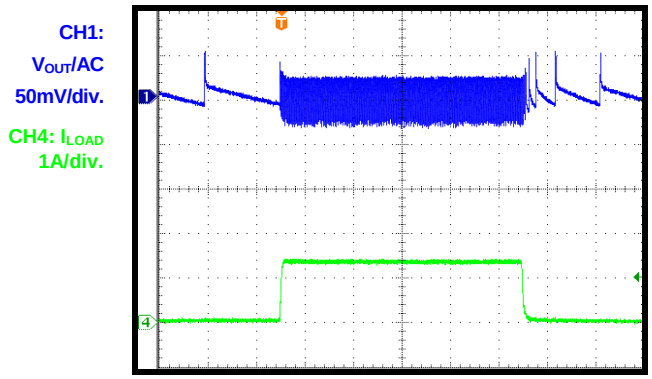
I_{OUT}=1A, E-load turn-on Threshold=0.32V



20ms/div.

Load Transient

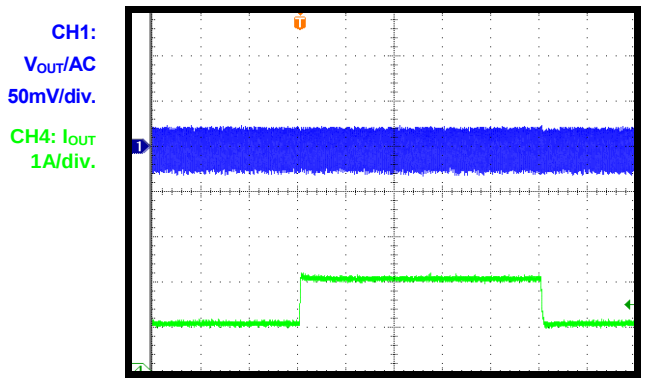
I_{OUT}=0A-->1A@70mA/µs



400µs/div.

Load Transient

I_{OUT}=1A-->2A@70mA/µs



400µs/div.

PRINTED CIRCUIT BOARD LAYOUT

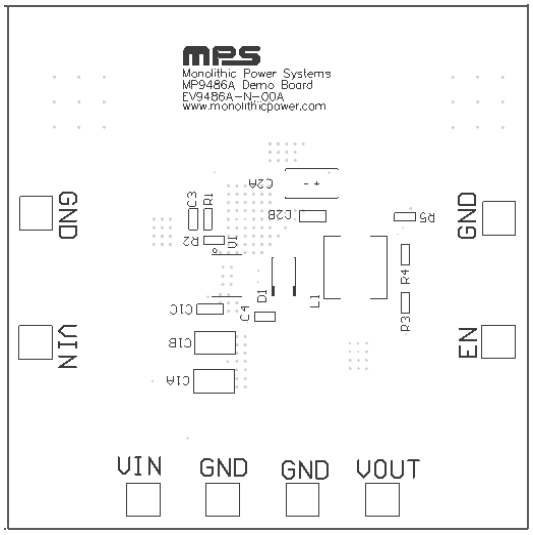


Figure 1: Top Silkscreen Layer

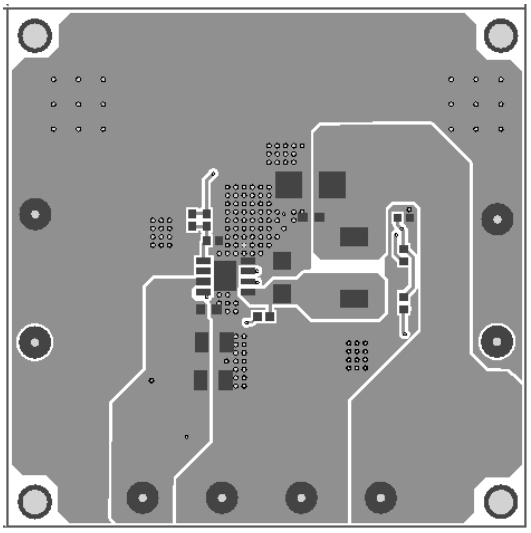


Figure 2: Top Layer

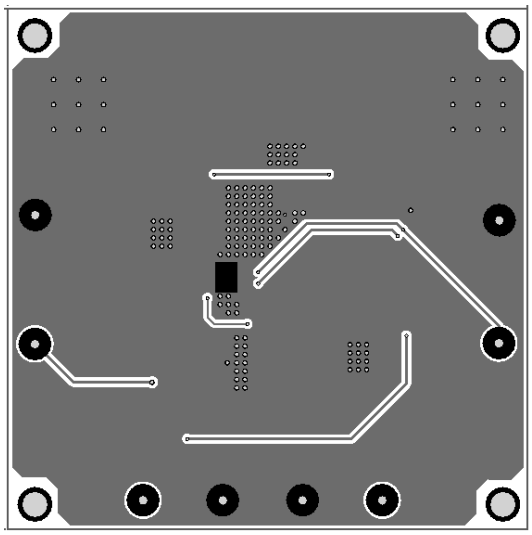


Figure 3: Bottom Layer