

DESCRIPTION

The EV4566DD-00A is used for demonstrating MPS's MP4566, a high voltage high frequency step-down converter with built in internal high-side power MOSFET. MP4566 provides single 0.6A highly efficient output with current mode control for fast loop response.

Wide 4.5V to 36V input range accommodates a variety of step-down applications in automotive input environment. The very low shutdown current allows battery-powered applications.

High power efficiency over a wide load range is achieved by scaling down the switching frequency at light load to reduce the switching relative loss. Frequency fold-back helps prevent inductor current runaway during start-up. Thermal shutdown provides reliable, fault-tolerant operation.

The MP4566 is available in a 2mmx3mm QFN8 package.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	4.5 – 36	V
Output Voltage	V_{OUT}	3.3	V
Output Current	I_{OUT}	0.6	A

FEATURES

- 30 μ A Quiescent Current
- Wide 4.5V to 36V Operating Input Range
- 450m Ω Internal Power MOSFET
- 1MHz fixed Switching Frequency
- Internal Compensated
- Stable with Ceramic Output Capacitors
- Internal Soft-Start
- Precise Current Limit without Current Sensing Resistor
- High Light Load Efficiency
- +1.0V FB Reference Voltage
- Output Adjustable from +1.0V to 0.8x V_{IN}
- Low Shutdown Mode Current: <2 μ A
- 2mmx3mm QFN8 Package

APPLICATIONS

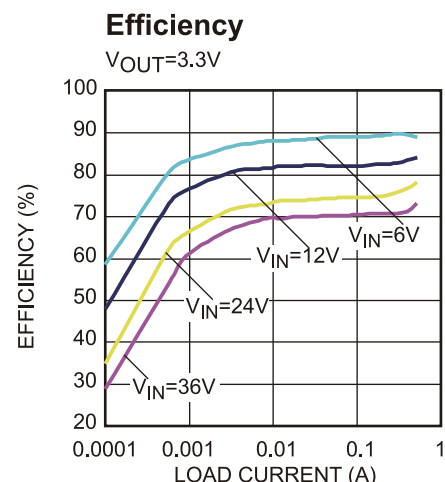
- High Voltage Power Conversion
- Automotive Systems
- Industrial Power Systems
- Distributed Power Systems
- Battery Powered Systems

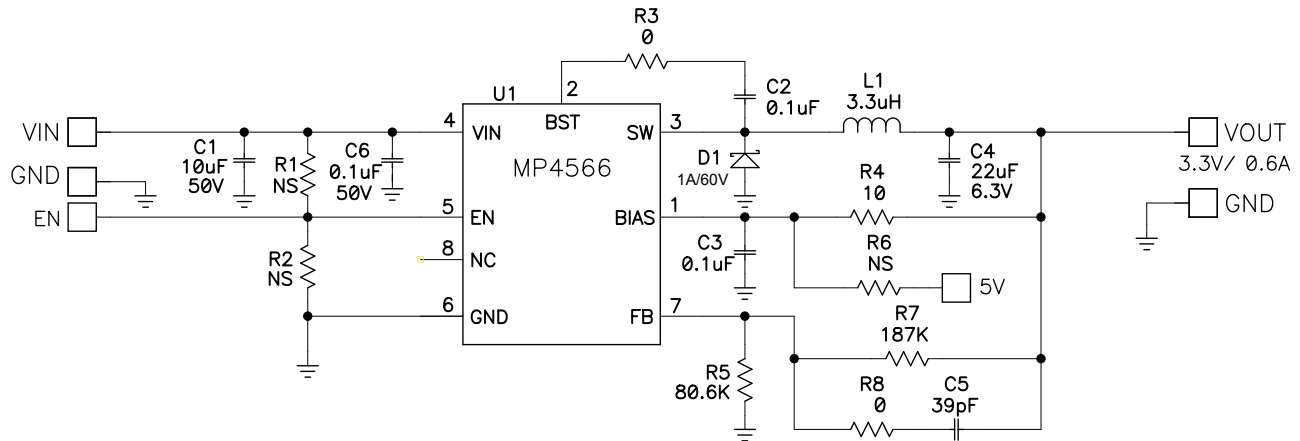
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EV4566DD-00A EVALUATION BOARD



Board Number	MPS IC Number
EV4566DD-00A	MP4566DD



EVALUATION BOARD SCHEMATIC

EV4466DD-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	C1	10µF	Ceramic Cap., 50V, 10%, X5R	1210	Taiyo Yuden	UMK325BJ106KM-T
2	C2,C3,C6	0.1µF	Ceramic Cap., 50V, 10%, X7R	0603	muRata	GRM188R71H104K
1	C4	22µF	Ceramic Cap., 6.3V, 10%, X5R	1210	muRata	GRM32DR60J226KA01L
1	C5	39pF	Ceramic Cap., 50V, 5%, C0G	0603	muRata	GRM1885C1H390J
1	D1	1A	Schottky Diode, 60V, 1A	SMA	Diodes Inc	B160-13-F
1	L1	3.3µH	Inductor, 2.57A, 21mΩ	D63CB	TOKO	A916CY-3R3M
3	R1,R2,R6	NS		0603		
2	R3,R8	0Ω	Film Res., 5%	0603	Yageo	RC0603JR-070RL
1	R4	10Ω	Film Res., 5%	0603	Yageo	RC0603JR-0710RL
1	R5	80.6kΩ	Film Res., 1%	0603	Yageo	RC0603FR-0780K6L
1	R7	187kΩ	Film Res., 1%	0603	Yageo	RC0603FR-07187KL
1	U1	MP4566	Step-Down Converter	QFN8	MPS	MP4566ED

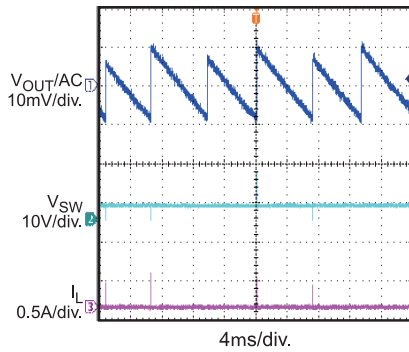
EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.

$V_{IN} = 12V$, $V_{OUT} = 3.3V$, $L = 3.3\mu H$, $T_A = 25^\circ C$, unless otherwise noted.

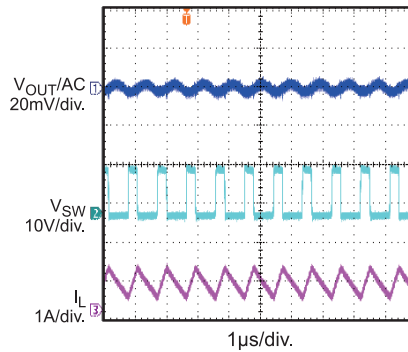
Output Ripple Voltage

$I_{OUT} = 0A$

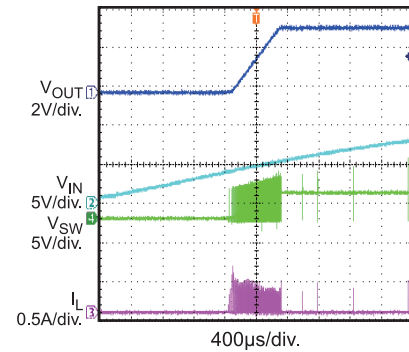


Output Ripple Voltage

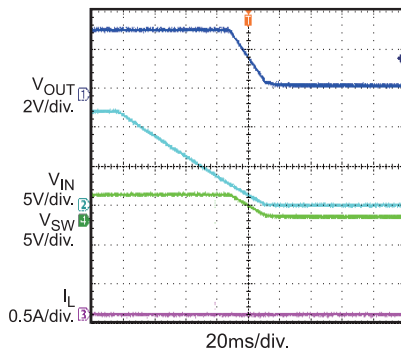
$I_{OUT} = 0.5A$



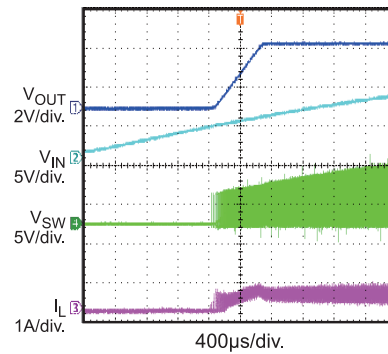
VIN Power Up without Load



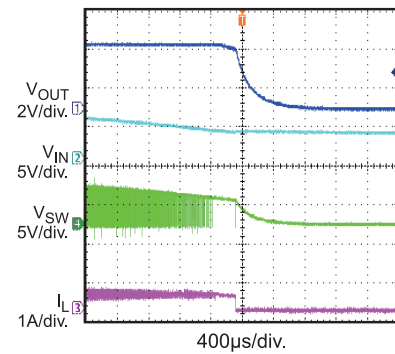
VIN Shut Down without Load



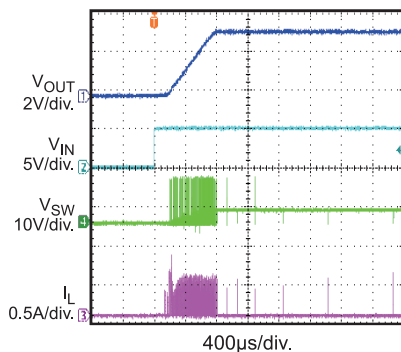
VIN Power Up with 0.5A Resistor Load



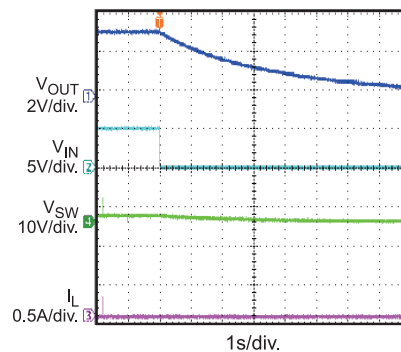
VIN Shut Down with 0.5A Resistor Load



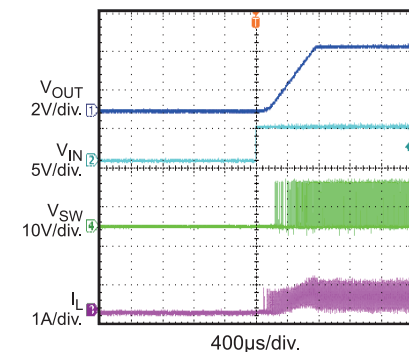
EN Start Up without Load



EN Shut Down without Load



EN Start Up with 0.5A Resistor Load

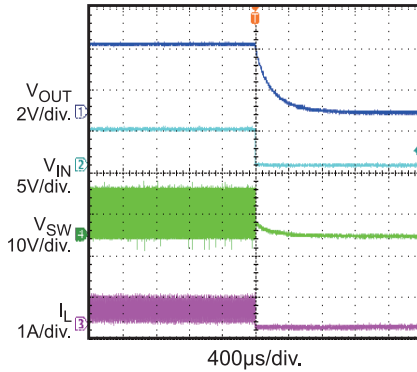


EVB TEST RESULTS (continued)

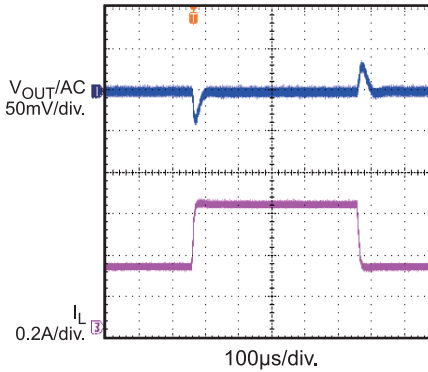
Performance waveforms are tested on the evaluation board.

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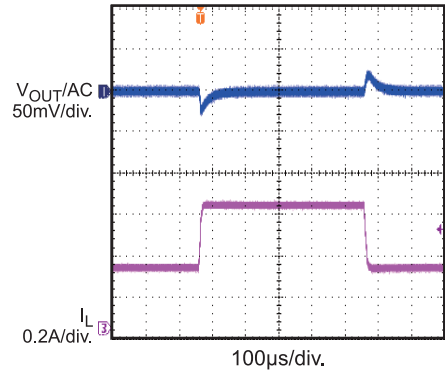
EN Shut Down with 0.5A Resistor Load



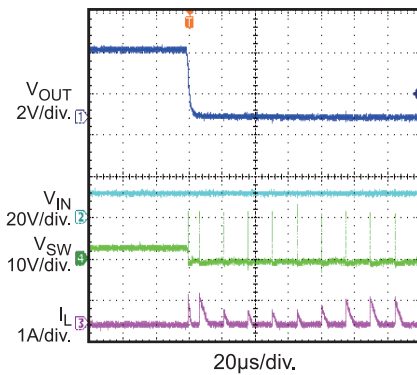
Load Transient Response
 $I_{OUT} = 0.3A-0.6A$, $C_{FF} = 39pF$



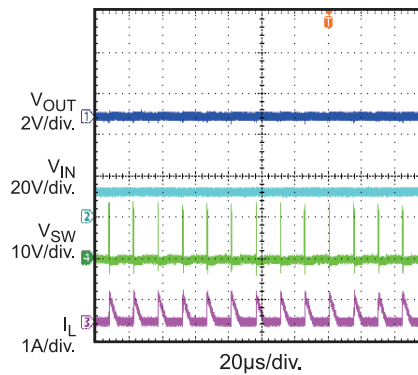
Load Transient Response
 $I_{OUT} = 0.3A-0.6A$, $C_{FF} = 150pF$



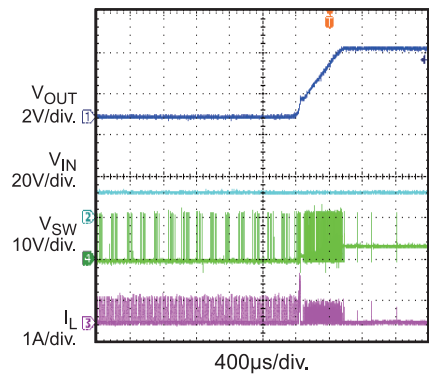
Short Entry



Short Circuit



Short Recovery



PRINTED CIRCUIT BOARD LAYOUT

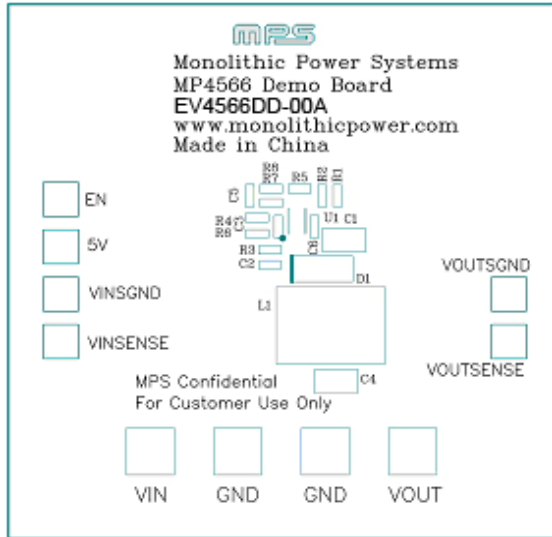


Figure 1—Top Silk Layer

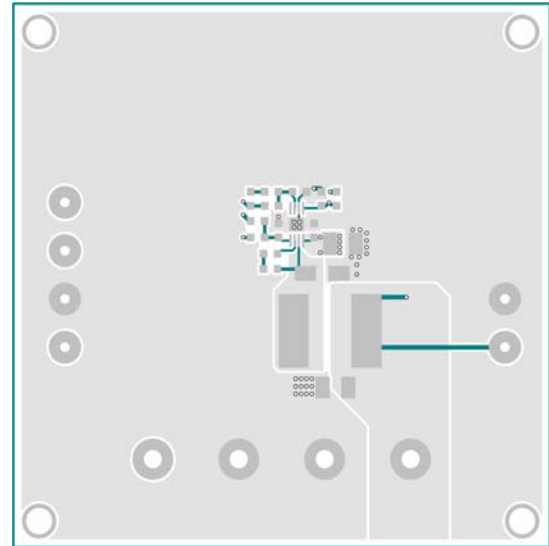


Figure 2—Top Layer

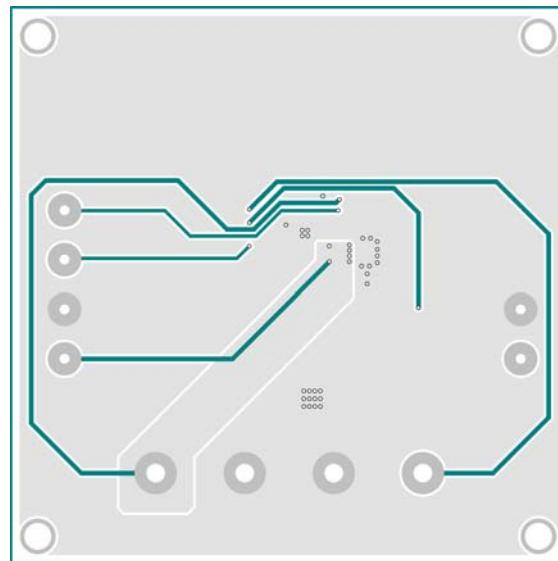


Figure 3—Bottom Layer

QUICK START GUIDE

1. Connect the positive and negative terminals of the load to the VOUT and GND pins, respectively.
2. Preset the power supply output between 6V and 36V, and then turn off the power supply.
3. Connect the positive and negative terminals of the power supply output to the VIN and GND pins, respectively.
4. Turn the power supply on. The board will automatically start up.
5. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 1.8V to turn on the regulator or less than 1.15V to turn it off.

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