EV1475S-J-00A

High-Efficiency, 3A, 16V, 500kHz Sync. Step-Down Converter Evaluation Board

The Future of Analog IC Technology

DESCRIPTION

The EV1475S-J-00A demonstrates MPS's MP1475S, a high-frequency, synchronous, rectified, step-down converter with built-in high-side and low-side power MOSFETs. The MP1475S offers a compact solution to achieve a 3A continuous output current with excellent load and line regulation over a wide input-supply range. The MP1475S has synchronous mode operation for higher efficiency over the output current load range.

Current-mode operation provides fast transient response and eases loop stabilization.

Full protection features include over-current protection (OCP) and thermal shutdown (TSD).

The MP1475S is available in a space-saving 8-pin TSOT23 package.

ELECTRICAL SPECIFICATION(1)

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	12	V
Output Voltage	V_{OUT}	3.3	V
Output Current	I_{OUT}	3	A
Frequency	F_{SW}	500	kHz

Notes:

1) For different input /output voltage, inductor value, output capacitor value, and switching frequency may affect the selection of application circuit parameters.

FEATURES

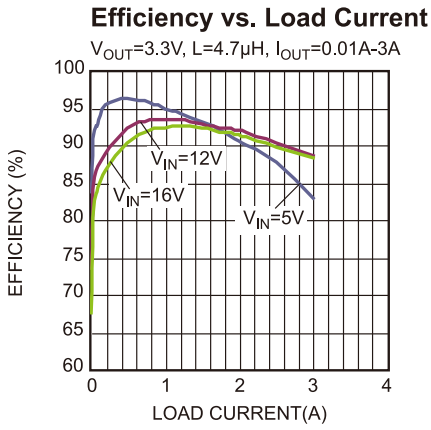
- Wide 4.5V to 16V Operating Input Range
- 120mΩ/50mΩ Low $R_{DS(ON)}$ Internal Power MOSFET
- High-Efficiency Synchronous Mode Operation
- Fixed 500kHz Switching Frequency
- Synchronizes from a 300kHz-to-2MHz External Clock
- Power-Save Mode at Light Load
- Internal Soft-Start
- Power Good Indication
- Over-Current Protection and Hiccup
- Thermal Shutdown
- Output Adjustable from 0.8V
- Available in a 8-pin TSOT-23 Package

APPLICATIONS

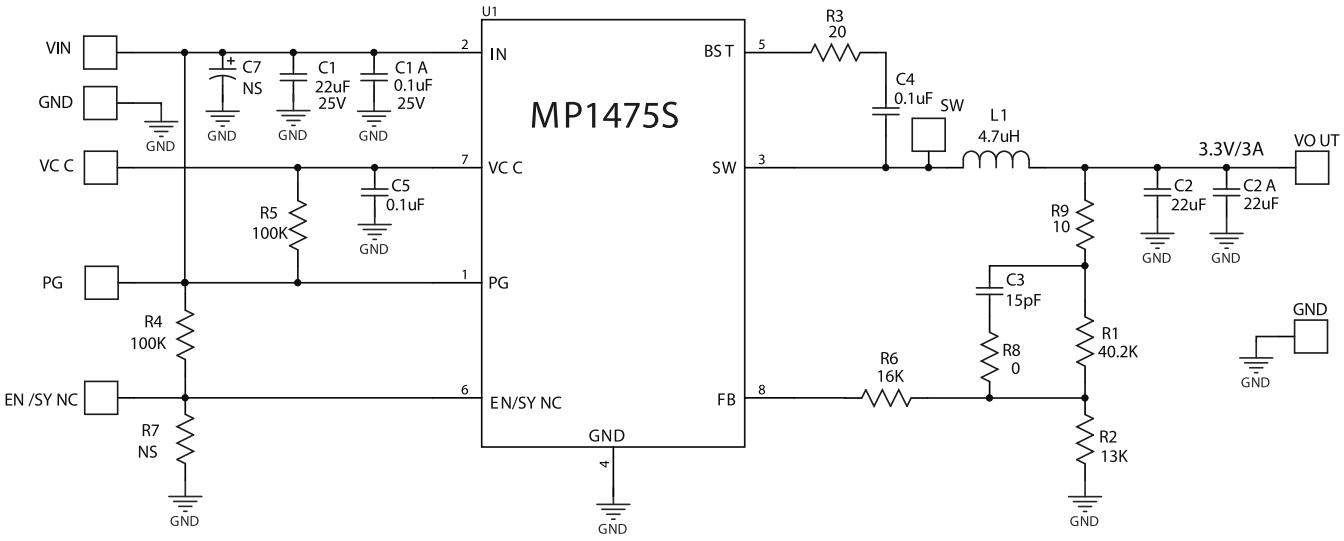
- Notebook System and I/O Power
- Digital Set-Top Boxes
- Flat-Panel Television and Monitors
- Distributed Power Systems

EV1475S-J-00A EVALUATION BOARD

Board Number	MPS IC Number
EV1475S-J-00A	MP1475SGJ



EVALUATION BOARD SCHEMATIC



EV1475S-J-00A BILL OF MATERIALS

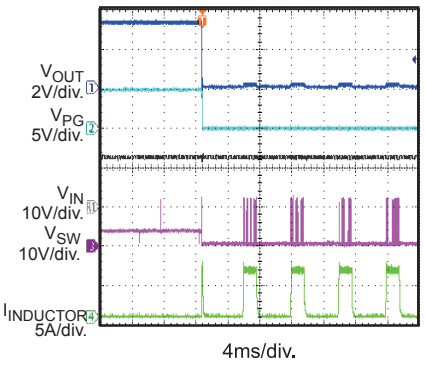
Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	C1	22µF	Ceramic Cap., 25V, X5R	1206	muRata	GRM31CR61E226KE15L
1	C1A	0.1µF	Ceramic Cap., 25V, X7R	0805	muRata	GRM21BR71E104KA01L
2	C2, C2A	22µF	Ceramic Cap., 10V, X7R	1206	muRata	GRM31CR71A226KE15L
1	C3	15pF	Ceramic Cap., 50V, C0G	0603	muRata	GRM1885C1H150JA01D
2	C4, C5	0.1µF	Ceramic Cap., 16V, X7R	0603	muRata	GRM188R71C104KA01D
0	C7	NS				
1	R1	40.2k	Thick Film Res., 1%	0603	Yageo	RC0603FR-0740K2L
1	R2	13k	Thick Film Res., 1%	0603	Yageo	RC0603FR-0713KL
1	R3	20Ω	Thick Film Res., 1%	0603	Yageo	RC0603FR-0720RL
2	R4, R5	100kΩ	Thick Film Res., 1%	0603	Yageo	RC0603FR-07100KL
1	R6	16k	Thick Film Res., 1%	0603	Yageo	RC0603FR-0716KL
0	R7	NS		0603		
1	R8	0Ω	Thick Film Res., 1%	0603	Yageo	RC0603FR-070RL
1	R9	10Ω	Thick Film Res., 1%	0603	Yageo	RC0603FR-0710RL
1	L1	4.7µH	Inductor, DCR=19.5mΩ, Is=7A	SMD	Wurth	744311470
1	U1	MP1475S GJ	Synchronous Step-Down Converter	TSOT23-8	MPS	MP1475SGJ

EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.
V_{IN} = 12V, V_{OUT} = 3.3V, L = 4.7μH, T_A = 25°C, unless otherwise noted.

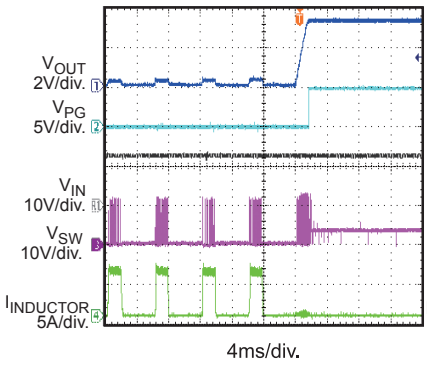
Short Entry

I_{OUT}=0A



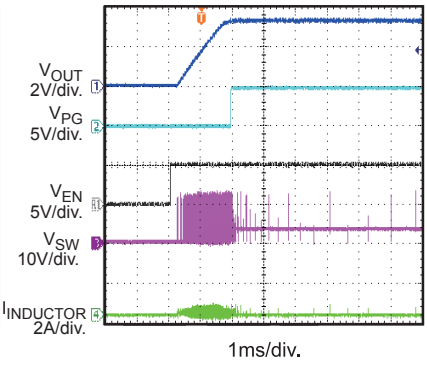
Short Recovery

I_{OUT}=0A



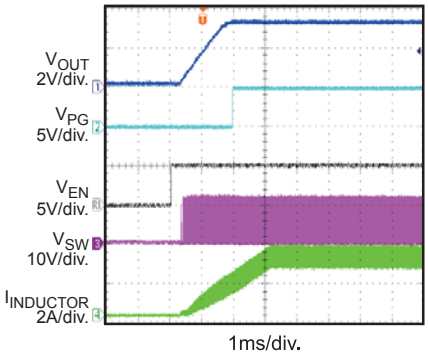
Start-Up through Enable

I_{OUT}=0A



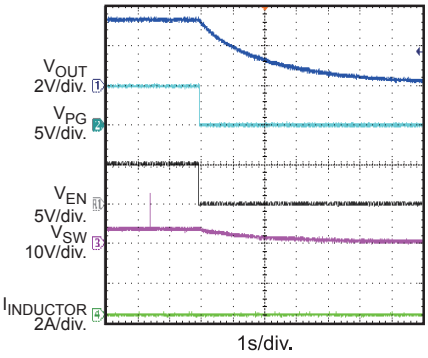
Start-Up through Enable

I_{OUT}=3A



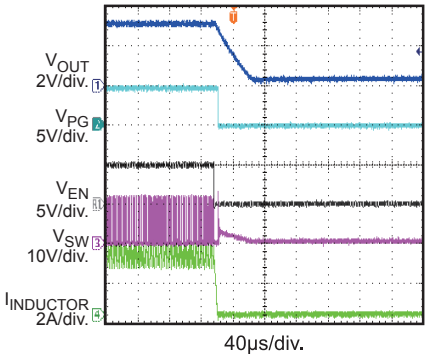
Shutdown through Enable

I_{OUT}=0A



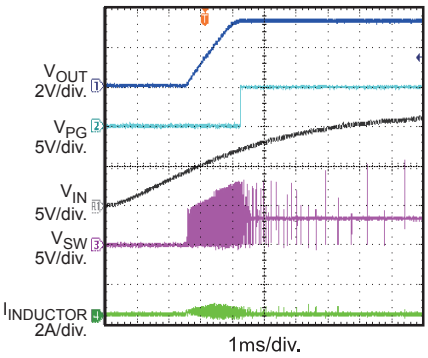
Shutdown through Enable

I_{OUT}=3A



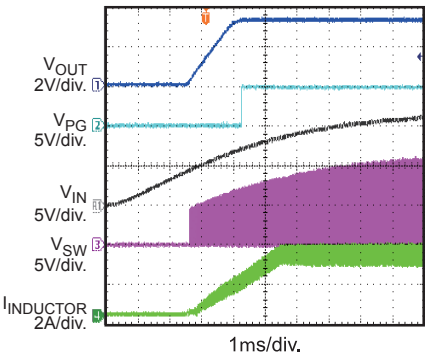
Start-Up through Input Voltage

I_{OUT}=0A



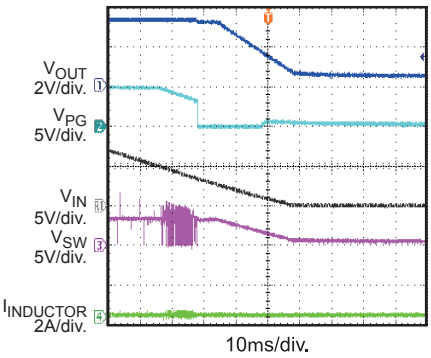
Start-Up through Input Voltage

I_{OUT}=3A



Shutdown through Input Voltage

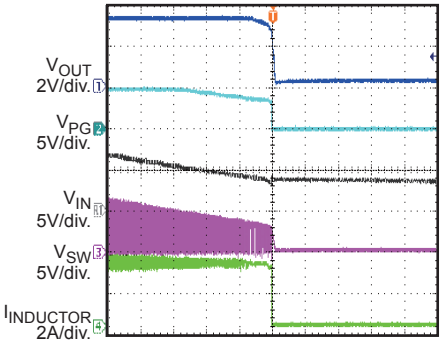
I_{OUT}=0A



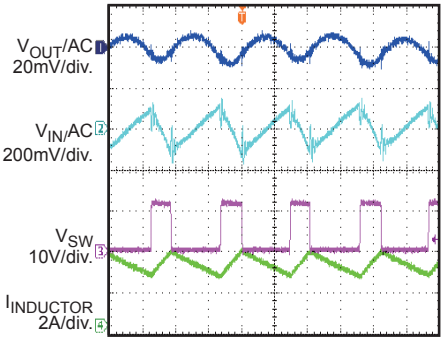
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.
V_{IN} = 12V, V_{OUT} = 3.3V, L = 4.7µH, T_A = 25°C, unless otherwise noted.

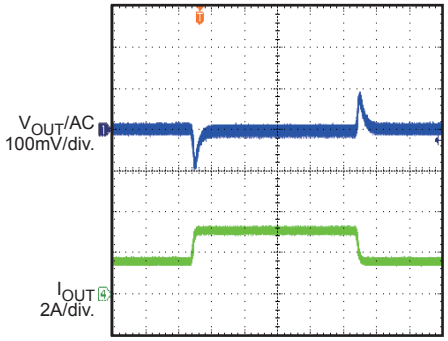
Shutdown through Input Voltage
I_{OUT}=3A



Input / Output Ripple
I_{OUT}=3A



Load Transient Reponse
I_{OUT}=1.5A-3A



PRINTED CIRCUIT BOARD LAYOUT

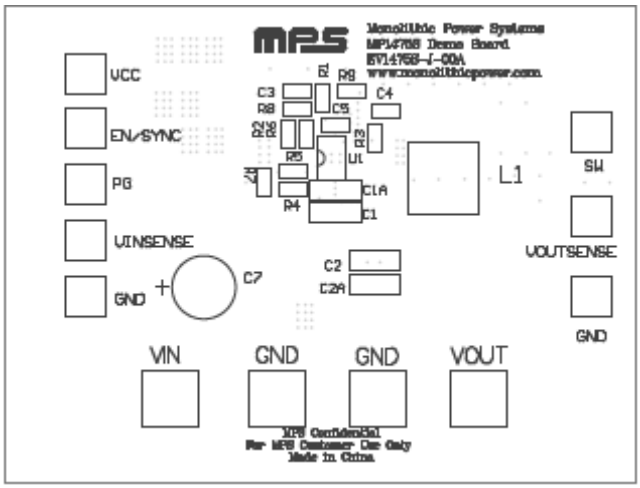


Figure 1—Top Layer

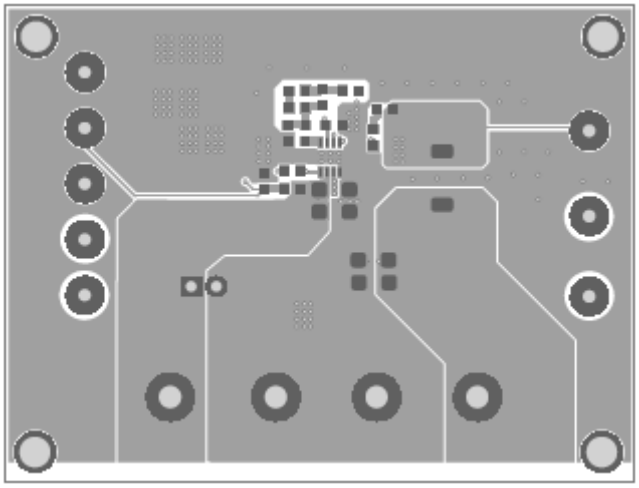


Figure 2—Top Silk Layer

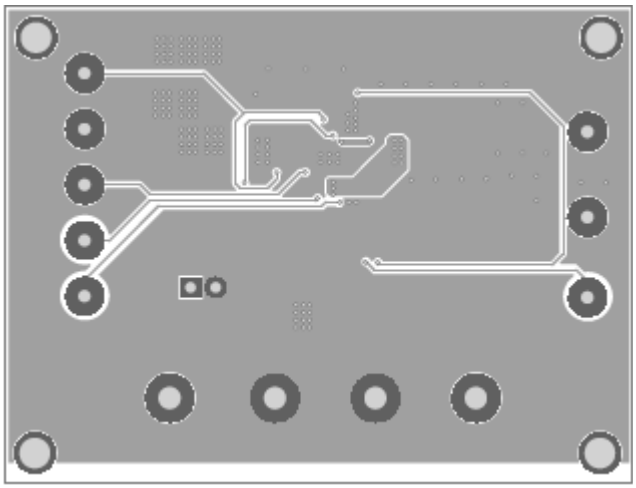


Figure 3—Bottom Layer