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

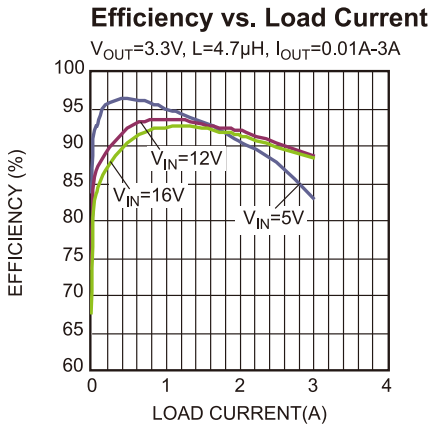
- Notebook System and I/O Power
- Digital Set-Top Boxes
- Flat-Panel Television and Monitors
- Distributed Power Systems

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EV1475S-J-00A EVALUATION BOARD

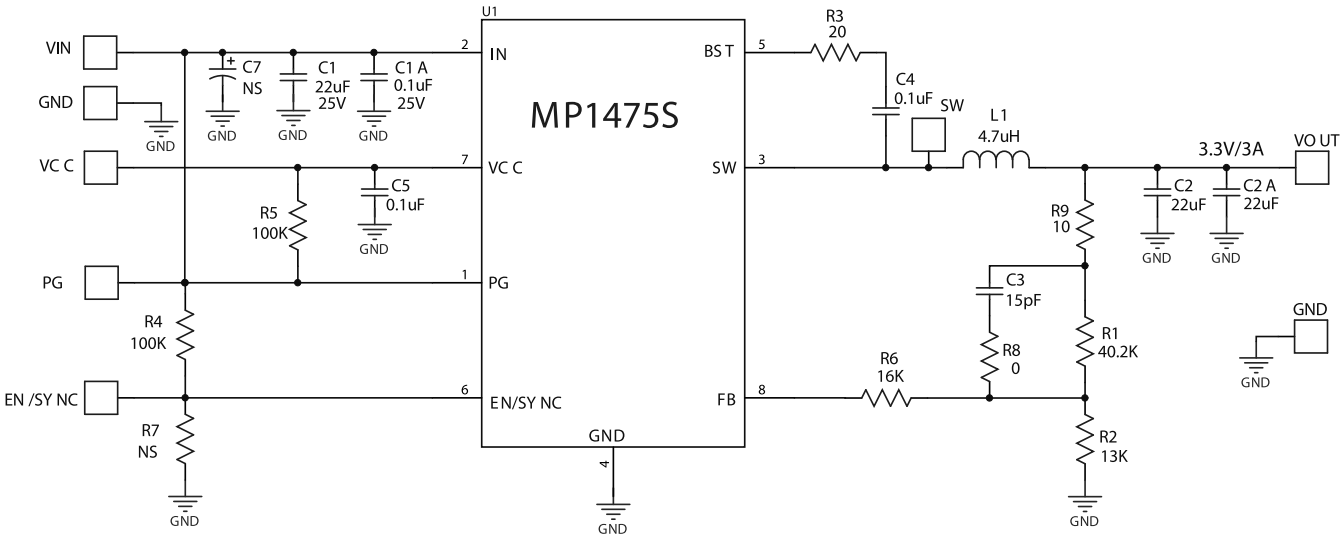


Board Number	MPS IC Number
EV1475S-J-00A	MP1475SGJ



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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

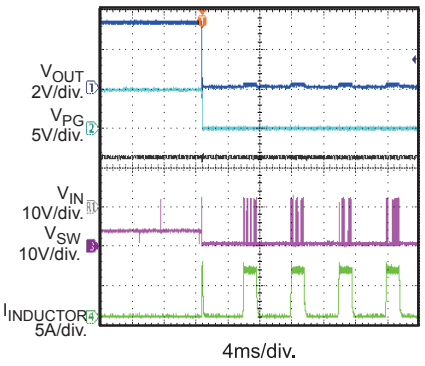
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EVB TEST RESULTS

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.

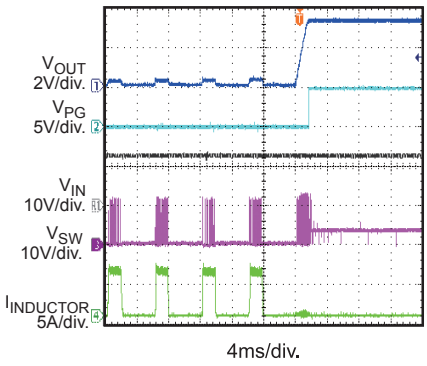
Short Entry

I_{OUT}=0A



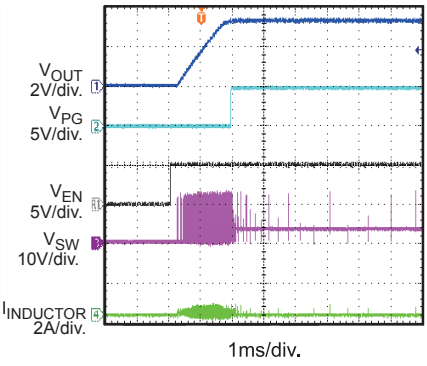
Short Recovery

I_{OUT}=0A



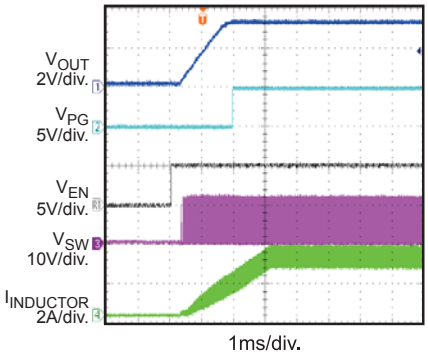
Start-Up through Enable

I_{OUT}=0A



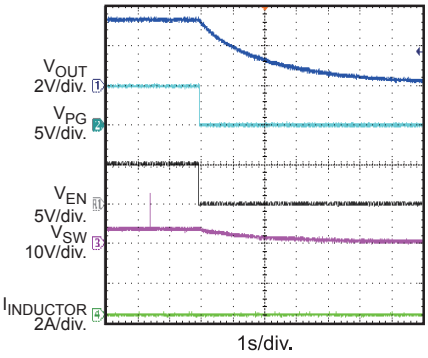
Start-Up through Enable

I_{OUT}=3A



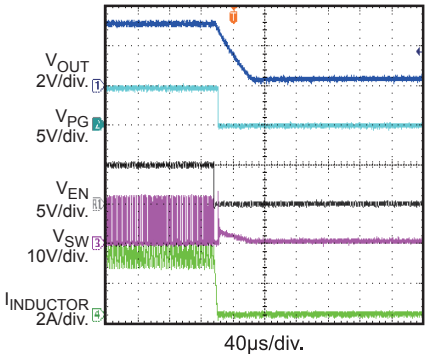
Shutdown through Enable

I_{OUT}=0A



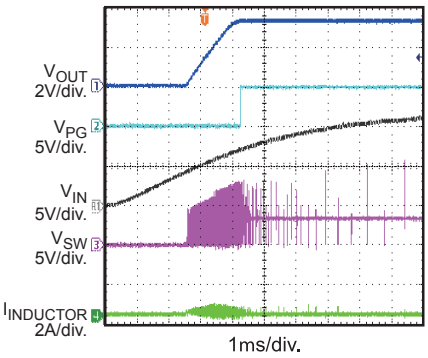
Shutdown through Enable

I_{OUT}=3A



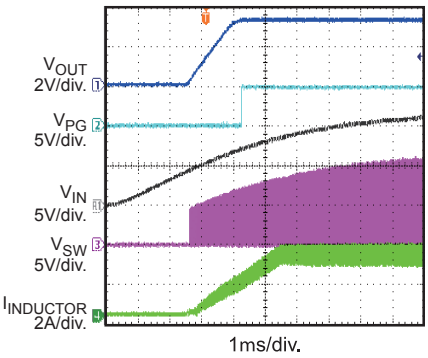
Start-Up through Input Voltage

I_{OUT}=0A



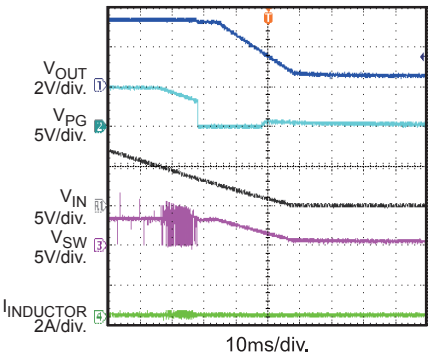
Start-Up through Input Voltage

I_{OUT}=3A



Shutdown through Input Voltage

I_{OUT}=0A

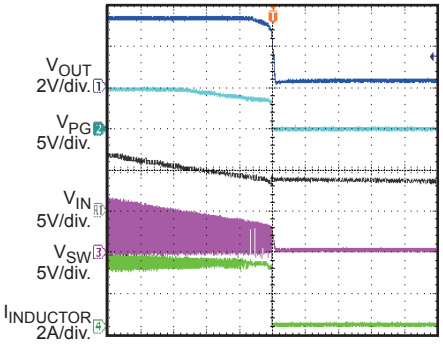


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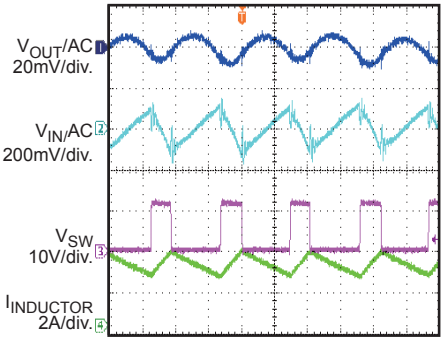
EVB TEST RESULTS *(continued)*

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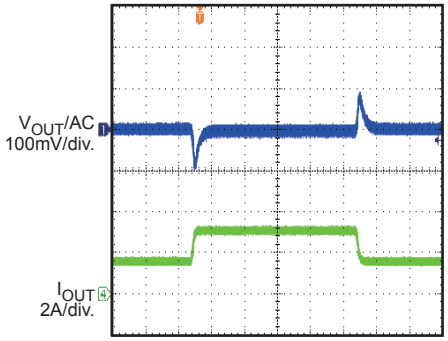
Shutdown through Input Voltage
I_{OUT}=3A



Input / Output Ripple
I_{OUT}=3A



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



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PRINTED CIRCUIT BOARD LAYOUT

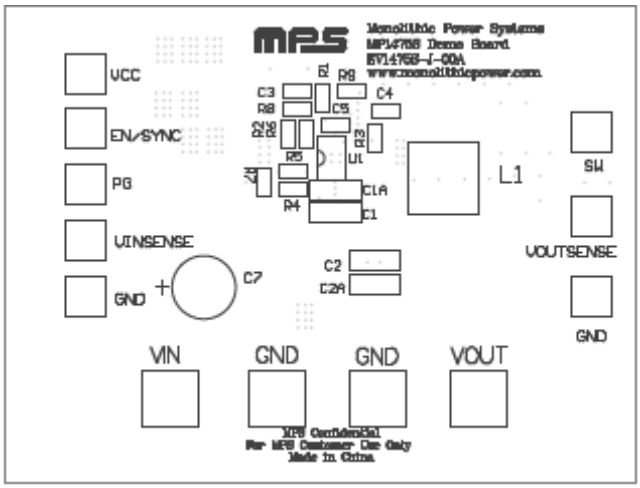


Figure 1—Top Layer

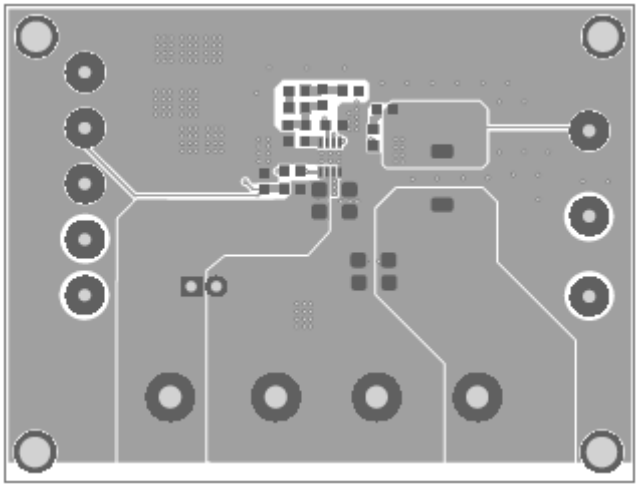


Figure 2—Top Silk Layer

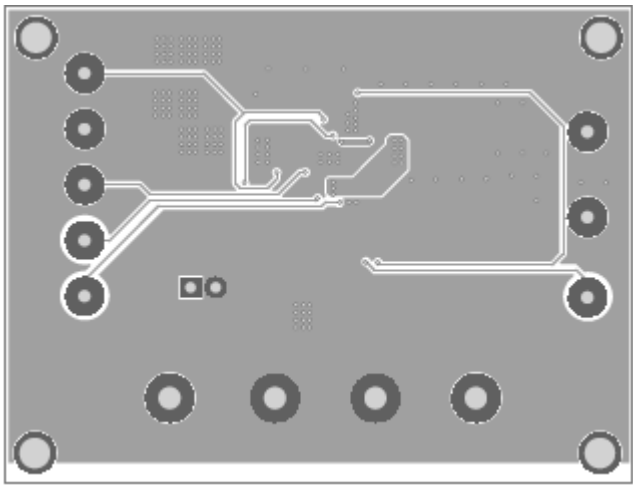


Figure 3—Bottom Layer

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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 12V, 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/SYNC pin. Drive EN higher than 1.4V to turn on the regulator, or less than 1.25V to turn it off.
6. To use the external synchronous function to adjust the switching frequency, apply an external clock signal to EN/SYNC pin.

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