EV1400-C-01A

7V Input, 0.6A, 1.5MHz Negative Power Convertor Evaluation Board

DESCRIPTION

The EV1400-C-01A demonstrates MPS's MP1400, a monolithic negative DCDC power converter with built-in internal power MOSFET. It offers a very compact solution to achieve up to 600mA continuous output current depending on input-voltage to output-voltage ratio. The output voltage can be regulated from -0.9V to -6V.

The 1500 kHz switching frequency allows for smaller external components producing a compact solution for a wide range of load currents.

Fault condition protection includes cycle-by-cycle current limiting and thermal shutdown. The MP1400 is available in a 0.8mm x 1.6mm 8-ball CSP package.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	2.7 – 7	V
Output Voltage	V_{OUT}	-5	V
Output Current	I_{OUT}	0.6	A

FEATURES

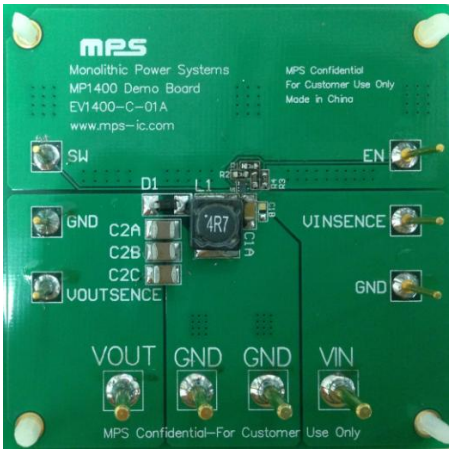
- Wide 2.7V to 7V Operating Input Range
- Output Adjustable from -0.9V to -6V
- Up to 600mA Output Current
- 300mΩ High Side MOSFET On Resistance
- Default 1.5MHz Switching Frequency
- Ground Reference Enable
- Cycle-by-Cycle Over Current Protection
- Short Circuit Protect with Hiccup Mode
- Output Voltage Discharge
- Output Over Voltage Protection
- Available in a 0.8mm x 1.6mm 8-ball CSP Package

APPLICATIONS

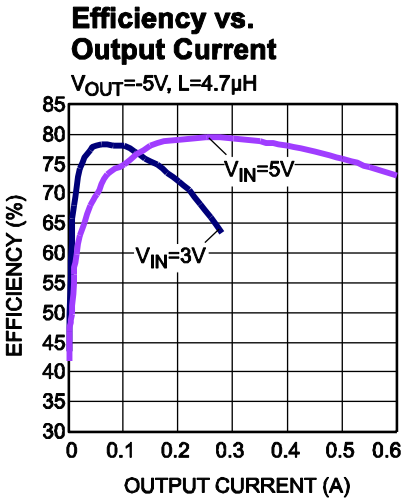
- General Negative Voltage
- HDD
- Small OLED Panel

All MPS parts are lead-free and adhere to the RoHS directive. For MPS green status, please visit MPS website under Quality Assurance.
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EV1400-J-01A EVALUATION BOARD

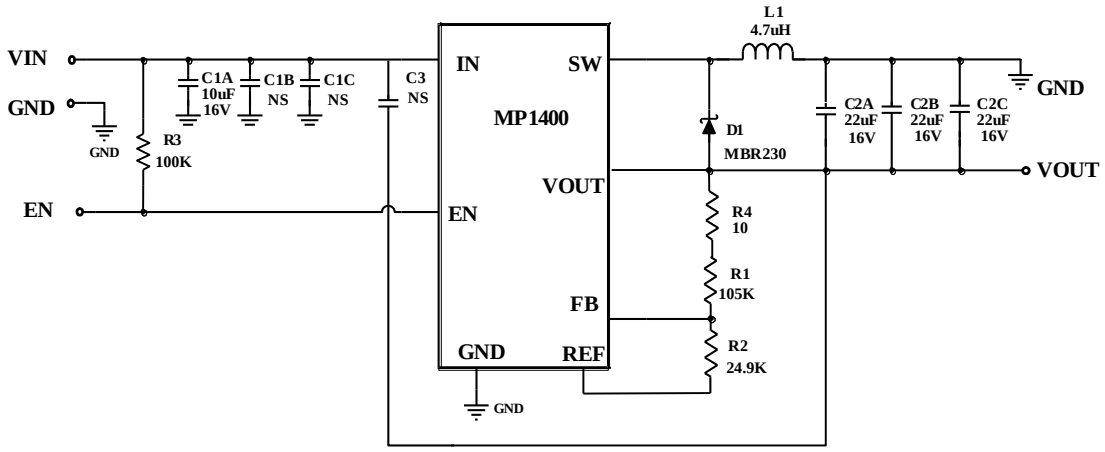


Board Number	MPS IC Number
EV1400-C-01A	MP1400GC



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EVALUATION BOARD SCHEMATIC



EV1400-J-00A BILL OF MATERIALS

Qty	RefDes	Value	Description	Package	Manufacturer	Manufacturer P/N
1	C1A	10μF	Ceramic Cap., 16V, X7R	1206	muRata	GRM31CR71C106KAC7L
3	C1B, C1C, C3	NS				
3	C2A, C2B,C2C	22μF	Ceramic Cap., 10V, X5R	1210	muRata	GRM32ER61C226KE20L
1	R1	105K	Thick Film Res., 1%	0603	ROYAL	RL0603FR-07105KL
1	R2	24.9K	Thick Film Res., 1%	0603	ROYAL	RL0603FR-0724K9L
1	R3	100K	Thick Film Res., 5%	0603	ROYAL	RL0603FR-07100KL
1	R4	10Ω	Thick Film Res., 1%	0603	ROYAL	RL0603FR-0710RL
	D1	Schottky	2A30V	SOD-123	Onsemi	MBR230LSFT1
1	L1	4.7μH	Inductor, DCR=35mΩ, Is=3.9A	SMD	Wurth	7447789004
1	U1	MP1400-C	Buck-Boost Convert	CSP_ 0.8mm*1.6mm	MPS	MP1400GC

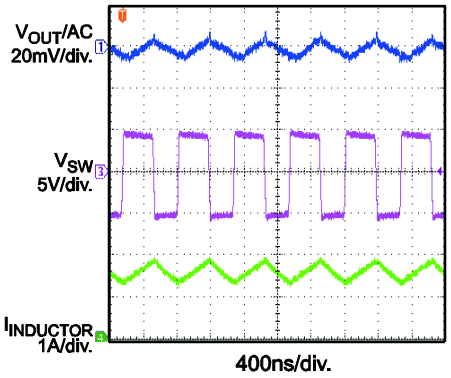
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EVB TEST RESULTS

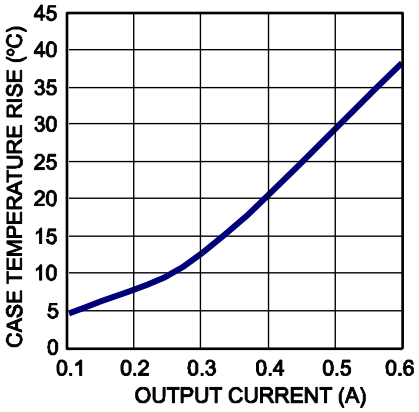
Performance waveforms are tested on the evaluation board.
V_{IN} = 5V, V_{OUT} = -5V, L = 4.7µH, T_A = 25°C, unless otherwise noted.

Output Ripple

I_{OUT}=0.6A

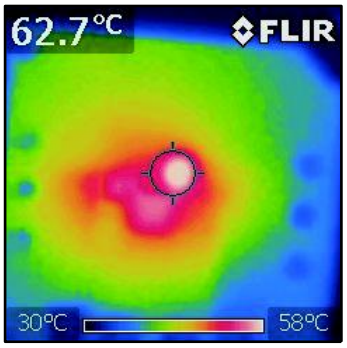


Case Temperature Rise vs. Output Current



Infrared Thermal Image

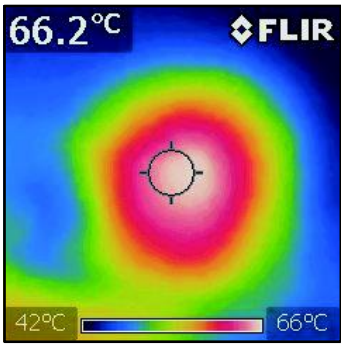
I_{OUT}=0.6A



Zoom in

Infrared Thermal Image

I_{OUT}=0.6A



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PRINTED CIRCUIT BOARD LAYOUT

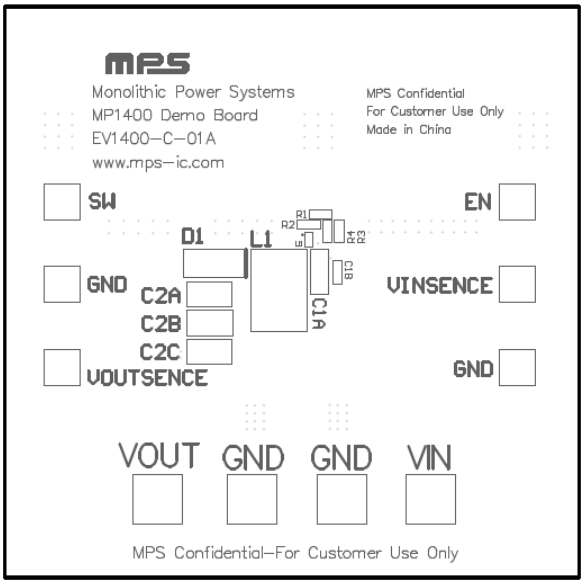


Figure 1—Top Silk Layer

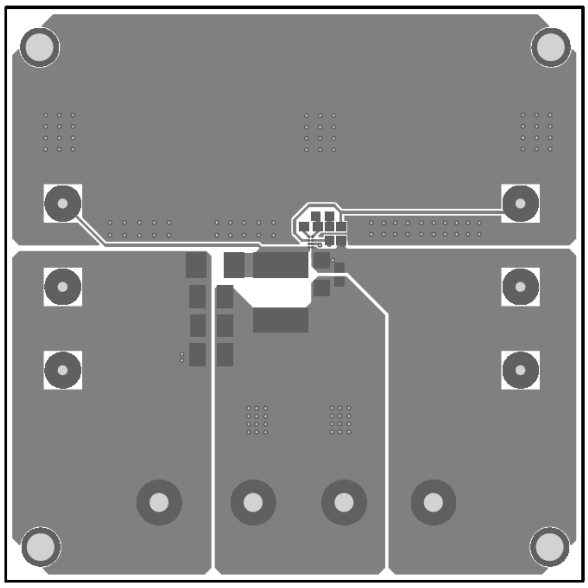


Figure 2—Top Silk Layer

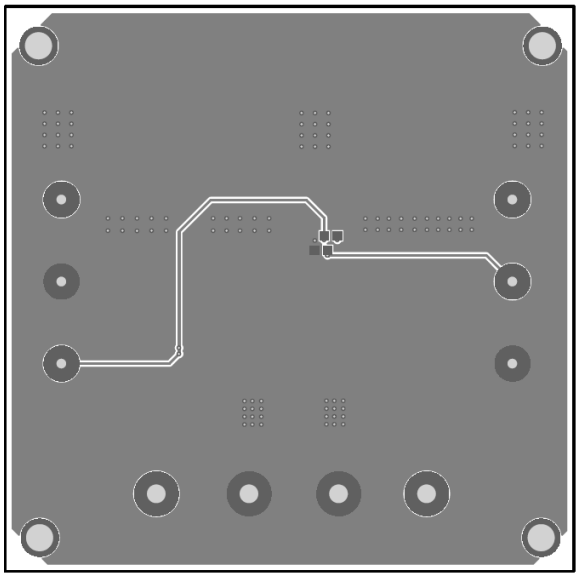


Figure 3—Bottom Layer

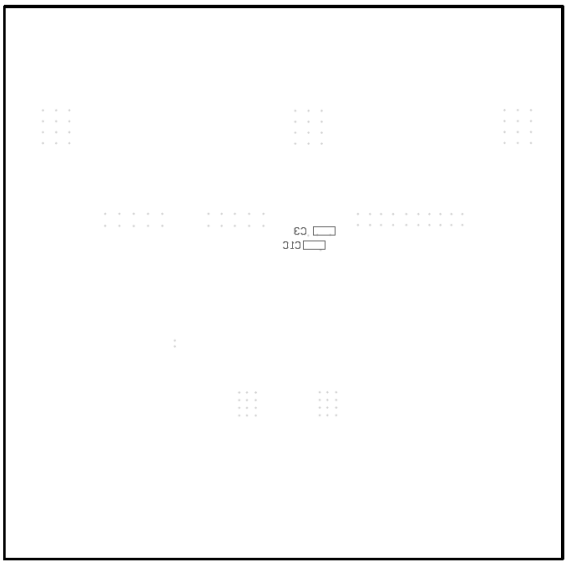


Figure 4—Bottom Silk Layer

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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 between 2.7V and 7V, 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.

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