

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

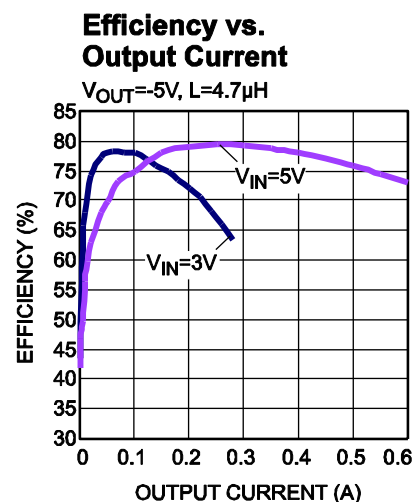
- General Negative Voltage
- HDD
- Small OLED Panel

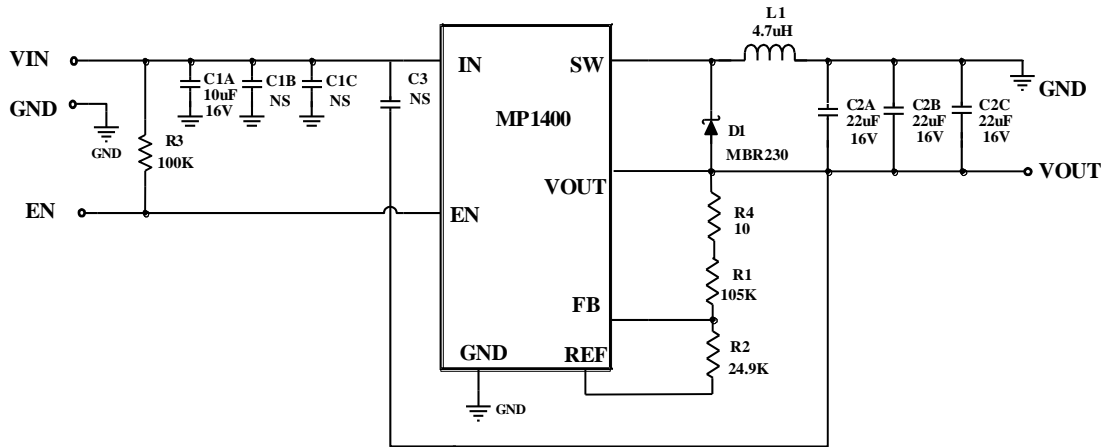
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EV1400-J-01A EVALUATION BOARD



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



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

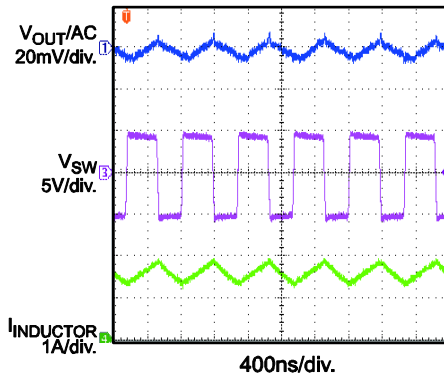
EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.

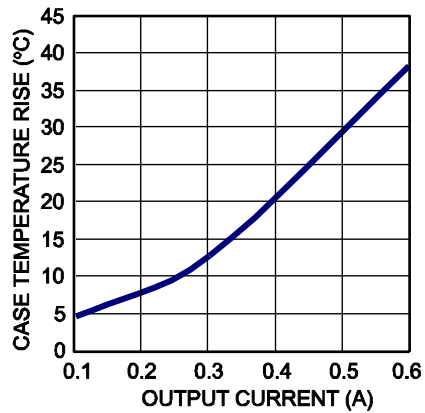
$V_{IN} = 5V$, $V_{OUT} = -5V$, $L = 4.7\mu H$, $T_A = 25^\circ C$, unless otherwise noted.

Output Ripple

$I_{OUT}=0.6A$

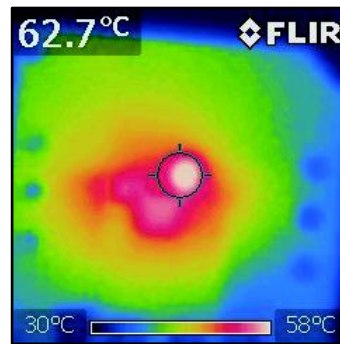


Case Temperature Rise vs. Output Current



Infrared Thermal Image

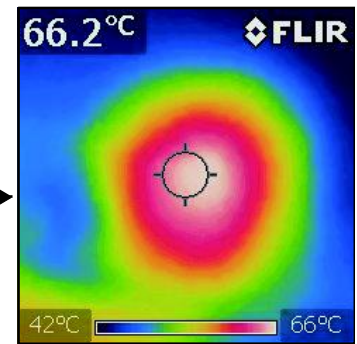
$I_{OUT}=0.6A$



Zoom in

Infrared Thermal Image

$I_{OUT}=0.6A$



PRINTED CIRCUIT BOARD LAYOUT

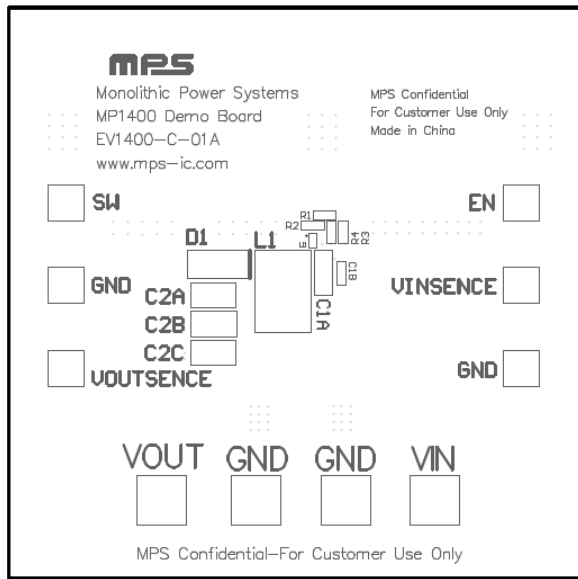


Figure 1—Top Silk Layer

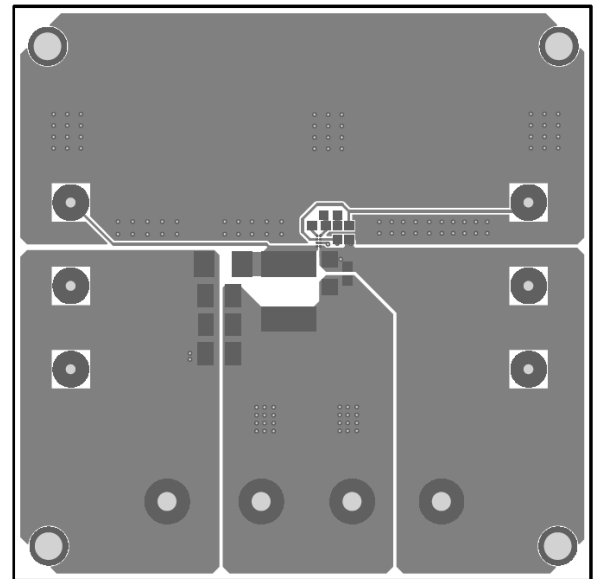


Figure 2—Top Silk Layer

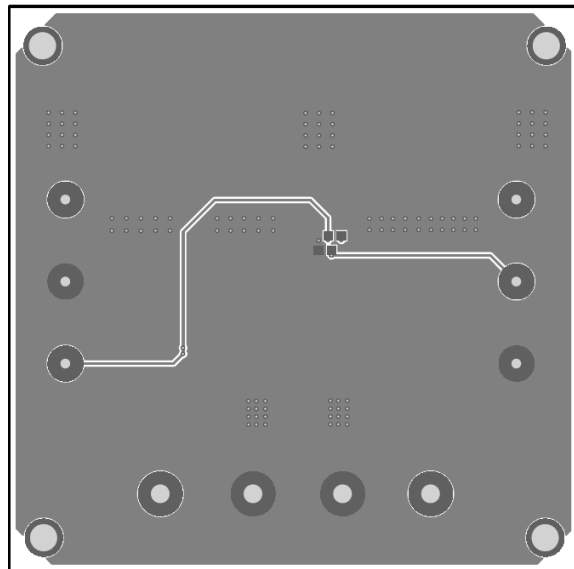


Figure 3—Bottom Layer

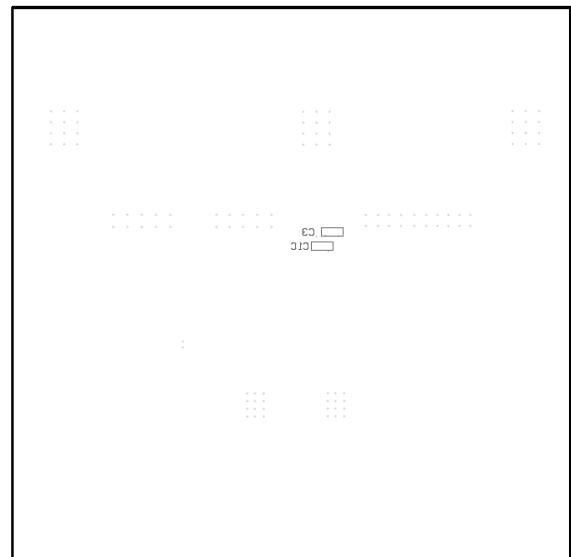


Figure 4—Bottom Silk Layer