EV1477-TF-00B

High-Efficiency, 800kHz,3A, 17V.
Step-Down Converter Evaluation Board

DESCRIPTION

The EV1477-TF-00B Evaluation Board is designed to demonstrate the capabilities of MPS' MP1477, a fully-integrated high-frequency, synchronous rectified, step-down, switch-mode converter with internal power MOSFETs. It offers a very compact solution to achieve a 3A continuous output current over a wide input range, with excellent load and line regulation. The MP1477 has synchronous-mode operation for higher efficiency over the output current-load range.

Constant On-Time control operation provides very fast transient response and easy loop design as well as very tight output regulation.

Full protection features include SCP, OCP, UVP, and thermal shutdown.

The MP1477 requires a minimal number of readily-available, standard, external components and is available in a space-saving SOT563 (1.6mmx1.6mm) 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

Notes:

1) For different Input/output voltage specs and different output capacitor/inductor may need change the application circuit parameters.

FEATURES

- Wide 4.2V-to-17V Operating Input Range
- 58mΩ/25mΩ Low-$R_{DS(ON)}$ Internal Power MOSFETs
- 180μA Low IQ Current
- High-Efficiency Synchronous-Mode Operation
- Power Save Mode at Light Load
- Fast Load Transient Response
- 800kHz Switching Frequency
- Internal Soft-Start
- Over-Current Protection and Hiccup
- Thermal Shutdown
- Output Adjustable from 0.8V
- Available in a SOT563(1.6mmx1.6mm) package

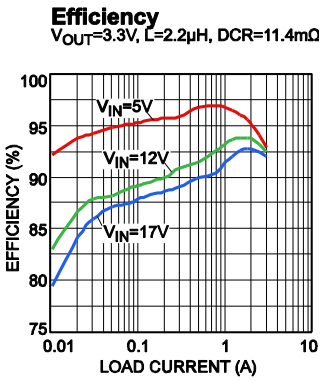
APPLICATIONS

- Security Camera
- Digital Set-Top Boxes
- Flat-Panel Television and Monitors
- General Purposes

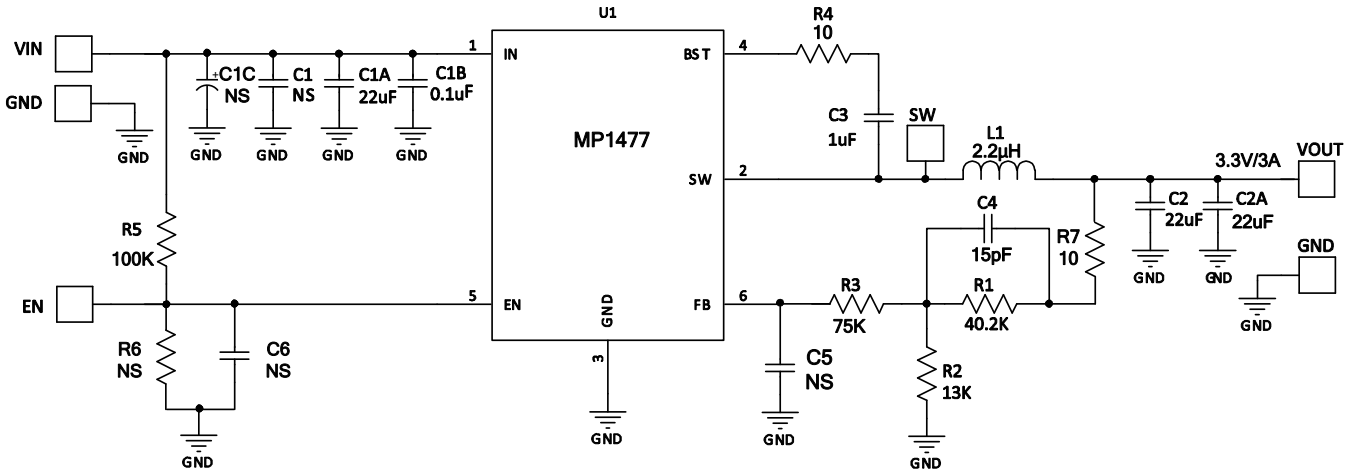
EV1477-TF-00B EVALUATION BOARD

(L x W x H) 63.7mm x 48.4mm x 6.4mm

Board Number	MPS IC Number
EV1477-TF-00B	MP1477GTF



EVALUATION BOARD SCHEMATIC



EV1477-TF-00B BILL OF MATERIALS

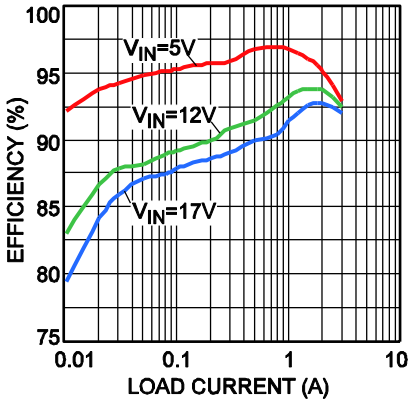
Qty	Ref	Value	Description	Package	Manufacturer	Part Number
1	C1A	22µF	Ceramic Cap., 25V, X5R	0805	muRata	GRM21BR61E226ME44L
1	C1B	0.1µF	Ceramic Cap., 25V, X7R	0603	muRata	GRM188R71E104KA01D
2	C2,C2A	22µF	Ceramic Cap., 16V, X5R	0805	muRata	GRM21BR61C226ME44L
1	C3	1µF	Ceramic Cap., 16V, X7R	0603	muRata	GRM188R71C105KA12D
0	C1,C1C, C5,C6	NS				
1	C4	15pF	Ceramic Cap., 50V, C0G	0603	muRata	GRM1885C1H150JA01D
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	75k	Thick Film Res., 1%	0603	Yageo	RC0603FR-0775KL
1	R5	100k	Thick Film Res., 1%	0603	Yageo	RC0603FR-07100KL
2	R4,R7	10Ω	Thick Film Res., 1%	0603	Yageo	RC0603JR-0710RL
0	R6	NS				
1	L1	2.2µH	Inductor, DCR=12mΩ,Is=14A	SMD	Wurth	74437349022
1	U1	MP1477GTF	Synchronous Step-Down Convert	SOT563	MPS	MP1477GTF

EVB TEST RESULTS

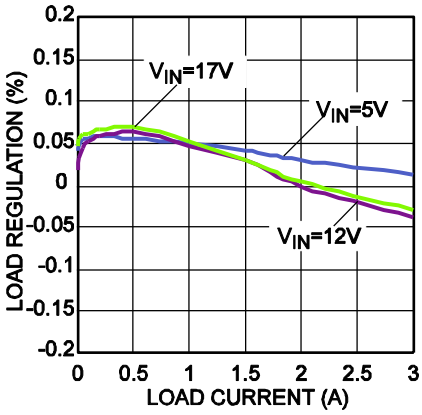
V_{IN} =12V, V_{OUT} =3.3V, L = 2.2µH, T_A = +25°C, unless otherwise noted.

Efficiency

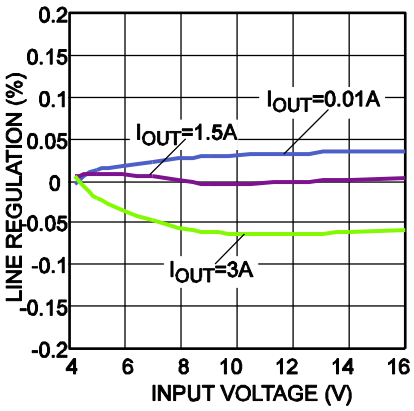
V_{OUT}=3.3V, L=2.2µH, DCR=11.4mΩ



Load Regulation

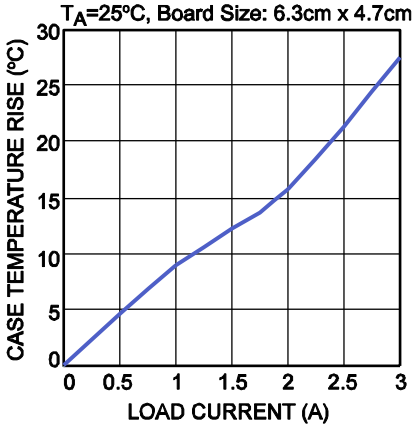


Line Regulation

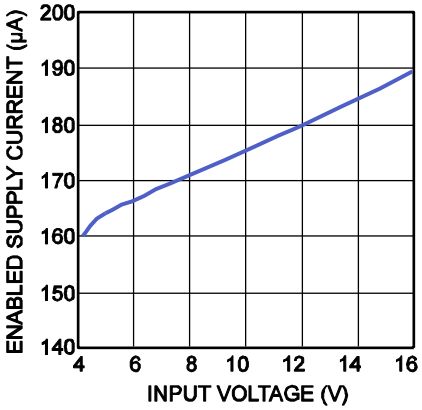


Case Temperature Rise vs. Load Current

T_A=25°C, Board Size: 6.3cm x 4.7cm



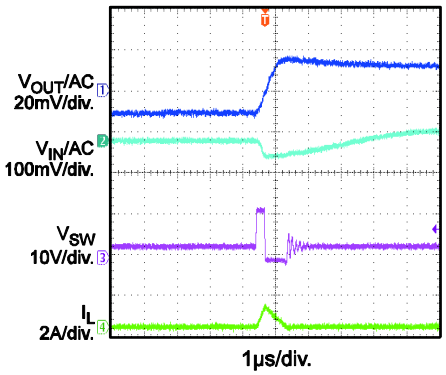
Enabled Supply Current vs. Input Voltage



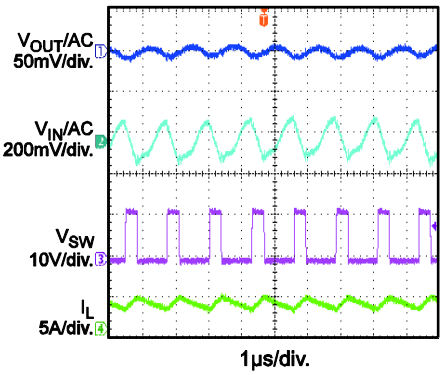
EVB TEST RESULTS *(continued)*

V_{IN} =12V, V_{OUT} =3.3V, L = 2.2µH, T_A = +25°C, unless otherwise noted.

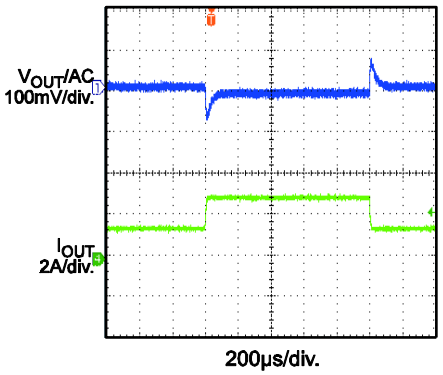
Input/Output Ripple
I_{OUT} = 0A



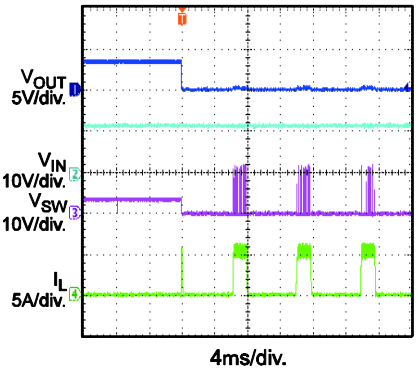
Input/Output Ripple
I_{OUT} = 3A



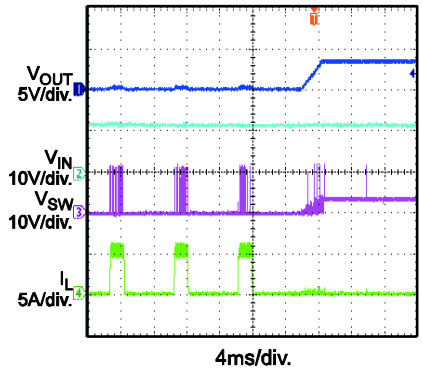
Transient Response
I_{OUT} = 1.5A to 3A, 2.5A/µs



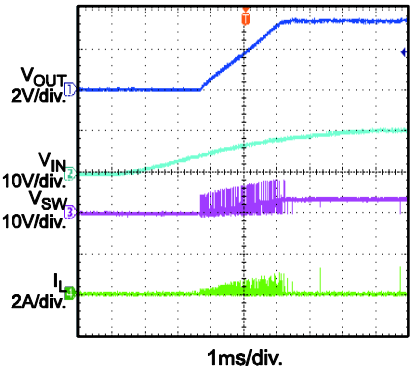
Short Circuit Entry
I_{OUT} = 0A



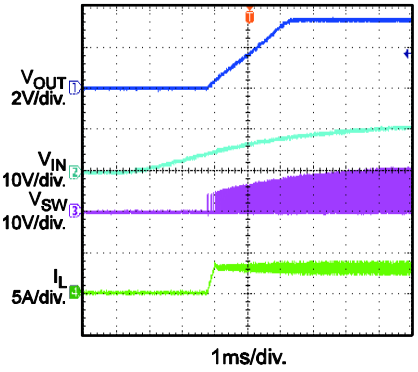
Short Circuit Recovery
I_{OUT} = 0A



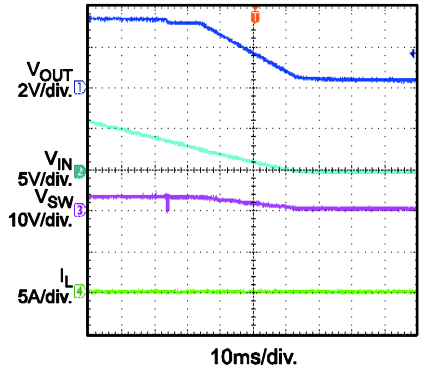
Start-Up through Input Voltage
I_{OUT} = 0A



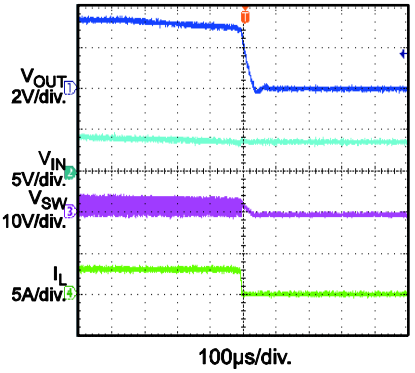
Start-Up through Input Voltage
I_{OUT} = 3A



Shutdown through Input Voltage
I_{OUT} = 0A



Shutdown through Input Voltage
I_{OUT} = 3A

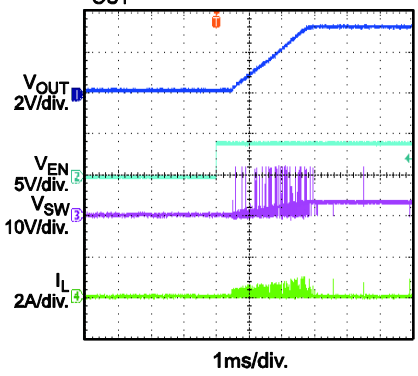


EVB TEST RESULTS *(continued)*

V_{IN} =12V, V_{OUT} =3.3V, L = 2.2µH, T_A = +25°C, unless otherwise noted.

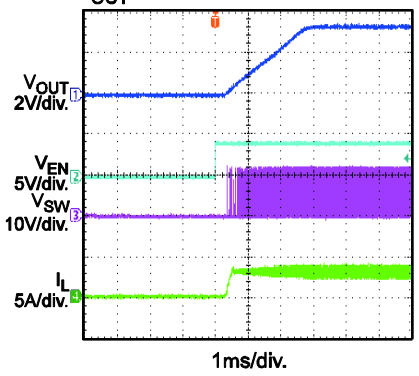
Start-Up through Enable

I_{OUT} = 0A



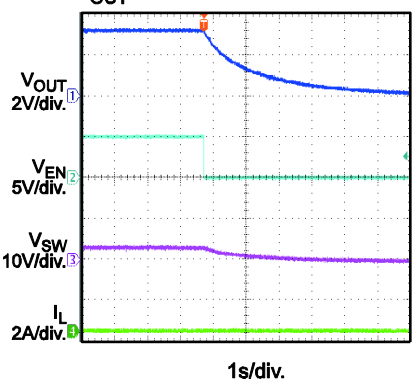
Start-Up through Enable

I_{OUT} = 3A



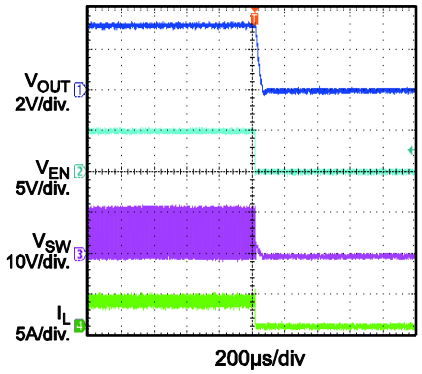
Shutdown through Enable

I_{OUT} = 0A



Shutdown through Enable

I_{OUT} = 3A



PRINTED CIRCUIT BOARD LAYOUT

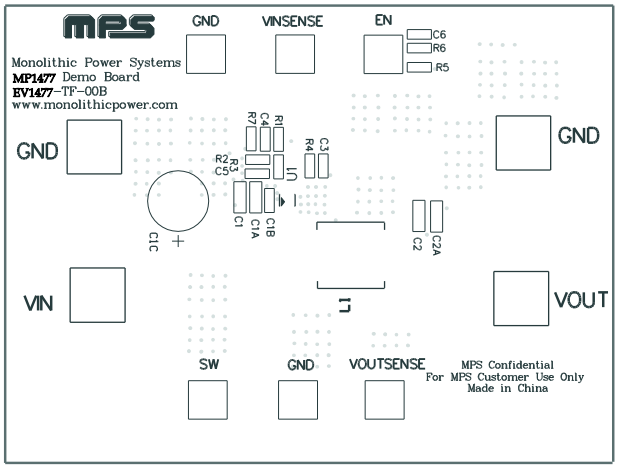


Figure1: Top Silk Layer

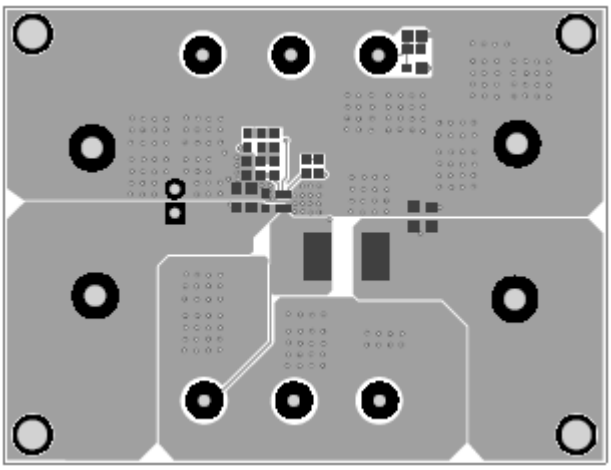


Figure2: Top Layer

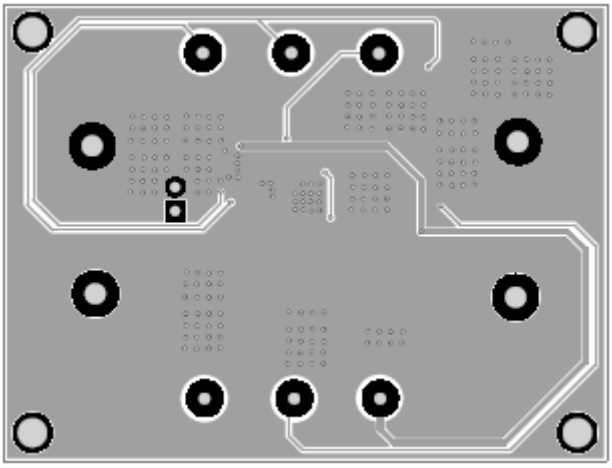


Figure3: Bottom Layer

QUICK START GUIDE

1. Preset Power Supply to12V.
2. Turn Power Supply off.
3. Connect Power Supply terminals to:
    a. Positive (+): VIN
    b. Negative (–): GND
4. Connect Load to:
    a. Positive (+): VOUT
    b. Negative (–): GND
5. Turn Power Supply on after making connections. The board will automatically start up.
6. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 1.3V to turn on the regulator, or less than 1V to turn it off.