EV2236-J-00A

High-Efficiency, 6A, 18V. Step-Down Converter Evaluation Board

The Future of Analog IC Technology

DESCRIPTION

The EV2236-J-00A Evaluation Board is designed to demonstrate the capabilities of MPS' MP2236, 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 6A continuous output current over a wide input range, with excellent load and line regulation.

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, and thermal shutdown.

The MP2236 requires a minimal number of readily-available, standard, external components and 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}	1	V
Output Current	I_{OUT}	6	A

Notes:

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

FEATURES

- Wide 3V-to-18V Operating Input Range
- 25mΩ/12mΩ Low-$R_{DS(ON)}$ Internal Power MOSFETs
- 6A Continuous Output Current
- 600mV Reference Voltage
- 600kHz Switching Frequency
- Internal Soft-Start
- Over-Current Protection and Hiccup
- Thermal Shutdown
- Ton Extension
- Available in a 8-pin TSOT-23 package

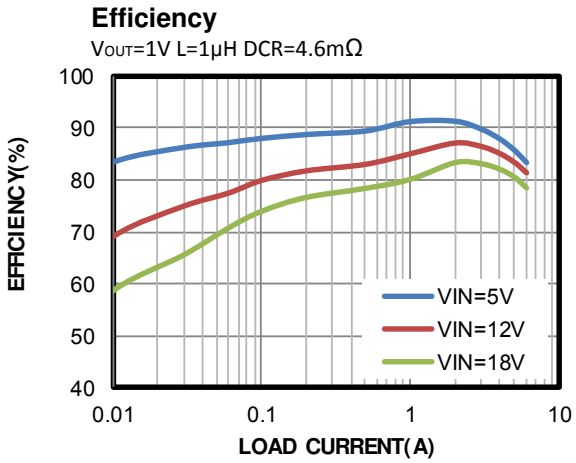
APPLICATIONS

- Digital TV Power Supply
- Digital Set-Top Boxes
- Flat-Panel Television and Monitors
- Distributed Power Systems

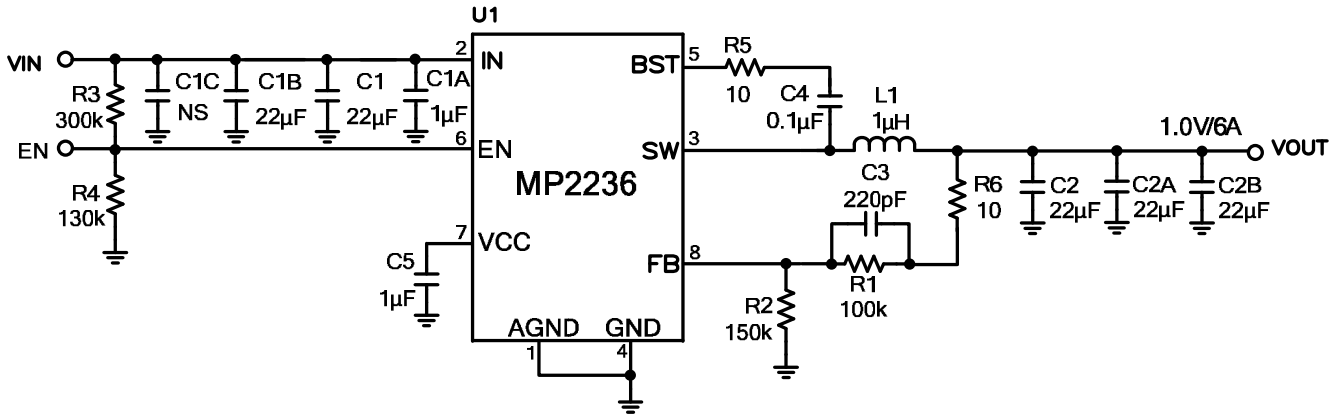
EV2236-J-00A EVALUATION BOARD

(L x W) 63.5mm x 63.5mm

Board Number	MPS IC Number
EV2236-J-00A	MP2236GJ



EVALUATION BOARD SCHEMATIC



EV2236-J-00A BILL OF MATERIALS

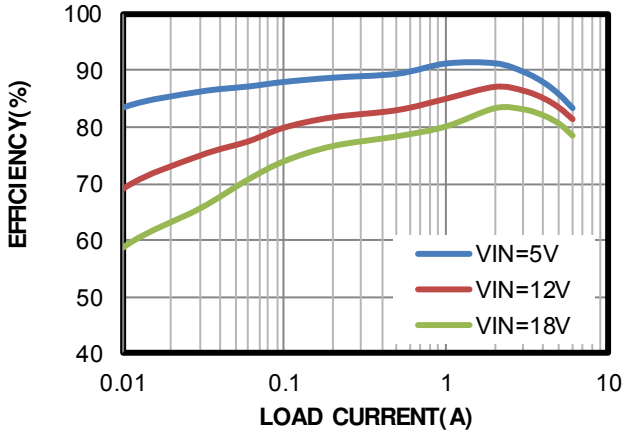
Qty	Ref	Value	Description	Package	Manufacturer	Part Number
2	C1, C1B	22µF	Ceramic Cap.,25V,X5R	1206	Murata	GRM31CR61E226KE15L
2	C1A, C5	1µF	Ceramic Cap.,25V,X7R	0603	Murata	GRM188R71E105KA12D
0	C1C	NS				
3	C2, C2A, C2B	22µF	Ceramic Cap.,10V,X7R	1206	Murata	GRM31CR71A226ME15L
1	C3	220pF	Ceramic Cap.,50V,X7R	0603	Murata	GRM188R71H221KA01D
1	C4	100nF	Ceramic Cap.,16V,X7R	0603	Murata	GRM188R71C104KA01D
1	R1	100k	Film Res,1%,0603,100K	0603	YAGEO	RC0603FR-07100KL
1	R2	150k	Film Res,1%,0603,150K	0603	YAGEO	RC0603FR-07150KL
1	R3	300k	Film Res,1%,0603,300K	0603	YAGEO	RC0603FR-07300KL
0	R4	130k	Film Res,1%,0603,130K	0603	YAGEO	RC0603FR-07130KL
2	R5, R6	10R	Film Res,1%,0603,10R	0603	YAGEO	RC0603FR-0710RL
1	L1	1µH	Inductor,RDC=4.6 mΩ,Isat=15A	SMD	Wurth	744311100
1	U1	MP2236GJ	Step-down converter	TSOT23-8	MPS	MP2236GJ

EVB TEST RESULTS

V_{IN} =12V, V_{OUT} =1V, L = 1µH, T_A = +25°C, unless otherwise noted.

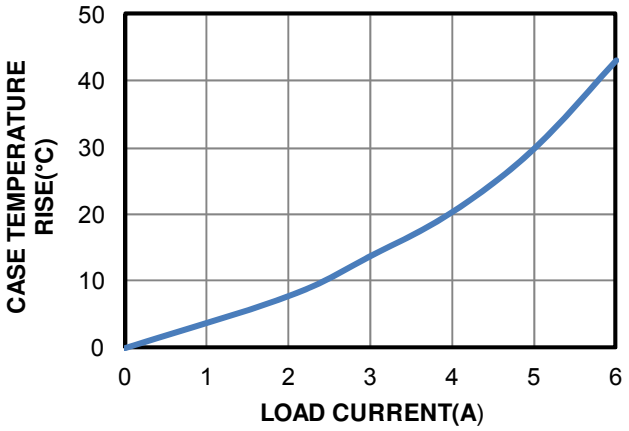
Efficiency

V_{OUT}=1V L=1µH DCR=4.6mΩ



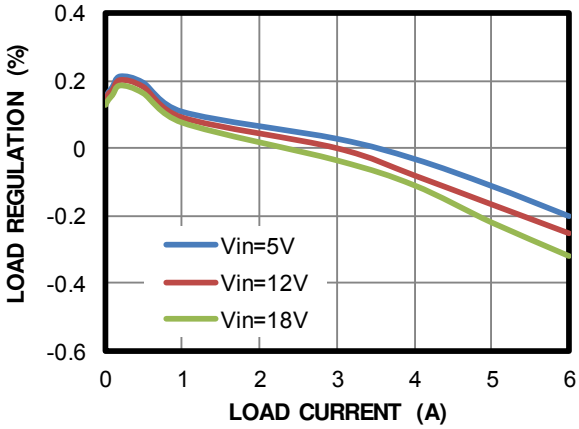
Case Temperature Rise vs. Load Current

V_{OUT}=3.3V, 4 layers PCB, size is 63.5mmx63.5mm



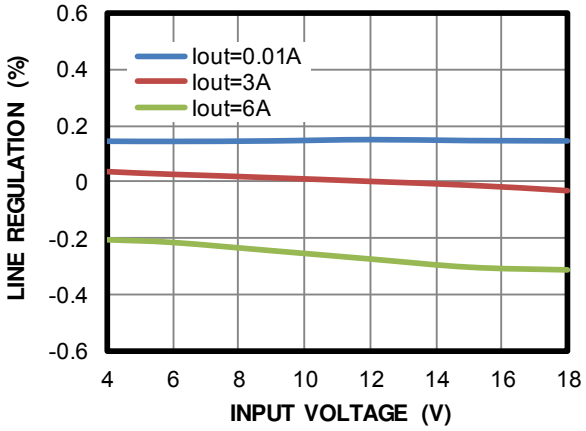
Load Regulation

I_{OUT}=0.01A to 6A



Line Regulation

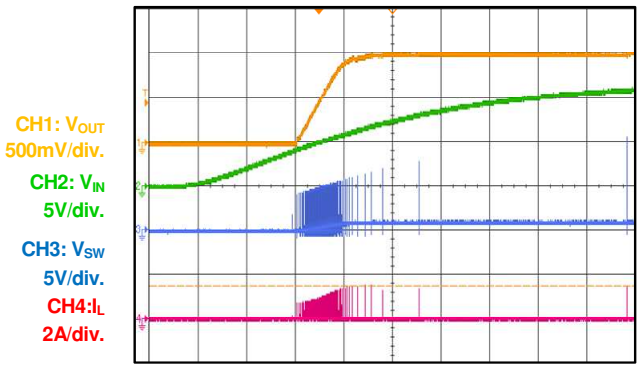
V_{IN}=4V to 18V



EVB TEST RESULTS *(continued)*

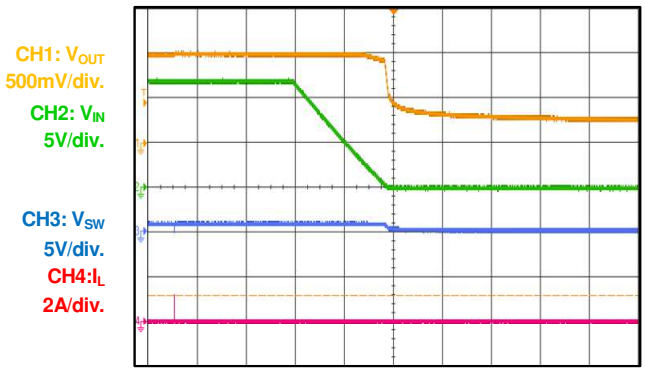
V_{IN} =12V, V_{OUT} =1V, L = 1µH, T_A = +25°C, unless otherwise noted.

Start up through Input Voltage
I_{OUT}=0A



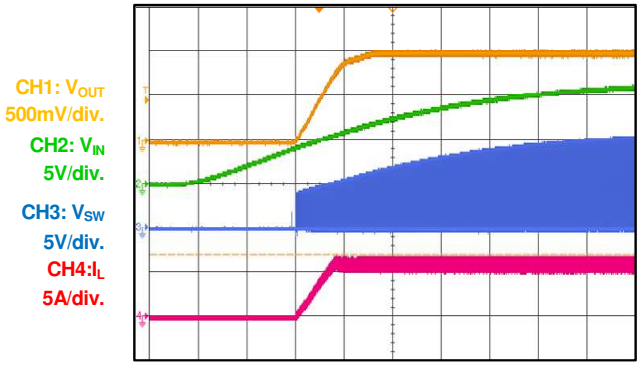
1ms/div.

Shutdown through Input Voltage
I_{OUT}=0A



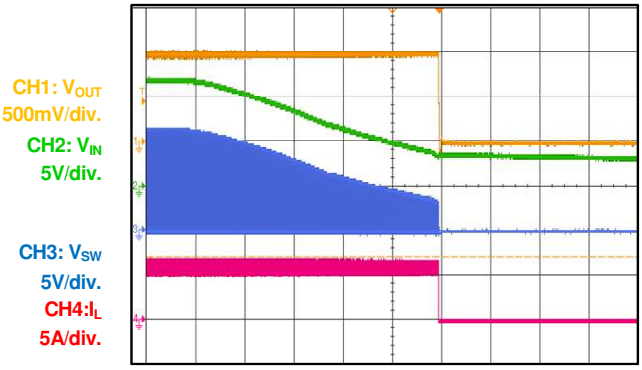
50ms/div.

Start up through Input Voltage
I_{OUT}=6A



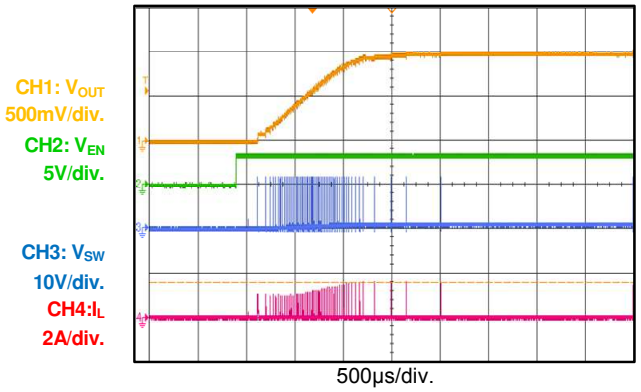
1ms/div.

Shutdown through Input Voltage
I_{OUT}=6A



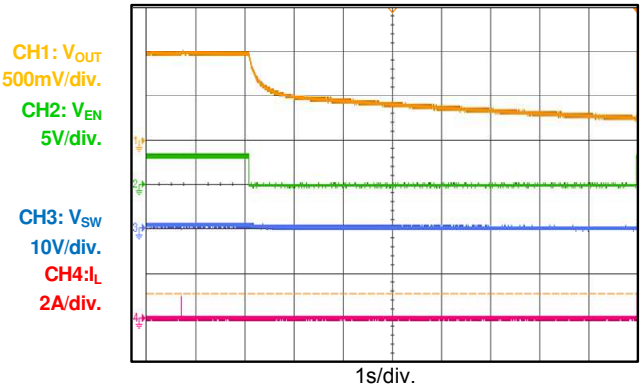
1ms/div.

Start up through Enable
I_{OUT}=0A



500µs/div.

Shutdown through Enable
I_{OUT}=0A



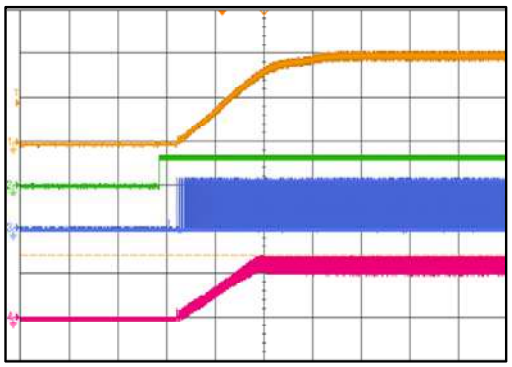
1s/div.

EVB TEST RESULTS *(continued)*

V_{IN} =12V, V_{OUT} =1V, L = 1µH, T_A = +25°C, unless otherwise noted.

Start up through Enable

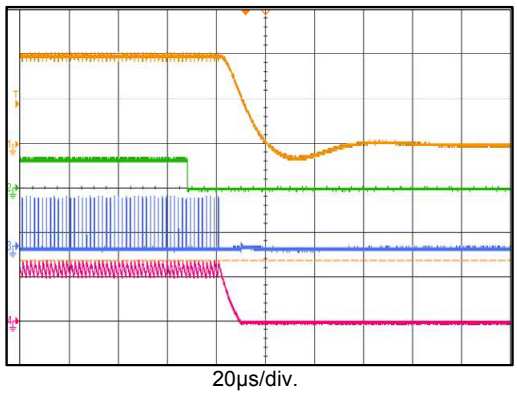
I_{OUT}=6A



500µs/div.

Shutdown through Enable

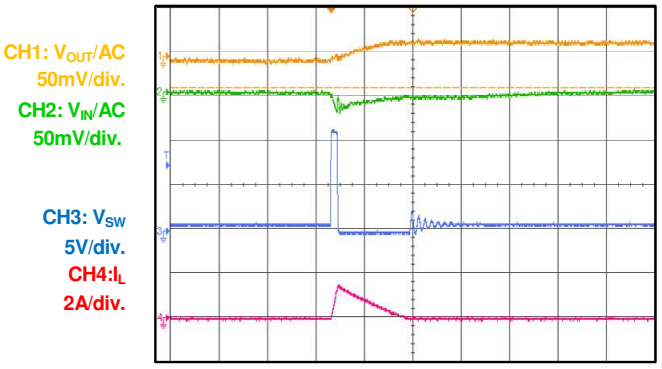
I_{OUT}=6A



20µs/div.

Input / Output Ripple

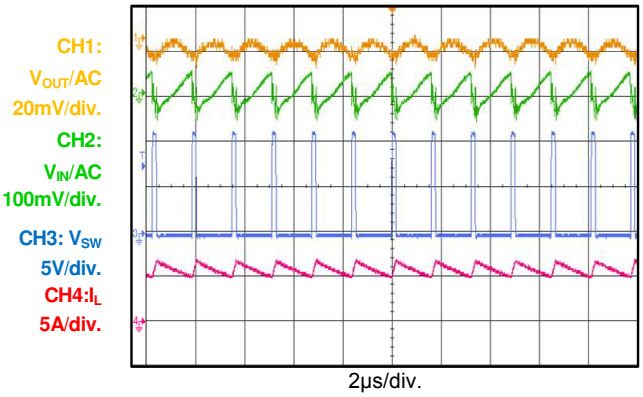
I_{OUT}=0A



1µs/div.

Input / Output Ripple

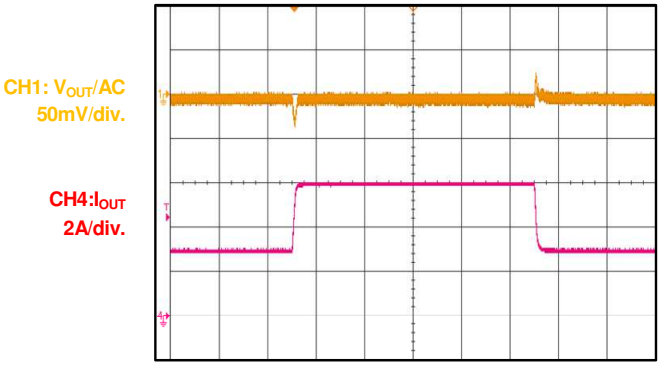
I_{OUT}=6A



2µs/div.

Transient Response

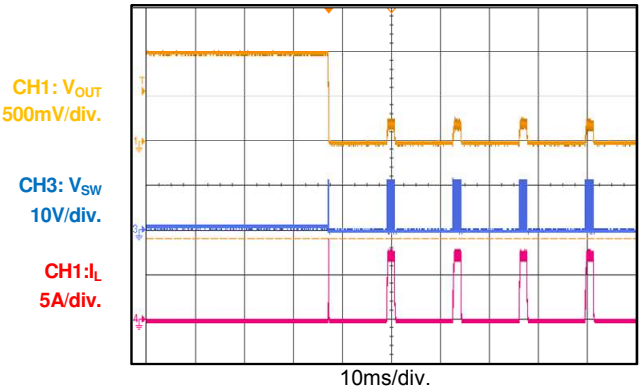
I_{OUT} =3A-6A, Slew rate=2.5A/us by Eload



100µs/div.

Short Circuit Entry

I_{OUT}=0A



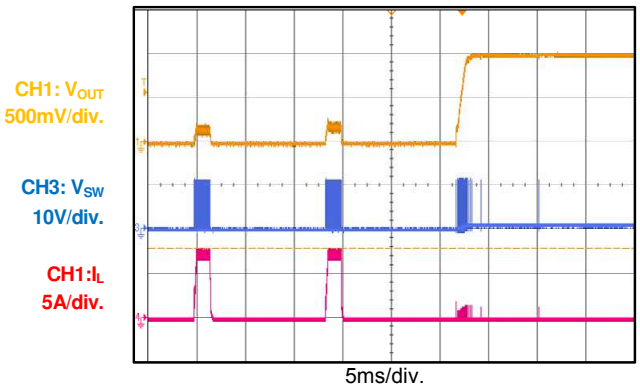
10ms/div.

EVB TEST RESULTS *(continued)*

V_{IN} =12V, V_{OUT} =1V, L = 1µH, T_A = +25°C, unless otherwise noted.

Short Circuit Recovery

I_{OUT}=0A



PRINTED CIRCUIT BOARD LAYOUT

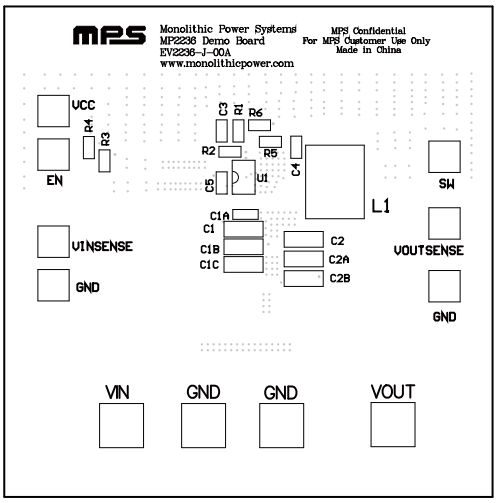


Figure 1—Top Silk Layer

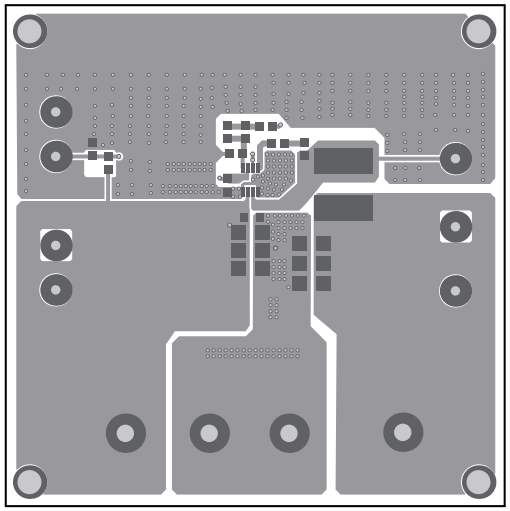


Figure 2—Top Layer

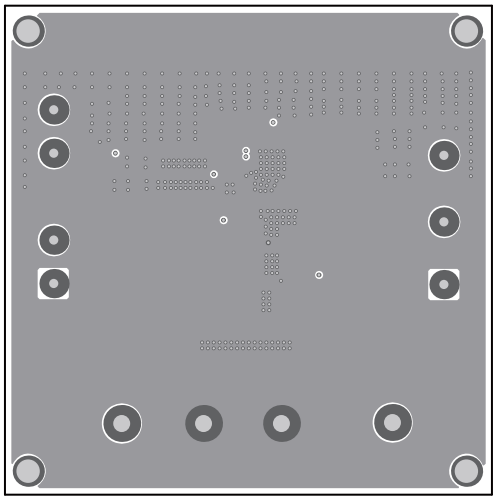


Figure 3—IN1 Layer

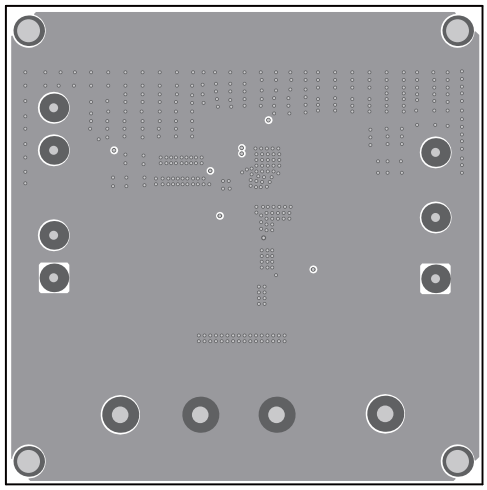


Figure 4—IN2 Layer

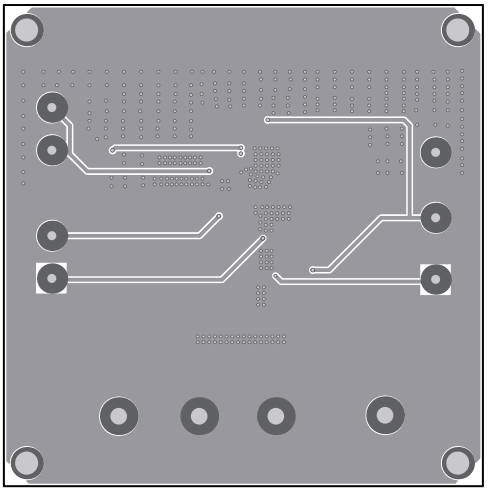


Figure 5—Bottom Layer

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 0.9V to turn it off.