EV8770-Q-00A

High-Efficiency, 700kHz, 8A, 17V Step-Down Converter Evaluation Board

The Future of Analog IC Technology

DESCRIPTION

The EV8770-Q-00A Evaluation Board is designed to demonstrate the capabilities of MPS' MP8770, 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 8A continuous output current over a wide input range, with excellent load and line regulation. The MP8770 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 MP8770 requires a minimal number of readily-available, standard, external components and is available in a space-saving QFN-16 (3mmx3mm) package.

ELECTRICAL SPECIFICATION (1)

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	12	V
Output Voltage	V_{OUT}	1	V
Output Current	I_{OUT}	8	A

FEATURES

- Wide 4.5V-to-17V Operating Input Range
- 22mΩ/10mΩ Low-$R_{DS(ON)}$ Internal Power MOSFETs
- 100μA Low IQ Current
- High-Efficiency Synchronous-Mode Operation
- Pre-biased Startup
- Fixed 700kHz Switching Frequency
- External Programmable Soft Startup Time
- EN and Power Good for Power Sequencing
- Over-Current Protection and Hiccup
- Thermal Shutdown
- Output Adjustable from 0.6V
- Available in a QFN-16 (3mmx3mm) package

APPLICATIONS

- Security Camera
- Portable Device, XDSL Device
- Digital Set-Top Boxes
- Flat-Panel Television and Monitors
- General Purposes

Notes:

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

All MPS parts are lead-free, halogen free, and adhere to the RoHS directive. For MPS green status, please visit MPS website under Quality Assurance.
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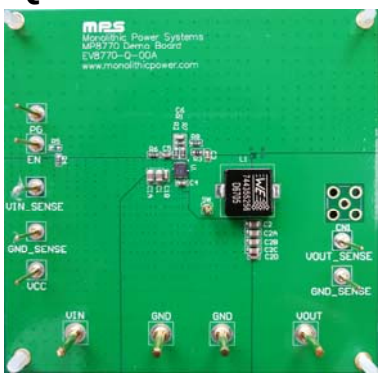
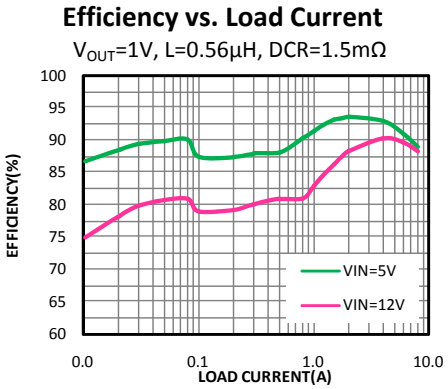
EV8770-Q-00A EVALUATION BOARD



(L x W) 85mm x 85mm

Board Number	MPS IC Number
EV8770-Q-00A	MP8770GQ



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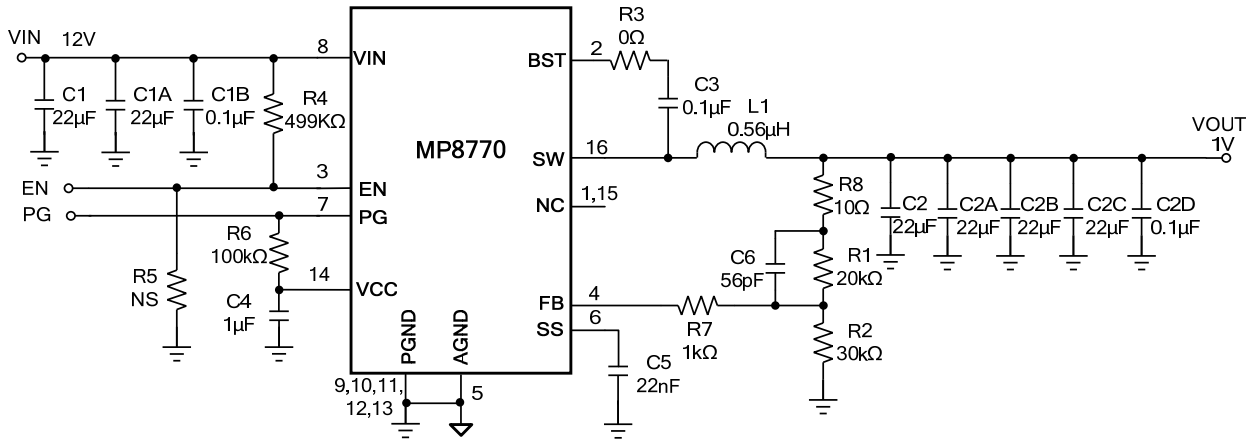
EVALUATION BOARD SCHEMATIC



EV8770-Q-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Part Number
6	C1,C1A, C2,C2A, C2B,C2C	22µF	Ceramic Cap., 25V, X5R	0805	muRata	GRM21BR61E226ME44L
3	C1B,C2D C3	0.1µF	Ceramic Cap., 25V, X7R	0603	muRata	GRM188R71E104KA01D
1	C4	1µF	Ceramic Cap., 25V, X7R	0603	muRata	GRM188R71E105KA12D
1	C5	22nF	Ceramic Cap., 16V, X7R	0603	muRata	GRM188R71C223KA01D
1	C6	56pF	Ceramic Cap., 50V, C0G	0603	muRata	GRM1885C1H560JA01D
1	R1	20k	Thick Film Res., 1%	0603	Yageo	RC0603FR-0720KL
1	R2	30k	Thick Film Res., 1%	0603	Yageo	RC0603FR-0730KL
1	R3	0Ω	Thick Film Res., 1%	0603	Yageo	RC0603FR-070RL
1	R4	499k	Thick Film Res., 1%	0603	Yageo	RC0603FR-07499KL
0	R5,R9, R10	NS		0603		
1	R6	100k	Thick Film Res., 1%	0603	Yageo	RC0603FR-07100KL
1	R7	1k	Thick Film Res., 1%	0603	Yageo	RC0603FR-071KL
1	R8	10Ω	Thick Film Res., 1%	0603	Yageo	RC0603JR-0710RL
1	L1	0.56µH	Inductor, DCR=1.5mΩ,Is=30A	SMD	Wurth	744355256
1	U1	MP8770	Synchronous Step-Down Convert	QFN-16 (3mmx3mm)	MPS	MP8770GQ

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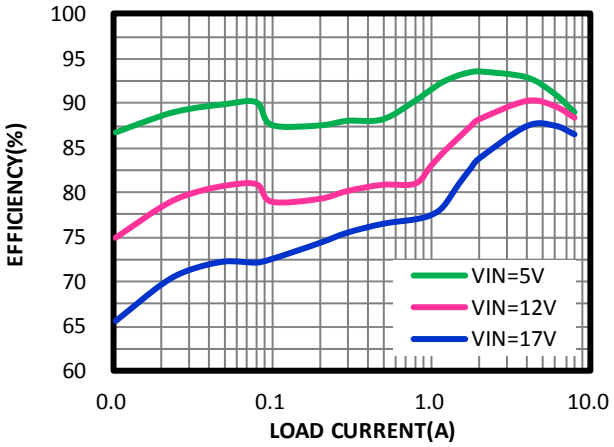
EVB TEST RESULTS

V_{IN} = 12V, V_{OUT} = 1V, L = 0.56µH, T_A = +25°C, unless otherwise noted.

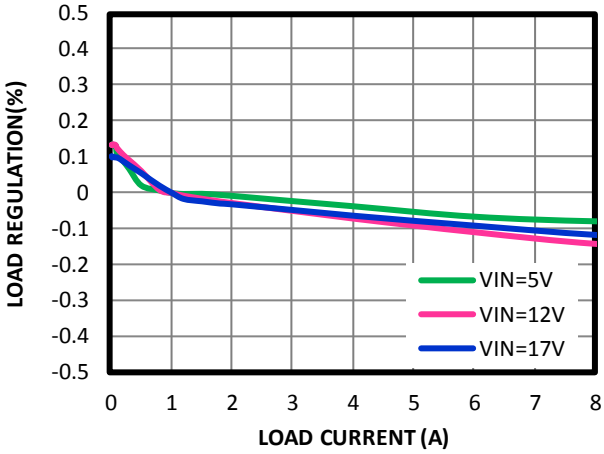
Efficiency vs. Load Current

V_{OUT}=1V, L=0.56µH, DCR=1.5mΩ

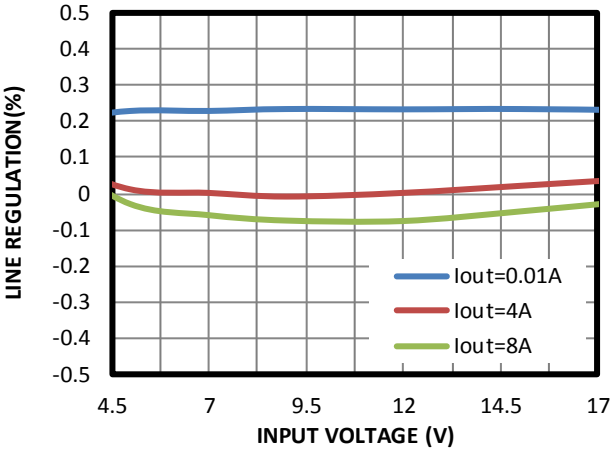


Load Regulation vs. Load Current

V_{OUT}=1V



Line Regulation vs. Input Voltage



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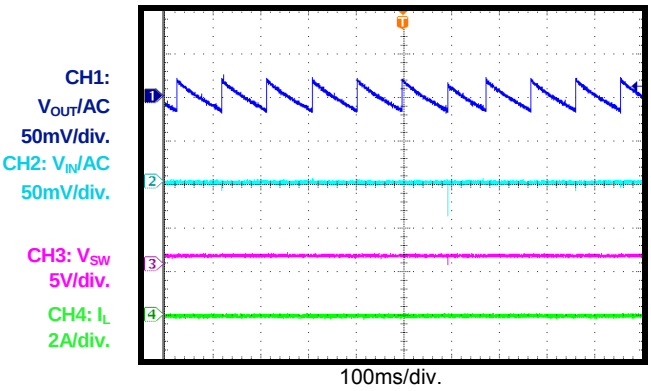
EVB TEST RESULTS *(continued)*

V_{IN} = 12V, V_{OUT} = 1V, L = 0.56µH, T_A = +25°C, unless otherwise noted.

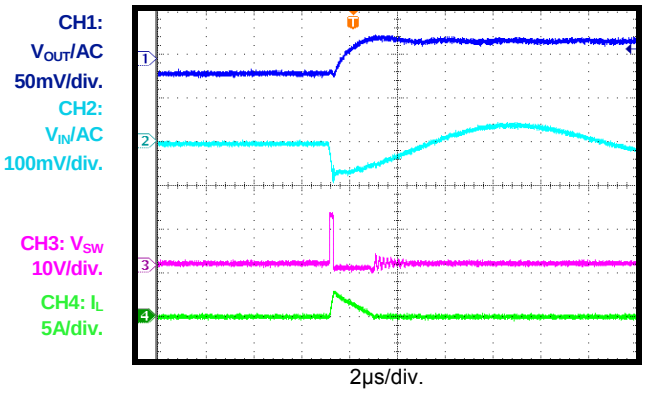
Input/Output Ripple

I_{OUT}=0A



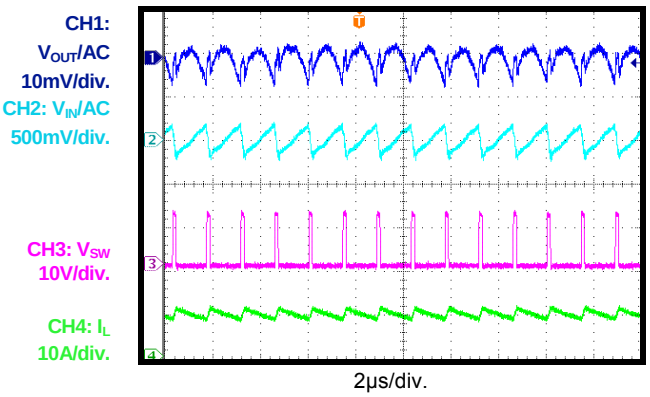
Input/Output Ripple

I_{OUT}=0A



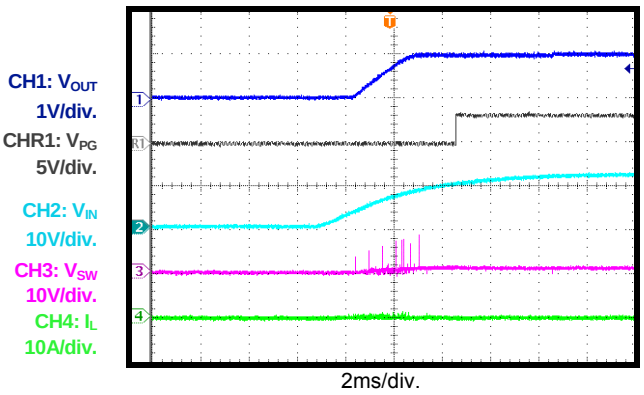
Input/Output Ripple

I_{OUT}=8A



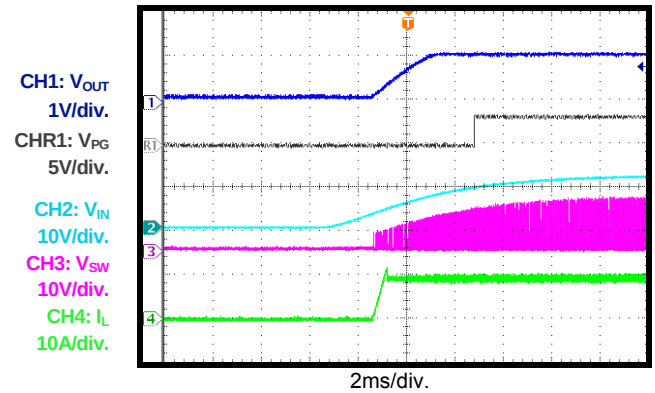
Start-Up through Input Voltage

I_{OUT}=0A



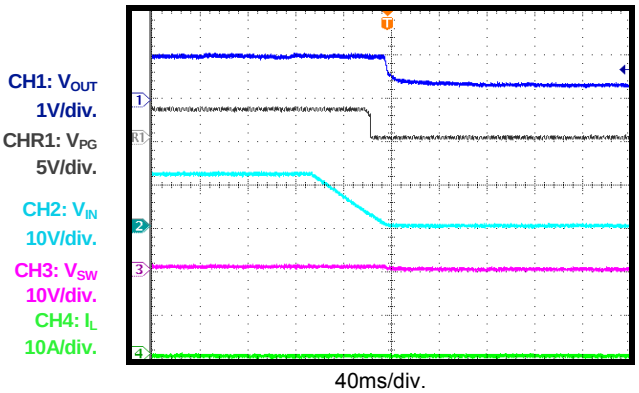
Start-Up through Input Voltage

I_{OUT}=8A



Shutdown through Input Voltage

I_{OUT}=0A



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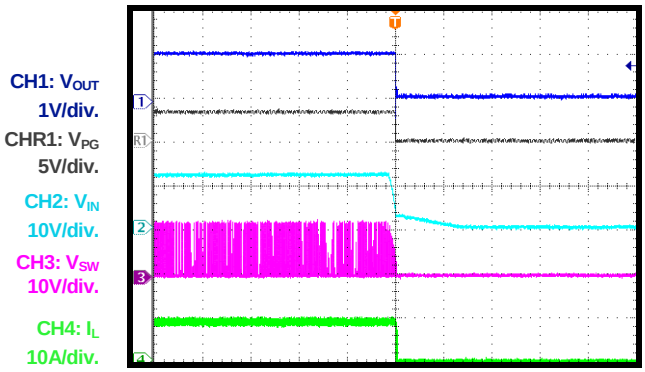
EVB TEST RESULTS *(continued)*

V_{IN} = 12V, V_{OUT} = 1V, L = 0.56µH, T_A = +25°C, unless otherwise noted.

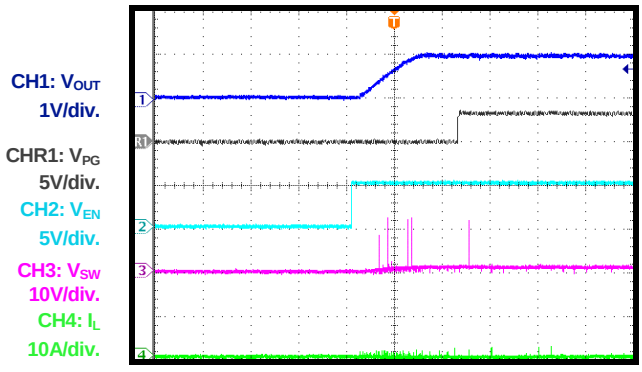
Shutdown through Input Voltage

I_{OUT}=8A



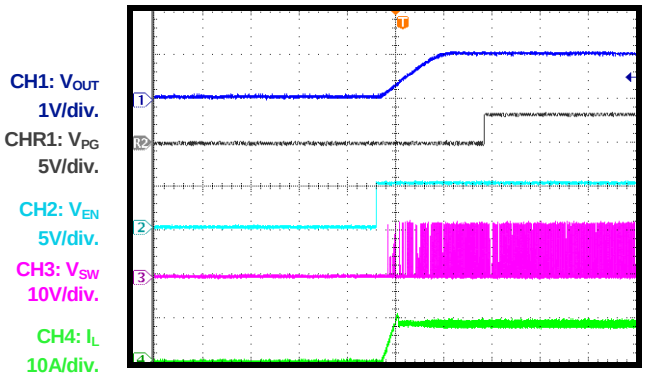
Start-Up through EN

I_{OUT}=0A



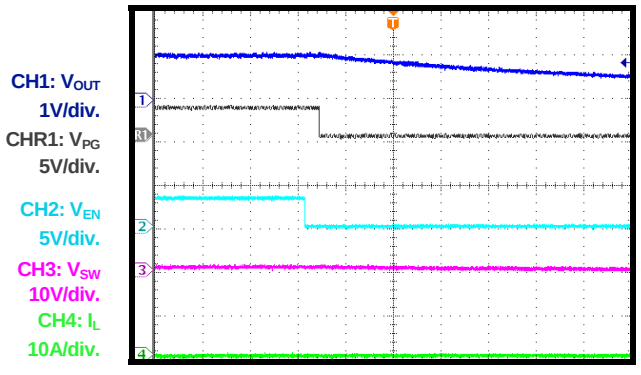
Start-Up through EN

I_{OUT}=8A



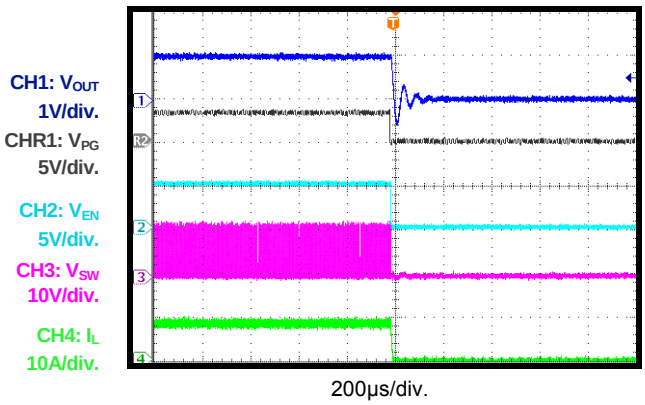
Shutdown through EN

I_{OUT}=0A



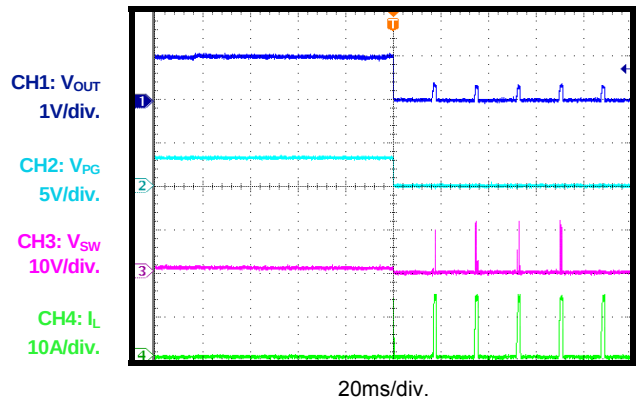
Shutdown through EN

I_{OUT}=8A



Short Circuit Protection Entry

I_{OUT}=0A



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EVB TEST RESULTS *(continued)*

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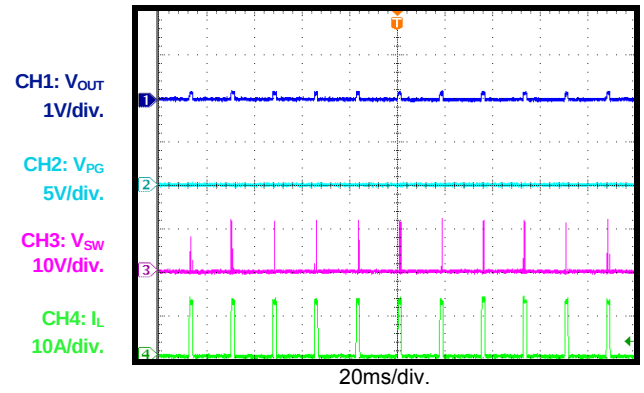
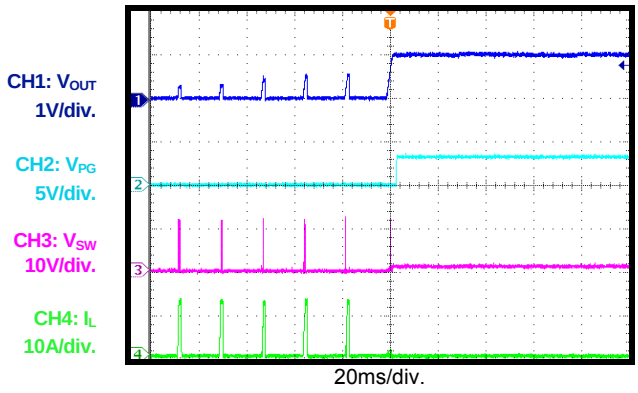
Short Circuit Protection Steady State

Short Output to GND



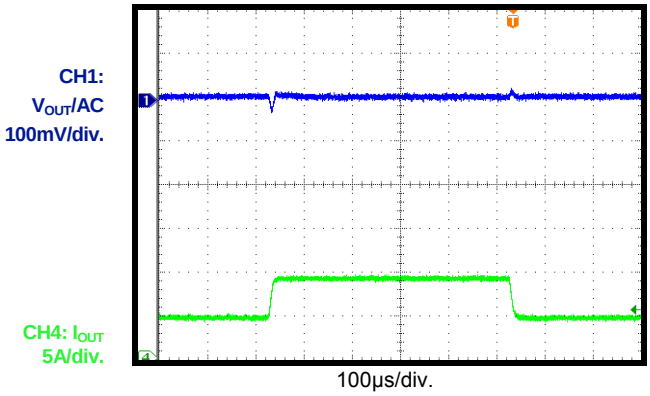
Short Circuit Protection Recovery

I_{OUT}=0A



Load Transient

I_{OU}T=4A-8A



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PRINTED CIRCUIT BOARD LAYOUT

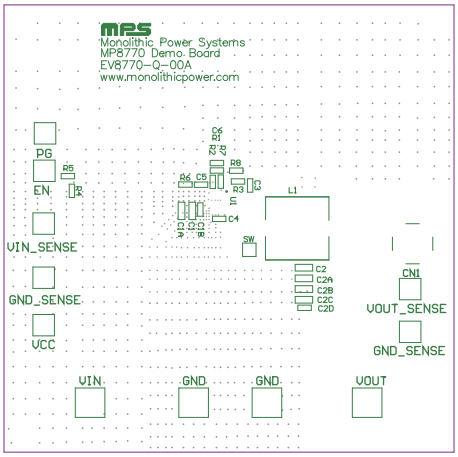

Figure 1—Top Silk Layer

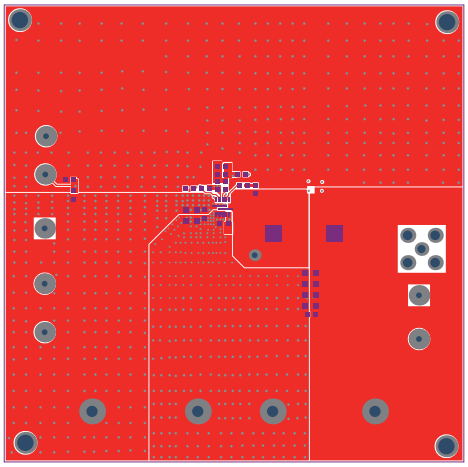

Figure 2—Top Layer

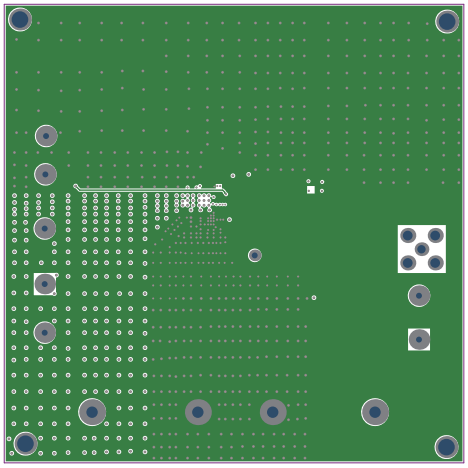

Figure 3—Inner Layer 1

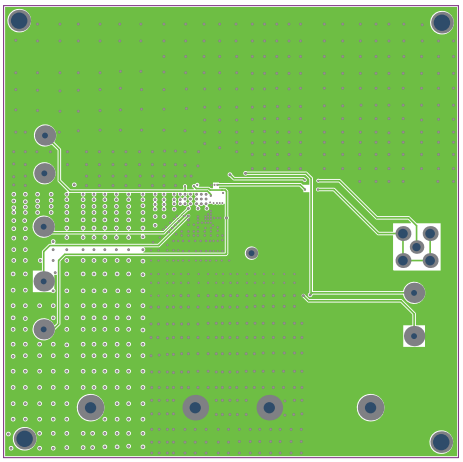

Figure 4—Inner Layer 2

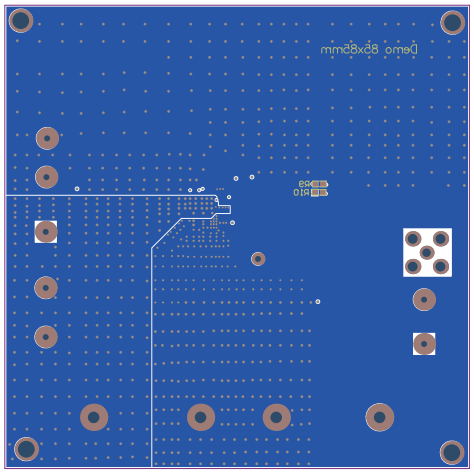

Figure 5—Bottom Layer

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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 1.2V to turn on the regulator, or less than 0.9V to turn it off.

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