



EV8634A-LE-00A

High Efficiency 16V, 12A Synchronous Step-Down Converter Evaluation Board

DESCRIPTION

The EVQ8634A-LE-00A is an evaluation board for the MPQ8634A, a high efficiency, monolithic, synchronous step-down converter.

The EV board can deliver 12A continuous load current over a wide operating input range. High efficiency can be achieved over a wide output current load range.

The MPQ8634A adopts internally compensated constant-on-time (COT) control mode that provides fast transient response and eases loop stabilization.

This EV board can be turned on or off via a remote ON/OFF input (EN) that is referenced to ground. This input is compatible with popular logic devices.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	8-16	V
Output Voltage	V_{OUT}	1.2	V
Output Current	I_{OUT}	12	A

FEATURES

- Wide Input Voltage Range from 2.7V:
 - 2.7V to 16V with External 3.3V VCC Bias
 - 4V to 16V with Internal VCC Bias or External 3.3V Bias
- Differential Output Voltage Remote Sense
- Programmable Accurate Current Limit Level
- 12A Output Current
- Low $R_{DS(ON)}$ Integrated Power MOSFETs
- Proprietary Switching Loss Reduction Technique

- Adaptive COT for Ultrafast Transient Response
- Stable with Zero-ESR Output Capacitor
- 0.5% Reference Voltage Over 0°C to +70°C Junction Temperature Range
- 1% Reference Voltage Over -40°C to +125°C Junction Temperature Range
- Selectable Pulse-Skip or Forced-CCM Operation
- Excellent Load Regulation
- Output Voltage Tracking
- Output Voltage Discharge
- PGOOD Active Clamped Low Level during Power Failure
- Programmable Soft Start Time from 1ms
- Pre-Bias Start up
- Selectable Switching Frequency of 600kHz, 800kHz and 1000kHz
- Latch-off OCP, UVP, UVLO, Thermal Shutdown, and Latch-off for OVP
- Output Adjustable from 0.9V to 90%* V_{in} , Up to 5.5V max.
- Available in a QFN3X4 mm Package

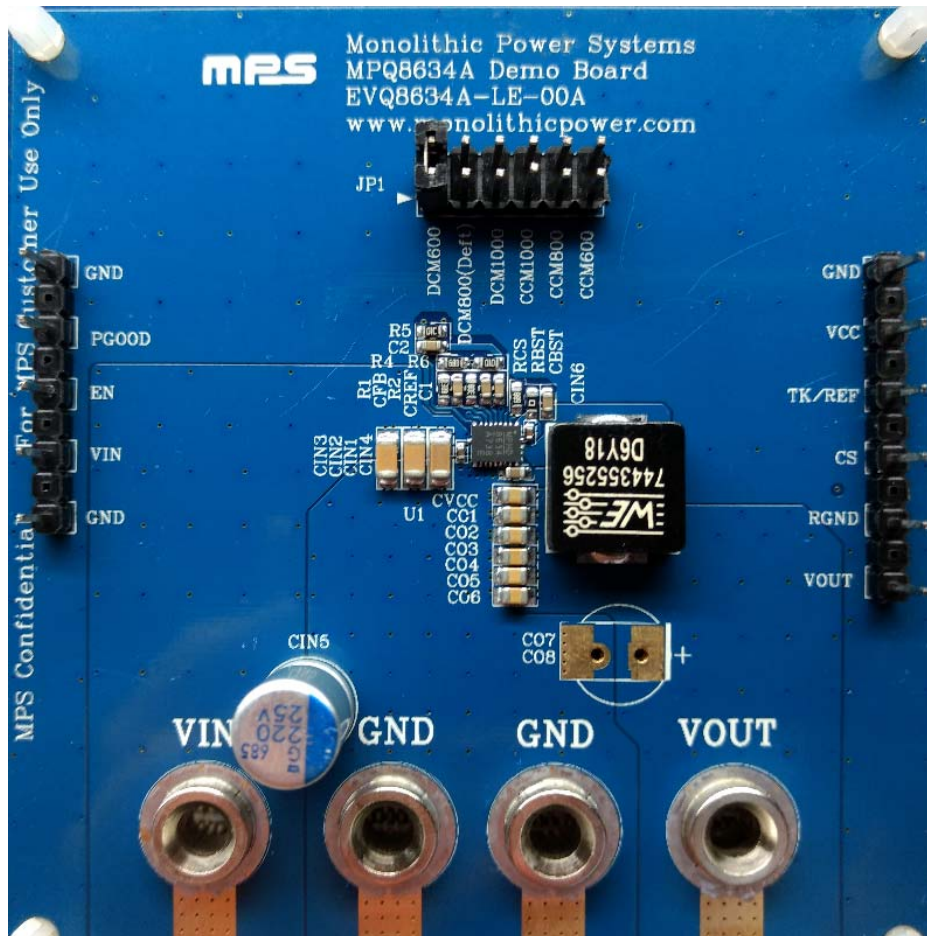
APPLICATIONS

- Telecom System and Networking Systems
- Servers, Cloud-Computing, Storage
- Base Stations
- General Purpose Point-of-Load (PoL)
- 12V Distribution Power Systems
- High-end TV
- Game Consoles and Graphic Cards

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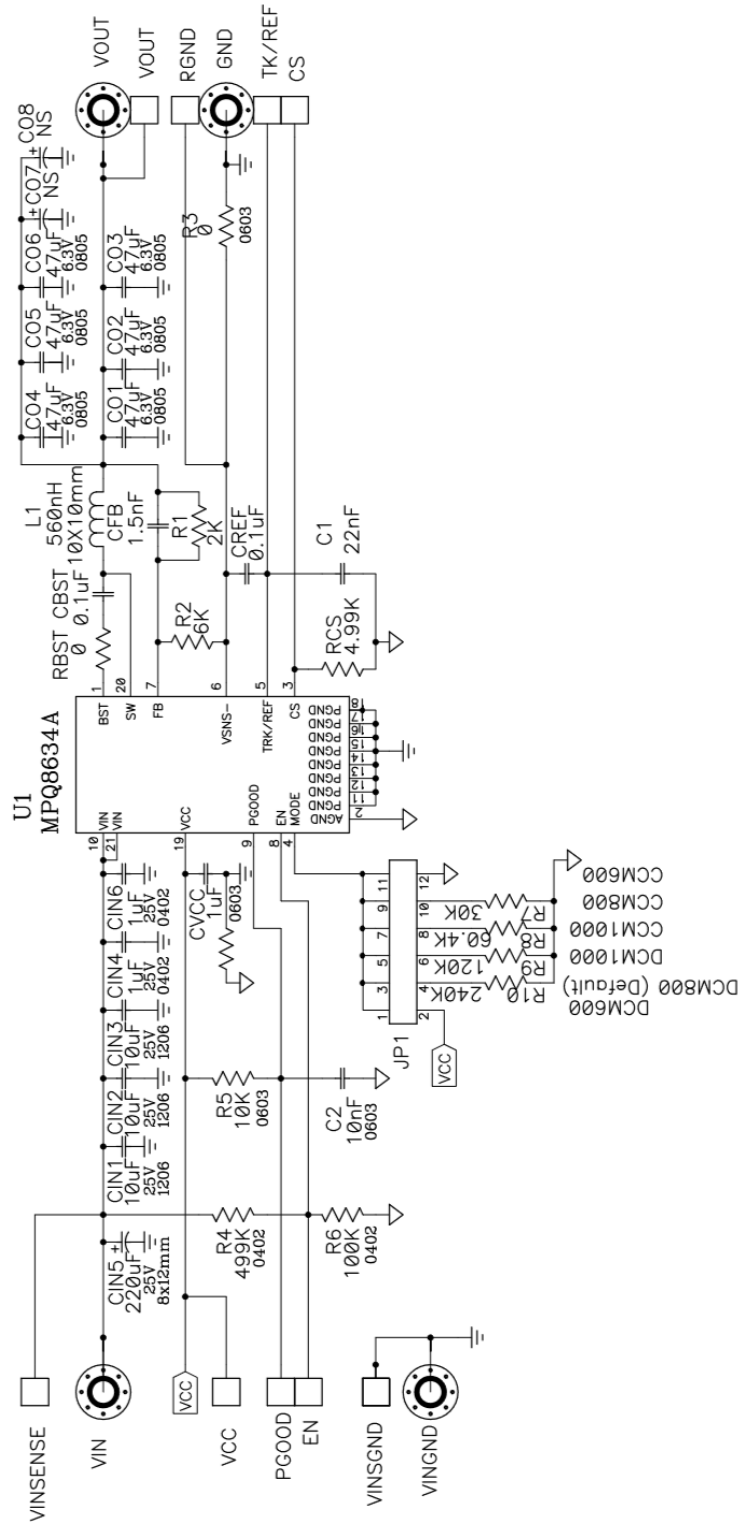
EV8634A-LE-00A EVALUATION BOARD



(L x W x H)81.3 mm x 77.5mm x 1.6 mm)

Board Number	MPS IC Number
EVQ8634A-LE-00A	MPQ8634AGLE

EVALUATION BOARD SCHEMATIC



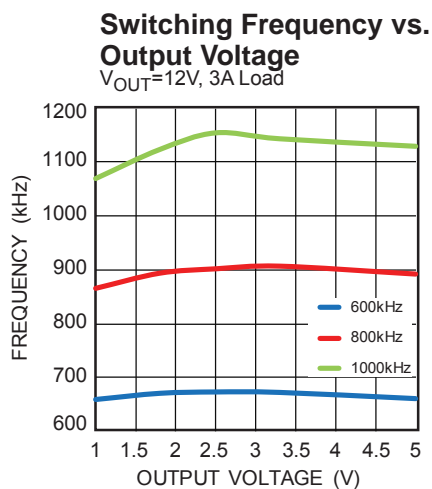
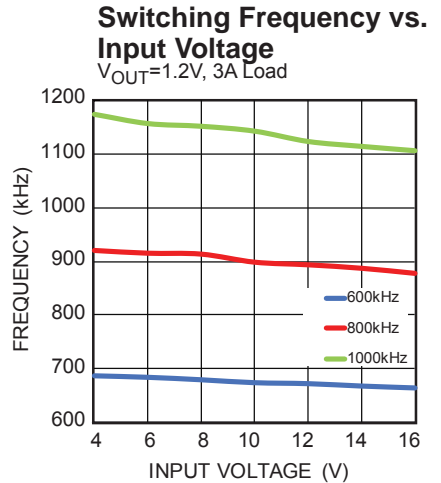
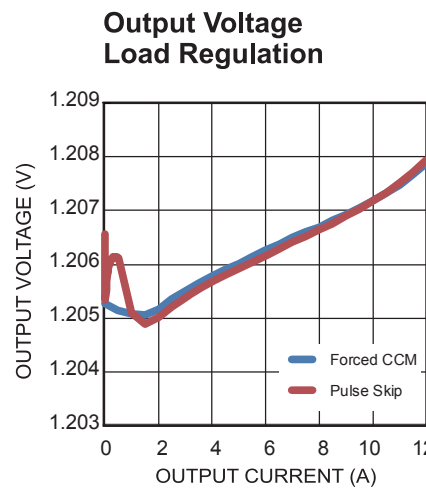
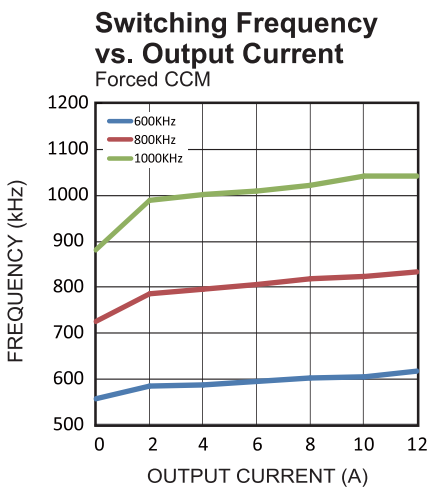
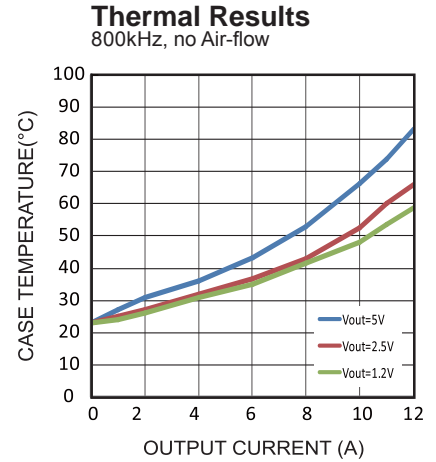
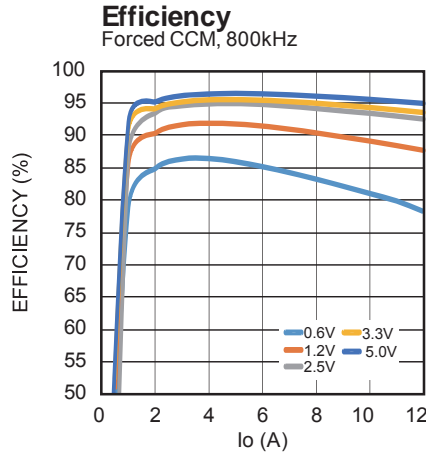
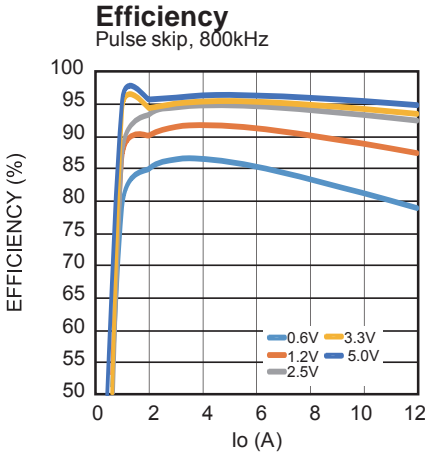
BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Part Number
1	C1	22nF	CAP, 25V, 10%, X7R	CAP0603	Generic	
1	C2	10nF	CAP, 25V, 10%, X7R	CAP0603	Generic	
2	CBST, CREF	0.1µF	CAP CER 0.1µF 25V 10% X7R 0603	CAP0603	Generic	
1	CFB	1.5nF	CAP, 50V, 10%, X7R	CAP0603	Generic	
3	CIN1, CIN2, CIN3	10µF	Capacitor, 25V, X7R, 10%	CAP1206	Murata or Generic	GRM31CR71E106KA12L
2	CIN4, CIN6	1µF/25V	CAP CER 1µF 25V 10% X6S 0402	CAP0402	Murata or Generic	GRM155C81E105KE11D
1	CIN5	220µF	220µF, 25V, 16mΩ ESR	D8P3.5mm	Chemi-Con or Generic	APSG250ELL221MHB5S
6	CO1, CO2, CO3, CO4, CO5, CO6	47µF	CAP, 6.3V, X5R, 20%	CAP0805	Murata or Generic	GRM21BR60J476ME15L
1	CO7	NS		D2		
1	CO8	NS		D8P3.5mm		
1	CVCC	1µF	CAP CER 1µF 6.3V 10% X7R 0603	CAP0603	Generic	
1	L1	560nH	Inductor	10x10mm	Würth or Generic	WE-744355256
1	R1	2K	Film Res., 1%	0603	Generic	
1	R2	6k	Film Res., 1%	0603	Generic	
2	R3, RBST	0	Film Res., 5%	0603	Generic	
1	R4	499K	Film Res., 1%	0603	Generic	
1	R5	10K	Film Res., 1%	0603	Generic	
1	R6	100K	Film Res., 1%	0603	Generic	
1	R7	30K	Film Res., 1%	0603	Generic	
1	R8	60.4K	Film Res., 1%	0603	Generic	
1	R9	120K	Film Res., 1%	0603	Generic	
1	R10	240K	Film Res., 1%		Generic	
1	RCS	4.99K	Film Res., 1%	0603	Generic	
1	U1	MQ8634AGLE	16V/12A Step Down Convert	QFN21-3x4mm	MPS	MQ8634AGLE

EVB TEST RESULTS

Performance waveforms are tested on the EVQ8634A-LE-00A evaluation board.

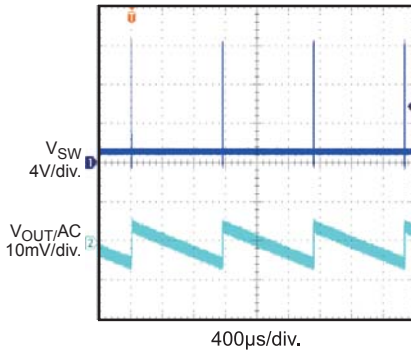
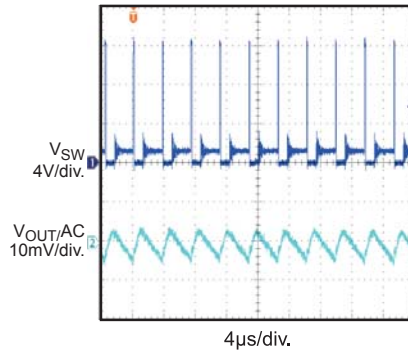
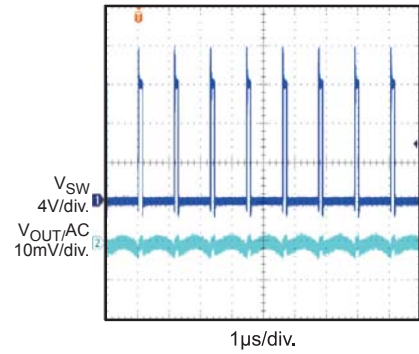
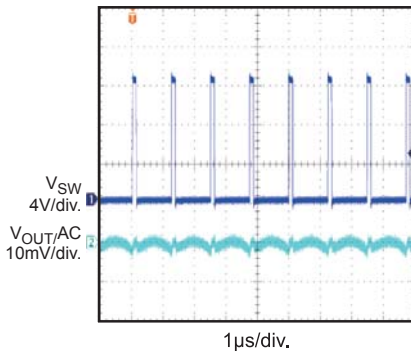
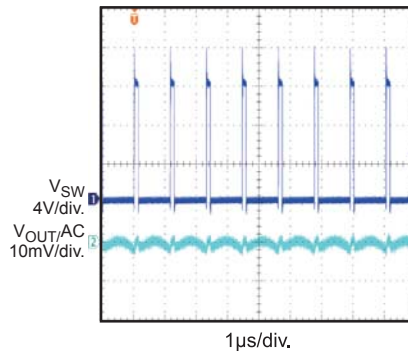
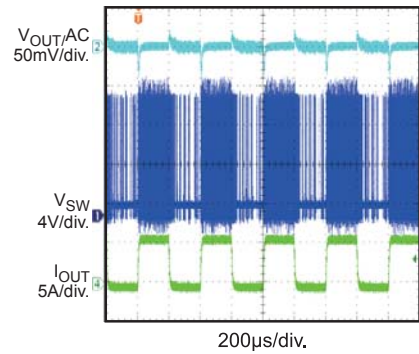
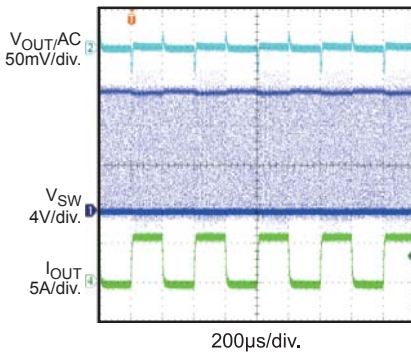
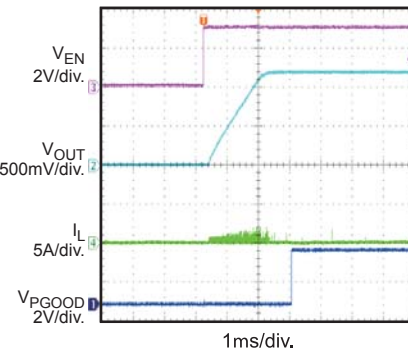
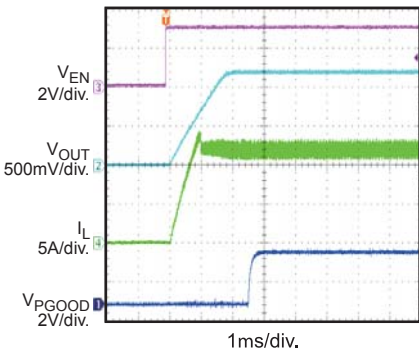
$V_{IN} = 12V$, $V_{OUT} = 1.2V$, $L = 560nH$, $T_A = +25^{\circ}C$, unless otherwise noted.



EVB TEST RESULTS (continued)

Performance waveforms are tested on the EVQ8634A-LE-00A evaluation board.

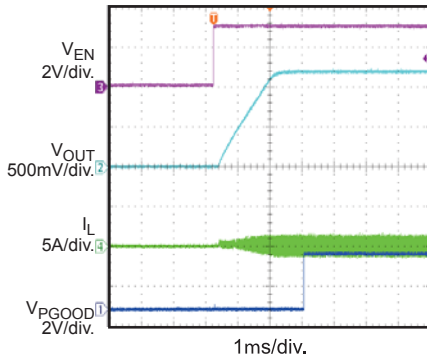
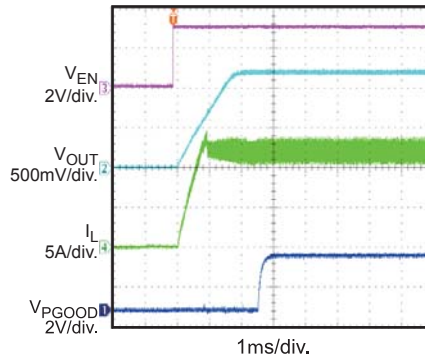
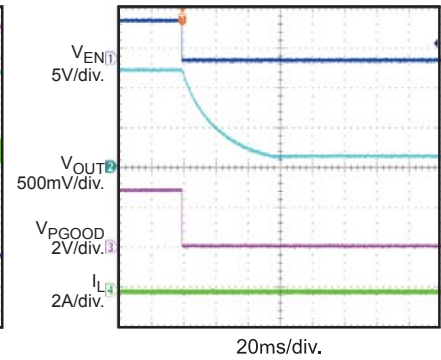
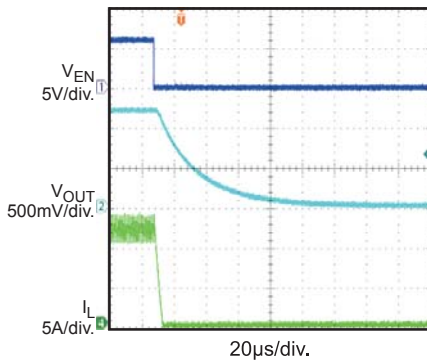
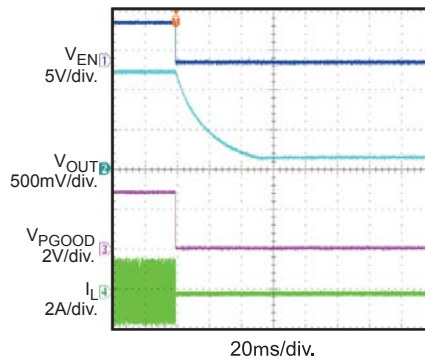
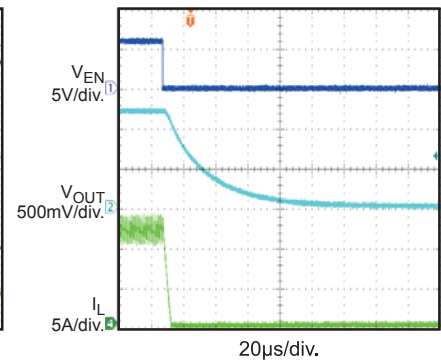
 $V_{IN} = 12V$, $V_{OUT} = 1.2V$, $L = 560nH$, $T_A = +25^{\circ}C$, unless otherwise noted.

Steady State
 $I_{OUT} = 0A$, Pulse Skip

Steady State
 $I_{OUT} = 0.5A$, Pulse Skip

Steady State
 $I_{OUT} = 12A$, Pulse Skip

Steady State
 $I_{OUT} = 0A$, Forced CCM

Steady State
 $I_{OUT} = 12A$, Forced CCM

Load Transient
 $I_{OUT} = 0A-6A$, Pulse Skip

Load Transient
 $I_{OUT} = 0A-6A$, Forced CCM

Power Up through EN
 $I_{OUT} = 0A$, Pulse Skip

Power Up through EN
 $I_{OUT} = 12A$, Pulse Skip


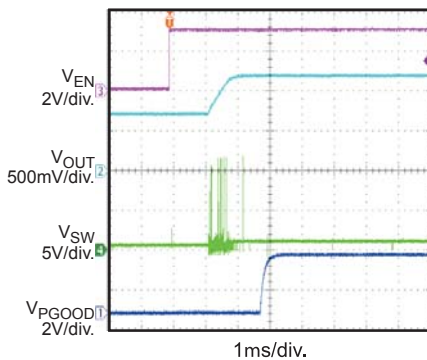
EVB TEST RESULTS (continued)

Performance waveforms are tested on the EVQ8634A-LE-00A evaluation board.

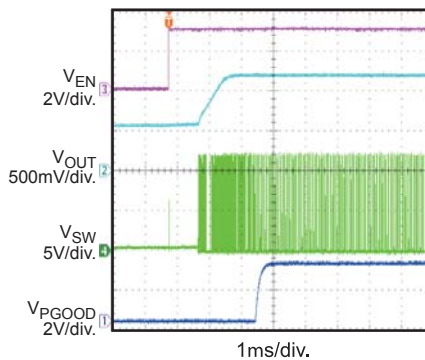
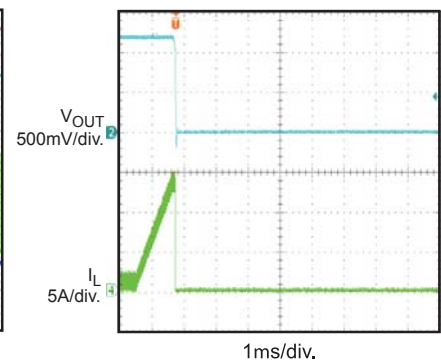
 $V_{IN} = 12V$, $V_{OUT} = 1.2V$, $L = 560nH$, $T_A = +25^{\circ}C$, unless otherwise noted.

Power Up through EN
 $I_{OUT} = 0A$, Forced CCM

Power Up through EN
 $I_{OUT} = 12A$, Forced CCM

Power Down through EN
 $I_{OUT} = 0A$, Pulse Skip

Power Down through EN
 $I_{OUT} = 12A$, Pulse Skip

Power Down through EN
 $I_{OUT} = 0A$, Forced CCM

Power Down through EN
 $I_{OUT} = 12A$, Forced CCM

Pre-bias Start Up

Pulse Skip


Pre-bias Start Up

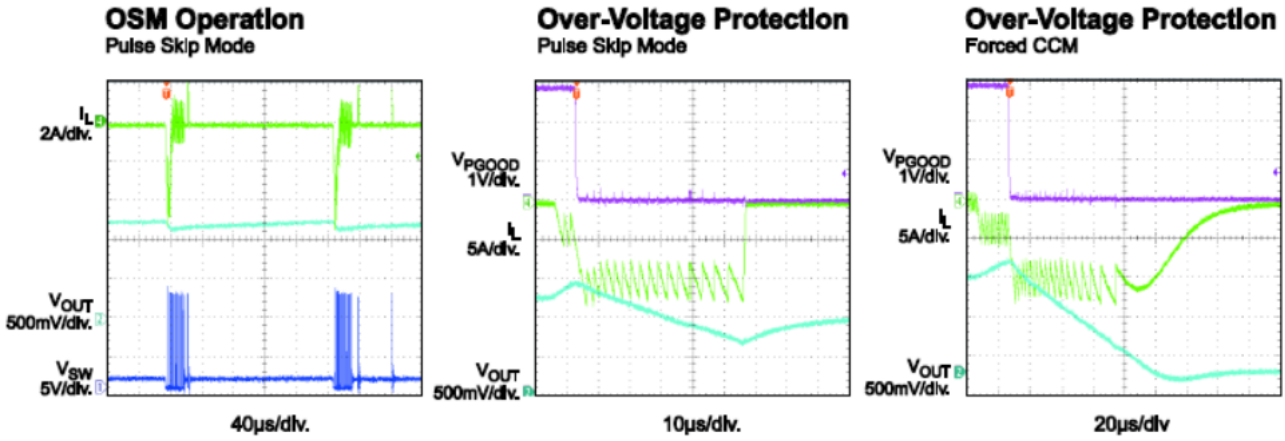
Forced CCM


Over-Current Protection Entry


EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the EVQ8634A-LE-00A evaluation board.

$V_{IN} = 12V$, $V_{OUT} = 1.2V$, $L = 560nH$, $T_A = +25^{\circ}C$, unless otherwise noted.



PRINTED CIRCUIT BOARD LAYOUT

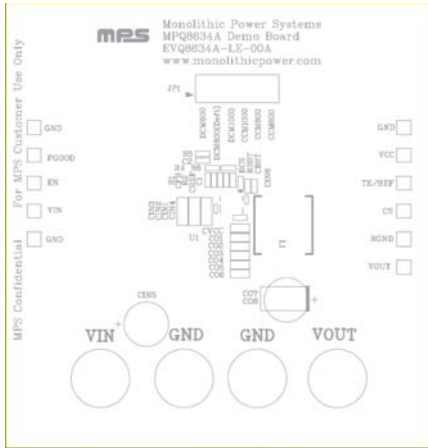


Figure 1—Top Silk Layer

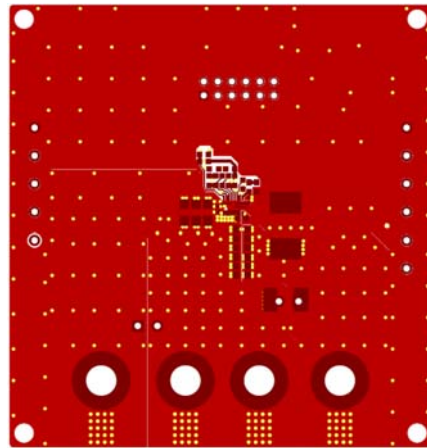


Figure 2—Top Layer

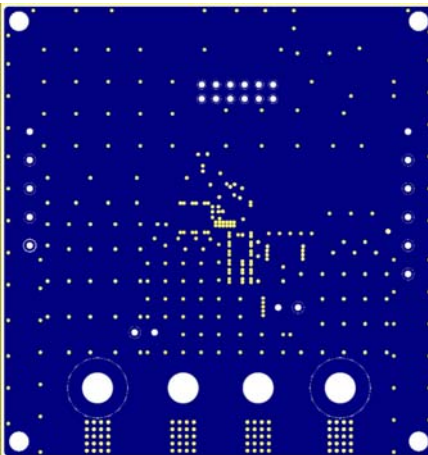


Figure 3—Inner Layer 1

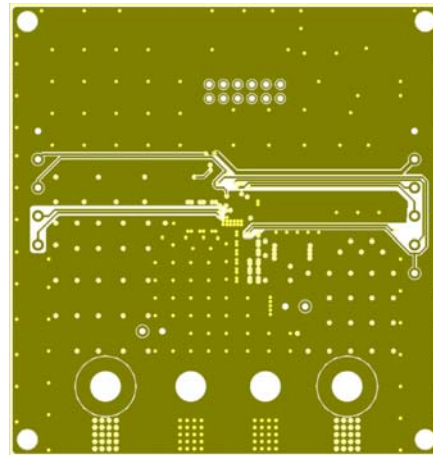


Figure 4— Inner Layer 2

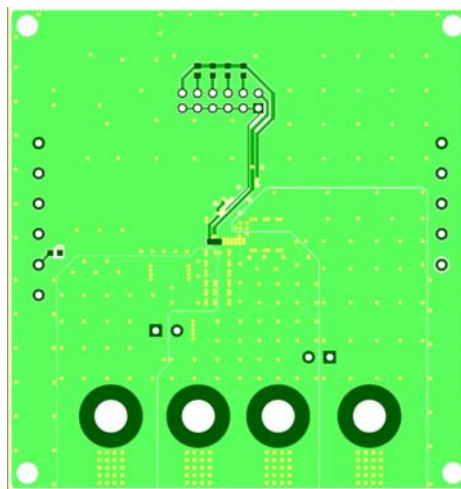


Figure 5—Bottom Layer