



EVQ8633B-LE-00A

High Efficiency, 16V, 20A Synchronous Step-Down Converter Evaluation Board

DESCRIPTION

The EVQ8633B-LE-00A is an evaluation board for the MPQ8633B, a high-efficiency, monolithic, synchronous, step-down converter.

This EVB can deliver 20A of continuous load current over a wide operating input range. High efficiency can be achieved over a wide output current load range.

The MPQ8633B adopts internally compensated constant-on-time (COT) control mode that provides fast transient response and eases loop stabilization.

This EVB can be turned on or off via a remote on/off input (EN) 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	V
Output current	I _{OUT}	20	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 VCC Bias
- Differential Output Voltage Remote Sense
- Programmable Accurate Current Limit Level
- 20A Output Current
- Low R_{DS(ON)} Integrated Power MOSFETs
- Proprietary Switching Loss Reduction Technique

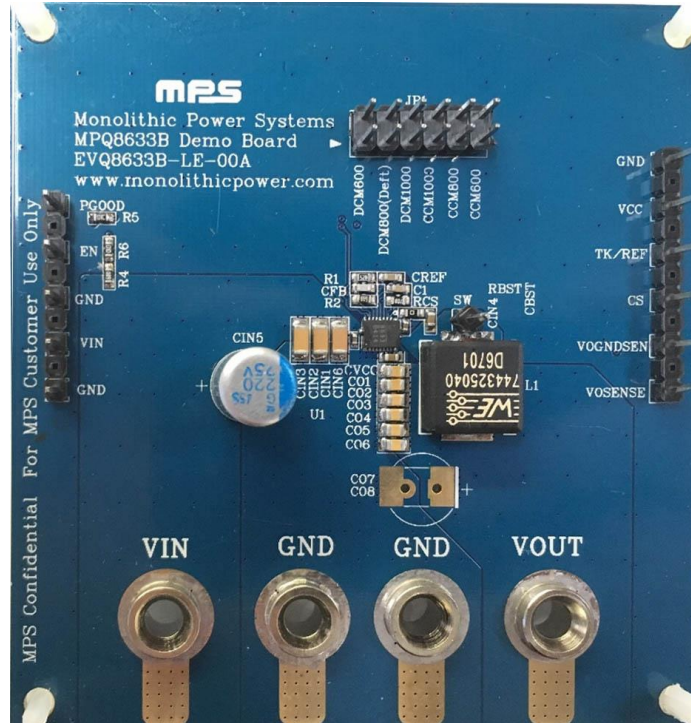
- Adaptive Constant-on-Time (COT) Control for Ultrafast Transient Response
- Stable with Zero-ESR Output Capacitor
- 0.5% Reference Voltage Over 0°C to +70°C Junction Temperature Range
- 1% Reference Voltage Over -40°C to +125°C Junction Temperature Range
- Selectable Pulse-Skip Mode or Forced CCM Operation
- 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, or 1000kHz
- Non-Latch OCP, UVP, UVLO, Thermal Shutdown, and Latch-Off for OVP
- Output Adjustable from 0.6V to 90%*V_{in}, Up to 5.5V Max
- Available in a QFN (3mmx4mm) Package

APPLICATIONS

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

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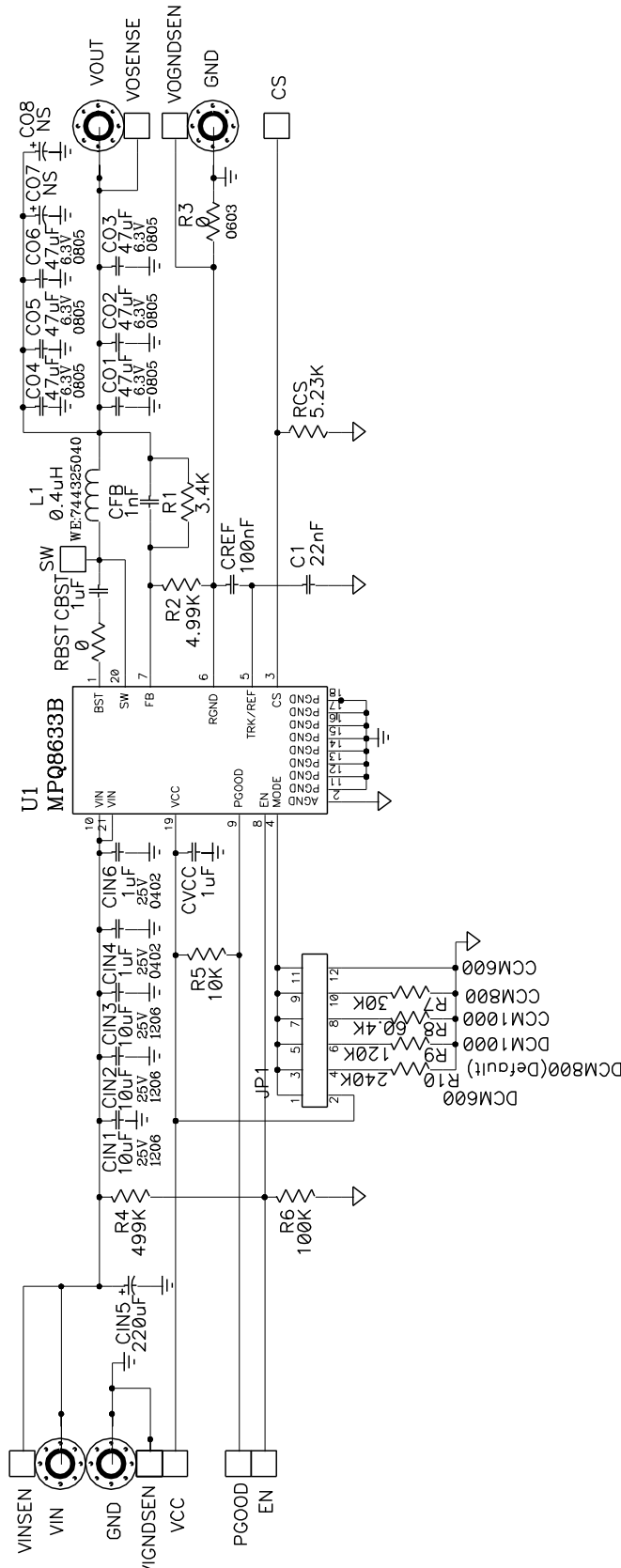
EVQ8633B-LE-00A EVALUATION BOARD



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

Board Number	MPS IC Number
EVQ8633B-LE-00A	MPQ8633BGL

EVALUATION BOARD SCHEMATIC



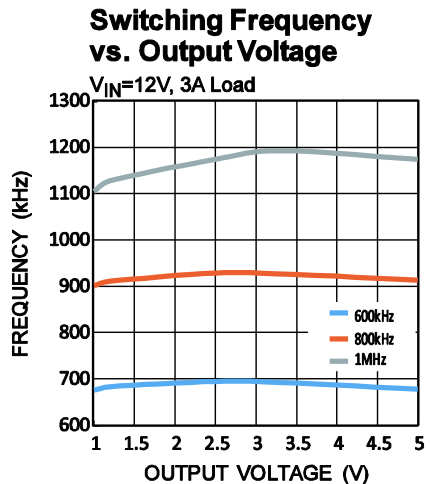
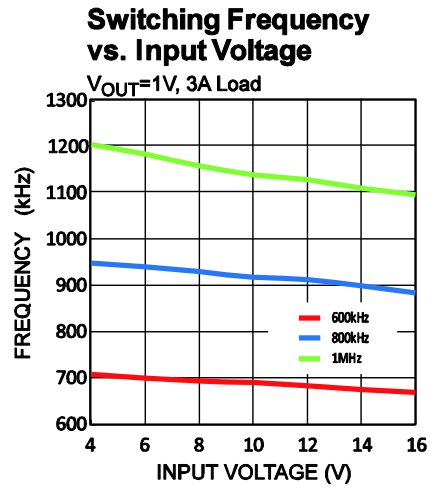
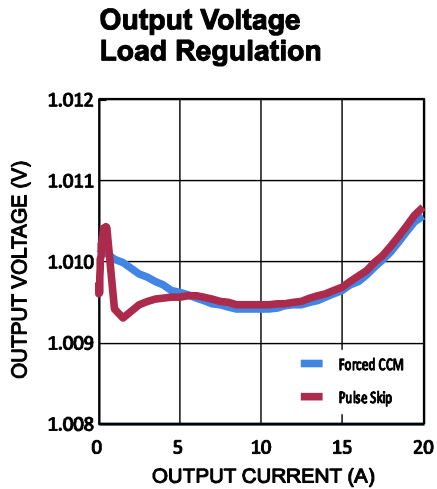
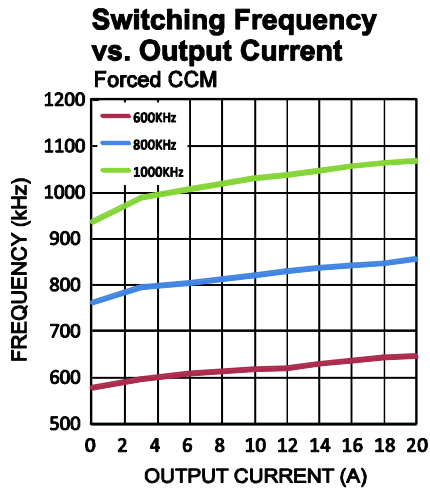
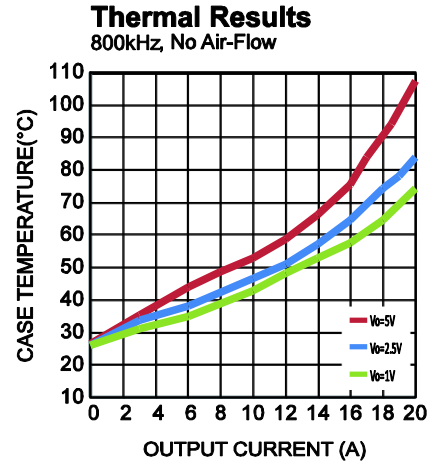
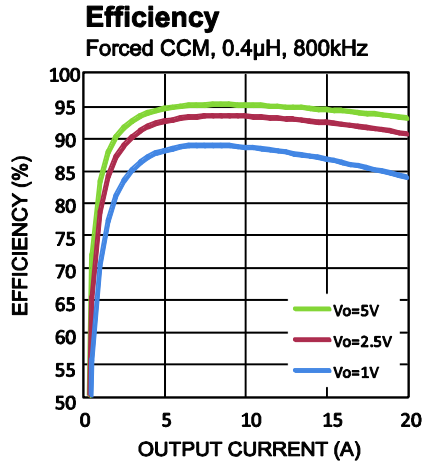
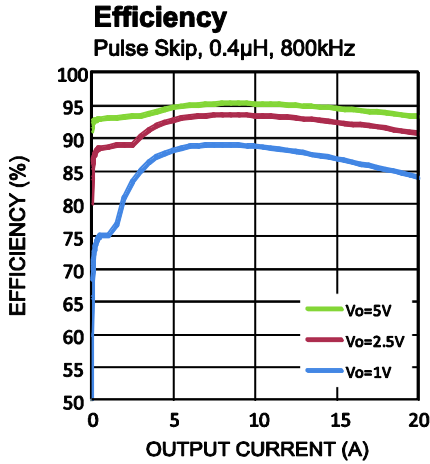
EVQ8633B-LE-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Part Number
1	C1	22nF	CAP, 25V, 10%, X7R	CAP0603	Generic	
2	CBST, CVCC	1 μ F	CAP CER 1 μ F 6.3V 10% X7R 0603	CAP0603	Generic	
1	CFB	1nF	CAP, 50V, 10%, X7R	CAP0603	Generic	
3	CIN1, CIN2, CIN3	10 μ F	Capacitor, 25V, X7R, 10%	CAP1206	Murata or Generic	GRM31CR71E106KA12L
2	CIN4, CIN6	1 μ F/25V	CAP CER 1 μ F 25V 10% X6S 0402	CAP0402	Murata or Generic	GRM155C81E105KE11D
1	CIN5	220 μ F	220 μ F, 25V, 16mOhm ESR	D8P3.5mm	Chemi-Con or Generic	APSG250ELL221MHB5S
6	CO1, CO2, CO3, CO4, CO5, CO6	47 μ F	CAP, 6.3V, X5R, 20%	CAP0805	Murata or Generic	GRM21BR60J476ME15L
1	CO7	NS		D2		
1	CO8	NS		D8P3.5mm		
1	CREF	100nF	CAP CER 0.1 μ F 25V 10% X7R 0603	CAP0603	Generic	
1	L1	0.4 μ H	Inductor	10x10mm	Würth or Generic	WE-744325040
1	R1	3.4k	Film Res., 1%	0603	Generic	
1	R2	4.99k	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	5.23k	Film Res., 1%	0603	Generic	
1	U1	MQ8633 BGLE	16V/20A Step Down Convert	QFN21- 3x4mm	MPS	MQ8633BGLE

EVB TEST RESULTS

Performance waveforms are tested on the EVQ8633B-LE-00A evaluation board.

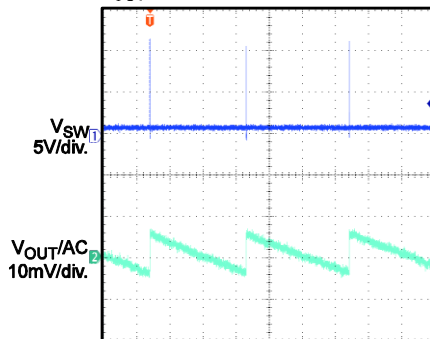
$V_{IN} = 12V$, $V_{OUT} = 1V$, $L = 400nH$, $T_A = +25^{\circ}C$, unless otherwise noted.



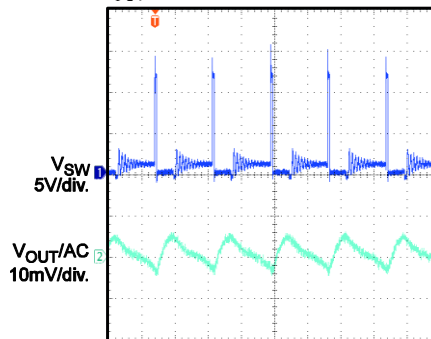
EVB TEST RESULTS (continued)

Performance waveforms are tested on the EVQ8633B-LE-00A evaluation board.

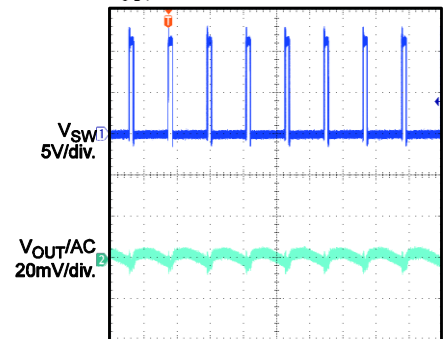
 $V_{IN} = 12V$, $V_{OUT} = 1V$, $L = 400nH$, $T_A = +25^{\circ}C$, unless otherwise noted.

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


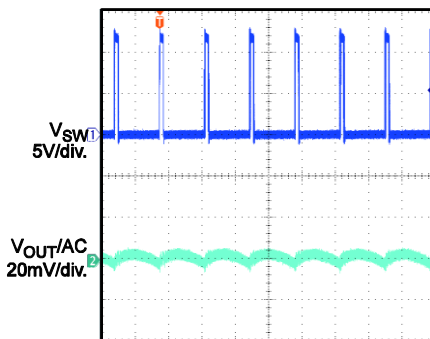
200µs/div.

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


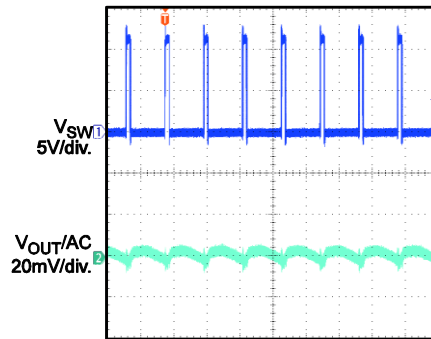
2µs/div.

Steady State
 $I_{OUT} = 20A$, Pulse Skip


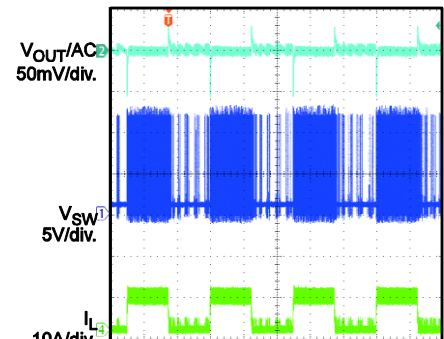
1µs/div.

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


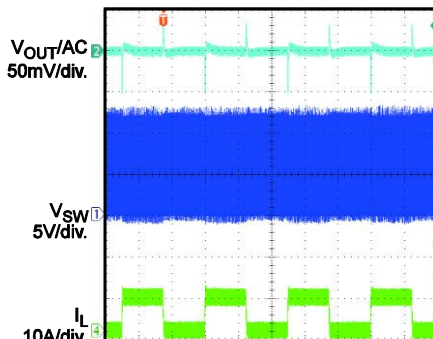
1µs/div

Steady State
 $I_{OUT} = 20A$, Forced CCM


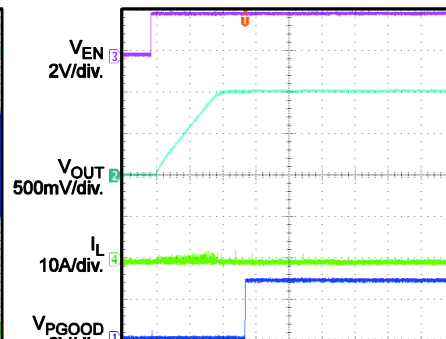
1µs/div

Load Transient
 $I_{OUT} = 0A \sim 8A$, Pulse Skip


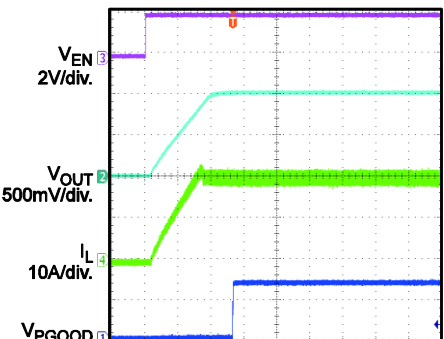
400µs/div

Load Transient
 $I_{OUT} = 0A \sim 8A$, Forced CCM


400µs/div

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


1ms/div

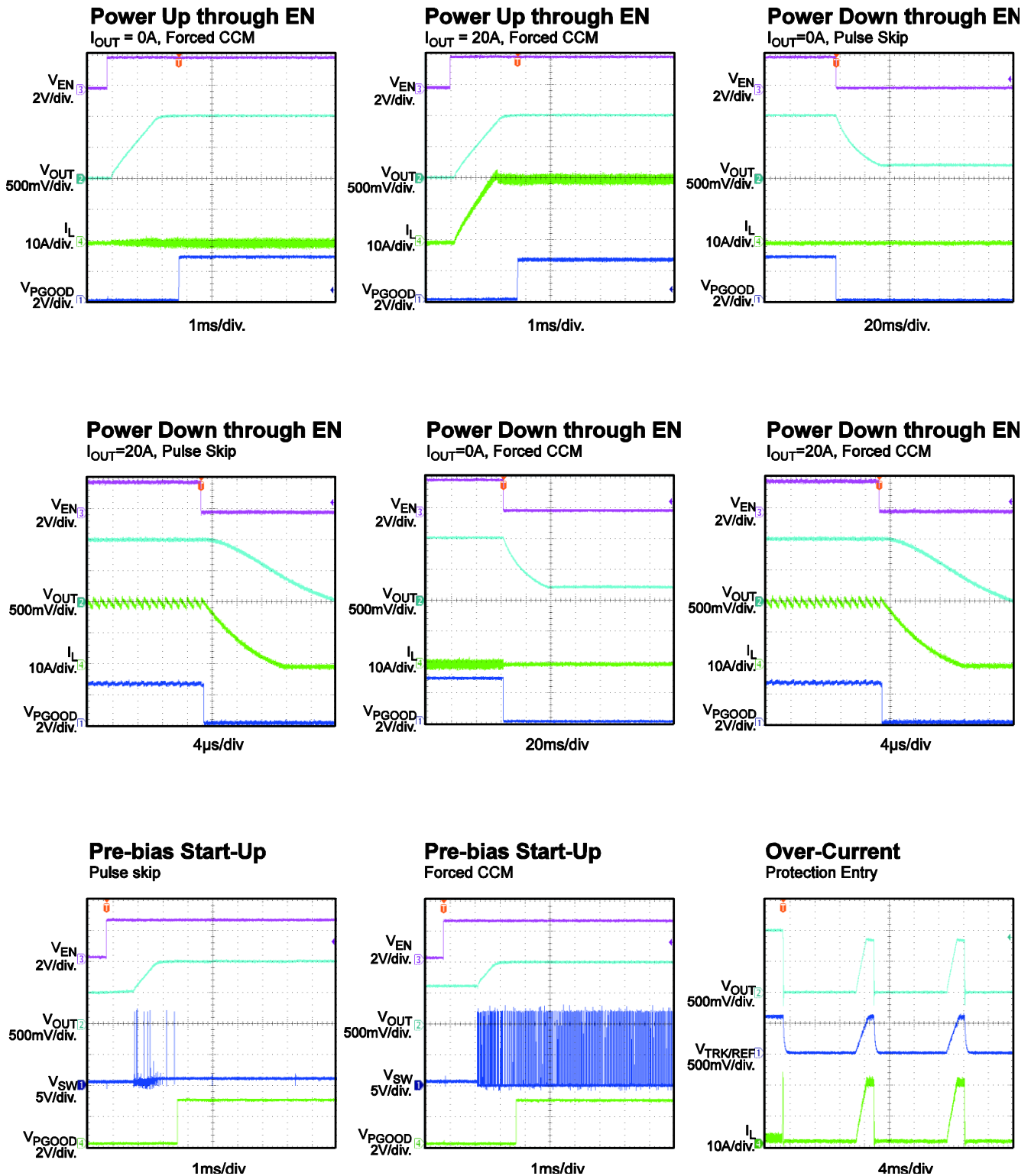
Power Up through EN
 $I_{OUT} = 20A$, Pulse Skip


1ms/div

EVB TEST RESULTS (continued)

Performance waveforms are tested on the EVQ8633B-LE-00A evaluation board.

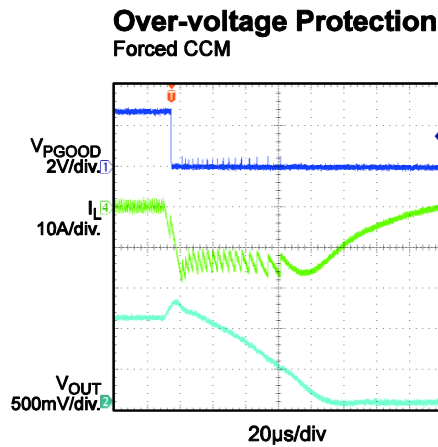
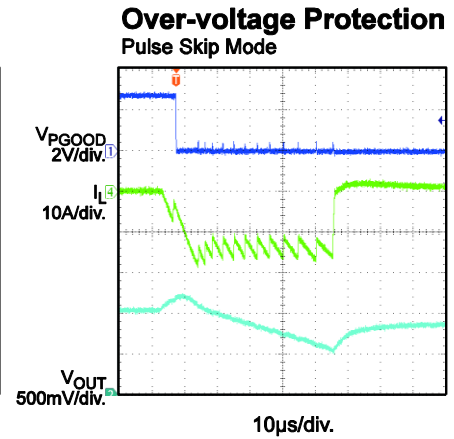
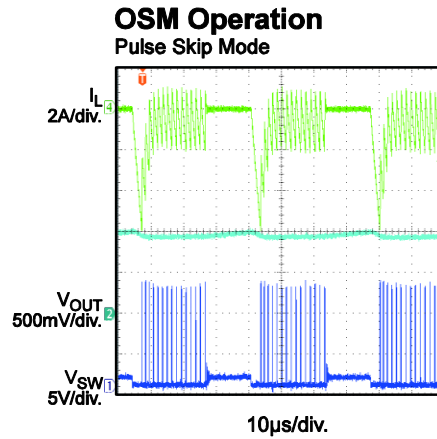
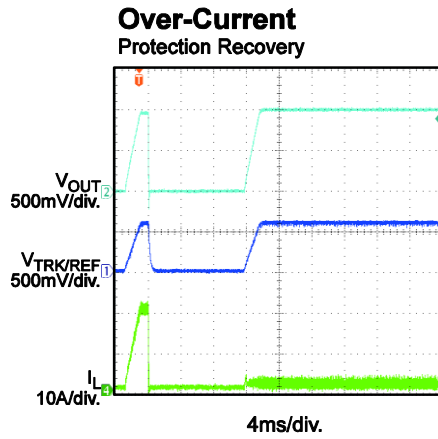
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EVB TEST RESULTS (continued)

Performance waveforms are tested on the EVQ8633B-LE-00A evaluation board.

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PRINTED CIRCUIT BOARD LAYOUT

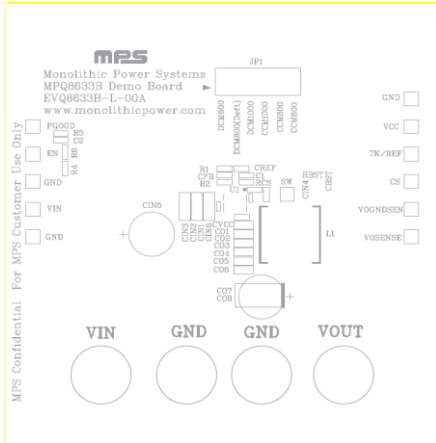


Figure 1: Top Silk Layer

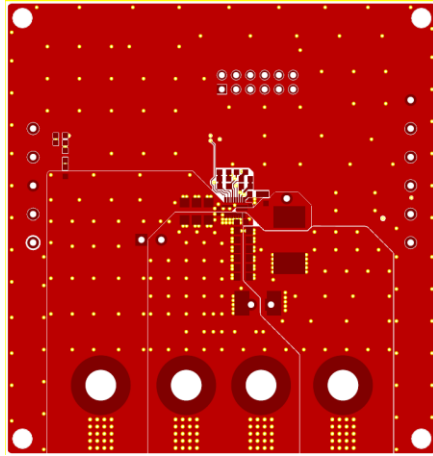


Figure 2: Top Layer

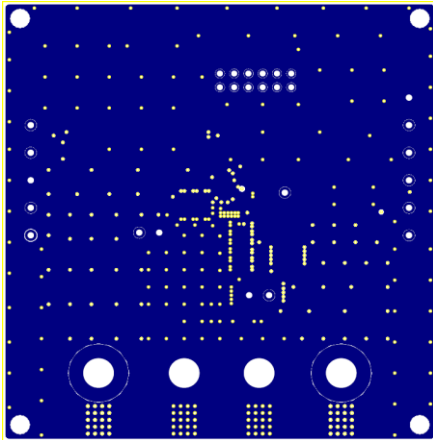


Figure 3: Inner Layer 1

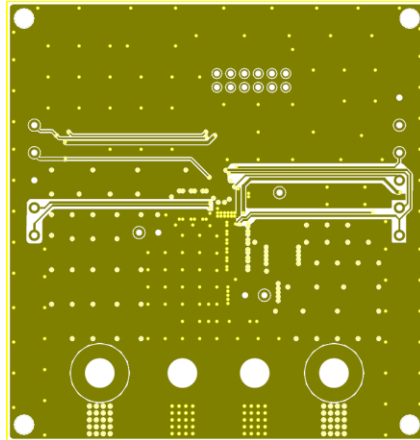


Figure 4: Inner Layer 2

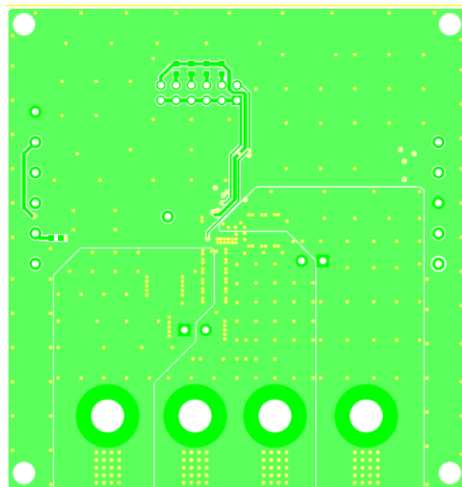


Figure 5: Bottom Layer