



EVQ4583-QVE-00A

90V, 3.5A, 9 μ A I_Q ,
Synchronous Step-Down DC/DC Converter
Evaluation Board

DESCRIPTION

The EVQ4583-QVE-00A evaluation board is designed to demonstrate the capabilities of the MPQ4583, a 9 μ A quiescent current (I_Q), synchronous step-down converter with integrated high-side and low-side MOSFETs (HS-FET and LS-FET, respectively). It supports up to 3.5A of output current (I_{OUT}) with internal compensation.

High power conversion efficiency across a wide load range is achieved via pulse-skip mode (PSM) and low I_Q under light-load conditions to reduce switching and gate driver losses.

To achieve a small output ripple at light loads, the MODE/SYNC pin can be pulled high to set

device operation to forced continuous conduction mode (FCCM). The switching frequency (f_{SW}) is always fixed at 400kHz under all load conditions.

Protection features include over-current protection (OCP), short-circuit protection (SCP) with hiccup mode, output over-voltage protection (OVP), and over-temperature protection (OTP).

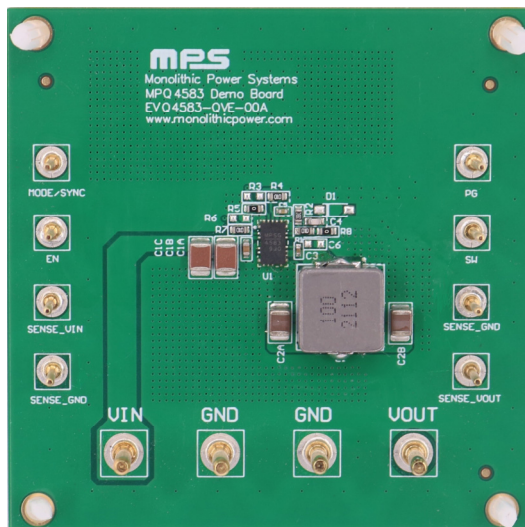
The MPQ4583 is available in a QFN-19 (3mmx5mm) package, and is available in AEC-Q100 Grade 1.

PERFORMANCE SUMMARY

Specifications are at $T_A = 25^\circ\text{C}$, unless otherwise noted.

Parameters	Conditions	Value
Input voltage (V_{IN}) range		6V to 90V
Output voltage (V_{OUT})	$V_{IN} = 6\text{V to } 90\text{V}$, $I_{OUT} = 0\text{A to } 3.5\text{A}$	$V_{OUT} = 5\text{V}$
Maximum output current (I_{OUT})	$V_{IN} = 6\text{V to } 90\text{V}$	3.5A
Switching frequency (f_{SW})		400kHz

EVALUATION BOARD



LxW (6.35cmx6.35cm)

Board Number	MPS IC Number
EVQ4583-QVE-00A	MPQ4583GQVE-AEC1

QUICK START GUIDE

The EVQ4583-QVE-00A evaluation board is easy to set up and use to evaluate the performance of the MPQ4583. For proper measurement equipment set-up, refer to Figure 1 and follow the steps below:

1. Preset the power supply to be between 6V and 90V, then turn off the power supply.
2. Connect the power supply terminals to:
 - a. Positive (+): VIN
 - b. Negative (-): GND
3. Connect the load terminals to:
 - a. Positive (+): VOUT
 - b. Negative (-): GND
4. The IC can be set to forced continuous conduction mode (FCCM) by pulling the MODE pin up to the VCC voltage (V_{CC}). The default setting is pulse-skip mode (PSM) by connecting to the MODE pin to GND.
5. After making the connections, turn on the power supply. The board should start up automatically.

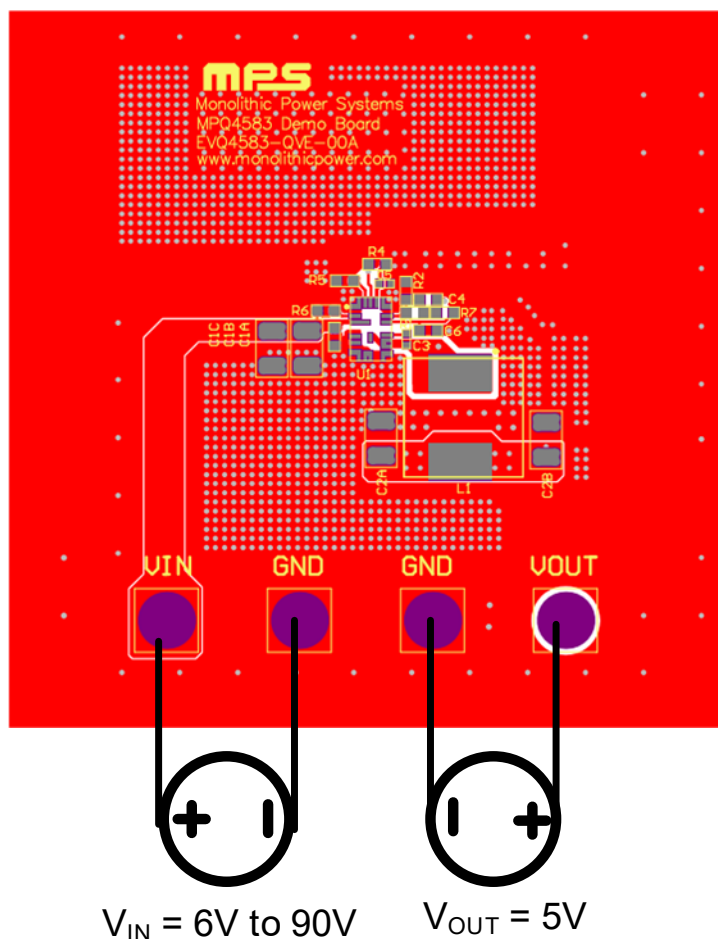


Figure 1: Measurement Equipment Set-Up

EVALUATION BOARD SCHEMATIC

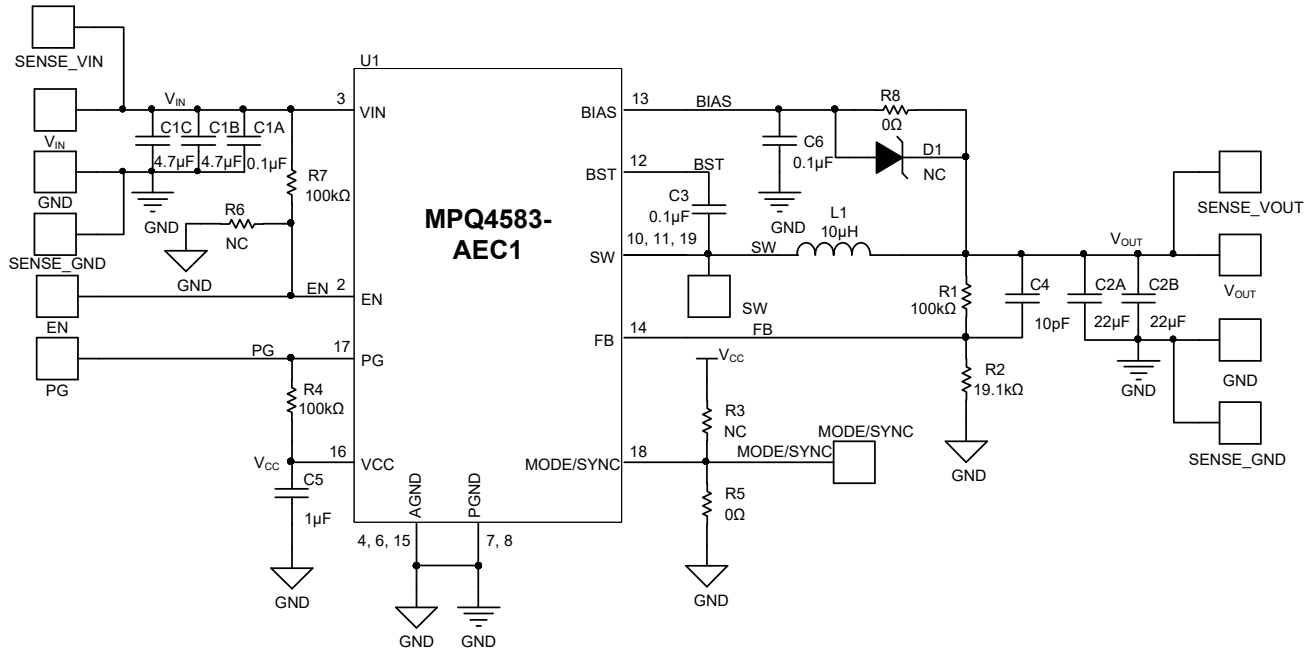


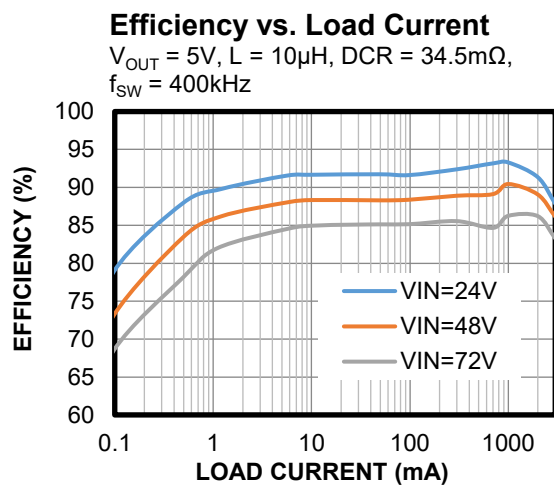
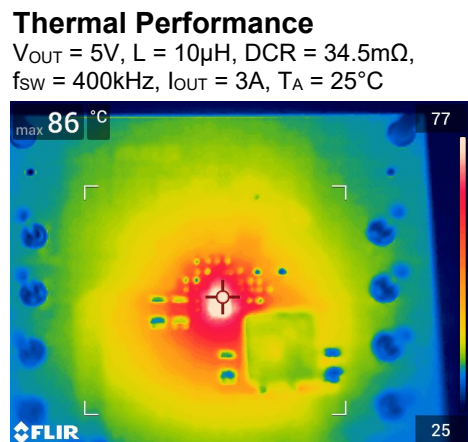
Figure 2: Evaluation Board Schematic

EVQ4583-QVE-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
1	C1A	100nF	Ceramic capacitor, 100V, X7R	0603	Murata	GRM188R72A104KA35D
2	C1B, C1C	4.7 μ F	Ceramic capacitor, 100V, X7S	1210	Murata	GRM32DC72A475KE01L
2	C2A, C2B	22 μ F	Ceramic capacitor, 16V, X5R	1210	Murata	GRM32ER61C226KE20L
2	C3, C6	100nF	Ceramic capacitor, 16V, X5R	0402	Murata	GRM155R61C104KA88D
1	C5	1 μ F	Ceramic capacitor, 10V, X5R	0402	Murata	GRM155R61A105KE01D
4	C4, R3, R6, D1	NS				
2	R4, R7	100k Ω	Film resistor, 1%	0603	Yageo	RC0603FR-07100KL
1	R1	100k Ω	Film resistor, 1%	0603	Yageo	RC0603FR-07100KL
1	R2	19.1k Ω	Film resistor, 1%	0603	Yageo	RC0603FR-0719K1L
2	R5, R8	0 Ω	Film resistor, 1%	0603	Yageo	RC0603FR-070RL
1	L1	10 μ H	Inductor, R _{DC} = 38m Ω , I _{SAT} = 6.9A	7.7mmx7.2mmx5.2mm	Cyntec	VCHA075D-100MS6
4	VIN, GND, GND, VOUT	ϕ 2.0	ϕ 2.0 copper pin	DIP	QJJCJ	ϕ 2.0 copper pin
6	SENSE_GND, SENSE_GND, EN, PG, SW, MODE/SYNC	ϕ 1.0	ϕ 1.0 copper pin	DIP	QJJCJ	ϕ 1.0 copper pin
1	U1	MPQ4583-AEC1	90V, 3A, synchronous step-down DC/DC converter, AEC-Q100 qualified	QFN-19 (3mmx5mm)	MPS	MPQ4583GQVE-AEC1

EVB TEST RESULTS

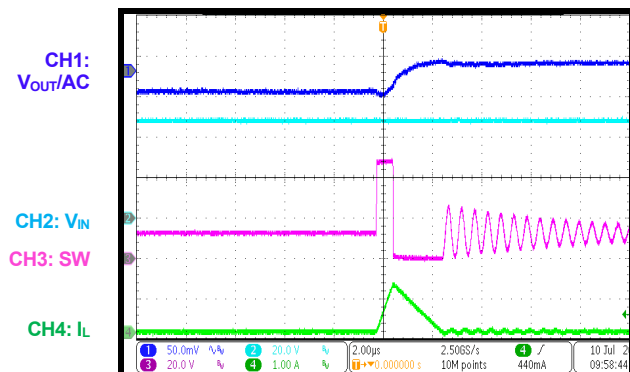
Performance curves and waveforms are tested on the evaluation board. $V_{IN} = 48V$, $V_{OUT} = 5V$, $T_A = 25^{\circ}C$, unless otherwise noted.



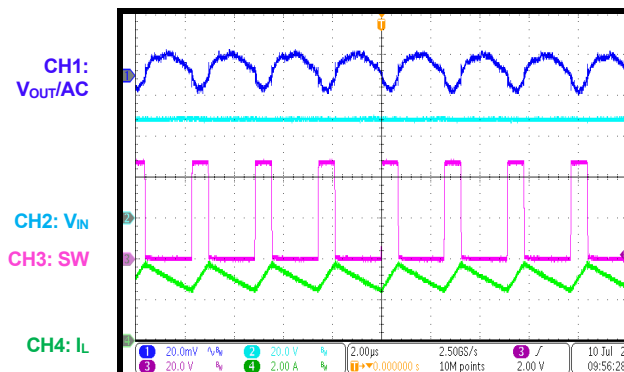
EVB TEST RESULTS *(continued)*

Performance curves and waveforms are tested on the evaluation board. V_{IN} = 48V, V_{OUT} = 5V, T_A = 25°C, unless otherwise noted.

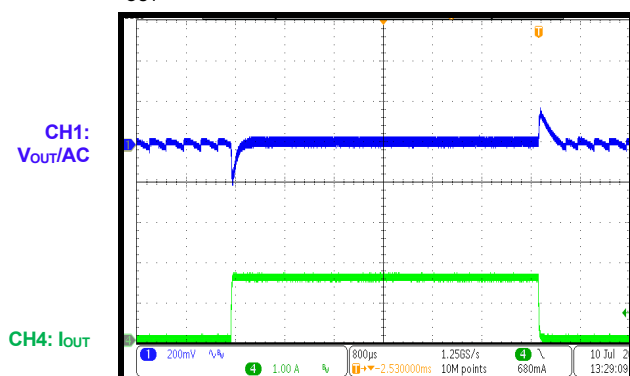
Steady State

I_{OUT} = 0A


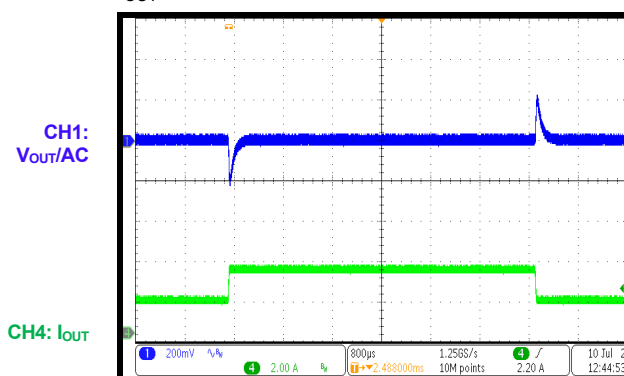
Steady State

I_{OUT} = 3A


Load Transient

I_{OUT} = 0A to 1.5A


Load Transient

I_{OUT} = 1.5A to 3A


PCB LAYOUT

Figure 3: Top Silk

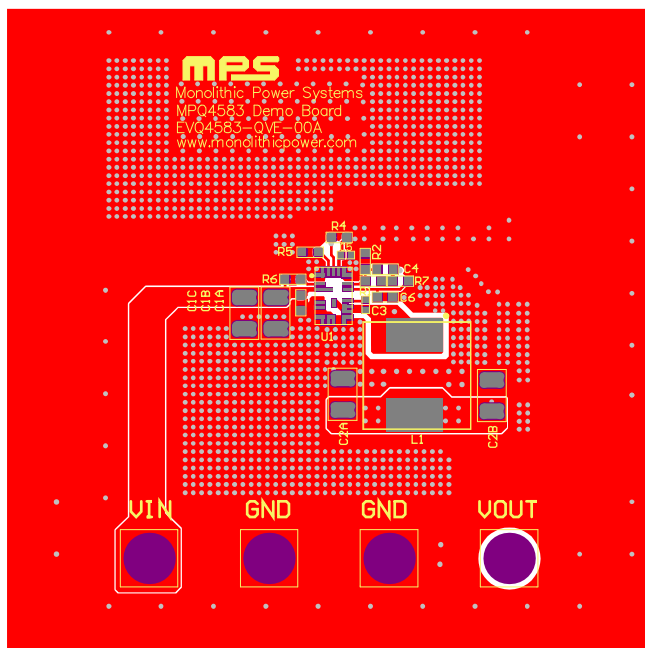


Figure 4: Top Layer

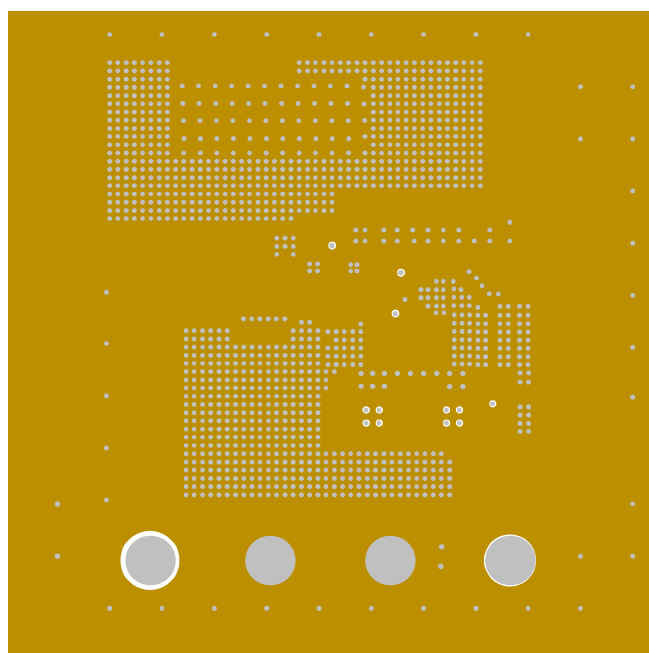


Figure 5: Mid-Layer 1

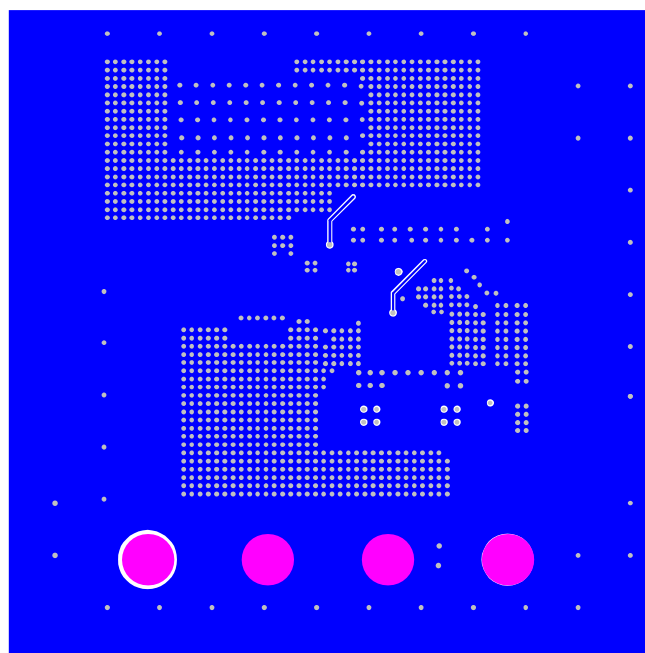


Figure 6: Mid-Layer 2

PCB LAYOUT (*continued*)

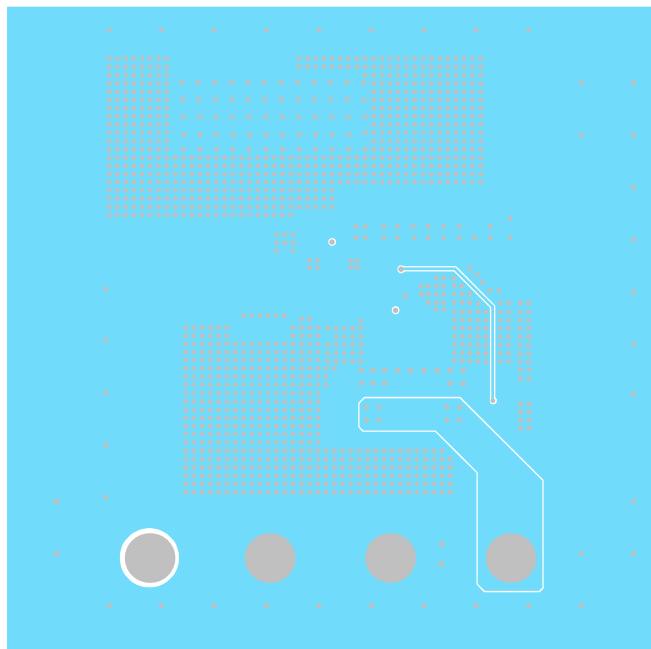


Figure 7: Bottom Layer

REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	4/15/2025	Initial Release	-

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