EVM3809C-PH-01A

5.5V, 0.6A, Ultra-Small Package Step-Down Module Evaluation Board

DESCRIPTION

The EVM3809C-PH-01A evaluation board is designed to demonstrate the capabilities of the MPM3809C, a fully integrated, high-efficiency, synchronous step-down power module. The device provides up to 0.6A of output current (I_{OUT}).

The MPM3809C features internally compensated constant-on-time (COT) control to provide fast transient response and ease loop stabilization. The switching frequency (f_{SW}) is fixed at 2.4MHz. Refer to the MPM3809C datasheet for more detailed information.

It is recommended to read the datasheet for the MPM3809C prior to making any changes to the EVM3809C-PH-01A.

PERFORMANCE SUMMARY (1)

Specifications are at T_A = 25°C, unless otherwise noted.

Parameters	Conditions	Value
Input voltage (V_{IN}) range		2.3V to 5.5V
Output voltage (V_{OUT})	V_{IN} = 2.3V to 5.5V, I_{OUT} = 0A to 0.6A	1.2V
Maximum output current (I_{OUT})	V_{IN} = 2.3V to 5.5V, V_{OUT} = 1.2V	0.6A
Peak efficiency	V_{IN} = 3.3V, V_{OUT} = 1.2V, I_{OUT} = 0.4A, f_{SW} = 2.4MHz	84.26%
Full load efficiency	V_{IN} = 3.3V, V_{OUT} = 1.2V, I_{OUT} = 0.6A, f_{SW} = 2.4MHz	82.55%
Switching frequency (f_{SW})		2.4MHz

Note:

1) For input and output voltage specifications with different output capacitors (C_{OUT}), the application circuit parameters may require changes.

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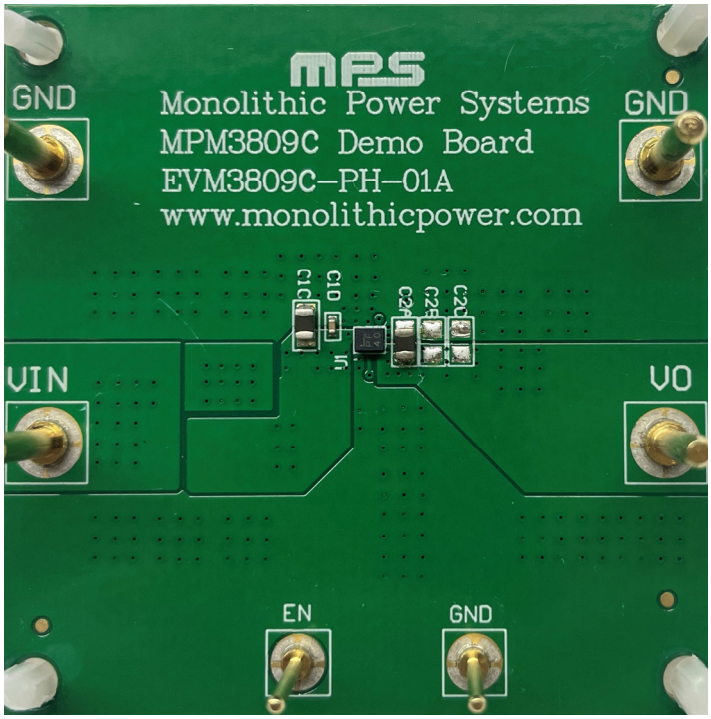
EVALUATION BOARD



LxWxH (5cmx5cmx1.5cm)

Board Number	MPS IC Number
EVM3809C-PH-01A	MPM3809C

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QUICK START GUIDE

The EVM3809C-PH-01A evaluation board is easy to set up to evaluate the performance of the MPM3809C. For proper measurement equipment set-up, refer to Figure 1 and follow the steps below:

1. Preset the power supply (V_{IN}) to be between 2.3V and 5.5V, then turn off the power supply. (2)
2. Connect the power supply terminals to:
   a. Positive (+): VIN
   b. Negative (-): GND
3. Connect the load terminals to:
   a. Positive (+): VO
   b. Negative (-): GND
4. After making the connections, turn on the power supply. The board should start up automatically.
5. Check for the proper output voltage (V_{OUT}) between the VO to GND terminals.
6. Once the proper V_{OUT} is established, adjust the load within the operating range, then measure the efficiency, output ripple voltage, and other parameters. (3)
7. After completing all tests, adjust the load to 0A and turn off the input power supply.

Notes:

2) Ensure that V_{IN} does not exceed 5.5V.
3) When measuring the output or input voltage ripple, do not use the long ground lead on the oscilloscope probe.

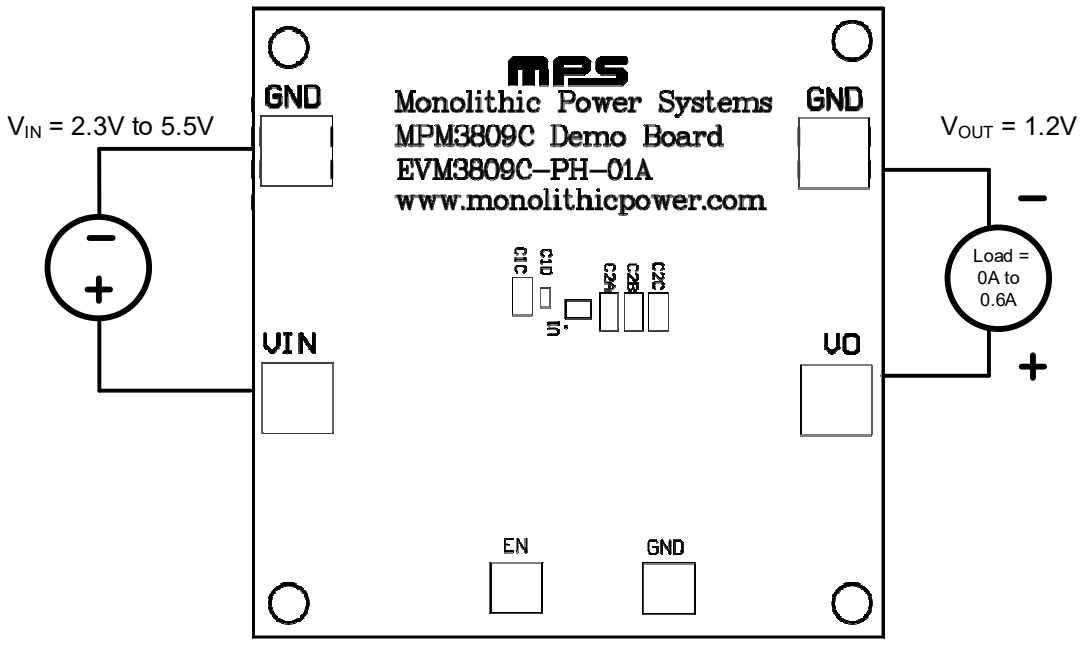

Figure 1: Measurement Equipment Set-Up

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EVALUATION BOARD SCHEMATIC

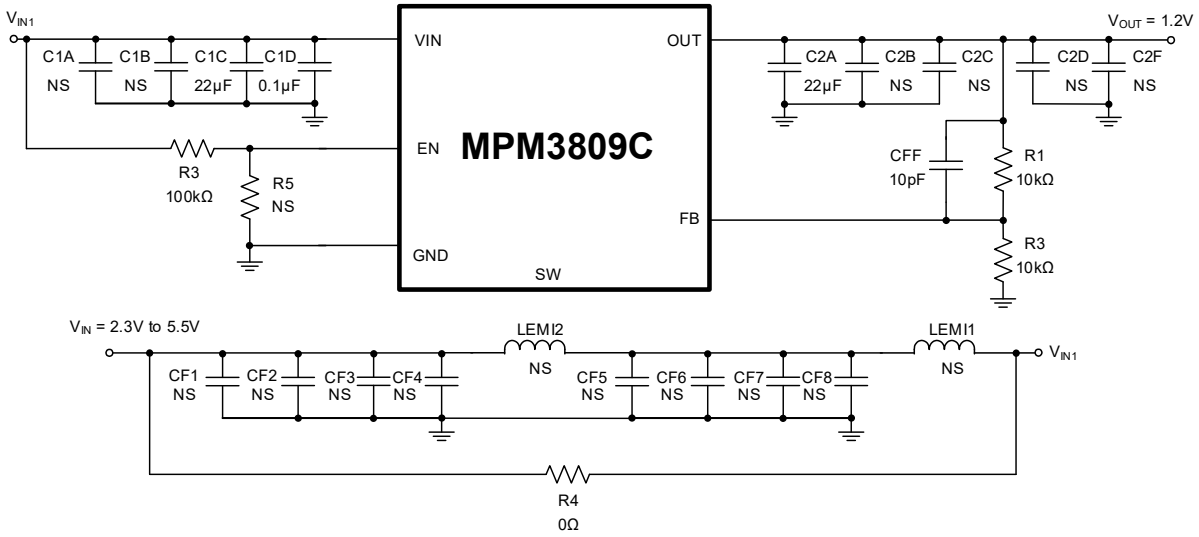

Figure 2: Evaluation Board Schematic

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EVM3809C-PH-01A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
1	C1D	0.1µF	Ceramic capacitor, 10V, X7R	0402	Wurth	885012205018
2	C1C, C2A	22µF	Ceramic capacitor, 10V, X7R	0805	TDK	C2012X7S1A226M
1	CFF	10pF	Ceramic capacitor, 25V, NP0	0402	Wurth	885012005040
2	R1, R2	10kΩ	Film resistor, 1%	0402	Yageo	RC0402FR-0710KL
1	R3	100kΩ	Film resistor, 1%	0402	Yageo	RC0402FR-07100KL
1	R4	0Ω	Film resistor, 1%	2512	Yageo	RC2512FK-070RL
1	R5	NS				
0	LEMI1, LEMI2	NS				
0	C1A, C1B, C2B, C2C, C2D, C2F	NS				
0	CF1, CF2, CF3, CF4, CF5, CF6, CF7, CF8	NS				
1	U1	MPM3809C	0.6A, 5.5V, synchronous, step-down power module	ECLGA-6 (1.5mmx 2mm)	MPS	MPM3809C

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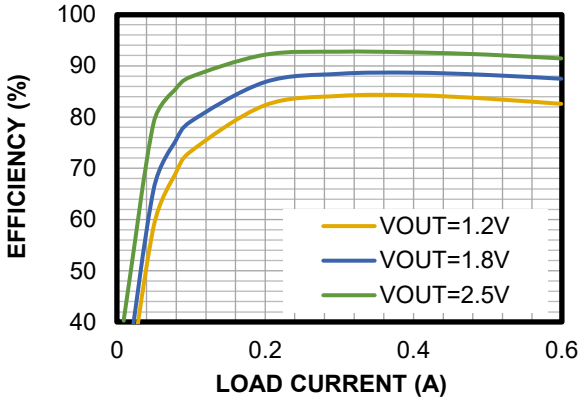
EVB TEST RESULTS

Performance curves and waveforms are tested on the evaluation board. V_{IN} = 3.3V, V_{OUT} = 1.2V, f_{SW} = 2400kHz, T_A = 25°C, unless otherwise noted.

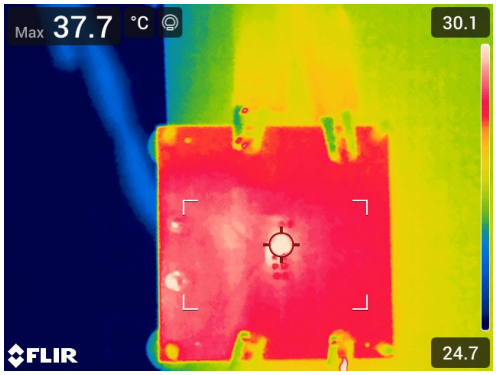
Efficiency vs. Load Current

V_{IN} = 3.3V, CCM



Thermal Performance (T_A = 28°C)

I_{OUT} = 0.6A, no forced airflow, T_{CASE} = 37.7°C



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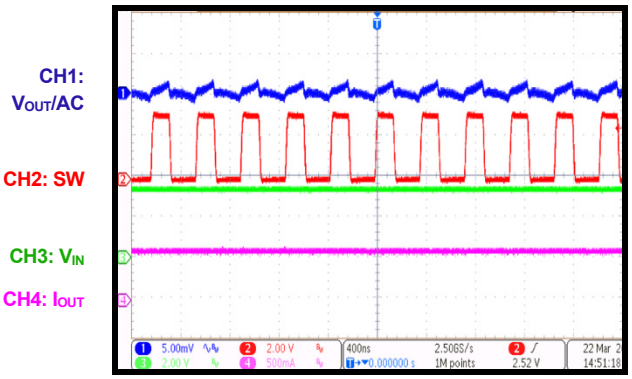
EVB TEST RESULTS *(continued)*

Performance curves and waveforms are tested on the evaluation board. V_{IN} = 3.3V, V_{OUT} = 1.2V, f_{SW} = 2400kHz, T_A = 25°C, unless otherwise noted.

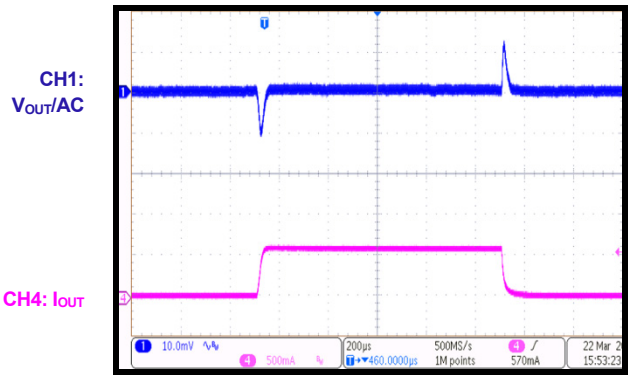
Steady State

I_{OUT} = 0.6A



Load Transient Ripple

I_{OUT} = 0A to 0.6A, slew rate = 0.8A/μs



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PCB LAYOUT

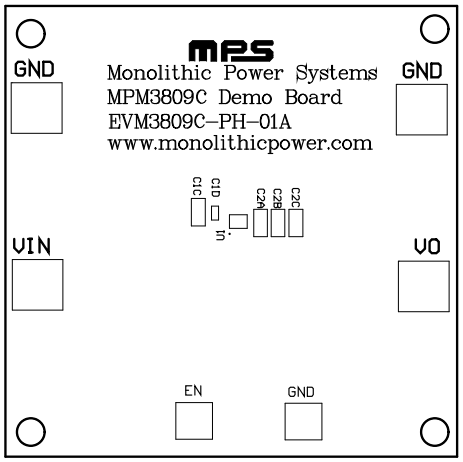

Figure 3: Top Silk

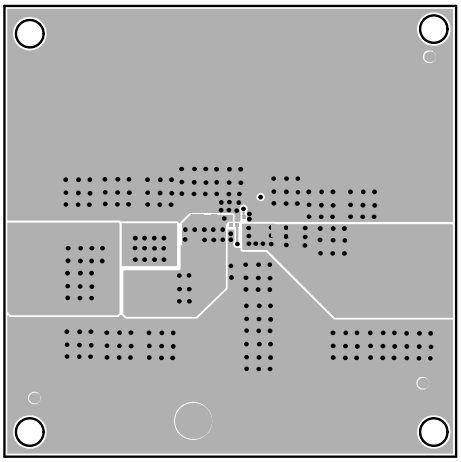

Figure 4: Top Layer

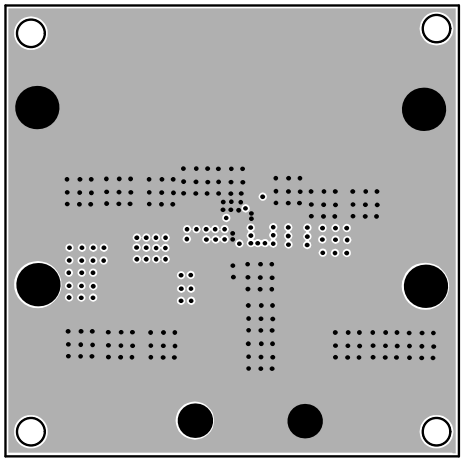

Figure 5: Mid-Layer 1

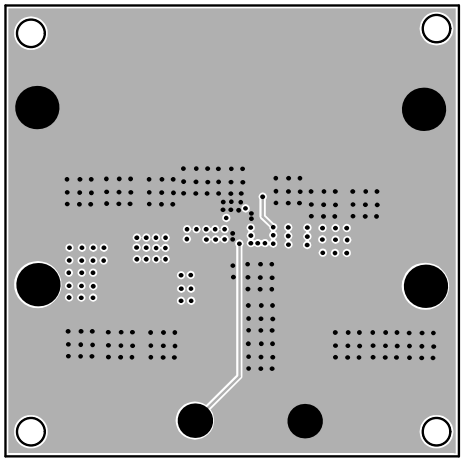

Figure 6: Mid-Layer 2

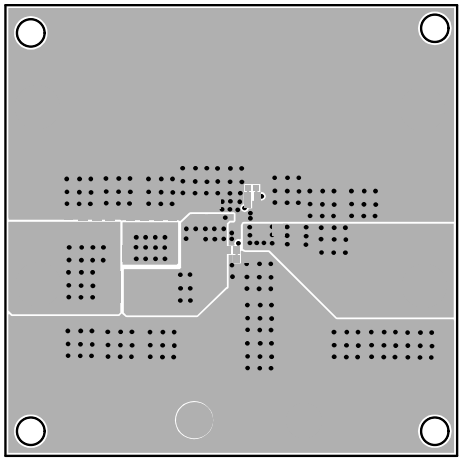

Figure 7: Bottom Layer

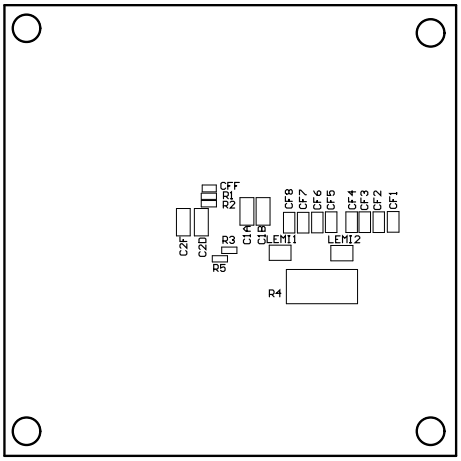

Figure 8: Bottom Silk

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REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	11/15/2024	Initial Release	-

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