EVM3824-PA-01A

2.75V to 6V, 2A, Ultra-Small and Ultra-Low Noise Power Module Evaluation Board

DESCRIPTION

The EVM3824-PA-01A is an evaluation board designed to demonstrate the capabilities of the MPM3824, a synchronous, step-down power module with an integrated inductor. The MPM3824 achieves 2A of continuous output current (I_{OUT}) from a 2.75V to 6V input voltage (V_{IN}) range with excellent load and line regulation.

The MPM3824 works in advanced asynchronous modulation (AAM) mode under light loads, and it can switch to continuous conduction mode (CCM) under heavy loads for a small output voltage ripple. Full protection features include cycle-by-cycle current limiting, short-circuit protection (SCP) with hiccup mode, and thermal shutdown.

It is recommended to read the MPM3824 datasheet prior to making any changes to the EVM3824-PA-01A.

PERFORMANCE SUMMARY (1)

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

Parameters	Conditions	Value
Input voltage (V_{IN}) range	Default configuration	2.75V to 6V
Output voltage (V_{OUT})	Default configuration	1.2V
Maximum output current (I_{OUT})	V_{IN} = 2.75V to 6V	2A
Typical efficiency	V_{IN} = 4.2V, V_{OUT} = 1.2V, I_{OUT} = 2A	85.64%
Peak efficiency	V_{IN} = 4.2V, V_{OUT} =1.2V, I_{OUT} = 1A	88.05%
Switching frequency (f_{SW})	Continuous conduction mode (CCM)	1250kHz

Note:

1) For different input/output voltage specifications with different output capacitors, the application circuit parameters may require changes.

EVALUATION BOARD

LxWxH (5cmx5cmx1.6mm)

Board Number	MPS IC Number
EVM3824-PA-01A	MPM3824GPA

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QUICK START GUIDE

The EVM3824-PA-01A evaluation board is designed to evaluate the performance of the MPM3824. For the proper measurement equipment set-up, refer to Figure 1 and follow the steps below:

1. Preset the power source (V_{IN}) to be between 2.75V and 6V. (2)
2. Turn the power source off.
3. Connect the power source terminals to:
   a. Positive (+): VIN
   b. Negative (-): GND
4. Connect the load terminals to: (3)
   a. Positive (+): VO
   b. Negative (-): GND
5. After making the connections, turn the power supply on. The board should automatically start up.
6. Check for the proper output voltage (V_{OUT}) from the VO+S and VO-S turrets.
7. Once the target V_{OUT} is established, adjust the load within the operating range then measure the efficiency, output voltage ripple, and other parameters. When measuring the output voltage ripple and input voltage ripple, do not use the long ground lead on the oscilloscope probe.

Notes:

2) Ensure that V_{IN} does not exceed 6V.
3) The initial load should be set to 0A.

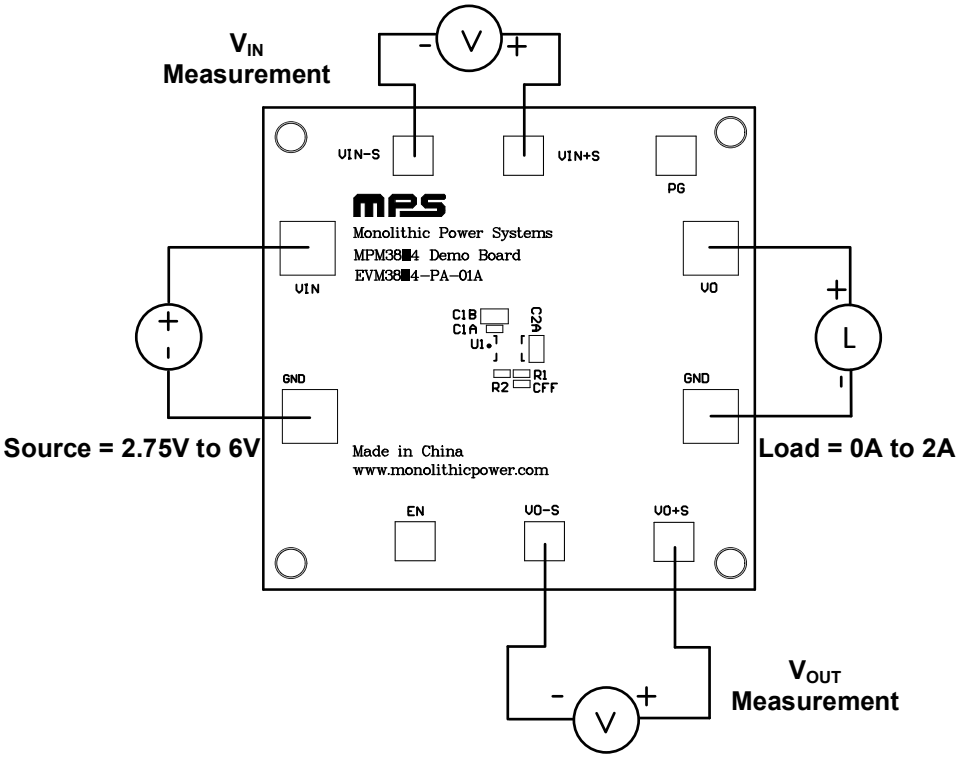

Figure 1: Measurement Equipment Set-Up

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EVALUATION BOARD SCHEMATIC

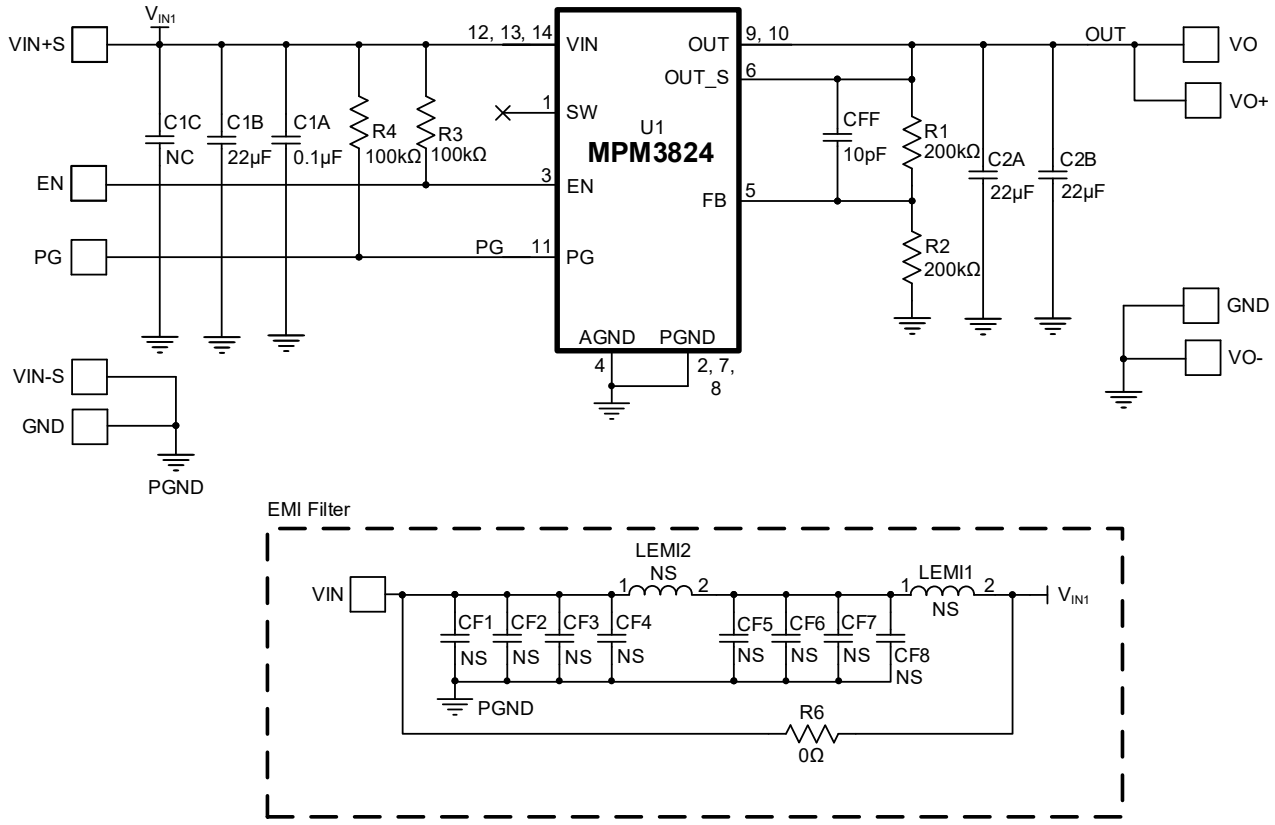

Figure 2: Evaluation Board Schematic

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EVM3824-PA-01A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
1	C1A	0.1μF	Ceramic capacitor, 16V, X7R	0402	TDK	C1005X7R1C104KT000E
3	C1B, C2A, C2B	22μF	Ceramic capacitor, 10V, X7S	0805	TDK	C2012X7S1A226M
1	CFF	10pF	Ceramic capacitor, 10V, X7R	0402	TDK	C1005X7R1C100KT000E
2	R1, R2	200kΩ	Film resistor, 1%	0402	Yageo	RC0402FR-07200KL
2	R3, R4	100kΩ	Film resistor, 1%	0402	Yageo	RC0402FR-07100KL
1	R6	0Ω	Film resistor, 1%	2512	Yageo	RC2512FK-070RL
4	VIN, VO, GND, GND	2mm	Copper pin	DIP	Custom	
6	VIN+S, VIN-S, VO+S, VO-S, EN, PG	1mm	Copper pin	DIP	Custom	
1	U1	MPM3824	6V/2A, step-down power module	LGA-14 (2.5mmx 2.5mmx 1.2mm)	MPS	MPM3824GPA

Note:

4) MPS custom-produces these pins. Contact MPS for details.

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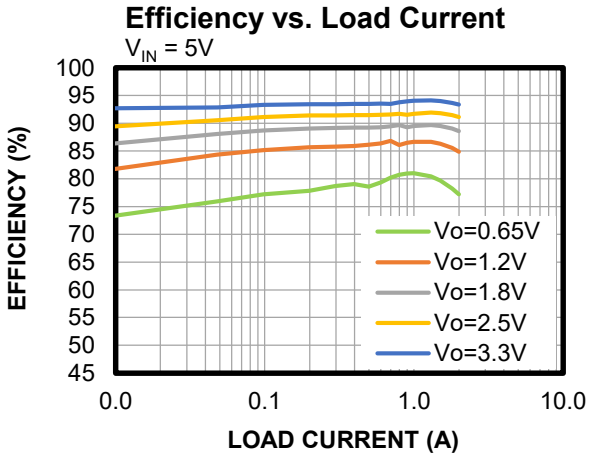
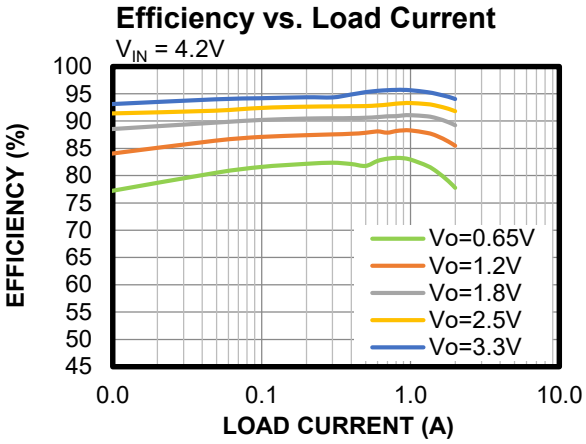
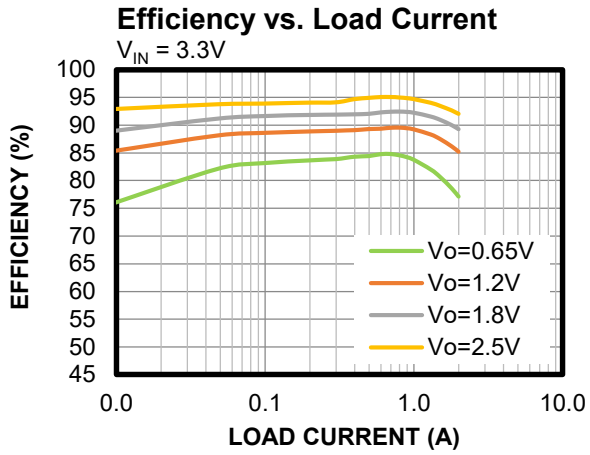
EVB TEST RESULTS

Performance curves and waveforms are tested on the evaluation board. V_{IN} = 5V, V_{OUT} = 1.2V, C_{OUT} = 22µF ceramic capacitor, AAM mode, T_A = 25°C, unless otherwise noted.







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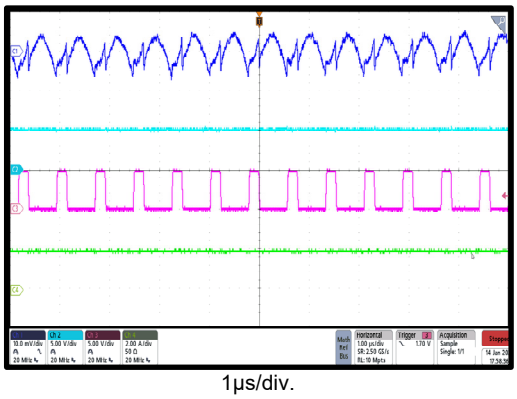
EVB TEST RESULTS *(continued)*

Performance curves and waveforms are tested on the evaluation board. V_{IN} = 5V, V_{OUT} = 1.2V, C_{OUT} = 22µF ceramic capacitor, AAM mode, T_A = 25°C, unless otherwise noted.

Steady State

V_{IN} = 5V, V_{OUT} = 1.2V, I_{OUT} = 2A

CH1: V_{OUT}/AC 10mV/div.
CH2: V_{IN} 5V/div
CH3: V_{SW} 5V/div.
CH4: I_{OUT} 2A/div.

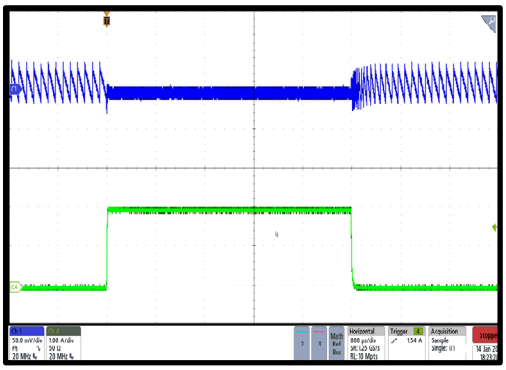


1µs/div.

Load Transient

V_{IN} = 5V, V_{OUT} = 1.2V, I_{OUT} = 0A to 2A, 2.5A/µs e-load

CH1: V_{OUT}/AC 50mV/div.
CH4: I_{OUT} 1A/div.

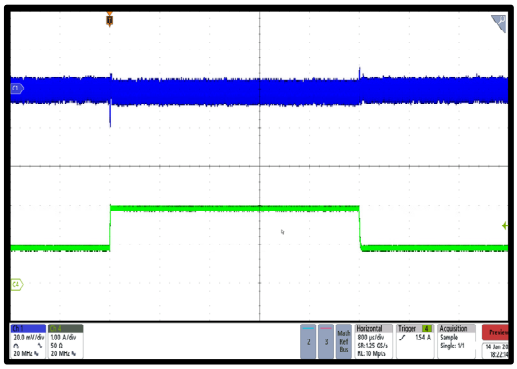


800µs/div.

Load Transient

V_{IN} = 5V, V_{OUT} = 1.2V, I_{OUT} = 1A to 2A, 2.5A/µs e-load

CH1: V_{OUT}/AC 20mV/div.
CH4: I_{OUT} 1A/div.



800µs/div.

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PCB LAYOUT

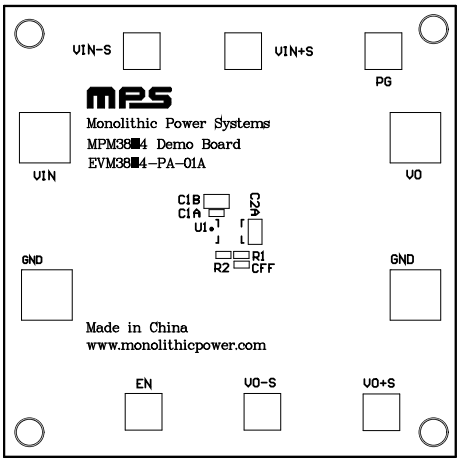

Figure 3: Top Silk

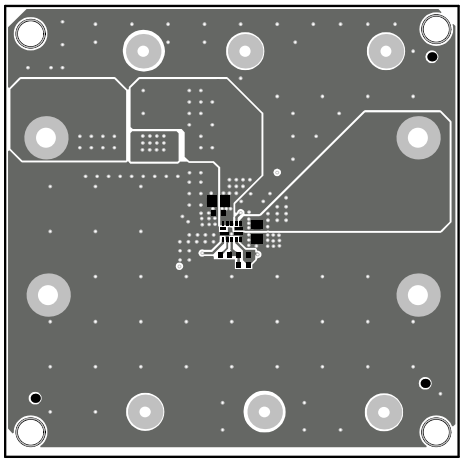

Figure 4: Top Layer

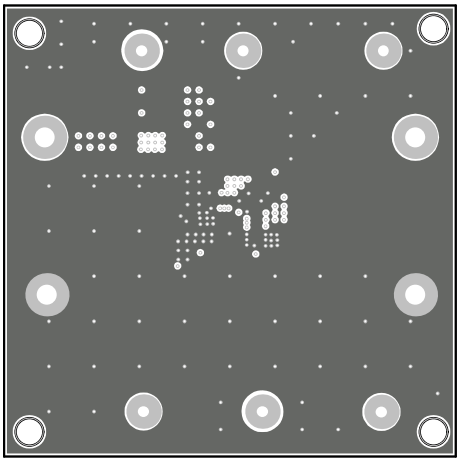

Figure 5: Mid-Layer 1

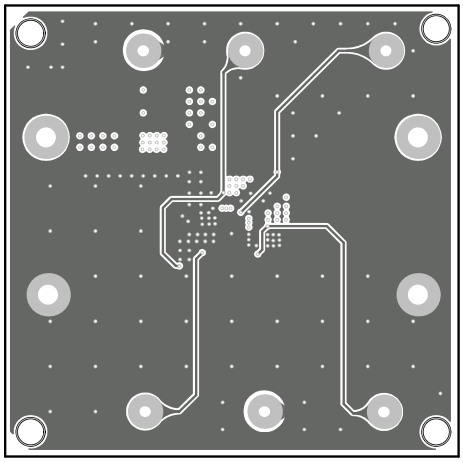

Figure 6: Mid-Layer 2

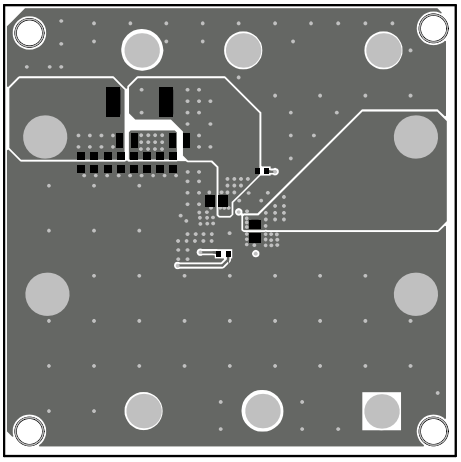

Figure 7: Bottom Layer

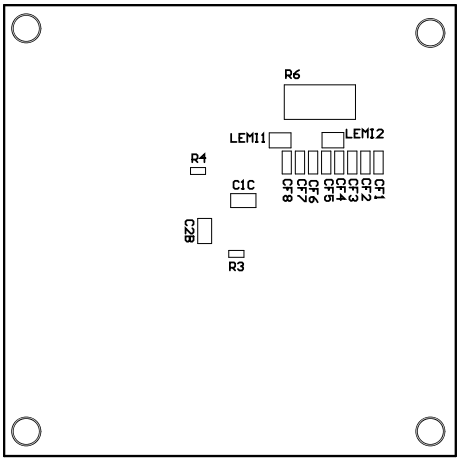

Figure 8: Bottom Silk

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REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	2/28/2025	Initial Release	-

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