



EVM3814-PA-01A

2.75V to 6V, 1A, Ultra-Small, Ultra-Low Noise Power Module Evaluation Board

DESCRIPTION

The EVM3814-PA-01A is an evaluation board designed to demonstrate the capabilities of the MPM3814, a synchronous, step-down power module with an integrated inductor. The MPM3814 achieves 1A of continuous output current (I_{OUT}) across a 2.75V to 6V input voltage (V_{IN}) range, with excellent load and line regulation.

The MPM3814 works in advanced asynchronous modulation (AAM) mode at light

loads, and it can switch to continuous conduction mode (CCM) at heavy loads with small voltage ripple. Full protections include cycle-by-cycle current limiting, short-circuit protection (SCP) with hiccup mode, and thermal shutdown.

It is recommended to read the MPM3814 datasheet prior to making any changes to the EVM3814-PA-01A.

PERFORMANCE SUMMARY ⁽¹⁾

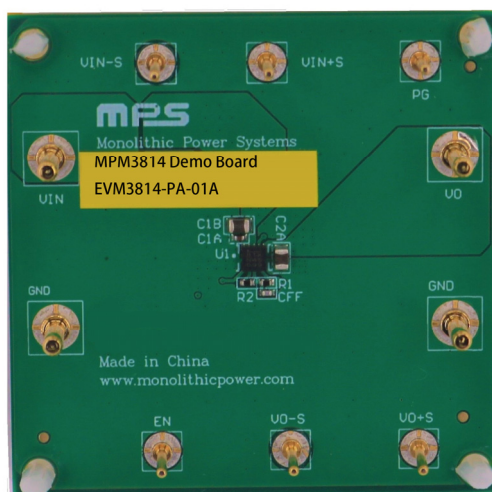
Specifications are at $T_A = 25^\circ\text{C}$, unless otherwise noted.

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})	$V_{IN} = 2.75\text{V to } 6\text{V}$	1A
Typical efficiency	$V_{IN} = 3.3\text{V}$, $V_{OUT} = 1.2\text{V}$, $I_{OUT} = 1\text{A}$	87.32%
Peak efficiency	$V_{IN} = 3.3\text{V}$, $V_{OUT} = 1.2\text{V}$, $I_{OUT} = 0.4\text{A}$	90%
Switching frequency (f_{SW})	Continuous conduction mode (CCM)	2200kHz

Note:

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

EVM3814-PA-01A EVALUATION BOARD



LxWxH (5cmx5cmx1.6mm)

Board Number	MPS IC Number
EVM3814-PA-01A	MPM3814GPA

QUICK START GUIDE

The EVM3814-PA-01A evaluation board is designed to evaluate the performance of the MPM3814. For proper measurement equipment set-up, refer to Figure 1 and follow the steps below:

1. Preset the power source (V_{IN}) between 2.75V and 6V. ⁽²⁾
2. Turn the power source off.
3. Connect the power source terminals to:
 - a. Positive (+): V_{IN}
 - b. Negative (-): GND
4. Connect the load terminals to: ⁽³⁾
 - a. Positive (+): V_O
 - b. Negative (-): GND
5. After making the connections, turn on the power supply. The board should automatically start up.
6. Check for the proper output voltage (V_{OUT}) between the V_O+S and V_O-S terminals.
7. Once the proper V_{OUT} is established, adjust the load within the operating range and measure the efficiency, output ripple voltage, and other parameters. ⁽⁴⁾

Notes:

- 2) Ensure that V_{IN} does not exceed 6V.
- 3) The initial load should be set to 0A.
- 4) When measuring the output voltage ripple and input voltage ripple, do not use the oscilloscope probe's long ground lead.

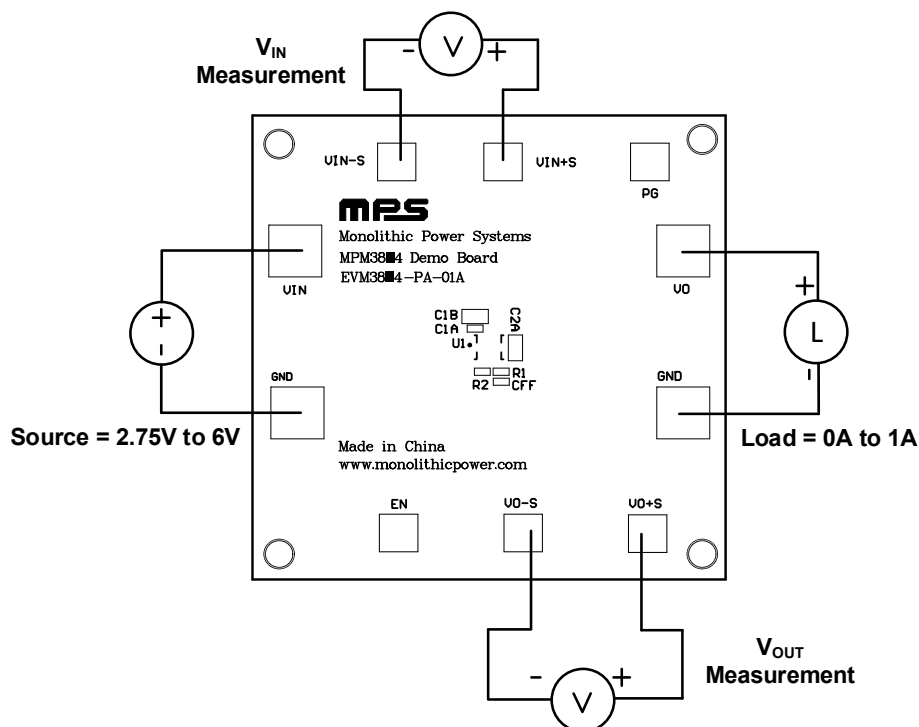


Figure 1: Measurement Equipment Set-Up

EVALUATION BOARD SCHEMATIC

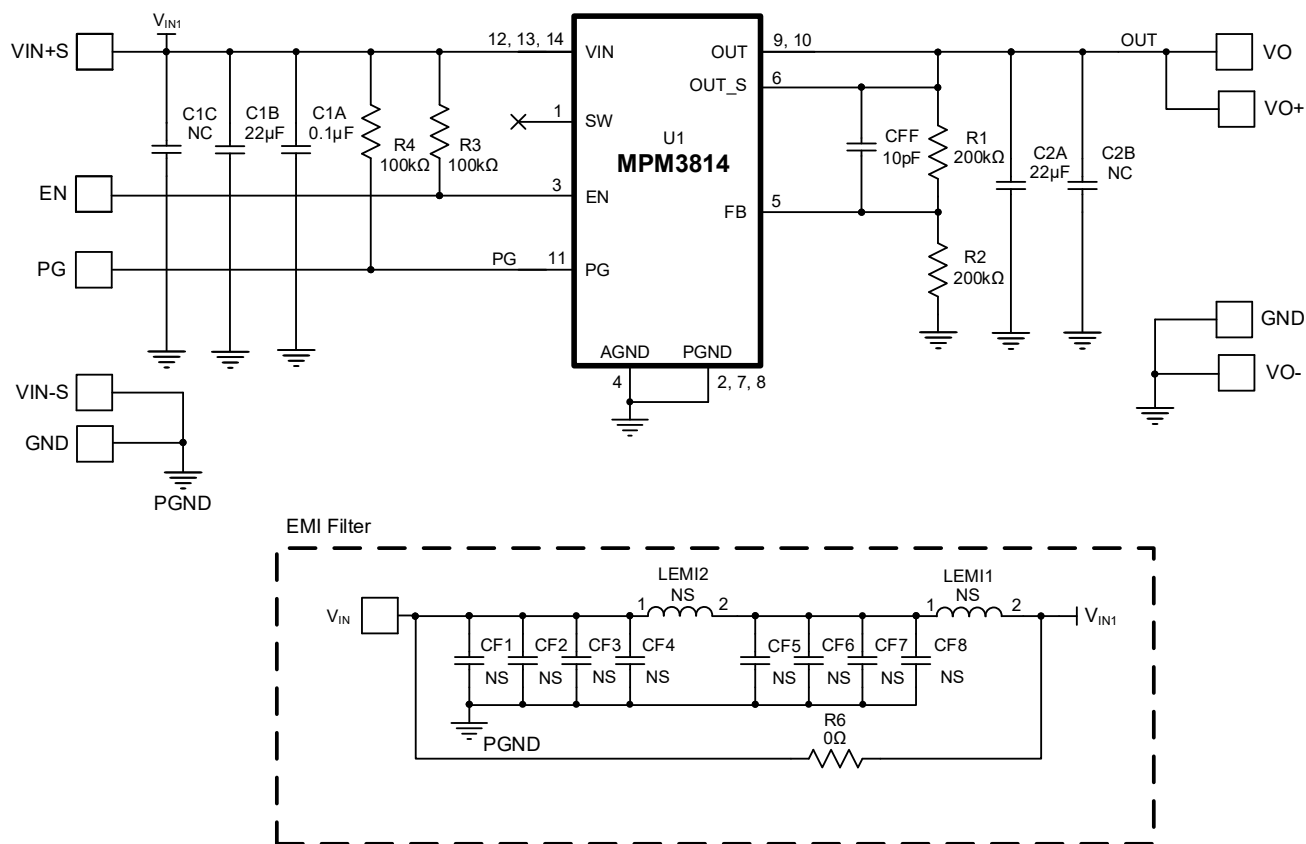


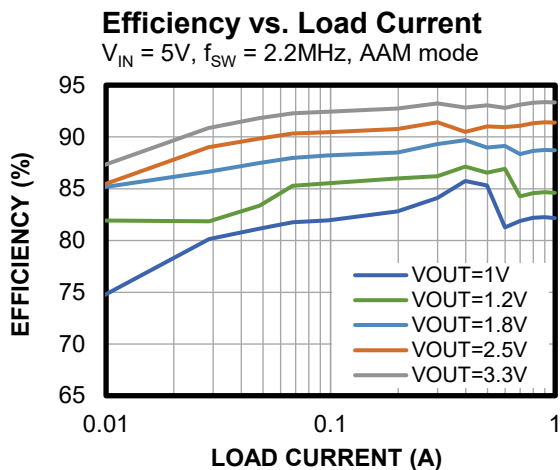
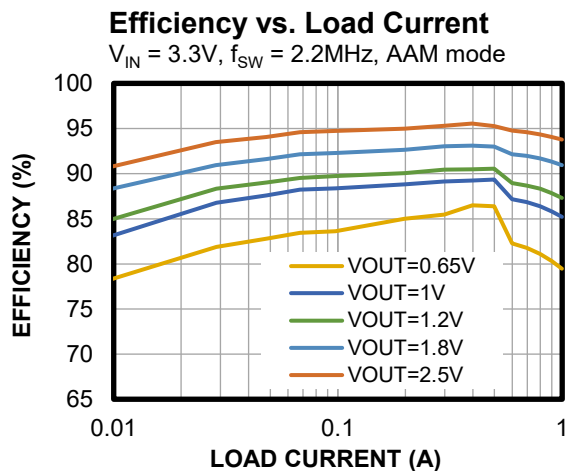
Figure 2: Evaluation Board Schematic

EVM3814-PA-01A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
1	C1A	0.1μF	Ceramic capacitor, 10V, X7R	0402	TDK	C1005X7R1C104KT000E
2	C1B, C2A	22μF	Ceramic capacitor, 10V, X7R	0805	TDK	C2012X7R1C226MT000N
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	RC0603FR-07100KL
1	R6	0Ω	Film resistor, 1%	2512	Yageo	RC2512FK-070RL
6	VIN_S, VO_S, GND_S, GND_S, EN, PG	1mm	Copper pin	DIP	Custom	
4	VIN, VO, GND, GND	2mm	Copper pin	DIP	Custom	
1	U1	MPM3814	6V, 1A, ultra-small step-down module	ECLGA-14 (2.5mmx 2.5mmx 1.2mm)	MPS	MPM3814GPA

EVB TEST RESULTS

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



EVB TEST RESULTS *(continued)*

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

Steady State

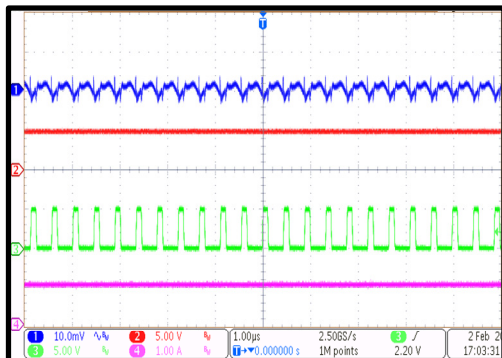
$V_{IN} = 5V$, $V_{OUT} = 1.2V$, $I_{OUT} = 1A$

CH1:
 V_{OUT}/AC
10mV/div.

CH2: V_{IN}
5V/div.

CH3: V_{SW}
5V/div.

CH4: I_{OUT}
1A/div.

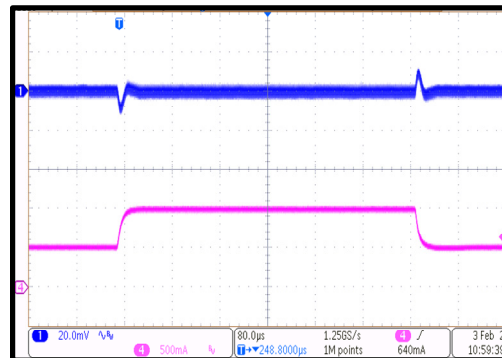


Load Transient

$V_{IN} = 5V$, $V_{OUT} = 1.2V$, $I_{OUT} = 0.5A$ to $1A$,
2.5A/ μs e-load

CH1:
 V_{OUT}/AC
20mV/div.

CH4: I_{OUT}
500mA/div.



PCB LAYOUT

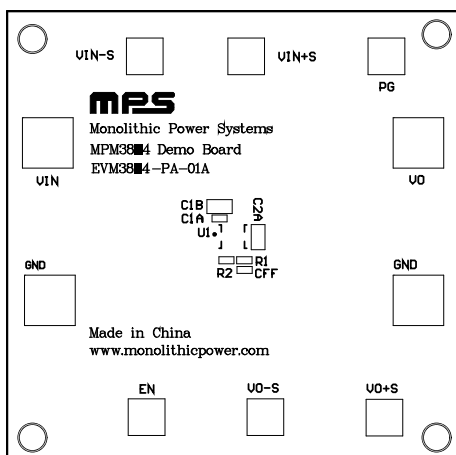


Figure 3: Top Silk

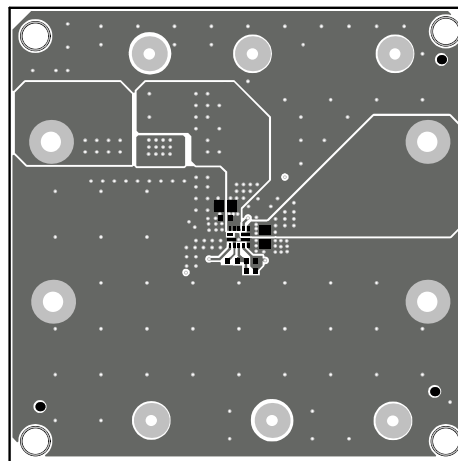


Figure 4: Top Layer

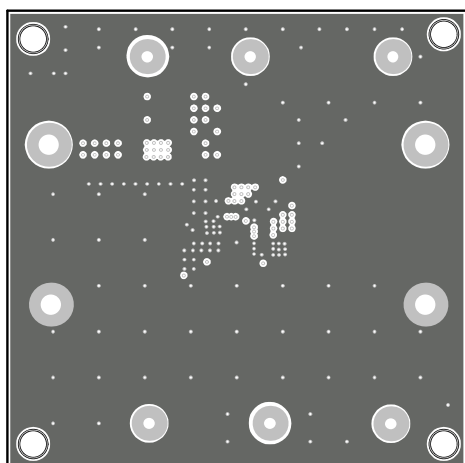


Figure 5: Mid-Layer 1

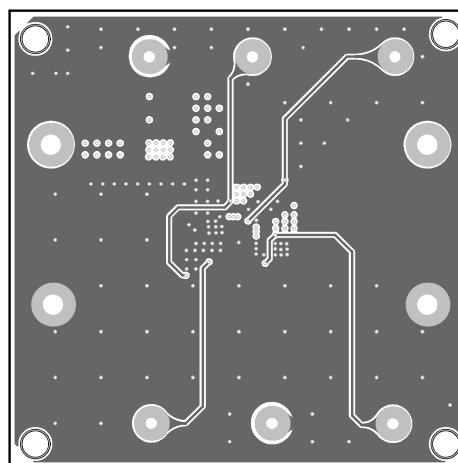


Figure 6: Mid-Layer 2

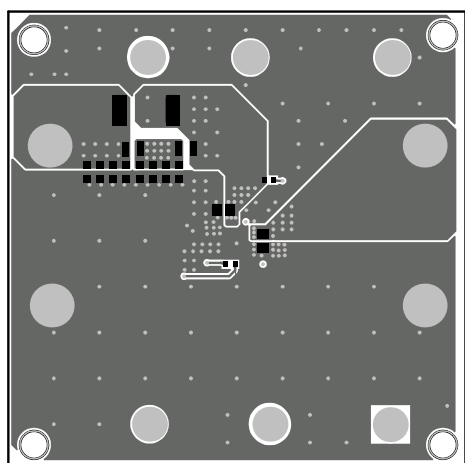


Figure 7: Bottom Layer

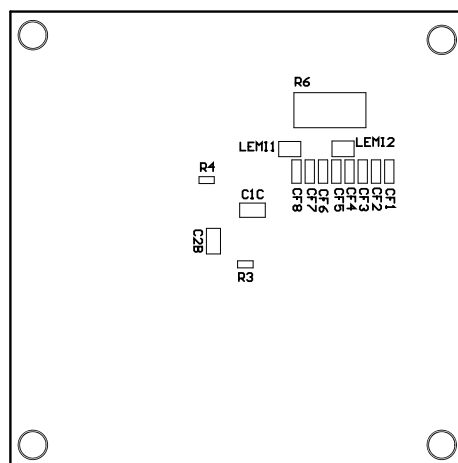


Figure 8: Bottom Silk



REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	9/6/2024	Initial Release	-

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