

DESCRIPTION

The EVM3864-PQ-00A is an evaluation board designed to demonstrate the capabilities of the MPM3864, a fully integrated, synchronous rectified, step-down, DC/DC power module with up to 6A of continuous current.

The MPM3864 adopts constant-on-time (COT) control to provide fast transient response, easy loop design, and tight output regulation. Full

protection features include short-circuit protection (SCP), over-current protection (OCP), under-voltage protection (UVP), and thermal shutdown.

It is recommended to read the MPM3864 datasheet prior to making any changes to the EVM3864-PQ-00A.

PERFORMANCE SUMMARY (1)

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

Parameters	Conditions	Value
Input voltage (V _{IN}) range		2.75V to 7V
Output voltage (Vout)	Default configuration	1.2V
Maximum output current (Iout)	V _{IN} = 2.75V to 7V	6A
Typical efficiency	VIN = 5V, VOUT = 1.2V, IOUT = 6A, fsw = 1.2MHz	83.4%
Peak efficiency	VIN = 5V, VOUT = 1.2V, IOUT = 2A, fsw = 1.2MHz	89.7%
Switching frequency (fsw)	Default configuration	1.2MHz

Note:

1) For different V_{IN} and V_{OUT} specifications with different output capacitors, the application circuit parameters may require changes.

EVALUATION BOARD



LxWxH (5.1cmx5.1cmx1.6cm)

Board Number	MPS IC Number	
EVM3864-PQ-00A	MPM3864GPQ	



QUICK START GUIDE

The EVM3864-PQ-00A evaluation board is easy to set up and use to evaluate the performance of the MPM3864. For proper measurement equipment set-up, refer to Figure 1 and follow the steps below:

- 1. Preset the power supply (V_{IN}) between 2.75V and 7V, 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: (3)
 - a. Positive (+): VOUT
 - b. Negative (-): GND
- 4. After making the connections, turn on the power supply. The board should automatically start up.
- 5. Check for the proper output voltage (V_{OUT}) between the VOUTSENSE and GNDSENSE 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⁾

Notes:

- 2) Ensure that V_{IN} does not exceed 7V.
- 3) There is no initial load by default.
- 4) When measuring the output voltage ripple or input voltage ripple, do not use the oscilloscope probe's long ground lead.



Figure 1: Proper Measurement Equipment Set-Up



EVALUATION BOARD SCHEMATIC



Figure 2: Evaluation Board Schematic



EVM3864-PQ-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
6	C1A, C1B, C2A, C2B, C3B, C4B	22µF	Ceramic capacitor, 25V	0805	Murata	GRM21BD71A226 ME44L
2	C3A, C6	0.1µF	Ceramic capacitor, 25V	0402	Murata	GRM155R71C104 KA88D
1	C5	1µF	Ceramic capacitor, 6.3V	0402	Wurth	885012206026
0	CF1, CF2, CF3, CF4, CF5, CF6, CF7, CF8, LEMI1, LEMI2	NS				
7	EN, GNDS, GNDS, PG, VINS, VOS, VCC	Φ1	Copper pin	DIP	Any	
4	GND, GND, VO, VIN	Ф2	Copper pin	DIP	Any	
2	R1, R2	20kΩ	Film resistor, 1%	0402	Yageo	RC0402FR- 0720KL
2	R3, R4	100kΩ	Film resistor, 1%	0402	Yageo	RC0402FR- 07100KL
1	R7	0Ω	Film resistor, 1%	2512	Yageo	RC2512FK-070RL
1	SWITCH_EN	500mA	Switch slide SPDT, 5V	10mmx 2.5mm	Wurth	450301014042
1	U1	MPM3864	1.2MHz, synchronous, rectified, 6A, step-down power module	ECLGA (3mmx3mm)	MPS	MPM3864GPQ



EVB TEST RESULTS

Performance curves and waveforms are tested on the evaluation board. $V_{IN} = 5V$, $V_{OUT} = 1.2V$, $T_A = 25^{\circ}C$, unless otherwise noted.



Thermal Rise Iout = 6A, T_A = 29.6°C





EVB TEST RESULTS (continued)

Performance curves and waveforms are tested on the evaluation board. $V_{IN} = 5V$, $V_{OUT} = 1.2V$, $T_A = 25^{\circ}C$, unless otherwise noted.





PCB LAYOUT



Figure 3: Top Silk



Figure 5: Mid-Layer 1



Figure 7: Bottom Layer



Figure 4: Top Layer



Figure 6: Mid-Layer 2



Figure 8: Bottom Silk



REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	10/13/2021	Initial Release	-

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