

# EVM3515-QV-02A

36V/1.5A Mini- Module Regulater with Intergrated Inductor Evaluation Board

### DESCRIPTION

The EVM3515-QV-02A is an evaluation board for MPM3515, a synchronous rectified, stepdown Mini-Module regulator with built-in power MOSFETS, inductor and two capacitors.

The Evaluation Board can deliver a 1.5A continuous output current with excellent load and line regulation over a wide input supply range.

Full protection features include over-current protection and thermal shut down.

The MPM3515 is available in a space-saving QFN-17 (3mmx5mmx1.6mm) package.

### **ELECTRICAL SPECIFICATION**

Parameter	Symbol	Value	Units	
Input Voltage	VIN	4 -36	V	
Output Voltage	Vouт	3.3	V	
Output Current	Іоит	1.5	Α	

#### **FEATURES**

- Complete Switch Mode Power Supply
- 4V-to-36V Wide Operating Input Range
- 1.5A Continuous Load Current
- Low R<sub>DS(ON)</sub> Internal Power MOSFETs
- Fixed 2.2MHz Switching Frequency
- 450kHz-2.2MHz Frequency Sync
- Forced CCM mode
- Power Good Indicator
- Valley OCP Protection with Current **Detection and Hiccup**
- Thermal Shutdown
- Output Adjustable from 0.8V
- Available in QFN-17 (3mmx5mmx1.6mm) Package
- Available in AEC-Q100 Grade 1

### **APPLICATIONS**

- **Industrial Controls**
- Automotive
- Medical and Imaging Equipment
- **Telecom Applications**
- Distributed Power Systems

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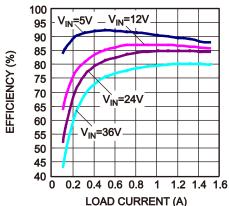
### EVM3515-QV-02A EVALUTION BOARD



 $(L \times W \times H)$  6.35cm  $\times$  6.35cm  $\times$  0.3cm

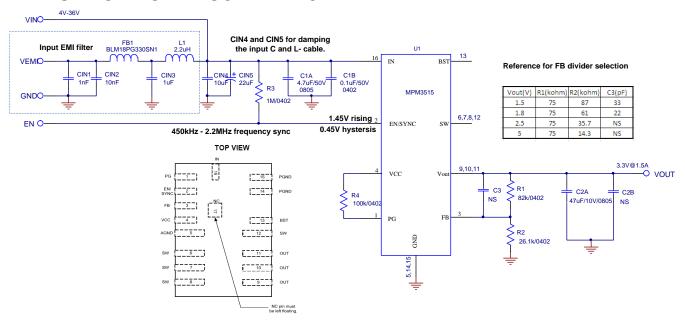
Board Number	MPS IC Number		
EVM3515-QV-02A	MPM3515GQV		

## **Efficiency** 100





## **EVALUATION BOARD SCHEMATIC**



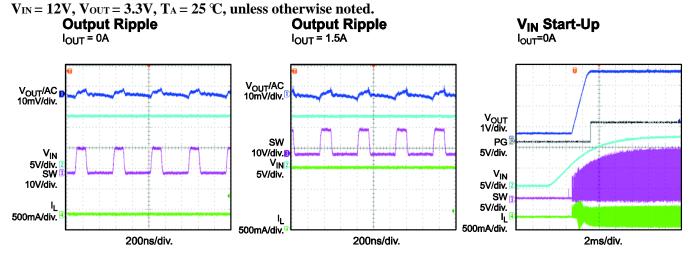
### **EVM3515-QV-02A BILL OF MATERIALS**

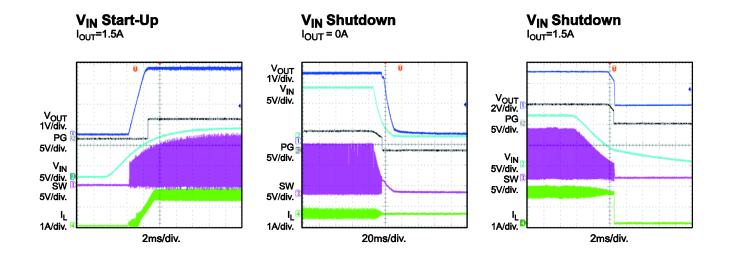
Qty	RefDes	Value	Description	Package	Manufacturer	Manufactuer_P/N
1	CIN1	1nF	Ceramic Cap., 50V, X7R	0603	muRata	GRM188R71H102KA01D
1	CIN2	10nF	Ceramic Cap., 50V, X7R	0603	muRata	GRM188R71H103KA01D
1	CIN3	1µF	Ceramic Cap., 50V, X7R	1206	muRata	GRM31MR71H105KA88L
1	CIN4	10μF	Ceramic Cap., 50V, X7R	1210	muRata	GRM32ER71H106KA12L
1	CIN5	22µF	Electrolytic Cap., 63V	SMD	Jianghai	VTD-63V22
1	C1A	4.7µF	Ceramic Cap., 50V, X7R	0805	muRata	GRM21BC71H475KE1
1	C1B	0.1µF	Ceramic Cap., 50V, X7R	0402	TDK	C1005X7R1C104K
1	C2A	47µF	Ceramic Cap., 10V, X5R	0805	muRata	GRM21BR61A476ME15L
0	C2B ,C3	NS				
1	R1	82k	Film Res.,1%	0402	Yageo	RC0402FR-0782KL
1	R2	26.1k	Film Res., 1%	0402	Yageo	RC0402FR-0726K1L
1	R3	1M	Film Res., 5%	0402	Yageo	RC0402JR-071ML
1	R4	100k	Film Res., 1%	0402	Yageo	RC0402FR-07100KL
1	FB1		Magnetic Bead; 3A	0603	muRata	BLM18PG330SN1
1	L1	2.2uH	Inductor; 82mohm; 3.3A	SMD	TOKO	DFE252012F-2R2M=P2
1	U1		module		MPS	MPM3515GQV-AEC1

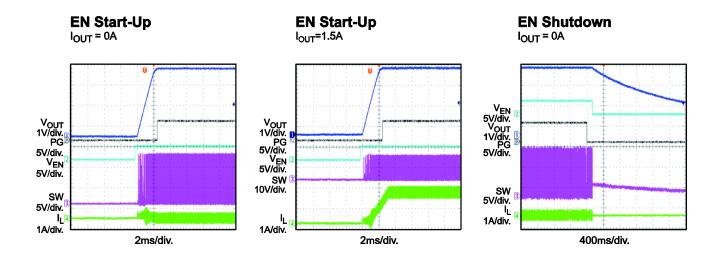


### **EVB TEST RESULTS**

Performance waveforms are tested on the evaluation board.



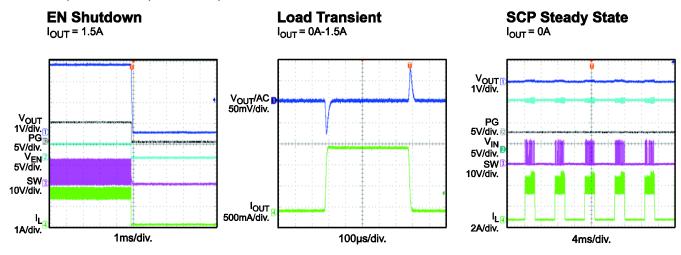


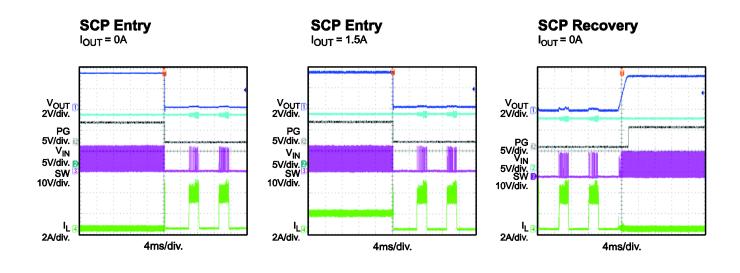


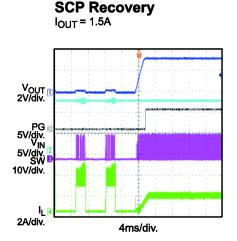


### **EVB TEST RESULTS**

Performance waveforms are tested on the evaluation board.  $V_{IN} = 12V$ ,  $V_{OUT} = 3.3V$ ,  $T_A = 25$  °C, unless otherwise noted.









### PRINTED CIRCUIT BOARD LAYOUT

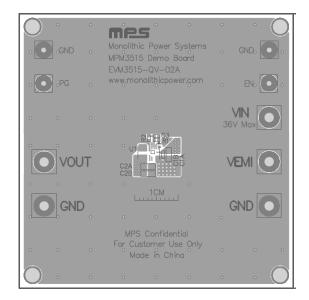


Figure 1-Top Silk Layer & Top layer

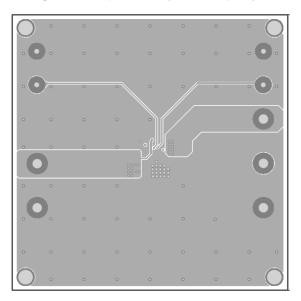


Figure 3-IN2 Layer

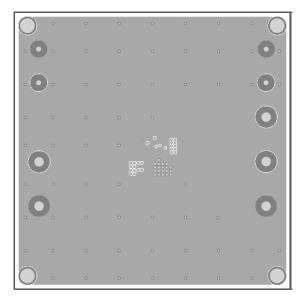


Figure 2-IN1 Layer

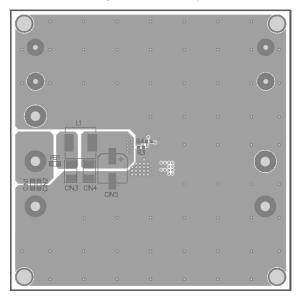
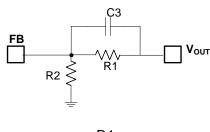


Figure 4-Bottom Silk Layer& Bottom Layer



### **QUICK START GUIDE**

- Connect the positive and negative terminals of the load to the VOUT and GND pins, respectively. Set load current between 0-1.5A. Be aware that electronic loads represent a negative impedance to the regulator and if set to a too high current will trigger over-current-protection or short-currentprotection.
- Preset the power supply output between 4V and 36V, and then turn off the power supply. If longer cables are used between the source and the EVB (>0.5m total), a damping capacitor should be installed at the input terminals, especially when V<sub>IN</sub>≥24V.
- 3. Connect the positive and negative terminals of the power supply output to the VIN and GND pins, respectively.
- 4. Turn the power supply on. The board will automatically start up. The default Vout is 3.3V.
- 5. To get better EMI performance, connect the input power supply between VEMI and GND.
- 6. To use EN turning on/off MPM3515, remove R3 first. Then give a voltage between EN and GND higher than 1.45V to turn on, lower than 1V to turn off. To use the SYNC function, connect an external clock with a range of 450 kHz to 2.2MHz to synchronize the internal clock rising edge to the external clock rising edge.
- 7. The external resistor divider sets the output voltage. The feedback resistor R1 sets the feedback loop bandwidth with the internal compensation capacitor C3. Choose R1 to be around 75k $\Omega$  when Vout  $\geq$  1V. R2 can then be calculated with below equation:



$$R2 = \frac{R1}{\frac{V_{OUT}}{0.807V} - 1}$$

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