EVM3820-QV-00A

6V Input, 1.2 MHz, 2A Module Synchronous Step-Down Converter with Integrated Inductor Evaluation Board

The Future of Analog IC Technology

DESCRIPTION

The EVM3820-QV-00A is used for demonstrating the performance of MPS's MPM3820 a low voltage high switching frequency step-down switcher with built-in power MOSFETs and power inductor. MPM3820 provides up to 2A continuous highly efficient output with constant-on-time control for fast loop response.

High power efficiency over a wide load range is achieved by scaling down the switching frequency at light load to reduce the switching related loss by constant on time control. Short circuit and thermal shutdown provides reliable, fault-tolerant operation.

MPM3820 is available in QFN 3.0x5.0x1.6mm package.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	2.7– 6	V
Output Voltage	V_{OUT}	1.2	V
Output Current	I_{OUT}	2	A

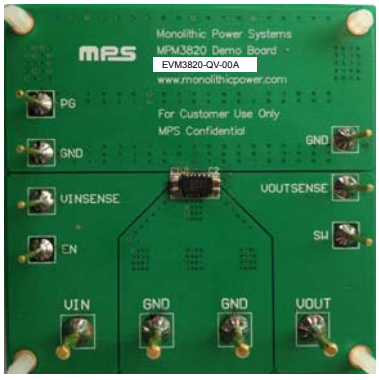
FEATURES

- Wide 2.7V to 6V Operating Input Range
- Fixed and Adjustable Output from 0.6V
- 3.0mm x 5.0mm x 1.6mm QFN Package
- Total Solution Size 8.5mm x 4.5 mm
- Up to 2A Continuous Output Current
- 100% Duty Cycle in Dropout
- Ultra Low IQ: 40μA
- EN and Power Good for Power Sequencing
- Cycle-by-Cycle Over-Current Protection
- Short Circuit Protection with Hiccup Mode
- Adjustable Output Only Needs 4 External Components - 2 Ceramic Capacitors and FB Divider Resistors
- Fixed Output Only Needs Input and Output Capacitors

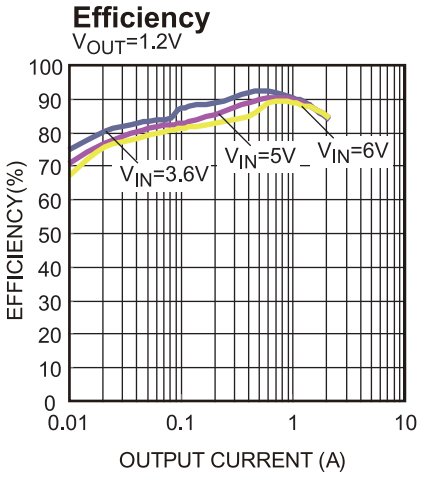
APPLICATIONS

- Low Voltage I/O System Power
- LDO Replacement
- Power for Portable Products
- Storage (SSD/HDD)
- Space-limited Applications

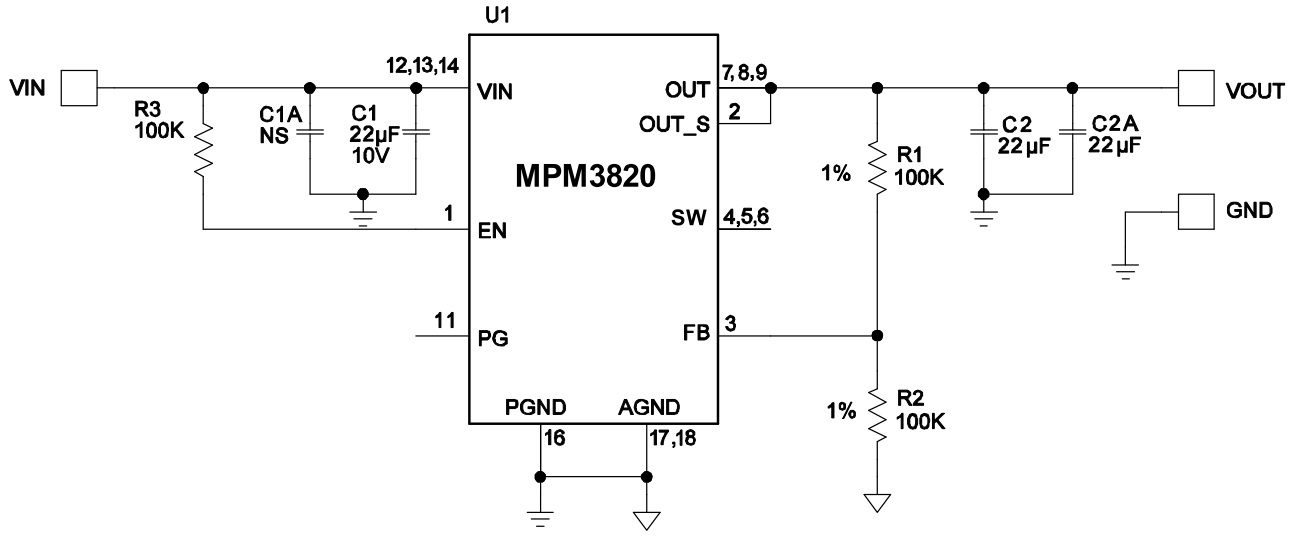
EVM3820-QV-00A EVALUATION BOARD



Board Number	MPS IC Number
EVM3820-QV-00A	MPM3820GQV



EVALUATION BOARD SCHEMATIC



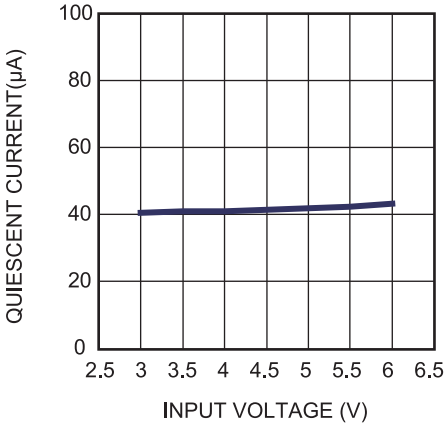
EVM3820-QV-00A BILL OF MATERIALS

Qty	RefDes	Value	Description	Package	Manufacturer	Manufacturer P/N
3	C1, C2,C2A	22µF	Ceramic Cap., 10V, X5R	SM0805	TDK	C2012X5R1A226K
0	C1A	NS				
1	R1	100k	Film Res., 1%	SM0603	Any	
1	R2	100k	Film Res.,1%	SM0603	Any	
1	R3	100k	Film Res., 5%	SM0603	Yageo	RC0603FR-07100KL
1	U1		COT Buck	QFN 3.0*5.0	MPS	MPM3820GQV

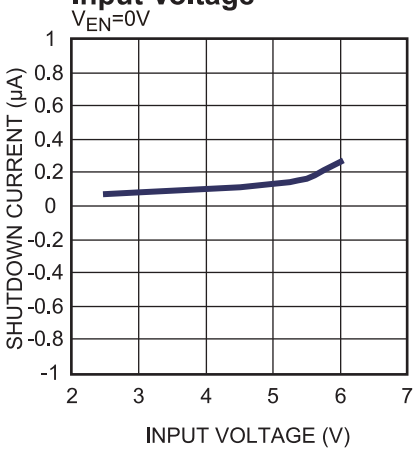
EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.
V_{IN}=5V, V_{OUT}=1.2V, T_A = 25°C, unless otherwise noted.

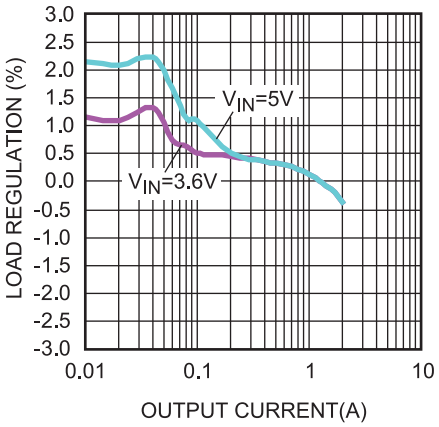
Quiescent Current vs. Input Voltage



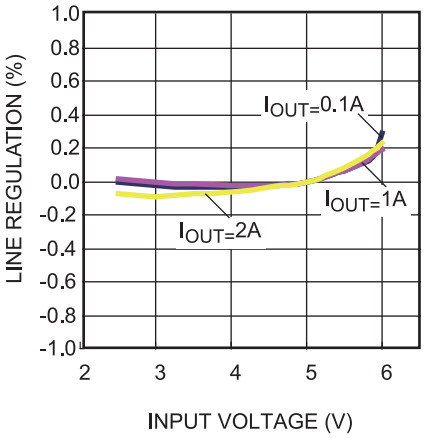
Shutdown Current vs. Input Voltage



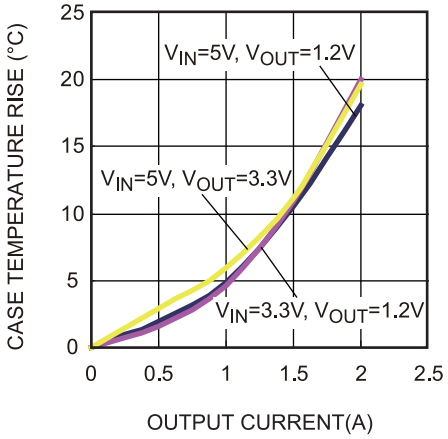
Load Regulation vs. Output Current



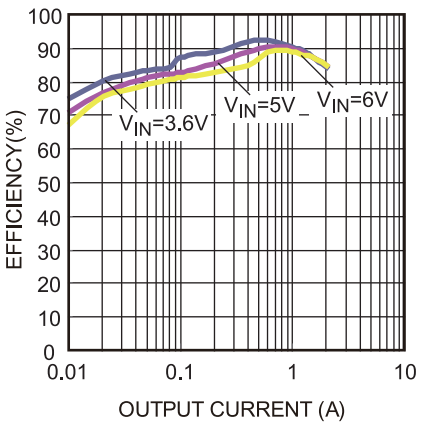
Line Regulation vs. Input Voltage



Case Temperature Rise



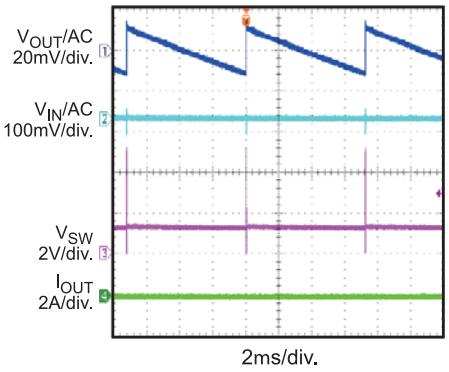
Efficiency



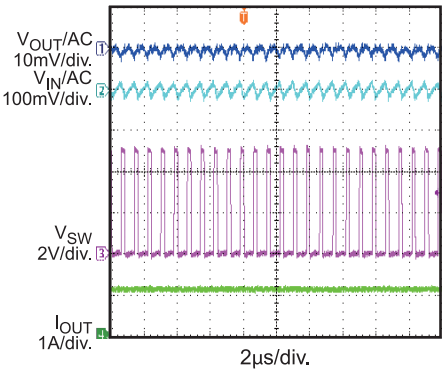
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.
V_{IN}=5V, V_{OUT}=1.2V, T_A = 25°C, unless otherwise noted.

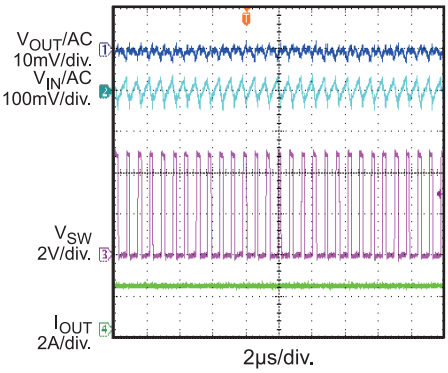
Input and Output Ripple
I_{OUT}=0A



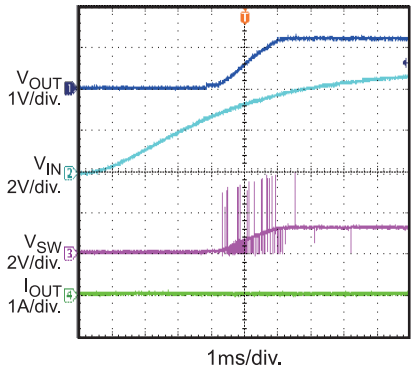
Input and Output Ripple
I_{OUT}=1A



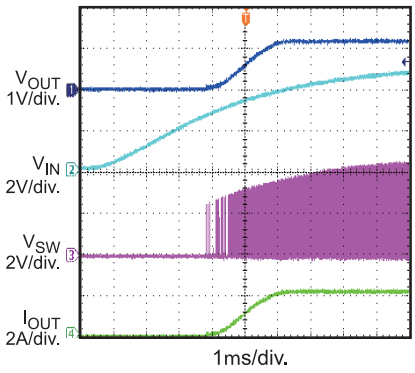
Input and Output Ripple
I_{OUT}=2A



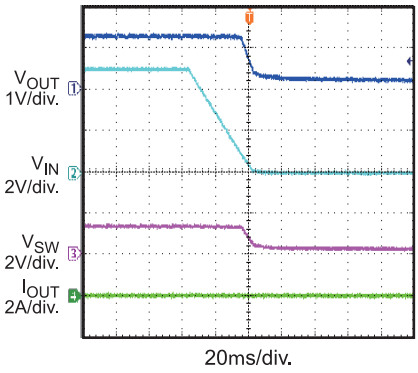
V_{IN} Power Up without Load



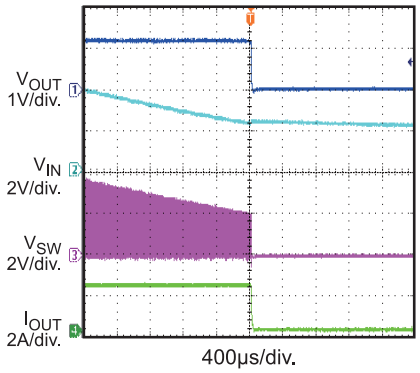
V_{IN} Power Up with 2A Load



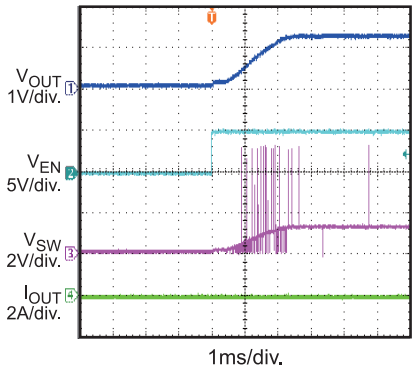
V_{IN} Shut down without Load



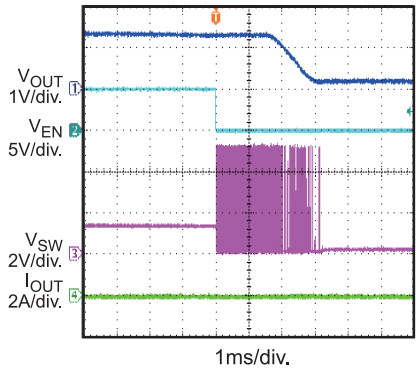
V_{IN} Shut down with 2A Load



EN Start Up without Load



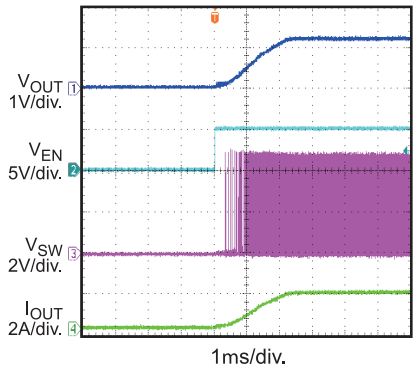
EN Shut Down without Load



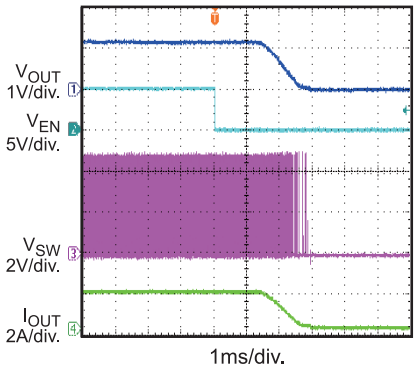
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.
V_{IN}=5V, V_{OUT}=1.2V, T_A = 25°C, unless otherwise noted.

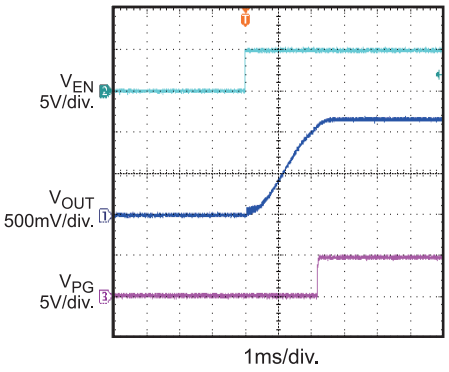
EN Start Up with 2A Load



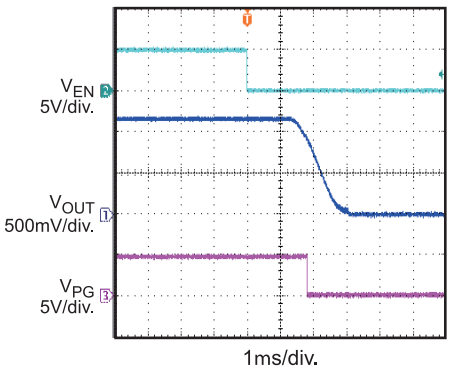
EN Shut Down with 2A Load



Power Good Through EN Start Up

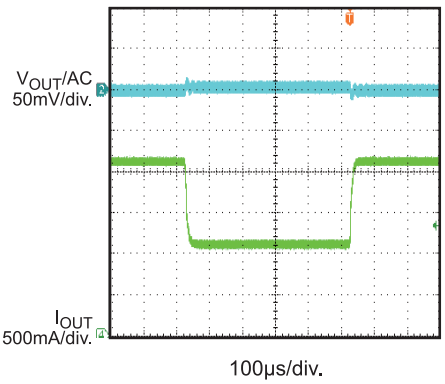


V_{IN} Power Up without Load

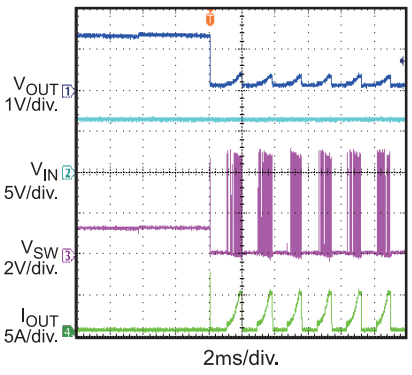


Load Transient Response

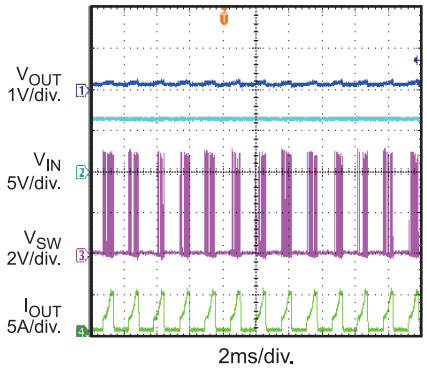
I_{OUT}=1A to 2A



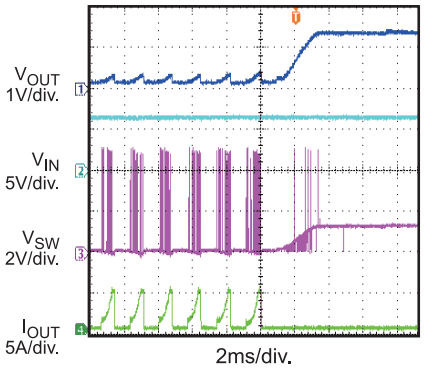
Short Circuit Entry



Short Circuit



Short Circuit Recovery



PRINTED CIRCUIT BOARD LAYER

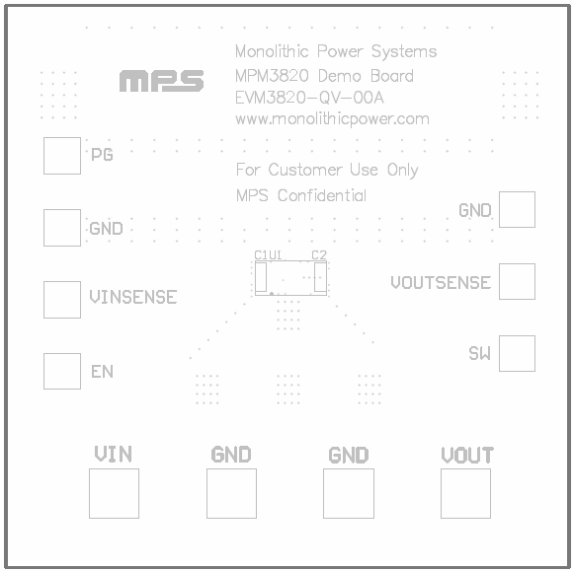


Figure 1: Top Silk Layer

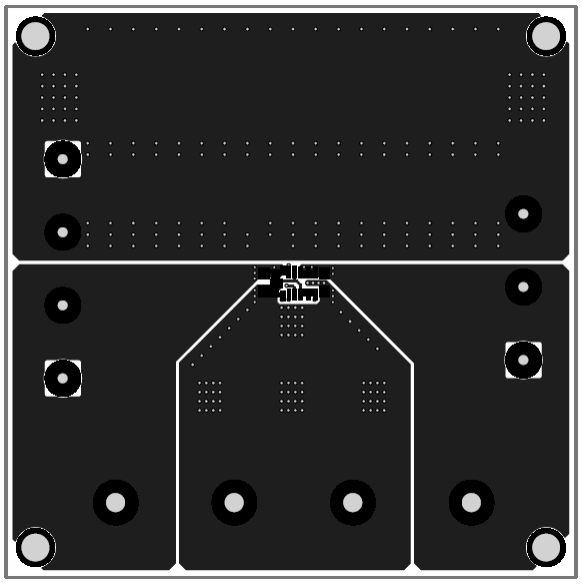


Figure 2: Top Layer

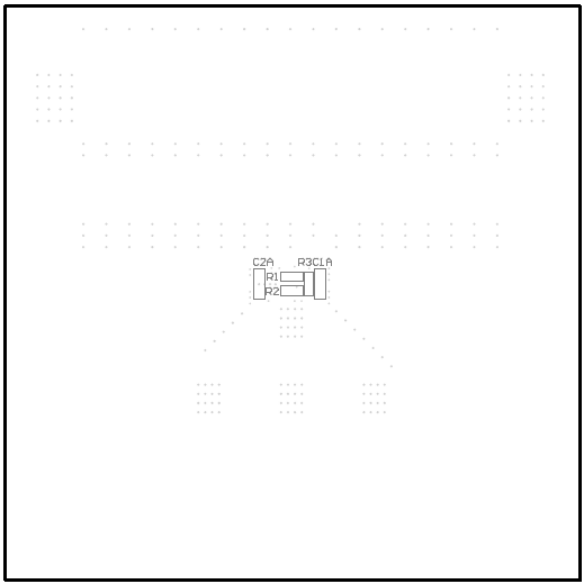


Figure 3: Bottom Silk Layer

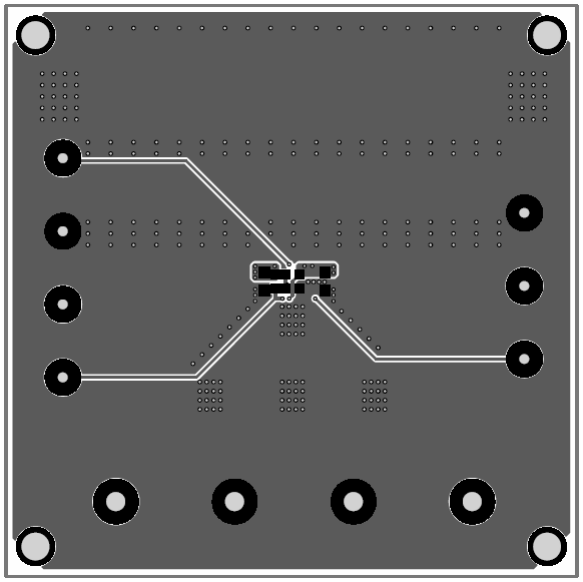


Figure 4: Bottom Layer

QUICK START GUIDE (ADJUSTABLE OUTPUT)

The output voltage of this board is set externally which can be regulated as low as 0.6V by operating from +2.7V to +6V input as the figure 5. The default output voltage of this board is set to 1.2V.

1. Connect the positive and negative terminals of the load to the VOUT and GND pins, respectively.
2. Preset the power supply output between 2.7V and 6V, and then turn off the power supply.
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.
5. The Output Voltage V_{OUT} can be changed by varying R2. Choose R1 to be around 50kΩ to 200kΩ. R2 is then given by:

$$R2 = \frac{R1}{\frac{V_{out}}{0.6} - 1}$$

Example: For Vout= 1V, R1=100kΩ, R2=150kΩ.

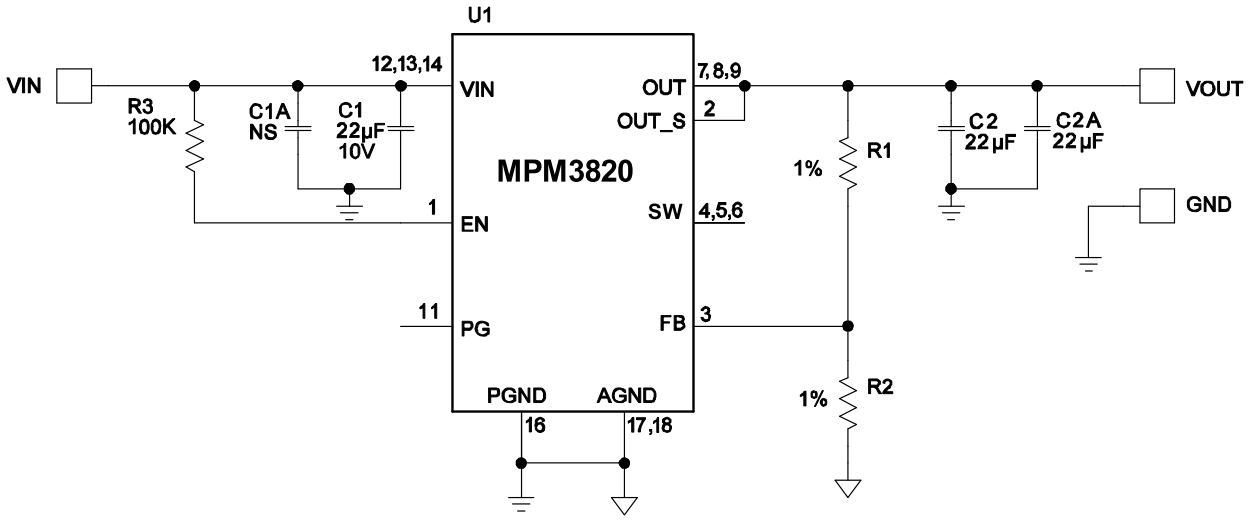


Figure 5—Adjustable Version

LAYOUT RECOMMENDATION OF MPM3820

Proper layout of the switching power supplies is very important, and sometimes critical to make it work properly. Especially, for the high switching converter, if the layout is not carefully done, the regulator could show poor line or load regulation, stability issues.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Power Management IC Development Tools ***category:***

Click to view products by Monolithic Power Systems ***manufacturer:***

Other Similar products are found below :

EVAL6482H-DISC EVAL-AD5522EBUZ EVAL-ADM1060EBZ EVAL-ADM1073MEBZ EVAL-ADM1166TQEBZ EVAL-ADM1168LQEBZ EVAL-ADM1171EBZ EVAL-ADM1276EBZ EVB-EN5319QI EVB-EN5365QI EVB-EN6347QI EVB-EP5348UI MIC23158YML EV MIC23451-AAAYFL EV MIC5281YMME EV 124352-HMC860LP3E ADM00513 ADM8611-EVALZ ADM8612-EVALZ ADM8613-EVALZ ADM8615-EVALZ ADP1046ADC1-EVALZ ADP1055-EVALZ ADP122-3.3-EVALZ ADP130-0.8-EVALZ ADP130-1.2-EVALZ ADP130-1.5-EVALZ ADP130-1.8-EVALZ ADP160UJZ-REDYKIT ADP166UJ-EVALZ ADP1712-3.3-EVALZ ADP1714-3.3-EVALZ ADP1715-3.3-EVALZ ADP1716-2.5-EVALZ ADP1740-1.5-EVALZ ADP1752-1.5-EVALZ ADP1754-1.5-EVALZ ADP1828LC-EVALZ ADP1870-0.3-EVALZ ADP1871-0.6-EVALZ ADP1873-0.6-EVALZ ADP1874-0.3-EVALZ ADP1876-EVALZ ADP1879-1.0-EVALZ ADP1882-1.0-EVALZ ADP1883-0.6-EVALZ ADP197CB-EVALZ ADP199CB-EVALZ ADP2102-1.25-EVALZ ADP2102-1.2-EVALZ