

DESCRIPTION

The MP2115 is a high frequency, current mode, PWM step-down converter with integrated input current limit switch. The step-down converter integrates a main switch and a synchronous rectifier for high efficiency without an external schottky diode. The input average current limit can be externally programmed. It is ideal for powering portable equipment that is powered by an USB port. The MP2115 can supply 2A of load current from a 2.8V to 6V input voltage. The output voltage can be regulated as low as 0.6V.

The MP2115 is available in a space-saving 3mm x 3mm 10-pin QFN package.

ELECTRICAL SPECIFICATION

| Parameter | Symbol | Value | Units |
|----------------|------------|---------|-------|
| Input Voltage | V_{IN} | 4.5 - 6 | V |
| Output Voltage | V_{OUT} | 3.8 | V |
| Output Current | I_{LOAD} | 0 - 2 | A |

FEATURES

- High efficiency: Up to 92%
- Programmable Switching Frequency
- Programmable Input Current Limit
- 2A Available Load Current
- 2.8V to 6V Input Voltage Range
- Output Voltage as low as 0.6V
- Current Mode Control
- Power Good Indicator
- Short Circuit Protection
- <0.1uA Shutdown Current
- Space Saving 3mm x 3mm QFN10 Package

APPLICATIONS

- USB Power Devices
- GSM/GPRS/EDGE
- PCMCIA Interface
- Cellular and Smart Phones
- Portable Instruments
- PDAs
- Digital Still and Video Cameras

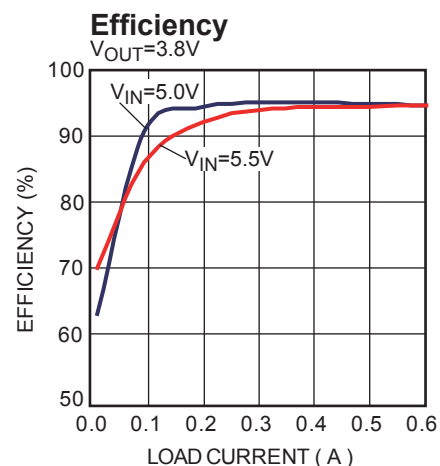
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EV2115DQ-00A EVALUATION BOARD

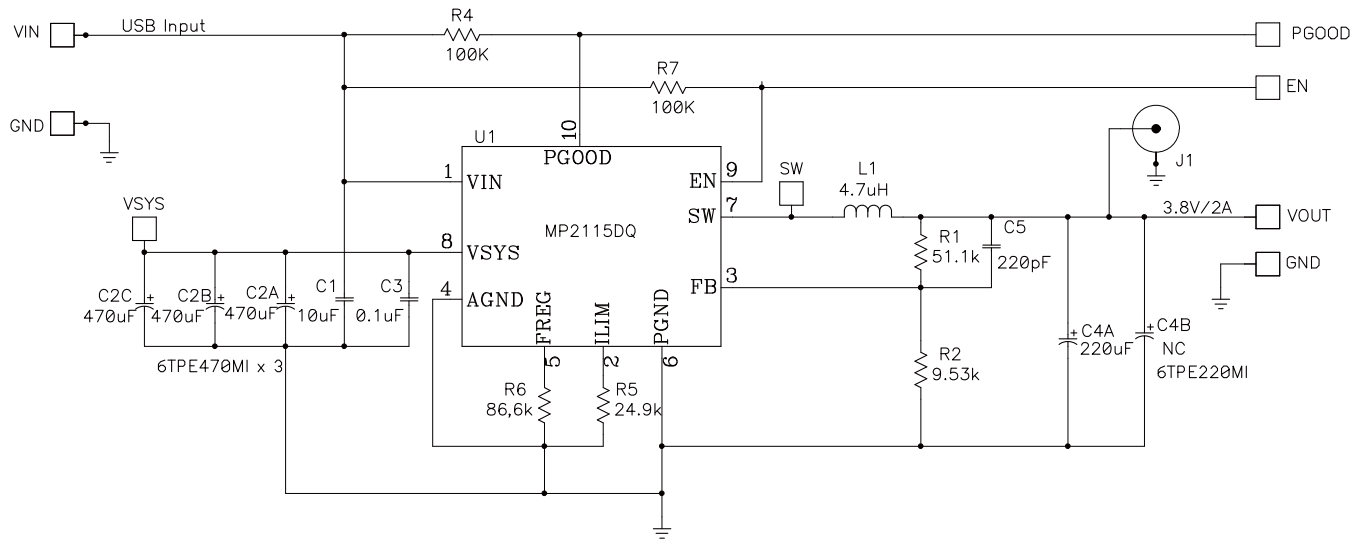


(L x W x H) 6.1cm x 5.1cm x 1.3cm

| Board Number | MPS IC Number |
|--------------|---------------|
| EV2115DQ-00A | MP2115 |



EVALUATION BOARD SCHEMATIC



EV2115DQ-00A BILL OF MATERIALS

| Qty | RefDes | Value | Description | Package | Manufacturer | Manufacturer P/N |
|-----|-------------|-------|---------------------------|---------|--------------|--------------------|
| 1 | C1 | 10µF | Ceramic Cap., 6.3V, X7R | 1206 | muRata | GRM31CR70J106KA01L |
| 3 | C2A,C2B,C2C | 470µF | 6.3V, POS-Cap. | D4 | SANYO | 6TPE470MI |
| 1 | C3 | 0.1µF | Ceramic Cap., 25V, X7R | 0603 | muRata | GRM188R71E104KA01D |
| 1 | C4A | 220µF | 6.3V, POS-Cap. | D3L | SANYO | 6TPE220MI |
| | C4B | NS | | D3L | | |
| 1 | C5 | 220pF | Ceramic Cap., 50V, X7R | 0603 | muRata | GRM188R71H221KA01D |
| 1 | R1 | 51.1k | Film Res., 1% | 0603 | Yageo | 9C06031A5112FKHFT |
| 1 | R2 | 9.53k | Film Res., 1% | 0603 | Yageo | 9C06031A9531FKHFT |
| 2 | R4,R7 | 100k | Film Res., 5% | 0603 | Yageo | 9C06031A1003JLHFT |
| 1 | R5 | 24.9k | Film Res., 1% | 0603 | Yageo | 9C06031A2492FKHFT |
| 1 | R6 | 86.6k | Film Res., 1% | 0603 | Yageo | 9C06031A8662FKHFT |
| 1 | L1 | 4.7µH | Inductor, DCR=20mΩ, Is=6A | 7x7x4mm | wurth | We-744311470 |
| 1 | J1 | NS | | | | |
| 8 | TP1~8 | | TP test point | TP1MM | | China |
| 4 | VIN~VOUT | | TP power pin | TP2MM | | China |
| 1 | U1 | | DC-DC Converter | QFN10 | MPS | MP2115DQ_R1 |

PRINTED CIRCUIT BOARD LAYOUT

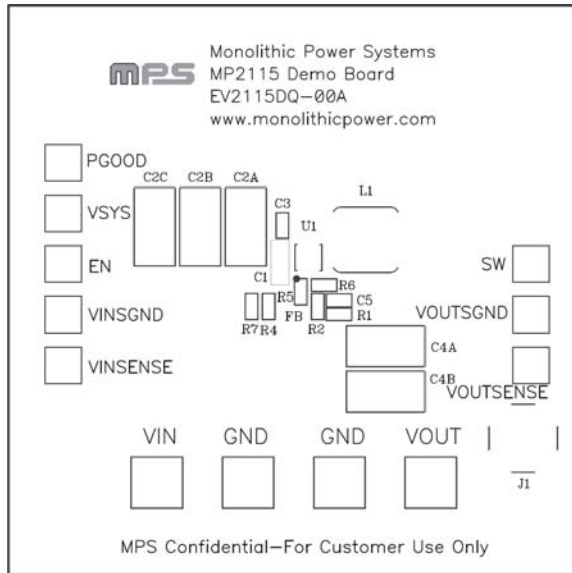


Figure 1—Top Silk Layer

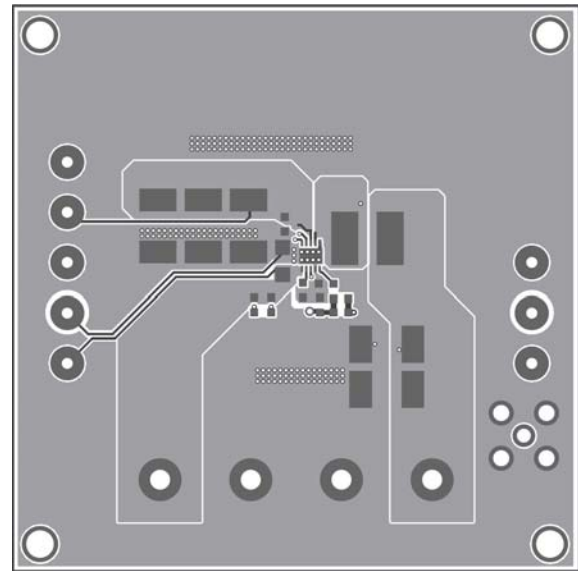


Figure 2—Top Layer

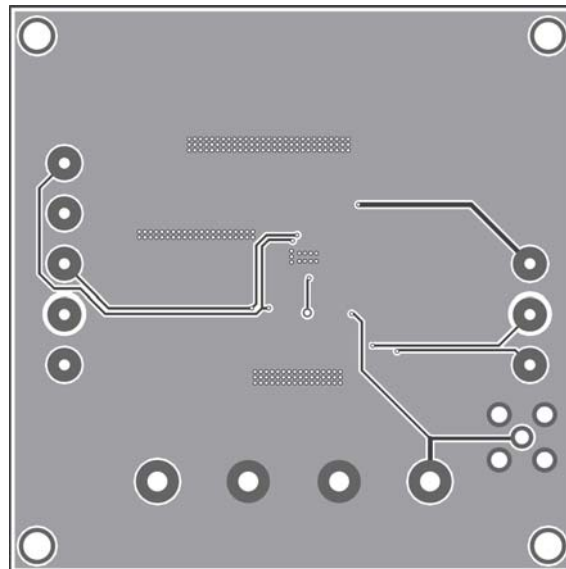


Figure 3—Bottom Layer

QUICK START GUIDE

- 1) The output voltage of this board is set to 3.8V. The board layout accommodates most commonly used inductors and output capacitors.
- 2) Attach the positive and negative ends of the load to the VOUT and GND pins, respectively.
- 3) Attach the input voltage ($4.5V \leq V_{IN} \leq 6V$) and input ground to the IN and GND pins, respectively.
- 4) The MP2115 will startup automatically without applying an external voltage to the EN pin.
The output voltage VOUT can be changed by varying R2. Calculate the new value using the formula:

$$R2=R1 \times (V_{FB}/V_{OUT}-V_{FB})$$

Where the $V_{FB}=0.6V$ and $R1=51k\Omega$.

- 5) The Switching frequency of this board is set to 1.5MHz, which is R6.

| R6 (kΩ) | Freq (MHz) |
|---------|------------|
| 380 | 0.4 |
| 300 | 0.5 |
| 245 | 0.6 |
| 207 | 0.7 |
| 178 | 0.8 |
| 155 | 0.9 |
| 103 | 1.3 |
| 87.8 | 1.5 |
| 58.7 | 2 |

Table 1—Resistor Selection vs. switching frequency

- 6) The Input current limit of this board is set to 500mA, which is R5.

| I _{IN} (A) | R5 (kΩ) |
|---------------------|---------|
| 0.2 | 60 |
| 0.3 | 40.4 |
| 0.4 | 30.24 |
| 0.5 | 24.6 |
| 0.6 | 20.93 |

Table 2—Resistor Selection vs. input current limit

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