

General Description

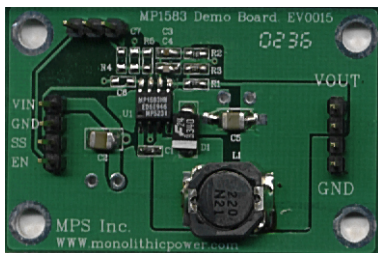
The EV0015 is a 3A Evaluation Board designed to demonstrate the MP1583's capabilities. The MP1583 is a monolithic step down (buck) converter with a built in internal Power MOSFET.

The MP1583 achieves 3A continuous output current over a wide input supply range with excellent load and line regulation. Current mode operation provides fast transient response and eases loop stabilization. Fault condition protection includes cycle-by-cycle current limiting and thermal shutdown. In shutdown mode the regulator draws 20 μ A of supply current.

Ordering Information

| Board Number | MPS IC Number |
|--------------|---------------|
| EV0015 | MP1583DN |

Figure 1: EV0015 Evaluation Board



(Actual Size Shown: 2"X x 1.25"Y)

Absolute Maximum Ratings

| | |
|-------------------------|----------------------------------|
| Supply Voltage V_{IN} | -0.3 to +26V |
| Switch Voltage V_{SW} | -1V to $V_{IN} + 0.3V$ |
| Boost Voltage V_{BS} | $V_{SW} - 0.3V$ to $V_{SW} + 6V$ |
| All other pins | -0.3 to 6V |

Recommended Operating Conditions

| | |
|---------------------------|-------------|
| Input Voltage V_{IN} | 4.75 to 23V |
| Output Regulation Voltage | 1.25 to 25V |
| Load Current | 0 to 3A |

Features

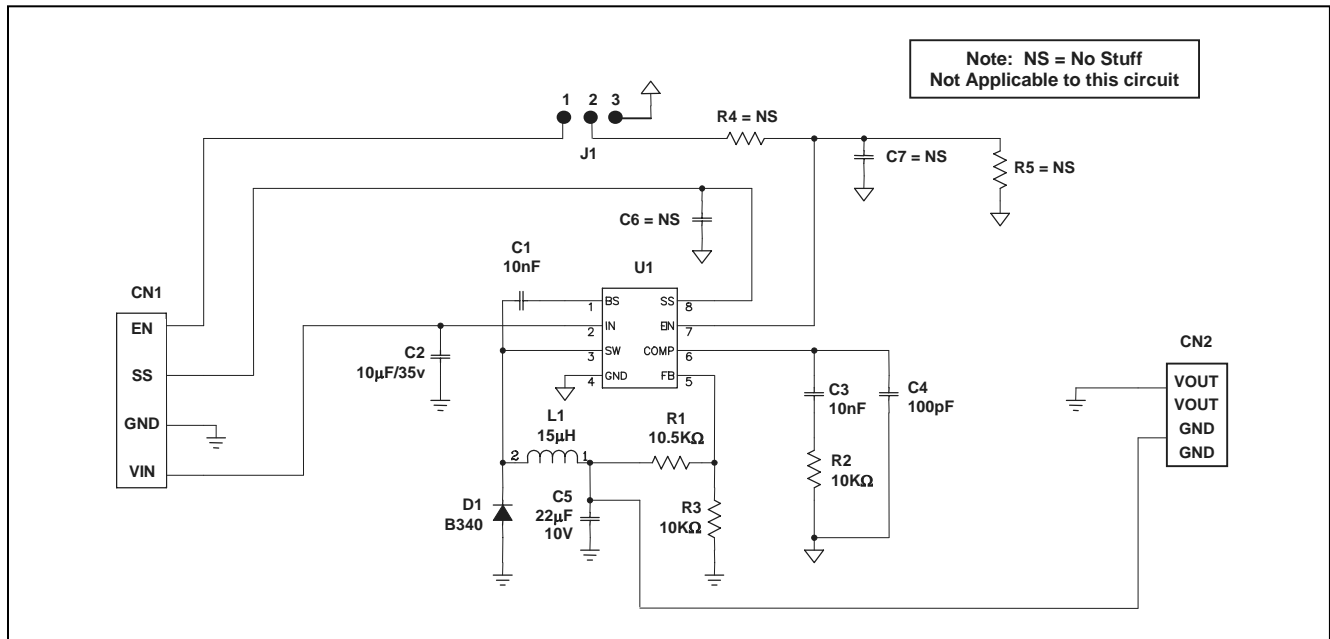
- 3A Output Current
- Programmable Soft-Start
- 100m Ω Internal Power MOSFET Switch
- Stable with Low ESR Output Ceramic Capacitors
- Up to 95% Efficiency
- 20 μ A Shutdown Mode
- Fixed 385KHz Frequency
- Thermal Shutdown
- Cycle-by-Cycle Over Current Protection
- Wide 4.75 to 23V Operating Input Range
- Output Adjustable From 1.22 to 21V
- Under Voltage Lockout

Applications

- Distributed Power Systems
- Battery Charger
- Pre-Regulator for Linear Regulators

Figure 2: EV0015 Evaluation Board Schematic

This board accommodates most commonly used Inductors and Output Capacitors and can be programmed for most standard Output Voltages. See the [MP1583 datasheet](#) for information on re-programming the output voltage.



Board Operation

This output voltage of this board is set to 2.5V. The board layout accommodates most commonly used inductors and output capacitors.

1. Attach positive end of load to VOUT pins and negative end of load to GND pins of connector CN2.
2. Attach input voltage (V_{IN}) and input ground (GND) to Pin 1 and 2 of connector CN1 respectively. **Note V_{IN} must be $4.75V < V_{IN} < 25V$.**
3. Applying a voltage greater than 2.495V to pin 4 of CN1 enables the MP1580. **Leave the input unconnected if unused.** An Under Voltage Lockout (UVLO) function can be implemented by the addition of a resistor divider from V_{IN} to GND. **For complete low current shutdown its needs to be less than 0.7V.**
4. To use Enable function stuff R4 with a 10KΩ resistor and connect pins 1 and 2 of Jumper J1.

Table 1: EV0015 Evaluation Board Schematic Bill of Materials

| Parts | Component | Package | QTY |
|--------------------------|-----------|--------------|-----|
| ICs | | | |
| MP1583DS | U1 | SOIC8 | 1 |
| Capacitors | | | |
| 10nF, Ceramic | C1, C3 | 0603 | 2 |
| 10 μ F, 35V, Ceramic | C2 | 1210 | 1 |
| 22 μ F, 10V, Ceramic | C5 | 1210 | 1 |
| 100pF, 50V, Ceramic | C4 | 0603 | 1 |
| Not Stuffed | C6, C7 | 0603 | 2 |
| Resistors | | | |
| 10.5K Ω , 1% | R1 | 0603 | 1 |
| 10K Ω , 1% | R2, R3 | 0603 | 2 |
| Not Stuffed | R4, R5 | 0603 | 2 |
| Diodes | | | |
| B340 | D1 | 1812 | 1 |
| Inductor | | | |
| 22 μ H, Sumida | L1 | CDRH104R-220 | 1 |

Table 2: Recommended components for standard output voltages

| V _{OUT} | R1 | R3 | L1 minimum |
|------------------|----------------|--------------|-------------|
| 1.22V | Short | Open | 6.8 μ H |
| 1.5V | 2.2K Ω | 10K Ω | 6.8 μ H |
| 1.8V | 4.7K Ω | 10K Ω | 10 μ H |
| 2.5V | 10.5K Ω | 10K Ω | 10 μ H |
| 3.3V | 17.0K Ω | 10K Ω | 15 μ H |
| 5.0V | 30.9K Ω | 10K Ω | 22 μ H |

Note: Refer to the MP1583 Datasheet's Table IV Inductor Selection Guide for choosing L

Figure 3: EV0015 Top Side

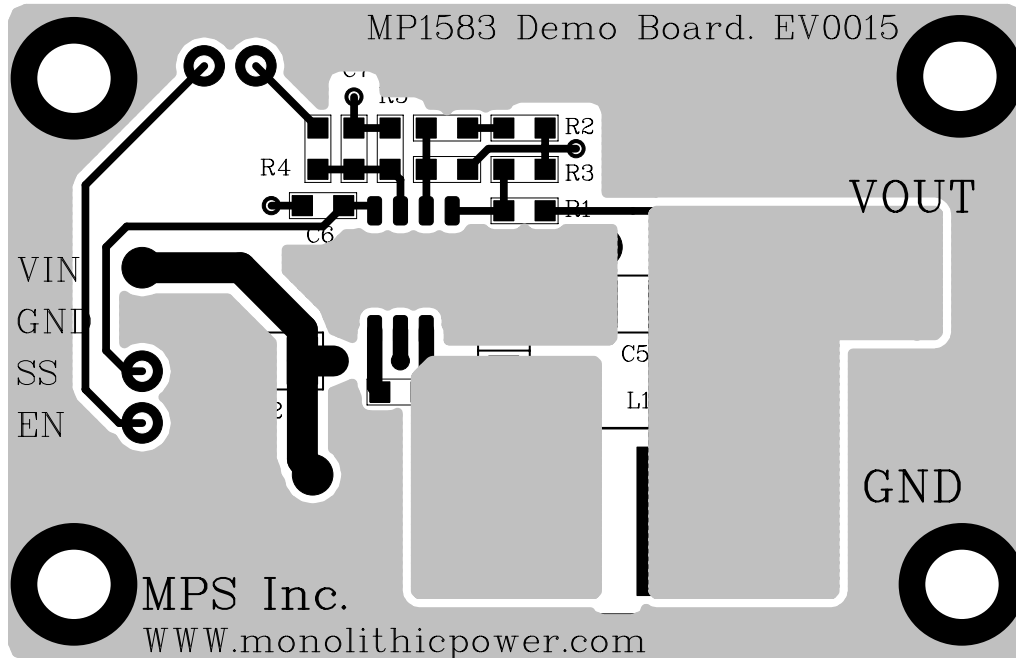
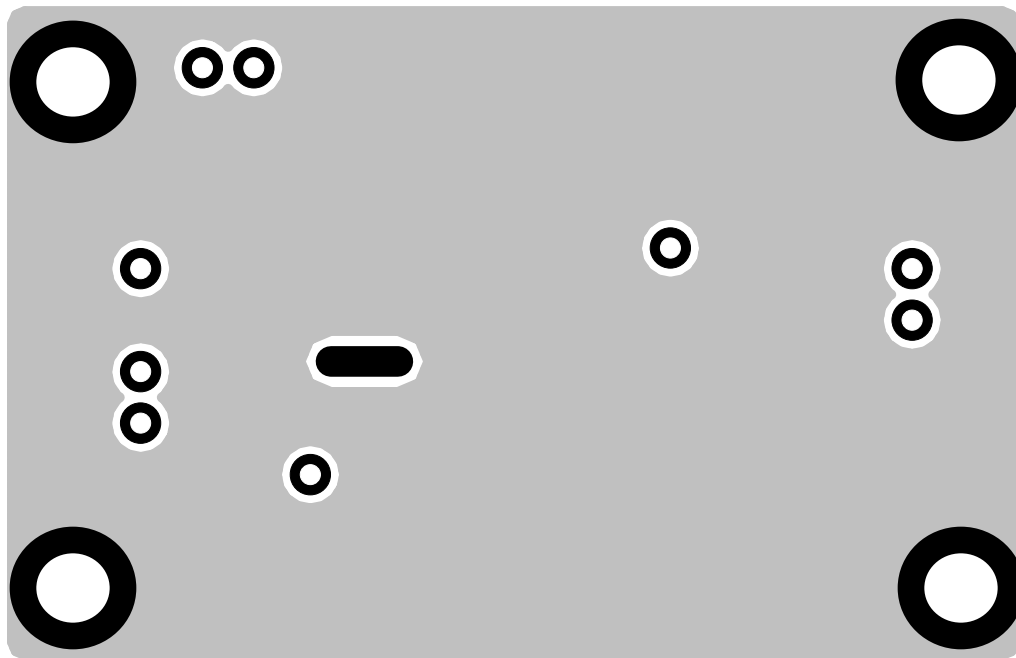


Figure 3: EV0015 Bottom Side



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