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EV2358DS-00A

2A, 23V, 370KHz Step-Down Converter Evaluation Board

DESCRIPTION

The EV2358DS-00A is the evaluation board for the MP2358, a monolithic step-down switch mode converter with a built in internal power MOSFET. It achieves 2A continuous output current over a wide input supply range with excellent load and line regulation.

The MP2358 employs current mode operation for fast transient response and loop stabilization.

Its Fault condition protection includes cycle-by-cycle current limiting and thermal shutdown. In shutdown mode the regulator draws 23µA of supply current. The Programmable soft-start minimizes the inrush supply current and the output overshoot at initial startup.

The MP2358 requires a minimum number of readily available standard external components.

ELECTRICAL SPECIFICATIONS

| Parameter | Symbol | Value | Units |
|----------------|------------------|-----------|-------|
| Input Voltage | V _{IN} | 4.75 – 23 | V |
| Output Voltage | V _{OUT} | 3.3 | V |
| Output Current | I _{OUT} | 2 | A |

FEATURES

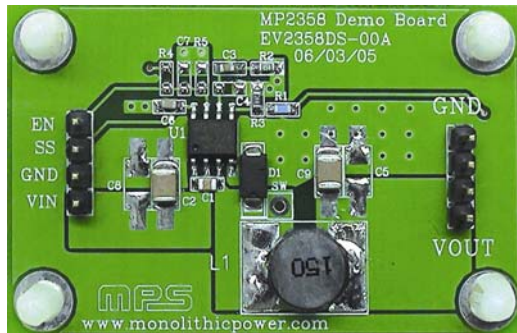
- 2A Output Current
- Stable with Low ESR Output Ceramic Capacitors
- Up to 95% Efficiency
- Wide 4.75V to 23V Operating Input Range

APPLICATIONS

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

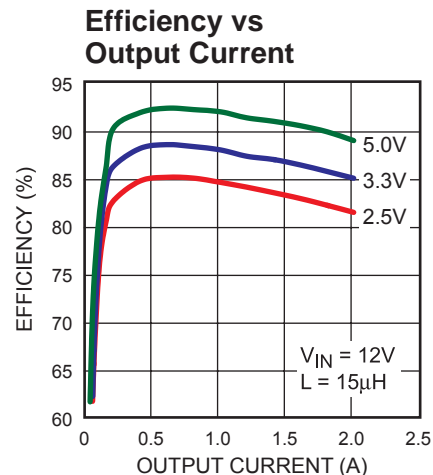
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EV2358DS-00A EVALUATION BOARD

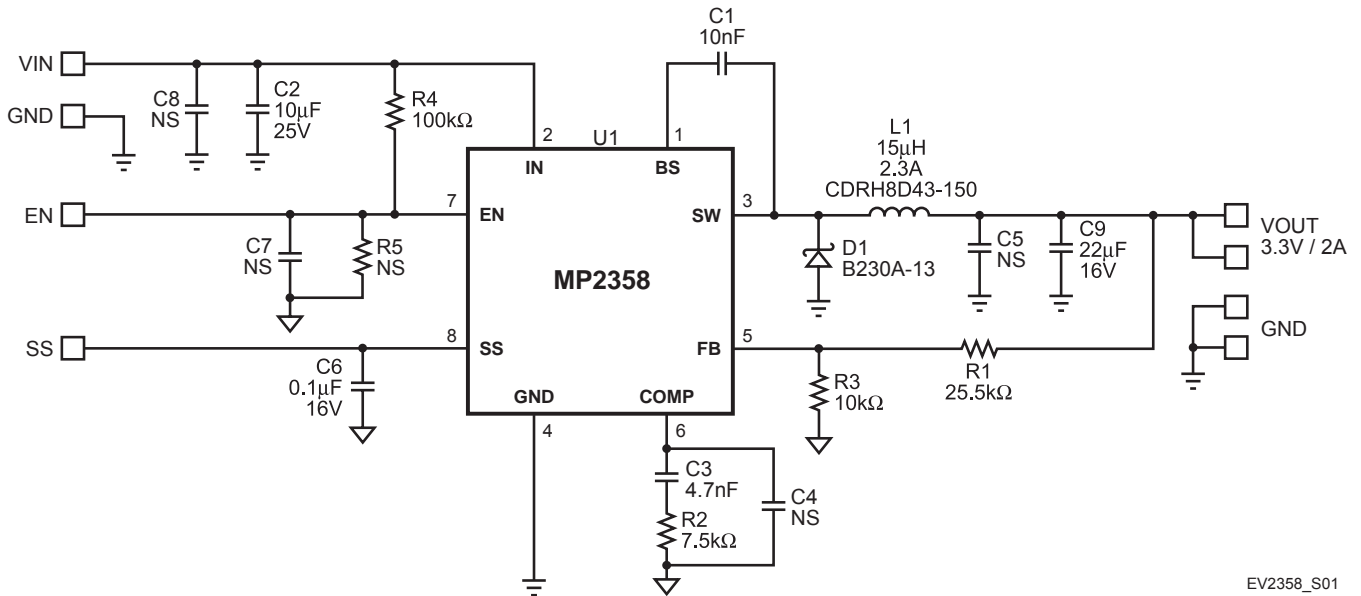


(L x W x H) 2.3" x 1.4" x 0.5"
(cm x cm x cm)

| Board Number | MPS IC Number |
|--------------|---------------|
| EV2358DS-00A | MP2358DS |



EVALUATION BOARD SCHEMATIC



EV2358_S01

EV2358DS-00A BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer P/N |
|-----|----------------|--------|---------------------------------|---------|--------------|------------------|
| 1 | C1 | 10nF | Ceramic Capacitor, 50V, X7R | 0603 | | |
| 1 | C2 | 10μF | Ceramic Capacitor, 25V, X7R | 1210 | TDK | C3225X7R1E106M |
| 1 | C3 | 4.7nF | Ceramic Capacitor, 50V, X7R | 0603 | | |
| 4 | C4, C5, C7, C8 | | Not Stuffed | | | |
| 1 | C6 | 0.1μF | Ceramic Capacitor, 16V, X7R | 0603 | | |
| 1 | C9 | 22μF | Ceramic Capacitor, 16V, X5R | 1210 | TDK | C3225X5R1C226M |
| 1 | D1 | | Diode Schottky, 30V, 2A | SMA | Diodes Inc. | B230A-13 |
| 1 | L1 | 15μH | Inductor, 2.3A | SMD | Sumida | CDRH8D43-150NC |
| 1 | R1 | 25.5kΩ | Resistor, 1% | 0603 | | |
| 1 | R2 | 7.5kΩ | Resistor, 5% | 0603 | | |
| 1 | R3 | 10kΩ | Resistor, 1% | 0603 | | |
| 1 | R4 | 100kΩ | Resistor, 5% | 0603 | | |
| 1 | R5 | | Not Stuffed | | | |
| 1 | U1 | | Step-Down Converter, 2A, 370KHz | SO8 | MPS | MP2358DS |

PRINTED CIRCUIT BOARD LAYOUT

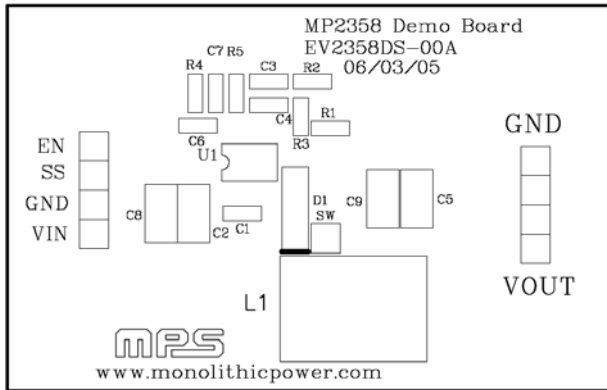


Figure 1—Top Silk Layer

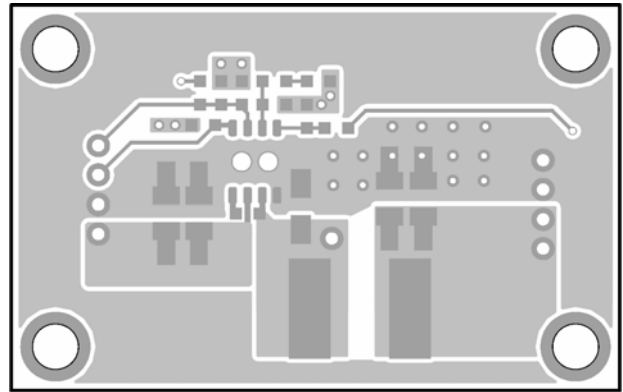


Figure 2—Top Layer

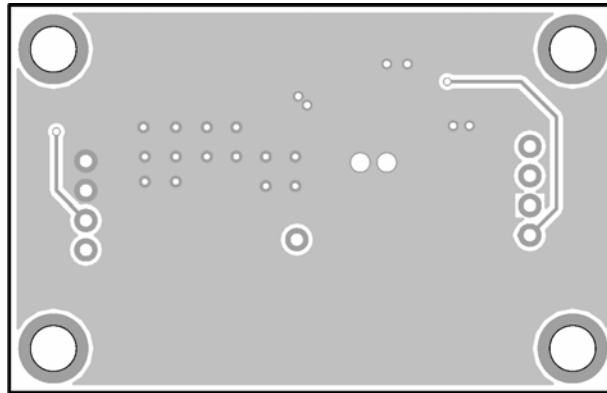


Figure 3—Bottom Layer

QUICK START GUIDE

The output voltage of this board is preset to 3.3V. The board is laid out to accommodate most commonly used inductors and output capacitors.

1. Connect the positive and negative ends of the load to the V_{OUT} and GND pins, respectively.
2. Connect the input voltage ($4.75V \leq V_{IN} \leq 23V$) and input ground to the VIN and GND pins, respectively.
3. To turn on the MP2358, apply an enable voltage V_{EN} to the EN pin. Drive EN higher than 1V to turn on the MP2358 or lower than 0.4V to turn it off.
4. The output voltage V_{OUT} can be programmed by varying R1. Calculate the new value using the formula:

$$R1 = R3 \times \left(\frac{V_{OUT}}{V_{FB}} - 1 \right)$$

Where V_{FB} = 0.9V and R3 = 10kΩ.

For example, for V_{OUT} = 2.5V:

$$R1 = R3 \times \left(\frac{V_{OUT}}{V_{FB}} - 1 \right) = 10k\Omega \times \left(\frac{2.5V}{0.9V} - 1 \right) = 17.78k\Omega \sim 17.8k\Omega$$

for the closest standard 1% value.

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