

DESCRIPTION

The MP2495 is a monolithic step-down switch mode converter with a programmable output current limit and an input over-voltage protection switch. It achieves 2A continuous output current over a wide input supply range with excellent load and line regulation.

The maximum output current can be programmed by sensing current through the inductor DC resistance (DCR) or an accurate sense resistor.

Fault condition protection includes cycle-by-cycle current limiting and thermal shutdown. The MP2495 can survive high-voltage transients such as those found in automotive and industrial applications.

The MP2495 requires a minimum number of readily available standard external components.

The MP2495 is available in a 16-pin SOIC package.

ELECTRICAL SPECIFICATIONS

| Parameter | Symbol | Value | Units |
|----------------|-------------------|-------|-------|
| Surge Voltage | | 80 | V |
| Input Voltage | V _{IN} | 12 | V |
| Output Voltage | V _{OUT} | 5 | V |
| Output Current | I _{LOAD} | 2 | A |

FEATURES

- Wide 4.5V to 36V Operating Input Range
- Input Surge Protection Up to 70V
- Programmable up to 2A Output Current
- Output Adjustable from 0.8V to 15V
- Programmable Output Current Limit without power loss
- 0.25Ω Internal Power MOSFET Switch
- Stable with Low ESR Output Ceramic Capacitors
- 95% Efficiency @ 500mA (Vo=5V)
- Fixed 700KHz Frequency
- Thermal Shutdown
- Cycle-by-Cycle Over Current Protection
- Available in a 16-Pin SOIC Package

APPLICATIONS

- USB Power Supplies
- Automotive Cigarette Lighter Adapters
- Power Supply for Linear Chargers

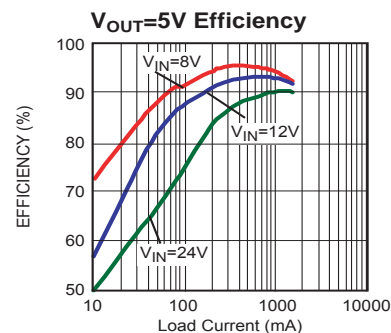
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EV2495DS-00A EVALUATION BOARD

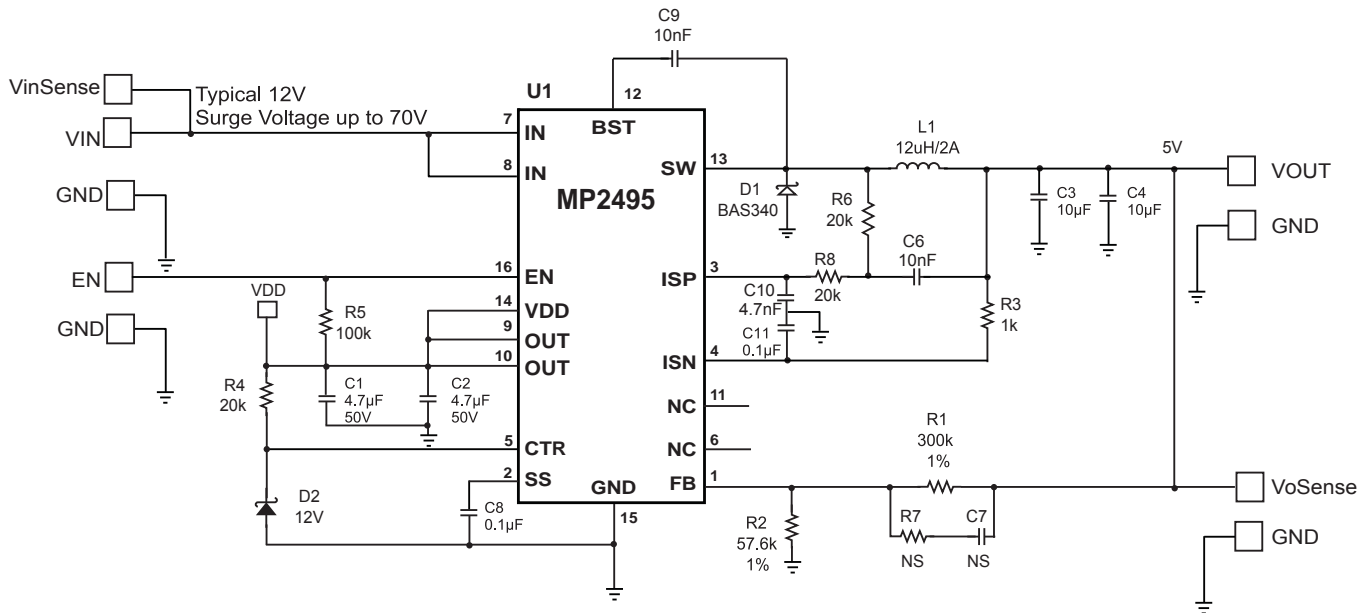


(L x W x H) 2.5" x 2.5" x 0.5"

| Board Number | MPS IC Number |
|--------------|---------------|
| EV2495DS-00A | MP2495DS |



EVALUATION BOARD SCHEMATIC



EV2495DS-00A BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer P/N |
|-----|----------|--------|------------------------------|---------|------------------|------------------|
| 2 | C1, C2 | 4.7uF | Ceramic Cap., 50V, X7R | 1210 | muRata | GRM32ER71H475K |
| 2 | C3, C4 | 10uF | Ceramic Cap., 25V, X7R | 1210 | muRata | GRM32DR71E106K |
| 2 | C6, C9 | 10nF | Ceramic Cap., 50V, X7R | 0805 | muRata | GRM216R71H103K |
| | C7 | NS | | 0805 | | |
| 2 | C8,C11 | 0.1uF | Ceramic Cap., 16V, X7R | 0805 | muRata | GRM219R71C104K |
| 1 | C10 | 4.7nF | Ceramic Cap., 16V, X7R | 0805 | muRata | GRM216R71H472K |
| 1 | D1 | 3A | Schottky Diode, SMD, 40V, 3A | SMA | ON Semiconductor | MBRA340T3GOSCT |
| 1 | D2 | 12V | Diode, SMD, | SOD-123 | Central Sem. | CMHZ5242B |
| 1 | L1 | 12uH | DS85LC Inductor, 2.3A/60mΩ | SMD | TOKO | B1000AS-120M |
| 1 | R1 | 300kΩ | Film Res., 1% | 0805 | Yageo | RT0805DRE07300KL |
| 1 | R2 | 57.6KΩ | Film Res., 1% | 0805 | Yageo | RT0805FRE0757K6L |
| 1 | R3 | 1kΩ | Film Res., 1% | 0805 | Yageo | RT0805FRE071KL |
| 3 | R4,R6,R8 | 20kΩ | Film Res., 1% | 0805 | Yageo | RT0805FRE0720KL |
| 1 | R5 | 100kΩ | Film Res., 5% | 0805 | Yageo | RC0805JR-07100KL |
| | R7 | NS | | 0805 | | |
| 1 | U1 | | Step-Down Converter | SOIC-16 | MPS | MP2495DS |

PRINTED CIRCUIT BOARD LAYOUT

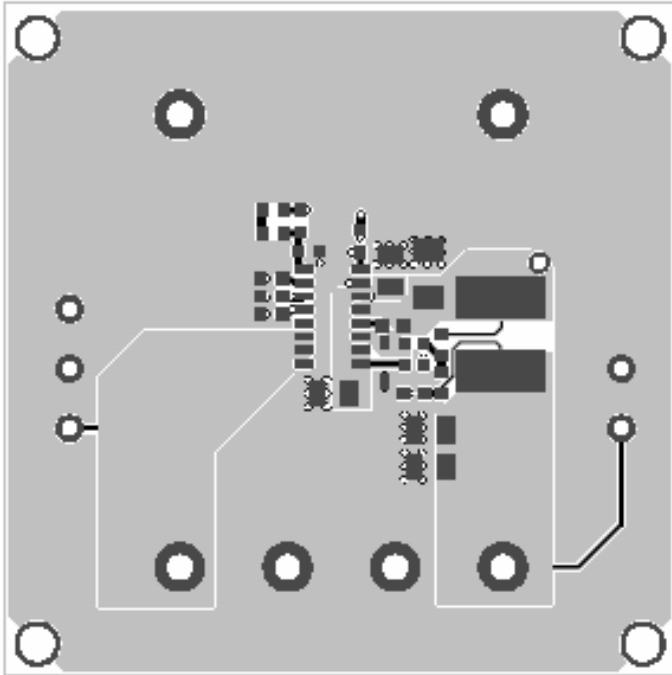


Figure 1—Top Silk Layer

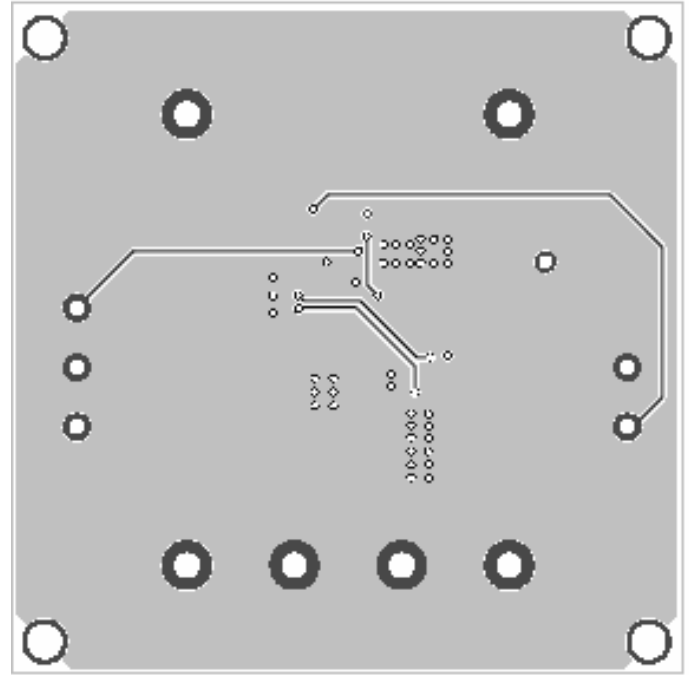
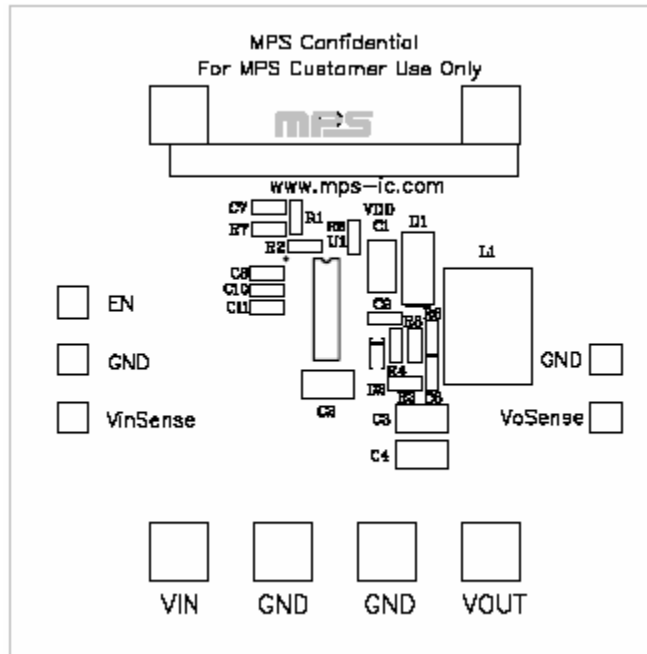


Figure 2—Top Layer

Figure 3—Bottom Layer



QUICK START GUIDE

1. The output voltage of this board is set to 5V. 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 (12V) and input ground to the IN and GND pins, respectively.
4. The MP2495 will startup automatically without applying an external voltage to the EN pin. The output voltage V_{OUT} can be changed by varying R2. Calculate the new value using the formula:

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

Where $V_{FB} = 0.8V$ and $R1 = 300k\Omega$.

For example, for $V_{OUT} = 5V$:

$$R2 = R1 \times V_{FB} / (V_{OUT} - V_{FB}) = 300K\Omega \times (0.8/5-0.8) = 57.1K\Omega$$

For the closest standard 1% value.

5. The output current limit is set as:

$$I_{OUT} = \frac{100mV}{DCR} \times \frac{R6 + R3}{R3}$$

For DCR current sense, it is desirable to keep:

$$\frac{R6 \times R3}{R6 + R3} \times C6 = \frac{L1}{DCR}$$

DCR is the DC resistance of the inductor winding.

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