

DESCRIPTION

The EV2372DN-00B is an evaluation board for the MP2372, a monolithic DC/DC step-down regulator.

It features a wide supply range of 5V to 28V and a continuous output current up to 3A. The output voltage is set to 3.3V, but can be easily adjusted to other levels from 0.92V. A 925KHz high switching frequency allows the use of small, low cost capacitors and inductors.

Current mode control and an integrated power MOSFET minimize component count, board area, and solution cost. Fault condition protection includes cycle-by-cycle current limit. And internal soft-start reduces the turn-on stress.

The small but thermally enhanced 8-pin SOIC package minimizes board area and provides excellent thermal management.

ELECTRICAL SPECIFICATION

| Parameter | Symbol | Value | Units |
|----------------|-----------|--------|-------|
| Input Voltage | V_{IN} | 5 – 28 | V |
| Output Voltage | V_{OUT} | 3.3 | V |
| Output Current | I_{OUT} | 3 | A |

FEATURES

- Up to 3A Output Current
- Wide 5V to 28V Operating Input Range
- Fixed 925KHz Frequency
- All Ceramic Input and Output Capacitors
- Programmable Soft-Start
- Fully Assembled and Tested

APPLICATIONS

- Distributed Power Systems
- Pre-Regulator for Linear Regulation
- Audio Systems

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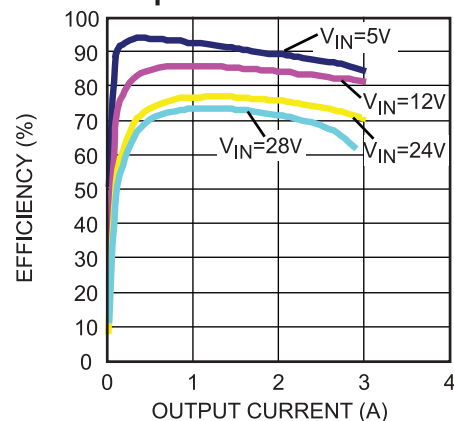
EV2372DN-00B EVALUATION BOARD

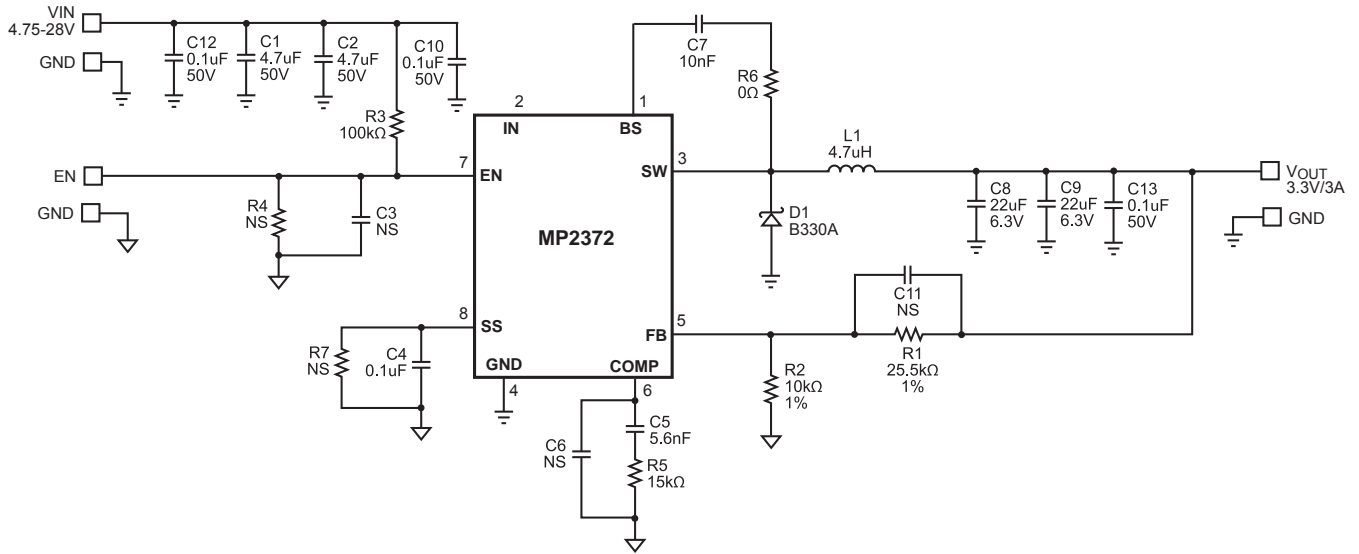


(L x W) 2.0" x 1.9"
(6.3cm x 6.3)

| Board Number | MPS IC Number |
|--------------|---------------|
| EV2372DN-00B | MP2372DN |

Efficiency vs. Output Current



EVALUATION BOARD SCHEMATIC

EV2372DN-00B BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Vendor | Manufacturer P/N |
|-----|---------------|--------|------------------------------|---------|------------|---------------------|
| 2 | C1, C2 | 4.7uF | Ceramic Capacitor, 50V, X7R | 1210 | Murata | GRM32ER71H475KA88L |
| 3 | C3, C6, C11 | NS | | | | |
| 1 | C4 | 0.1uF | Ceramic Capacitor, 25V, X7R | 0603 | TDK | C1608X7R1E104K |
| 1 | C5 | 5.6nF | Ceramic Capacitor, 50V, X7R | 0603 | Panasonic | ECJ-1VB1H562K |
| 1 | C7 | 10nF | Ceramic Capacitor, 50V, X7R | 0603 | TDK | C1608X7R1H103K |
| 2 | C8, C9 | 22uF | Ceramic Capacitor, 6.3V, X5R | 1210 | TDK | C3225X5R0J226M |
| 3 | C10, C12, C13 | 0.1uF | Ceramic Capacitor, 50V, X7R | 0805 | TDK | C2012X7R1H104K |
| 1 | R1 | 25.5kΩ | Fim Res., 1% | 0603 | Panasonic | ERJ-3EKF2552V |
| 1 | R2 | 10kΩ | Fim Res., 1% | 0603 | Panasonic | ERJ-3EKF10002V |
| 1 | R3 | 100kΩ | Fim Res., 5% | 0603 | Panasonic | ERJ-3GEYJ104V |
| 2 | R4, R7 | NS | | | | |
| 1 | R5 | 15kΩ | Fim Res., 5% | 0603 | Panasonic | ERJ-3GEYJ153V |
| 1 | R6 | 0Ω | Fim Res., 5% | 0603 | Panasonic | ERJ-3GEYJ0R00V |
| 1 | D1 | | Schottky Diode, 30V, 3A | SMB | Diodes Inc | B330B-13-F |
| 1 | L1 | 4.7uH | Inductor, 3.8A | SMD | TOKO | DS84LC-B1015AS-4R7N |
| | | 4.7uH | Inductor, 3.78A | SMD | COPPER | DR73-4R7-R |
| | | 4.7uH | Inductor, 4.1 A | SMD | Sumida | CDRH8D43-4R7NC |
| 1 | U1 | | DC-DC Converter | SO-8 | MPS | MP2372DN |

PRINTED CIRCUIT BOARD LAYOUT

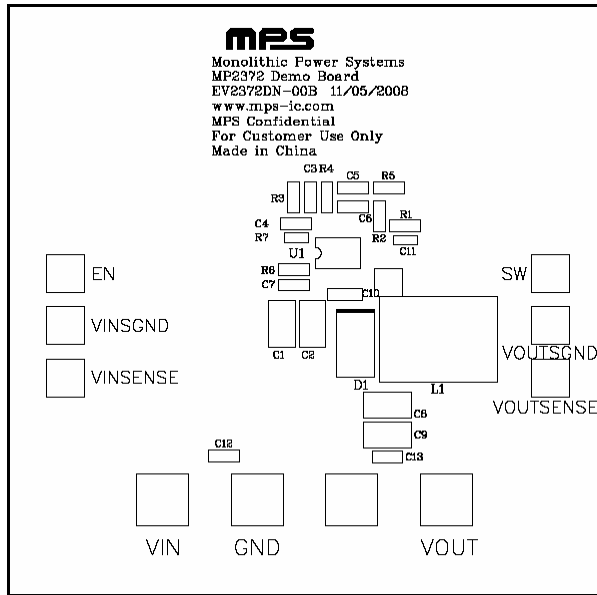


Figure 1—Top Silk Layer

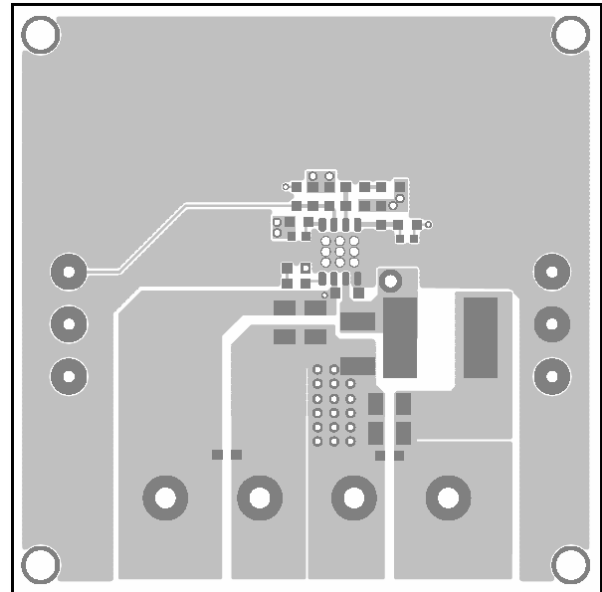


Figure 2—Top Layer

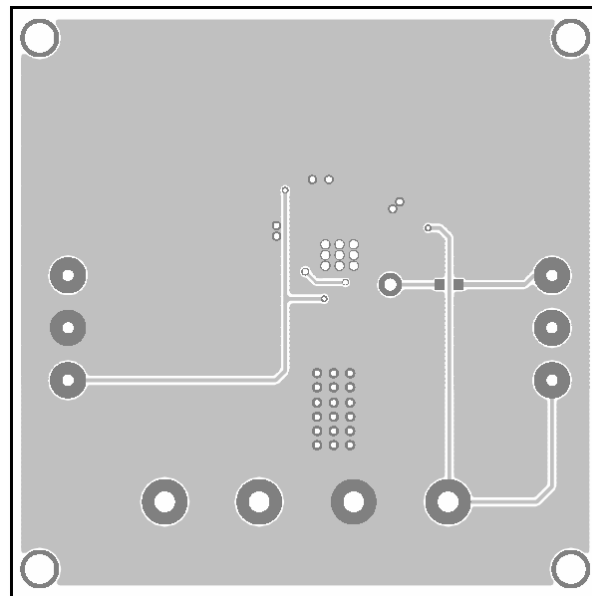


Figure 3— Bottom Layer

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 VOUT and GND pins, respectively.
2. Connect the input voltage ($5V \leq V_{IN} \leq 28V$) and input ground to the VIN and GND pins, respectively.
3. Turn the supply on. The MP2372 will automatically start-up.
4. To use the Enable function, apply a digital input to EN pin. Drive EN higher than 2.6V drive EN less than 1.4V to turn it off.
5. The output voltage V_{OUT} can be programmed by varying R1. Calculate the new value using the formula:

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

Where $V_{FB} = 0.92V$ and $R3 = 10k\Omega$.

For example, for $V_{OUT} = 3.3V$:

$$R1 = R3 \times \left(\frac{V_O}{V_{FB}} - 1 \right) = 10k\Omega \times \left(\frac{3.3}{0.92} - 1 \right) = 25.86k\Omega$$

Then, the closest standard 1% value resistor can be used.

6. For 5V input voltage, the MP2372 can't output 3.3V/3A because of the little charge time of the bootstrap capacitor. An external charge circuit can be a solution as shown in Figure 4. D1 integrates two diodes in SOT-523 package such as BAV199T which will not increase the space of the PCB and the cost. The additional capacitor C1 can be only 10nF.

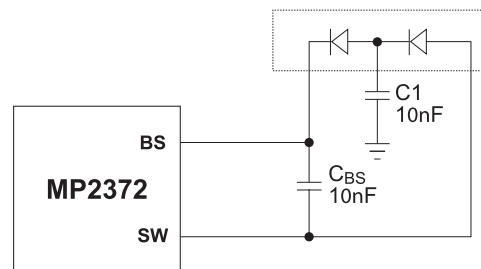


Figure 4— External Bootstrap Diode Circuit

The highest efficiency of MP2372 with the external charge circuit can reach 93.8% when $V_{IN}=5V$ as the efficiency curve shown.

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