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EV2305SDS-00A

4.75V to 23V IN, 2A OUT
Synchronous Buck Converter

DESCRIPTION

The EV2305SDS-00A is the evaluation board of MPS' MP2305S synchronous buck converter, which has a wide supply range from 4.75V to 23V and a continuous output current up to 2A. The output voltage is preset to 3.3V, but can be easily adjusted to other levels from 0.923V. Soft-start can be programmed through SS capacitor to reduce turn-on stress

The MP2305S features synchronous rectification for high efficiency with integrated high-side and low-side power MOSFETs. Current mode control and integrated power MOSFETs minimize component counts, board area, and solution cost. Fault condition protections include cycle-by-cycle current limiting, thermal shutdown and under-voltage lockout. Small SO-8 package minimizes board area.

FEATURES

- Up to 2A Output Current
- Wide 4.75V to 23V Operating Input Range
- All Ceramic Input and Output Capacitors
- Programmable Soft-Start
- Programmable Input Under Voltage Lockout

APPLICATIONS

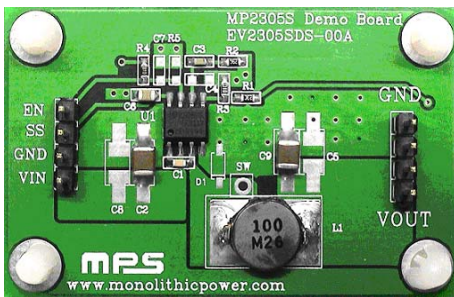
- Distributed Power Systems
- Networking Systems
- FPGA, DSP, ASIC Power Supplies
- Green Electronics/ Appliances
- Notebook Computers

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ELECTRICAL SPECIFICATIONS

| Parameter | Symbol | Value | Units |
|----------------|-----------|------------|-------|
| Supply Voltage | V_{IN} | 4.75 to 23 | V |
| Output Voltage | V_{OUT} | 3.3 | V |
| Output Current | I_{OUT} | 0 to 2 | A |

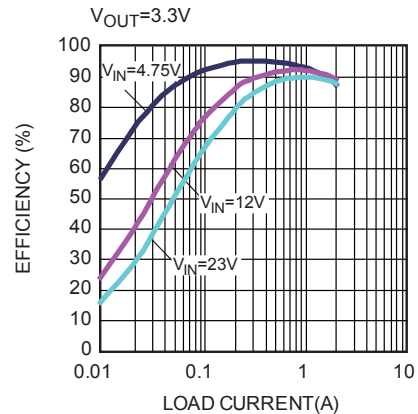
EV2305SDS-00A EVALUATION BOARD



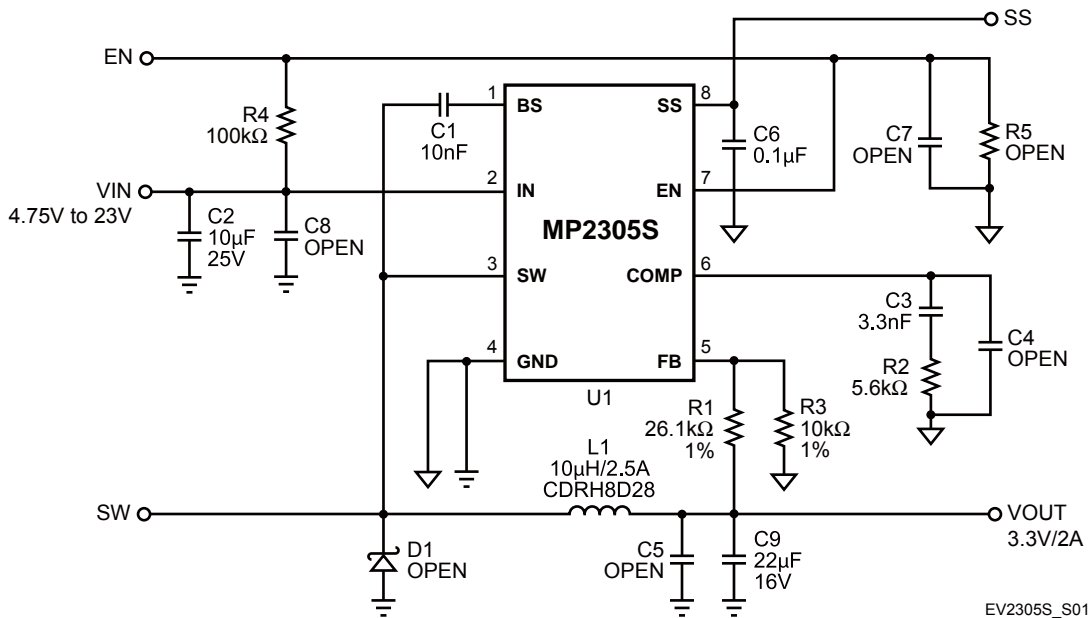
(L x W x H) 2.0" x 1.5" x 0.5"
(5.0cm x 3.8cm x 1.2cm)

| Board Number | MPS IC Number |
|---------------|---------------|
| EV2305SDS-00A | MP2305SDS |

Efficiency vs. Load Current



EVALUATION BOARD SCHEMATIC



EV2305S_S01

EV2305SDS-00A BILL OF MATERIALS

| Item | Qty | Ref | Value | Description | Package | Manufacturer | Part Number |
|------|-----|------------------|--------|-----------------------|---------|--------------|----------------|
| 1 | 1 | C1 | 10nF | Ceramic Cap, 50V, X7R | SM0805 | AVX | 08055C103KAT2A |
| 2 | 1 | C2 | 10µF | Ceramic Cap, 25V, X5R | SM1210 | AVX | 12103D106KAT2A |
| 3 | 1 | C3 | 3.3nF | Ceramic Cap, 50V, X7R | SM0805 | AVX | 08055C332KAT2A |
| 4 | 0 | C4, C5 C7, C8 | OPEN | Not Stuffed | | | |
| 5 | 1 | C6 | 0.1µF | Ceramic Cap, 50V, X7R | SM0805 | AVX | 08055C104KAT2A |
| 6 | 1 | C9 | 22µF | Ceramic Cap, 16V, X5R | SM1210 | AVX | 1210YD226KAT2A |
| 7 | 0 | D1 | | Do Not Stuff | | | |
| 8 | 1 | L1 | 10µH | Inductor, 2.5A | SMD | Sumida | CDRH8D28 |
| 9 | 1 | R1 | 26.1kΩ | Resistor, 1% | SM0805 | Panasonic | ERJ-6ENF2612V |
| 10 | 1 | R2 | 5.6kΩ | Resistor, 5% | SM0805 | Panasonic | ERJ-6GEYJ562V |
| 11 | 1 | R3 | 10kΩ | Resistor, 1% | SM0805 | Panasonic | ERJ-6ENF1002V |
| 12 | 1 | R4 | 100kΩ | Resistor, 5% | SM0805 | Panasonic | ERJ-6GEYJ104V |
| 13 | 0 | R5 | OPEN | Not Stuffed | SM0805 | | |
| 14 | 1 | U1 | | DC-DC Converter | SO8 | MPS | MP2305SDS |

PRINTED CIRCUIT BOARD LAYOUT

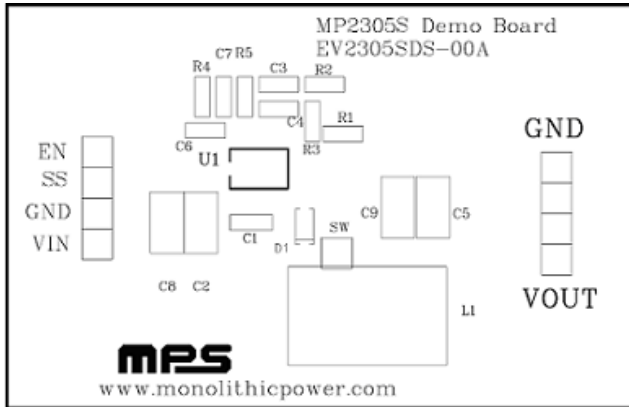


Figure 1—Top Silk Layer

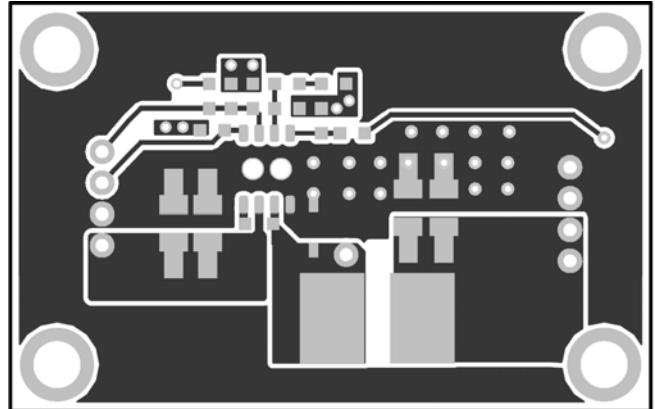


Figure 2—Top Layer

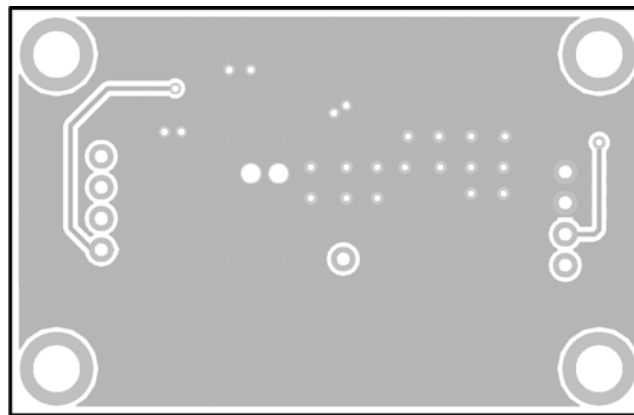


Figure 3—Bottom Layer

QUICK START GUIDE

1. Connect the positive terminals of the load to the VOUT pins and the negative terminals to the GND pins.
2. Preset the power supply output to 4.75V to 23V and turn it off.
3. Connect the positive terminal of the power supply output to the VIN pin and the negative terminal to the GND pin
4. Turn on the power supply; the MP2305S will automatically startup.
5. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 2.5V to turn on the regulator or less than 0.7V to turn it off.
6. An under voltage lockout (UVLO) function can be implemented by the addition of a resistor divider (R4 and R5). The EN threshold is 2.5V, so VIN UVLO threshold is: $\left(1 + \frac{R4}{R5}\right) \times 2.5V$.

RECOMMENDED COMPONENTS FOR STANDARD OUTPUT VOLTAGES

The output voltage of this board is set to 3.3V. This board is laid out to accommodate most commonly used inductors and output capacitors and to also be programmed for most standard output voltages. The following table lists recommended components for some standard output voltages. Listed compensation components (R2, C3) values are based on the output capacitor installed on this board. For other capacitors, refer to the Application Information section of the MP2305S datasheet.

| V _{OUT} | L1 | R1 | R2 | C3 |
|------------------|-------|--------|-------|-------|
| 1.8V | 6.8uH | 9.53kΩ | 3.3kΩ | 5.6nF |
| 3.3V | 10μH | 26.1kΩ | 5.6kΩ | 3.3nF |
| 5.0V | 15μH | 44.2kΩ | 10kΩ | 2.2nF |
| 12.0V | 22μH | 120kΩ | 15kΩ | 1.0nF |

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