

DESCRIPTION

The MP5023 is a hot-swap protection device designed to protect circuitry on its output from transients on its input. The MP5023 also protects its input from undesired shorts and transients coming from its output.

During start-up, inrush current is limited by the slew rate at the output. The slew rate is controlled by the external capacitor at SS.

The maximum load at the output is current-limited through on-die current sense technology. The magnitude of the current limit is controlled by a low-power resistor from ISET to ground.

An internal charge pump drives the gate of the power device, allowing for a power MOSFET with a very low on resistance of 1.1mΩ.

The MP5023 includes an IMON option that produces a voltage proportional to the current through the power device set by a resistor from IMON to ground.

The PMBus™ interface allows the MP5023 to read current, voltage, temperature data, and input power from the internal ADC.

The MP5023 includes an optional discharge function through the PMBus™ that provides a discharge path for the external output capacitor when the part is disabled.

Fault protection includes current limiting, thermal shutdown, and damaged MOSFET detection. Both current limit and thermal shutdown have auto-retry and latch-off modes via the PMBus™ interface that can be set by the user. The MP5023 also features over-voltage protection (OVP) and under-voltage protection (UVP).

The MP5023 is available in a small FCQFN-24 package (4mmx5mm).

ELECTRICAL SPECIFICATION

| Parameter | Value | Units |
|----------------|-------|-------|
| Input Voltage | 12 | V |
| Output Voltage | 12 | V |
| Current limit | 50 | A |

FEATURES

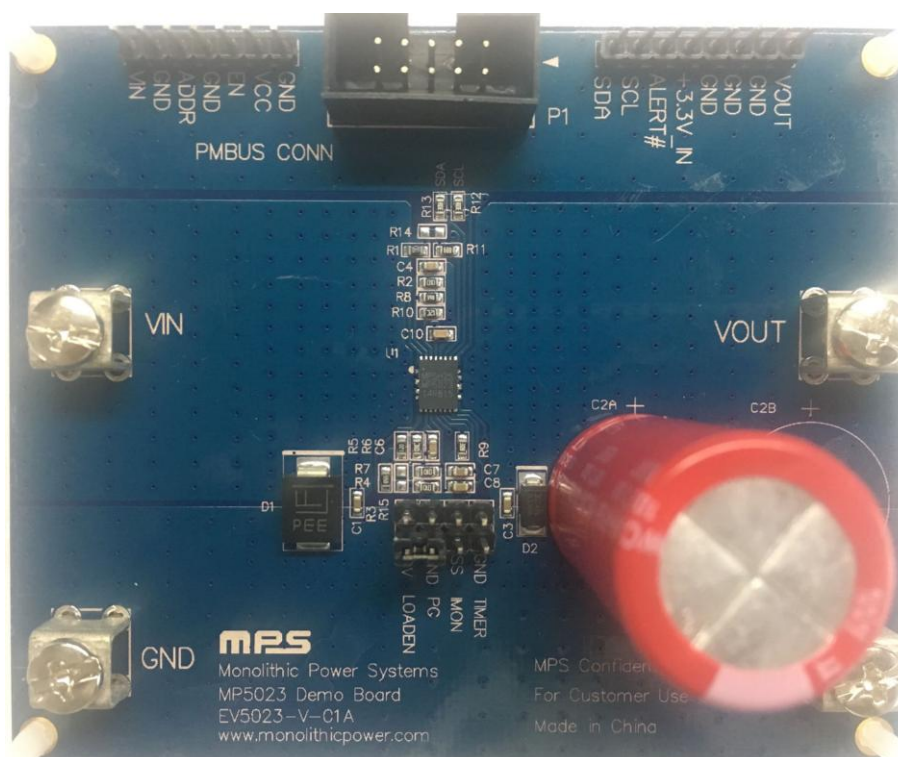
- Input Voltage Range: 4V to 16V
- Integrated 1.1mΩ Power MOSFET
- Maximum 50A Output Current
- Adjustable Current Limit
- Output Current Measurement
- Fast Response (<200ns) for Short Protection
- PG Detector and Indication
- PG Asserts Low at VIN = 0
- Damaged MOSFET Detection
- External Soft Start (SS)
- PMBus™ 1.3 Compliant
- Configurable Over-Voltage Lockout with Hysteresis
- Real-Time Monitoring of VIN, VOUT, IOUT, and Temperature by PMBus™
- Auto-Retry or Latch-Off Mode in Over-Current Protection (OCP) through the PMBus™
- Programmable Start-Up Current Limit
- Thermal Protection
- Available in a FCQFN-24 (4mmx5mm) Package

APPLICATIONS

- Hot Swaps
- PC Cards
- Disk Drives
- Servers
- Networking
- Laptops

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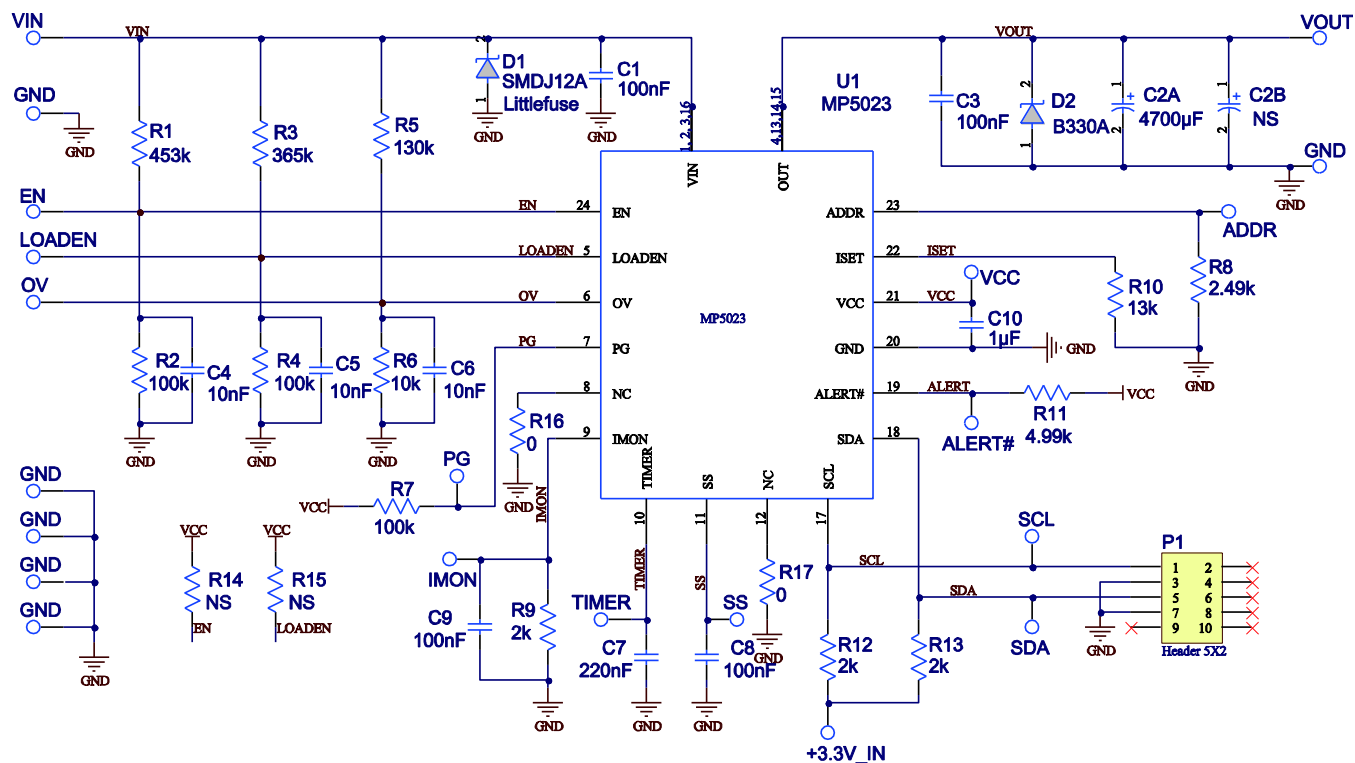
EV5023-V-01A EVALUATION BOARD



(L x W x H) 9.37cm x 7.57cm x 1.7mm

| Board Number | MPS IC Number |
|--------------|---------------|
| EV5023-V-01A | MP5023GV |

EVALUATION BOARD SCHEMATIC



EV5023-V-01A BILL OF MATERIALS

| Qty | Designator | Value© | Description | Package | Manufacturer | Part Number© |
|-----|---|--------------|----------------------------|----------------|--------------|--------------------------|
| 4 | C1, C3, C8, C9 | 100nF | Ceramic Capacitor;50V;X7R; | 0603 | Murata | GRM188R71H104KA93D |
| 1 | C2A | 4700μF | Electrolytic Cap, 35V | DIP | Wurth | 860020581026(4700uF/35V) |
| 1 | C2B | NS | | | | |
| 3 | C4, C5, C6 | 10nF | Ceramic Capacitor;50V;X7R; | 0603 | Murata | GRM188R71H103KA01D |
| 1 | C7 | 220nF | Ceramic Capacitor;6.3;X7R; | 0603 | Murata | GRM188R70J224KA88D |
| 1 | C10 | 1μF | Ceramic Capacitor;10V;X7R | 0603 | muRata | GRM188R71A105KA61D |
| 1 | D1 | SMDJ12A | SCHOTTKY/SMA | DO-214AB | Littlefuse | 'SMDJ12A |
| 1 | D2 | B330A | Schottky Diode | SMA | Diodes | B330A |
| 1 | R1 | 453k | Film Res., 1% | 0603 | Yageo | RC0603FR-07453KL |
| 1 | R3 | 365k | Film Res., 1% | 0603 | Yageo | RC0603FR-07365KL |
| 3 | R2, R4, R7 | 100k | Film Res., 1% | 0603 | Yageo | RC0603FR-07100KL |
| 1 | R5 | 130k | Film Res., 1% | 0603 | Yageo | RC0603FR-07130KL |
| 1 | R8 | 2.49k | Film Res., 1% | 0603 | Yageo | RC0603FR-072K49L |
| 1 | R6 | 10k | Film Res., 1% | 0603 | Yageo | RC0603FR-0710KL |
| 3 | R9, R12, R13 | 2k | Film Res., 1% | 0603 | Yageo | RC0603FR-072KL |
| 1 | R10 | 13k | Film Res., 1% | 0603 | Yageo | RC0603FR-0713K5L |
| 1 | R11 | 4.99k | Film Res., 1% | 0603 | Yageo | RC0603FR-074K99L |
| 2 | R14,R15 | NS | | | | |
| 2 | R16,R17 | 0 | Film Res., 5% | 0603 | Yageo | RC0603JR-070RL |
| 23 | ADDR, ALERT#, EN, IMON, LOADEN, OV, PG, SCL, SDA, SS, TIMER, VCC, VIN, VOUT, GND(*8pcs), +3.3V_IN | TP | Test point | | | 1*40 180 度 2.54mm 排针 |
| 4 | VIN, VOUT, GND, GND | KEYSTONE7701 | Connector | KEYSTONE E7701 | Keystone | KEYSTONE7701 |
| 1 | P1 | 2*5connector | Header, 5-Pin, Dual row | | | 2*5 2.54mm 带边框插座 |
| 1 | U1 | MP5023GV-R5 | HOT-SWAP WITH PMBUS | FCQFN24 | MPS | MP5023GV-R5 |

PRINTED CIRCUIT BOARD LAYOUT

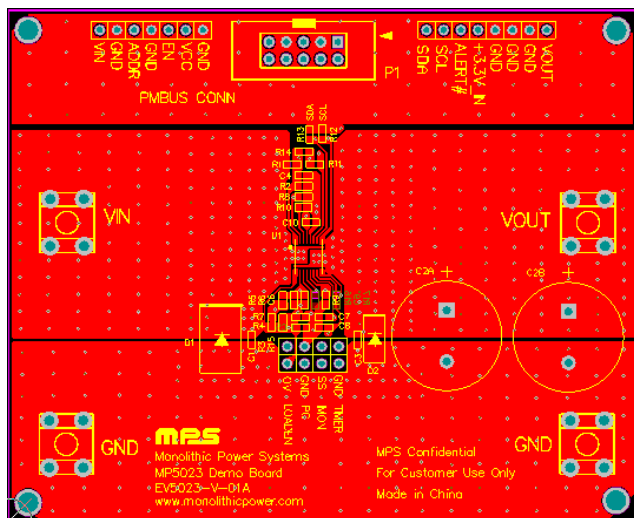


Figure 1—Top Layer

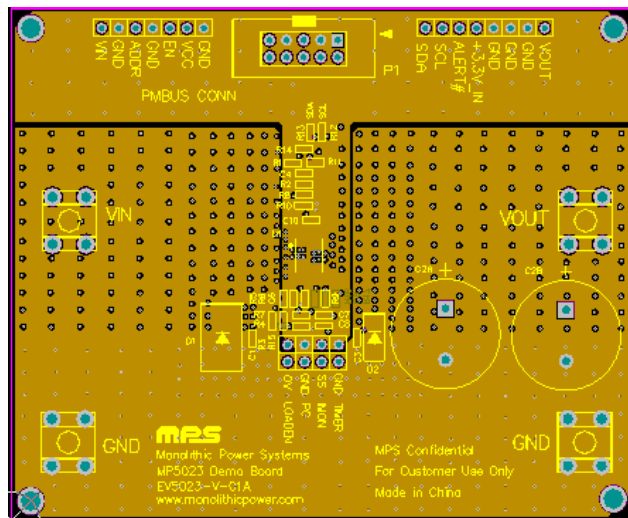


Figure 2—Inner Layer1

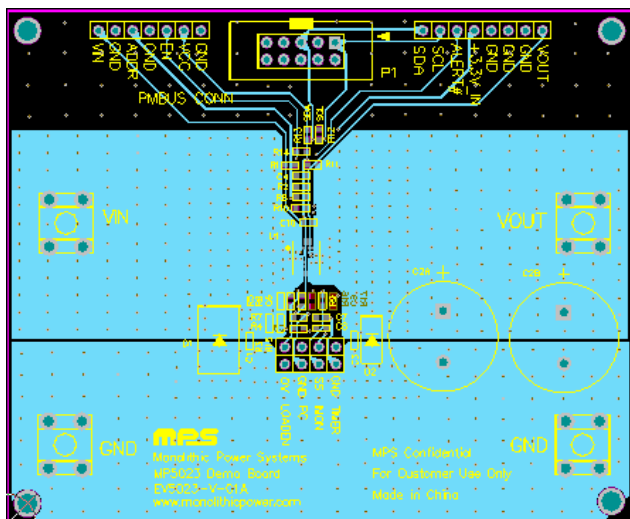


Figure 3—Inner Layer2

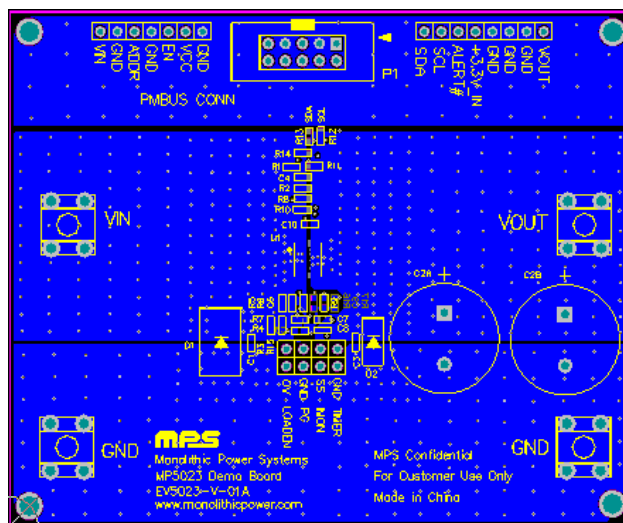


Figure 4—Bottom Layer

QUICK START GUIDE

1. Attach the positive and negative terminals of the load to the VOUT and GND terminals on demo board, respectively.
2. Preset the power supply output to be 12V, and then turn off the power supply.
3. Attach the positive and negative terminals of the power supply to the VIN and GND terminals on demo board, respectively.
4. Turn on the VIN power supply.

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