

DESCRIPTION

The EV5087-G-00B is an evaluation board for the MP5087, a low $R_{DS(on)}$ load switch with current monitoring

The MP5087 is a load switch, designed to provide 7A load protection covering 0.5V to 5.5V voltage range. With low $R_{DS(on)}$ in tiny package, the MP5087 provides very high efficiency and space-saving solution for notebook, tablet and other portable applications.

The MP5087 is equipped with the very accurate current monitoring function. The gain of the current monitor can be scaled to different applications. With the soft start function, the MP5087 can avoid inrush current during circuit start-up. The MP5087 also provides other features, like power good, output discharge function, and fast short-circuit response time.

The EV board can deliver a continuous 7A load current over 0.8V to 5.5V operating input range.

ELECTRICAL SPECIFICATION

| Parameter | Symbol | Value | Units |
|------------------------------|-----------|---------|-------|
| Input Voltage ⁽¹⁾ | V_{IN} | 0.8-5.5 | V |
| Vcc Voltage | V_{CC} | 3-5.5 | V |
| Output Current | I_{OUT} | 7 | A |

Note:

1) For specifications of lower voltage, please contact factory.

FEATURES

- Output Current Monitoring Accurate as High as 3%
- Wide V_{IN} Range: 0.5V to 5.5V
- <1uA Shutdown Current
- Integrated 10mΩ Low $R_{DS(on)}$ FET
- Typical 7A Load Current Range
- Push-pull PG Indicator
- Adjustable Start Up Slew Rate
- Output Discharge Function
- <200ns Short-Circuit Response Protection
- Thermal Protection
- Small 2mmx2mm QFN Package

APPLICATIONS

- Notebook and Tablet Computers
- Portable Devices
- Solid State Drives
- Handheld Devices

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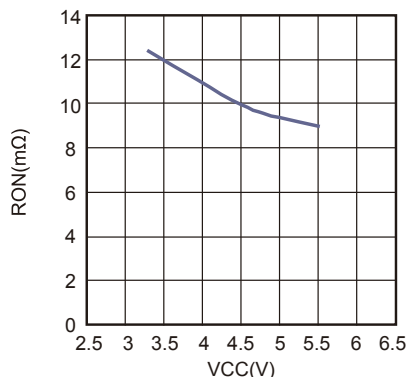
EV5087-G-00B EVALUATION BOARD



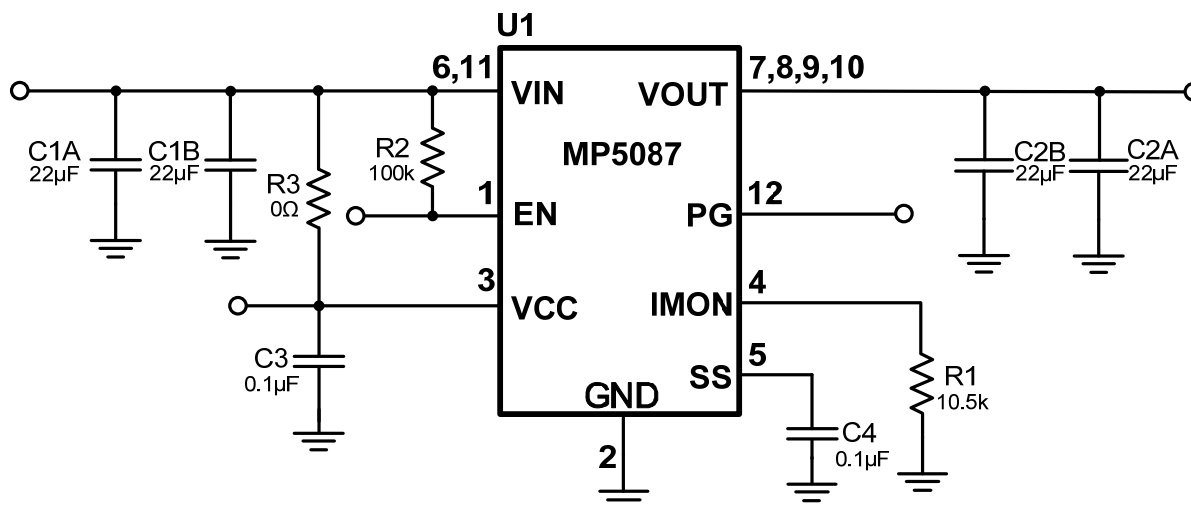
(L x W x H) 6.4cm x 6.4cm x 1.3cm

| Board Number | MPS IC Number |
|--------------|---------------|
| EV5087-G-00B | MP5087GG |

Rds_on vs. Vcc



EVALUATION BOARD SCHEMATIC



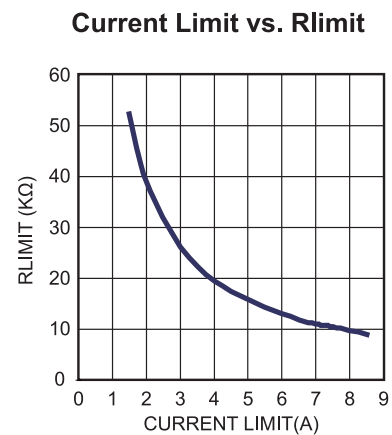
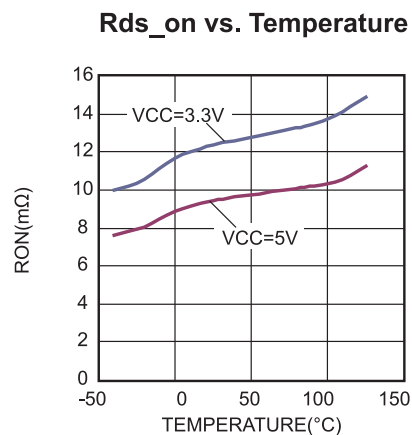
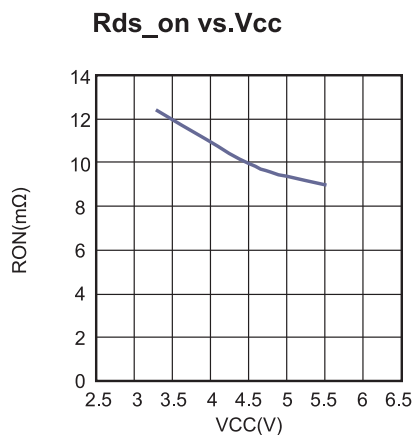
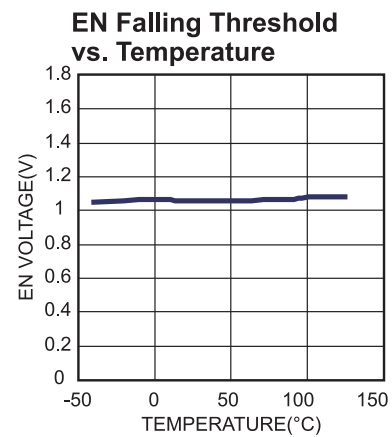
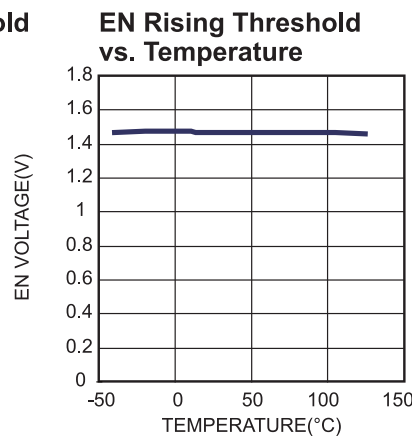
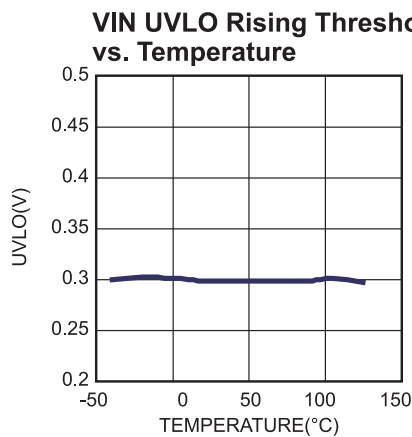
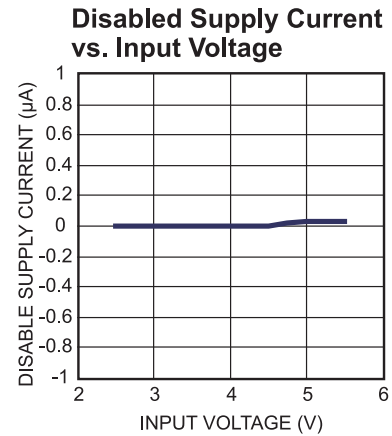
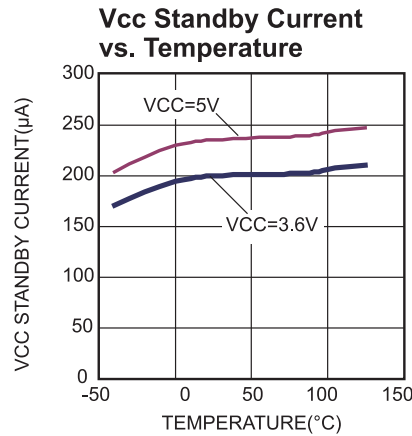
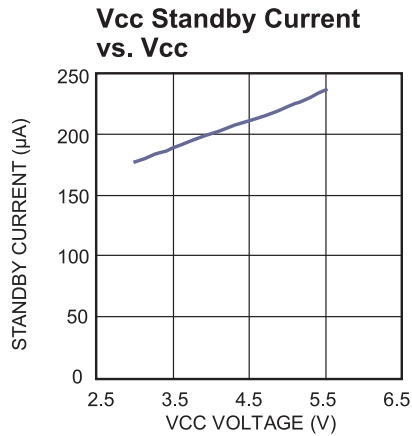
EV5087-G-00B BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer P/N |
|-----|---------------------|--------|------------------------|----------------|--------------|--------------------|
| 1 | R1 | 10.5kΩ | Film Res,1% | 0603 | ROYAL | RL0603FR-0710K5L |
| 1 | R2 | 100kΩ | Film Res,1% | 0603 | ROYAL | RL0603FR-07100KL |
| 1 | R3 | 0Ω | Film Res,1% | 0603 | ROYAL | RC0603FR-070RL |
| 4 | C1A,C1B, C2A,C2B | 22µF | Ceramic Cap,10V,X5R | 0805 | muRata | GRM21BR61A226ME51L |
| 2 | C3,C4 | 0.1µF | Ceramic Cap,16V,X7R | 0603 | muRata | GRM188R71C104KA01D |
| 1 | U1 | MP5087 | 7A Load Switch | QFN 2mmx2mm | MPS | MP5087GG |

EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.

$V_{IN} = 3.6V$, $V_{CC} = 3.6V$, $EN=2.5V$, $R_{IMON} = 10.5k$, $T_A = 25^{\circ}C$, unless otherwise noted.

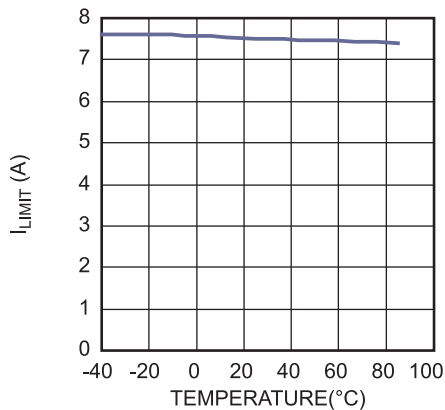


EVB TEST RESULTS *(continued)*

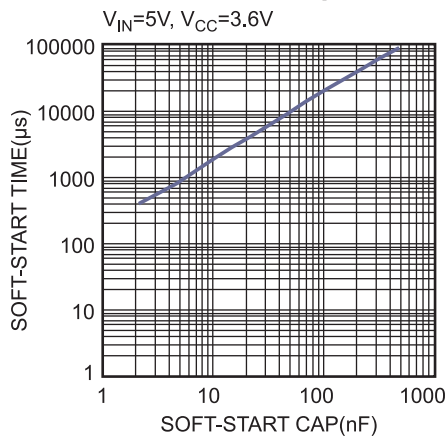
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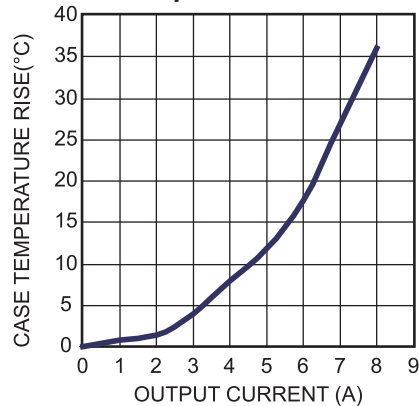
I_{LIMIT} vs. Temperature



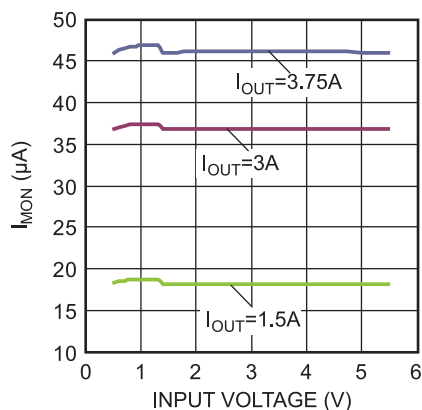
Soft-Start vs. Cap



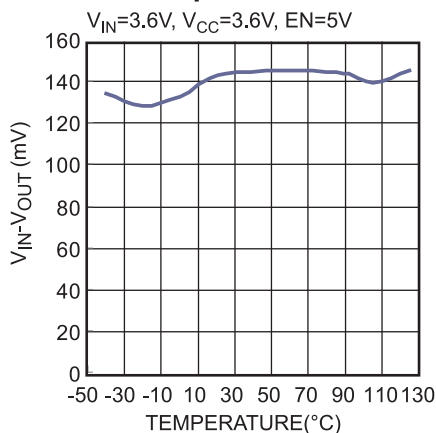
Case Temperature Rise vs. Output Current



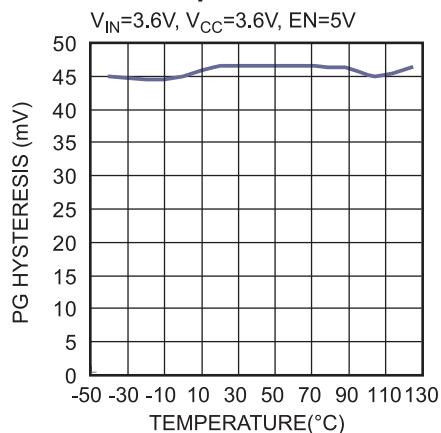
I_{MON} vs. V_{IN}



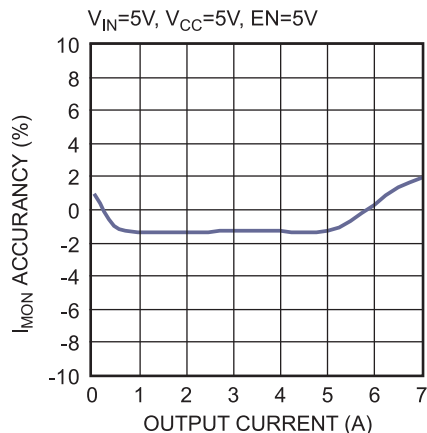
PG Rising Threshold vs. Temperature



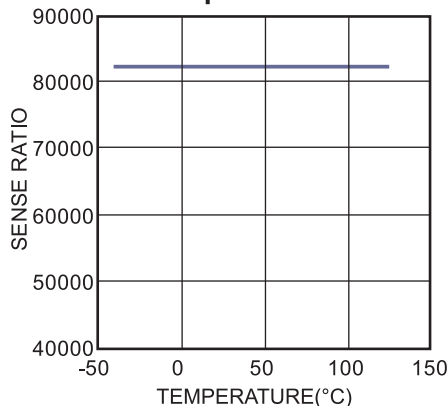
PG Hysteresis vs. Temperature



I_{MON} Accuracy vs. I_{OUT}



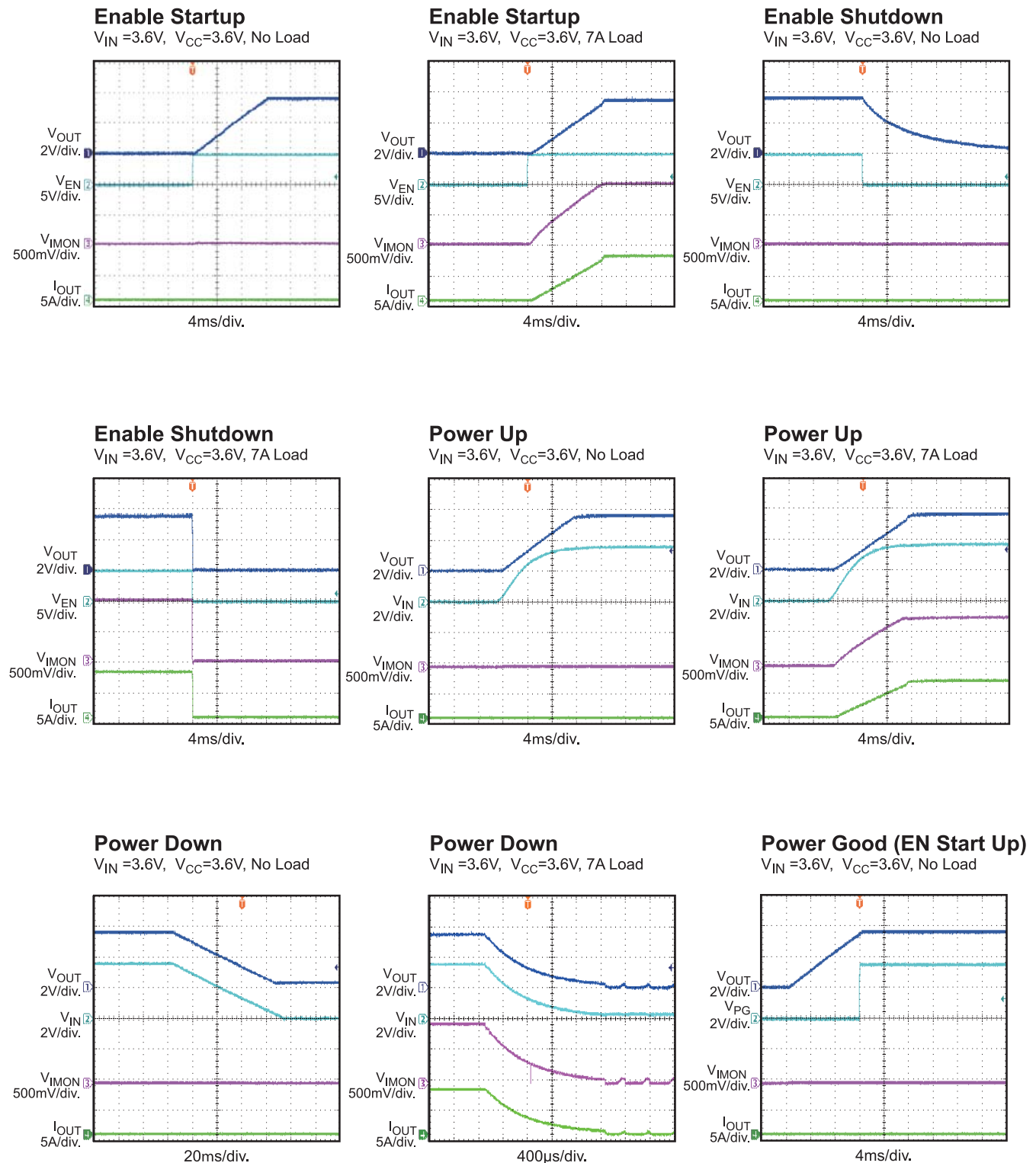
Sense Ratio vs. Temperature



EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.

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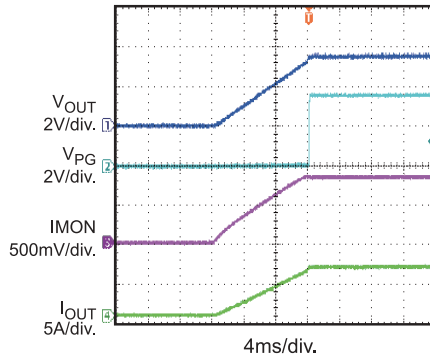
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.

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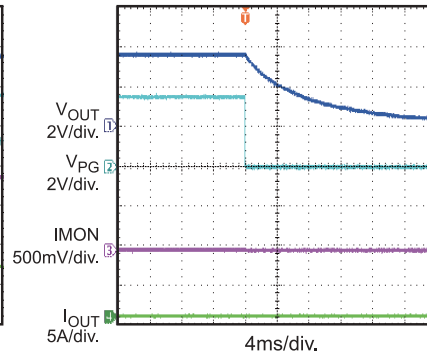
Power Good (EN Start Up)

$V_{IN}=3.6V$, $V_{CC}=3.6V$, 7A Load



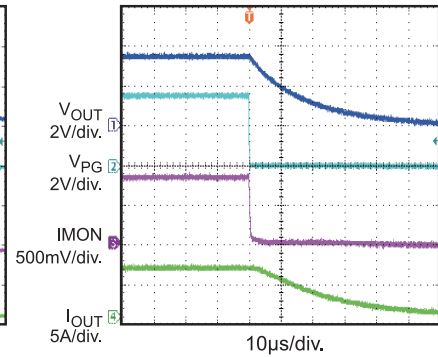
Power Good(EN Shutdown)

$V_{IN}=3.6V$, $V_{CC}=3.6V$, No Load



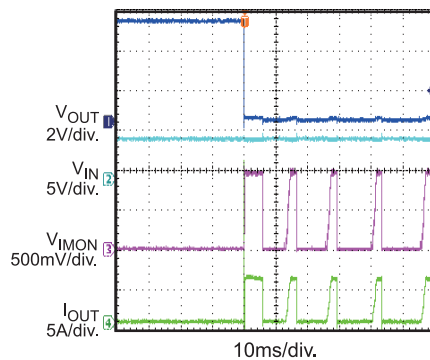
Power Good(EN Shutdown)

$V_{IN}=3.6V$, $V_{CC}=3.6V$, 7A Load



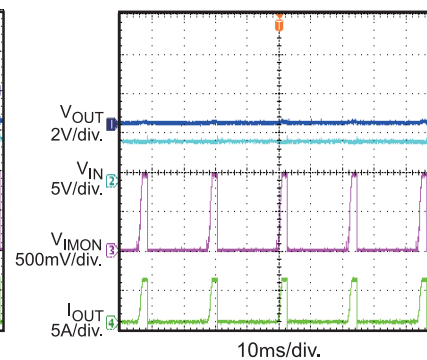
SCP Enter

$V_{IN}=5V$, $V_{CC}=3.3V$



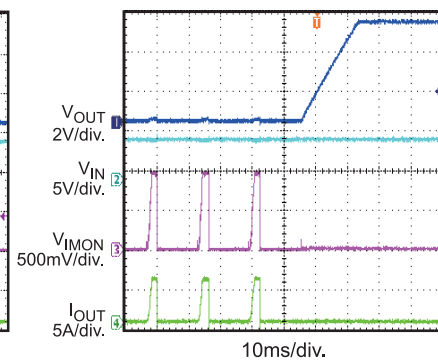
SCP Steady State

$V_{IN}=5V$, $V_{CC}=3.3V$



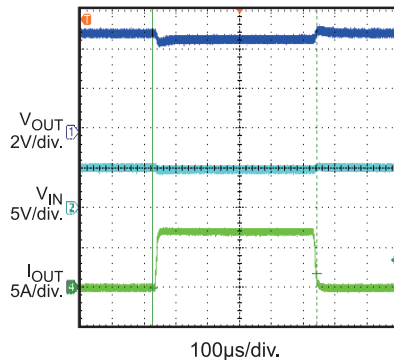
SCP Recover

$V_{IN}=5V$, $V_{CC}=3.3V$



Load Transient Response

$V_{IN}=5V$, $V_{CC}=3.3V$, $I_{OUT}=0A \rightarrow 7A$



PRINTED CIRCUIT BOARD LAYOUT

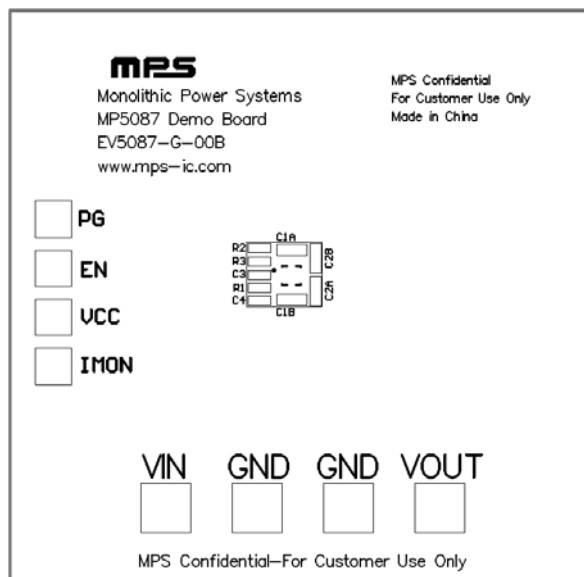


Figure1: Top Layer Silkscreen

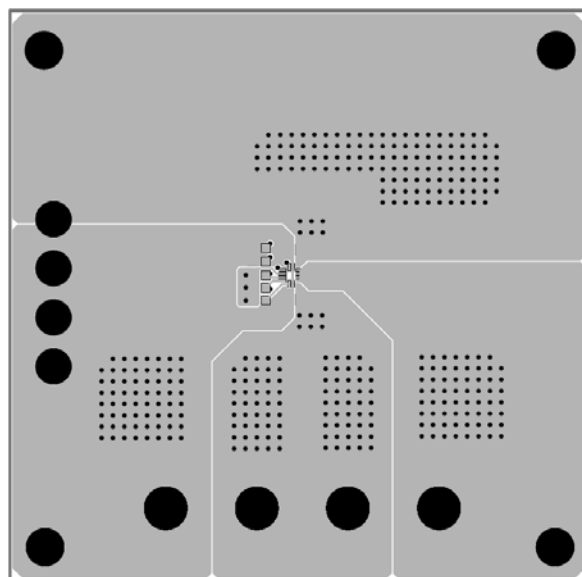


Figure2: Top Layer

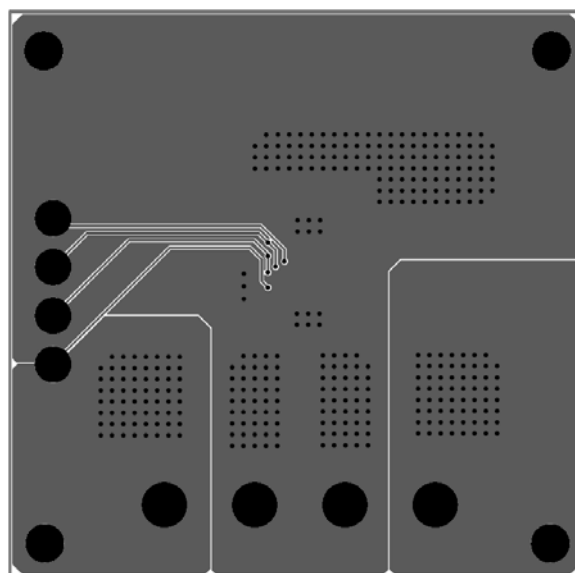


Figure3: Bottom Layer

QUICK START GUIDE

1. Connect the positive and negative terminals of the load to the V_{OUT} and GND pins, respectively.
2. Preset the power supply output between 0.8V and 5.5V, and then turn off the power supply.
3. Connect the positive and negative terminals of the power supply output to the V_{IN} and GND pins, respectively.
4. Turn the power supply on. The MP5087 will automatically startup.
5. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 1.5V to turn on the regulator or less than 1.3V to turn it off.
6. Use R1 to set the output current limit. C4 to set the SS time, Follow the Application Information section in the device datasheet to select appropriate R1, C4.

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