EV5036A-J-00A

5V, 0.4A-5A Current Limit Switch with Over Voltage Clamp

DESCRIPTION

The EV5036A-J-00A Evaluation Board is designed to demonstrate the capabilities of MPS' MP5036A, a protection device designed to protect circuitry on the output from transients on input. It also protects input from undesired shorts and transients coming from the output. MP5036A is a small R_{ON}, low quiescent current, current limited switch.

At startup, the inrush current is limited by limiting the slew rate at the output. The slew rate is controlled by a capacitor at the DV/DT pin.

The maximum load at the output is current limited. The magnitude of the current limit is controlled by an external resistor from ILIMIT to GND. There is a fixed 2.5A current limit when floating ILIMIT pin.

The output voltage is limited by the output over voltage protection (OVP) function.

The MP5036A is available in a space-saving 8 pin-TSOT23-6 package.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	5	V
Output Current	I_{OUT}	3	A

FEATURES

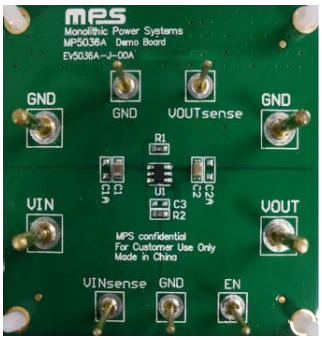
- Wide 2.9V to 5.5V Continued Operating Input Range
- 26V Absolute Maximum Transient Input Voltage
- Fixed 5.75V Over Voltage Clamp Threshold
- Fast Output OVP Response
- Integrated 43mΩ Power FET
- Adjustable Current-Limit or Fixed Current Limit when floating ILIMIT pin
- Soft Start Time Programmable through DV/DT pin
- Fast Response for Hard Short Protection
- OCP Hiccup Protection
- Thermal Shutdown and Auto Retry
- Available in TSOT23-6 Package

APPLICATIONS

- HDD, SSD
- Hot Swap
- Wireless Modem Data Cards
- PC Cards
- USB Power Distribution
- USB Protection
- USB3.1 Power Delivery

All MPS parts are lead-free, halogen free, and adhere to the RoHS directive. For MPS green status, please visit MPS website under Quality Assurance. "MPS" and "The Future of Analog IC Technology" are Registered Trademarks of Monolithic Power Systems, Inc.

EV5036A-J-00A EVALUATION BOARD



(L × W × H) 54mm x 46mm x 6.4mm

Board Number	MPS IC Number
EV5036A-J-00A	MP5036AGJ

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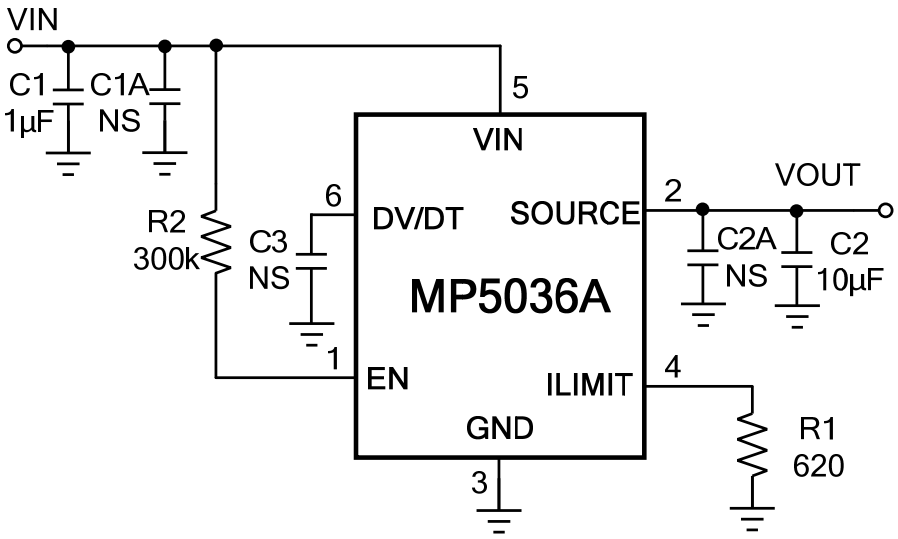
EVALUATION BOARD SCHEMATIC



EV5036A-J-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Part Number
1	C1	1µF	Ceramic Cap.,25V,X7R	0805	Murata	GRM21BR71E105KA99L
1	C2	10µF	Ceramic Cap.,25V,X5R	0805	Murata	GRM21BR61E106KA73L
0	C1A, C2A, C3	NS				
1	R1	620Ω	Thick Film Res., 1%	0603	Yageo	RC0603FR-07620RL
1	R2	300kΩ	Thick Film Res., 1%	0603	Yageo	RC0603FR-07300KL
1	U1	MP5036AGJ	Current limit switch	TSOT23-6	MPS	MP5036AGJ

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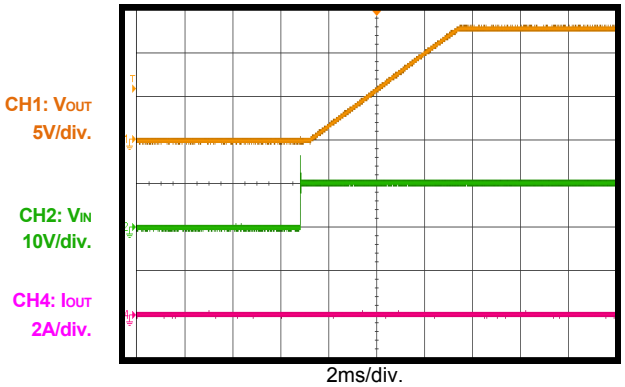
EVB TEST RESULTS

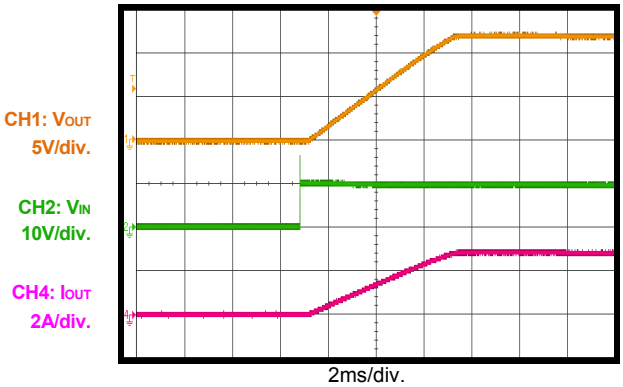
V_{IN}=5V, V_{EN}=5V, R_{LIMIT}=620Ω, DV/DT float, C_{OUT}=10μF, T_A=25°C, unless otherwise noted.

Start-Up through Input Voltage
I_{OUT}=0A



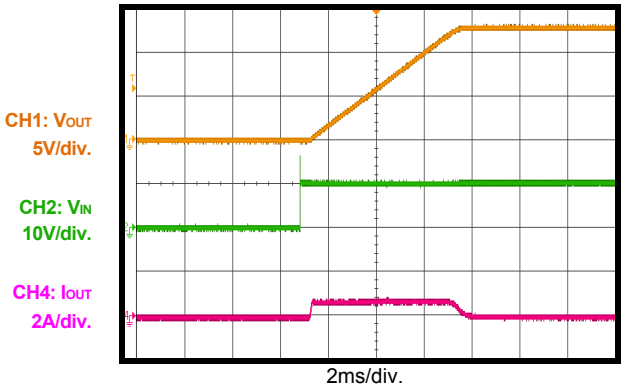
2ms/div.

Start-Up through Input Voltage
I_{OUT}=3A



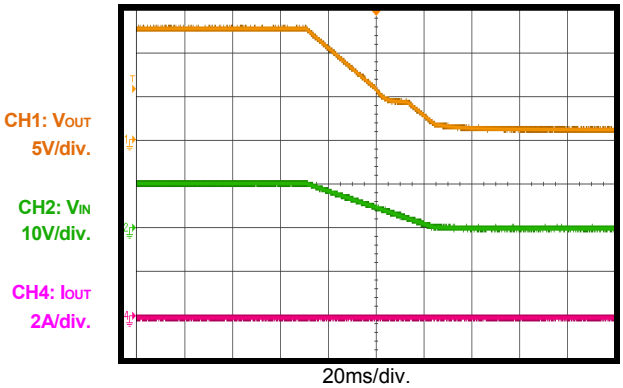
2ms/div.

Start-Up through Input Voltage
I_{OUT}=0A, C_{OUT}=1000μF



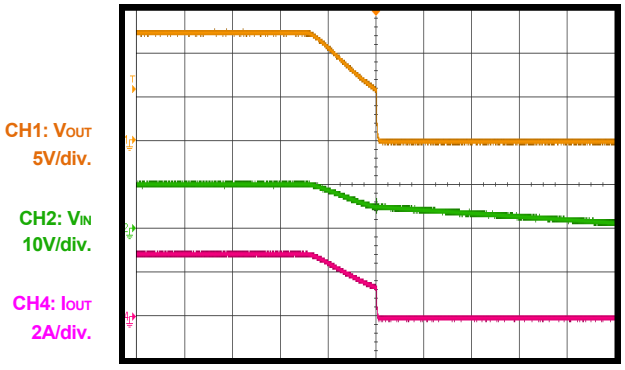
2ms/div.

Shutdown through Input Voltage
I_{OUT}=0A



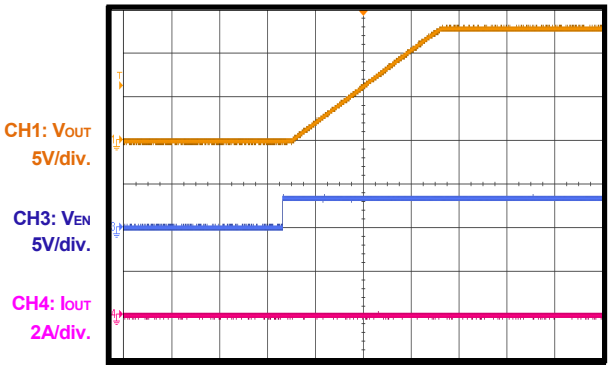
20ms/div.

Shutdown through Input Voltage
I_{OUT}=3A



2ms/div.

Start-Up through Enable
I_{OUT}=0A



2ms/div.

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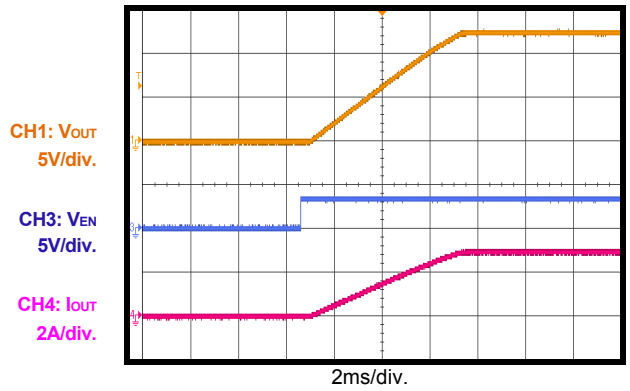
EVB TEST RESULTS *(continued)*

V_{IN}=5V, V_{EN}=5V, R_{LIMIT}=620Ω, DV/DT float, C_{OUT}=10µF, T_A=25°C, unless otherwise noted.

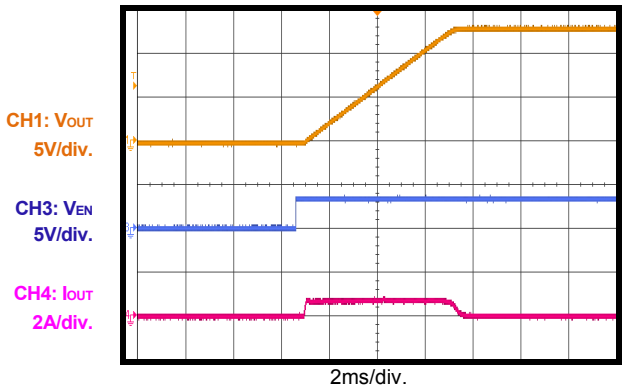
Start-Up through Enable

I_{OUT}=3A



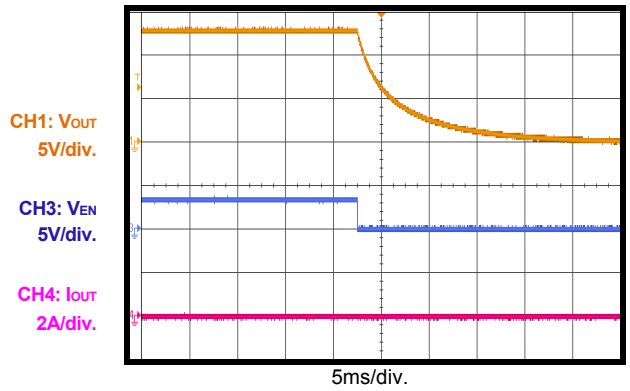
Start-Up through Enable

I_{OUT}=0A, C_{OUT}=1000µF



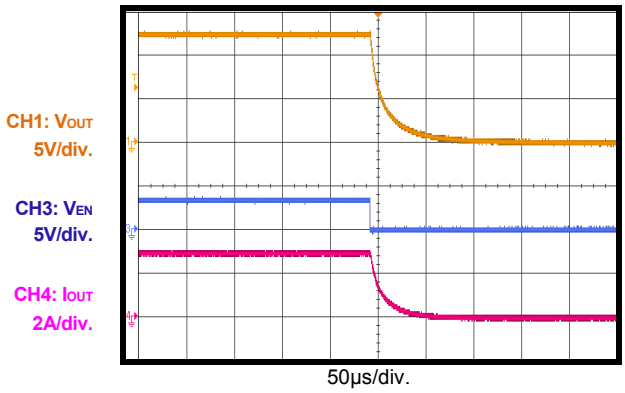
Shutdown through Enable

I_{OUT}=0A



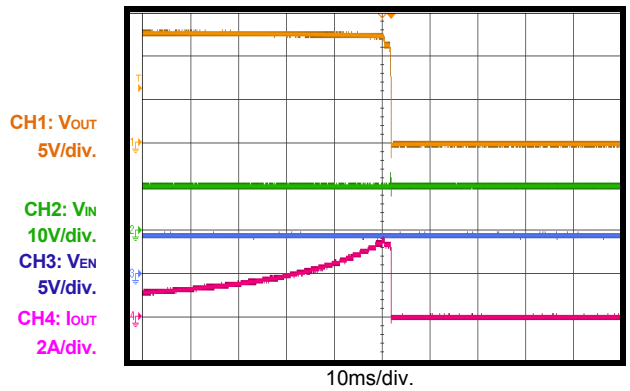
Shutdown through Enable

I_{OUT}=3A

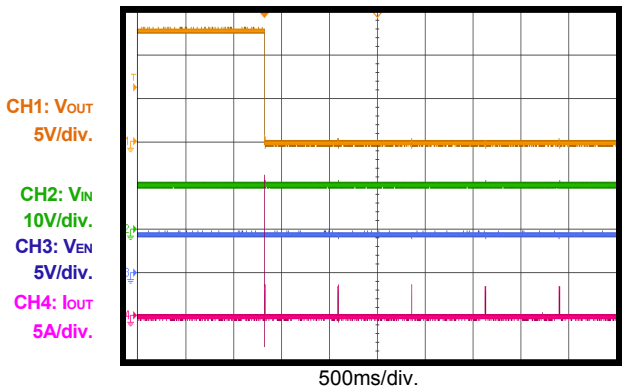


Current Limit

Increase I_{OUT} slowly



Short Circuit during Normal Operation and Hiccup



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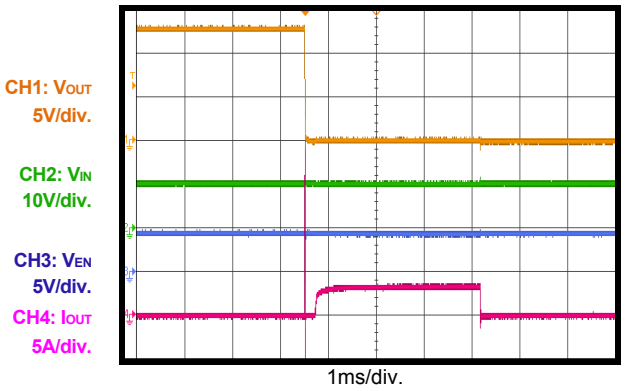
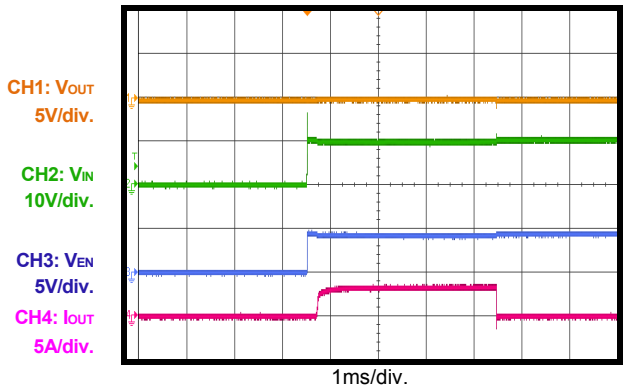
EVB TEST RESULTS *(continued)*

V_{IN}=5V, V_{EN}=5V, R_{LIMIT}=620Ω, DV/DT float, C_{OUT}=10μF, T_A=25°C, unless otherwise noted.

Short Circuit Entry during Normal Operation

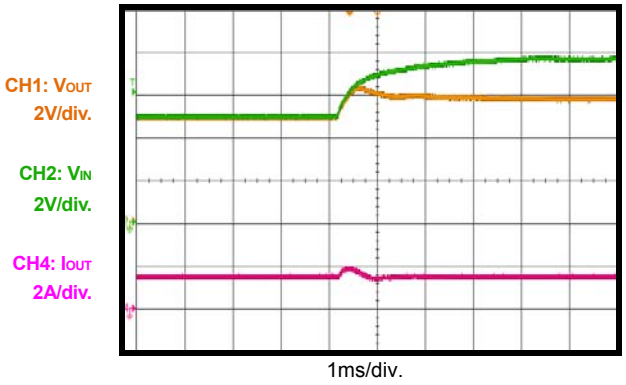


Short Circuit before Input Voltage Start-Up



Output Over Voltage Protection

V_{IN}=5V to 8V, I_{OUT}=1.5A



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PRINTED CIRCUIT BOARD LAYOUT

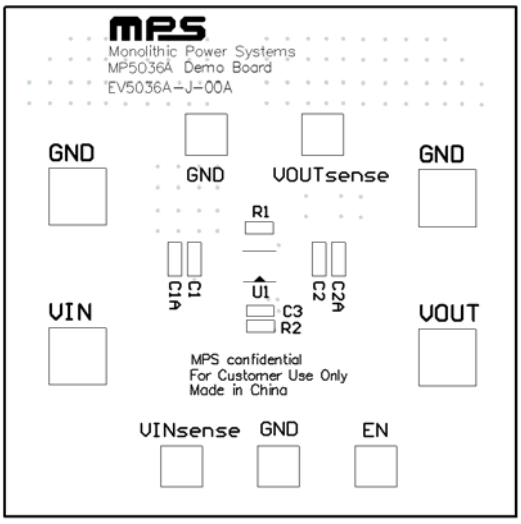

Figure 1: Top Silk Layer

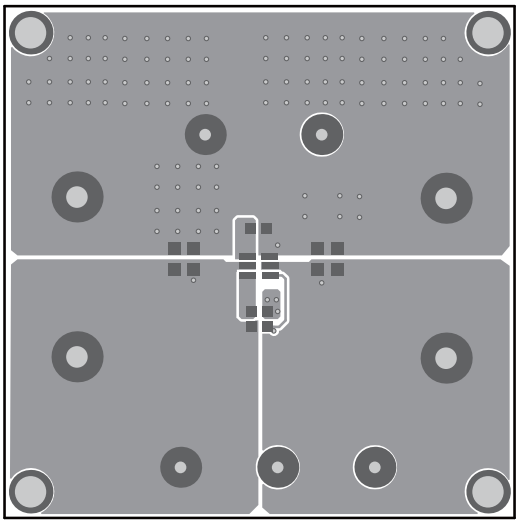

Figure 2: Top Layer

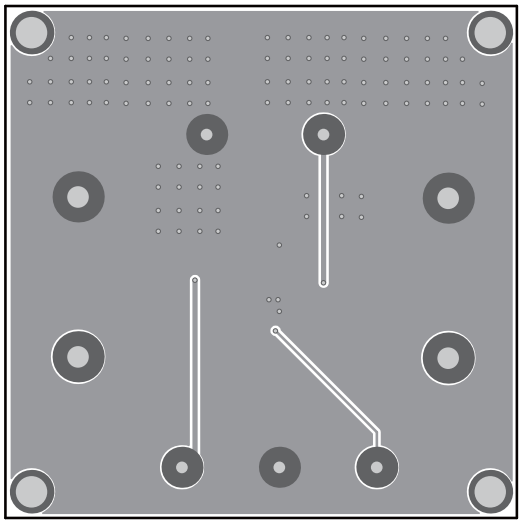

Figure 3: Bottom Layer

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QUICK START GUIDE

1. Preset V_{IN1} Power Supply to 5V.
2. Turn Power Supply off.
3. Connect Power Supply terminals to:
    a. Positive (+): V_{IN}
    b. Negative (–): GND
4. Connect Load to:
    a. Positive (+): V_{OUT}
    b. Negative (–): GND
5. Turn Power Supply on after making connections. The board will automatically start up.
6. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 2.2V to turn on the regulator, or less than 1.5V to turn it off.

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