EV5025A-QV-00A

16V, 12A, 3mΩ $R_{DS(ON)}$ Hot-Swap Protection Device With Current Monitoring Evaluation Board

DESCRIPTION

The EV5025A-QV-00A is an evaluation board designed for the MP5025A, a hot-swap protection device designed to protect circuitry on its output from transients on its input. The device also protects its input from undesired shorts and transients originating at the output.

An internal charge pump drives the gate of the power device, allowing for a power FET with a very low on resistance (about 3mΩ). The MP5025A includes an optional discharge function that provides a discharge path for the external output capacitor when the part is disabled. Fault protections include current limiting, thermal shutdown, and damaged MOSFET detection. The device also features over-voltage protection (OVP) and under-voltage protection (UVP).

The MP5025A is available in a QFN-22 (3mmx5mm) package.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input voltage	V_{IN}	12	V
Output voltage	V_{OUT}	12	V
Load maximum	I_{OUT}	15	A

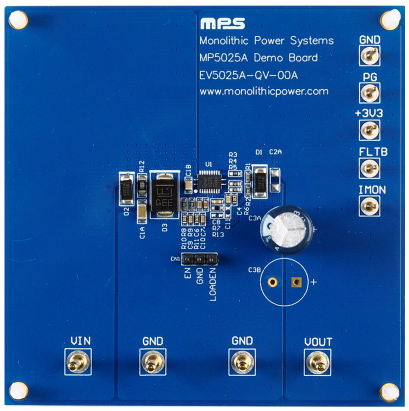
FEATURES

- 8V to 16V Operating Input Range
- Integrated 3mΩ Power FET
- Adjustable Current Limit
- Output Current Measurement
- ±3% Current Limit and Accuracy Monitoring
- Fast Response (<200ns) for Short Protection
- PG Detection and FLTB Indication
- PG Asserts Low when V_{IN} = 0V
- Damaged MOSFET Detection
- External Soft Start
- Configurable EN Blanking Time
- Under-Voltage (UV) and Over-Voltage Lockout (OVLO)
- Thermal Protection
- Available in a QFN-22 (3mmx5mm) Package

APPLICATIONS

- Hot-Swap Protection
- PC Cards
- Disk Drives
- Servers
- Networking
- Laptops

EV5025A-QV-00A EVALUATION BOARD



LxWxH (8.55cmx8.55cmx1.6mm)

Board Number	MPS IC Number
EV5025A-QV-00A	MP5025AGQV

QUICK START GUIDE

The board layout accommodates most commonly used Schottky diodes and output capacitors.

1. Attach the load terminals to:
   a. Positive (+): VOUT
   b. Negative (-): GND
2. Preset the power supply output to be 12V, and then turn the power supply off.
3. Attach the power supply terminals to:
   a. Positive (+): VIN
   b. Negative (-): GND
4. Turn the power supply on. The MP5025A should automatically start up.
5. To use the enable function, apply a digital input to the EN pin. Drive EN above 2V to turn the device on; drive EN below 0.4V to turn it off.
6. To use PG and FLTB indication function, connect the +3V3 and GND pins to a 3.3V power supply.

EVALUATION BOARD SCHEMATIC

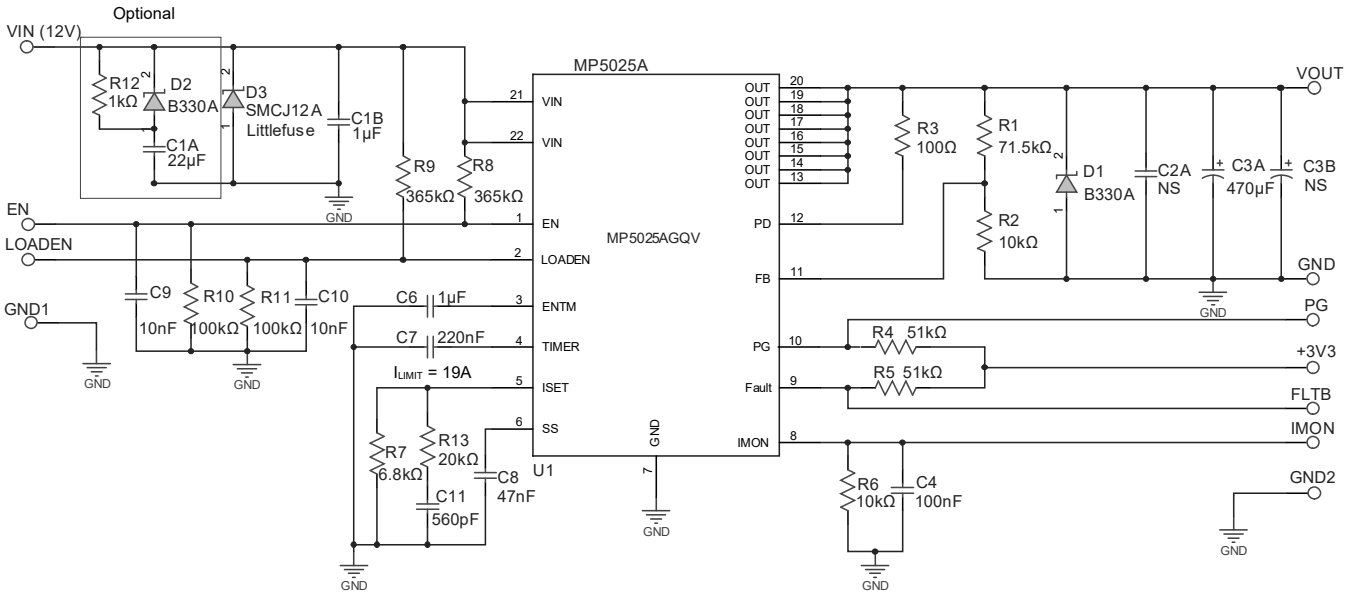


Figure 1: Evaluation Board Schematic

EV5025A-QV-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	C1A	22μF	Ceramic capacitor, 25V, 10%, X5R	1206	Murata	GRM31CR61E227KE15
1	C1B	1μF	Ceramic capacitor, 50V, 10%, X7R	0805	Murata	GRM21BR71H105KA12L
1	C3A	470μF	Electrolytic capacitor, 35V	DIP	Jianghai	CD263-35V470
1	C4	100nF	Ceramic capacitor, 25V, 10%,X7R	0603	Murata	GRM188R71C104KA01D
1	C6	1μF	Ceramic capacitor, 16V, 10%, X7R	0603	Murata	GRM188R71C105KA12D
1	C7	220nF	Ceramic capacitor, 16V, 10%, X7R	0603	Murata	GRM188R71C224KA01D
1	C8	47nF	Ceramic capacitor, 50V, 10%, X7R	0603	Murata	GRM188R71H473KA61D
2	C9, C10	10nF	Ceramic capacitor, 50V, 10%, X7R	0603	Murata	GRM188R71E103JA01D
1	C11	NS				
1	R1	71.5kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-0771K5L
2	R2,R6	10kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-0710KL
1	R3	100Ω	Film resistor, 1%	0603	Yageo	RC0603FR-07100RL
2	R4,R5	51kΩ	Film resistor, 1%	0603	Synton Tech	RC0603FR-0751KL
1	R7	6.8kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-076K8L
2	R8, R9	365kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-07365KL
2	R10, R11	100kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-07100KL
1	R12	1kΩ	Film resistor, 1%	1206	Hottechohm	RI1206L1001FT
1	R13	NS				
2	D1,D2	B330A	Schottky diode, 30V, 3A	SMA	Diodes	B330A
1	D3	SMCJ12A	TVS diode, 12V	SMC	Littlefuse	SMCJ12A
4	VIN,VOUT,GND,GND	Connector	Power pins	TP2MM		
5	PG,+3.3V,GND,FLTB,IMON	Connector	Test point pins	TP1MM		
1	CN1	2.54mm	3-pin, 2.54mm connector	Any		
1	U1	MP5025A	Hot-swap protection device	QFN-22 (3mmx5mm)	MPS	MP5025AGQV

PCB LAYOUT

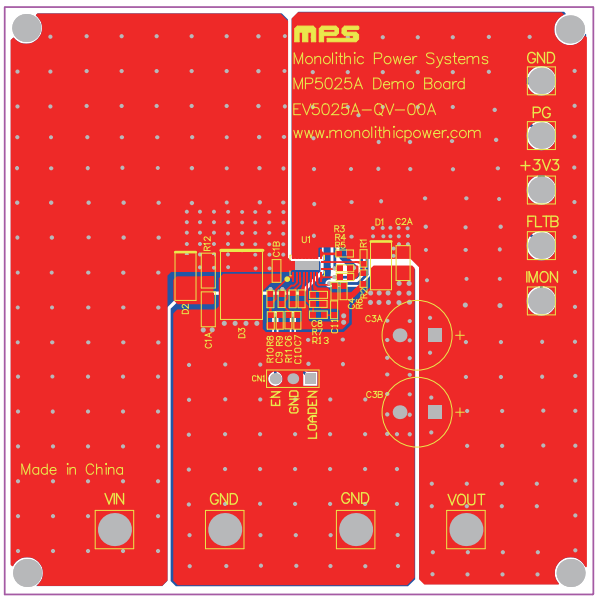


Figure 2: Top Layer

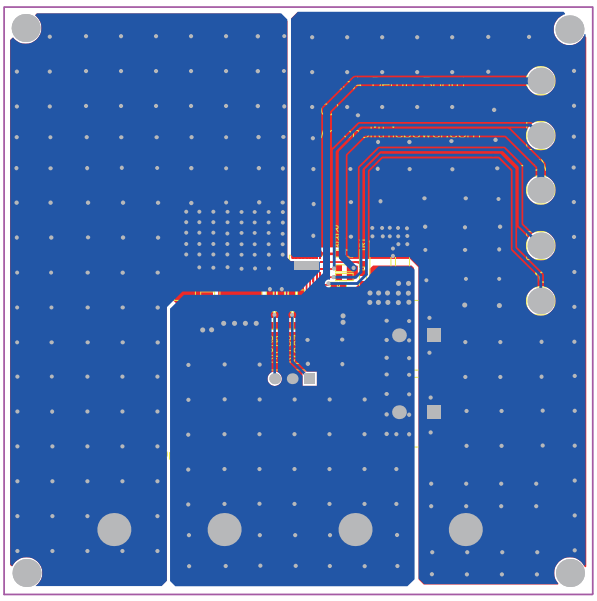


Figure 3: Bottom Layer

REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	4/2/2021	Initial Release	-