EV5021B-QV-00A

16V, 10A, 7mΩ R_{DS_ON} Hot Swap Protection Device with Current Monitoring

The Future of Analog IC Technology

DESCRIPTION

The MP5021B is a hot-swap protection device designed to protect circuitry on its output from transients on its input. It also protects its input from undesired shorts and transients coming from its output.

An internal charge pump drives the gate of the power device, allowing for a power FET with a very low ON resistance of 7mΩ.

The MP5021B includes an optional discharge function that provides a discharge path for the external output capacitor when the part is disabled. Fault protection includes current limit, thermal shutdown and damaged MOSFET detection. Both of the current limit and thermal shutdown have user settable auto retry and latch off mode. The device also features over-voltage protection and under-voltage protection

The MP5021B is available in 3mmx5mm QFN package.

FEATURES

- 4.8V to 16V Operating Input Range
- Integrated 7mΩ Power FET
- Adjustable Current Limit
- Output Current Measurement
- +/-5% Current Monitor Accuracy
- Fast Response (<200ns) for Short Protection
- PG Detector and FLTB Indication
- PG Assert Low at VIN=0
- Damaged MOSFET Detection
- External Soft Start
- Programmable EN Blanking Time
- Under/Over Voltage Lockout
- Thermal Protection
- Small 3mmx5mm QFN Package

APPLICATIONS

- Hot Swap
- PC Cards
- Disk Drives
- Laptops

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	12	V
Output Voltage	V_{OUT}	12	V
Maximum Current Limit	I_{OUT}@ V_{IN}≥8V	10	A
	I_{OUT}@ V_{IN}=5V	5	A

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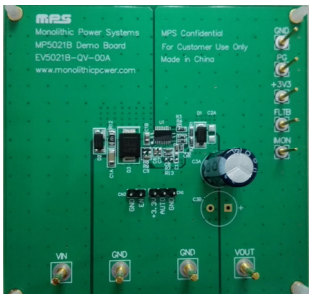
EV5021B-QV-00A EVALUATION BOARD



(L × W × H) 8.55cm × 8.55cm × 1.6mm

Board Number	MPS IC Number
EV5021B-QV-00A	MP5021BGQV

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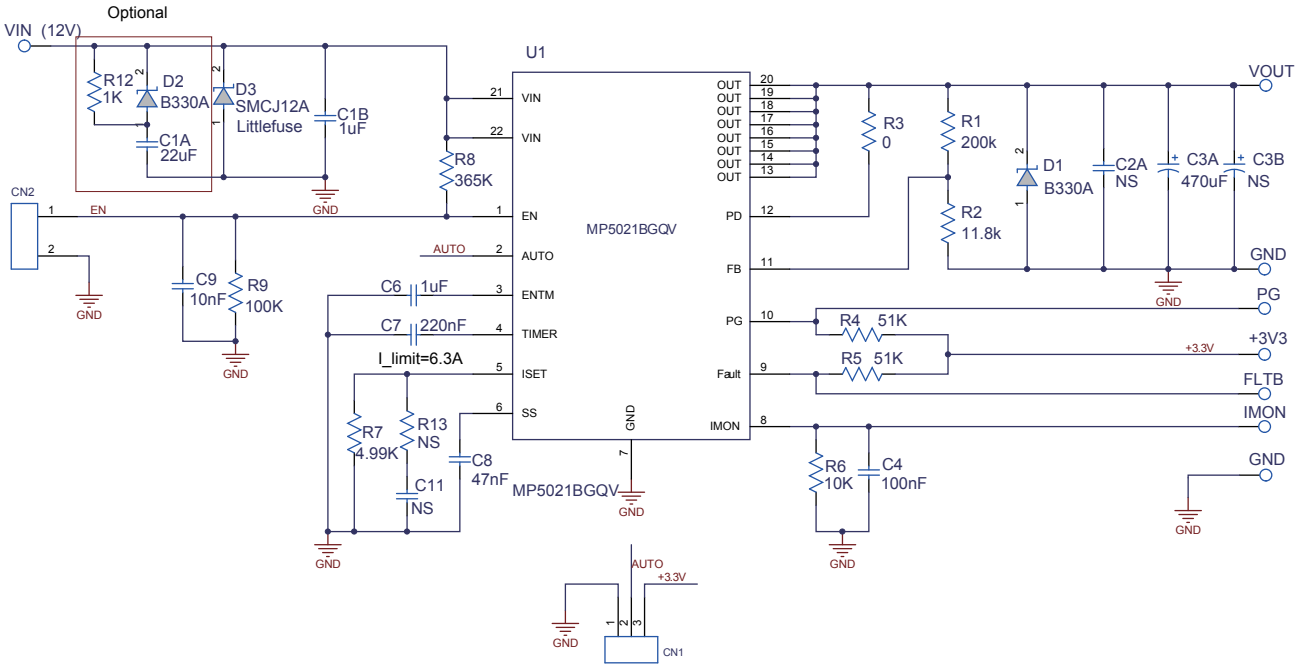
EVALUATION BOARD SCHEMATIC



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EV5021B-QV-00A BILL OF MATERIALS

Qty	RefDes	Value	Description	Package	Manufacture	Manufature P/N
1	C1A	22μF	Ceramic Cap.,25V, 10%, X5R	1206	muRata	GRM31CR61E226KE15
1	C1B	1μF	Ceramic Cap.,50V, 10%, X7R	0805	muRata	GRM21BR71H105KA12L
1	C3A	470μF	Electrolytic Cap., 35V	DIP	江海	CD263-35V470
1	C4	100nF	Ceramic Cap., 25V, 10%,X7R	0603	muRata	GRM188R71C104KA01D
1	C6	1μF	Ceramic Cap., 16V, 10%, X7R	0603	muRata	GRM188R71C105KA12D
1	C7	220nF	Ceramic Cap.,16V, 10%, X7R	0603	muRata	GRM188R71C224KA01D
1	C8	47nF	Ceramic Cap., 50V, 10%, X7R	0603	muRata	GRM188R71H473KA61D
1	C9	10nF	Ceramic Cap., 50V, 10%, X7R	0603	muRata	GRM188R71H103KA61D
3	C11,C2A, C3B	NS				
1	R1	200k	Film Res., 1%	0603	Yageo	RC0603FR-07200KL
1	R2	11.8k	Film Res., 1%	0603	Yageo	RC0603FR-0711K8L
1	R3	0	Film Res., 5%	0603	Yageo	RC0603JR-070R0L
1	R4,R5	51k	Film Res., 1%	0603	Yageo	RC0603FR-0751KL
1	R6	10k	Film Res., 1%	0603	Yageo	RC0603FR-0710KL
1	R7	4.99k	Film Res., 1%	0603	Yageo	RC0603FR-074K99L
1	R8	365k	Film Res., 1%	0603	Yageo	RC0603FR-07365KL
1	R9	100k	Film Res., 1%	0603	Yageo	RC0603FR-07100KL
1	R13	NS				
1	R12	1k	Film Res., 1%	1206	Hottechohm	RI1206L1001FT
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	connector	3pin 2.54mm			
1	CN2	connector	2pin 2.54mm			
1	U1	IC	Hot Swap Protection device	QFN22(3*5mm)	MPS	MP5021BGQV

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PRINTED CIRCUIT BOARD LAYOUT

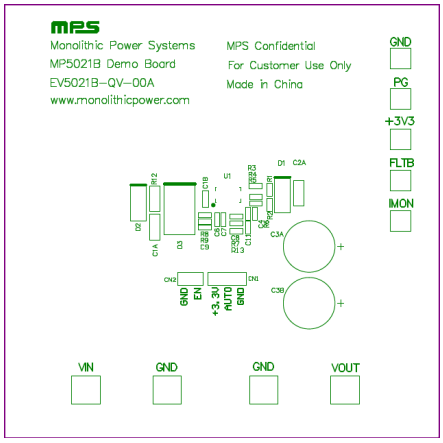

Figure 1—Top Silk Layer

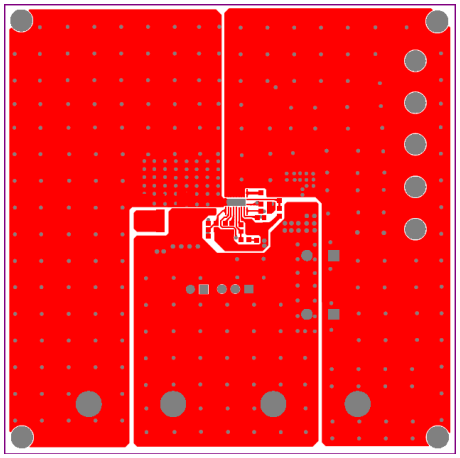

Figure 2—Top Layer

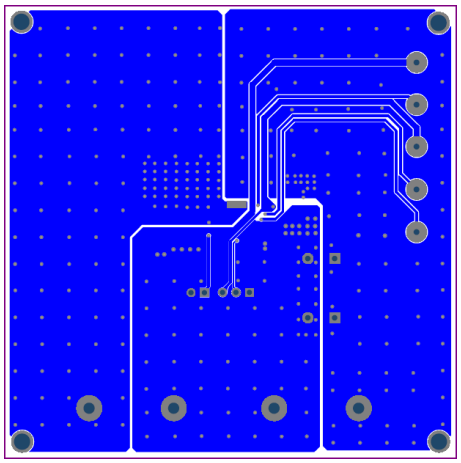

Figure 3—Bottom Layer

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QUICK START GUIDE

The default output voltage of this board is set to 12V.
The board layout accommodates most commonly used schottky and output capacitors.

1. Attach the positive and negative ends of the load to the VOUT and GND pins, respectively.
2. Attach the input voltage (4.8V≤VIN≤16V) and input ground to the VIN and GND pins, respectively. Then the board is powered up.
3. The EV5021B-QV-00A is enabled ON in default. It's turned on once the input voltage is applied. To enable the board externally, apply a voltage, VEN≥2V, to the EN pin. To disable the board, apply a voltage, VEN≤0.4V, to the EN pin.
4. The board is retry mode when OCP in default, users can select retry mode or latch mode by apply the auto pin to VCC or GND.
5. If output voltage is set to 5V, please remove R9.

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