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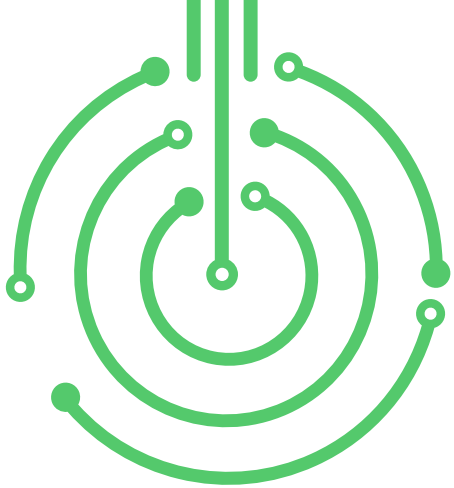


DC Solid State Power Relay with Current Feedback

SKU: EL130553

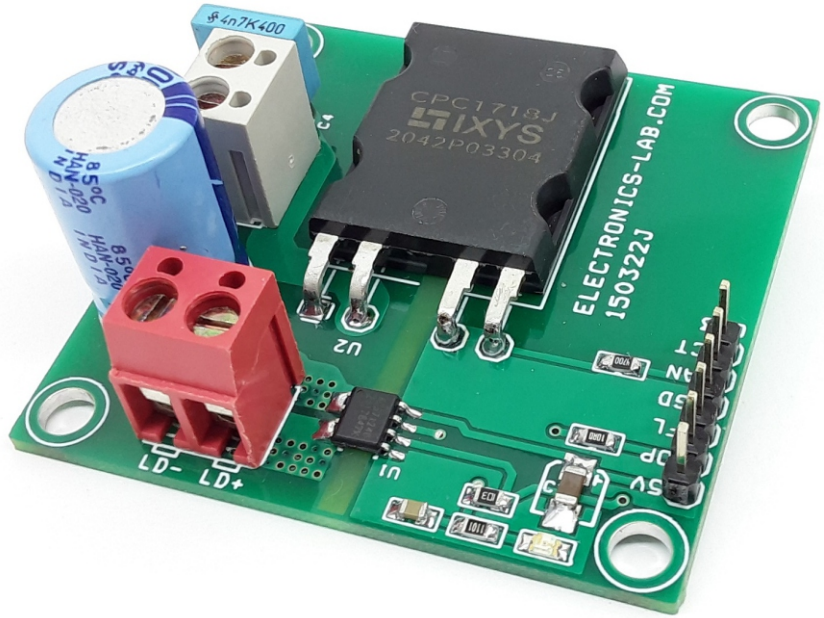
DC Solid State Power Relay with Current Feedback

This project employs CPC1718J 100V Single-Pole, Normally Open DC-Only Power Relay and ACS71240 Galvanically Isolated Current Sensor IC with Common-Mode Field Rejection and Overcurrent Detection. The board can be used for applications such as industrial controls, motor control, robotics, and electronics switching. The relay is normally open and requires a 3.3V to 5V input signal to operate with a maximum operating load power supply of 100V DC, and load up to 6.75A without a heatsink and 17.5A with a heatsink.

Note: The relay can handle load up to 17.5A with heatsink and 6.75A without heatsink, solder the CPC1718J relay under the PCB for heatsink mount.

Features

- Load Power Supply 90V DC (Range up to 100V)
- Load Current 6.75A Without Heatsink, 17.5A with heatsink and Fan
- Power Relay Low 0.075W On-Resistance
- 2500Vrms Input/Output Isolation
- Relay Turn-on Time 7.5mS to 20mS
- Relay Turn Off Time 0.19mS to 5mS
- Relay Input Signal 3.3V to 5V @ 10mA
- PCB Dimensions 52.71MM X 50.17MM
- 4 X 4MM Mounting Holes
- 100uF /100V DC Bus Capacitor
- Screw Terminals for Load and Load Power Supply



Connections and other details

- CN1: Pin 1 = VCC Input Up to 90V DC, Pin 2 = GND
- CN2: Pin 1 = +Load, Pin 2 = GND-Load
- D1: Power LED Logic Supply for Current Sense Circuit
- CN3: Pin 1 = 3.3V Input for Current Sense IC, Pin 2 = Current Monitor Output, Pin 3 = Fault (Active Low), Pin 4 = GND(Logic), Pin 5 = LED Anode, Pin 6 = LED Cathode

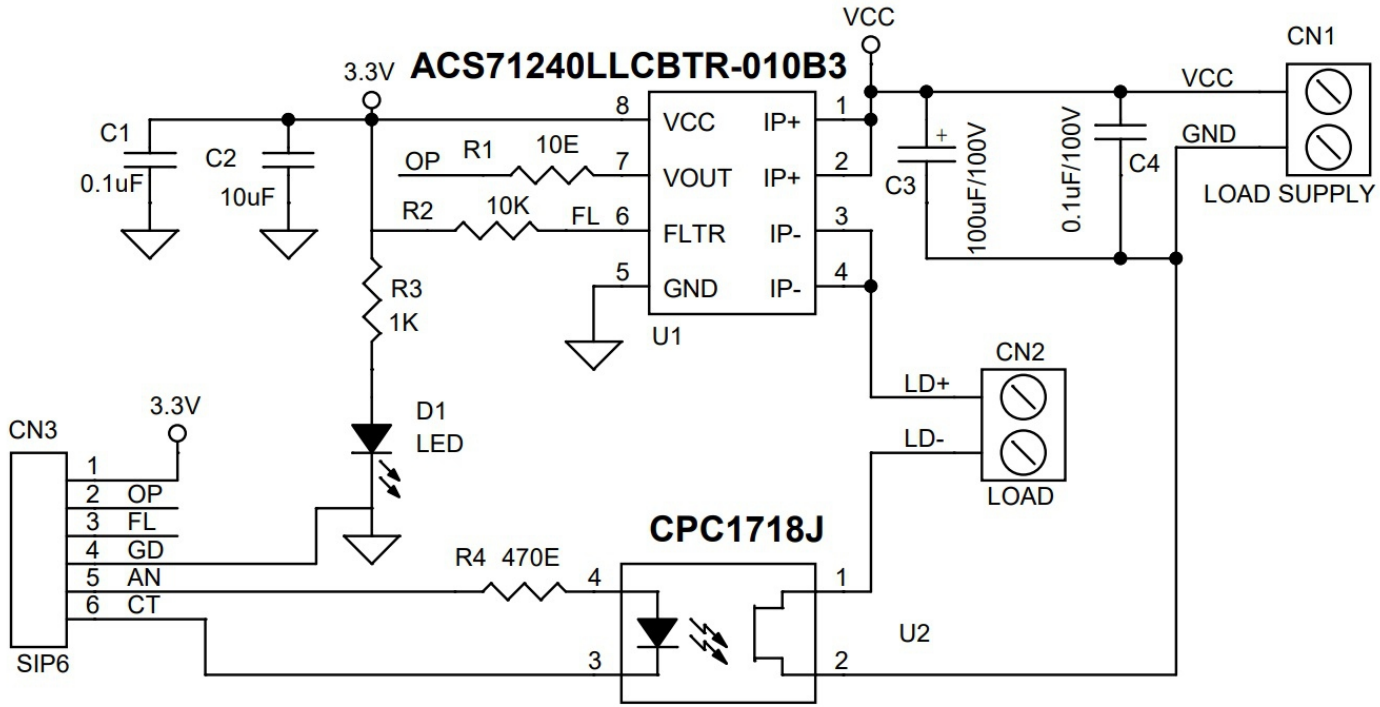
Note: ACS71240 Current sensor can measure current up to 10A. The working voltage of the chip is 3.3V. This sensor is available with various current ranges and working voltage, refer to the datasheet of the ACS71240 chip for an appropriate device as per user requirements.

Current Monitor Output

The project also consists of a current sensor for load current feedback. The current sense circuit is built using ACS71240. The current sense output is also galvanically isolated and can be used to monitor the load current, fault condition, open load, and short circuit. The current sense circuit requires 3.3V Supply, and the sensor output is 132mV/A, Zero-Current Output Voltage 1.65V. The normal output of the current sensor is 1.65V when the load is disabled or not connected.

The ACS71240 current sensor IC is an economical and precise solution for AC or DC current sensing in industrial, automotive, commercial, and communications applications. The device consists of a precise, low-offset linear Hall sensor circuit with a copper conduction path located near the surface of the die. Applied current flowing through this copper path generates a magnetic field which is sensed by the integrated Hall IC and converted into a proportional voltage. The resistance of the integrated conductor is far less than typical sense resistors, which reduces power loss and improves efficiency. Rejection of external common-mode magnetic fields is achieved through differential sensing, enabling high accuracy in magnetically noisy environments. A precise voltage proportional to the measured current is generated by the low-offset, chopper stabilized Hall front end

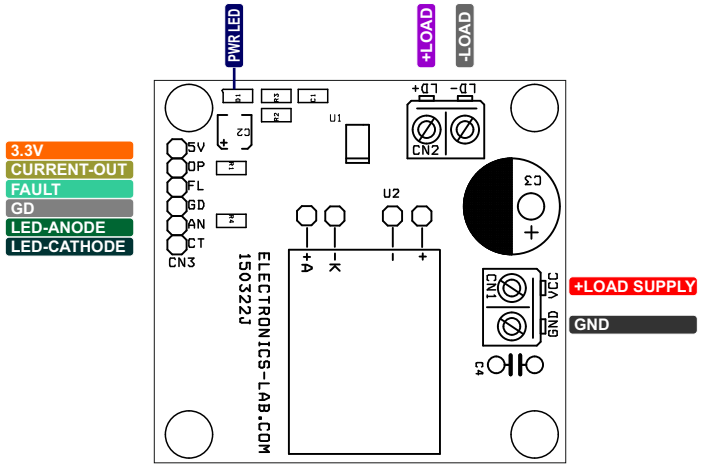
Schematic

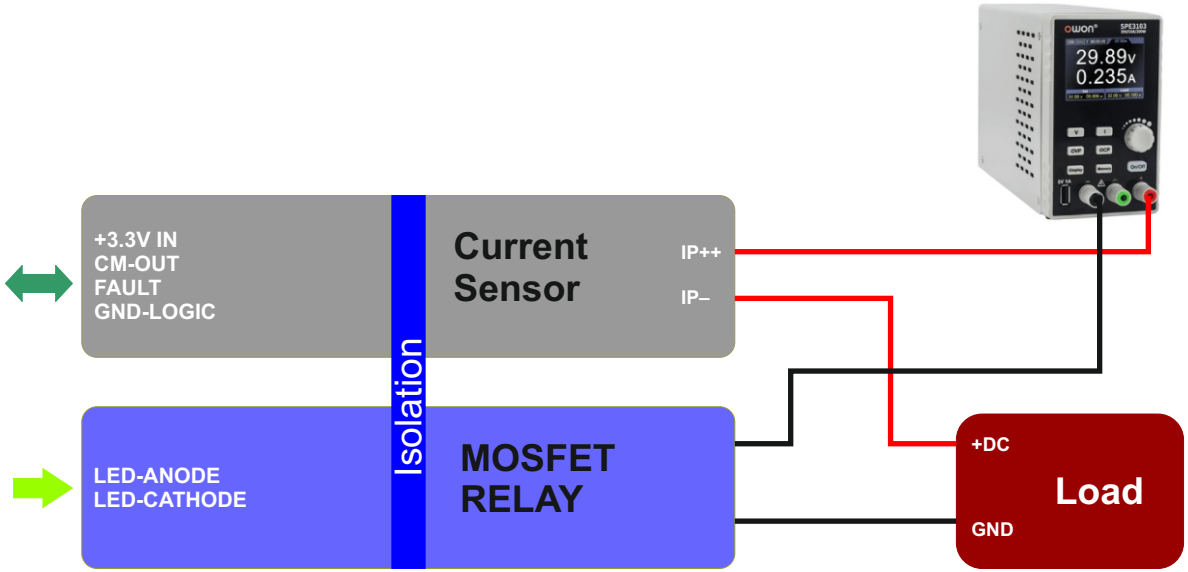


Current Sense Features

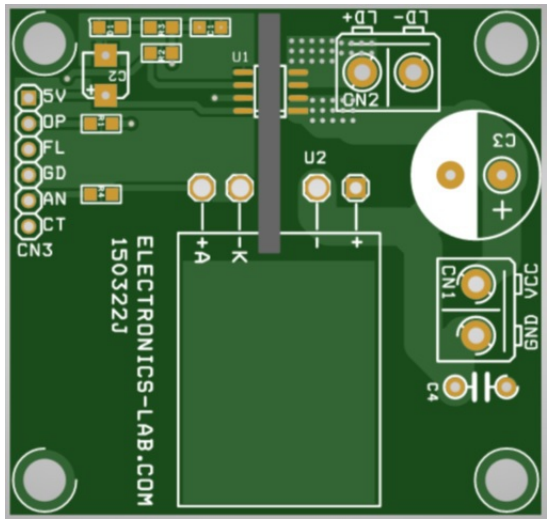
- Operating Power Supply 3.3V DC @ 15mA
- Power LED
- Output 132mV/A
- Zero-Current Output Voltage 1.65V
- Current Sense Range up to 10Amps (Read Note2 for Higher Current)
- Overcurrent FAULT available between 50% and 200% IP with 1.5 µs (typ) response time
- Fault Output Active Low
- Current Sensor Accuracy Error 5%

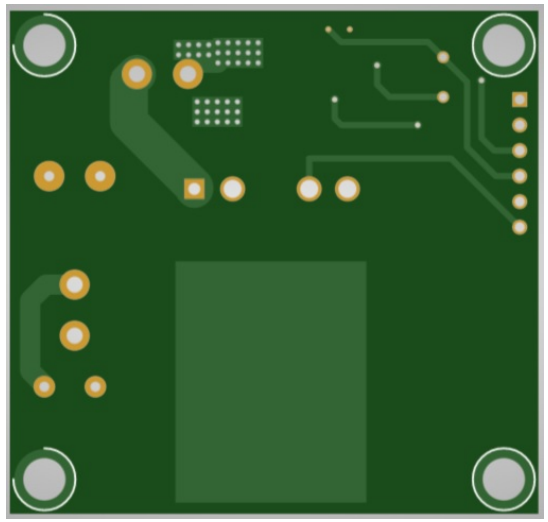
Connections



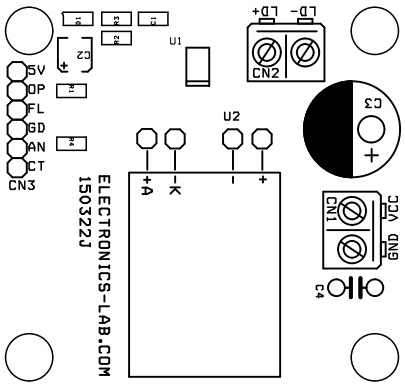


PCB

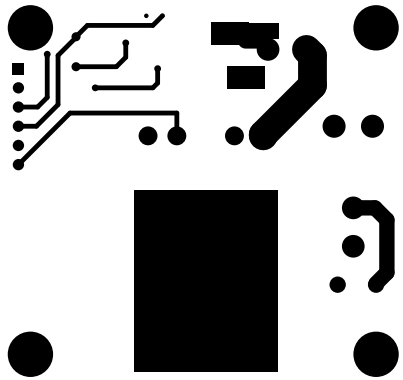




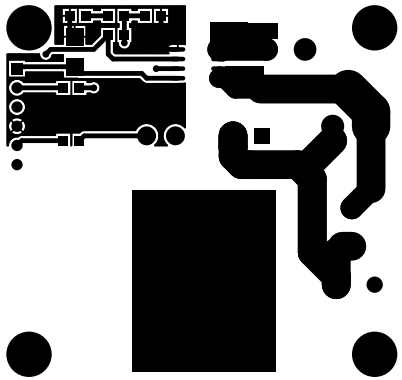
PCB GERBER FILES AVAILABLE



SILK SCREEN TOP



BOTTOM LAYER



TOP LAYER

PCB DIMENSIONS 52.71MM X 50.17MM

Parts List

BOM						
NO.	QNTY.	REF.	DESC.	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	1	CN1	2 PIN SCREW TERMINAL PITCH 5.08MM	PHOENIX	DIGIKEY	277-1247-ND
2	1	CN2	2 PIN SCREW TERMINAL PITCH 5.08MM	PHOENIX	DIGIKEY	277-1247-ND
3	1	CN3	6 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5319-ND
4	1	C1	0.1uF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
5	1	C2	10uF/16V CERAMIC SMD SIZE 1206/1210	YAGEO/MURATA	DIGIKEY	
6	1	C3	100uF/100V ELECTROLYTIC	ILLINOIS CAP	DIGIKEY	107KBM100M-ND
7	1	C4	0.1uF/100V THT	YAGEO/MURATA	ELEMENT14	1166887
8	1	D1	LED RED SMD SIZE 0805	OSRAM	DIGIKEY	475-1278-1-ND
9	1	R1	10E 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
10	1	R2	10K 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
11	1	R3	1K 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
12	1	R4	470E 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
13	1	U1	ACS71240LLCBTR-010B3	ALLEGRO	DIGIKEY	620-2051-1-ND
14	1	U2	CPC1718J	IXYS INT	DIGIKEY	CLA315-ND

Notes

APP

Android App

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