

## 3A Thermoelectric Cooler (TEC) Driver

3A TEC Driver Module is a complete power stage solution to drive Thermoelectric Cooler. Its required DC voltage input to control the current. It consists of the Texas instruments DRV593 power driver IC, along with a few discrete passive components required for operation. It also includes jumpers for configuring the features of the device, LEDs for fault monitoring, and an output filter. The 4 Pin header connector for the inputs, 4 pin header connector for output, and 4 Pin header connector for power supply, provide ease of connection to any system, from an existing design to a bread-boarded prototype Connect a dc control voltage to CN1 Pin 3 (IN+), ranging from ground to VCC. The Pin 7 of the IC is held to VCC/2 with a resistor voltage divider, as shown in the schematic. Therefore, a dc control voltage of VCC/2 provides 0-V output from PWM to H/C. Input DC voltage range is 1.2V to 3.8V when supply 5V, and 1.2V to 2.1V when supply voltage is 3.3V

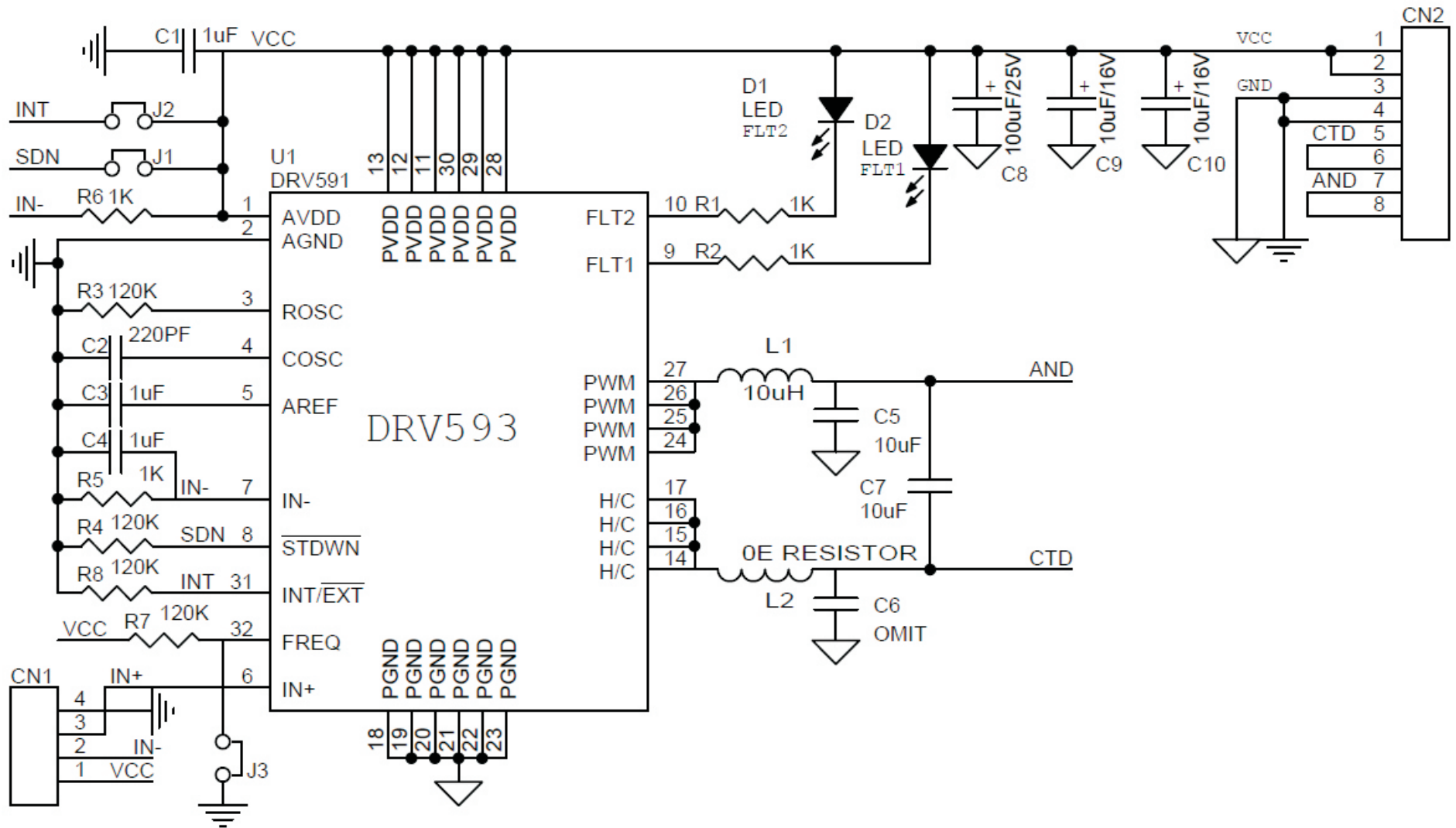
The DRV593 is a high efficiency, high-current power amplifier ideal for driving a wide variety of thermoelectric cooler elements in systems powered 2.8V to 5.5V. The operation of the device requires only one inductor and capacitor for output filter, saving significant printed-circuit board area. Pulse width modulation (PWM) operation and low output stage on-resistance significantly decrease power dissipation in the amplifier. The IC is internally protected against thermal and current overloads. Logic level fault indicators signal when the junction temperature has reached approximately 128 degree centigrade to allow for system level shutdown before the amplifier's internal thermal shutdown circuitry activates. The fault indicators also signal when an over current circuitry is tripped, the devices automatically reset. The PWM switching frequency has been set to 500 KHz, this can be changed to 100 KHz by changing capacitor value C2 1nF. The amplifiers gain is at 2.3V/V

**Note:** This board required DC input voltage to control the TEC temperature, 1.2 V to 3.8 V when using a 5-V supply, and 1.2 V to 2.1 V when using a 3.3-V supply.

### Features

- 3A Maximum Output Current
- Low Supply Voltage 2.8V To 5.5V
- Frequency 500 KHz (Refer Note To change Frequency)
- High Efficiency Generates Less Heat
- Over Current and Thermal Protection
- Fault LED for Over Current, Thermal & Under Voltage Conditions
- When J3-Jumper is closed, the board is configured for 500-kHz operation.  
When J3-Jumper is Open, the device is configured for 100-kHz operation. However, capacitor C2 must be removed and replaced with a 1-nF capacitor for proper operation.
- J2-Jumper closed for normal operation
- J1-Jumper Closed for normal operation, when the jumper is open device goes in to shutdown mode
- The common mode input range is 1.2 V to 3.8 V when using a 5-V supply, and 1.2 V to 2.1 V when using a 3.3-V supply





<b>BOM</b>			
<b>SR.</b>	<b>QNTY.</b>	<b>REF.</b>	<b>DESC.</b>
1	1	CN1	4 PIN HEADER CONNECTOR
2	1	CN2	8 PIN HEADER CONNECTOR
3	3	C1,C3,C4	1uF SMD 0805
4	1	C2	220PF SMD 0805
5	2	C5,C7	10uF/16V SMD 1210
6	1	C6	OMIT
7	1	C8	100uF/25V SMD
8	2	C9,C10	10uF/16V SMD 1210
9	2	D1,D2	LED SMD 0805
10	3	J1,J2,J3	JUMPER
11	1	L1	10uH SMD 12MM
12	1	L2	OE RESISTOR
13	4	R1,R2,R5,R6	1K SMD 0805
14	4	R3,R4,R7,R8	120K SMD 0805
15	1	U1	DRV593

<b>FAULTS</b>		
<b>Fault2-LED 1</b>	<b>Fault 1-LED 2</b>	<b>Operation</b>
LED ON	LED ON	OVER CURRENT
LED OFF	LED ON	OVER VOLTAGE
LED ON	LED OFF	OVER TEMPERATURE
LED OFF	LED OFF	NORMAL OPERATION

