

CT220BMV-IS5 Evaluation Board User Guide

DESCRIPTION

The CTD221-PT-1.5 evaluation board is designed to demonstrate the current sensing capabilities of the CT220 linear magnetic sensor from Allegro MicroSystems. The CT220 is a contactless current sensor based on XtremeSense™ tunnel magnetoresistance (TMR) technology. It features a full-bridge configuration comprising four TMR elements monolithically integrated with active CMOS circuitry, allowing it to have high resolution and low noise in a small-package footprint. This user guide describes how to connect and use the CTD221-PT-1.5 evaluation board.

FEATURES

- Field range: ± 1.5 mT
- Gain: 300 mV/V/mT
- 3 V to 5 V power supply

EVALUATION BOARD CONTENTS

- CTD221-PT-1.5 evaluation board

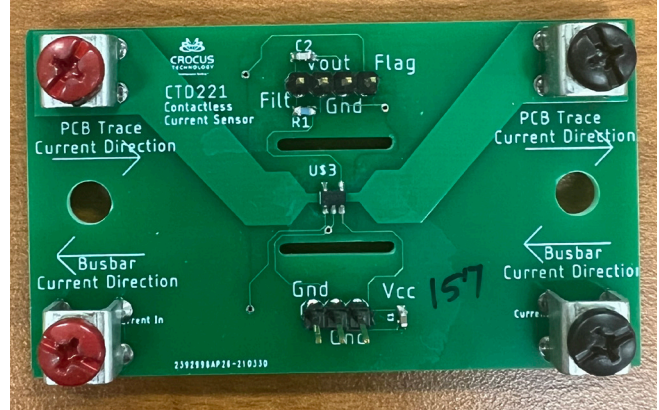


Figure 1: CTD221-PT-1.5 Evaluation Board

Table of Contents

Description	1
Features	1
Evaluation Board Contents	1
Using the Evaluation Board	2
Schematic	4
Layout	5
Bill of Materials	6
Related Links	7
Application Support	7
Revision History	8

Table 1: CTD221-PT-1.5 Evaluation Board Configurations

Configuration Name	Part Number	B-Field	Gain
CTD221-PT-1.5	CT220BMV-IS5	± 1.5 mT	300 mV/V/mT

Table 2: General Specifications

Specification	Min.	Typ.	Max.	Units
Input Operating Voltage	3	3.3	5	V
Cutoff Frequency (3 dB)	–	10	–	kHz
Operating Temperature	–40	–	85	°C

USING THE EVALUATION BOARD

This section provides an overview of the connections and configuration options of the CTD221-PT-1.5 evaluation board. Each group of connections highlighted in Figure 2 has a detail section below. The product datasheet contains detailed information about the use and functionality of each pin and should be consulted for more-detailed information than is contained in this user guide.

The evaluation board is powered by connecting a DV bias voltage between the VCC and GND pins on the PCB. The OUT pin of the PCB should be connected to a digital voltmeter (DVM) or an oscilloscope to monitor the output of the CT220 current sensor. The data present in this section is for a 5 V bias voltage.

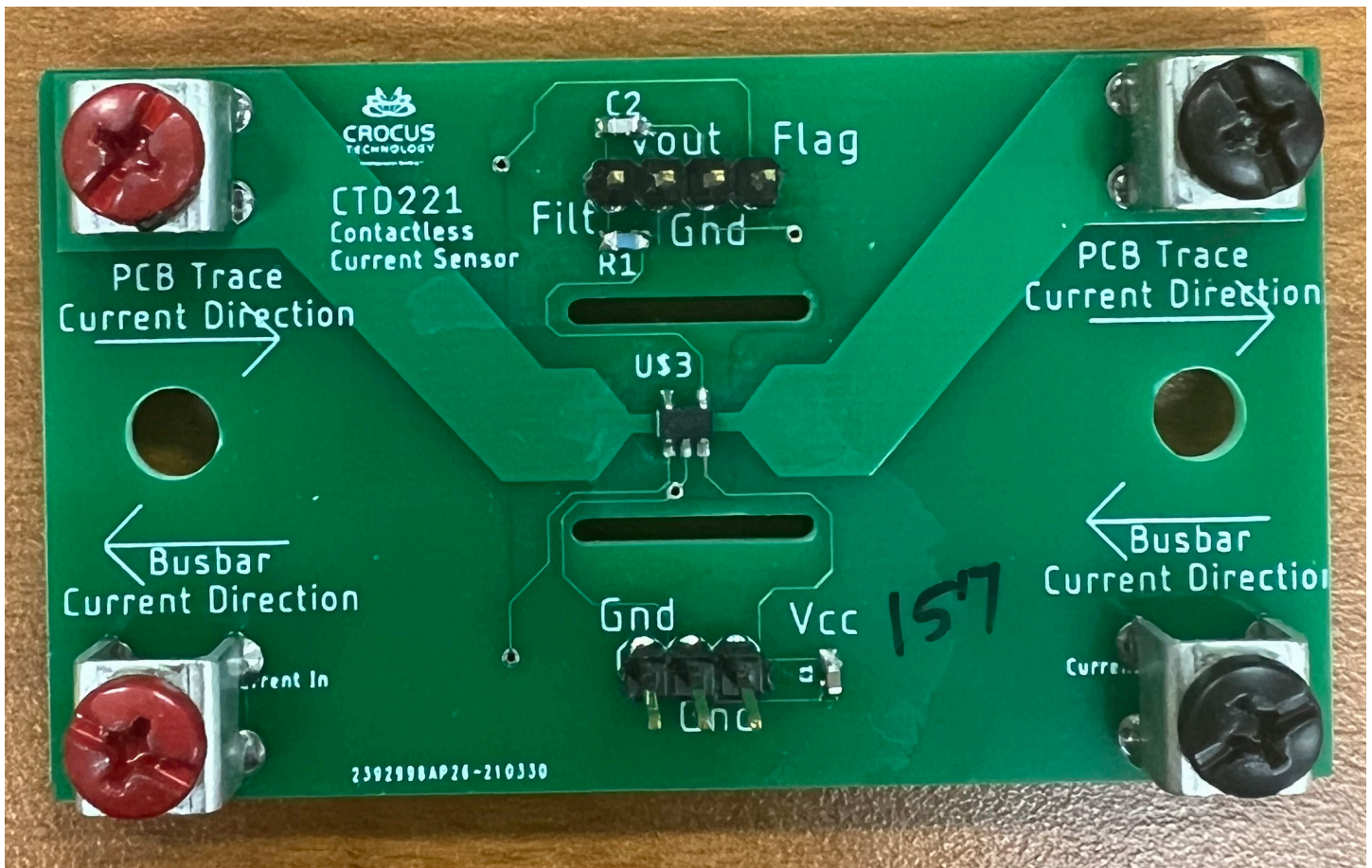


Figure 2: CTD221-PT-1.5 Evaluation Board with Busbar

Low-Current Mode

In low-current mode, the current passes through a 0.9 mm-wide trace on the top layer of the PCB. This mode can be used to measure currents in the range of ± 3.85 A. Clearance between the trace and IC pads is 0.35 mm, which provides isolation of 1 kV between the current trace and the SOT23 pins.

In addition to the excellent linearity across temperature, the high signal-to-noise ratio (SNR) of the CT220 enables it to measure extremely low currents.

Medium-Current Mode

In medium-current mode, the current passes through a 2 mm-wide trace on the bottom layer of the PCB. This wider trace (compared to low-current mode) allows for a larger current to be detected. This mode can be used to measure currents of ± 10 A, with the ability to resolve in 10 mA steps. The isolation of the CT220 for this configuration is 5.1 kV_{rms} because the distance between the bottom trace and the SOT23 pins is 1.6 mm.

SCHEMATIC

The schematic of the CTD221-PT-1.5 evaluation board is shown in Figure 3.

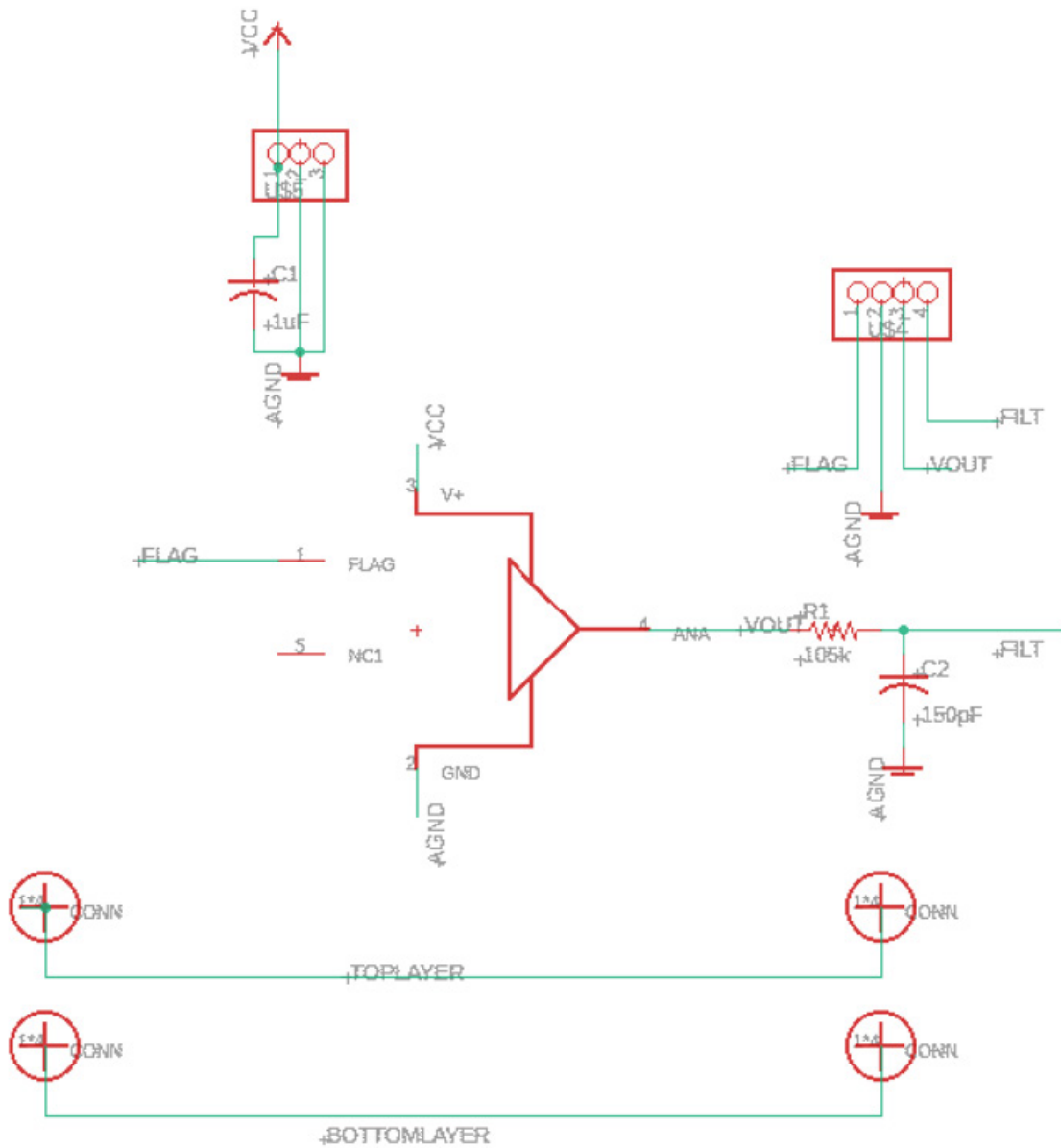


Figure 3: CTD221-PT-1.5 Evaluation Board Schematic

LAYOUT

The top and bottom layers of the CTD221-PT-1.5 evaluation board are shown in Figure 4 and Figure 5.

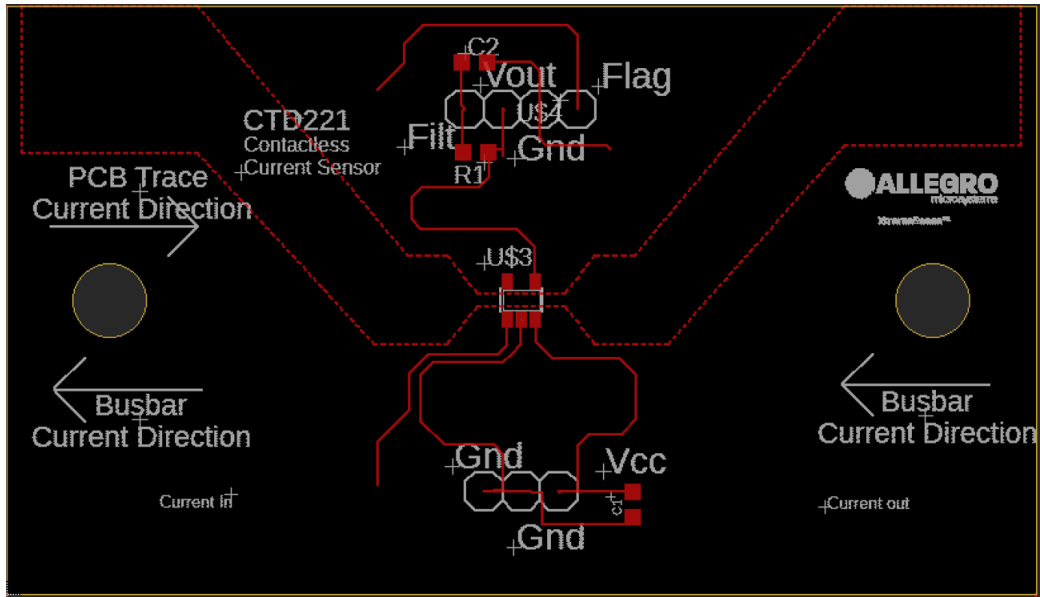


Figure 4: Top Layer

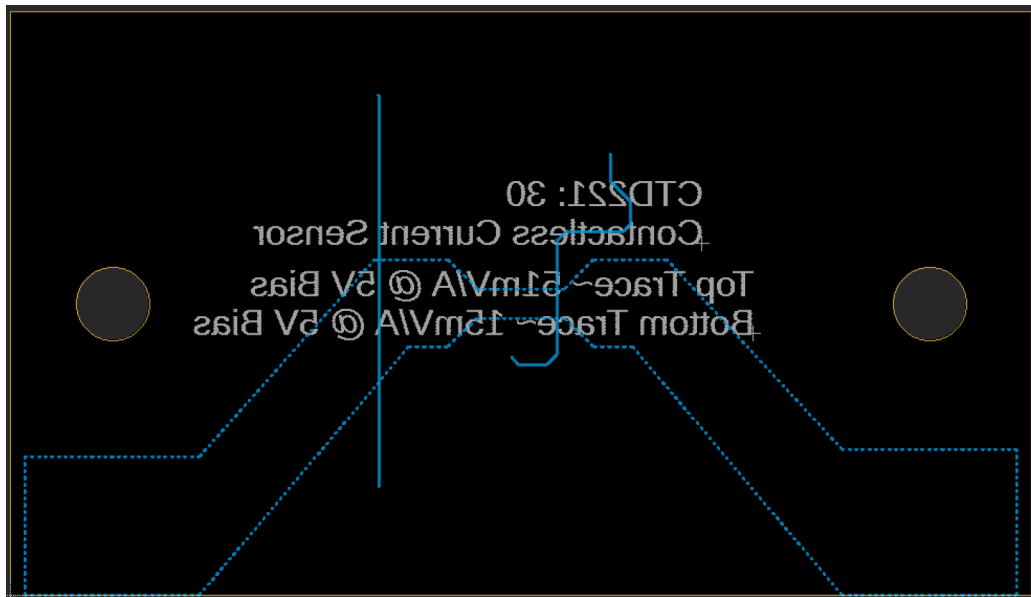


Figure 5: Bottom Layer

BILL OF MATERIALS

Table 3: CT220BMV-IS5 Version Evaluation Board Bill of Materials

Designator	Quantity	Description	Manufacturer	Manufacturer Part Number
ELECTRICAL COMPONENTS				
-	1	CTD221-PT-1.5 EVAL PCB	Allegro MicroSystems	-
U\$3	1	CT220 Sensor	Allegro MicroSystems	-
FLAG, GND, VOUT, FILTER	1	Male Header Connectors	Samtec	TSW-104-07-F-S
GND, VCC	1	Male Header Connectors	Samtec	TSW-102-07-F-S
C1	1	Capacitor, Ceramic, 1.0 μ F, 25 V, 10% X7R 0603	TDK	MSAST168SB7105KTNA01
C2	1	Capacitor, Ceramic, 150 pF, 1 kV, 10% X5F 0603	Vishay	562R10TST15
R1	1	Resistor, 105 k Ω , 1/10 W, 1% 0603	Vishay	TNPW0603105KBEEA
OTHER COMPONENTS				
-	4	Connector Heads	Keystone Electronics	36-7701-ND
-	4	M3x6mm Metal Screws for Connector Heads	UXCell	15120300ux0251

RELATED LINKS

CT220 Product Webpage:

<https://www.allegromicro.com/en/products/sense/current-sensor-ics/sip-package-zero-to-thousand-amp-sensor-ics/ct220>

Revision History

Number	Date	Description
-	September 11, 2024	Initial release

Copyright 2024, Allegro MicroSystems.

Allegro MicroSystems reserves the right to make, from time to time, such departures from the detail specifications as may be required to permit improvements in the performance, reliability, or manufacturability of its products. Before placing an order, the user is cautioned to verify that the information being relied upon is current.

Allegro's products are not to be used in any devices or systems, including but not limited to life support devices or systems, in which a failure of Allegro's product can reasonably be expected to cause bodily harm.

The information included herein is believed to be accurate and reliable. However, Allegro MicroSystems assumes no responsibility for its use; nor for any infringement of patents or other rights of third parties which may result from its use.

Copies of this document are considered uncontrolled documents.