

## Product Description

The CT219 Series is a differential current sensor especially designed for consumer and industrial applications based on Crocus Technology's patented TMR technology, Magnetic Logic Unit™ (MLU™). Used in a closed-loop circuit configuration, the CT219 measures bi-directional magnetic fields generated by a current carrying conductor such as a PCB trace or bus bar.



The CT219 provides design flexibility with high sensitivity in a small footprint SOT-26 package and is cost competitive for high volume manufacturing. The CTD203 development board demonstrating the closed-loop circuit solution is available for additional support and guidance.

## Features and Benefits

- High sensitivity
- Wide Dynamic Range
- Stable temperature performance up to 85°C
- AC and DC Current Sensing
- Low power consumption
- High frequency performance
- Differential voltage output
- Cost competitive
- RoHS Compliant

## Application Examples

- Current Transformer (CT) Replacement
- Variable Speed Drives
- Power Utility Meters
- Motor control
- UPS, SMPS, and telecom power supplies
- Air Conditioning
- Over-current fault protection
- Threshold detection
- Robotics

**Table 1: Absolute Maximum Ratings**

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vs		10	V
Supply Current	Is		300	uA
Operating Temp	Ta		125	°C
Storage Temp	Ts		150	°C
Soldering Temp	T		260	°C
Magnetic Flux Density	B		1	T

**Table 2: Electrical Characteristics**

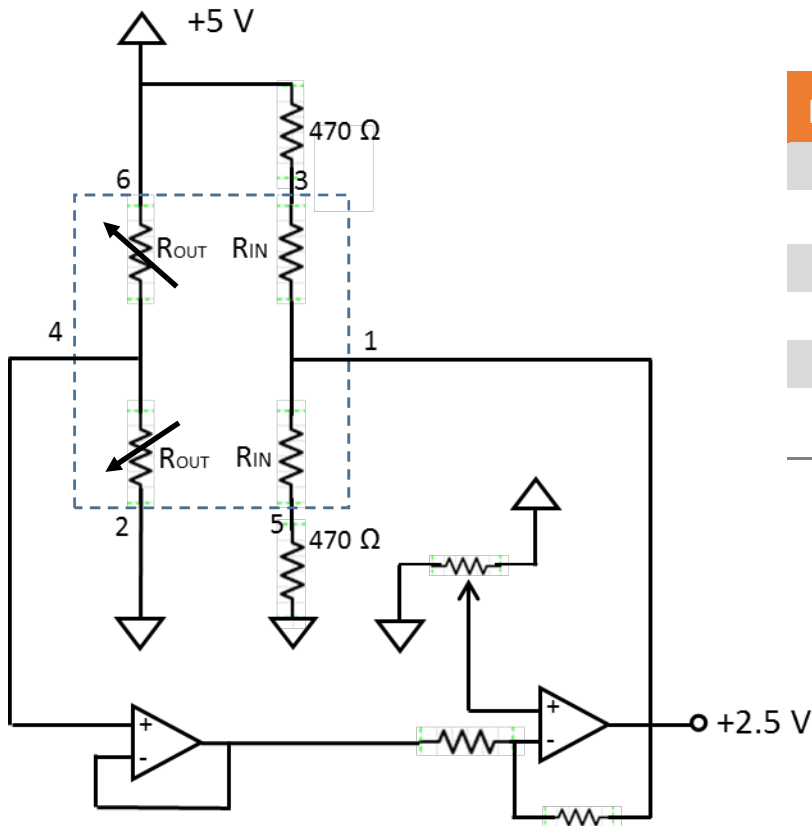
Supply Voltage = 5.0V, Ta = 25°C unless otherwise specified.

Characteristic	Symbol	Conditions	Min	Typ	Max	Unit
Operating Temperature	Ta		-40	25	85	°C
Supply Voltage	V <sub>B</sub>			5		V
Supply Current	I <sub>B</sub>				200	μA
Quiescent Voltage	V <sub>O</sub>	B=0, I <sub>N</sub> = 5mA	2.3	2.5	2.7	V
Input Bias Current	I <sub>N</sub>			5		mA
Field Line Resistance	R <sub>IN</sub>	Each Resistor		30		Ohm
Sensitivity				75		mV/mT
Linearity Error*		±1.0 mT		0.5	1.0	%FS
Hysteresis		±1.0 mT		1		%FS
Operating Frequency*					1	MHz
Temperature Coefficient of Output*				15	30	ppm/°C

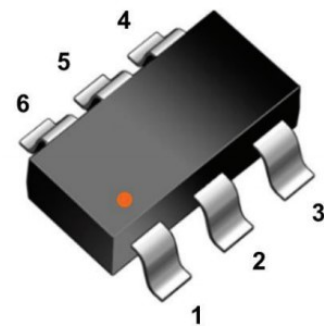
\*Note: Tested in closed-loop configuration as shown in Figure 3.

**Figure 1: Closed-loop Application Circuit**

Below is an example of the recommended closed-loop circuit for the half-bridge CT219 with +5V supply. The input bias current (field line current) should be approximately 5 mA. The typical value of  $R_{IN}$  is 30  $\Omega$ .

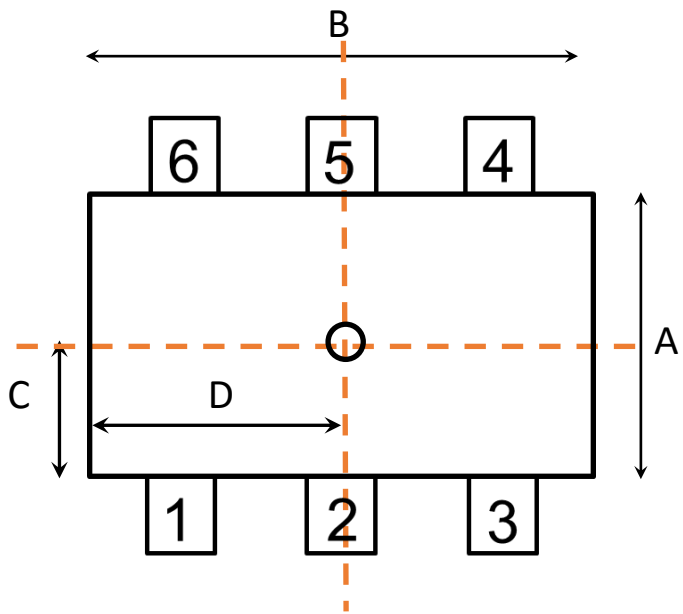


Pin Name	Pin #	Function
$I_{IN\ MID}$	1	Input Mid
$V_B$	2	Power/Ground
$I_{IN}$	3	Input Bias Current
$V_{OUT}$	4	Output Voltage
$I_{IN\ GND}$	5	Input Ground
$V_{B\ GND}$	6	Ground/Power



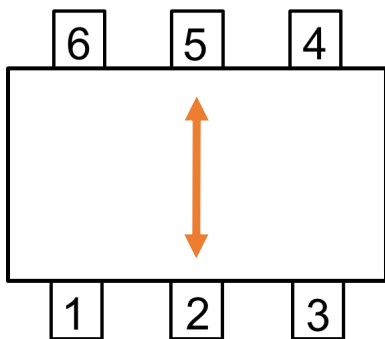
**Figure 2: TMR Sensor Location**

The center of the TMR sensor is centrally located in the package. When designing with the CT219, the magnetic field lines generated by the current carrying conductor should run through the TMR sensor as shown below. The polarity can also be adjusted to as noted in Figure 3.



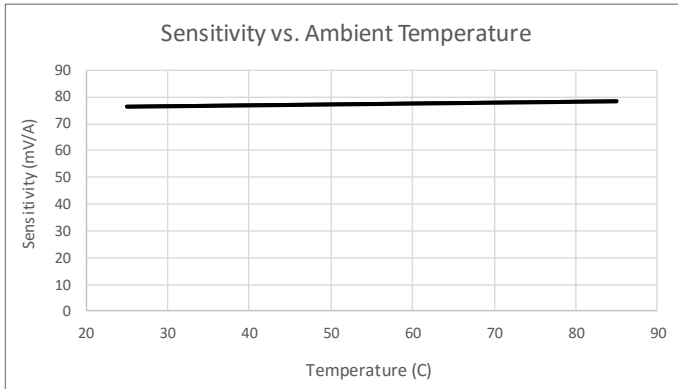
Symbol	Nominal Dimensions (mm)
A	1.60
B	2.90
C	0.65
D	1.43

**Figure 3: Axis of Sensitivity**

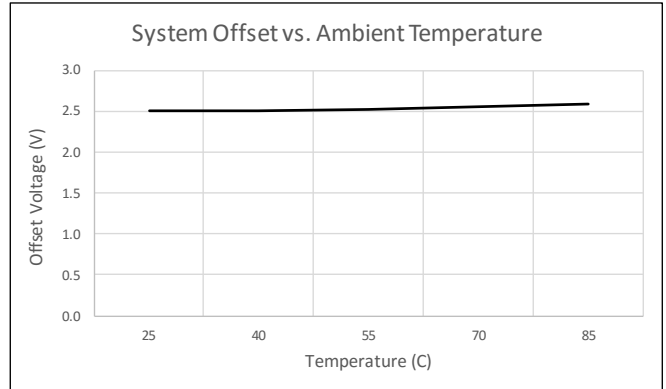


The arrow represent the axis of sensitivity of the two sensors inside the device (as referenced as Rout in Figure 1) that have their axis of sensitivity 180 degrees out of phase with each other.

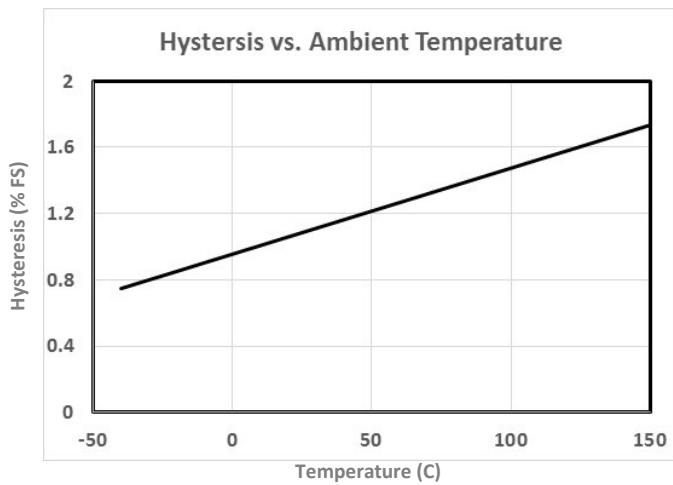
**Figure 4: Typical Performance Characteristics**



Note: Sensitivity based on current trace measurement on PCB

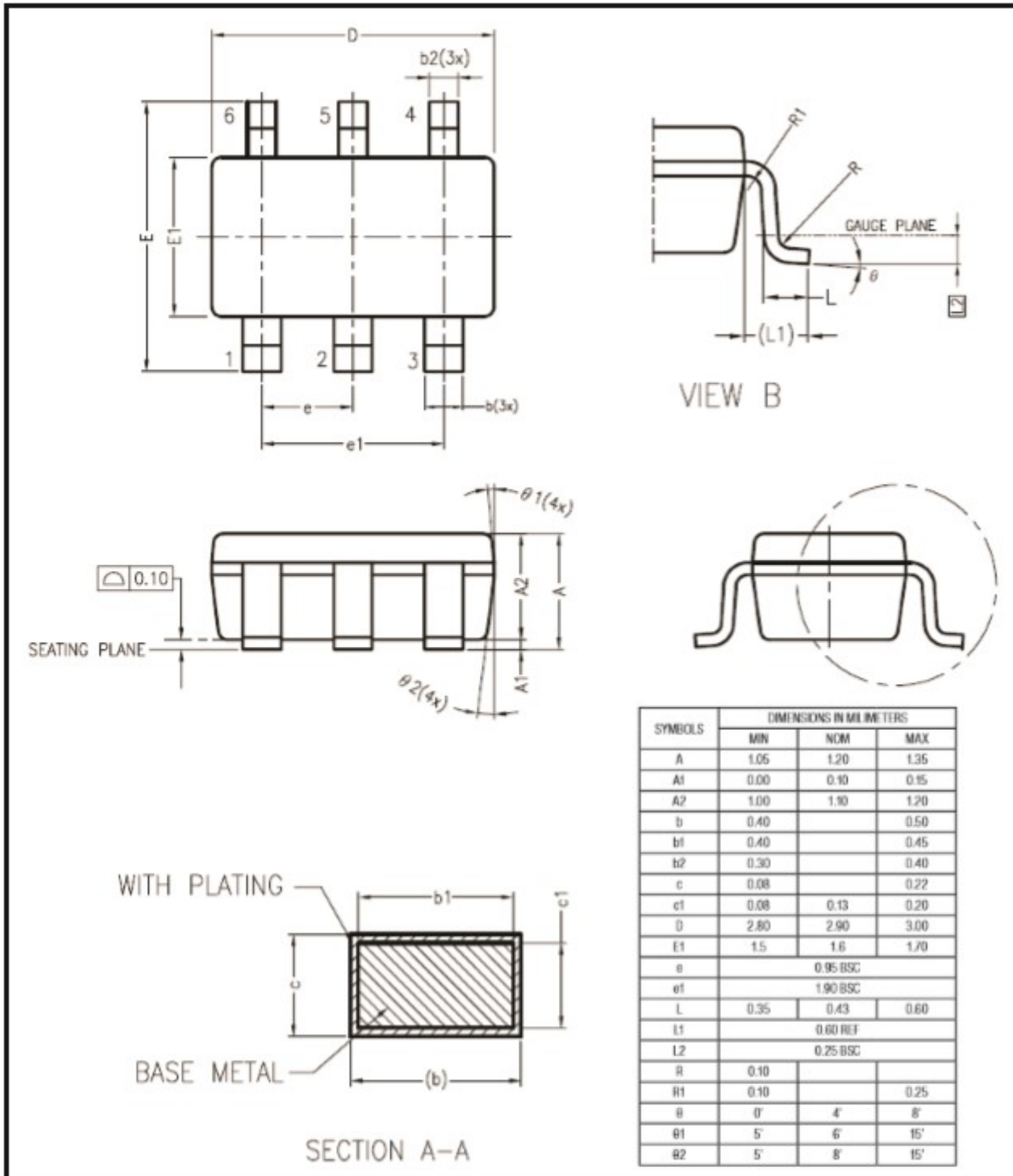


Note: Sensitivity based on current trace measurement on PCB



Output Voltage (V)

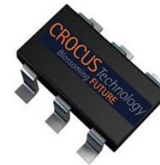
**Figure 5: Package Dimensions**



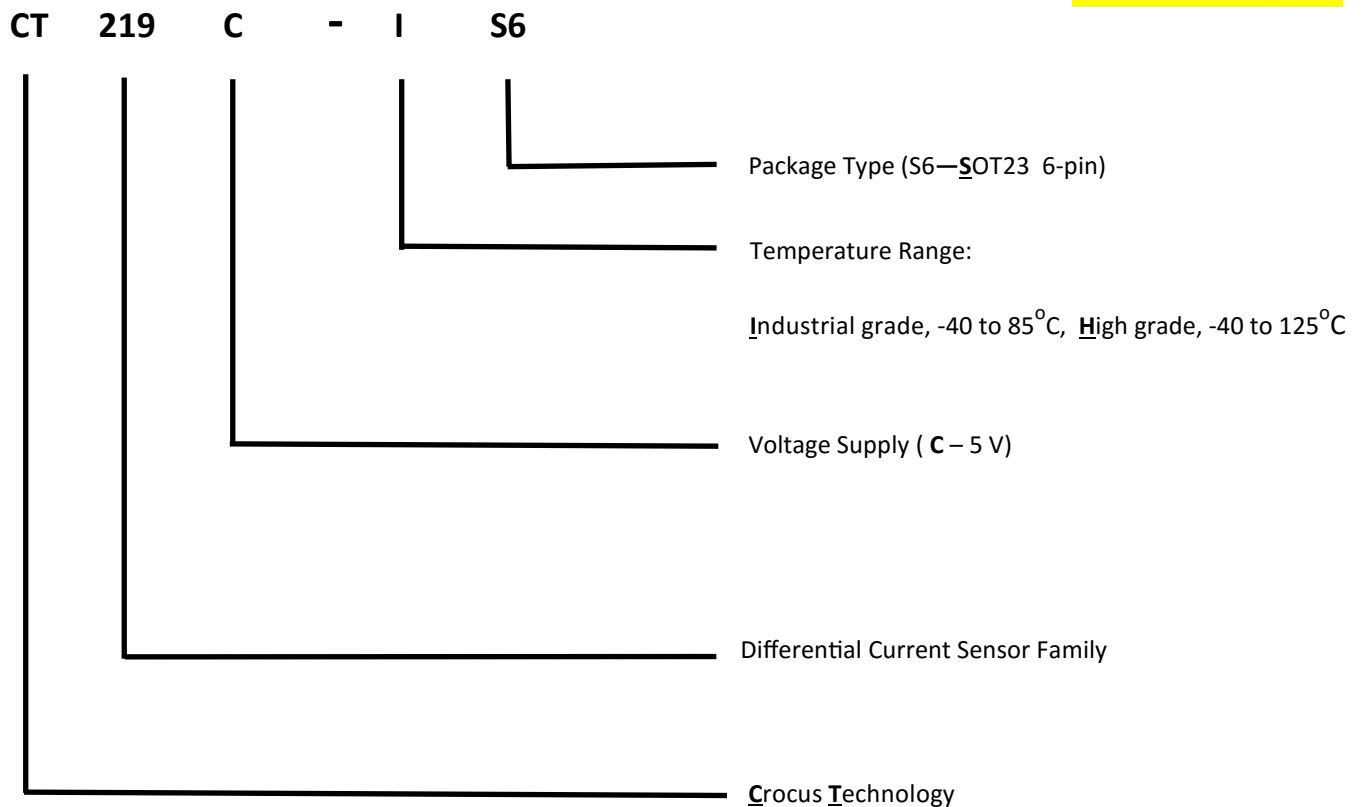
**Table 3: Order Guide**

Part Number	Operating Temperature	Description
CT219C—IS6	-40 to 85°C	Differential current sensor with differential output SOT-26 Package, Tape-and-reel packaging
CT219C—HS6 *	-40 to 125°C	

Note\*: For high temperature grade device availability consult factory.



**Figure 6: Part Number Legend**



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