

CT100 1D Linear Sensor

Features

- Operating Magnetic Field Range: ±50 mT
- Stable Magnetic Performance over Temperature
- Linearity Error: ±0.5% from -20 mT to +20 mT
- Differential Outputs
- Supply Voltage: 1.0 V to 5.5 V
- Operating Temperature: -40°C to +150°C
- Package Options:
 - o 6-lead SOT23
 - \circ 6-lead DFN, 1.50 \times 1.50 \times 0.45 mm

Applications

- Linear Measurements
- Proximity Sensing
- Current Sensing

Product Description

The CT100 is a 1D linear sensor in full-bridge configuration from Crocus Technology developed on its patented XtremeSense® TMR technology. The total magnetic field range for the CT100 is from -50 mT to +50 mT and it achieves a linearity error of $\pm 0.5\%$ for a range of -20 mT to +20 mT while providing XtremeSense® performance to achieve unparalleled temperature stability across the full temperature range. It supports a wide operating voltage range of 1.0 V to 5.5 V.

It is available in a 6-lead SOT23 package and for space critical applications, a low profile and small form factor 6-lead DFN package that is $1.50 \times 1.50 \times 0.45$ mm in size.

Ordering Information

Part Number	Operating Temperature Range	Output Type	Package	Packing Method
CT100LW-IS6-M	-40°C to +85°C	Differential	6-lead SOT23	Tape & Reel
	-40 C to +125 C		2.90 X 2.00 X 1.20 11111	
CT100LW-ID6-M	-40°C to +85°C	Differential	6-lead DFN	Tapa & Paal
CT100LW-HD6-M	-40°C to +125°C	Differential	1.50 x 1.50 x 0.45 mm	Tape & Reel

CT100

Block Diagram



Figure 1. CT100 Functional Block Diagram for SOT23-6



Figure 2. CT100 Functional Block Diagram for DFN-6



Figure 3. CT100 Axis of Sensitivity for SOT23-6 (Top Down View)



Figure 4. CT100 Axis of Sensitivity for DFN-6 (Top Down View)

Pin Configuration



Figure 5. CT100 Pin-out Diagram

Pin Definitions

SOT23-6 Pin #	Pin Name	Pin Description
1	X2	Differential Output X2
2	N/C	No Connect
3	X1	Differential Output X1
4	GND	Ground
5	N/C	No Connect
6	VDD	Supply Voltage

CT100

Pin Configuration



DFN-6 – Top-Down View

Figure 6. CT100 Pin-out Diagrams

Pin Definitions



DFN-6 – Bottoms Up View

DFN-6 Pin #	Pin Name	Pin Description
1	VDD	Supply Voltage
2	N/C	No Connect
3	GND	Ground
4	X1	Differential Output X1
5	N/C	No Connect
6	X2	Differential Output X2

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the CT100 and may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter		Min.	Max.	Unit
V _{DD}	Supply Voltage		-0.3	6.0	V
V _{OUT}	Analog Output Pins Maximum V	/oltage	-1560	+1560	mV
	Electrostatic Discharge	Human Body Model (HBM) per JESD22-A114	±4.0		
ESD Protection Level	Charged Device Model (CDM) per JESD22-C101	±1.0		κv	
B _{MAX}	Maximum Magnetic Field @ T _A = +25°C			±200	mT
T _{STG}	Storage Temperature		-65	+160	°C
TL	Lead Soldering Temperature, 10) Seconds		+260	°C

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual operation of the CT100. Recommended operating conditions are specified to ensure optimal performance to the specifications. Crocus Technology does not recommend exceeding them or designing to absolute maximum ratings.

Symbol	Parameter	Min.	Тур.	Max.	Unit	
Vdd	Supply Voltage Range		1.0	3.0	5.5	V
Vout	OUT Voltage Range		-1430		+1430	mV
BOPERATING	Operating Magnetic Field				±50	mT
		Industrial	-40	+25	+85	
TA	Operating Ambient Temperature	Extended Industrial	-40	+25	+125	°C
		Full Range	-40	+25	+150	

Electrical & Magnetic Specifications

Unless otherwise specified: V_{DD} = 1.0 V to 5.5 V and T_A = -40°C to +150°C. Typical values are V_{DD} = 3.0 V and T_A = +25°C.

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Units
Magnetic		•	•			
BOPERATING	Operating Magnetic Field ⁽¹⁾				±50	mT
Electrical						
RBRIDGE	Bridge Resistance		20		40	kΩ
D-	Power Consumption	V _{DD} = 3.0 V,		0.20		mW
FD	Power Consumption	$R_{BRIDGE} = 30 \ k\Omega$		0.30		
VOFFSET	Offset Voltage	$B_{OP} = \pm 20 \text{ mT}$	-5		+5	mV/V
S	Sensitivity (Full-bridge Gain)	BOPERATING = ±20 mT	3.8	4.5	5.2	mV/V/mT
TCRBRDIG	Temperature Coefficient				-750	nnm/°C
E	Resistance of Bridge ⁽¹⁾				100	
тсо	Temperature Coefficient of Offset Voltage ⁽¹⁾				±4.0	µV/V/°C
TCS	Temperature Coefficient of Sensitivity ⁽¹⁾			-250	-350	ppm/°C
L	Linearity	$B_{OP} = \pm 20 \text{ mT}$			±0.5	%
EHYST	Hysteresis Error	B _{OP} = ±20 mT, T _A = +25°C			0.05	%
0.1		f = 10 Hz, V _{DD} = 1.0 V,		700		nV _{RMS} /√H
еn		BOPERATING = 0 mT, T_A = +25°C	700			z

(1) Not tested in production. Guaranteed by design and characterization.

Electrical Characteristics

 V_{DD} = 1.0 V and T_A = +25°C.







Figure 8. Offset Voltage vs. Temperature

Recommended Application Circuit



Figure 9. CT100 (SOT23-6) Application Diagram

Table 1.	Recommended	External	Components

Component	Description	Vendor & Part Number	Parameter	Min.	Тур.	Max.	Unit
С _{вур} 0.1 µF, X7R		Murata GRM033Z71A104KE14	С		0.1		μF
		Others					

SECTION A-A

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SOT23-6 Package Drawing and Dimensions



SEE VIEW B



Symbol	Dimensions in Millimeters (mm)				
Symbol	Min.	Тур.	Max.		
Α	1.05	1.20	1.35		
A1	0.00	0.10	0.15		
A2	1.00	1.10	1.20		
b	0.40	-	0.50		
b1	0.40	-	0.45		
b2	0.30	-	0.40		
С	0.08	-	0.22		
c1	0.08	0.13	0.20		
D	2.80	2.90	3.00		
E	2.60	2.80	3.00		
E1	1.50	1.60	1.70		
е		0.95 BSC			
e1		1.90 BSC			
L	0.35	0.43	0.60		
L1		0.60 REF			
L2		0.25 BSC			
R	0.10	-	-		
R1	0.10	-	0.25		
θ	0°	4°	8°		
θ1	5°	6°	15°		
θ2	5°	8°	15°		

Table 2. CT100 6-Lead SOT23 Package Dimensions

Crocus Technology provides package drawings as a service to customers considering or planning to use Crocus products in their designs. Drawings may change without notice. Please note the revision and date of the data sheet and contact a Crocus Technology representative to verify or obtain the most recent version. The package specifications do not expand the terms of Crocus Technology's worldwide terms and conditions, specifically the warranty therein, which covers Crocus Technology's products.

SOT23 Tape & Pocket Drawing and Dimensions



NOTES:

- 1. Material: Conductive Polystyrene
- 2. Dimensions in mm.
- 3. 10 sprocket hole pitch cumulative tolerance ± 0.20 mm.
- 4. Camber bot to exceed 1 mm in 100 mm.
- 5. Pocket position relative to sprocket hole measured as true position of pocket and not pocket hole.
- 6. (S.R. Ω /sq) means surface electric resistivity of the carrier tape.

Figure 11. Tape and Pocket Drawing for SOT23 Package

DFN-6 Package Drawing and Dimensions



Figure 12. DFN-6 Package Drawing

Table 3.	CT100	DFN-6	Package	Dimensions
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Symbol	Dimensions in Millimeters (mm)					
Symbol	Min.	Тур.	Max.			
A	0.40	0.45	0.50			
A1	0.00	0.02	0.05			
b	0.15	0.20	0.25			
С	-	0.15 REF	-			
D	1.40	1.50	1.60			
D2	1.15	1.20	1.25			
E	1.40	1.50	1.60			
E2	0.65	0.70	0.75			
е	-	0.50	-			
L	0.15	0.20	0.25			
у	0.000	-	0.075			

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DFN-6 Tape & Pocket Drawing and Dimensions



NOTES:

- I. Measured from centerline of sprocket hole to centerline of pocket.
- II. Cumulative tolerance of 10 sprocket holes is ± 0.20 .
- III. Measured from centerline of sprocket hole to centerline of pocket.
- IV. Other material available.

Figure 13. Tape and Pocket Drawing for DFN-6 Package

Symbol	Dimension (mm)
Ao	1.70 ± 0.05
Во	1.70 ± 0.05
Ko	0.60 ± 0.05
F	3.50 ± 0.05
P1	4.00 ± 0.10
DW	8.00 ± 0.30

Table 4. DFN-6 Tape and Pocket Dimensions

Package Information

Table 5.	CT100	Package	Information
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Part Number	Package Type	# of Leads	Package Quantity	Lead Finish	Eco Plan ⁽¹⁾	MSL Rating ⁽²⁾	Operating Temperature ⁽³⁾	Device Marking
CT100LW-IS6-M	SOT23	6	3,000	Sn	Green & RoHS	1	-40°C to +85°C	CT YWWS
CT100LW-HS6-M	SOT23	6	3,000	Sn	Green & RoHS	1	-40°C to +125°C	CT YWWS
CT100LW-ID6-M	DFN	6	3,000	Sn	Green & RoHS	1	-40°C to +85°C	C YZ
CT100LW-HD6-M	DFN	6	3,000	Sn	Green & RoHS	1	-40°C to +125°C	C YZ

(1) RoHS is defined as semiconductor products that are compliant to the current EU RoHS requirements. It also will meet the requirement that RoHS substances do not exceed 0.1% by weight in homogeneous materials. Green is defined as the content of Chlorine (CI), Bromine (Br) and Antimony Trioxide based flame retardants satisfy JS709B low halogen requirements of ≤ 1,000 ppm.

(2) MSL Rating = Moisture Sensitivity Level Rating as defined by JEDEC standard classifications.

(3) Package will withstand ambient temperature range of -40°C to +150°C and storage temperature range of -65°C to +160°C.

(4) Device Marking for SOT23 is defined as XZ YWWS where XZ = part number, Y = year, WW = work week and S = sequential number. DFN is defined as X where X = part number and YZ = date code information.

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Product Status Definition

Data Sheet Identification	Product Status	Definition
Objective	Proposed New Product Idea or In Development	Data sheet contains design target specifications and are subject to change without notice at any time.
Preliminary	First Production	Data sheet contains preliminary specifications obtained by measurements of early samples. Follow-on data will be published at a later date as more test data is acquired. Crocus reserves the right to make changes to the data sheet at any time.
None	Full Production	Data sheet contains final specifications for all parameters. Crocus reserves the right to make changes to the data sheet at any time.
Obsolete	Not in Production	Data sheet for a product that is no longer in production at Crocus. It is for reference only.