

Product Description

The CT512 Series is an integrated magnetic sensor especially designed for consumer switching applications based on Crocus Technology's patented Magnetic Logic Unit™ (MLU™) technology with integrated CMOS process. The CT512 Series operates with low power consumption in low magnetic fields and large air gaps with industry leading high frequency performance.



The CT512 Series provides design flexibility with high sensitivity in a small footprint SOT-23 package and is cost effective for high volume manufacturing. Custom solutions are available.

Features and Benefits

- High sensitivity
- Stable temperature performance
- Resistant to mechanical stress
- Low power
- High frequency performance
- Digital output
- Cost-effective
- RoHS Compliant

Application Examples

- Door or lid closure detection
- Smart phones, tablets, and laptops
- Reed switch replacement
- Motor controllers
- Proximity detection
- Power switch or open-close detection
- Water, electric, and gas utility meters
- Fluid level detection

Table 1: Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vs		7	V
Supply Current	I _{dd}		15	mA
Operating Temp	T _a	-40	85	°C
Storage Temp	T _s		150	°C
Soldering Temp	T		260	°C
ESD Level (HBM)	V _{esd}		4,000	V

Table 2: Electrical Characteristics for CT512VA Series

Supply Voltage = 3.0V, T_a = 25C unless otherwise specified.

Characteristic	Symbol	Min	Typ	Max	Unit
Operating Temperature		-40	25	85	°C
Operating Magnetic Flux	B	0		10	mT
Supply Voltage	V _{cc}	2.7	3.0	3.3	V
Output Voltage High	V _{oh}		2.7		V
Output Voltage Low	V _{ol}		0.2		V
Active Mode Current	I _{on}			80	μA
Sleep Mode Current	I _{stb}			170	nA
Average Current	I _{avg}		350		nA
Switching Frequency	F _{sw}		10		Hz
Awake Mode Time	t _{aw}		80		μS
Standby Mode Time	T _{stb}		43		mS
Duty Cycle	DC		0.2		%

Table 3: Electrical Characteristics for CT512VB Series

Supply Voltage = 3.0V, Ta = 25C unless otherwise specified.

Characteristic	Symbol	Min	Typ	Max	Unit
Operating Temperature		-40	25	85	°C
Operating Magnetic Flux	B	0		10	mT
Supply Voltage	Vcc	2.7	3.0	3.3	V
Output Voltage High	Voh		2.7		V
Output Voltage Low	Vol		0.2		V
Active Mode Current	Ion			80	μA
Sleep Mode Current	Istb			170	nA
Average Current	Iavg		2		μA
Switching Frequency	Fsw		100		Hz
Awake Mode Time	taw		80		μS
Standby Mode Time	Tstb		3.5		mS
Duty Cycle	DC		2.2		%

Table 4: Electrical Characteristics for CT512VC Series

Supply Voltage = 3.0V, Ta = 25C unless otherwise specified.

Characteristic	Symbol	Min	Typ	Max	Unit
Operating Temperature		-40	25	85	°C
Operating Magnetic Flux	B	0		10	mT
Supply Voltage	Vcc	2.7	3.0	3.3	V
Output Voltage High	Voh		2.7		V
Output Voltage Low	Vol		0.2		V
Active Mode Current	Ion			80	μA
Sleep Mode Current	Istb			170	nA
Average Current	Iavg		20		μA
Switching Frequency	Fsw		1.5		KHz
Awake Mode Time	taw		80		μS
Standby Mode Time	Tstb		240		μS
Duty Cycle	DC		25		%

Table 5: Magnetic Characteristics

Supply Voltage = 3.0V

Characteristic	Symbol	Conditions	Min	Typ	Max	Unit
Operate Point	B_{OP}	$T_a = -40C$ to $85C$	2	3	4	mT
Release point	B_{RP}	$T_a = -40C$ to $85C$	0.8	1.5	2.5	mT
Hysteresis	B_{HYS}	$B_{OP} - B_{RP}$, $T_a = -40C$ to $85C$		1.5		mT

Figure 1: Magnetic Flux

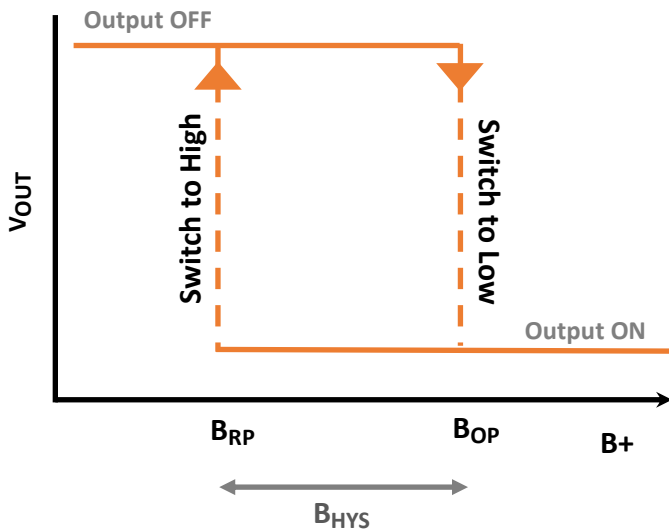


Table 6: Output Behavior versus Magnetic Field

Characteristic	Conditions	Output
South Pole	$B > B_{OP}$	Low
Null or weak magnetic field	$B < B_{RP}$	High
North Pole	$B > B_{OP}$	High

Figure 2: CT512 Series Digital Functional Block Diagram

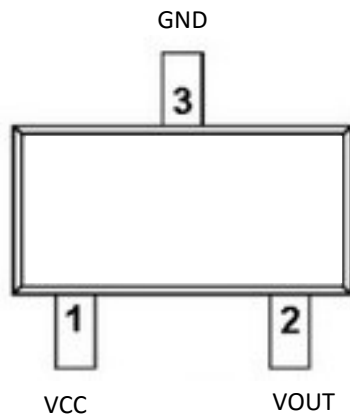
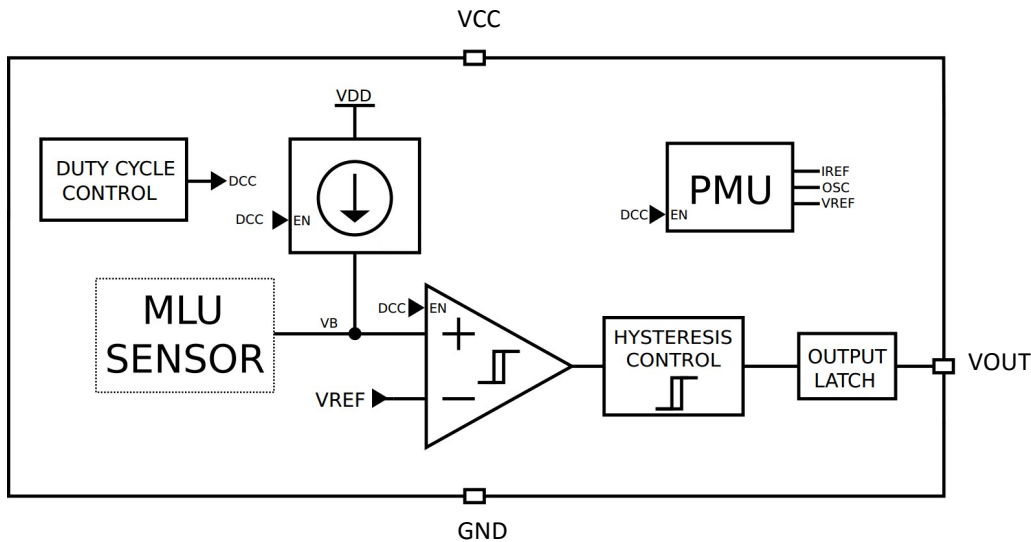
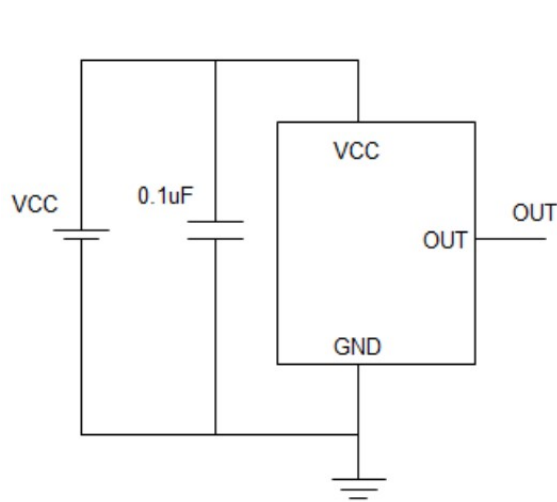


Figure 3: Application Circuit

A decoupling capacitor between the supply voltage and ground is required with placement close to the magnetic sensor. A typical capacitor value of 0.1 uF will suffice.



CT512 Digital Output

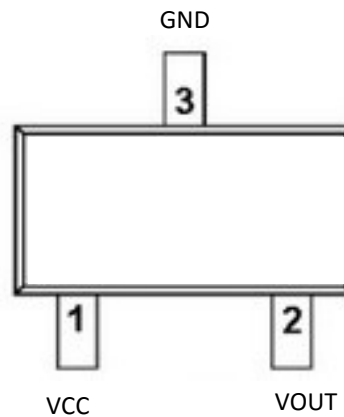
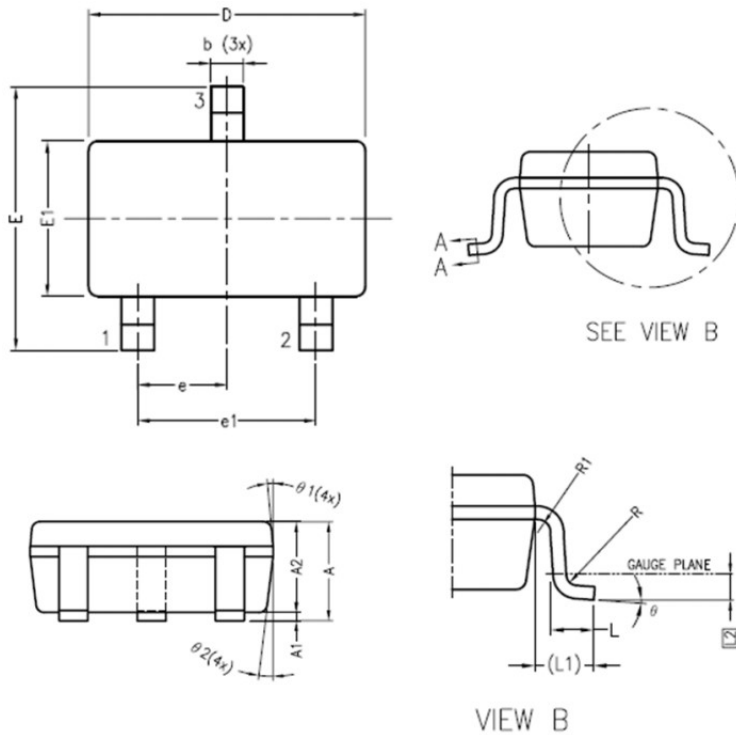


Figure 4: Package Dimensions



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	1.05	1.20	1.35
A1	0.00	0.10	0.15
A2	1.00	1.10	1.20
b	0.30	—	0.50
b1	0.30	0.35	0.45
c	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
e	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°
θ_1	5°	6°	15°
θ_2	5°	8°	15°

Figure 5: Sensor Polarity Configuration

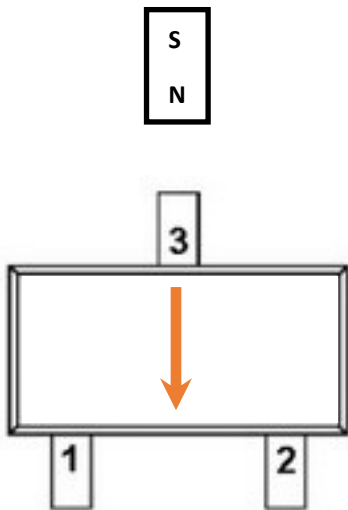
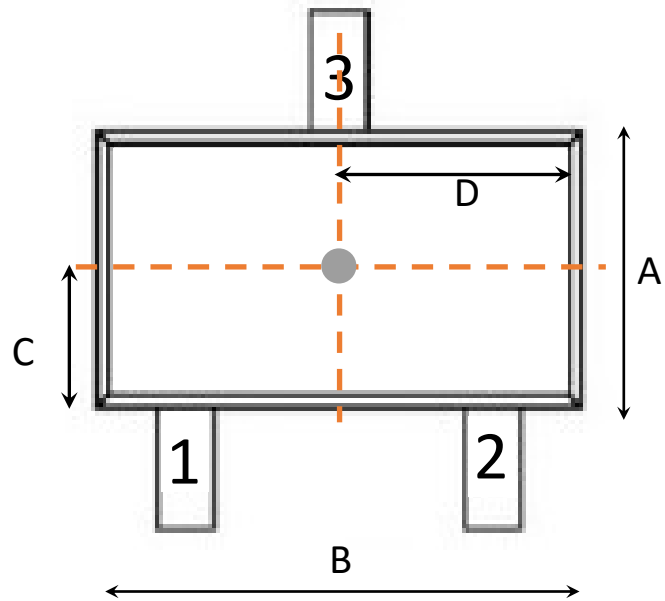


Figure 6: MLU Sensor Location

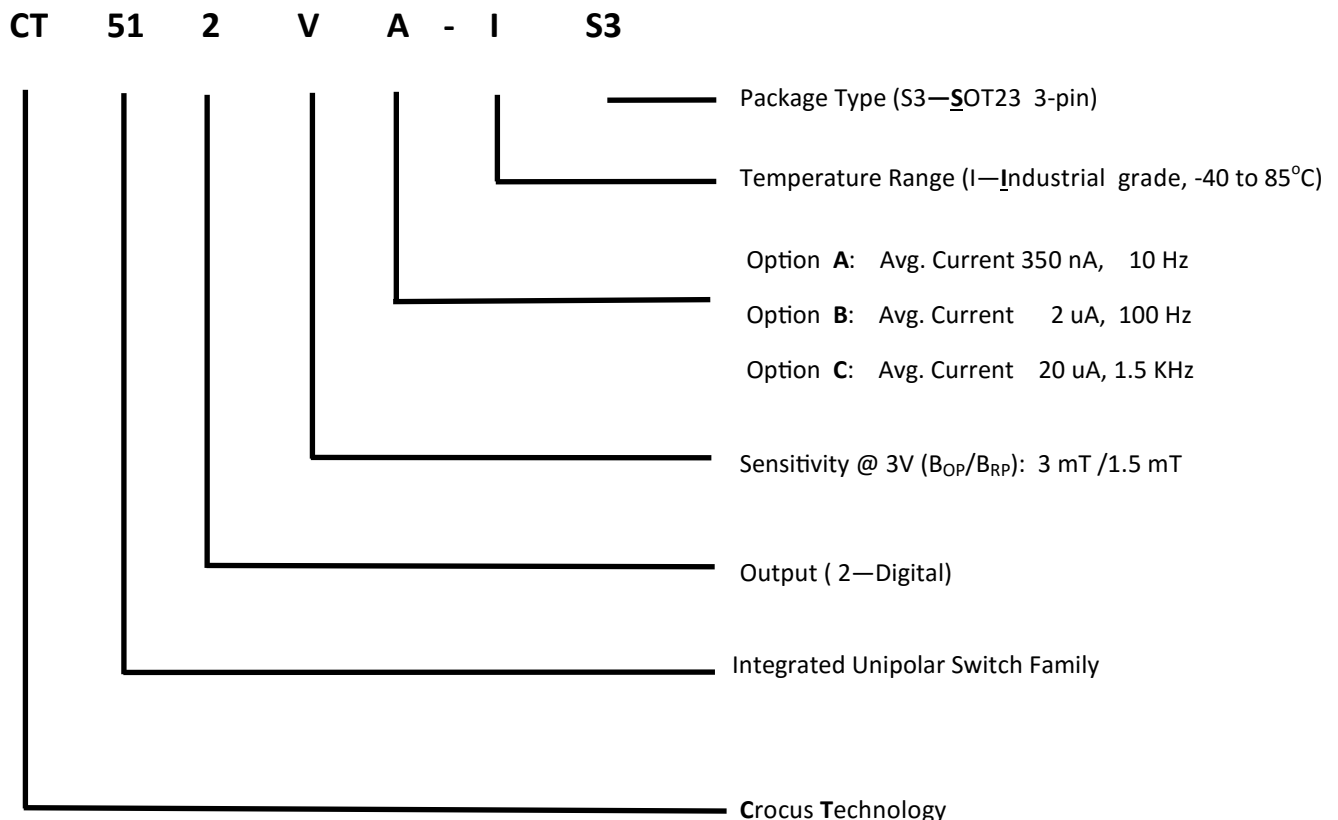


Symbols	Nominal Dimensions
A	1.60
B	2.90
C	0.80
D	1.45

Table 7: Order Guide

Part Number	Output	Operating Temperature	Description
CT512VA-IS3 CT512VB-IS3 CT512VC-IS3	Digital	-40 to 85 °C	CT512 Series Unipolar magnetic switch with digital output, SOT-23 Package, Tape-and-reel packaging (3,000 units per reel)

Figure 7: Part Number Legend



Revision Number	Revision Date	Summary of Changes
0.1	12/15/16	Datasheet Initiated
0.2	01/7/16	Updated Part Number Guide. Deleted awake and sleep mode times. Updated Order Guide.
0.3	2/11/16	Updated Switch Point Sensitivity.
0.4	4/22/16	Updated Switch Point Sensitivity
0.5	5/5/16	Updated temperature range
0.6	6/2/16	Removed Preliminary Watermark
0.7	7/19/16	Updated Part Numbering System. Added Sensitivity Designator and removed supply voltage designator
0.8	7/27/16	Added Revision Table
0.9	8/1/16	Updated Switch Point Sensitivity and application circuit requirement.
1.0	8/26/16	Updated polarity

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