CROCUS TECHNOLOGY
Intelligence in Sensing™

CT813x

Integrated Omnipolar TMR Digital Latches

Features

- Sensitivity with B_{OP} Range: 0.9 mT to 7.0 mT
- Ultra-low Power Consumption: ~110 nA @ V_{DD} = 1.8 V and f_S = 2 Hz
- Supply Voltage Range: 1.7 V to 5.5 V
- Sensor Polarity: Omnipolar
- Digital CMOS Outputs:
  - Push-pull
  - Open Drain
- Under-Voltage Lockout (UVLO)
- Package Options:
  - 3-Lead SOT23
  - 4-lead LGA, 1.45 × 1.45 × 0.44 mm

Applications

- IoT Devices
- Smartphones, Tablets and Laptops
- Door or Lid Closure
- Reed Switch Replacement
- Tamper-proofing for Utility Smart Meters
- Fluid Level Sensing/Detection
- Proximity Detection
- Motor Controllers
- Gimbals for Camera Systems in Drones/UAVs
- Industrial Machinery/Robots
- Medical Devices

Product Description

The CT813x series of omnipolar Tunnel Magneto-resistance (TMR) digital latches are designed for consumer and industrial applications. They are based on Crocus Technology's patented XtremeSense™ TMR technology with integrated CMOS process to provide a monolithic solution for superior sensing performance. The CT813x digital latches offer stable magnetic operation over the operating temperature range.

This product family has very low power consumption as low as 110 nA which is ideal for battery-operated products where minimal current consumption is required. It supports magnetic fields down to 0.9 mT for applications where there is a large air gap requirement.

For applications that require a very small form factor and low profile, the CT813x is assembled in a 4-lead LGA package. It is also available in an industry standard package 3-lead SOT-23 to support high volume manufacturing for industrial markets.

Ordering Information

Part Number	Operating Temperature Range	Sensor Type	Output	B_{OP} (mT)	B_{RP} (mT)	f_S	Package	Packing Method
CT8131BV-IL4	-40°C to +85°C	Omnipolar	Open Drain	±3.0	±2.0	2 Hz	4-lead LGA	Tape & Reel
CT8131BV-HL4	-40°C to +125°C							
CT8131BV-IS3	-40°C to +85°C	Omnipolar	Open Drain	±3.0	±2.0	2 Hz	3-lead SOT23	Tape & Reel
CT8131BV-HS3	-40°C to +125°C							
CT8132BH-IS3	-40°C to +85°C	Omnipolar	Push-pull	±3.0	±2.0	10 kHz	3-lead SOT23	Tape & Reel
CT8132BH-HS3	-40°C to +125°C							
CT8132BL-IS3	-40°C to +85°C	Omnipolar	Push-pull	±3.0	±2.0	250 Hz	3-lead SOT23	Tape & Reel
CT8132BL-HS3	-40°C to +125°C							
CT8132BV-IL4	-40°C to +85°C	Omnipolar	Push-pull	±3.0	±2.0	2 Hz	4-lead LGA	Tape & Reel
CT8132BV-HL4	-40°C to +125°C							
CT8132BV-IS3	-40°C to +85°C	Omnipolar	Push-pull	±3.0	±2.0	2 Hz	3-lead SOT23	Tape & Reel
CT8132BV-HS3	-40°C to +125°C							
CT8132DM-IS3	-40°C to +85°C	Omnipolar	Push-pull	±1.5	±1.0	2.5 kHz	3-lead SOT23	Tape & Reel
CT8132DM-HS3	-40°C to +125°C							
CT8132EK-IS3	-40°C to +85°C	Omnipolar	Push-pull	±7.0	±5.0	10 Hz	3-lead SOT23	Tape & Reel
CT8132EK-HS3	-40°C to +125°C							
CT8132SK-IL4	-40°C to +85°C	Omnipolar	Push-pull	±0.9	±0.5	10 Hz	4-lead LGA	Tape & Reel
CT8132SK-HL4	-40°C to +125°C							
CT8132SK-IS3	-40°C to +85°C	Omnipolar	Push-pull	±0.9	±0.5	10 Hz	3-lead SOT23	Tape & Reel
CT8132SK-HS3	-40°C to +125°C							
CT8132SL-IS3	-40°C to +85°C	Omnipolar	Push-pull	±0.9	±0.5	250 Hz	3-lead SOT23	Tape & Reel
CT8132SL-HS3	-40°C to +125°C							

Block Diagram

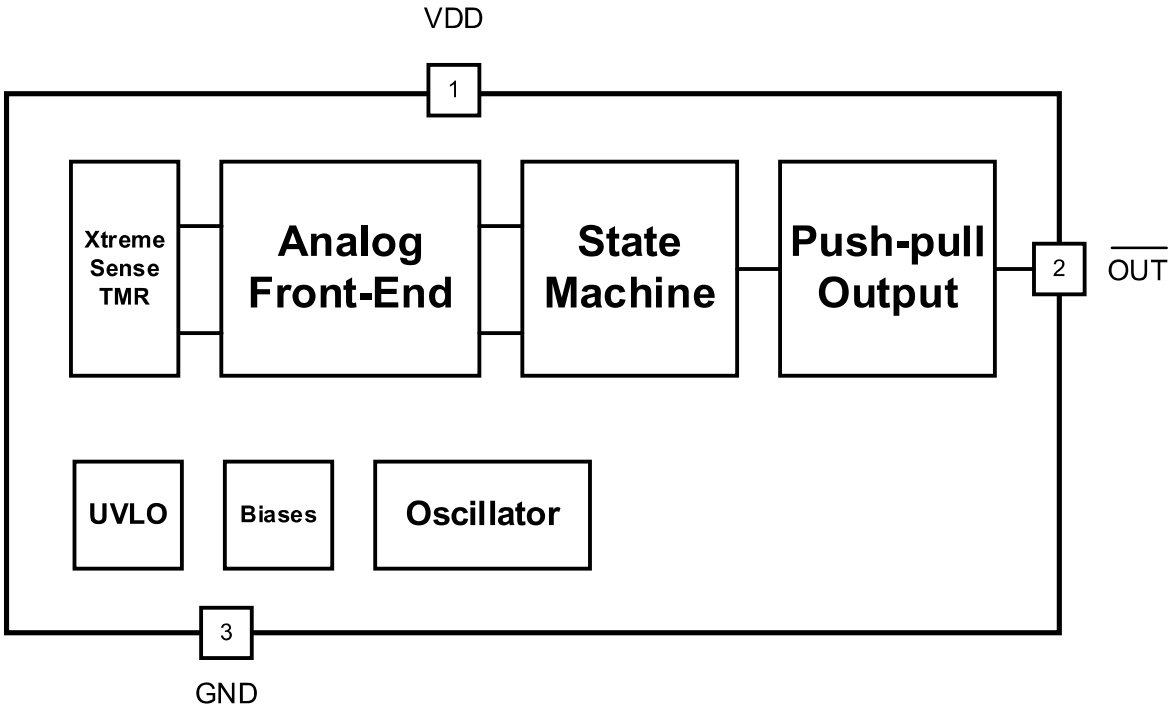

Figure 1. CT8132 with Push-pull Output Block Diagram for 3-lead SOT23 Package

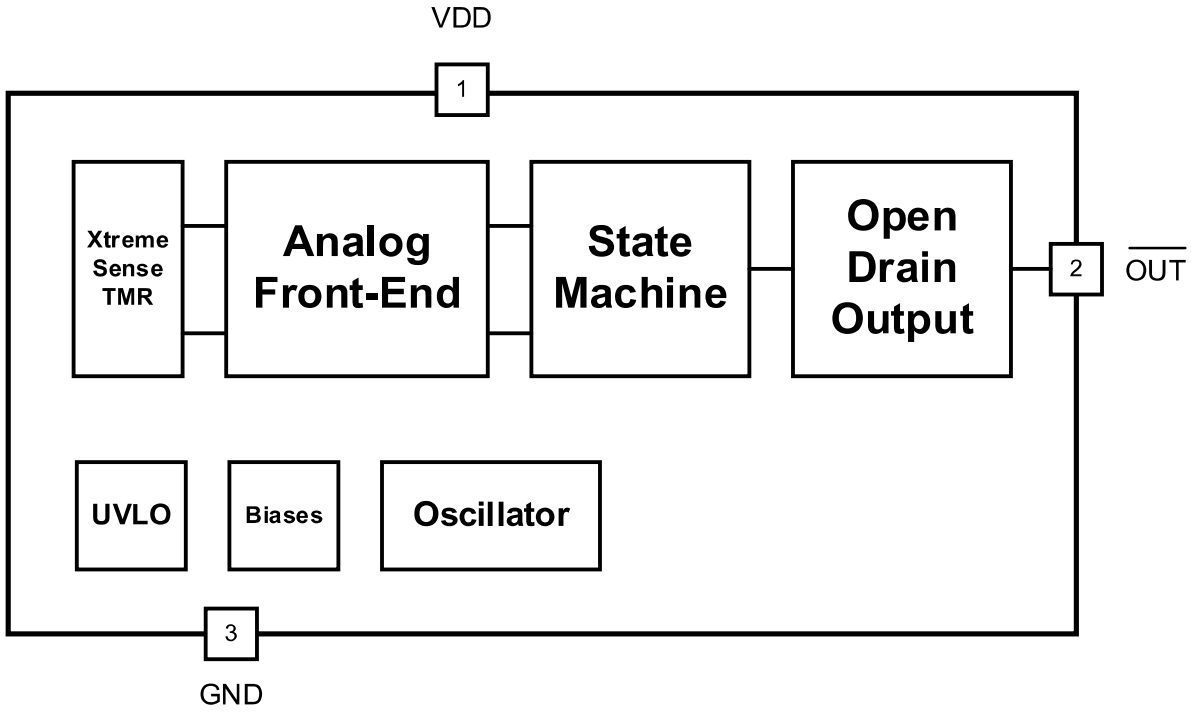

Figure 2. CT8131 with Open Drain Output Block Diagram for 3-lead SOT23 Package

SOT23 Pin Configuration

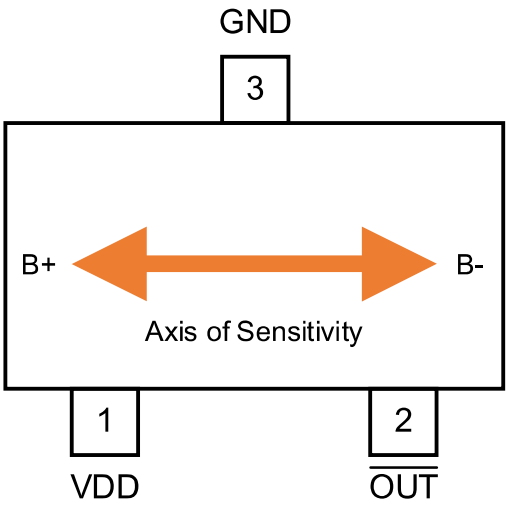

Figure 3. CT813x: 3-Lead SOT23 Package for Digital Output

Pin Definitions

Pin #	Pin Name	Pin Description
1	VDD	Supply Voltage
2	$\overline{\text{OUT}}$	Output Signal (Active LOW)
3	GND	Ground

LGA Pin Configuration

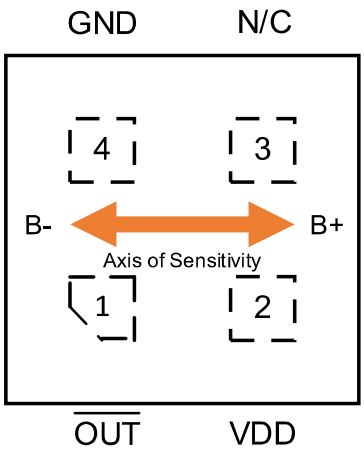

Figure 4. CT8131: 4-Lead LGA Package with Digital Output, Top View

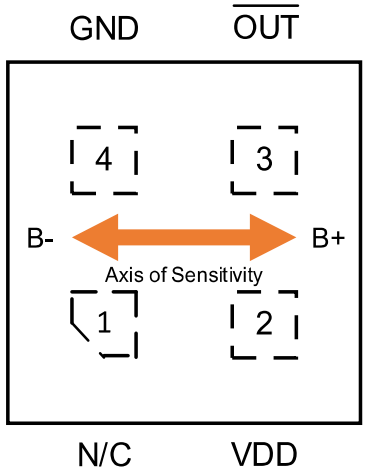

Figure 5. CT8132: 4-Lead LGA Package with Digital Output, Top View

Pin Definitions

Pin #	CT8131	CT8132	Pin Description
1	$\overline{OUT}$	N/C	Output Signal for Open Drain (Active LOW) N/C – No Connect
2	VDD	VDD	Supply Voltage
3	N/C	$\overline{OUT}$	N/C – No Connect Output Signal for Push-pull (Active LOW)
4	GND	GND	Ground

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the CT813x. The CT813x products 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. Crocus Technology does not recommend exceeding or designing to absolute maximum ratings.

Symbol	Parameter		Min.	Max.	Unit
V_{DD}	Supply Voltage		-0.3	6.0	V
V_{OUT_PP}	Push-pull Output (Active LOW)		-0.3	V_{DD} + 0.3	V
V_{OUT_OD}	Open Drain Output (Active LOW)		-0.3	6.0	V
$V_{I/O}$	Input/Output Pins Maximum Voltage		-0.3	V_{DD} + 0.3	V
I_{IN} / I_{OUT}	Input and Output Current			±20.0	mA
B_{MAX}	Maximum External Magnetic Field @ T_A = +25°C	CT8132Sx		±60	mT
		CT813xBx, CT8132DM, CT8132EK		±200	
ESD	Electrostatic Discharge Protection Level	Human Body Model (HBM) per JESD22-A114	±4.0		kV
		Charged Device Model (CDM) per JESD22-C101	0.5		
T_J	Junction Temperature		-40	+150	°C
T_{STG}	Storage Temperature		-65	+150	°C
T_L	Lead Soldering Temperature, 10 Seconds			+260	°C

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual operation of the CT813x. Recommended operating conditions are specified to ensure optimal performance to the specifications. Crocus Technology does not recommend exceeding or designing to absolute maximum ratings.

Symbol	Parameter		Min.	Typ.	Max.	Unit
V_{DD}	Supply Voltage Range		1.7	3.3	5.5	V
V_{OUT}	OUT Voltage Range		0		V_{DD}	V
B_{OP}	Operating Magnetic Flux				30	mT
I_{OUT}	OUT Current				±3.0	mA
C_{BYP}	Bypass Capacitor			1.0		µF
T_A	Operating Ambient Temperature	Industrial	-40	+25	+85	°C
		Extended Industrial	-40	+25	+125	

Thermal Properties

Junction-to-ambient thermal resistance is a function of application and board layout and is determined in accordance to JEDEC standard JESD51 for a four (4) layer 2s2p FR-4 printed circuit board (PCB) with 2 oz. of copper (Cu). Special attention must be paid to not exceed junction temperature $T_{J(MAX)}$ at a given ambient temperature T_A.

Symbol	Parameter	Min.	Typ.	Max.	Unit
θ_{JA}	Junction-to-Ambient Thermal Resistance, SOT23-3		202		°C/W
θ_{JA}	Junction-to-Ambient Thermal Resistance, LGA-4		165		°C/W

Electrical Specifications

General Parameters

Unless otherwise specified: V_{DD} = 1.7 V to 5.5 V, C_{BYP} = 1.0 µF and T_A = -40°C to +125°C. Typical values are V_{DD} = 3.3 V and T_A = +25°C.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Push-pull Output						
V_{OH}	Output Voltage High $\overline{OUT}$ (1)		0.9 × V_{DD}			V
V_{OL}	Output Voltage LOW $\overline{OUT}$ (1)				0.1 × V_{DD}	V
I_{OUT}	Current for $\overline{OUT}$ (1)			±2.0		mA
Open Drain Output						
V_{OH}	Output Voltage High (1)				5.5	V
V_{OL}	Output Voltage Low	I_{OUT} ≤ 20 mA	0		0.5	V
I_{LEAK}	High Output Leakage Current (1)	V_{OH} = 5.5 V, B_{OP} = 0		20		pA
Timings						
t_{ON}	Power-On Time (1)	V_{DD} ≥ 1.7 V		50	75	µs
t_{ACTIVE}	Active Mode Time (1)			2.6		µs
Protection						
V_{UVLO}	Under-Voltage Lockout (1)	Rising V_{DD}		1.60	1.64	V
		Falling V_{DD}	1.44	1.53		V
V_{UV_HYS}	UVLO Hysteresis (1)			70		mV

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

Typical Timing Characteristics

V_{DD} = 3.3 V, T_A = +25°C and C_{BYP} = 1.0 µF (unless otherwise specified)

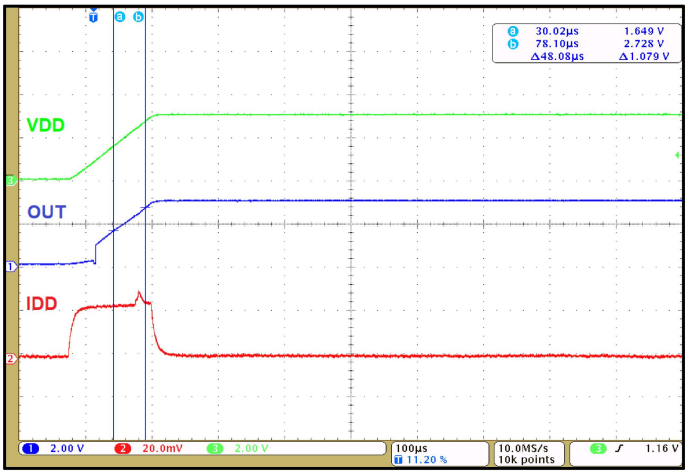

Figure 6. Power-On Time for Push-pull Output

CT8131BV Electrical & Magnetic Specifications

Unless otherwise specified: V_{DD} = 1.7 V to 5.5 V, C_{BYP} = 1.0 µF and T_A = -40°C to +125°C. Typical values are V_{DD} = 3.3 V and T_A = +25°C.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_{DD(AVG)}$	Average Supply Current	t ≥ 10 s		140	900	nA
$I_{DD(AVG)\_1.8V}$	Average Supply Current @ V_{DD} = 1.8 V	t ≥ 10 s, V_{DD} = 1.8 V		110	900	nA
f_{S1}	Sampling Frequency		1	2	4	Hz
t_{IDLE1}	Idle Mode Time	f_S = 2 Hz	250	500	1000	ms
B_{OPN}	Operate Point, B-		+2.3	+3.0	+3.8	mT
B_{OPS}	Operate Point, B+		-3.8	-3.0	-2.3	mT
B_{RPN}	Release Point, B-		+1.4	+2.0	+2.7	mT
B_{RPS}	Release Point, B+		-2.7	-2.0	-1.4	mT
B_{HYST}	Hysteresis		0.5	1.0		mT

CT8132BH Electrical & Magnetic Specifications

Unless otherwise specified: V_{DD} = 1.7 V to 5.5 V, C_{BYP} = 1.0 µF and T_A = -40°C to +125°C. Typical values are V_{DD} = 3.3 V and T_A = +25°C.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_{DD(AVG)}$	Average Supply Current	t ≥ 10 s		36		µA
$I_{DD(AVG)\_1.8V}$	Average Supply Current @ V_{DD} = 1.8 V	t ≥ 10 s, V_{DD} = 1.8 V		32		µA
f_S	Sampling Frequency		6	10	14	kHz
t_{IDLE}	Idle Mode Time	f_S = 10 kHz	71	100	167	µs
B_{OPN}	Operate Point, B-		+2.3	+3.0	+3.8	mT
B_{OPS}	Operate Point, B+		-3.8	-3.0	-2.3	mT
B_{RPN}	Release Point, B-		+1.4	+2.0	+2.7	mT
B_{RPS}	Release Point, B+		-2.7	-2.0	-1.4	mT
B_{HYST}	Hysteresis		0.5	1.0		mT

CT8132BL Electrical & Magnetic Specifications

Unless otherwise specified: V_{DD} = 1.7 V to 5.5 V, C_{BYP} = 1.0 µF and T_A = -40°C to +125°C. Typical values are V_{DD} = 3.3 V and T_A = +25°C.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_{DD(AVG)}$	Average Supply Current	t ≥ 10 s		1.2	3.0	µA
$I_{DD(AVG)\_1.8V}$	Average Supply Current @ V_{DD} = 1.8 V	t ≥ 10 s, V_{DD} = 1.8 V		1.0	2.5	µA
f_S	Sampling Frequency		150	250	350	Hz
t_{IDLE}	Idle Mode Time	f_S = 250 Hz	2.8	4.0	6.7	ms
B_{OPN}	Operate Point, B-		+2.3	+3.0	+3.8	mT
B_{OPS}	Operate Point, B+		-3.8	-3.0	-2.3	mT
B_{RPN}	Release Point, B-		+1.4	+2.0	+2.7	mT
B_{RPS}	Release Point, B+		-2.7	-2.0	-1.4	mT
B_{HYST}	Hysteresis		0.5	1.0		mT

CT8132BV Electrical & Magnetic Specifications

Unless otherwise specified: V_{DD} = 1.7 V to 5.5 V, C_{BYP} = 1.0 µF and T_A = -40°C to +125°C. Typical values are V_{DD} = 3.3 V and T_A = +25°C.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_{DD(AVG)}$	Average Supply Current	t ≥ 10 s		140	900	nA
$I_{DD(AVG)\_1.8V}$	Average Supply Current @ V_{DD} = 1.8 V	t ≥ 10 s, V_{DD} = 1.8 V		110	900	nA
f_S	Sampling Frequency		1	2	4	Hz
t_{IDLE}	Idle Mode Time	f_S = 2 Hz	250	500	1000	ms
B_{OPN}	Operate Point, B-		+2.3	+3.0	+3.8	mT
B_{OPS}	Operate Point, B+		-3.8	-3.0	-2.3	mT
B_{RPN}	Release Point, B-		+1.4	+2.0	+2.7	mT
B_{RPS}	Release Point, B+		-2.7	-2.0	-1.4	mT
B_{HYST}	Hysteresis		0.5	1.0		mT

Typical Electrical Characteristics for CT813xBV

V_{DD} = 3.3 V, T_A = +25°C and C_{BYP} = 1.0 µF (unless otherwise specified)

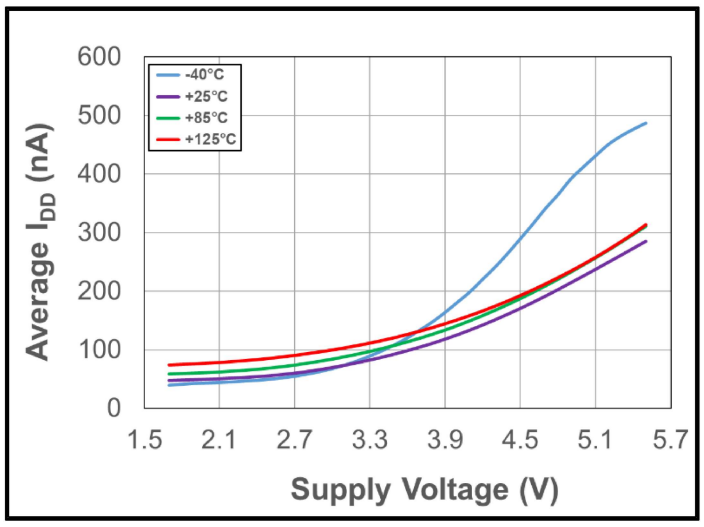

Figure 7. Average Supply Current vs. Supply Voltage vs. Temperature

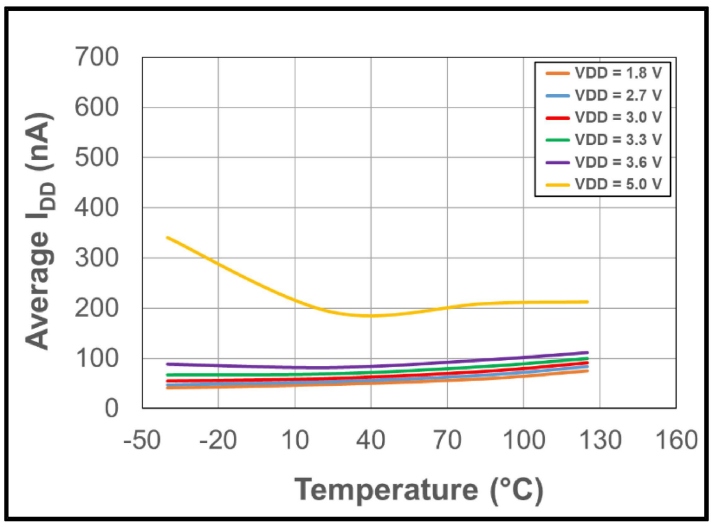

Figure 8. Average Supply Current vs. Temperature vs. Supply Voltage

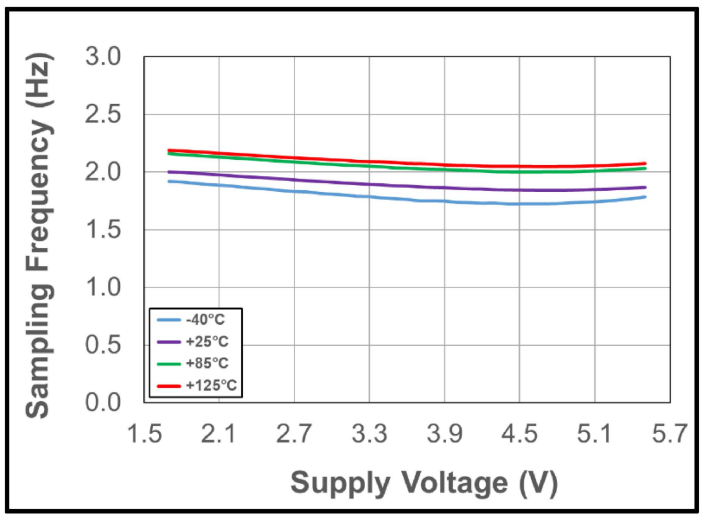

Figure 9. Sampling Frequency vs. Supply Voltage vs. Temperature

Typical Magnetic Characteristics for CT813xBV, CT8132BH and CT8132BL

V_{DD} = 3.3 V, T_A = +25°C and C_{BYP} = 1.0 µF (unless otherwise specified)

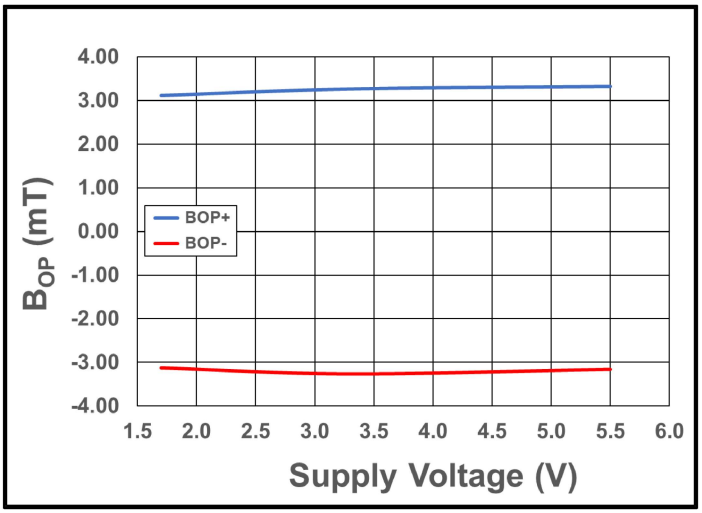

Figure 10. B_{OP-} (Red) and B_{OP+} (Blue) vs. Supply Voltage at T_A = +25°C

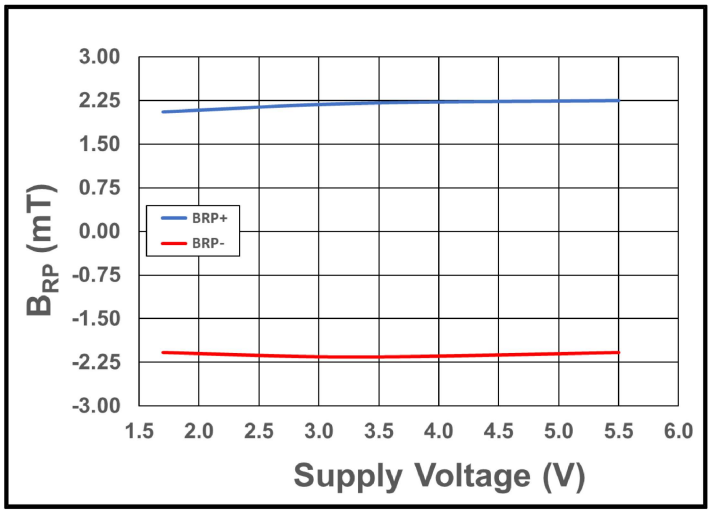

Figure 11. B_{RP-} (Red) and B_{RP+} (Blue) vs. Supply Voltage at T_A = +25°C

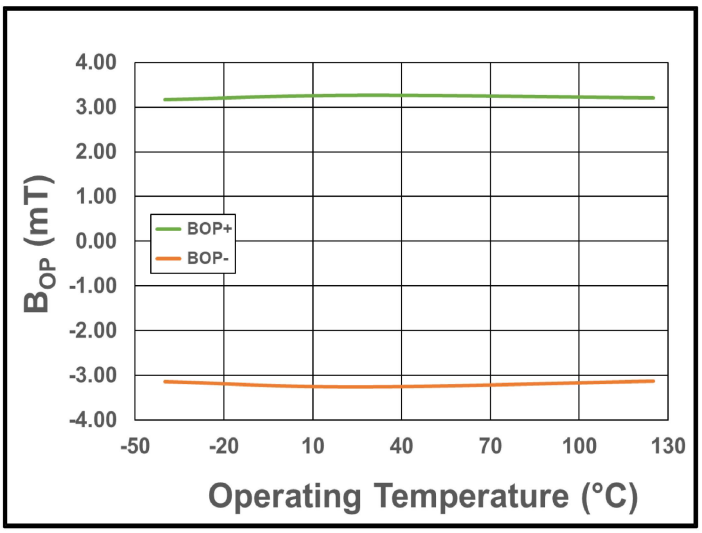

Figure 12. B_{OP-} (Orange) and B_{OP+} (Green) vs. Temperature at V_{DD} = 3.3 V

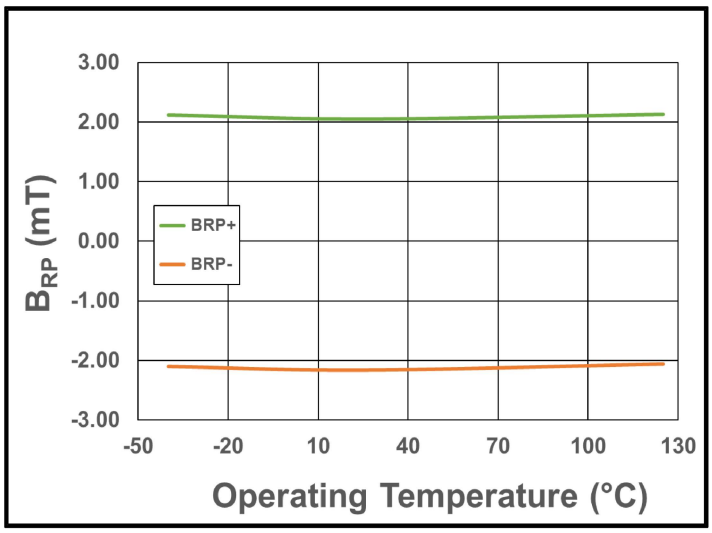

Figure 13. B_{RP-} (Orange) and B_{RP+} (Green) vs. Temperature at V_{DD} = 3.3 V

CT8132DM Electrical & Magnetic Specifications

Unless otherwise specified: V_{DD} = 1.7 V to 5.5 V, C_{BYP} = 1.0 µF and T_A = -40°C to +125°C. Typical values are V_{DD} = 3.3 V and T_A = +25°C.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_{DD(AVG)}$	Average Supply Current	t ≥ 10 s		9.0		µA
$I_{DD(AVG)\_1.8V}$	Average Supply Current @ V_{DD} = 1.8 V	t ≥ 10 s, V_{DD} = 1.8 V		8.1		µA
f_S	Sampling Frequency		1.5	2.5	3.5	kHz
t_{IDLE}	Idle Mode Time	f_S = 2.5 kHz	285	400	667	µs
B_{OPN}	Operate Point, B-		+1.1	+1.5	+1.9	mT
B_{OPS}	Operate Point, B+		-1.9	-1.5	-1.1	mT
B_{RPN}	Release Point, B-		+0.6	+1.0	+1.4	mT
B_{RPS}	Release Point, B+		-1.4	-1.0	-0.6	mT
B_{HYST}	Hysteresis		0.3	0.5		mT

CT8132EK Electrical & Magnetic Specifications

Unless otherwise specified: V_{DD} = 1.7 V to 5.5 V, C_{BYP} = 1.0 µF and T_A = -40°C to +125°C. Typical values are V_{DD} = 3.3 V and T_A = +25°C.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_{DD(AVG)}$	Average Supply Current	t ≥ 10 s		160	900	nA
$I_{DD(AVG)\_1.8V}$	Average Supply Current @ V_{DD} = 1.8 V	t ≥ 10 s, V_{DD} = 1.8 V		120	900	nA
f_S	Sampling Frequency		6	10	14	Hz
t_{IDLE}	Idle Mode Time	f_S = 10 Hz	71	100	166	ms
B_{OPN}	Operate Point, B-		+6.2	+7.0	+7.8	mT
B_{OPS}	Operate Point, B+		-7.8	-7.0	-6.2	mT
B_{RPN}	Release Point, B-		+4.2	+5.0	+6.0	mT
B_{RPS}	Release Point, B+		-6.0	-5.0	-4.2	mT
B_{HYST}	Hysteresis		1.2	2.0		mT

CT8132SK Electrical & Magnetic Specifications

Unless otherwise specified: V_{DD} = 1.7 V to 5.5 V, C_{BYP} = 1.0 µF and T_A = -40°C to +125°C. Typical values are V_{DD} = 3.3 V and T_A = +25°C.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_{DD(AVG)}$	Average Supply Current	t ≥ 10 s		160	900	nA
$I_{DD(AVG)\_1.8V}$	Average Supply Current @ V_{DD} = 1.8 V	t ≥ 10 s, V_{DD} = 1.8 V		120	900	nA
f_S	Sampling Frequency		6	10	14	Hz
t_{IDLE}	Idle Mode Time	f_S = 10 Hz	71	100	166	ms
B_{OPN}	Operate Point, B-		+0.7	+0.9	+1.2	mT
B_{OPS}	Operate Point, B+		-1.2	-0.9	-0.7	mT
B_{RPN}	Release Point, B-		+0.3	+0.5	+0.7	mT
B_{RPS}	Release Point, B+		-0.7	-0.5	-0.3	mT
B_{HYST}	Hysteresis		0.3	0.4		mT

CT8132SL Electrical & Magnetic Specifications

Unless otherwise specified: V_{DD} = 1.7 V to 5.5 V, C_{BYP} = 1.0 µF and T_A = -40°C to +125°C. Typical values are V_{DD} = 3.3 V and T_A = +25°C.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_{DD(AVG)}$	Average Supply Current	t ≥ 10 s		1.2	3.0	µA
$I_{DD(AVG)\_1.8V}$	Average Supply Current @ V_{DD} = 1.8 V	t ≥ 10 s, V_{DD} = 1.8 V		1.0	2.5	µA
f_S	Sampling Frequency		150	250	350	Hz
t_{IDLE}	Idle Mode Time	f_S = 250 Hz	2.8	4.0	6.7	ms
B_{OPN}	Operate Point, B-		+0.7	+0.9	+1.2	mT
B_{OPS}	Operate Point, B+		-1.2	-0.9	-0.7	mT
B_{RPN}	Release Point, B-		+0.3	+0.5	+0.7	mT
B_{RPS}	Release Point, B+		-0.7	-0.5	-0.3	mT
B_{HYST}	Hysteresis		0.3	0.4		mT

Typical Electrical Characteristics for CT8132SK

V_{DD} = 3.3 V, T_A = +25°C and C_{BYP} = 1.0 µF (unless otherwise specified)

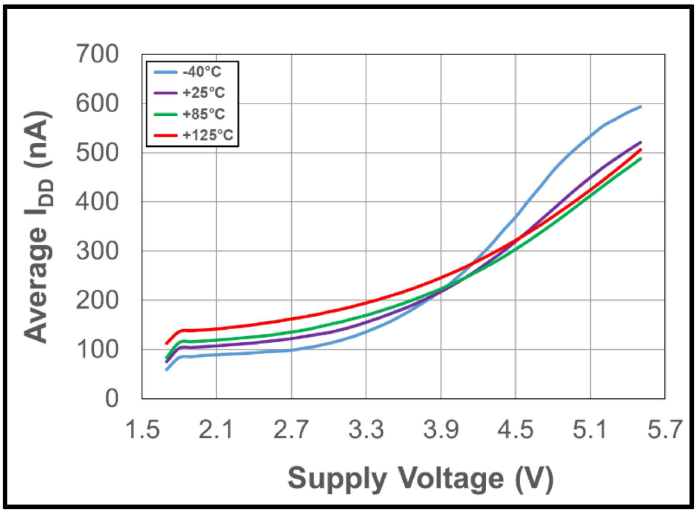

Figure 14. Average Supply Current vs. Supply Voltage vs. Temperature

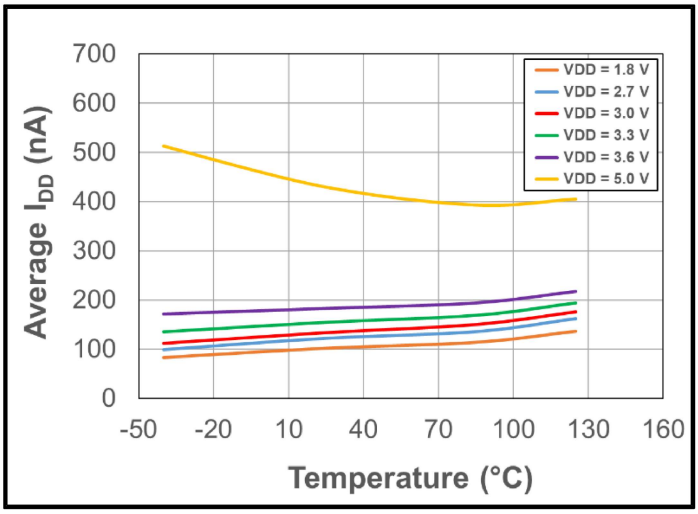

Figure 15. Average Supply Current vs. Temperature vs. Supply Voltage

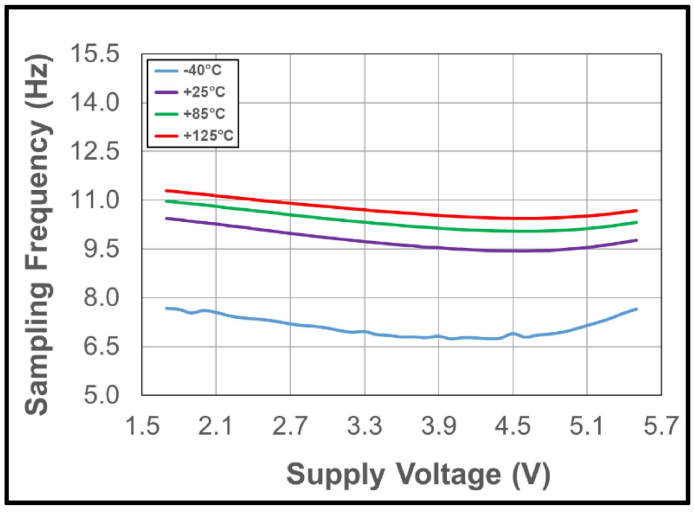

Figure 16. Sampling Frequency vs. Supply Voltage vs. Temperature

Typical Magnetic Characteristics for CT8132SK and CT8132SL

V_{DD} = 3.3 V, T_A = +25°C and C_{BYP} = 1.0 µF (unless otherwise specified)

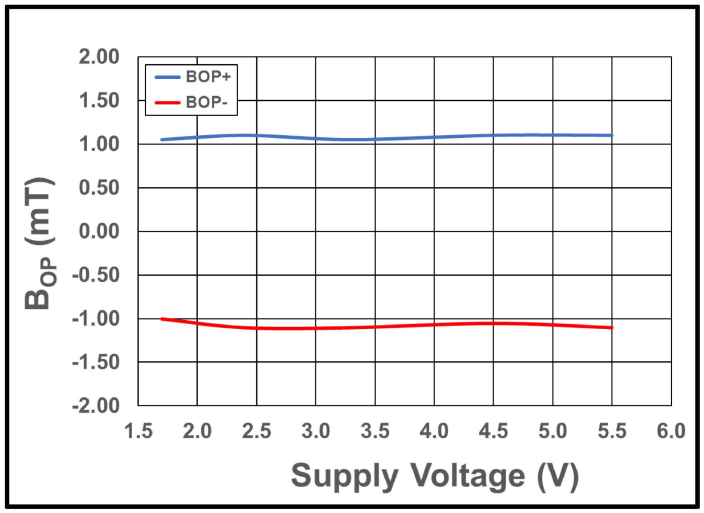

Figure 17. B_{OP-} (Red) and B_{OP+} (Blue) vs. Supply Voltage at T_A = +25°C

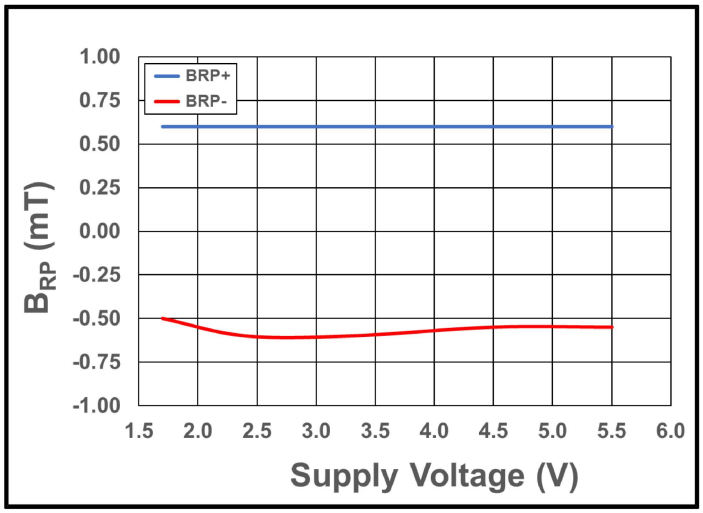

Figure 18. B_{RP-} (Red) and B_{RP+} (Blue) vs. Supply Voltage at T_A = +25°C

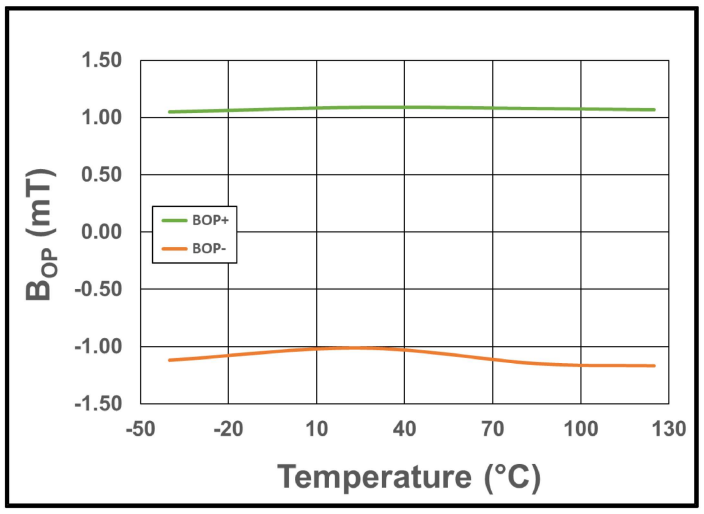

Figure 19. B_{OP-} (Orange) and B_{OP+} (Green) vs. Temperature at V_{DD} = 3.3 V

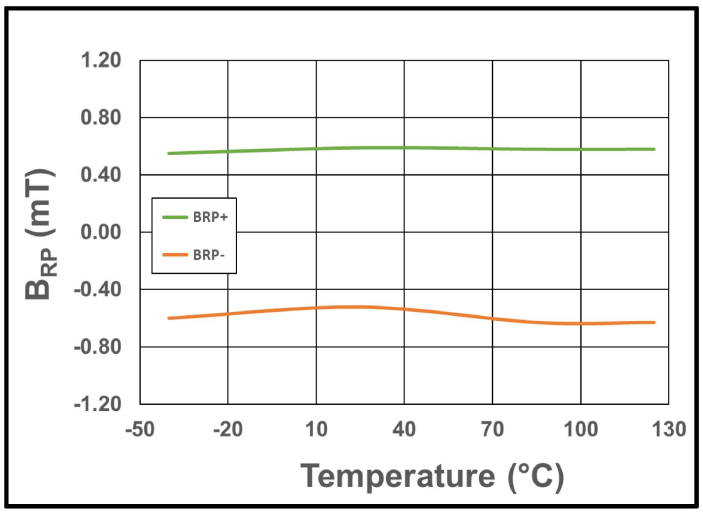

Figure 20. B_{RP-} (Orange) and B_{RP+} (Green) vs. Temperature at V_{DD} = 3.3 V

Circuit Description

Overview

The CT813x is a product family of omnipolar TMR magnetic latches that supports a wide operating voltage range of 1.7 V to 5.5 V and is capable of providing two (2) digital output configurations: open drain or push-pull. These omnipolar TMR digital latches are designed to consume a minimal amount of current which is ideal for battery-operated products. It also supports a wide range of sensitivity levels for various applications.

Under-Voltage Lockout (UVLO)

The Under-Voltage Lock-out protection circuitry of the CT813x is activated when the supply voltage (V_{DD}) falls below 1.53 V. The CT813x remains in a low quiescent state and the $\overline{OUT}$ output is not valid until V_{DD} rises above the UVLO threshold (1.60 V).

Power-On Time (t_{ON})

The Power-On Time (t_{ON}) of 50 µs is the amount of time required by the CT813x to start up, power-on and acquire the first sample. The chip is fully powered up and operational from the moment the supply voltage passes the rising UVLO point (1.60 V). This time includes the ramp up time and the settling time (within 10% of steady-state voltage under an applied magnetic field) after the power supply have reach the minimum V_{DD}.

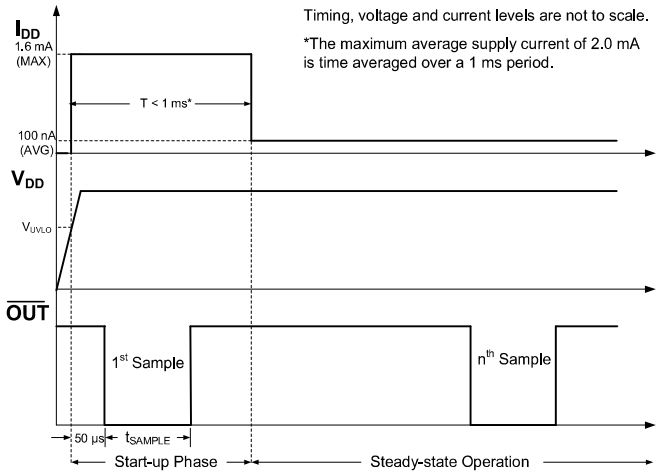

Figure 21. CT813x Power-On Timing Diagram

Omnipolar Magnetic Flux

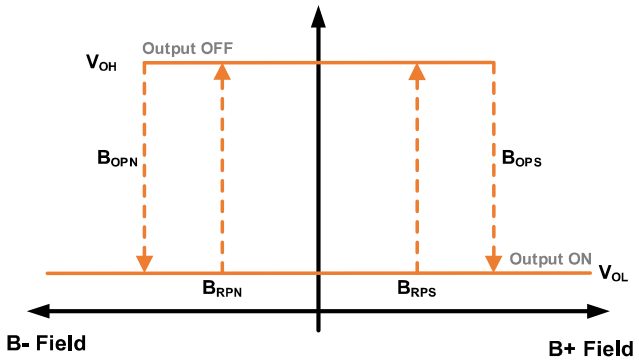

Figure 22. CT813x Output Behavior vs. Magnetic Field

Table 1. CT813x Output Behavior

Magnetic Field	Condition	Output
Positive Field	B > B_{OPS}	Low (ON)
	0 < B < B_{RPS}	High (OFF)
Negative Field	B < B_{OPN}	Low (ON)
	0 > B > B_{RPN}	High (OFF)

Applications Information

A decoupling capacitor, C_{BYP}, between the supply voltage (VDD) and ground (GND) is required to lower the noise going into the CT8131 as well as providing isolation from the other circuits. The decoupling capacitor should be placed close to the TMR digital latch. A typical capacitor value of 1.0 µF (ceramic) will be sufficient. A pull-up resistor of 47 kΩ connected from the $\overline{OUT}$ to the system voltage (V_{SYS}) is required for the CT8131.

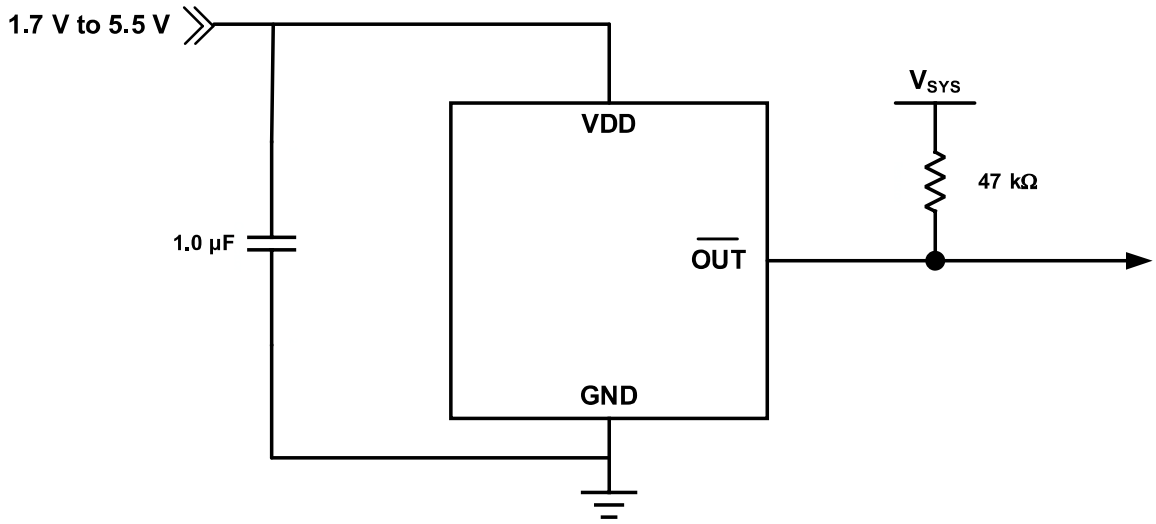

Figure 23. CT8131 Application Block Diagram

Similar to the CT8131, the CT8132 products require a 1.0 µF (ceramic) bypass capacitor to be connected between the supply voltage and ground.

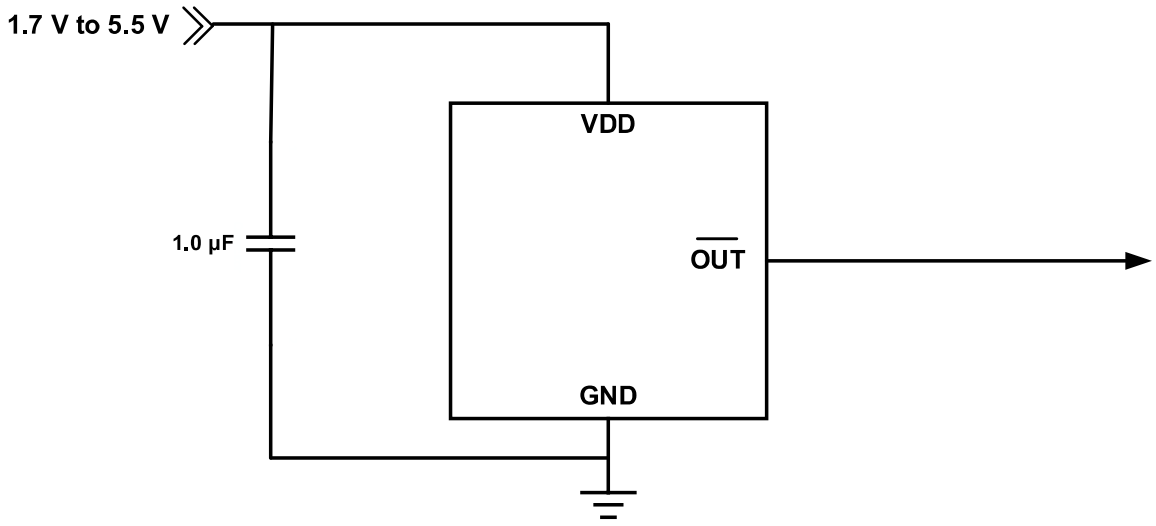

Figure 24. CT8132 Application Block Diagram

Applications Information

The XtremeSense TMR sensor location for the CT813x products are shown in Figure 25 and Figure 26. The dimensions shown in both figures are typical values.

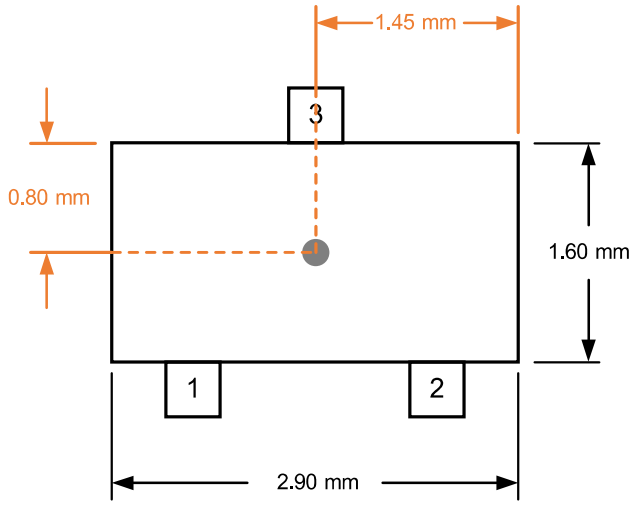

Figure 25. XtremeSense TMR Sensor Location for CT813x products in 3-lead SOT23 Package

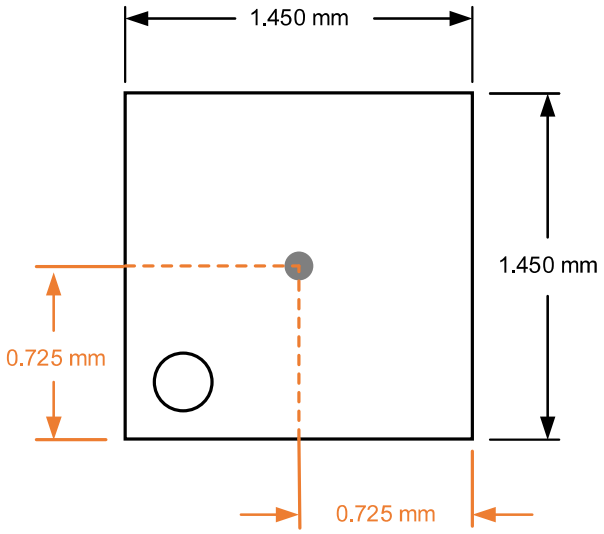

Figure 26. XtremeSense TMR Sensor Location for CT813x products in 4-lead LGA Package

SOT23-3 Package Drawing and Dimensions

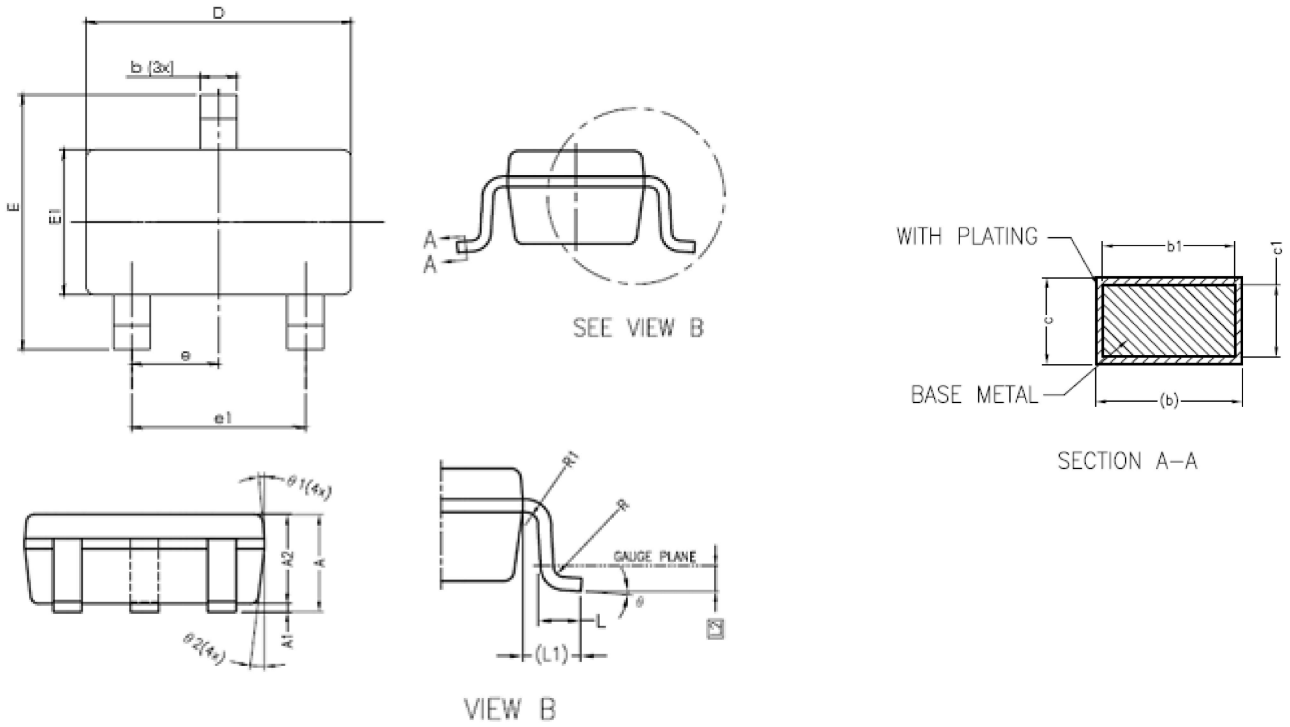

Figure 27. 3-Lead SOT23 Package Drawing

Table 2. CT813x 3-Lead SOT23 Package Dimensions

Symbol	Dimensions in Millimeters (mm)		
	Min.	Typ.	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	0.50 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°

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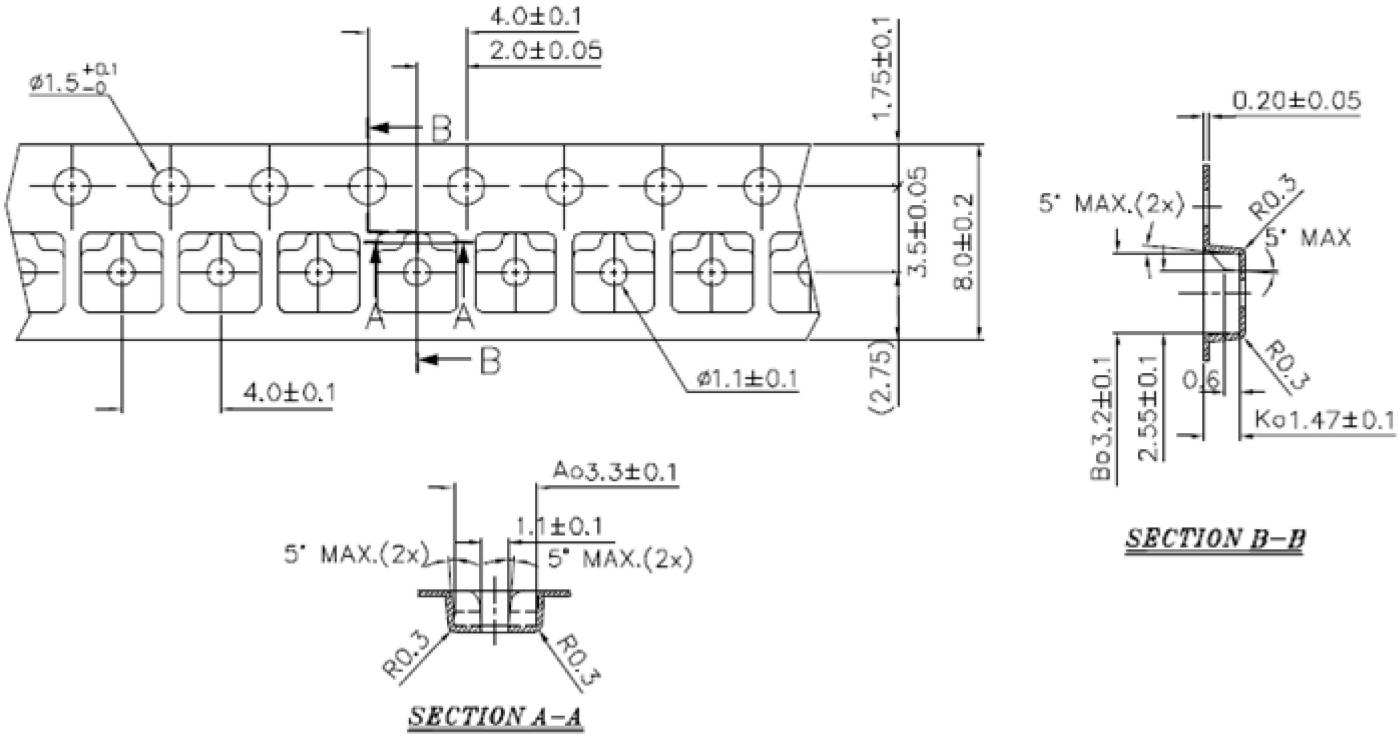
SOT23 Tape & Pocket Drawing and Dimensions

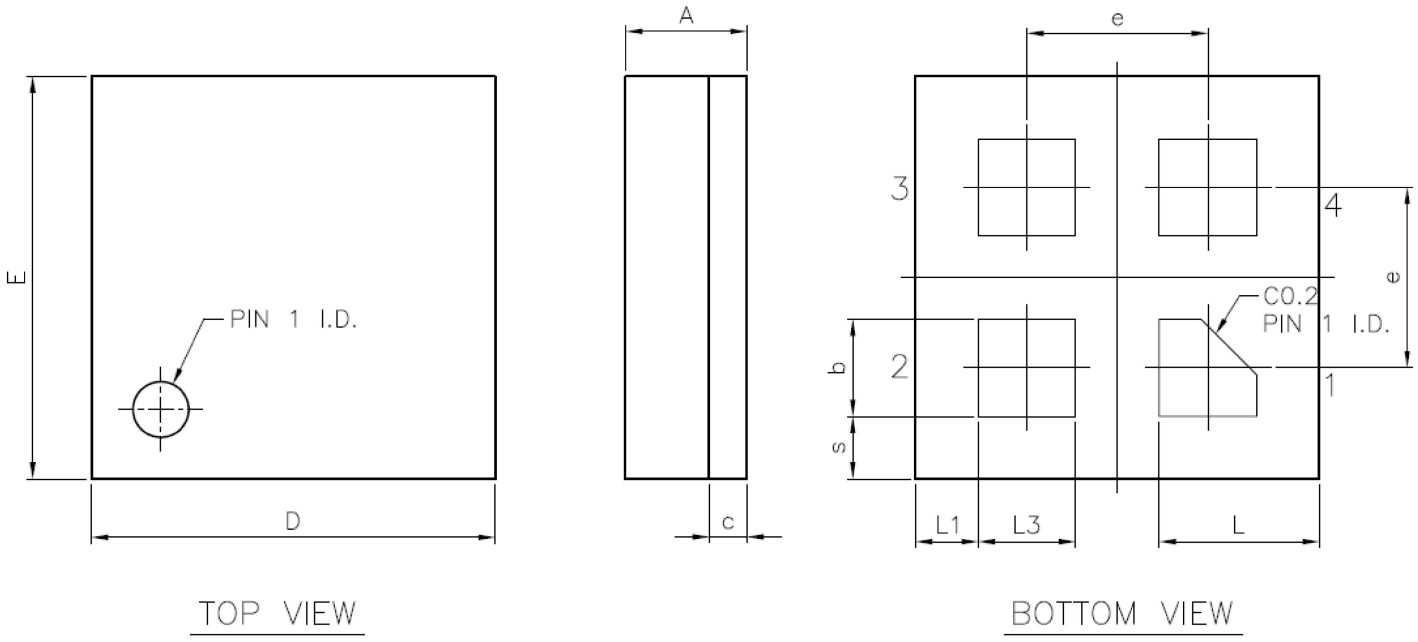


NOTES:

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 28. Tape and Pocket Drawing for SOT23 Package

LGA-4 Package Drawing and Dimensions



NOTES:

1. All dimensions are in millimeters.
2. Pin A1 ID is marked by ink or laser.

Figure 29. 4-Lead LGA Package Drawing

Table 3. CT813x 4-Lead LGA Package Dimensions

Symbol	Dimensions in Millimeters (mm)		
	Min.	Typ.	Max.
A	0.386	0.436	0.486
b	0.300	0.350	0.400
c	-	0.136 REF	-
D	1.400	1.450	1.500
E	1.400	1.450	1.500
e	-	0.650	-
L	0.525	0.575	0.625
L1	0.175	0.225	0.275
L3	0.300	0.350	0.400
s	0.175	0.225	0.275

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LGA-4 Tape & Pocket Drawing and Dimensions

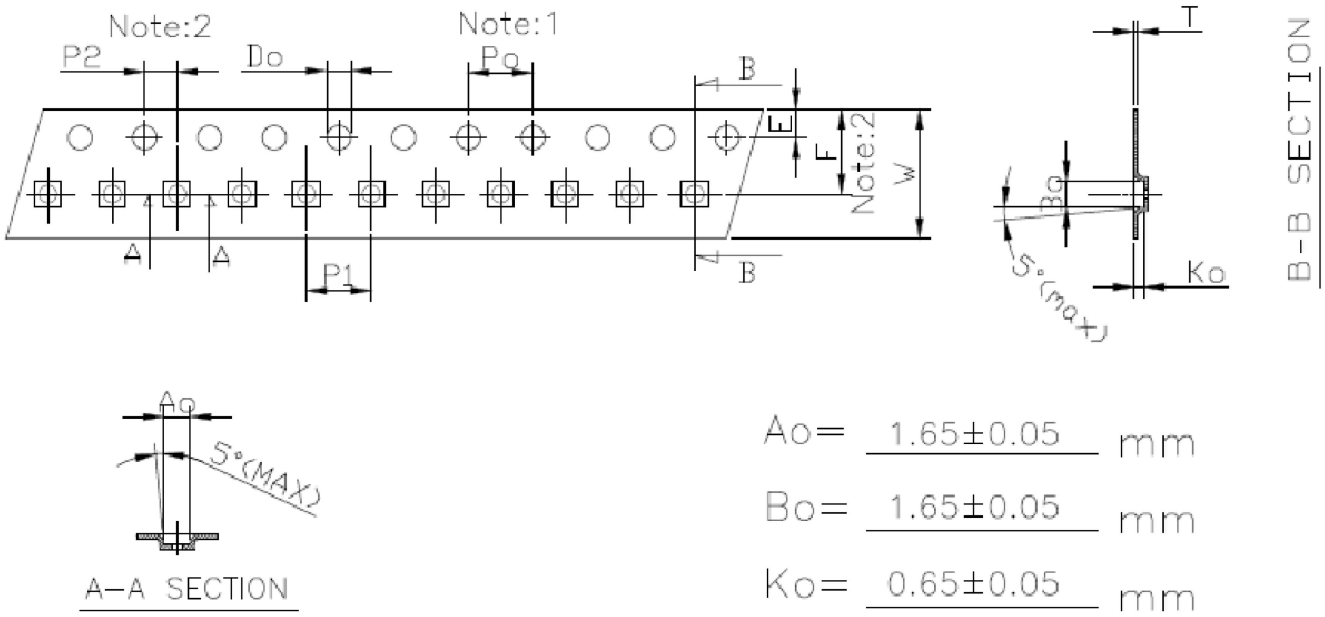

Figure 30. Tape and Pocket Drawing for LGA-4 Package

Table 4. LGA-4 Tape and Pocket Dimensions

Symbol	Specification
Po	4.00 mm ± 0.10 mm
P1	4.00 mm ± 0.10 mm
P2	2.00 mm ± 0.05 mm
Do	1.50 mm ± 0.10 mm
D1	1.10 mm ± 0.05 mm
E	1.75 mm ± 0.10 mm
F	3.50 mm ± 0.05 mm
10Po	40.00 mm ± 0.10 mm
W	8.00 mm ± 0.20 mm
T	0.25 mm ± 0.02 mm

Notes:

1. 10 Sprocket hole pitch cumulative tolerance is ±0.10 mm.
2. Pocket position is relative to sprocket hole measured as true position of pocket and not pocket hole.
3. Ao and Bo measured on a place of 0.3 mm above the bottom of the pocket to top surface of the carrier.
4. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
5. Carrier camber shall not more than 1 mm per 100 mm through a length of 250 mm.

Package Information

Table 5. CT813x Package Information

Part Number	Package Type	# of Leads	Package Quantity	Lead Finish	Eco Plan (1)	MSL Rating (2)	Operating Temperature (3)	Device Marking
CT8131BV-IS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +85°C	JD YWWS
CT8131BV-HS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +125°C	JD YWWS
CT8131BV-IL4	LGA	4	3,000	Sn	Green & RoHS	3	-40°C to +85°C	L YZ
CT8131BV-HL4	LGA	4	3,000	Sn	Green & RoHS	3	-40°C to +125°C	L YZ
CT8132BL-IS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +85°C	MB YWWS
CT8132BL-HS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +125°C	MB YWWS
CT8132BH-IS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +85°C	MG YWWS
CT8132BH-HS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +125°C	MG YWWS
CT8132BV-IL4	LGA	4	3,000	Sn	Green & RoHS	3	-40°C to +85°C	M YZ
CT8132BV-HL4	LGA	4	3,000	Sn	Green & RoHS	3	-40°C to +125°C	M YZ
CT8132BV-IS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +85°C	MA YWWS
CT8132BV-HS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +125°C	MA YWWS
CT8132DM-IS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +85°C	MD YWWS
CT8132DM-HS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +125°C	MD YWWS
CT8132EK-IS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +85°C	MF YWWS
CT8132EK-HS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +125°C	MF YWWS
CT8132SK-IL4	LGA	4	3,000	Au	Green & RoHS	3	-40°C to +85°C	P YZ
CT8132SK-HL4	LGA	4	3,000	Au	Green & RoHS	3	-40°C to +125°C	P YZ
CT8132SK-IS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +85°C	MC YWWS
CT8132SK-HS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +125°C	MC YWWS
CT8132SL-IS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +85°C	ME YWWS
CT8132SL-HS3	SOT23	3	3,000	Sn	Green & RoHS	1	-40°C to +125°C	ME YWWS

(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 (Cl), 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 +150°C.

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