CT815x

Integrated Omnipolar TMR Analog Sensor

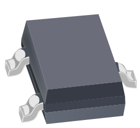
FEATURES AND BENEFITS

- Sensitivity and magnetic field range:
  - S = 5 mV/V/G, B_{ANA} = ±80 G
- Analog output mode current consumption: ~1.3 µA
  - Current consumption in digital output only: ~150 nA @ V_{DD} = 1.8 V and f_S = 12.5 Hz
- Supply voltage range: 1.7 to 5.5 V
- Sensor polarity: omnipolar
- Sample and hold analog output @ f_S = 100 Hz
- Dual analog and digital output operation capability
  - Digital output is push-pull
- Undervoltage lockout (UVLO)

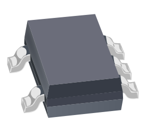
APPLICATIONS

- IoT devices
- Smartphones, tablets, and laptops
- Door or lid closure
- 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

PACKAGES:



3-lead SOT-23



5-lead SOT-23

Not to scale.
4-lead LGA package not shown.

DESCRIPTION

The CT815x series of tunnel magnetoresistance (TMR) analog sensors (with option for digital latch output) are designed for consumer and industrial applications. The devices are based on Allegro patented XtremeSense™ TMR technology with integrated CMOS process to provide a monolithic solution for superior sensing performance. The CT815x digital latches offer magnetic operation over the operating temperature range.

The CT815x is an analog sensor product family that provides a linear sample-and-hold (S&H) analog output voltage with a sampling frequency of 100 Hz.

The CT8152 is a TMR sensor that combines both analog and digital outputs in a single chip. It uses the digital output to turn on the analog output so that it can remain in an ultra-low power state until the analog mode is enabled. When B_{RP} is triggered in digital mode, the analog output function will start operating.

This product family has very low power consumption—as low as 1.3 µA in analog output mode and 150 nA in digital output mode—which makes it ideal for battery-operated products where minimal current consumption is required.

For applications that require a very small form factor and low profile, the CT815x sensors are assembled in a 4-lead LGA package. The CT8150 is also available in an industry-standard 3-lead SOT-23 package while CT8152 is offered in a 5-lead SOT23 package to support high-volume manufacturing.

FUNCTIONAL BLOCK DIAGRAMS

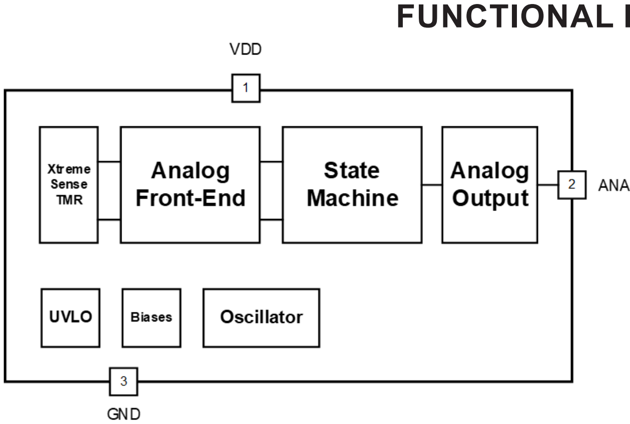


Figure 1: CT8150 with Analog Output Block Diagram

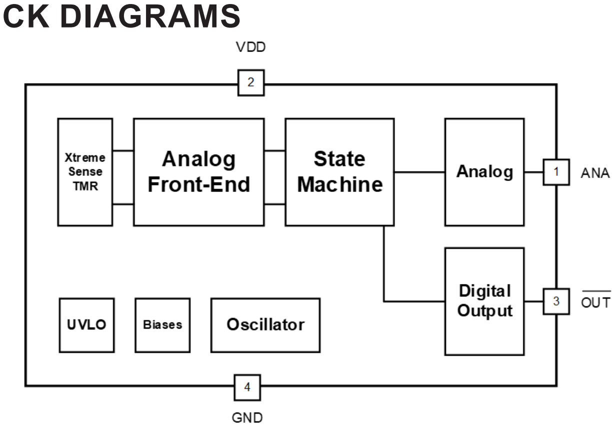


Figure 2: CT8152 with Dual Analog and Digital Outputs Block Diagram

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SELECTION GUIDE

Part Number	Operating Temp. Range (°C)	Sensor Type	Analog Output	Digital Output (B_{OP}/B_{RP})	S (mV/V/G)	Range (G)	Package	Packing
CT8150PC-IS3	–40 to 85	Omnipolar	Yes	No	5	±80	3-lead SOT23	Tape and Reel
CT8150PC-HS3	–40 to 125							
CT8150PC-IL4	–40 to 85	Omnipolar	Yes	No	5	±80	4-lead LGA	Tape and Reel
CT8150PC-HL4	–40 to 125							
CT8152PC-IS5	–40 to 85	Omnipolar	Yes	Yes (60 G/40 G)	5	±80	5-lead SOT23	Tape and Reel
CT8152PC-HS5	–40 to 125							
CT8152PC-IL4	–40 to 85	Omnipolar	Yes	Yes (60 G/40 G)	5	±80	4-lead LGA	Tape and Reel
CT8152PC-HL4	–40 to 125							

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ABSOLUTE MAXIMUM RATINGS [1]

Characteristic	Symbol	Notes	Rating	Unit
Supply Voltage	V_{DD}		–0.3 to 6.0	V
Push-Pull Output (Active Low)	V_{OUT_PP}		–0.3 to V_{DD} + 0.3 [2]	V
Analog Input/Output Pins Maximum Voltage	$V_{I/O}$		–0.3 to V_{DD} + 0.3 [2]	V
Input and Output Current	I_{IN}, I_{OUT}		±20.0	mA
Analog Output	I_{ANA}		±140	μA
Maximum External Magnetic Field	B_{MAX}	T_A = 25°C	±2000	G
Electrostatic Discharge Protection Level	ESD	Human Body Model (HBM) per JESD22-A114	±4.0 (min)	kV
		Charged Device Model (CDM) per JESD22-C101	±0.5 (min)	kV
Junction Temperature	T_J		–40 to 150	°C
Storage Temperature	T_{STG}		–65 to 155	°C
Lead Soldering Temperature	T_L	10 seconds	260	°C

[1] Stresses exceeding the absolute maximum ratings may damage the CT815x 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. Allegro does not recommend exceeding or designing to absolute maximum ratings

[2] The lower of V_{DD} + 0.3 V or 6.0 V.

RECOMMENDED OPERATING CONDITIONS [1]

Characteristic	Symbol	Notes	Min.	Typ.	Max.	Unit
Supply Voltage Range	V_{DD}		1.7	3.3	5.5	V
Output Voltage Range	V_{OUT}		0	–	V_{DD}	V
Operating Magnetic Flux	B_{OP}		–	–	300	G
Output Current	I_{OUT}		–	–	±3.0	mA
Bypass Capacitor	C_{BYP}		–	1.0	–	μF
Operating Ambient Temperature	T_A	Industrial	–40	25	85	°C
		Extended Industrial	–40	25	125	°C
Operating Junction Temperature	T_J		–40	–	125	°C

[1] The Recommended Operating Conditions table defines the conditions for actual operation of the CT815x. Recommended operating conditions are specified to ensure optimal performance to the specifications. Allegro does not recommend exceeding them or designing to absolute maximum ratings.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Test Conditions		Value	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$	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) and 4 oz. of copper (Cu) or more for 65 A. Special attention must be paid not to exceed junction temperature $T_{J(MAX)}$ at a given ambient temperature T_A.	SOT23-3	202	°C/W
			LGA-4	165	°C/W

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PINOUT DIAGRAMS AND TERMINAL LISTS

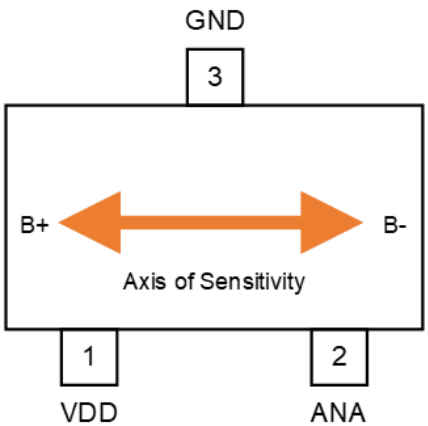

Figure 3: CT8150 3-Lead SOT23 Package for Analog Output

Terminal List

Number	Name	Function
1	VDD	Supply Voltage
2	ANA	Analog Output
3	GND	Ground

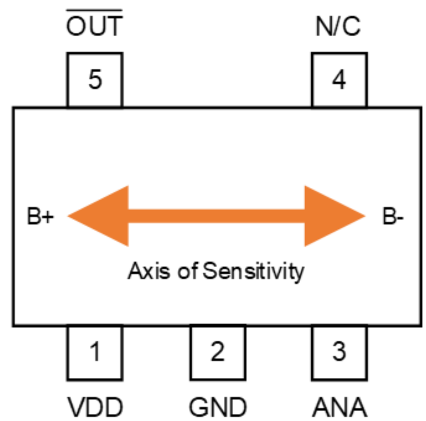

Figure 4: CT8152 5-Lead SOT23 Package for Analog Output

Terminal List

Number	Name	Function
1	VDD	Supply Voltage
2	GND	Ground
3	ANA	Analog Output
4	NC	No Connect
5	$\overline{OUT}$	Output Signal (Active Low)

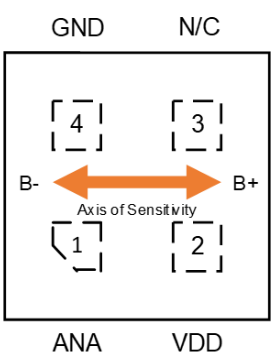

Figure 5: CT8150 4-Lead LGA Package with Analog Output (Top View)

Terminal List

Number	Name	Function
1	ANA	Analog Output
2	VDD	Supply Voltage
3	NC	No Connect
4	GND	Ground

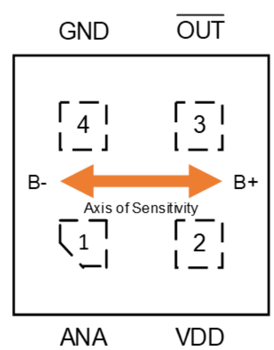

Figure 6: CT8152 4-Lead LGA Package with Analog and Digital Outputs (Top View)

Terminal List

Number	Name	Function
1	ANA	Analog Output
2	VDD	Supply Voltage
3	$\overline{OUT}$	Output Signal (Active Low)
4	GND	Ground

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ELECTRICAL CHARACTERISTICS: Valid for V_{DD} = 1.7 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, unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
TIMINGS						
Power-On Time [1]	t_{ON}	V_{DD} ≥ 1.7 V	–	50	75	µs
Active Mode Time [1]	t_{ACTIVE}		–	2.6	–	µs
PROTECTION						
Undervoltage Lockout	V_{UVLO}	Rising V_{DD}	–	1.60	1.64	V
		Falling V_{DD}	1.44	1.53	–	V
UVLO Hysteresis	V_{UV_HYS}		–	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)

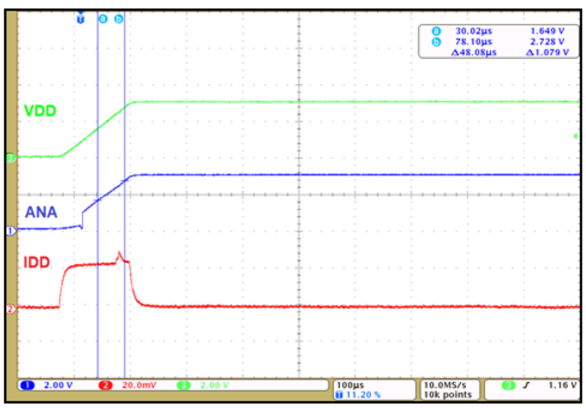

Figure 7: Power-On Time for Analog Output

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Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Average Supply Current	$I_{DD(AVG)}$	t ≥ 10 seconds	–	1.5	5.0	µA
	$I_{DD(AVG)\_1.8V}$	t ≥ 10 seconds, V_{DD} = 1.8 V	–	1.3	3.0	µA
Sampling Frequency	f_S		60	100	140	Hz
Idle Mode Time	t_{IDLE}	f_S = 100 Hz	7.1	10.0	16.7	ms
Maximum Drive Capability [1]	$I_{DRV(MAX)}$	ΔV_{OUT} ≤ 10 mV	–10	–	+10	µA
Output Capacitive Load [1]	C_L		–	–	10	pF
Analog Output Magnetic Field	B_{ANA}		±54	±80	±100	G
Analog Output Voltage Range	V_{ANA}		0.1 × V_{DD}	–	0.9 × V_{DD}	V
Voltage Output Quiescent	V_{OQ}		45	50	55	% V_{DD}
Sensitivity	S		3.5	5.0	6.5	mV/V/G

[1] Guaranteed by design and characterization; not tested in production.

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TYPICAL MAGNETIC CHARACTERISTICS FOR CT8150PC

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

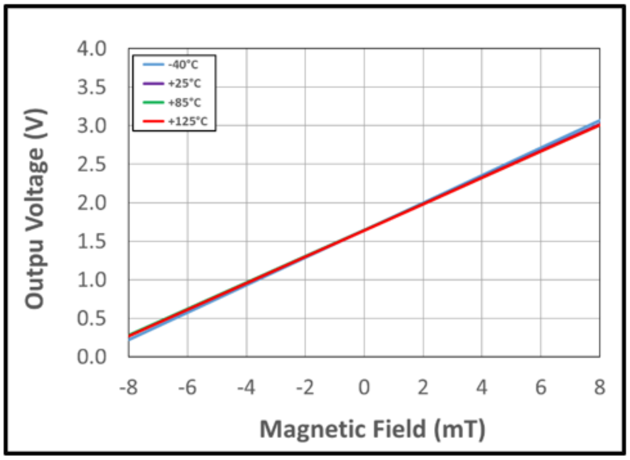

Figure 8: Output Voltage vs. Magnetic Field over Temperature at V_{DD} = 3.3 V

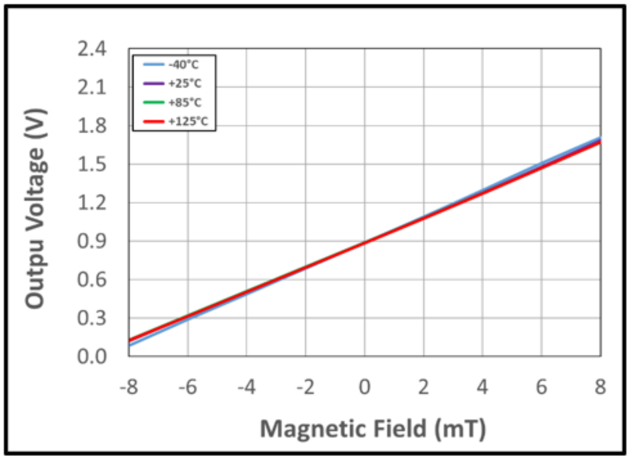

Figure 9: Output Voltage vs. Magnetic Field over Temperature at V_{DD} = 1.8 V

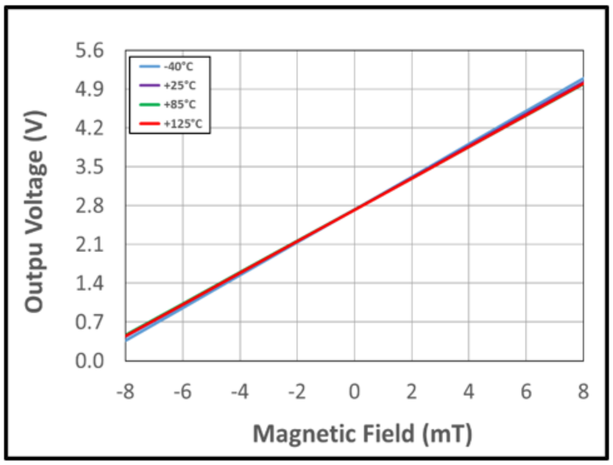

Figure 10: Output Voltage vs. Magnetic Field over Temperature at V_{DD} = 5.5 V

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TYPICAL ELECTRICAL CHARACTERISTICS FOR CT8150PC

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

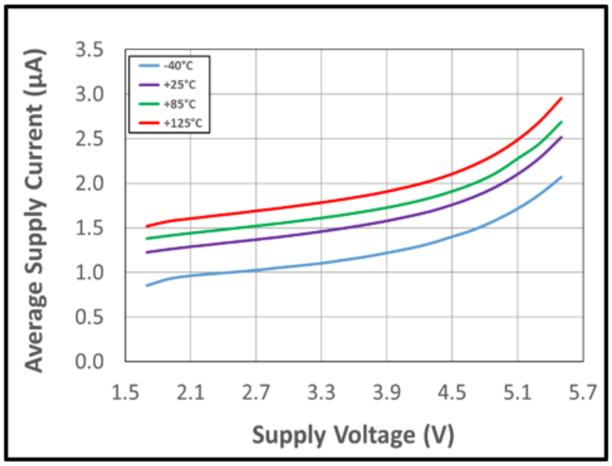

Figure 11: Average Supply Current vs. Supply Voltage vs. Temperature

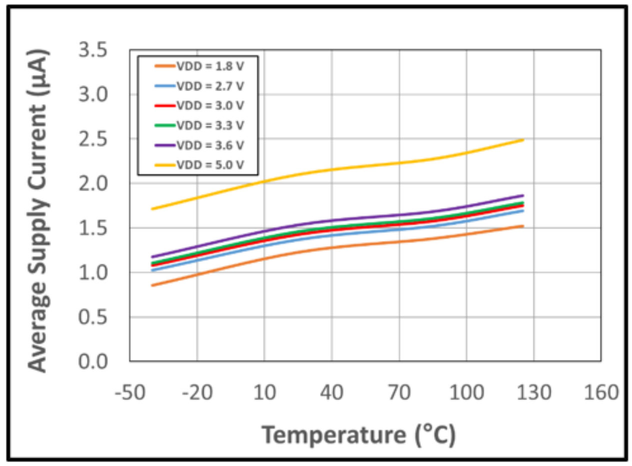

Figure 12: Average Supply Current vs. Temperature vs. Supply Voltage

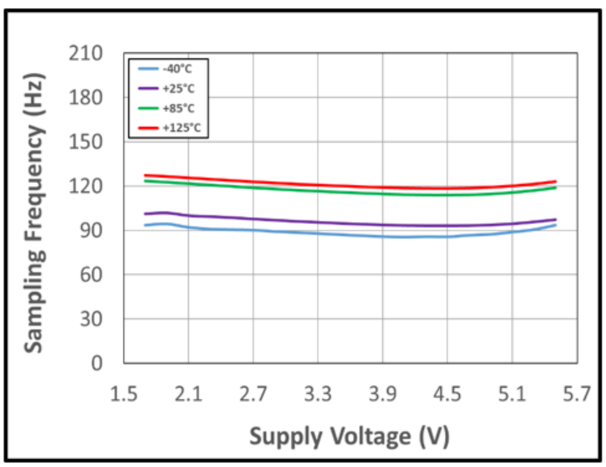

Figure 13: Sampling Frequency vs. Supply Voltage vs. Temperature

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CT8152PC – ELECTRICAL CHARACTERISTICS and MAGNETIC SPECIFICATIONS: Uness otherwise specified, valid for V_{DD} = 1.7 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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
ANALOG OUTPUT MODE (DIGITAL MODE IS ON)						
Average Supply Current	$I_{DD(AVG)}$	t ≥ 10 seconds; analog and digital modes on	–	1.5	5.0	µA
	$I_{DD(AVG)\_1.8V}$	t ≥ 10 seconds, V_{DD} = 1.8 V; analog and digital modes on	–	1.3	3.0	µA
Maximum Drive Capability [1]	$I_{DRV(MAX)}$	$\Delta V_{OUT} \leq$ 10 mV	–10	–	+10	µA
Analog Sampling Frequency	f_{S_ANA}		60	100	140	Hz
Idle Mode Time, Analog Output	t_{IDLE_ANA}	f_S = 100 Hz	7.1	10.0	16.7	ms
Output Capacitive Load [1]	C_L		–	–	10	pF
Analog Output Magnetic Field	B_{ANA}		±54	±80	±100	G
Analog Output Voltage Range	V_{ANA}		0.1 × V_{DD}	–	0.9 × V_{DD}	V
Voltage Output Quiescent	V_{OQ}		45	50	55	% V_{DD}
Sensitivity	S		3.5	5.0	6.5	mV/V/mGT
DIGITAL OUTPUT MODE						
Average Supply Current	$I_{DD(AVG)}$	t ≥ 10 seconds; analog mode off	–	200	900	nA
	$I_{DD(AVG)\_1.8V}$	t ≥ 10 seconds, V_{DD} = 1.8 V; analog mode off	–	150	700	nA
Output Voltage High $\overline{OUT}$ [1]	V_{OH}		0.9 × V_{DD}	–	–	V
Output Voltage Low $\overline{OUT}$ [1]	V_{OL}		–	–	0.1 × V_{DD}	V
$\overline{OUT}$ Current [1]	I_{OUT}		–	±2.0	–	mA
Sampling Frequency	f_{S_DIG}		7.5	12.5	17.5	Hz
Idle Mode Time	t_{IDLE_DIG}	f_S = 2 Hz	57	80	133	ms
Operate Point, B+	B_{OPS}		46	60	76	G
Operate Point, B–	B_{OPN}		–76	–60	–46	G
Release Point, B+	B_{RPS}		28	40	56	G
Release Point, B–	B_{RPN}		–56	–40	–28	G
Hysteresis	B_{HYST}		10	20	–	G

[1] Guaranteed by design and characterization; not tested in production.

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TYPICAL MAGNETIC CHARACTERISTICS FOR CT8152PC IN DIGITAL MODE

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

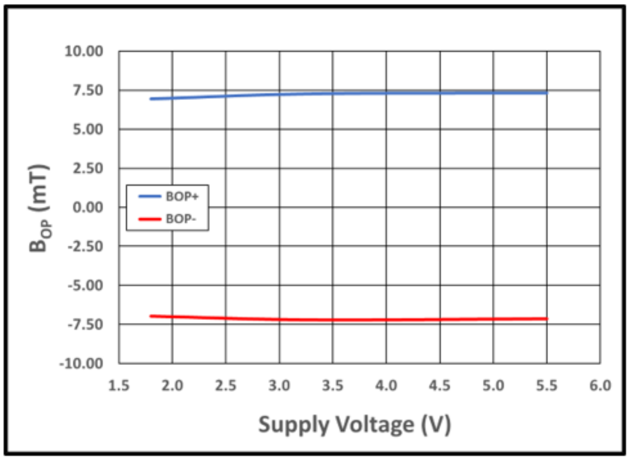

Figure 14: B_{OP-} (Red) and B_{OP+} (Blue) vs. Supply Voltage at T_A = 25°C

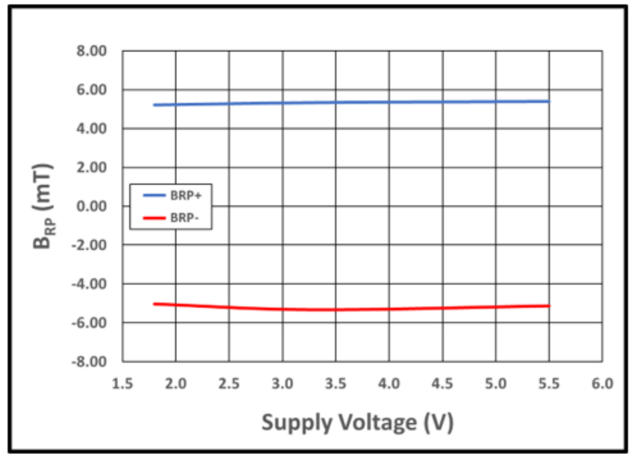

Figure 15: B_{RP-} (Red) and B_{RP+} (Blue) vs. Supply Voltage at T_A = 25°C

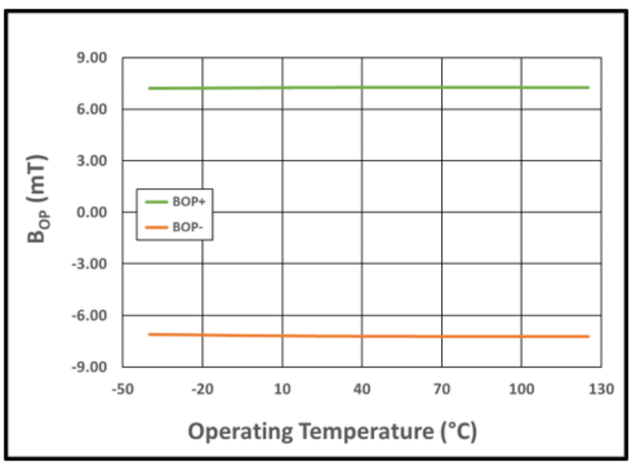

Figure 16: B_{OP-} (Orange) and B_{OP+} (Green) vs. Temperature at V_{DD} = 3.3 V

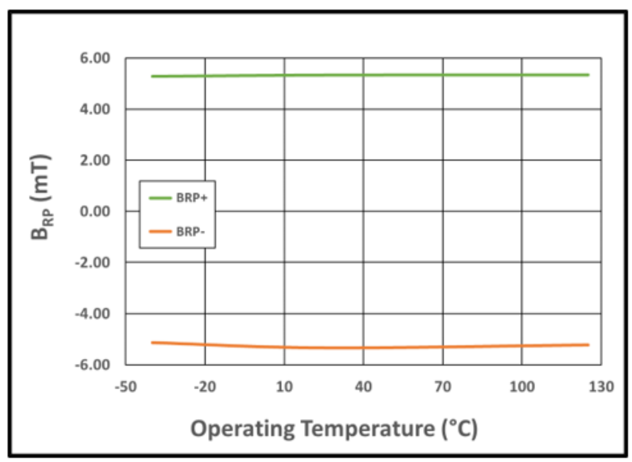

Figure 17: B_{RP-} (Orange) and B_{RP+} (Green) vs. Temperature at V_{DD} = 3.3 V

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TYPICAL MAGNETIC CHARACTERISTICS FOR CT8152PC IN ANALOG MODE

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

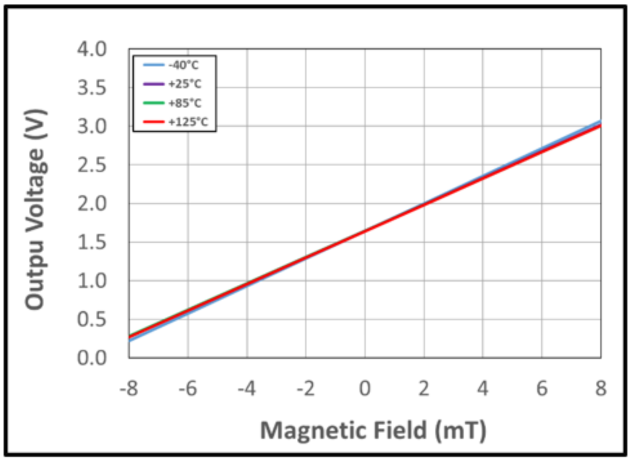

Figure 18: Output Voltage vs. Magnetic Field over Temperature at V_{DD} = 3.3 V

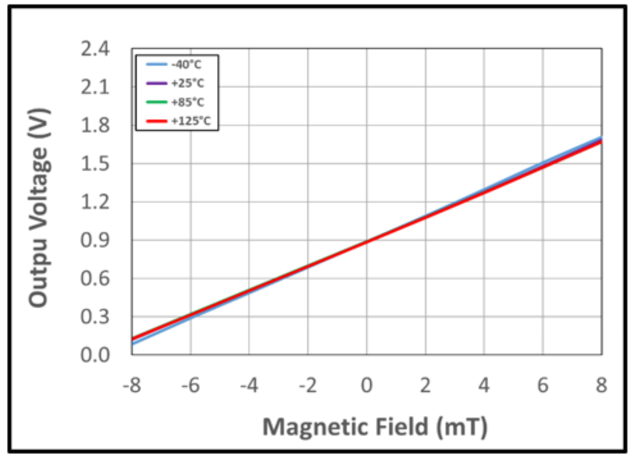

Figure 19: Output Voltage vs. Magnetic Field over Temperature at V_{DD} = 1.8 V

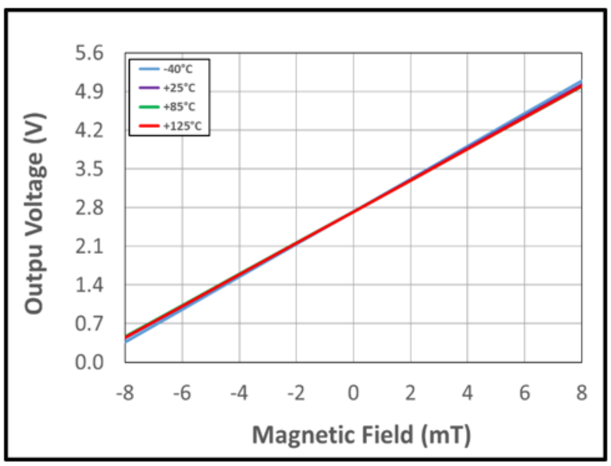

Figure 20: Output Voltage vs. Magnetic Field over Temperature at V_{DD} = 5.5 V

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TYPICAL ELECTRICAL CHARACTERISTICS FOR CT8152PC IN DIGITAL MODE ONLY

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

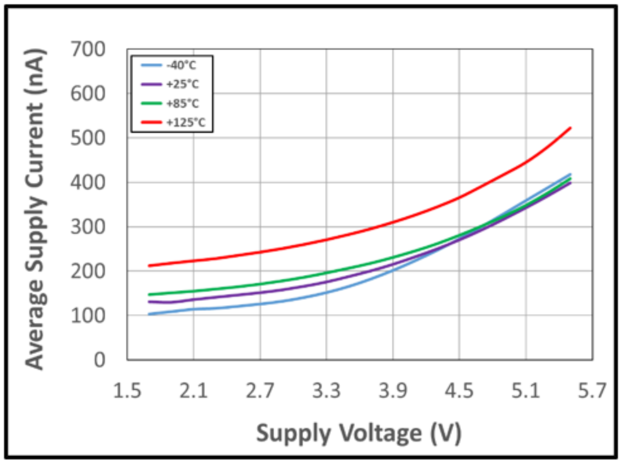

Figure 21: Average Supply Current vs. Supply Voltage vs. Temperature

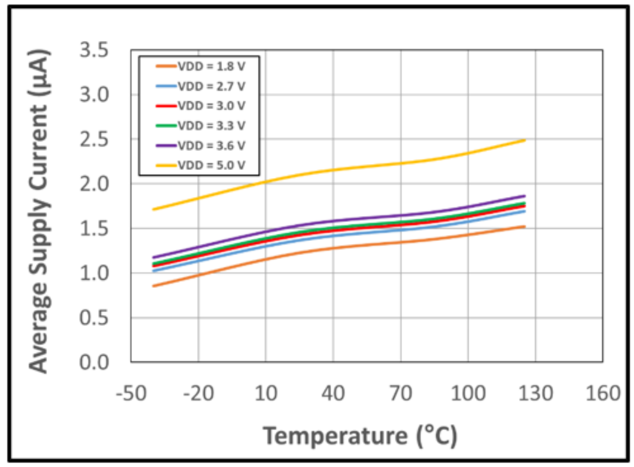

Figure 22: Average Supply Current vs. Temperature vs. Supply Voltage

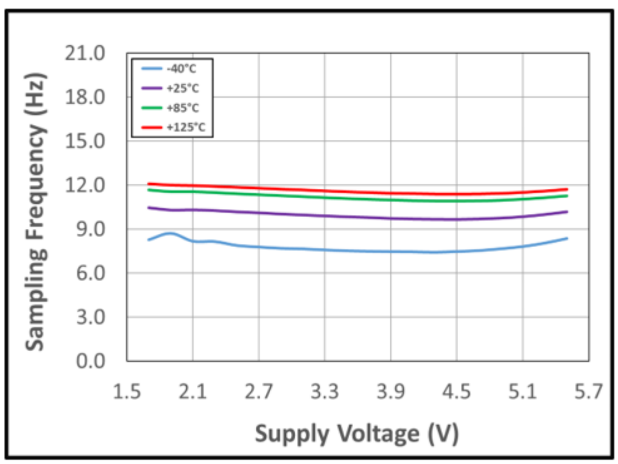

Figure 23: Sampling Frequency vs. Supply Voltage vs. Temperature

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TYPICAL ELECTRICAL CHARACTERISTICS FOR CT8152PC IN ANALOG AND DIGITAL MODE

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

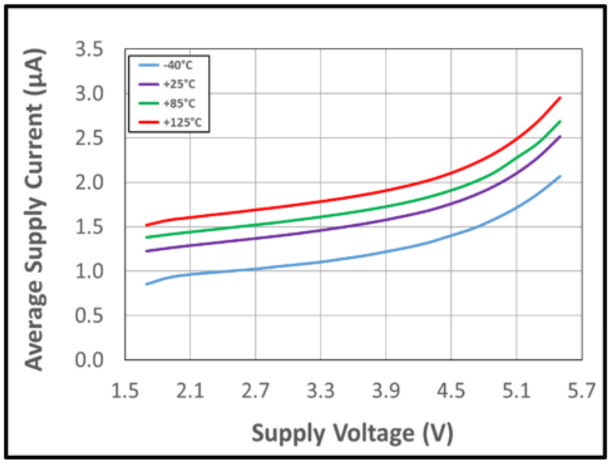

Figure 24: Average Supply Current vs. Supply Voltage vs. Temperature

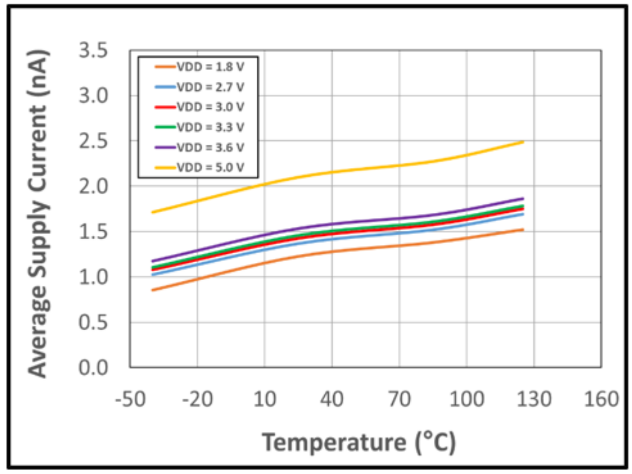

Figure 25: Average Supply Current vs. Temperature vs. Supply Voltage

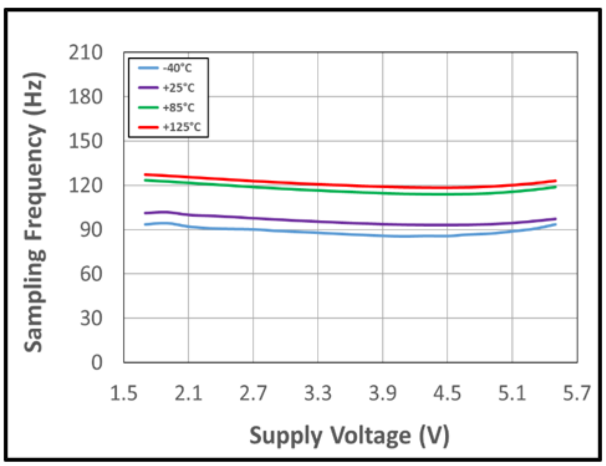

Figure 26: Sampling Frequency vs. Supply Voltage vs. Temperature

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FUNCTIONAL DESCRIPTION

Overview

The CT815x is a product family of TMR analog sensors that provides a linear analog output voltage for a range of magnetic fields. It supports a wide operating voltage range of 1.7 to 5.5 V, enabling these devices to be used in many applications. Designed to consume a minimal amount of current which is ideal for battery-powered products.

Analog Output Measurement

The CT815x provides a continuous (sample & hold) linear analog output voltage which represents the measured magnetic field. The output voltage range of ANA is 10% of V_{DD} to 90% of V_{DD} which represents the magnetic field from the typical low-end value of –80 G to the maximum magnetic field value of +80 G for a sensitivity of 5 mV/V/G. A resistor-capacitor (R-C) filter may be implemented on the ANA pin to further lower the noise. Figure 27 illustrates the output voltage range of the ANA pin as a function of the measured current.

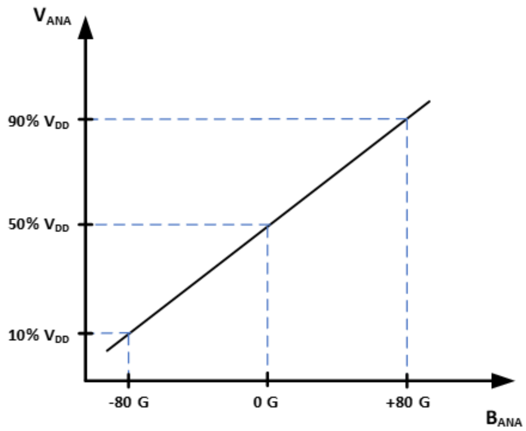

Figure 27: Linear Output Voltage Range vs. Measured Magnetic Field for S = 5 mV/V/G.

Undervoltage Lockout (UVLO)

The Undervoltage Lockout protection circuitry of the CT815x is activated when the supply voltage (V_{DD}) falls below 1.53 V. The CT815x remains in a low quiescent state and the ANA and $\overline{OUT}$ outputs are 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 CT815x 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}.

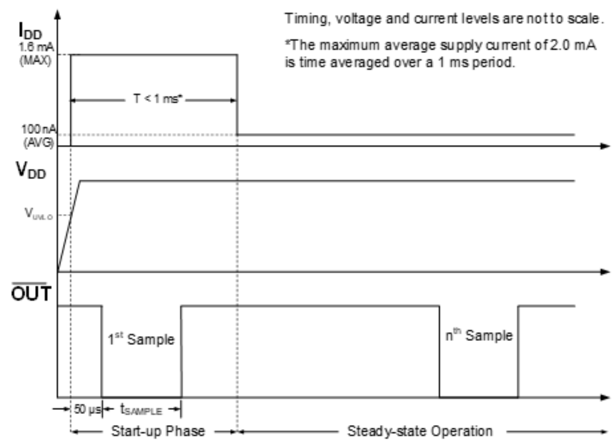

Figure 28: CT815x Power-On Timing Diagram

Omnipolar Magnetic Flux

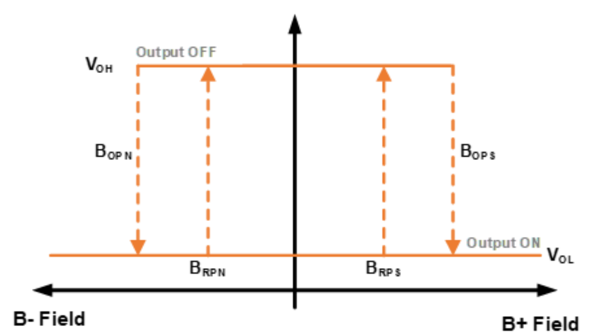

Figure 29: CT8152 Output Behavior vs. Magnetic Field

Table 1: CT8152 Push-Pull 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)

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Dual Analog and Digital Output Mode

The CT8152 supports both a digital and an analog signal output operating at the same time. The analog output will turn on when B_{RP} on the digital output side is triggered at ±8.0 mT and both outputs remain on until the CT8152 is powered off. The digital output is configured as a CMOS push-pull, and it will start sampling one full cycle/period once dual output mode has been initiated. The analog and digital outputs have a sampling frequency of 100 Hz and 12.5 Hz, respectively, and they work independently of one another.

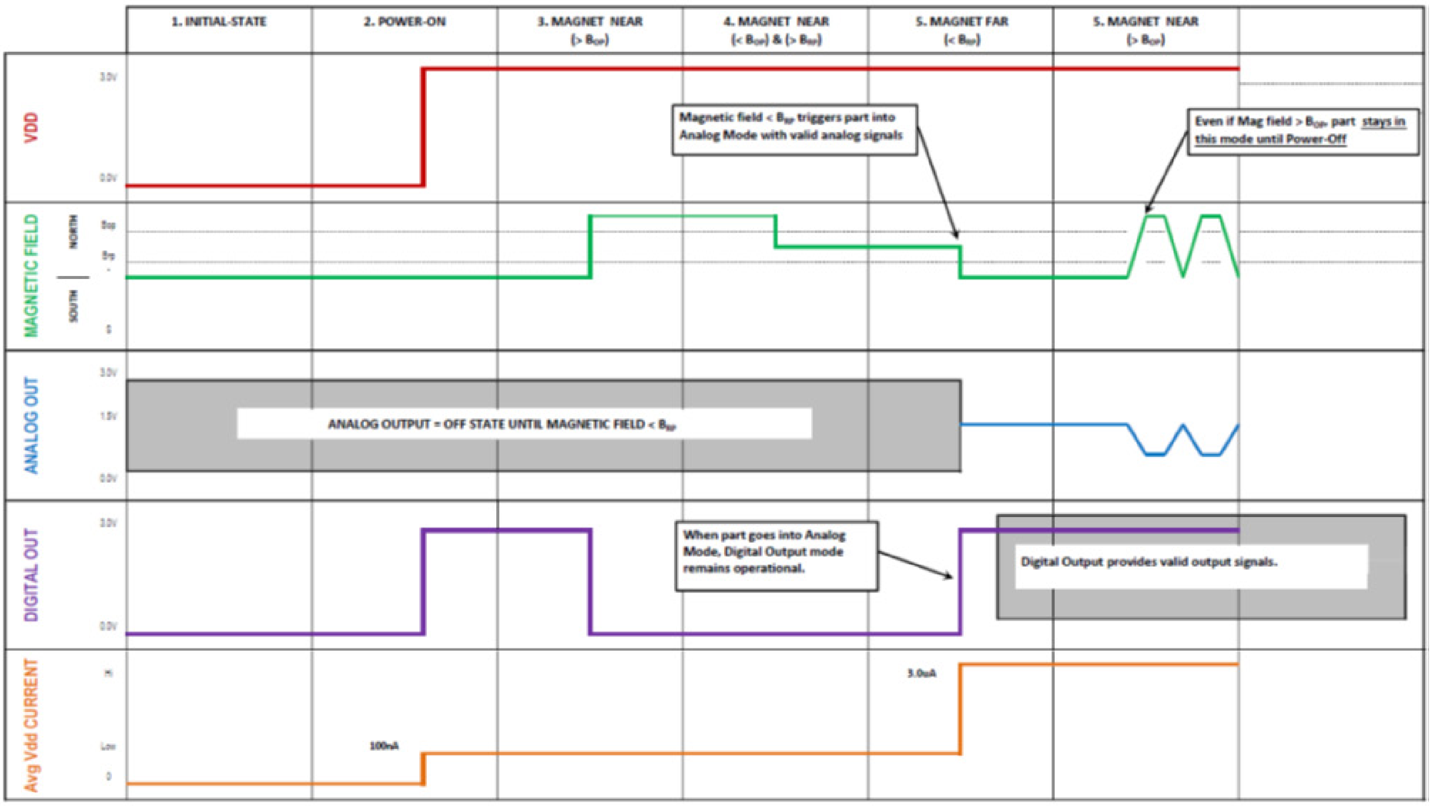

Figure 30: Dual Analog and Digital Mode Operating Conditions of the CT8152.

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APPLICATIONS INFORMATION

A decoupling capacitor, C_{BYP}, between the supply voltage (VDD) and ground (GND) is required to lower the noise going into the CT815x as well as providing isolation from the other circuits. The decoupling capacitor should be placed close to the TMR analog sensor. A typical capacitor value of 1.0 µF (ceramic) will be sufficient. For the analog output, a simple RC filter (R = 47 kΩ and C = 100 pF) is recommended on the ANA pin as shown in Figure 31.

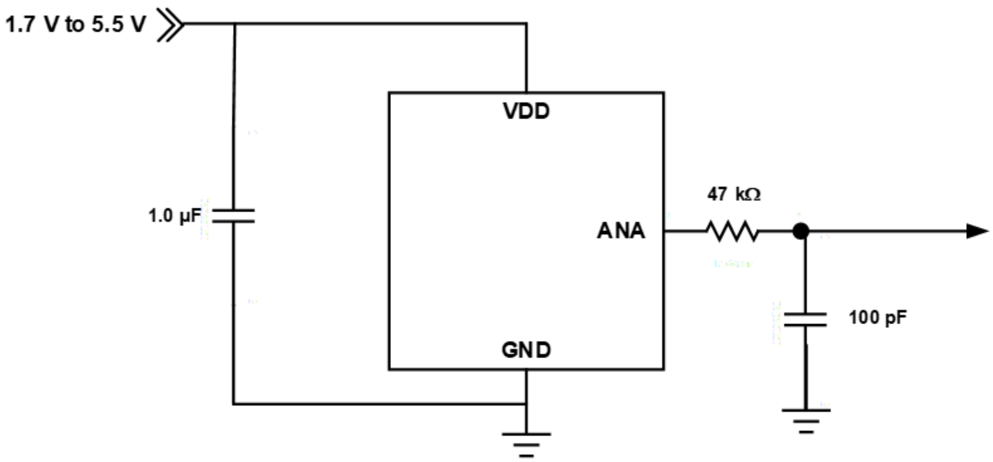

Figure 31: CT8150 Application Block Diagram

For the CT8152, the same bypass capacitor and RF filter of the CT8150 should be implemented.

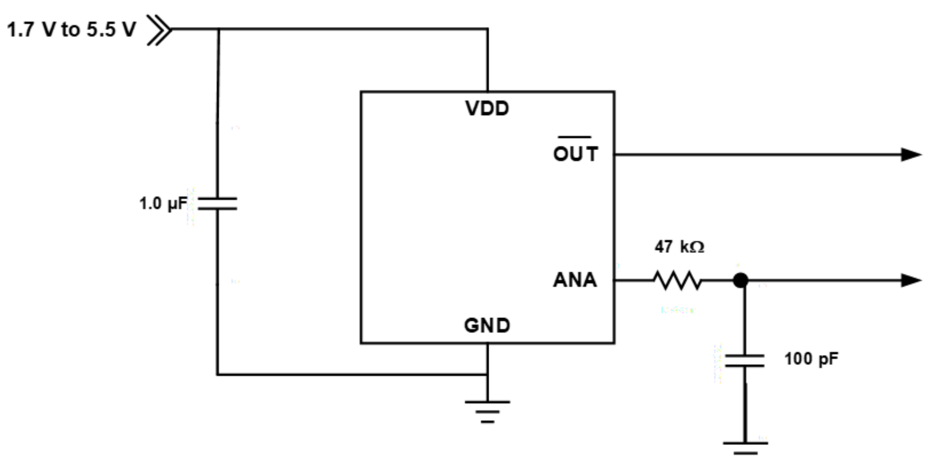

Figure 32: CT8152 Application Block Diagram

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XtremeSense TMR Current Sensor Location

The XtremeSense TMR sensor location for the CT815x products are shown in Figure 33, Figure 34, and Figure 35. The dimensions shown in the three figures are typical values.

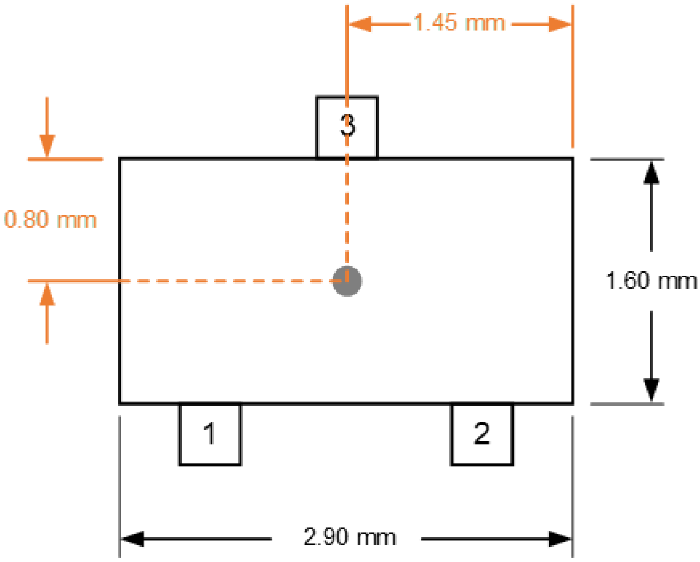

Figure 33: XtremeSense TMR Sensor Location for CT8150 products in 3-lead SOT23 Package

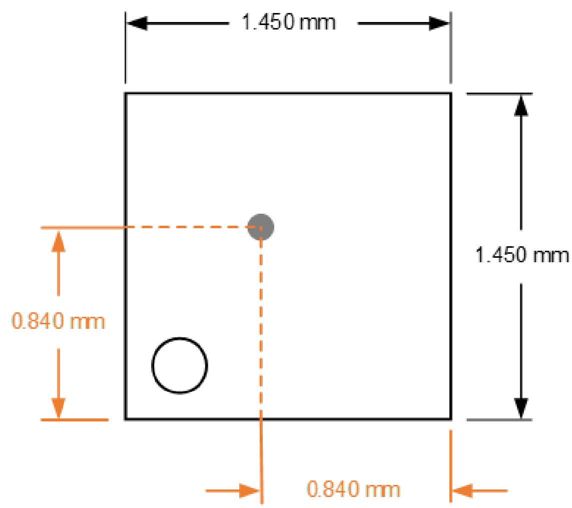

Figure 34: XtremeSense TMR Sensor Location for CT815x products in 4-lead LGA Package

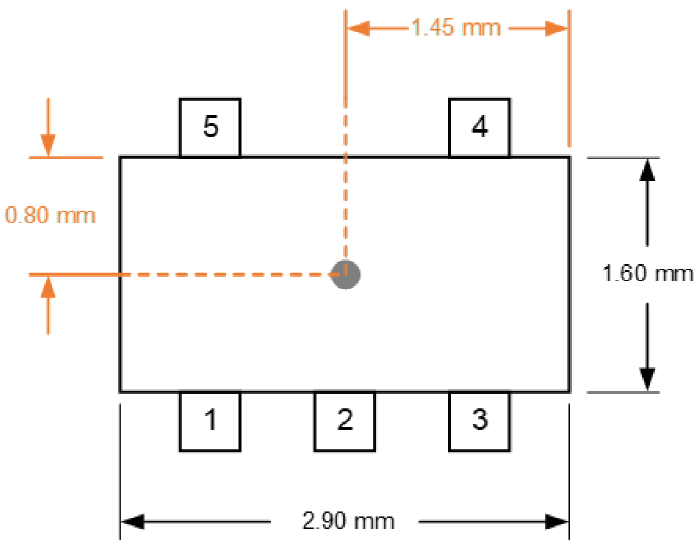

Figure 35: XtremeSense TMR Sensor Location for CT8152 products in 5-lead SOT23 Package

Figure 36: XtremeSense TMR Sensor Location in z Dimension for CT815x in 4-lead LGA Package

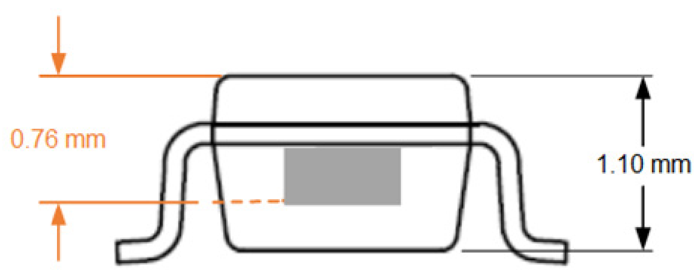

Figure 37: XtremeSense TMR Sensor Location in z Dimension for CT815x in SOT23 Package

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PACKAGE OUTLINE DRAWINGS

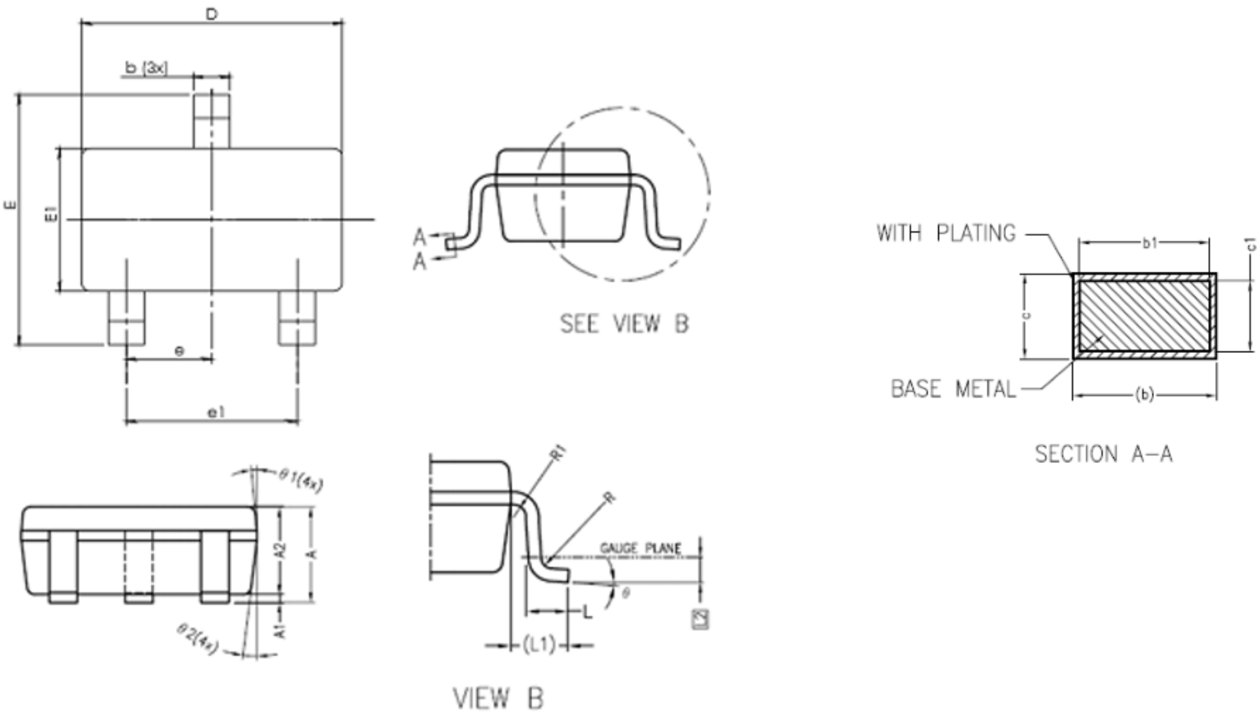

Figure 38: 3-Lead SOT23 Package Drawing

Table 2: CT815x 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

Symbol	Dimensions in Millimeters (mm)		
	Min.	Typ.	Max.
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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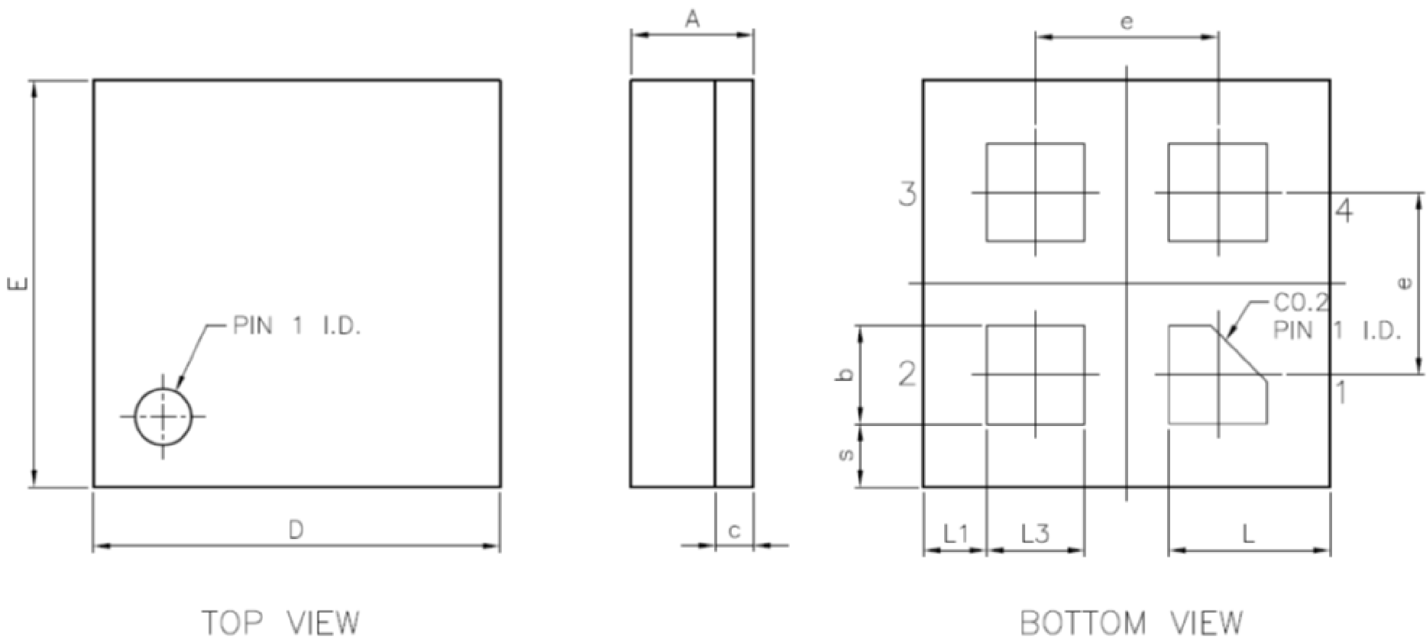

NOTES:

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

Figure 39: 4-Lead LGA Package Drawing

Table 3: CT815x 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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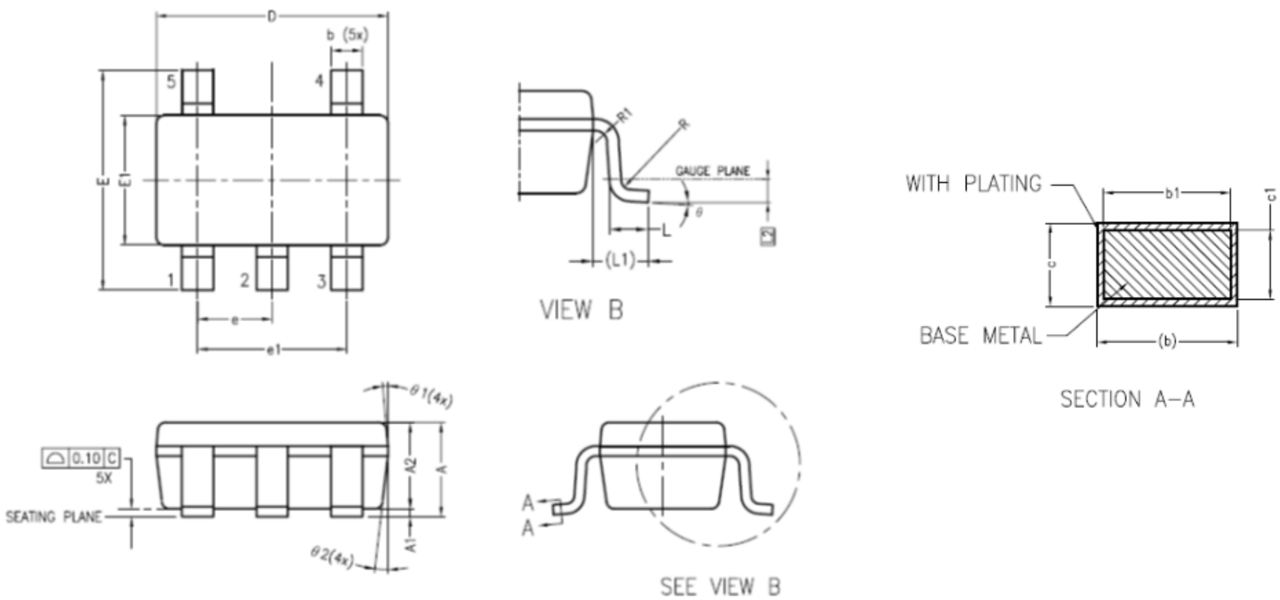

Figure 40: 5-Lead SOT23 Package Drawing

Table 4: CT815x 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

Symbol	Dimensions in Millimeters (mm)		
	Min.	**Typ.**	**Max.**
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°
θ1	5°	6°	15°
θ2	5°	8°	15°

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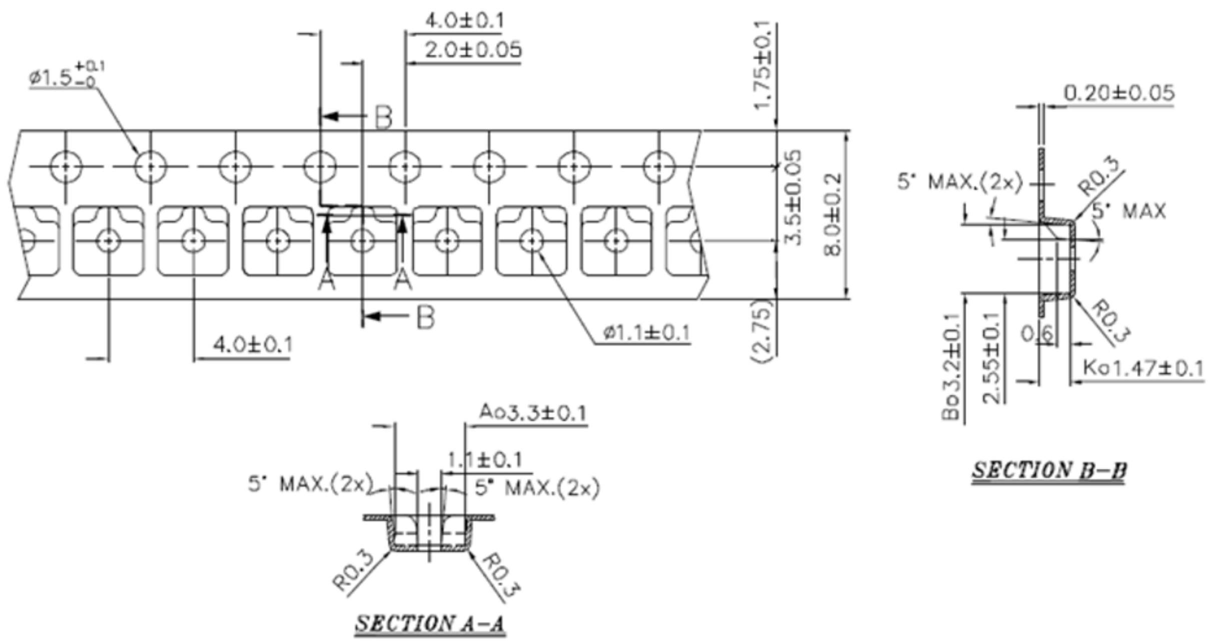
TAPE AND REEL POCKET DRAWINGS AND DIMENSIONS



NOTES:

1. Material: Conductive Polystyrene.
2. Dimensions in mm.
3. 10 sprocket hole pitch cumulative tolerance ±0.20 mm.
4. Camber not 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 41: Tape and Pocket Drawing for 3-lead SOT23 Package

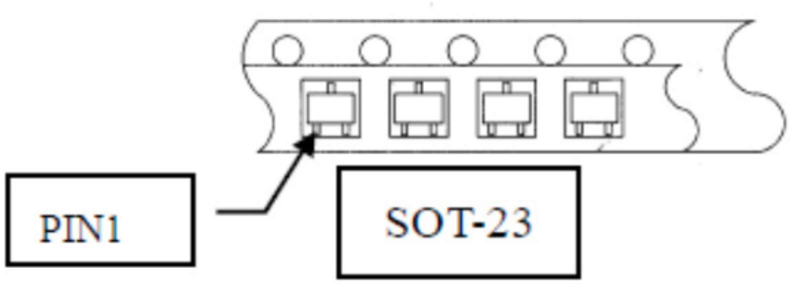


Figure 42: SOT23 Orientation in Tape Pocket

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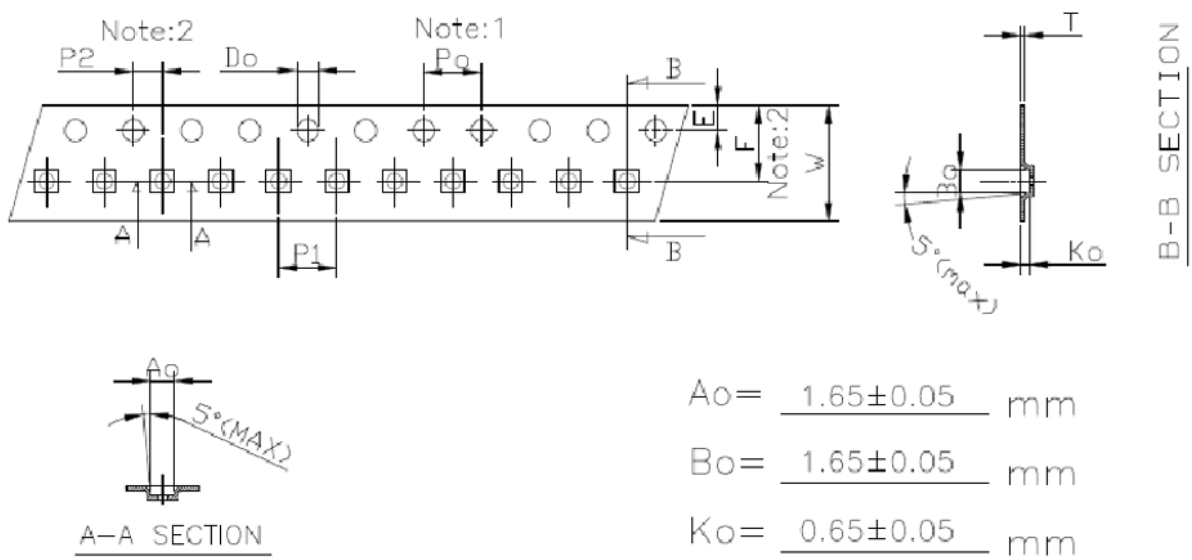

Figure 43: Tape and Pocket Drawing for LGA-4 Package

Table 5: 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.

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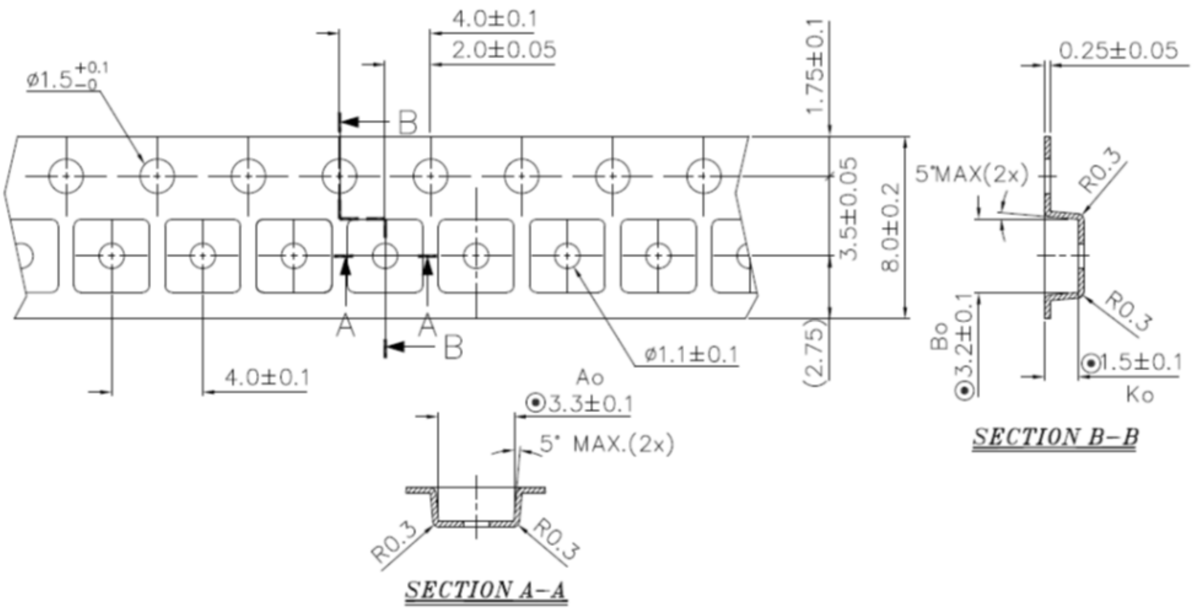

NOTES:

1. Material: Conductive Polystyrene
2. Dimensions in mm.
3. 10 sprocket hole pitch cumulative tolerance ±0.20 mm.
4. Camber not 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. S.R. is less than or equal to 1.0 × 10E7 Ω/sq.
7. A_O and B_O measured on a plane 0.30 mm above the bottom of the pocket.
8. K_O measured from a plane on the inside bottom of the pocket to the top surface of the carrier.

Figure 44: Tape and Pocket Drawing for 5-lead SOT23 Package

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PACKAGE INFORMATION

Table 6: CT815x Package Information

Part Number	Package Type	# of Leads	Package Quantity	Lead Finish	Eco Plan [1]	MSL Rating [2]	Operating Temperature (°C) [3]	Device Marking [4]
CT8150PC-IS3	SOT23	3	3000	Sn	Green & RoHS	1	–40 to 85	MH YWWS
CT8150PC-HS3	SOT23	3	3000	Sn	Green & RoHS	1	–40 to 125	MH YWWS
CT8150PC-IL4	LGA	4	3000	Au	Green & RoHS	3	–40 to 85	H YZ
CT8150PC-HL4	LGA	4	3000	Au	Green & RoHS	3	–40 to 125	H YZ
CT8152PC-IS5	SOT23	5	3000	Au	Green & RoHS	1	–40 to 85	MK YWWS
CT8152PC-HS5	SOT23	5	3000	Au	Green & RoHS	1	–40 to 125	MK YWWS
CT8152PC-IL4	LGA	4	3000	Au	Green & RoHS	3	–40 to 85	R YZ
CT8152PC-HL4	LGA	4	3000	Au	Green & RoHS	3	–40 to 125	R 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 (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.

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Revision History

Number	Date	Description
2	December 11, 2023	Document rebranded and minor editorial updates

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