TMR2104

General-purpose Multi-function TMR Linear Sensor

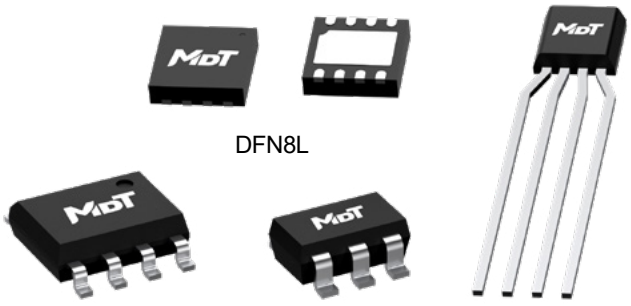
Description

TMR2104 TMR linear sensor adopts a unique push-pull Wheatstone full bridge structure utilizing four TMR sensor elements. This Wheatstone full bridge provides differential voltage output with excellent temperature stability when the applied magnetic field changes parallel to the sensor's sensitive direction.

This TMR2104 magnetic linear sensor are available in DFN8L (3 mm × 3 mm × 0.75 mm), SOT23-5, SOP8 and SSIP4 package with compact size and easy to weld.

Features and Benefits

- Tunneling magnetoresistance (TMR) technology
- High sensitivity
- Large dynamic range
- Low power consumption
- Excellent temperature stability
- RoHS & REACH compliant

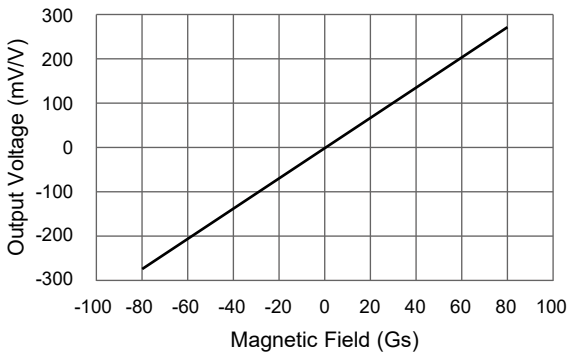


DFN8L

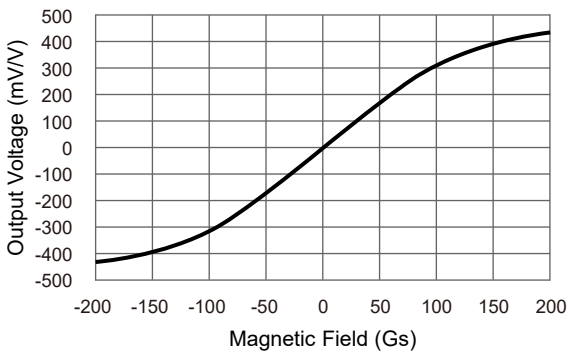
SOP8 SOT23-5 SSIP4

Applications

- Magnetometer
- Current sensor
- Position sensor
- Rotation sensor



TMR2104 ±80 Gs Output Curve



TMR2104 ±200 Gs Output Curve

Selection Guide

Part Number	Resistance	Linear range	Sensitivity	Package	Packing Form
TMR2104B	30 kΩ	±80 Gs	-3.1 mV/V/Gs	SSIP4	Anti-Static Bag
TMR2104D	30 kΩ	±80 Gs	-3.1 mV/V/Gs	DFN8L	Tape & Reel
TMR2104P	30 kΩ	±80 Gs	-3.1 mV/V/Gs	SOP8	Tape & Reel
TMR2104LS	1 kΩ	±80 Gs	3.1 mV/V/Gs	SOT23-5	Tape & Reel

Catalogue

1. Functional Block Diagram

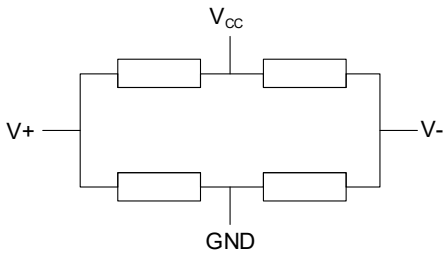


Figure 1. Block Diagram

2. Operating Principle

The TMR2104 sensing axis is parallel to the package top-marking surface; the sensing axis is defined from the N pole toward the S pole, as indicated by the arrow in the figure below.

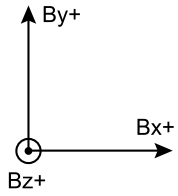


Figure 2-1. Definition of axis

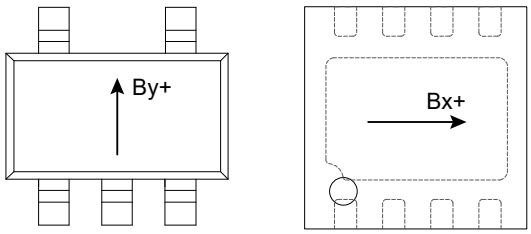


Figure 2-2. Axial diagram (SOT23-5) and (DFN8L) top view

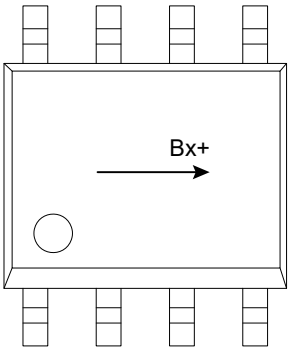


Figure 2-3. Axial diagram (SOP8 top view)

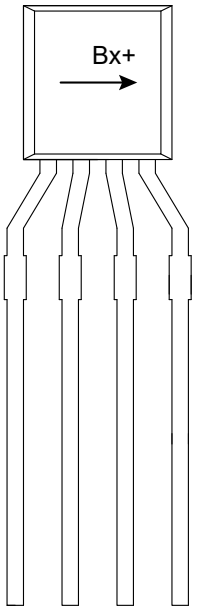


Figure 2-4. Axial diagram (SSIP4 top view)

3. Pin Configuration

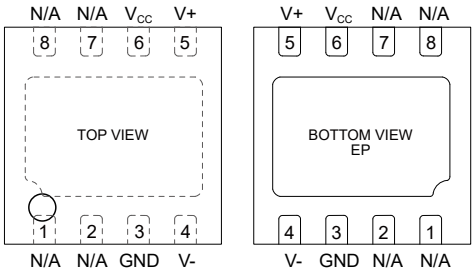


Figure 3-1. Pin Configuration (DFN8L)

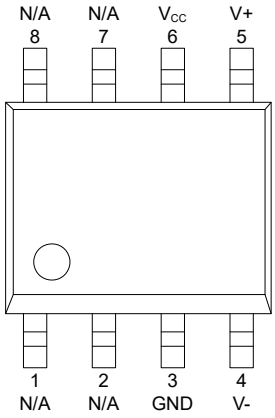


Figure 3-2. Pin Configuration (SOP8)

Pin Number	Name	Function
1, 2, 7, 8	N/A	Not connected
3	GND	Ground
4	V-	Analog differential output 2
5	V+	Analog differential output 1
6	V_{CC}	Power supply

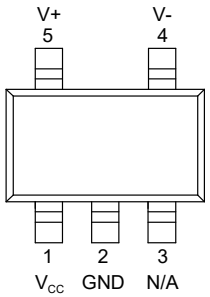


Figure 3-3. Pin Configuration (SOT23-5)

Pin Number	Name	Function
1	V_{CC}	Power supply
2	GND	Ground
3	N/A	Not connected
4	V-	Analog differential output 2
5	V+	Analog differential output 1

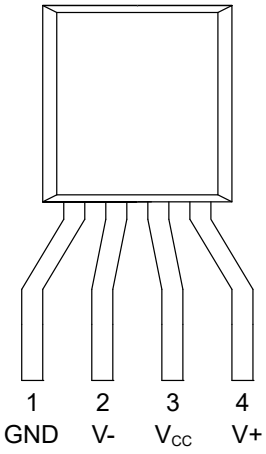


Figure 3-4. Pin Configuration (SSIP4)

Pin Number	Name	Function
1	GND	Ground
2	V-	Analog differential output 2
3	V_{CC}	Power supply
4	V+	Analog differential output 1

4. Absolute Maximum Ratings

Parameters	Symbol	Min.	Max.	Unit	Applicable Part Number
Supply voltage	V_{CC}	-	7	V	All parts
Reverse supply voltage	V_{RCC}	-	7	V	All parts
External magnetic field	B	-	4000	Gs	All parts
ESD performance (HBM)	V_{ESD}	-	4	kV	All parts
Operating ambient temperature	T_A	-40	125	°C	All parts
Storage ambient temperature	T_{STG}	-50	150	°C	All parts

5. Electrical Specifications

V_{CC} = 1.0 V, T_A = 25 °C, differential output unless otherwise specified

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Applicable Part Number
Supply Voltage	V_{CC}	Operating	-	1	7	V	All parts
Supply Current [1)]	I_{CC}	B = 0 Gs	-	1000	-	μA	TMR2104LS
			-	33	-	μA	TMR2104B, TMR2104D, TMR2104P
Resistance [1, 2)]	R_B	-	-	1	-	kΩ	TMR2104LS
			-	30	-	kΩ	TMR2104B, TMR2104D, TMR2104P
Sensitivity	SEN	B in ±80 Gs	-	3.1	-	mV/V/Gs	TMR2104LS
			-	-3.1	-	mV/V/Gs	TMR2104B, TMR2104D, TMR2104P
Saturation Magnetic Field	H_{SAT}	-	-	±150	-	Gs	All parts
Nonlinearity	NONL	B in ±80 Gs	-	1.5	-	%FS	All parts
Offset	V_{OFFSET}	-	-10	-	10	mV/V	TMR2104LS
		-	-8	-	8	mV/V	TMR2104B, TMR2104D, TMR2104P
Hysteresis	HYS	B in ±80 Gs	-	0.5	-	Gs	All parts
Resistance Temperature Coefficient	TCR_B	B = 0 Gs	-	-600	-	PPM/°C	All parts
Sensitivity Temperature Coefficient	TCS	-	-	-300	-	PPM/°C	All parts

1) $I_{CC} = V_{CC} / R_B$, and supply current changes linearly with supply voltage.

2) Bridge resistance is customizable. Contact MultiDimension Technology for details.

6. Dimensions

SSIP4 Package

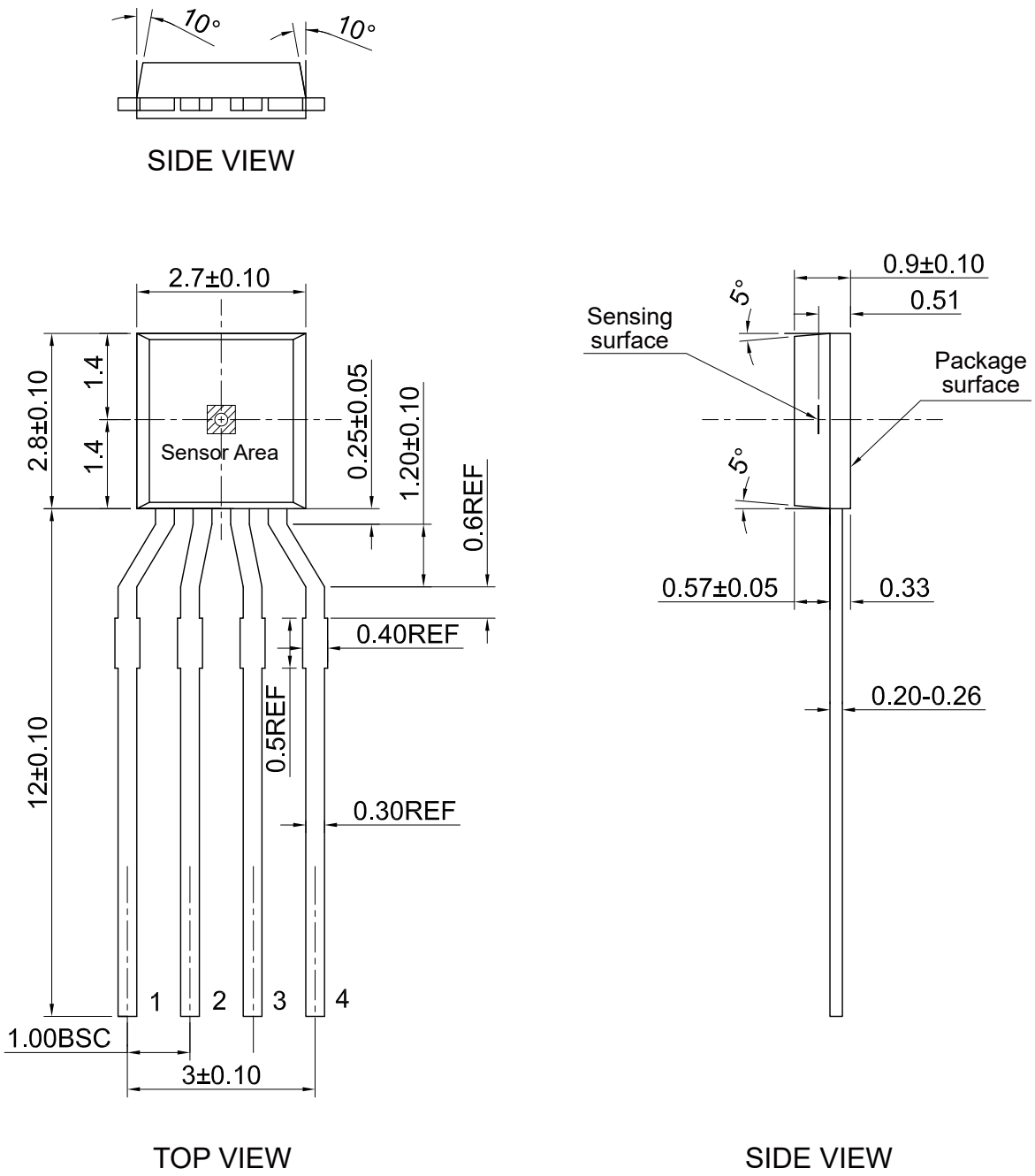


Figure 4. Package outline of SSIP4 (unit: mm)

DNF8L Package

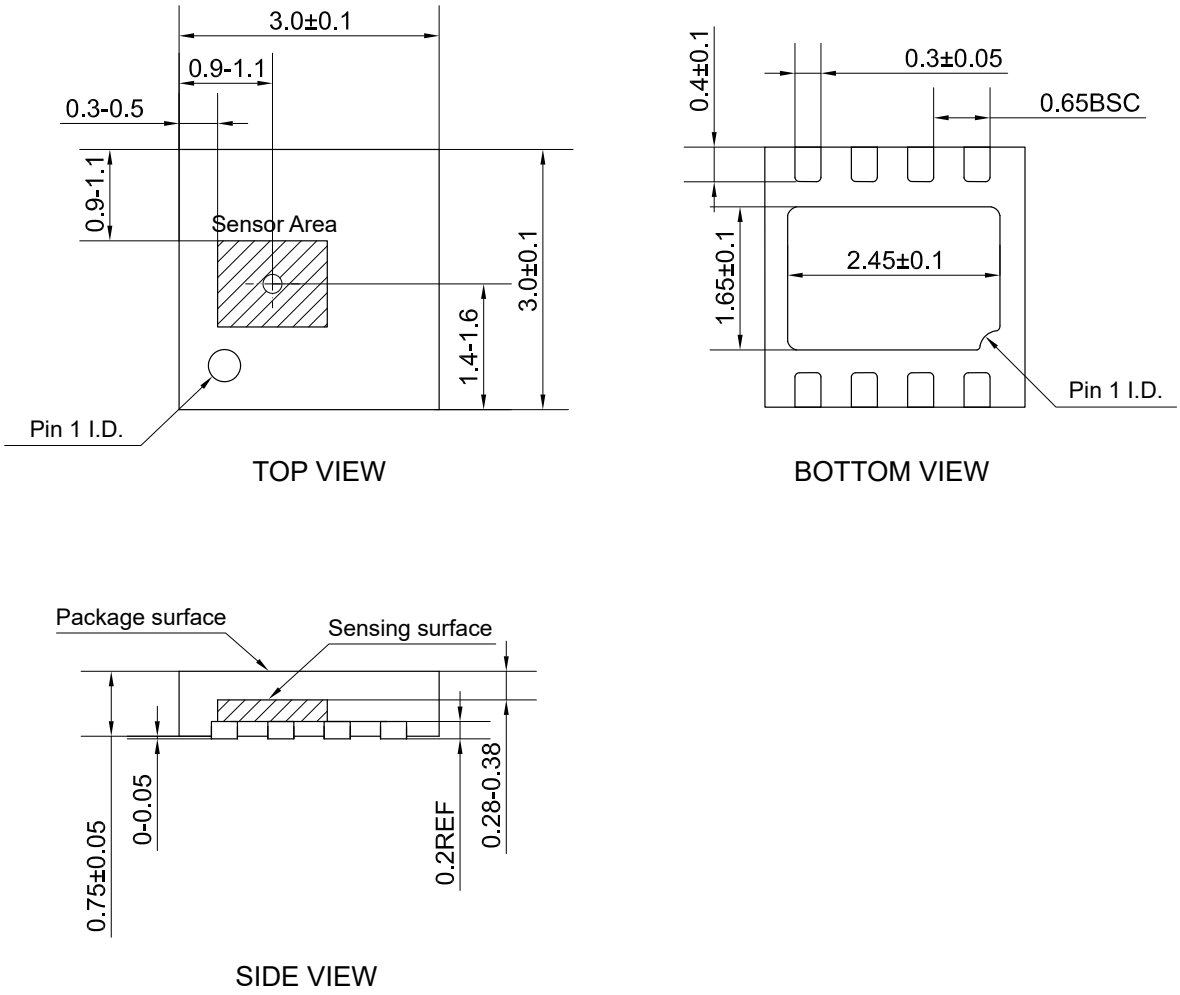


Figure 5. Package outline of DNF8L (unit: mm)

SOP8 Package

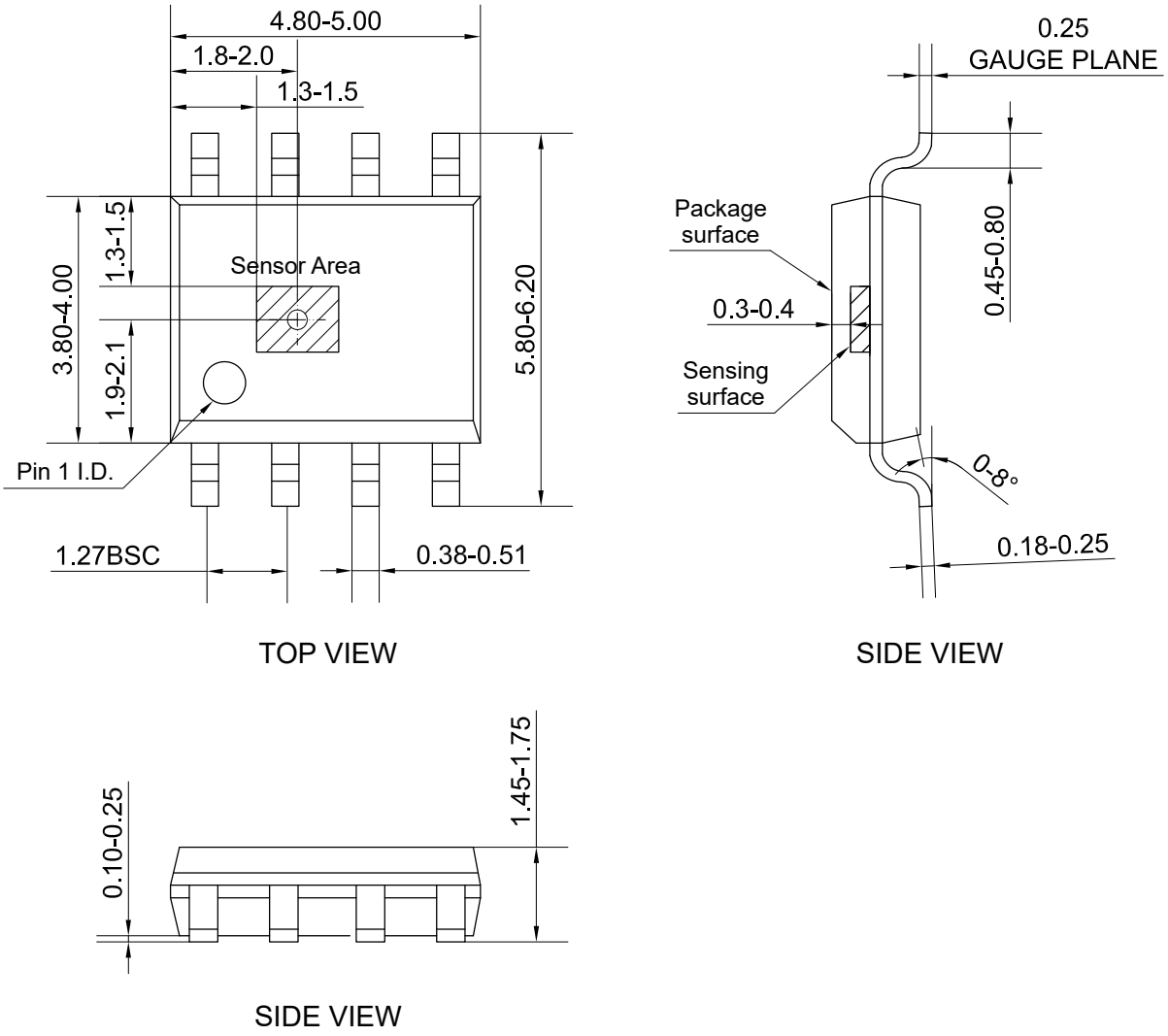


Figure 6. Package outline of SOP8 (unit: mm)

SOT23-5 Package

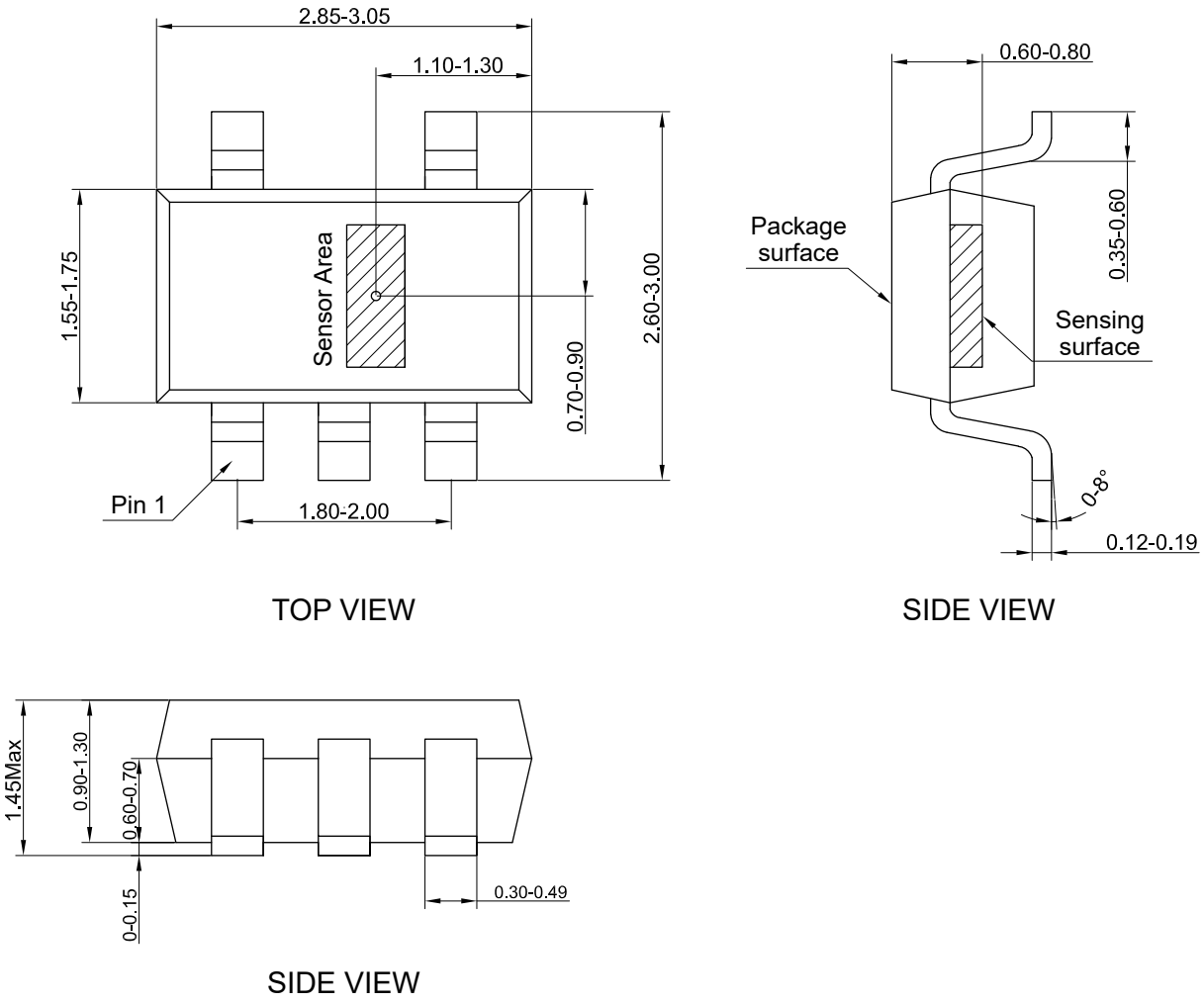


Figure 7. Package outline of SOT23-5 (unit: mm)

Recycling

The product(s) in this document should be disposed of at the end of the product(s) life using a qualified waste management company for recycling in accordance with local regulations.

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