

TMR2617S-AAC

Low Power Large Range TMR Linear Magnetic Sensor

Description

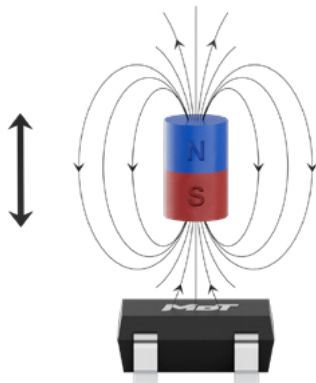
The TMR2617S-AAC magnetic sensor is a low-voltage, low-power consumption TMR linear sensor with wide linear range.

The TMR2617S-AAC integrates tunneling magnetoresistance (TMR) sensor, a low-noise operational amplifier, and a DAC circuit, where the analog output voltage maintains a linear relationship with the external magnetic field. The sensor can be widely used in various position sensing applications, supporting customer requirements for low voltage, high resolution, high signal-to-noise ratio, and wide linear range.

The product is packaged in SOT23-3 and complies with RoHS and REACH.



SOT23-3

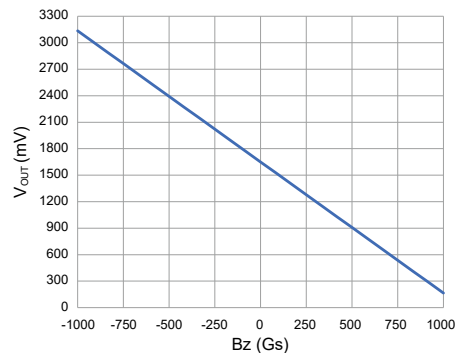


Features and Benefits

- Tunneling magnetoresistance (TMR) technology
- Supply voltage: 1.71 V to 5 V
- Static current consumption < 300 μ A
- Output voltage: 5% to 95% V_{CC}
- Output voltage follows V_{CC} changes
- Low noise
- Z-axis sensitivity
- Sensitivity with high consistency
- Low hysteresis
- RoHS & Reach compliant

Applications

- Magnetic keyboard
- Magnetic field sensing
- Position sensing



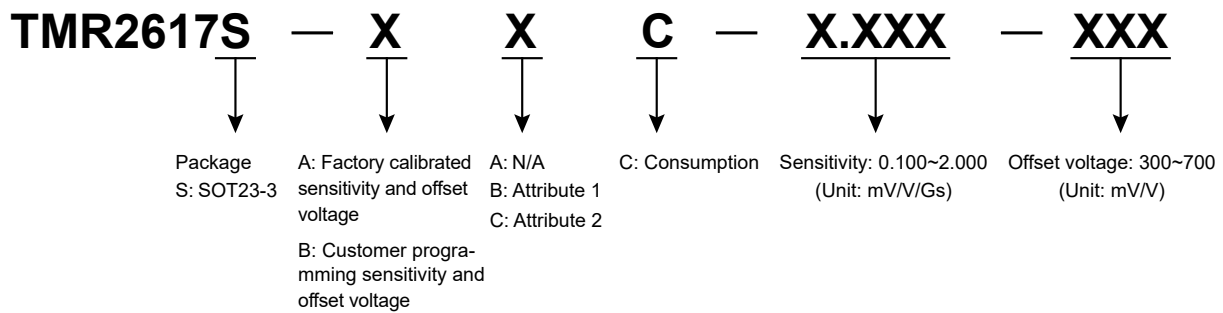
TMR2617S-AAC Output curve

Selection Guide

Part Number*	Supply Voltage	Linear Range	Operating temperature	Static Current Consumption	Package	Packing Form
TMR2617S-AAC-X.XXX-XXX	1.71 V to 5 V	±1000 Gs	-40 °C to 85 °C	< 300 μA	SOT23-3	Tape & Reel

Note: Sensitivity and offset voltage can be customized according to customer requirements.

Product Model Description



Note: A sensitivity value of 1.000 corresponds to 1.000 mV/V/Gs, please refer to the Z axis output curve diagram on the home page. and a zero-offset output voltage value of 500 corresponds to 500 mV/V.

Catalogue

1. Functional Block Diagram.....	03
2. Operating Principle.....	03
3. Pin Configuration.....	03
4. Absolute Maximum Ratings.....	04
5. Electrical Specifications.....	04
6. Output Characteristics.....	05
7. Application Circuit.....	05
8. Dimensions.....	06

1. Functional Block Diagram

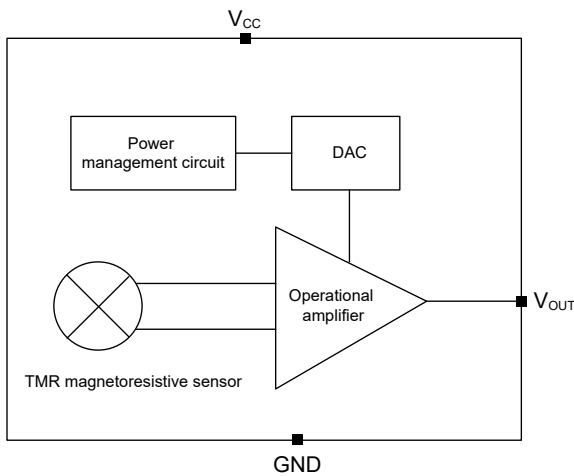


Figure 1. Block diagram

The TMR2617S-AAC output voltage varies linearly with the magnetic field along the sensing axis.

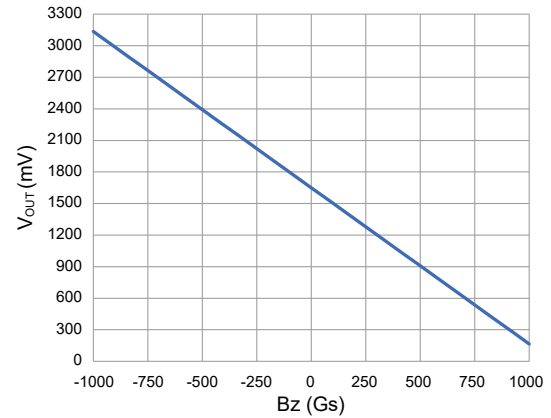


Figure 3. TMR2617S-AAC output curve

2. Operating Principle

The TMR2617S-AAC sensing axis is perpendicular 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.

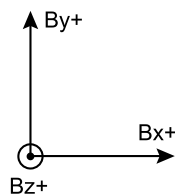


Figure 2-1. Definition of axis

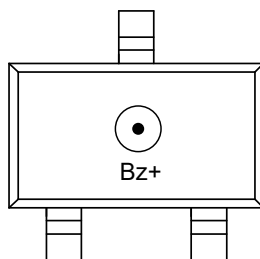


Figure 2-2. Axial diagram (SOT23-3 top view)

3. Pin Configuration

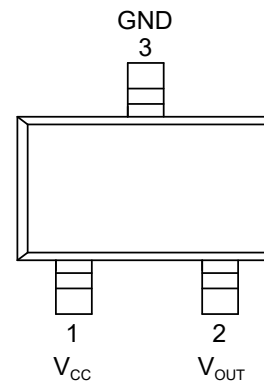


Figure 4. Pin configuration (SOT23-3)

Pin Number	Name	Function
1	V _{CC}	Supply voltage
2	V _{OUT}	Output
3	GND	Ground

4. Absolute Maximum Ratings

Parameters	Symbol	Min.	Max.	Unit
Supply voltage	V_{CC}	-0.3	6	V
Magnetic flux density	B	-	4000	Gs
V_{OUT} current drive	-	-	1.5	mA
Operating temperature	T_A	-40	85	°C
Storage temperature	T_{STG}	-50	150	°C
ESD (HBM)	V_{ESD}	-	4000	V

Note: The maximum value in the limit parameter only ensures that the IC is not permanently damaged, please refer to the “Electrical Performance Parameters” for normal operating conditions of the IC.

5. Electrical Specifications

$V_{CC} = 1.71\text{ V to }5\text{ V}$, $T_A = 25\text{ °C}$, a 100nF capacitor connected between the power and ground

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	V_{CC}	-	1.71	3.3	5	V
Operating current	I_{CC}	-	-	-	300	μA
Bandwidth	BW	-3 dB	-	-	50	kHz
Load resistance	R_L	-	10	-	-	kΩ
Load conductance	C_L	-	-	-	10	nF
Sensitivity	SEN	Bz: ±1000 Gs	User programmable			mV/V/Gs
Temperature coefficient of sensitivity	TCS	$T_A = -40\text{ °C to }85\text{ °C}$	-	1000	-	PPM/°C
Offset voltage	V_{OFFSET}	-	User programmable			mV/V
Temperature coefficient of offset	TCO	$T_A = -40\text{ °C to }85\text{ °C}$	-	-0.12	-	mV/°C
Nonlinearity	NONL	Bz: ±1000 Gs	-	2.5	-	%FS
Hysteresis	HYS	Bz: ±1000 Gs	-	2.5	-	%FS
Noise	V_N	$V_{CC} = 3.3\text{ V}$, BW = 5 kHz	-	-	10	mV _{pp}
Power-on time	t_{PO}	-	-	-	100	μs

6. Output Characteristics

The output voltage of the TMR2617S-AAC changes linearly with external magnetic field. As shown in Figure 5, the V_{OUT} is $50\% V_{CC}$ at zero magnetic field. When the magnetic field changes from $-B$ Gs to B Gs, the V_{OUT} output range is from 95% to $5\% V_{CC}$.

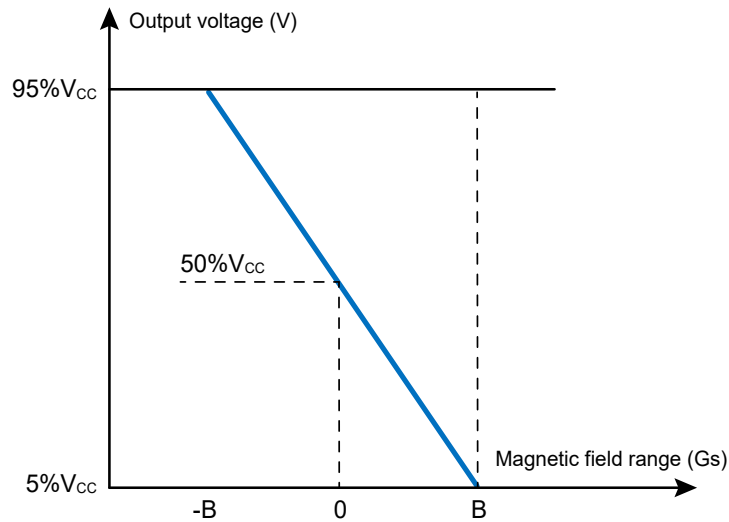


Figure 5. Output voltage versus magnetic field

7. Application Circuit

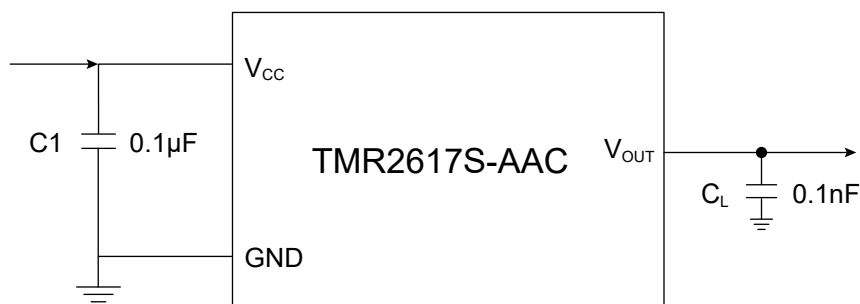


Figure 6. Application circuit diagram

Note: $C1$ should be as close as possible to the V_{CC} and GND pins. For detailed pin definitions, please refer to section 3 Pin Configuration.

8. Dimensions

SOT23-3 Package

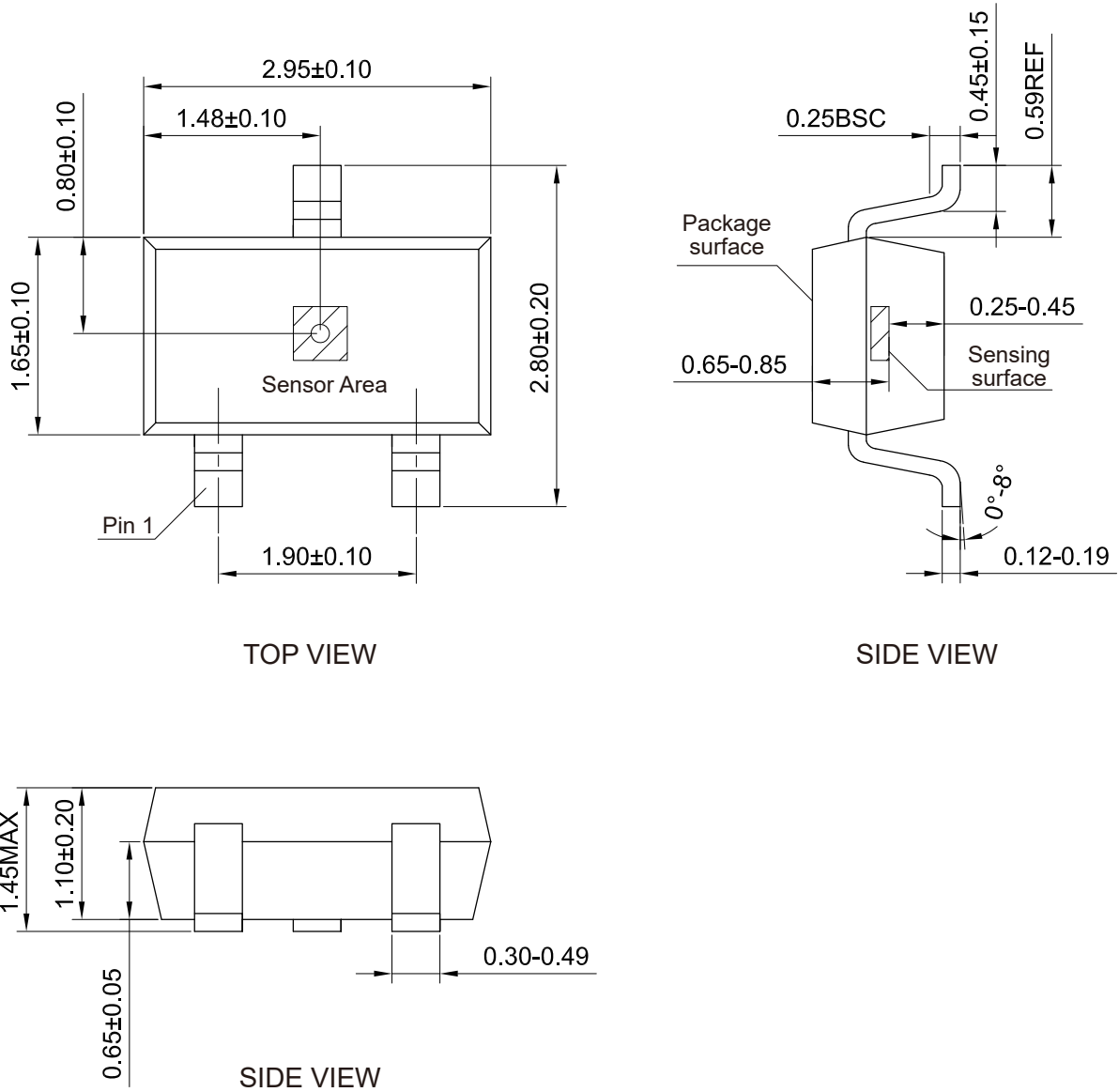


Figure 7. Package outline of SOT23-3 (unit: mm)

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