

TMR2615x-AAC

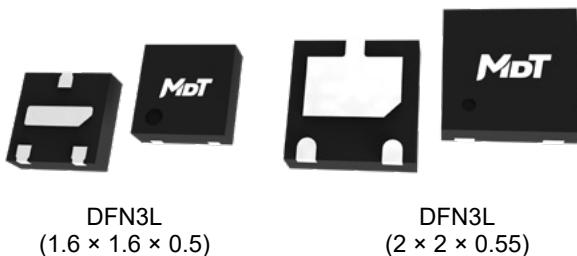
Low Power Large Range TMR Linear Magnetic Sensor

Description

The TMR2615x-AAC is a low-power, wide-linear-range, programmable TMR linear sensor IC by MultiDimension Technology. The IC integrates tunnel magnetoresistance (TMR) sensor, programmable operational amplifier, and DAC circuits to provide a linear relationship between analog output voltage and external magnetic field.

The IC can be widely used in various position sensing applications and supports customers' demands for low voltage, high resolution, high signal-to-noise ratio, and wide linear range.

The sensor is either available as TMR2615D-AAC in a DFN3L (2 mm × 2 mm × 0.55 mm) package or as TMR2615F-AAC in DFN3L (1.6 mm × 1.6 mm × 0.5 mm) package. The sensor complies with RoHS standards.

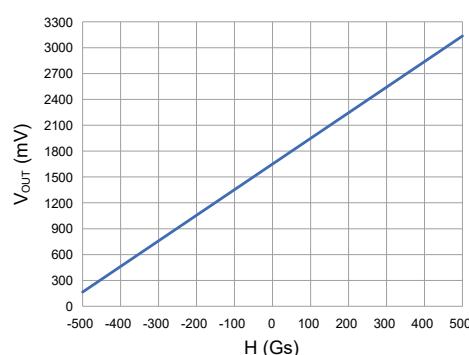


Features and Benefits

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

Applications

- Joystick controller
- Magnetic keyboard
- Consumer electronics



TMR2615x-AAC ±500 Gs Output curve

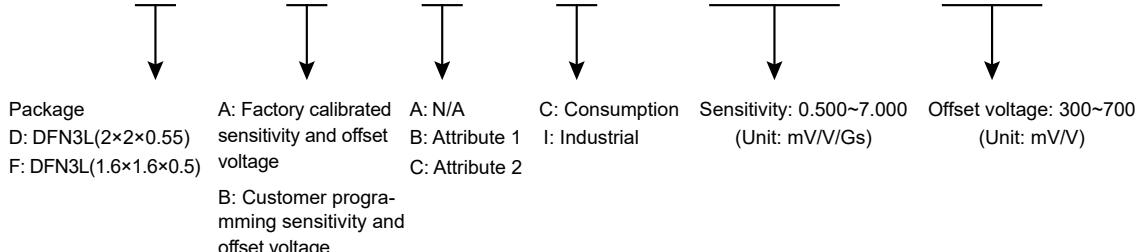
Selection Guide

Part Number*	Supply Voltage	Linear Range	Operating temperature	Static Current Consumption	Package	Packing Form
TMR2615D-AAC-XXXX-XXX	1.71 V to 5 V	±500 Gs	-40 °C to 85 °C	< 300 µA	DFN3L (2×2×0.55)	Tape & Reel
TMR2615F-AAC-XXXX-XXX	1.71 V to 5 V	±500 Gs	-40 °C to 85 °C	< 300 µA	DFN3L (1.6×1.6×0.5)	Tape & Reel

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

Product Model Description

TMR2615x — X — X — XXXX — XXX



Catalogue

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1. Functional Block Diagram

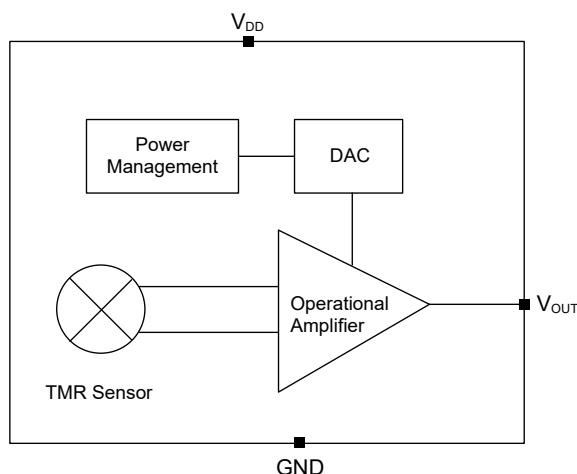


Figure 1. Block Diagram

2. Sensing Direction

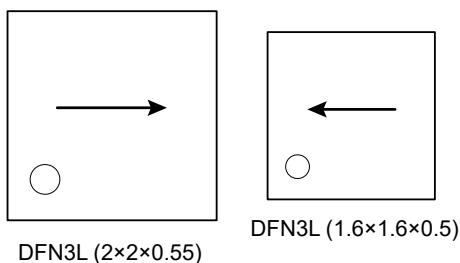


Figure 2. Sensing Direction

3. Pin Configuration

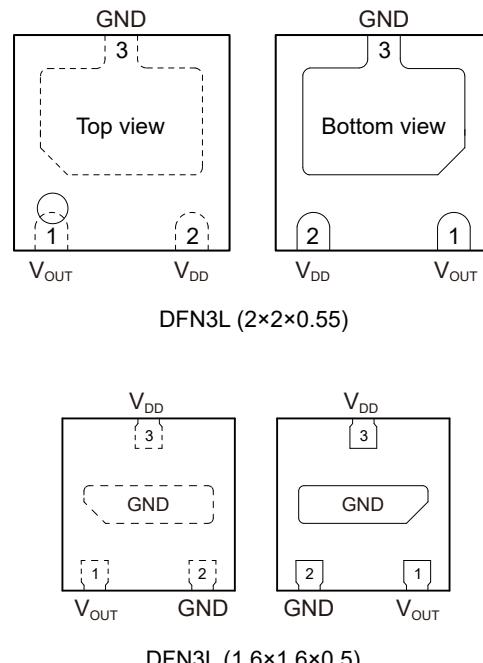


Figure 3. Pin Configuration

Pin Number		Name	Function
DFN3L (2x2x0.55)	DFN3L (1.6x1.6x0.5)		
1	1	V _{OUT}	Output voltage
2	3	V _{DD}	Supply voltage
3	2	GND	Ground

4. Absolute Maximum Ratings

Parameters	Symbol	Min.	Max.	Unit
Supply voltage	V_{DD}	-0.3	6	V
External magnetic field	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

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

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	V_{DD}	-	1.71	3.3	5	V
Operating current	I_{CC}	$V_{DD} = 1.8$ V	-	200	-	µA
		$V_{DD} = 3.3$ V	-	240	-	µA
Bandwidth	BW	-3 dB	-	-	30	kHz
Load resistance	R_L	-	10	-	-	kΩ
Load conductance	C_L	-	-	-	10	nF
Sensitivity	SEN	-	User programmable			mV/V/Gs
Temperature coefficient of sensitivity	TCS	$T_A = -40$ °C to 85 °C	-	1000	-	PPM/°C
Offset voltage	V_{OFFSET}	-	User programmable			mV/V
Temperature coefficient of offset	TCO	$T_A = -40$ °C to 85 °C	-	-0.12	-	mV/°C
Nonlinearity	NONL	in ±500 Gs range	-	2	-	%FS
Hysteresis	HYS	in ±500 Gs range	-	2	-	%FS
Noise	V_N	$V_{DD} = 3.3$ V, BW = 5 kHz	-	-	10	mV _{PP}
Power-on time	t_{PO}	-	-	-	100	µs

6. Output Characteristics

As shown in Figure 4, the output voltage of the TMR2615x-AAC IC changes with the external magnetic field intensity. When there is no magnetic field, V_{OUT} outputs 50% V_{DD} , and when the magnetic field changes from -500 Gs to 500 Gs, the linear output voltage range of V_{OUT} is 5% V_{DD} to 95% V_{DD} . Customers can modify the linear range through the adjustment provided by the TMR2615x-AAC.

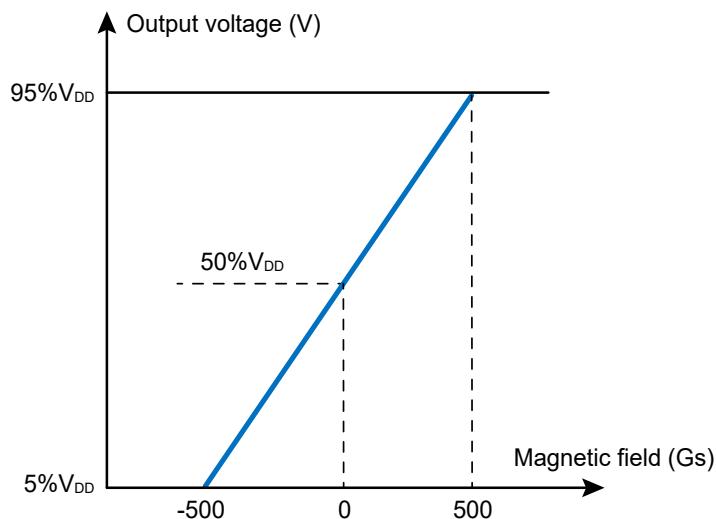


Figure 4. Output voltage versus magnetic field

7. Application Circuit

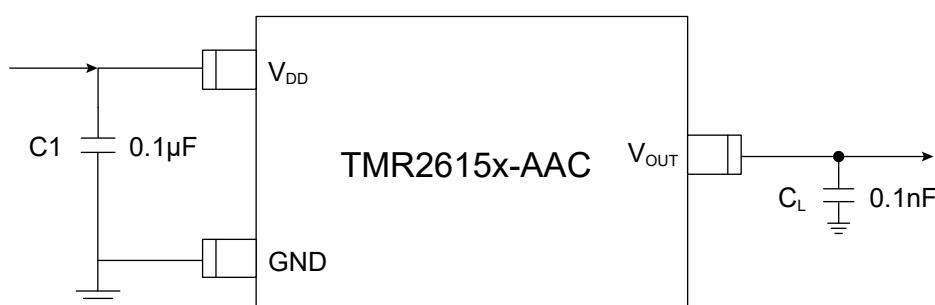


Figure 5. Application circuit diagram

Note: C1 should be as close as possible to the V_{DD} and GND pins.

8. Dimensions

DFN3L (2×2×0.55) Package

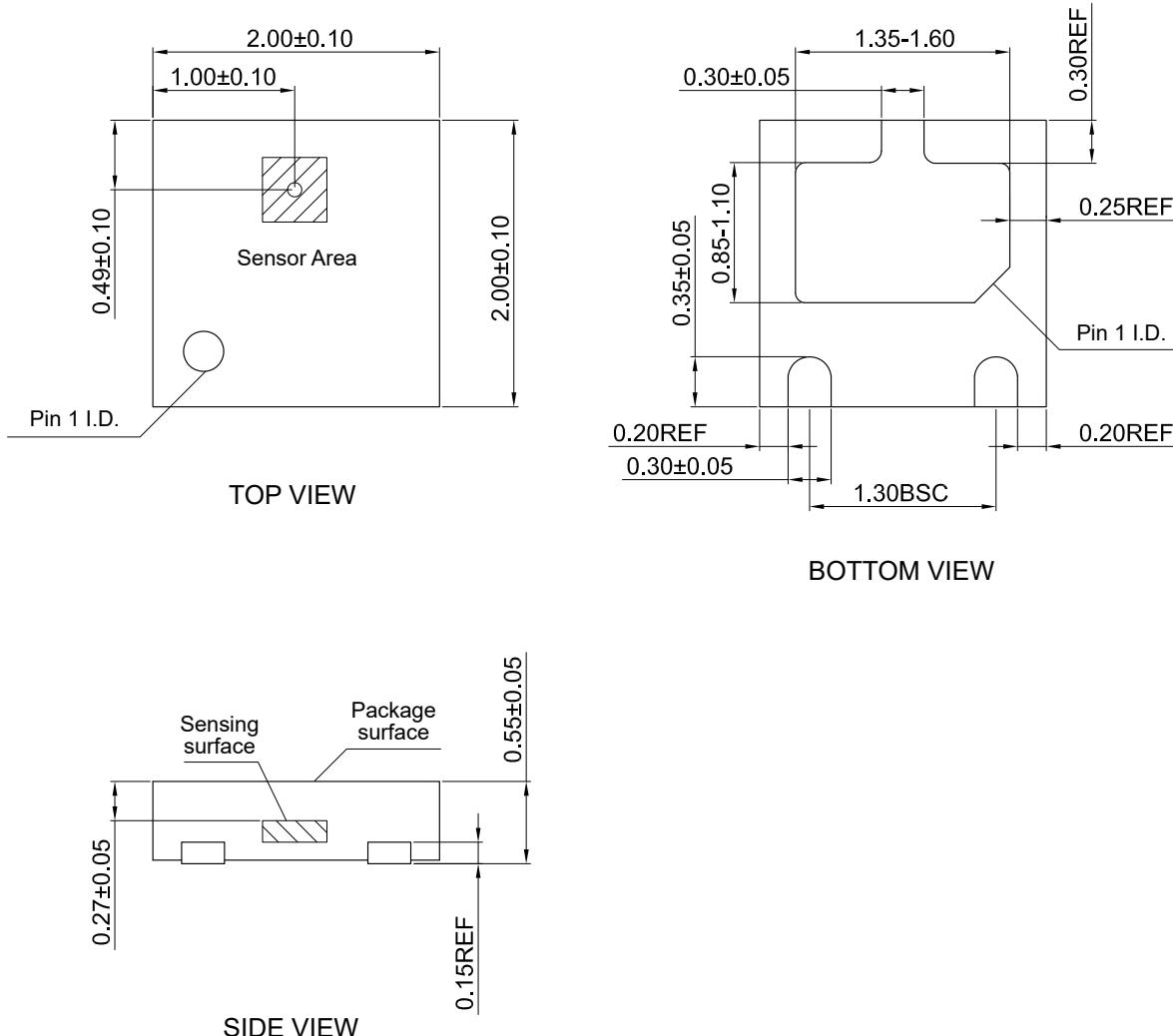


Figure 6. Package outline of DFN3L (2×2×0.55) (unit: mm)

DFN3L (1.6×1.6×0.5) Package

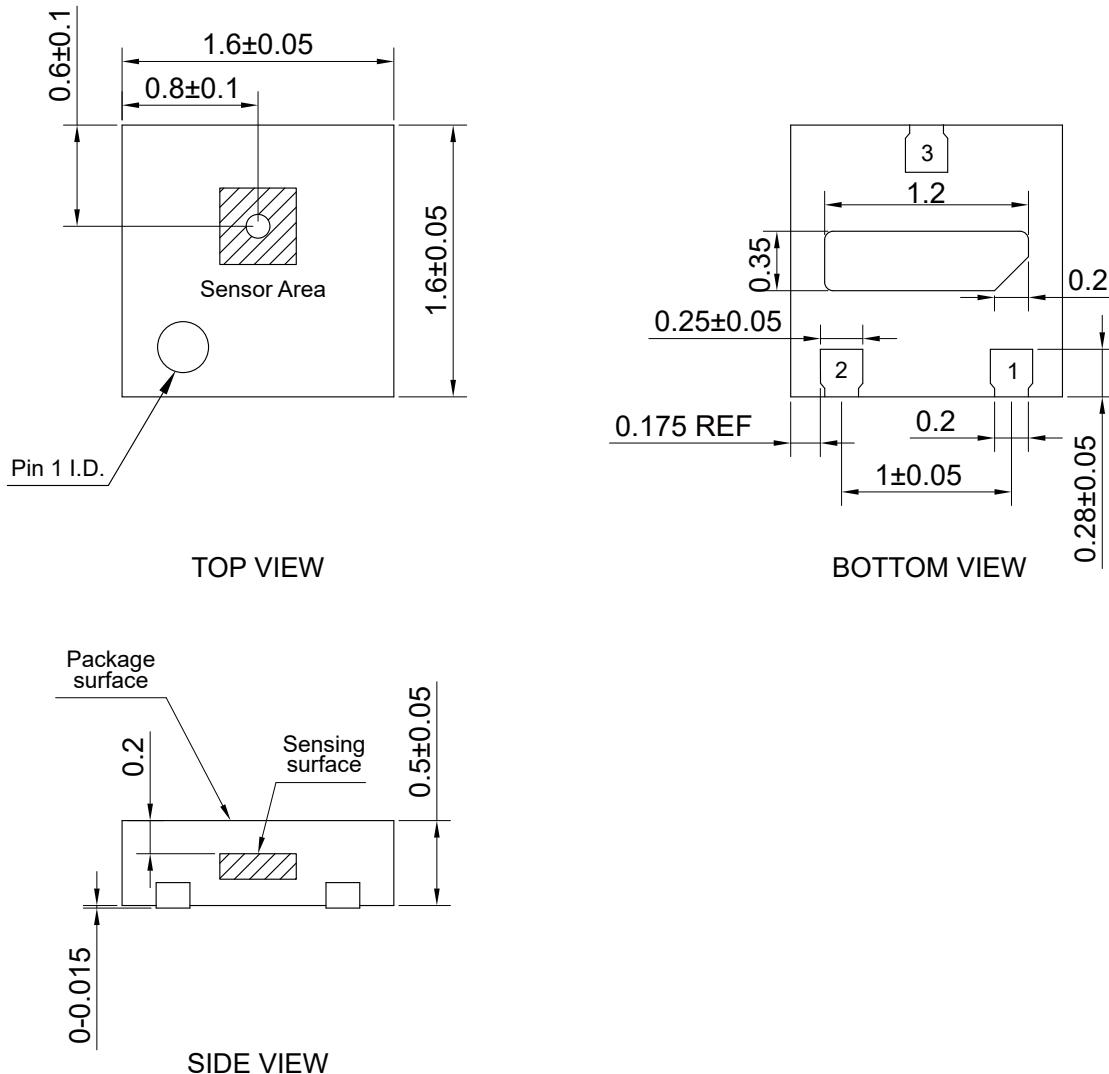


Figure 7. Package outline of DFN3L (1.6×1.6×0.5) (unit: mm)

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