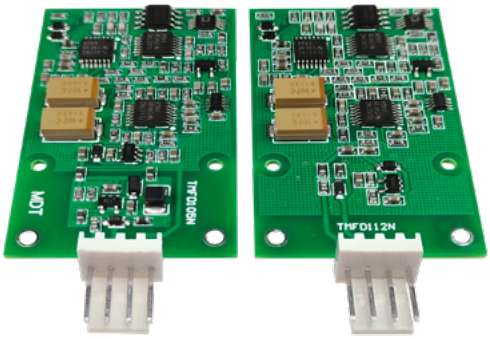
TMR81xx

Single-axis, Low Noise, High Transient Response Magnetic Sensor

Description

The TMR81xx series features single-axis, low-noise, high transient response magnetic sensors that utilize the miniaturized, ultra-low noise TMR sensor. These sensors employ phase-sensitive detection and weak magnetic signal modulation technology to convert broad passband measurements into narrowband measurements. This technique significantly reduces the interference of 1/f noise, enhancing the signal-to-noise ratio of weak magnetic signals. Consequently, it enables high transient response and high-resolution detection of weak magnetic signals, facilitating ultra-long-distance detection of ferromagnetic materials.



TMR8105N TMR8112N

Features and Benefits

- Excellent detection capabilities for dynamic weak magnetic fields at low frequencies
- High-resolution measurements
- Large saturation field: typ. ±600 μT
- Wide background magnetic field: typ. ±300 μT
- Highly integrated design, easy secondary integration

Applications

- Security system
- Magnetic material detection
- Traffic flow control

Selection Guide

Part Number	Sensing Direction	Frequency Response (-3dB)	Magnetic Field Spectral Noise Density	Supply Voltage	Dimension
TMR8105N	Single axis	0 to 10 Hz	100 pT/√Hz@1Hz	5 V	50 mm × 30 mm × 5 mm
TMR8112N	Single axis	0 to 10 Hz	100 pT/√Hz@1Hz	12 V	50 mm × 30 mm × 5 mm

1. Specification Parameters

Specification	Typical Value	Unit
Number of axes	1	-
Saturation field[1)]	±600	μT
Measuring range[1)]	±300	μT
Frequency response (-3dB)	0 to 10	Hz
Magnetic field spectral noise density	100	pT/√Hz@1Hz
Sensitivity	40	mV/nT
Scaled temperature coefficient	150	PPM/°C
Start up time	100	ms
Electrical balance time	2	min
Hysteresis[2)]	0.1	Gs

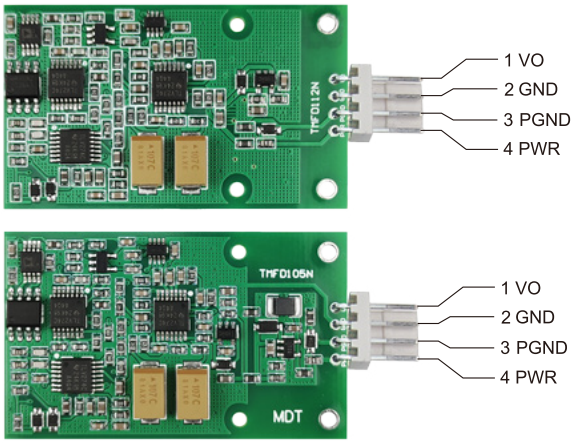
1) The maximum background magnetic field for the sensor to operate

2) 1 Gs = 100 μT

2. Electrical Characteristics Parameters

Specification	Min.	Typ.	Max.	Unit	Applicable Model
Supply voltage	4.5	5	5.5	V	TMR8105N
	11	12	12.5	V	TMR8112N
Supply current	40	46	50	mA	TMR8105N
	10	12	14	mA	TMR8112N
Starting current	-	70	-	mA	TMR8105N
	-	15	-	mA	TMR8112N
Voltage protection	-	6	-	V	TMR8105N
	-	13.5	-	V	TMR8112N
Current protection	-	300	-	mA	All models
Analog voltage output	0	-	5	V	TMR8105N
	0	-	10	V	TMR8112N
Reference voltage	-	2.6	-	V	TMR8105N
	-	6.0	-	V	TMR8112N
Output resistance	-	430	-	kΩ (±5%)	All models
Output	Short circuits protection			-	All models

3. Interface Definition



Number	Name	Function
1	VO	Signal
2	GND	Singal ground
3	PGND	Power ground
4	PWR	Power supply

4. Mechanical / Interface Specifications

Specification	Parameter	Unit
Dimensions (length × width × height)	50 × 30 × 5	mm
Weight	5 to 6	g
Electrical interface	4 × Φ0.9, hole center distance 2.5	mm
Mounting interface	4 × Φ2, hole center distance 24 × 13	mm
Sensitive axis direction	Isotropic (> 3 times the maximum size of the target to be measured)	-

5. Storage and Operating Environmental Parameters

Subject	Parameter	Unit
Operating temperature range	-20 to +70	°C
Storage temperature range	-40 to +85	°C
Environmental protection	Conformal layers	-

6. Interface Size

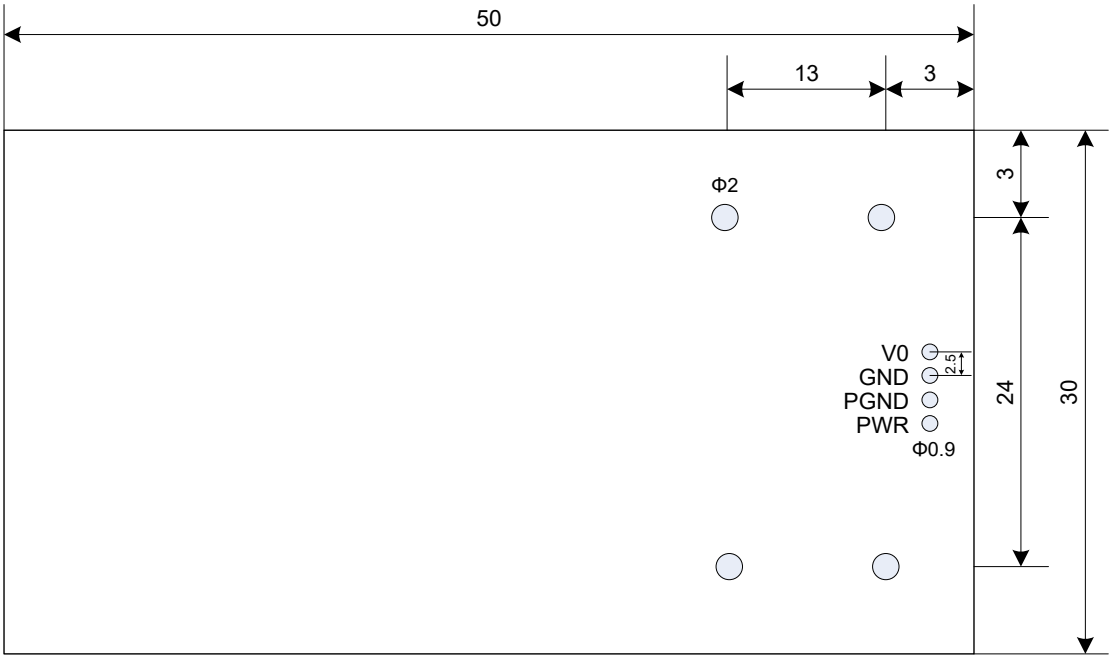


Figure 1. TMR8105N/TMR8112N

7. Recommend Interface Circuits

Due to the relatively high output impedance of the module and the possible presence of power-line interference, the following interface circuits are recommended:

1) If the module output signal already meets the system requirements, a buffer/isolation circuit should be added before A/D sampling, as shown in Figure 2.

2) If additional gain is required for the module output signal, one or more amplification stages may be implemented using the circuit shown in Figure 3.

3) If significant power-line interference is observed in the signal, the notch filter circuit shown in Figure 4 may be used.

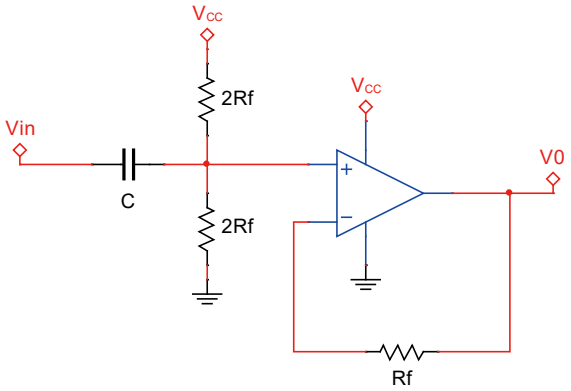


Figure 2. Isolation Circuit

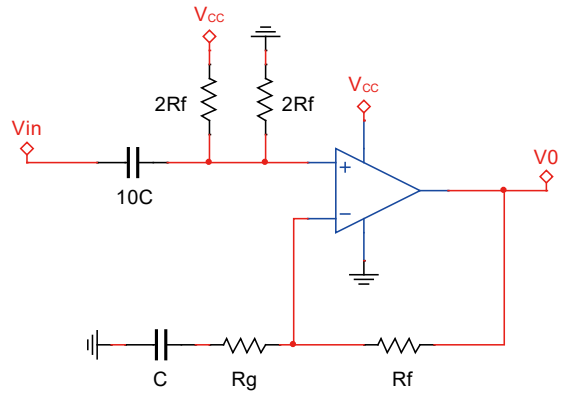


Figure 3. Isolation Amplifier Circuit

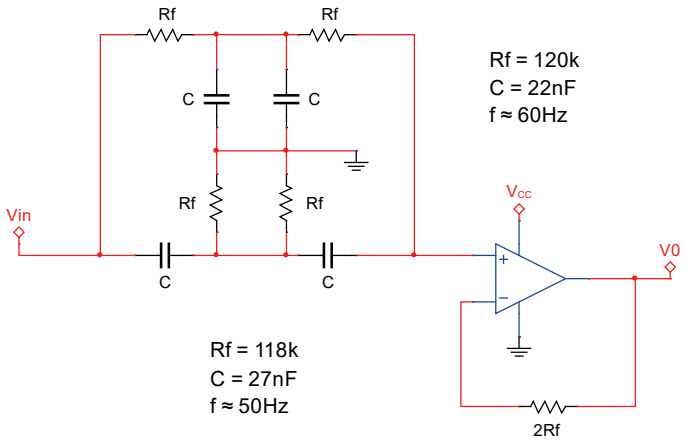


Figure 4. Notch Filter Circuit

Recycling

The product(s) in this document need to be handed over to a qualified solid waste management services company for recycling in accordance with relevant regulations on waste classification after the end of the product(s) life.

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