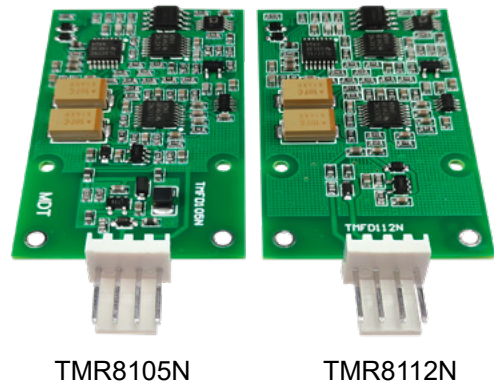


TMR81xx

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.



Features and Benefits

- Excellent detection capabilities for dynamic weak magnetic fields at low frequencies
- High-resolution measurements
- Large saturation field: typ. $\pm 600 \mu\text{T}$
- Wide background magnetic field: typ. $\pm 300 \mu\text{T}$
- 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/ $\sqrt{\text{Hz}}$ @1Hz	5 V	50 mm × 30 mm × 5 mm
TMR8112N	Single axis	0 to 10 Hz	100 pT/ $\sqrt{\text{Hz}}$ @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

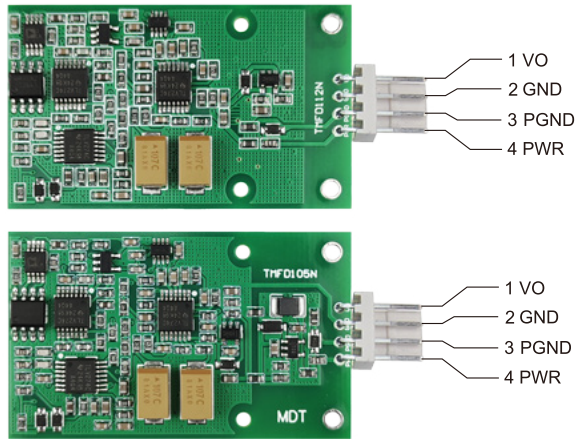
1) The maximum background magnetic field for the sensor to operate

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

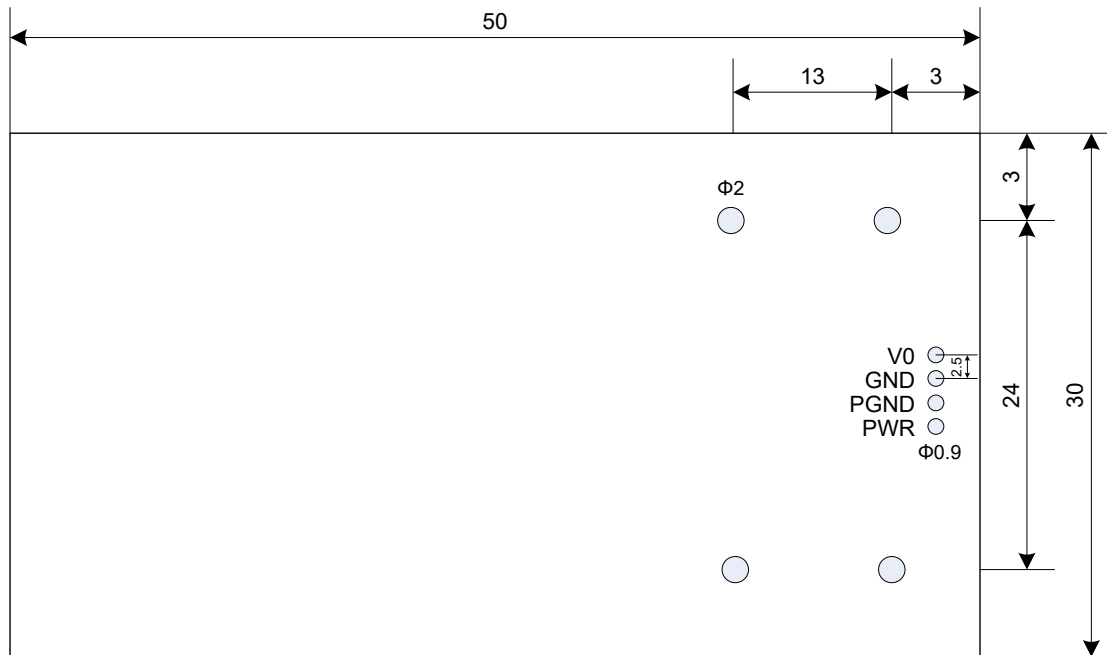


Figure 1. TMR8105N/TMR8112N

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.

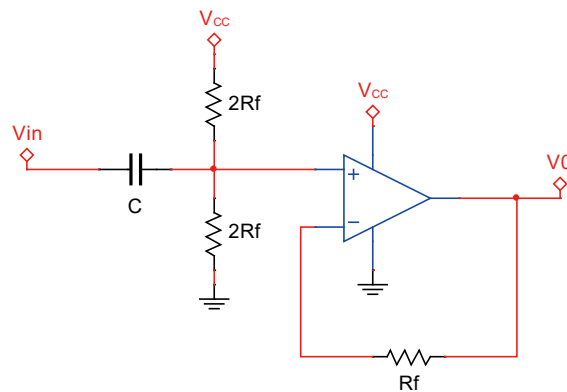


Figure 2. Isolation Circuit

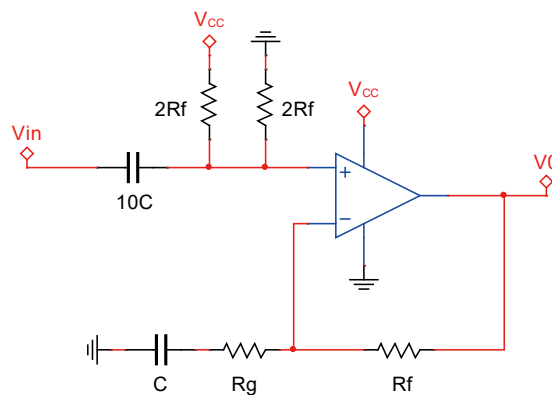


Figure 3. Isolation Amplifier Circuit

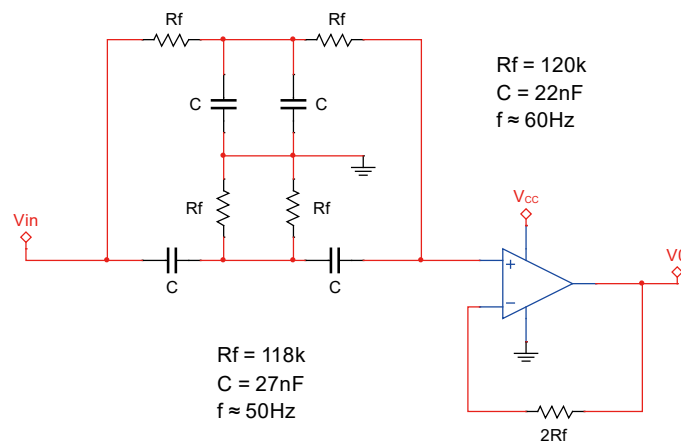


Figure 4. Notch Filter Circuit

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