

# TRACKER™ NSE-5310 Position Sensor and Evaluation Pack

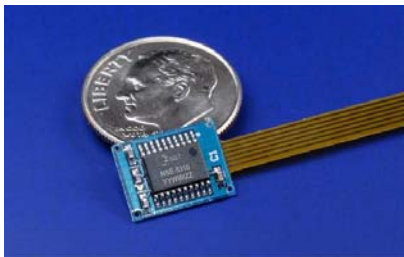


## 1 General Description

The TRACKER™ NSE-5310 position sensor is a magnetic sensor array with integrated on-chip digital encoding. With smallest size, 0.5µm resolution and low sensitivity to external magnetic fields, this miniature position sensor is a robust and cost-effective solution for precision positioning.

On-chip encoding provides direct digital output using standard I<sup>2</sup>C protocol, eliminating the need for external pulse counters. Efficient control system communications allows up to two TRACKER NSE-5310 position sensors for a single I<sup>2</sup>C bus.

The highest-resolution magnetic encoder available, the TRACKER NSE-5310 position sensor is insensitive to light, shock, vibration, and high-particulate environments.



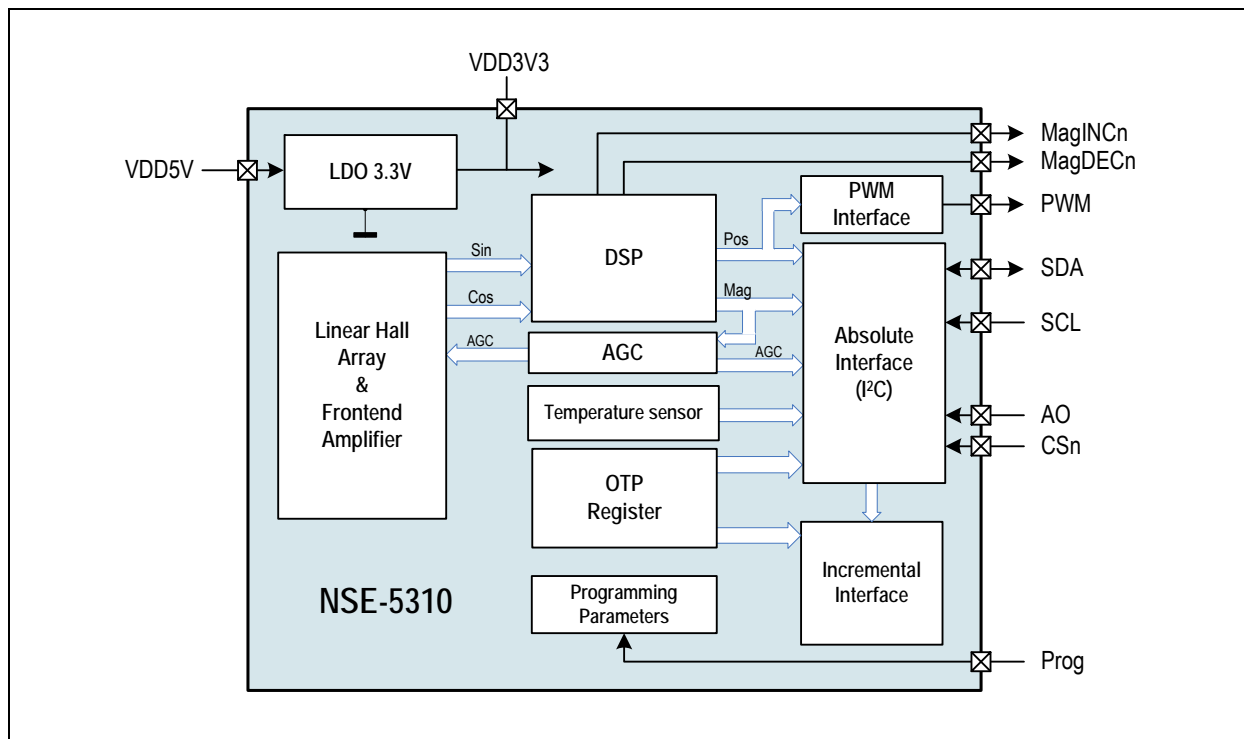
## 2 Key Features

- **Smallest Size:** Chip-scale packaging as small as 3.9 x 2.5 mm
- **Accurate, Non-contact Sensing:** 0.5µm resolution, < 2µm repeatability
- **Complete System on a Chip:** Sensing and encoding integrated in one ingeniously small package
- **Direct Digital Output (I<sup>2</sup>C):** Eliminates need for external pulse counters
- **Robust:** Insensitive to light, shock, vibration and particulates; less stringent mounting alignment
- **Absolute Performance:** Zero reference, automatic gain & offset correction

## 3 Applications

The TRACKER NSE-5310 position sensor is ideal for optical and imaging applications, such as focus and optical image stabilization as well as applications in consumer electronics, precision biomedical devices, industrial instrumentation and defense/security. Its small size makes it perfect for creating tiny, integrated closed-loop motion systems using micro motors, such as New Scale's SQUIGGLE® motor.

Figure 1. TRACKER NSE-5310 Functional Block Diagram



## 4 Specifications and Operating Conditions

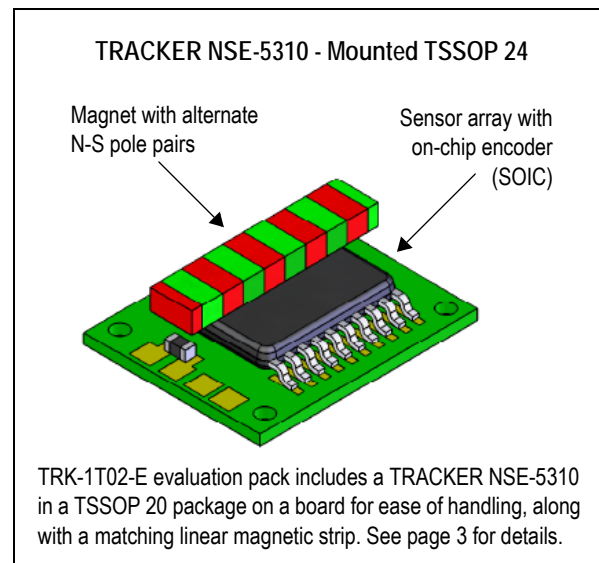
Parameter	Min	Typ	Max	Units	Comments
Supply Voltage VDD3V3	3		3.6	V	
Negative Supply Voltage VSS	0			V	
Supply current			21	mA	
Resolution	0.5 $\mu\text{m}$ @ 12 bits per 2 mm pole pair				
Integral error	$\pm 20 \mu\text{m} < 2\text{mm}$ 1% / 10mm				Error includes magnet error. Magnets supplied by New Scale.
Differential error	$\pm 0.97 \mu\text{m}$ 10bit, no missing codes				
Hysteresis	2-8 LSB				Incremental output, 12-bit resolution
	0				Absolute serial output
I <sup>2</sup> C read-out frequency		400	800	kHz	
Operating temperature	-40		+125	°C	
Storage Temperature	-55		125	°C	
Humidity non-condensing	5		85	%	
Thermal Package Resistance (R <sub>th</sub> )			114.5	°C/W	still air

## 5 System Overview

The TRACKER NSE-5310 magnetic encoder achieves its precision through a linear array of eight Hall-effect sensors on the chip that measure the spatially varying magnetic field produced by moving a multi-pole magnetic strip above the sensor.

The TRK-1T02-E evaluation pack includes a TRACKER NSE-5310 mounted in a TSSOP 20 package with flex cable and a suitable linear magnetic strip, a MC-31MB interface card and New Scale Pathway™ software to facilitate evaluation. The system can be connected to your computer using a USB interface providing direct position information to your application.

TRACKER NSE-5310 in TSSOP or dice-on-foil packaging is available. Custom TRACKER NSE-5310 packaging such as wafer-level chip scale packaging and chip-on-board packaging can also be provided for qualified OEMs. Minimum order quantities may apply.



## 6 Functional Description

Moving a multi-pole magnetic strip over the Hall array on the encoder chip generates internal sinusoidal (SIN) and phase-shifted sinusoidal (COS) signals. These signals are filtered and transformed into angle (ANG) and magnitude (MAG), representing the absolute linear position of a 2mm long pole pair on the magnetic strip. Position information is read via I<sup>2</sup>C interface (SDA, SCL).

Automatic gain control (AGC) adjusts for DC bias in the magnetic field and provides a large magnetic field dynamic range, for high immunity to external magnetic fields. It also provides an absolute magnitude of the magnetic field intensity, which is used to detect the end of the magnetic strip and thereby serves as a built-in zero reference.

The TRK-1T02-E Evaluation Pack is a full- featured development platform for the TRACKER NSE-5310 Position Sensor. The MC-31MB interface card accepts the I<sup>2</sup>C input from one or two TRACKER NSE-5310 sensors, and connects via USB to your PC. Use the New Scale Pathway™ Software to view and collect position information. This development kit provides for easy sensor evaluation and system development.

TRK-1T02-E Evaluation Pack



## 7 Ordering Information

The devices are available as the standard products shown in the table below.

Ordering Code	Description
TRK-1T02	NSE-5310 SOIC TSSOP version on 8.5 x 11.6 mm printed circuit board with flex cable. (Magnet sold separately)
TRK-1T02-E Evaluation Pack	TRK-1T02 position sensor, MC-31MB interface card, power supply, cables, USB cable and New Scale Pathway Software Options: <ul style="list-style-type: none"> <li>- 11mm magnet (for 8mm travel)</li> <li>- Greater than 11mm and less than or equal to 53mm, please contact New Scale.</li> </ul>
NSE-5310 SOIC	TSSOP, die-on-foil; contact us for information.

**Note:** All products are RoHS compliant and Pb-free.

Buy our products or get free samples online at ICdirect: <http://www.austriamicrosystems.com/ICdirect>

Technical Support is available at <http://www.austriamicrosystems.com/Technical-Support>

For further information and requests, please contact us <mailto:sales@austriamicrosystems.com> or find your local distributor at <http://www.austriamicrosystems.com/distributor>

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