matronic

A1425

High-accuracy speed sensor is ideal for automotive crankshaft applications

The new A1425 from Allegro MicroSystems Europe is a new high-accuracy analogue Hall-effect speed sensor IC with an integrated tracking capacitor and a dual zero-crossing output signal which makes it ideal for automotive crankshaft speed sensing applications using ring magnets.

The A1425 includes a voltage regulator, two Hall-effect sensing elements, temperature compensation circuitry, a low-level amplifier, bandpass filter, Schmitt trigger, and an output driver. The on-board regulator permits operation with supply voltages from 4.0 to 26.5 V. The output stage can easily switch 20 mA over the full frequency response range of the sensor (20 Hz to 30 kHz), and is compatible with both TTL and CMOS logic circuits.

The AC-coupled differential sensor features true zero-crossing detection in which the output switches precisely when the difference in magnetic field strength between the two Hall elements is zero.

A dual-comparator scheme provides for accurate switching at the zero crossing on both the positive- and negative-going regions of the differential signal, utilising hysteresis to prevent false switching.
These accurate switch-points are maintained over the entire automotive temperature range by an on-chip temperature compensation circuit.

When coupled with a back-biasing magnet, the sensor can be configured to turn on or off with the leading or trailing edge of a gear tooth or slot. Two integrated Hall transducers sense changes in fields on the magnet face caused by a moving ferrous mass, and are differentially amplified by on-chip electronics.

The differential sensing design provides immunity to radial vibration within the device's operating air gap. Steady-state magnet and system offsets are eliminated using an on-chip differential bandpass filter, which also provides relative immunity to interference from electromagnetic sources. The combination of on-chip temperature-compensation and Schmitt-trigger circuitry guarantees optimal operation to low frequencies over a wide range of air gaps and temperatures.

The device is available in a 4-pin plastic single-inline package, and is rated for operated over the temperature range from -40°C to +150°C.