



## User-programmable automotive linear sensor offers dual operating modes

The new AI386 from Allegro MicroSystems Europe is a user-programmable linear Hall-effect sensor IC targeted at applications in the automotive market requiring flexibility and accuracy in absolute position sensing.

The new device is unique in offering dual operating modes: normal and low power. In normal mode, the AI386 operates as a highly accurate, user-programmable linear sensor with ratiometric output. In low-power mode, the device disengages some internal components to reduce power consumption. Although its accuracy is compromised during low-power operation, the sensor can still be used as a region indicator – to detect the north or south pole of a rotating ring magnet.

The AI386 is based on a BiCMOS monolithic circuit which integrates a Hall element, temperature-compensating circuitry to reduce the intrinsic sensitivity drift of the Hall element, a small-signal high-gain amplifier, a clamped low-impedance output stage, and proprietary dynamic offset cancellation circuitry.

The device provides an analogue voltage output that is proportional to the applied magnetic field over the entire 5 V supply range. Both the quiescent voltage output and the magnetic sensitivity are user adjustable. The quiescent voltage output can be set to approximately 50% of the supply voltage, and the sensitivity can be adjusted between 1.90 mV/G and 3.50 mV/G for a forward supply voltage of 5 V.

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The quiescent voltage and sensitivity are extremely stable against temperature variations, minimising the dangers of output drift and the resulting output errors. The temperature coefficient of sensitivity of the AI386 is factory-programmed to 0.13%/degC, making the devices optimised for use with neodymium magnets with no need for user adjustment.

An important feature of the AI386 is its ability to recognise when the forward supply voltage drops below a certain voltage threshold, at which time the device operates at a nominal 3 V and both the quiescent voltage output and sensitivity are scaled ratiometrically. The device is most accurate at a nominal 5 V.

These features make the AI386 ideal for high-accuracy sensing in automotive and industrial applications, with guaranteed performance over an extended temperature range of -40°C to +150°C.

The AI386 is available in an ultra miniature through-hole single-inline package (UA suffix) or a miniature surface mount package (LH suffix).

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