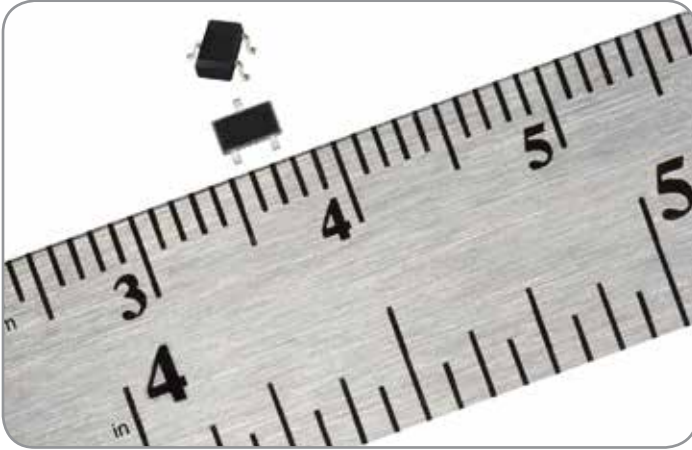


High Sensitivity Latching Digital Hall-effect Sensor ICs: VF360NT, VF360ST

32311084
Issue A

Datasheet



DESCRIPTION

The VF360NT and VF360ST High Sensitivity Latching Digital Hall-Effect Sensor ICs are small, sensitive and versatile devices that are operated by the magnetic field from a permanent magnet or an electromagnet. They are designed to respond to alternating North and South poles. The VF360NT is turned ON by a North pole, while the VF360ST is turned ON by a South pole. This sensor IC does not use chopper stabilization on the Hall element, providing a clean output signal and a faster latch response time when compared to competitive high sensitivity Hall-effect bipolar latching sensor ICs which do use chopper stabilization.

VALUE TO CUSTOMERS

- AEC-Q100 qualification provides enhanced reliability and quality of electronic components. Components meeting these specifications are often suitable for use in harsh automotive environments without the customer's need for additional component-level qualification testing.
- Designed to provide reliable, consistent performance and a fast response time, enhancing efficiency in brushless dc motor (BLDC) applications
- Designed to provide a wide supply voltage range and no chopper delay, allowing for potential use in a variety of applications
- Designed to provide a clean output signal without the customer having to include additional circuitry to achieve noise suppression due to chopper stabilization

DIFFERENTIATION

Honeywell's VF360NT and VF360ST AEC-Q100-qualified latching sensor ICs offer better performance than many competitive sensor ICs that employ chopper stabilization techniques.

- **Response time:** Honeywell's device provides a fast response time, enabling efficiency in BLDC motors.
- **No noise generation:** Honeywell's device utilizes a resistor-capacitor (RC) circuit to enable noise suppression required for chopper stabilized sensors.

FEATURES

- Qualified to the AEC-Q100 standard for potential use in automotive applications
- Fastest response time in its class [1.5 μ s]
- Operate from 30 Gauss typical at 25°C [77 °F] and 55 Gauss maximum over the full -40 °C to 150 °C [-40 °F to 302 °F] temperature range
- Latching magnetics
- Repeatable magnetics (no jitter)
- No additional electronic noise generated by sensor
- Non-chopper-stabilized design
- Subminiature SOT-23 surface mount package supplied on tape and reel (3,000 units per reel)
- 3 Vdc to 24 Vdc
- Built-in reverse polarity protection
- RoHS-compliant material

POTENTIAL TRANSPORTATION APPLICATIONS

- BLDC motor commutation for automotive applications: Air input flap to engine, convertible roof position, electronic parking brakes, electronic window lifts and anti-pinch power window systems, HVAC blowers, headlights, power doors, mirrors and tail gates, seat motors, steering, windshield washers and wipers
- Speed and RPM sensing: Motors and fans; tachometer and counter pickup
- Flow rate sensing

PORTFOLIO

The VF360NT and VF360ST join Honeywell's family of latching digital Hall-effect sensor ICs including:

- [SS360NT](#), [SS360ST](#), [SS360ST-10K](#), [SS460S](#), [SS460S-T2](#) High sensitivity latching digital Hall-effect sensor ICs
- [SS360PT](#), [SS460P](#), [SS460P-T2](#) High sensitivity latching digital Hall-effect sensor ICs with built-in pull-up resistor
- [SS361CT](#), [SS461C](#) High sensitivity latching digital Hall-effect sensor ICs
- [SS361RT](#), [SS461R](#) Latching Hall-effect digital sensor ICs
- [SS400 Series](#) unipolar/bipolar/latching Hall-effect digital sensor ICs
- SS41, SS51T Series bipolar Hall-effect digital sensor ICs
- [SS42R Series](#) Latching Hall-effect digital sensor ICs with dual active high/active low complementary outputs
- SS46 latching Hall-effect digital sensor IC
- [VF526DT](#) Latching dual Hall-effect digital sensor IC with speed and direction outputs

High Sensitivity Latching Digital Hall-effect Sensor ICs: VF360NT, VF360ST

Table 1. Performance Specifications

(At $V_s = 3.0$ Vdc to 24 Vdc, 20 mA load, $T_A = -40$ °C to 150 °C [-40 °F to 302 °F] except where otherwise specified.)

Characteristic	Condition	Min.	Typ.	Max.	Unit
Supply voltage	-40 °C to 125 °C [-40 °F to 257 °F] 150 °C [302 °F]	3.0 3.0	— —	24.0 12.0	Vdc
Supply current	$V_{supply} = 3.0$ Vdc at 25 °C [77 °F] —	— —	3.5 —	6.0 8.0	mA
Output current	—	—	—	20.0	mA
V_{sat}	Gauss > 55	—	—	0.6	V
Output leakage current	Gauss > -55	—	—	10.0	μA
Rise/fall time	25 °C [77 °F]	—	—	1.5	μs
Thermal resistance	single layer, single sided PCB	—	303	—	°C/W
Magnetic characteristics:					
operate (Bop)	25 °C [77 °F]	15	30	45	Gauss
operate (Bop)	—	5	30	55	
release (Brp)	25 °C [77 °F]	-45	-30	-15	
release (Brp)	—	-55	-30	-5	
differential	—	40	60	80	
Operating temperature	—	-40 [-40]	—	150 [302]	°C [°F]
Storage temperature	—	-40 [-40]	—	150 [302]	°C [°F]
ESD (Human Body Model)	per JEDEC JS-001, Class H3A / 3A	-4	—	+4	kV
Soldering temperature and time	infrared reflow: peak temperatures not to exceed 245 °C [473°F] for 10 s max				

NOTICE

These Hall-effect sensor ICs may have an initial output in either the ON or OFF state if powered up with an applied magnetic field in the differential zone (applied magnetic field >Brp and <Bop). Honeywell recommends allowing 10 μs after supply voltage has reached 5 V for the output voltage to stabilize.

NOTICE

The magnetic field strength (Gauss) required to cause the switch to change state (operate and release) will be as specified in the magnetic characteristics. To test the switch against the specified limits, the switch must be placed in a uniform magnetic field.



Table 2. Absolute Maximum Specifications

Characteristic	Min.	Typ.	Max.	Unit
Supply voltage	-26.0	—	26.0	V
Applied output voltage	-0.5	—	26.0	V
Output current	—	—	20.0	mA
Magnetic flux	—	—	no limit	Gauss

NOTICE

Absolute maximum ratings are the extreme limits the device will momentarily withstand without damage to the device. Electrical and mechanical characteristics are not guaranteed if the rated voltage and/or currents are exceeded, nor will the device necessarily operate at absolute maximum ratings.

High Sensitivity Latching Digital Hall-effect Sensor ICs: VF360NT, VF360ST

Figure 1. Sensor IC Block Diagram

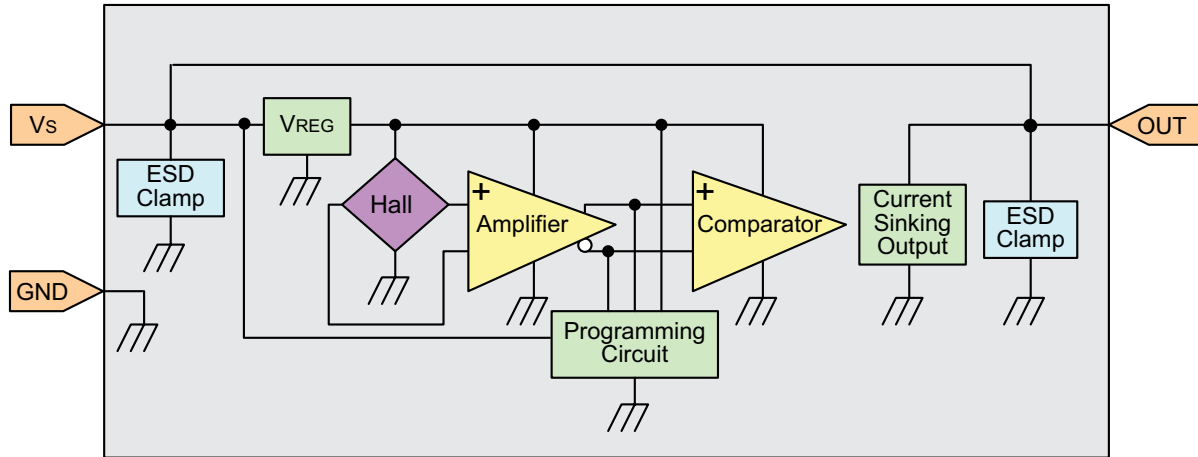


Figure 2. Typical Magnetic Characteristics vs Ambient Temperature at Supply Voltages

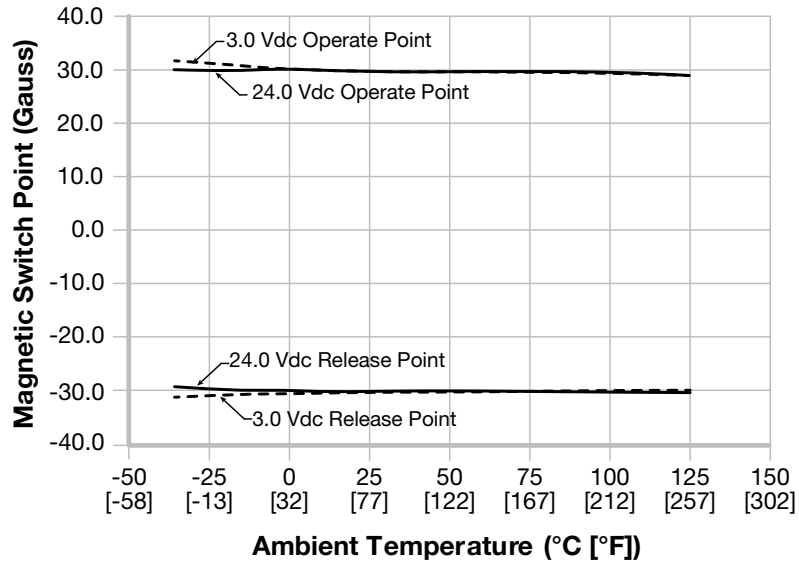
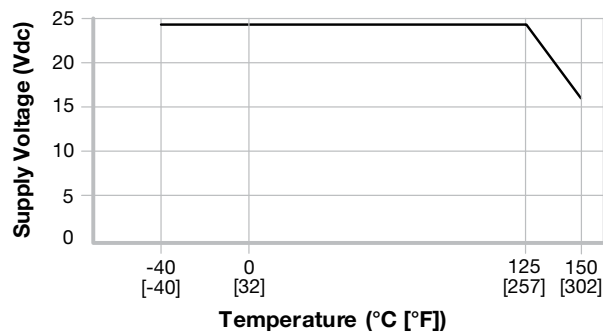


Figure 3. Rated Supply Voltage vs Temperature



High Sensitivity Latching Digital Hall-effect Sensor ICs: VF360NT, VF360ST

Figure 5. Magnetic Activation

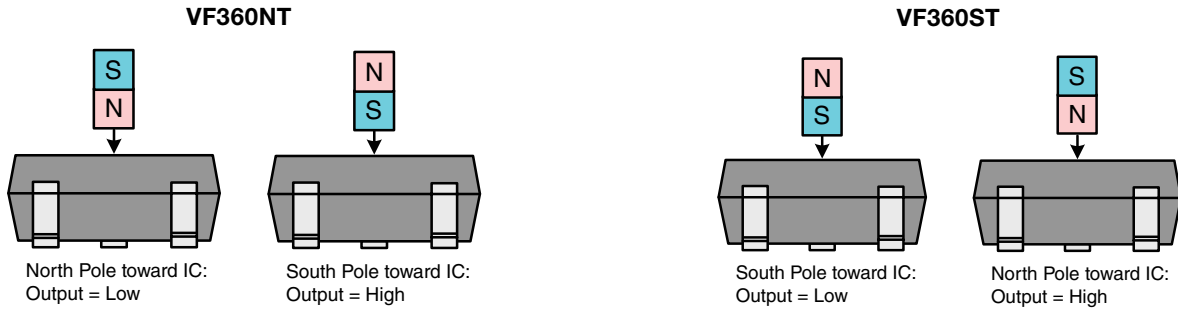


Table 3. Order Guide

Catalog Listing	Description
VF360NT	High sensitivity latching, digital Hall-effect sensor IC with built-in pull-up resistor, North pole activated, SOT-23 package, tape and reel packaging (3000 units per reel)
VF360ST	High sensitivity latching, digital Hall-effect sensor IC with built-in pull-up resistor, South pole activated, SOT-23 package, tape and reel packaging (3000 units per reel)



ADDITIONAL INFORMATION

The following associated literature is available on the Honeywell web site at sensing.honeywell.com:

- Product line guide
- Product range guide
- Product installation instructions
- Application notes:
 - Product application note
 - Magnetic Position Sensing in Brushless DC Electric Motors
- Technical note:
 - Achieving High Sensitivity and Magnetic Stability without the Use of Chopper Stabilization in Latching Hall-Effect Sensors for Brushless DC Motor Applications

Find out more

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors.

For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office.

To learn more about Honeywell Sensing and Productivity Solutions' products, call **+1-815-235-6847** or **1-800-537-6945**, visit **sensing.honeywell.com**, or e-mail inquiries to **info.sc@honeywell.com**

Sensing and Productivity Solutions
Honeywell
1985 Douglas Drive North
Golden Valley, MN 55422
honeywell.com

⚠ WARNING **PERSONAL INJURY**

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

⚠ WARNING **MISUSE OF DOCUMENTATION**

- The information presented in this datasheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective.

The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Honeywell