

Features and Benefits

- Short Circuit Protection
- Rotary Position Gear Tooth Sensor
- Self-Adjusting Magnetic Range
- High Speed Operation
- No Chopper Delay
- Zero Speed Detection
- No Rotary Orientation Concerns

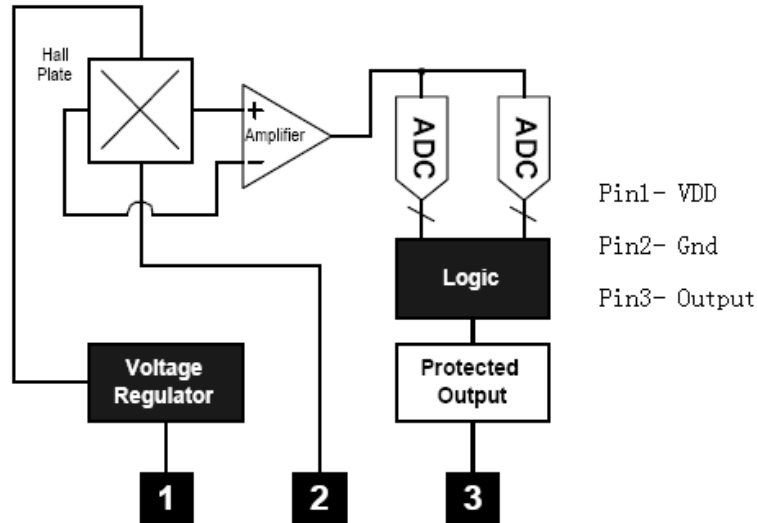
Application Examples

- Camshaft Sensor
- Geartooth Sensor
- Linear Encoder
- Rotary Encoder
- Direction Detection



3 pin TO92 (suffix UA)

Functional Block Diagram



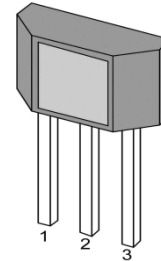
General Description

The SS5340 is a self adjusting digital output rotary position gear tooth sensor designed for use in automotive camshaft sensing as well as other speed sensing applications. It is designed to be used with a bias magnet south facing the back (non-marked) side of the IC. The bias magnet can be from 500 to 4000 Gauss. The device has an open collector output which is short circuit protected.

As the signal is sampled, the logic recognizes an increasing or decreasing flux density. The output will turn off after the flux has reached its peak and decreased by an amount equal to the hysteresis. Similarly the output will turn on after the flux has reached its minimum value and increased by an amount equal to the hysteresis.

Pin Definitions and Descriptions

SOT Pin №	Name	Type	Function
1	V _{DD}	Supply	Supply Voltage pin
2	GND	Ground	Ground pin
3	OUT	Output	Open Collector Output pin



Absolute Maximum Ratings

Parameter	Symbol	Value	Units
Supply Voltage	V _{DD}	36	V
Supply Current	I _{DD}	50	mA
Output Voltage	V _{OUT}	36	V
Output Current	I _{OUT}	30	mA
Operating Temperature Range	T _A	-40 to +150	°C
Storage Temperature Range	T _S	-65 to 170	°C
Maximum Junction Temperature	T _J	+175	°C

Absolute Maximum Temperature

Operating Temperature Range	Symbol	Value	Units
Temperature Suffix “E”	T _A	-40 to 85	°C
Temperature Suffix “K”	T _A	-40 to 125	°C
Temperature Suffix “L”	T _A	-40 to 150	°C

Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute-maximum- rated conditions for extended periods may affect device reliability

DC Electrical Characteristics

DC Operating Parameters $T_A = 25^\circ \text{C}$, $V_{DD} = 12\text{V}$ (unless otherwise specified)

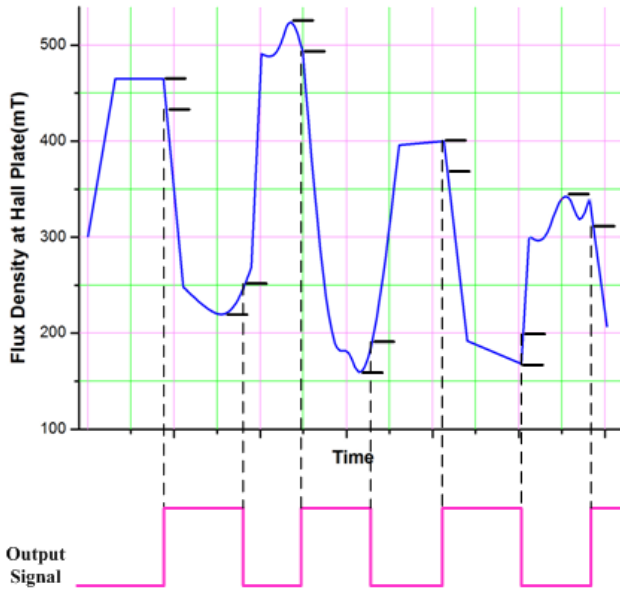
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Supply voltage	V_{DD}	Operating	6	12	24	V
Supply current	I_{DD}	Average	1.5	3	4.5	mA
Leakage Current	I_{LEAK}	$V_{OUT} = 4.5\text{V to } 24\text{V}$			10	μA
Output Current	I_{OUT}	Operating			25	mA
Saturation Voltage	V_{SAT}	$V_{DD} = 12\text{V}, I_{OUT} = 25\text{mA}$			0.6	V
Output Short Circuit Current	I_{FAULT}	Fault	50	100	150	mA
Output Short Circuit Shut-down	T_{FAULT}	Fault	100		200	μS
Clock Frequency	f_{CLK}	Operating	300	500	800	kHz
Output Rise Time	t_r	$V_{DD} = 12\text{V}$ $R_1 = 1\text{K}$ $C_1 = 20\text{pf}$			400	nS
Output Fall Time	t_f	$V_{DD} = 12\text{V}$ $R_1 = 1\text{K}$ $C_1 = 20\text{pf}$			400	nS
Bandwidth	B_W	Operating			15	kHz

Magnetic Characteristics

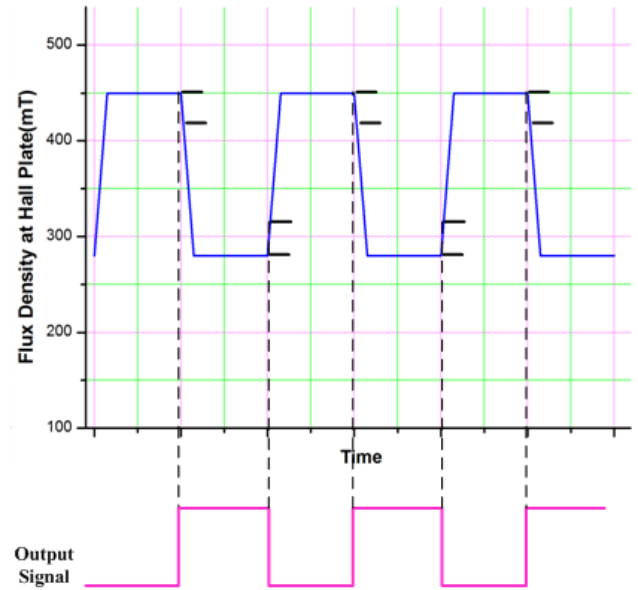
DC Operating Parameters $T_A = 25^\circ \text{C}$, $V_{DD} = 12\text{V}$ (unless otherwise specified)

PARAMETER	Symbol	Min	Type	Max	Units
Back Bias Range	B_{BIAS}	-300		4000	Gs
Linear Region		500		5000	Gs
Hysteresis	B_{hys}	20	40	100	Gs

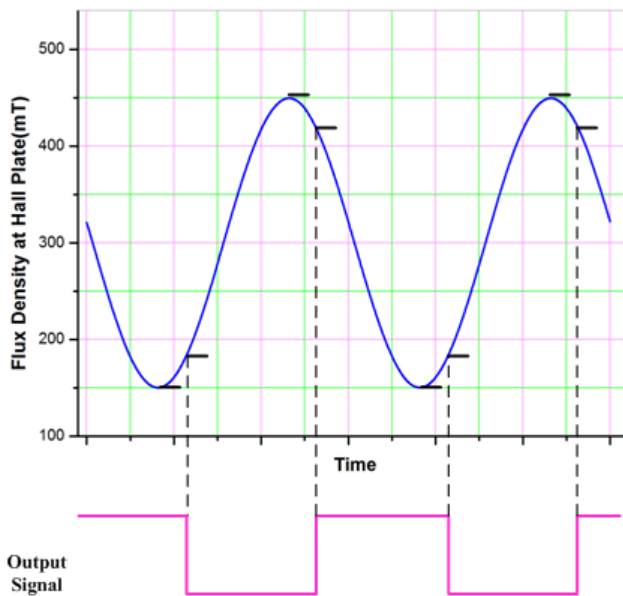
Performance Characteristics



**Switch Points versus Irregular
Magnetic Signal (Worn Gear)**



**Switch Points versus Regular
Magnetic Signal (New Gear)**



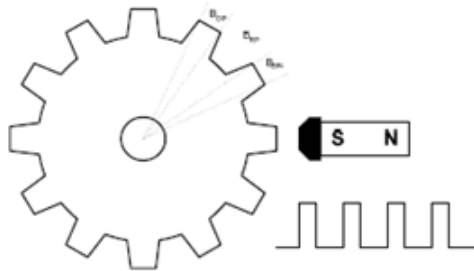
**Switch Points versus Analog
Magnetic Signal (Cam Lobe)**

Application Notes

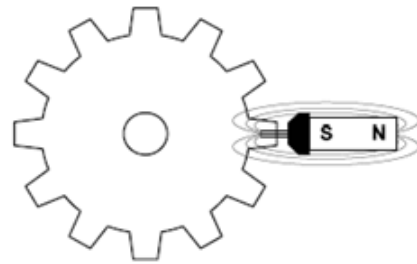
Maximum dynamic range is 5000 Gauss. The hysteresis is fixed at 50 Gauss. Best angular accuracy will be obtained when the magnetic circuit provides peak magnetic flux at the chip near the high end of the linear range of 5000 Gauss.

EMC protection using external components are recommended. Two possibilities are shown on the following page. Normally the South pole faces the unbranded side of the device. A North pole will enable a test sequence used in factory.

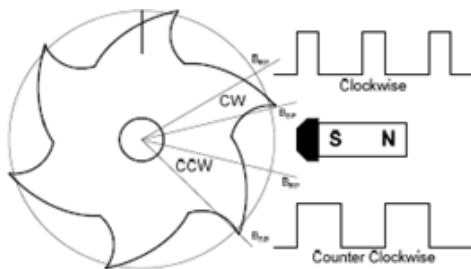
Applications Examples



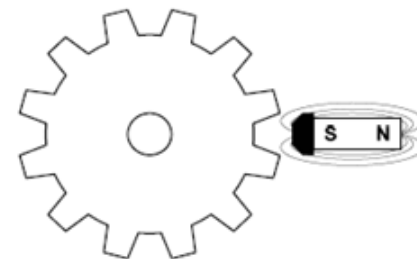
Edge Sensing(unidirectional)



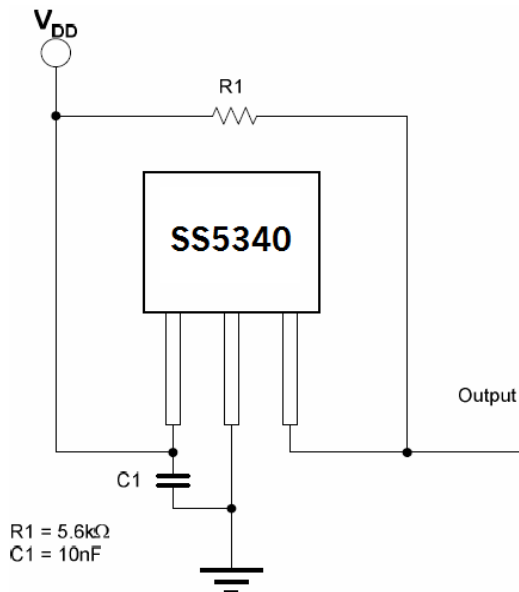
Flux Concentration – Tooth Position



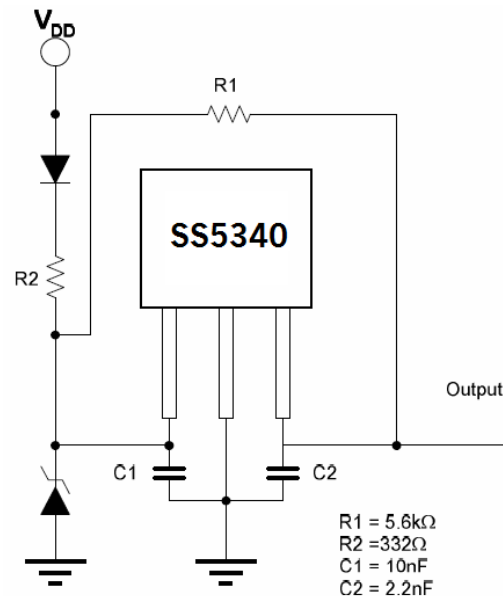
Lobe Sensing(bidirectional)



Flux Concentration – Valley Position

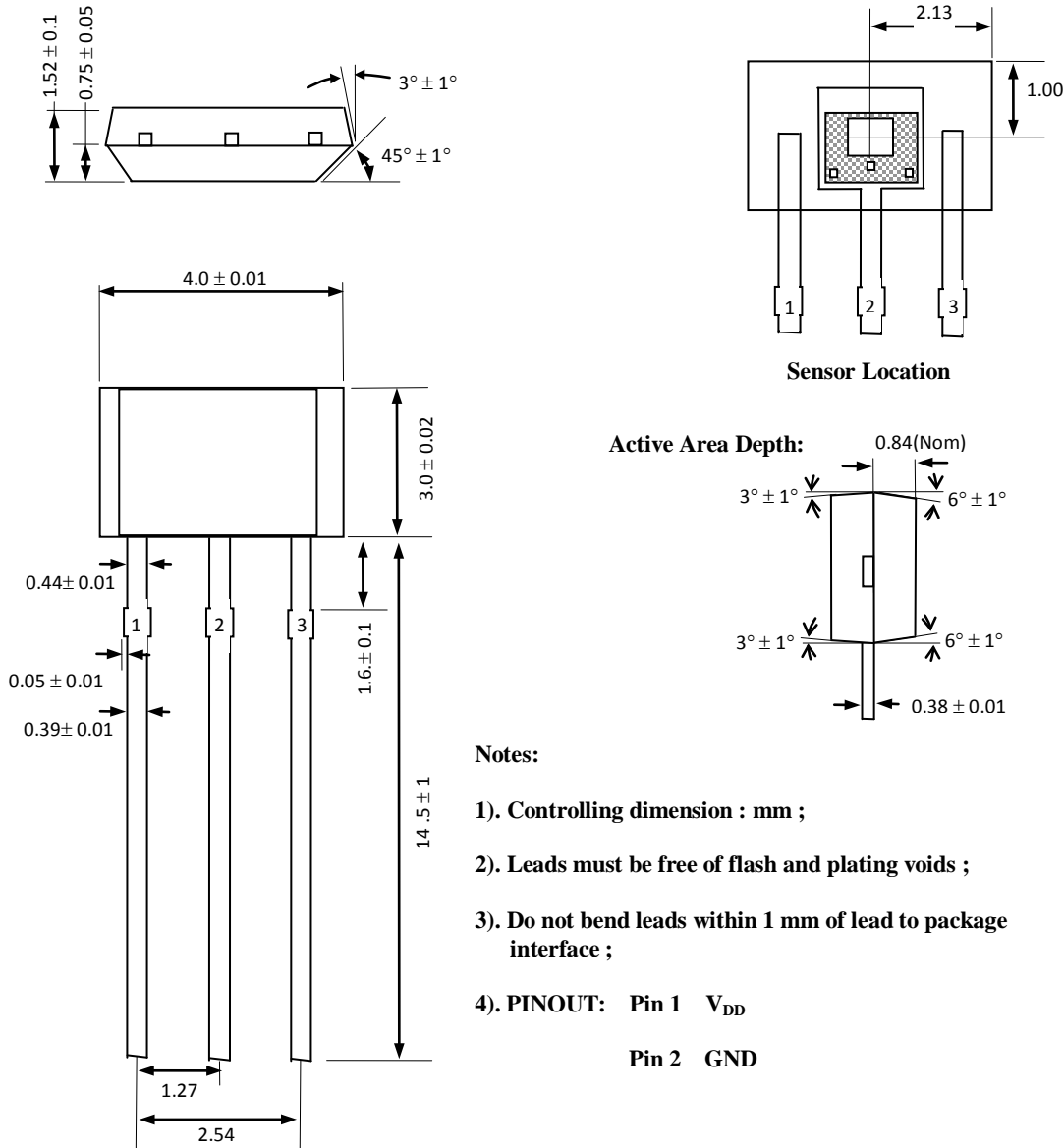


Recommended Wiring and Minimum Protection Circuit



Severe Environment and Automotive Protection Circuit

TO-92 Package Physical Characteristics



Notes:

- 1). Controlling dimension : mm ;
- 2). Leads must be free of flash and plating voids ;
- 3). Do not bend leads within 1 mm of lead to package interface ;
- 4). PINOUT: Pin 1 V_{DD}
Pin 2 GND

Ordering Information

Part No.	Pb-free	Temperature Code	Package Code	Packing
SS5340EUA	YES	-40°C to 85°C	TO-92	Bulk, 1000 pieces/bag
SS5340KUA	YES	-40°C to 125°C	TO-92	Bulk, 1000 pieces/bag
SS5340LUA	YES	-40°C to 150°C	TO-92	Bulk, 1000 pieces/bag