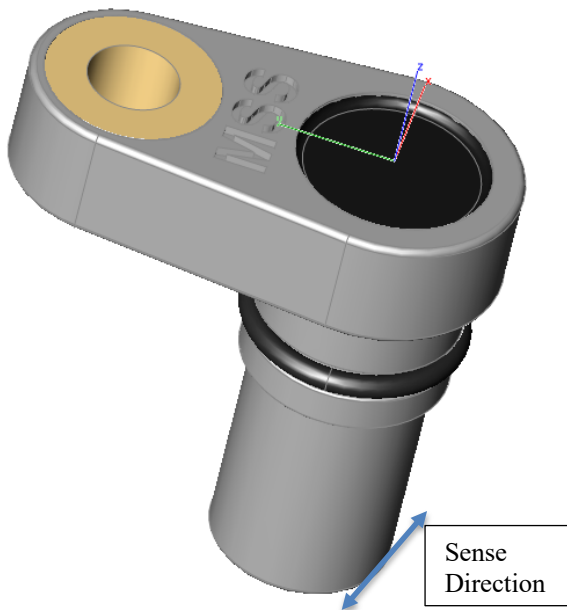


**Differential Magnetic Speed and Direction Sensors**

**Description**

This sensor uses a Back Biased differential Hall Effect device to measure the passing teeth of a ferrous target. The sensor face must be oriented such that, the bolt hole is in line with the direction of rotation. The device uses an industry standard 2 level current output (nominals: 7mA and 14mA).



**Features and Benefits**

- Senses motion of a ferrous object, no additional magnet(s) need to be added
- 2-wire Current output
- Extremely small size (Body: OD:13.75mm x L:38mm), and 38mm flange
- Very Immune to EMC
- True Zero Speed
- AGC (Automatic Gain Control)
- AOA (Automatic Offset Adjust)
- Under voltage Lockout

**Absolute Maximum Ratings**

Characteristics	Symbol	Notes	Rating	Units
Forward Supply Voltage	Vcc		28	V
Reverse-Supply Voltage	Vrcc		-18	V
Operating Ambient Temp	Ta		-40 to 150	C

**Electrical Characteristics**

Characteristics	Symbol	Test Condition	Min	Typ	Max.	Units
Supply Voltage	Vcc	T<=150C	4.0	-	24	V
Undervoltage Lockout	Vcc(uv)	Vcc, 0-5 or 5-0	-	3.6	3.95	V

Reverse Supply Current	I <sub>cc</sub>	V <sub>cc</sub> = V <sub>rcc(max)</sub>	-	-	-10	mA
Supply Zener Clamp Voltage	V <sub>zs</sub>	I <sub>cc</sub> = I <sub>cc_max</sub> + 3mA, T <sub>a</sub> =25C	28	-	-	V
Supply Zener Current	I <sub>cc</sub>	T <sub>a</sub> =25C, V <sub>cc</sub> =28V	-	-	19	mA
Chopping frequency	F <sub>c</sub>	T <sub>a</sub> =25C	-	400	-	kHz
Bypass Capacitance		V <sub>cc</sub> to GND	-	2200	-	pF

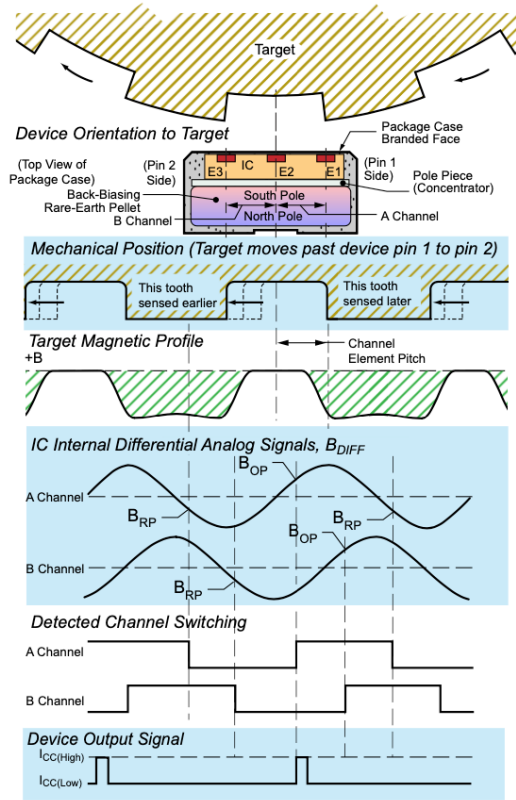
**Output Characteristics**

Characteristics	Symbol	Test Condition	Min	Typ	Max.	Units
Power-on State	POS	V <sub>cc</sub> > V <sub>cc(min)</sub>	-	I <sub>cc(Low)</sub>	-	-
Power-on time	t <sub>po</sub>	Time from V <sub>cc</sub> >V <sub>cc(min)</sub> to calibration start	-	-	1	mS
Supply Current	I <sub>cc(low)</sub>	Low-Current State	5.9	7	8.0	mA
	I <sub>cc(High)</sub>	High-current state	12	14	16	mA
Supply Current Ratio	I <sub>cc(High)</sub> /I <sub>cc(Low)</sub>	Measured as a ratio of High current to low current	1.9	-	-	-
Output Rise time	T <sub>r</sub>	Output slew rate, R <sub>l</sub> =100Ω	0	2	4	uS
Output Fall time	T <sub>f</sub>	Output slew rate, R <sub>l</sub> =100Ω	0	2	4	uS

**Operating Characteristics**

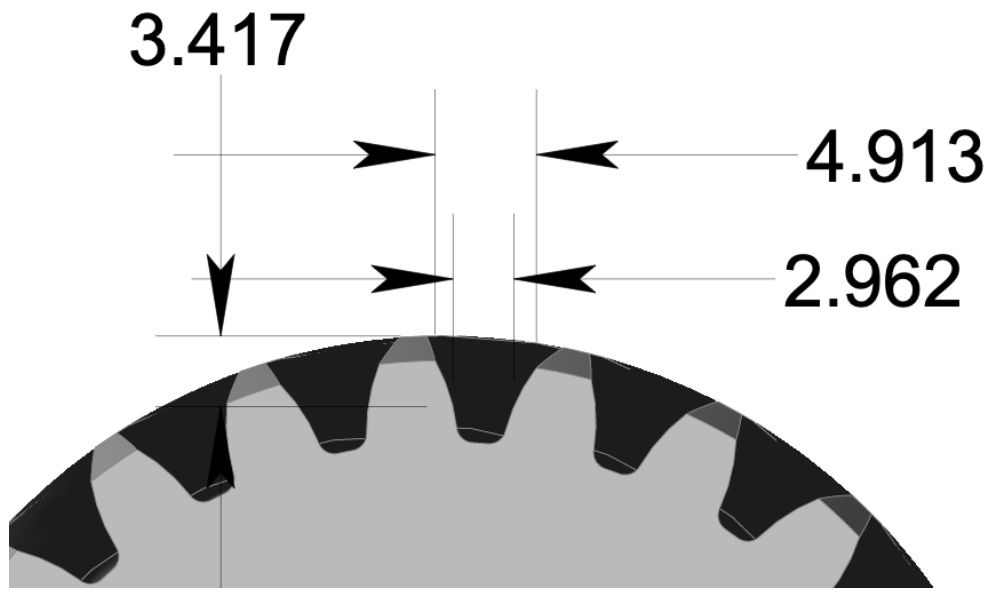
Characteristics	Symbol	Test Condition	Min	Typ	Max.	Units
Operate Point	B <sub>op</sub>	% of Pk-Pk, normalized internal signal	-	670	-	%
Release Point	B <sub>rp</sub>	% of Pk-Pk, normalized internal signal	-	30	-	%
Operating Differential Magnetic Input	B <sub>diff(pk-pk)</sub>		30	-	-	G
Operating Frequency	F fwd	Narrow Option	0	-	12	kHz
Operating Frequency	F rev	Narrow Option	0	-	7	kHz
Operating Frequency	F ND	Narrow Option	0	-	4	kHz
Allowable Differential Sequential Signal Variation	B <sub>seq</sub>		0.7	-	1.3	-
Pulse Width Forward		Narrow Option	38	45	52	μS
Pulse Width Reverse		Narrow Option	76	90	104	μS
Pulse Width non-direction		Narrow Option	153	180	201	μS

**Sensing Configuration:**



**Target Geometry:**

A nominal 4.0mm wide teeth and valleys should be used as well as at least 4mm of valley depth. Hyzon Target example below is acceptable.



## Pin-out

Red = Vcc

White = Vout

Circuit Example:

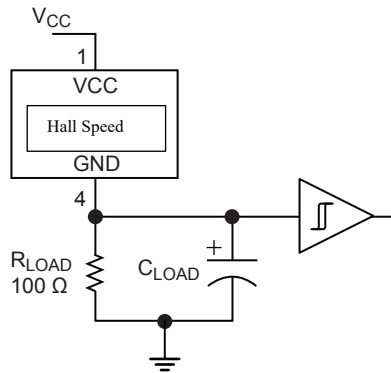
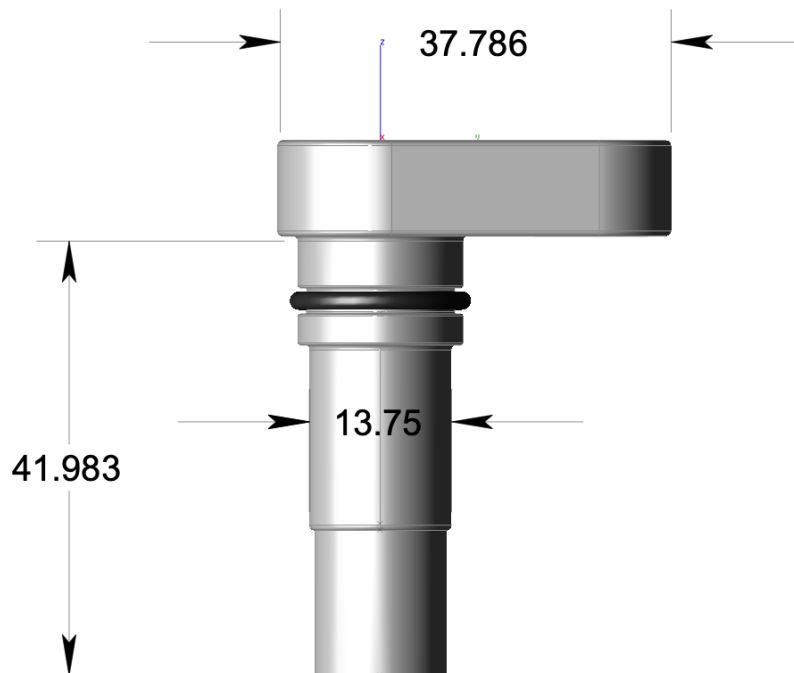


Figure 1: Typical Application Circuit

## Base dimensions

### (Speed and Direction Sensor)



## Appendix A: Setting choices. This Product uses: -FSNHPYUE-A

