OIM3C

Magnetic linear position sensor

General Description

OIM3C is a magneto resistive position sensor based on the *Anisotropic Magneto Resistance* (AMR) effect in a plastic FR4 package with glob top hard black resin.

When the device is moved along a magnetic scale with a N\S pole pitch of 2 mm the two Wheatstone bridges generate differential sinusoidal output voltage (PSIN - NSIN) and (PCOS - NCOS) phase-shifted at 90°. One sine\cosine cycle averaged using a pair of N\S poles is thus produced for a pole width.

The amplitude of the differential output voltages are largely independent of the magnetic field strength and thus not sensitive to changes in distance.

The absolute magnetic field strength must be large enough for the sensor to go into saturation and for the magnetization of resistor stripes to assume the direction of the outer magnetic fields.

Applications

Linear position sensing

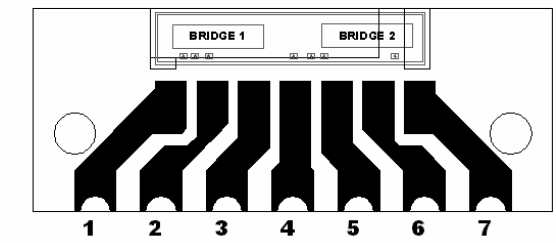
Length measuring systems

Non-contact location of motional objects

Proximity detection

Valve positioning

Angular position measurements



Features

- **Magneto resistive position sensor**
- **Strong field sensor for 2 mm N/S pole pitch**
- **One sine/cosine cycle per pole width**
- **High interpolation due to a sine signal with few harmonics**
- **Low saturation field strength**
- **High amplitude consistency with changes in distance**
- **Resistant to strong magnetic fields**
- **Not sensitive to external homogenous magnetic fields**

Pin Functions

No.	Name	Function
1	V_{COS}	Power supply Cosine bridge
2	COS -	Output Cosine -
3	SIN -	Output Sine -
4	GND	Ground
5	V_{SIN}	Power supply Sine bridge
6	SIN +	Output Sine +
7	COS +	Output Cosine +

Ordering Information

OIM3C	2 mm pitch magnetic sensor

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Min	Max	Unit
V_{BRIDGE}	Supply voltage to bridge	-10	10	V
V_{PIN}	Voltage at PSIN, NSIN, PCOS, NCOS	-10	10	V
I_{BRIDGE}	Supply current to bridge	-11	11	mA
I_{PIN}	Current in PSIN, NSIN, PCOS, NCOS	-11	11	mA
T_A	Operating Temperature Range	-25	100	℃
T_S	Storage Temperature	-40	100	℃

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

T_A = -40 … 100℃, V_{BRIDGE} = 5V ± 10%, I H_{EXT} I > 25kA/m at the bottom edge of the sensor, unless otherwise noted.

Symbol	Parameter	Conditions	T [℃]	Min	Typ	Max	Unit
V_{BRIDGE}	Permissible Supply Voltage			-8		8	V
I_{BRIDGE}	Supply Current in V_{BRIDGE}	PSIN, NSIN, PCOS, NCOS		3.4		6.2	mA
R_{BRIDGE}	Bridge Resistance of one sin/cos bridge		25℃	1.8		2.6	KΩ
TCR_{BRIDGE}	Bridge Resistance Temperature Drift			0.27	0.32	0.37	% / K
V_{PK}	Amplitude of Differential Output Voltages			8		20	mV / V
TC (Va)	Amplitude Temperature Drift			-0.4		-0.25	% / K
V_{OS}	Offset Voltage	H_{EXT}=0 kA/m at the bottom edge of the sensor		-2		2	mV / V
TC (V_{OS})	Offset Voltage Temperature Drift			-3		3	µV/VK
V_{REL}	Relative Change in Amplitude	Distance bottom edge of the sensor to the magnetic scale: 0…1.5 mm		-5		5	%
AA_{abs}	Absolute Angle Accuracy	Without offset voltage, distance bottom edge of the sensor to the magnetic scale: 0.5mm		-1		1	DEG

MECHANICAL DIMENSIONS

Units=mm Mechanical tolerance=+/-0.2mm Die positioning tolerance=+/-0.030mm