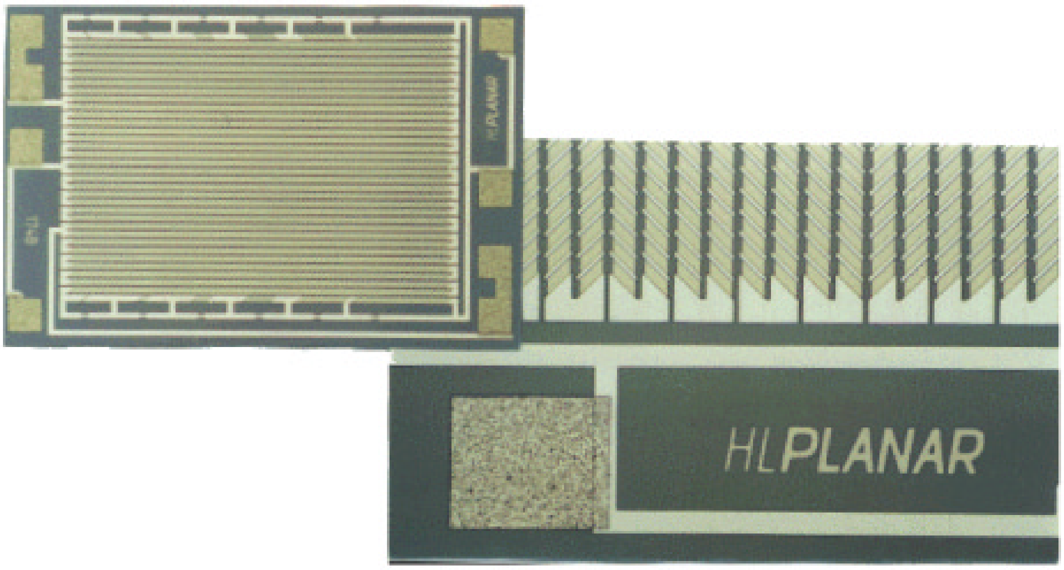
Magnetic Field Sensors
KMZ 20 M1



Function principle

Magnetoresistive materials can change their resistivity in an external magnetic field. The variation of the resistivity is determined by the rotation of magnetisation with respect to the direction of the current flow. Permalloy ($Ni_{81}Fe_{19}$) is commercially used as magnetoresistive material. The relative change of resistivity is 2-3 % for this material. The high sensitive and small size magnetoresistive sensor consists of the chip 174B covered with thin film permalloy stripes. These stripes form a Wheatstone bridge, whose output voltage is proportional to the magnetic field component H_y.

Characteristic

The bridge imbalance is a value for the magnetic field component H_y in the plane of the chip. It is of advantage to apply an auxiliary field H_x = 3 kA/m which avoids flipping of the magnetisation of the stripes caused by disturbing magnetic fields. A perpendicular field H_x is necessary to stabilize sensor operation. This can be done by using a small permanent magnet. Magnetic fields vertical to the chip surface have no influence on the output voltage.

Special feature

The sensor KMZ 20 M1 has a small permanent magnet which is glued on the package. The sensor is ready to use. No external auxillary fields are required for safe operation in a disturbing field up to 30 kA/m.

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HLPLANAR TECHNIK

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Technical data

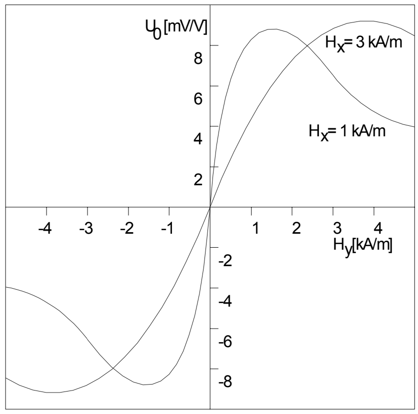
Absolute maximum ratings			
Parameter	**Symbol**	**Unit**	**Value**
Supply voltage	V_B	V	12
Total power dissipation	P_{to}	mW	120
Operating temperature range	T_{amb}	°C	-40 ... + 125
Storage temperature range	T_{stg}	°C	-65 ... +150
Disturbing field	H_d	kA/m	≤ 30

Electrical characteristics (T_{amb} = 25°C)			
Parameter	**Symbol**	**Unit**	**Value**
Bridge resistance	R_B	kOhm	1.4 .. 2.2
Open circuit sensitivity	S_V	(mV/V)/(kA/m)	4.0 ± 0.8
Output voltage range	$\Delta V_O/V_B$	mV/V	20.0 ± 4.0
Hysteresis of output voltage	$V_{O\,H}/V_B$	µV/V	≤ 50
Offset voltage	V_{OFF}/V_B	mV/V	$\leq \pm 1.0$
Permanent auxiliary field	H_x	kA/m	3.6 ± 0.4

Temperature coefficients (- 25 °C < T_{amb} < 125 °C) of			
Parameter	**Symbol**	**Unit**	**Value**
Bridge resistance	T_{CBR}	%/K	0.30 ± 0.05
Open circuit sensitivity			
(V_B = const)	T_{CSV}	%/K	-0.25 ± 0.05
(I_B = const)	T_{CSI}	%/K	0.05 ± 0.05
Offset voltage	T_{COFF}	(µV/V)/K	$\leq \pm 3$
Difference of offset voltage for sensor pair	ΔT_{COFF}	(µV/V)/K	$\leq \pm 0.5$

Applications

- detection of weak magnetic fields, e.g. earth magnetic field
- contactless mechanical switch
- displacement measurement with high resolution
- revolution speed detection on ferromagnetic gear wheels
- contactless angle measurement
- galvanically seperated current measurement



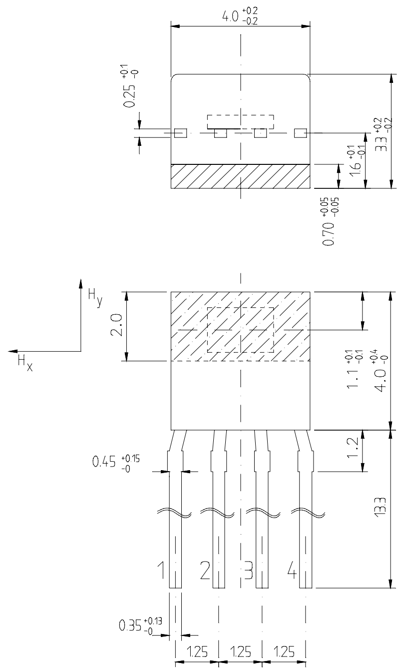
Output voltage versus field component H_y for different stabilizing magnetic fields H_x

Housing of KMZ 20 M: E-Line 4-Pin

1: $+V_o$ 3: $-V_o$
2: - V_B 4: $+V_B$

V_o : output voltage
V_B : input voltage

metric dimensions



2 KMZ 20 M1

We also offer selected pairs of KMZ 20 M1. These pairs have a similar temperature characteristic of the voltage offset and are well suited for differential measuring techniques. The temperature drift of the magnetoresistive sensor is strongly reduced by applying this technique.

Sensors in thin film technology

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