



## KMZ10CM

### Linear Magnetic Field Sensor

#### SPECIFICATIONS

- ◆ Magneto resistive sensor technology
- ◆ Linear signal output
- ◆ Over increased field range
- ◆ Very low hysteresis
- ◆ High sensitivity
- ◆ Substitutes KMZ10C / NXP

Due to its featured properties - high sensitivity and almost no hysteresis – the **KMZ10CM** sensor is used in a wide range of applications, like magnetic field measurement, revolution counters, proximity detection and position measurement

#### FEATURES

- ◆ Wheatstone bridge
- ◆ Passive output signal
- ◆ Linear signal output proportional to magnetic field strength
- ◆ 4 lead package for measurement of z direction

#### APPLICATIONS

Detection of small magnetic fields, as in:

- ◆ Contactless switch
- ◆ Contactless displacement measurement
- ◆ Current measurement
- ◆ Polarity detection of small magnetic fields



## PERFORMANCE SPECIFICATIONS

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>A. Operating Limits 1)</b>						
max. supply voltage	V <sub>CC,max</sub>				10	V
operating temperature	T <sub>op</sub>		-40		+150	→C
storage temperature	T <sub>st</sub>		-65		+165	→C
<b>B. Sensor Specifications (T = 25 °C ; H<sub>x</sub> = 3 kA/m)</b>						
supply voltage	V <sub>CC</sub>			5	10	V
bridge resistance	R <sub>b</sub>		1000	1400	1800	Ω
offset voltage	V <sub>OFF</sub> /V <sub>CC</sub>	H <sub>x</sub> =0	-1.5	0	+1.5	mV/V
sensitivity	S	note 2	1	1.2	2	(mV/V)/(kA/m)
hysteresis	V <sub>HYST</sub>	note 3	-	-	100	μV/V
linearity deviation	FL	note 4	-	-	6.5	%
<b>C. Sensor Specifications (T<sub>low</sub> = 30 °C ; T<sub>high</sub> = 80 °C ; H<sub>x</sub> = 3 kA/m ; V<sub>CC</sub> = 5 V)</b>						
TC of sensitivity	TCS	note 5	-	- 0.35	-	%/K
TC of resistance	TCBR	note 6	-	+ 0.45	-	%/K
TC of offset	TCV <sub>off</sub>	note 7,8, H <sub>x</sub> =0	-4	0	+4	μV/V/K

1) Stress above one or more of the limiting values may cause permanent damage to the device. Exposure to limiting values for extended periods may affect device reliability.

2) The sensitivity is defined as the average slope of characteristic between H<sub>y</sub>=0 and 6 kA/m and H<sub>x</sub>=3kA/m:

$$S = \frac{V_0(H_y = 6kA/m) - V_0(H_y = 0)}{6 * V_{CC}}$$

3) Hysteresis is defined as the difference between offset voltages measured without H<sub>y</sub>-field after premagnetization by negative and positive H<sub>y</sub>=±6 kA/m field:

$$V_{HYST} = V_0(H_y = -6, H_x = 0) - V_0(H_y = 6, H_x = 0); H_0 = 0; H_1 = 6 \frac{kA}{m}; H_x = 3 \frac{kA}{m}; V_{CC} = 5V$$

4) The linearity error is the deviation of output voltage measured at H<sub>y</sub>=3 kA/m from the average of H<sub>y</sub>=0 and 6 kA/m- output voltages, expressed as percentage of the output voltage difference measured between 0 and 6 kA/m:

$$FL = \left| \frac{1}{2} \frac{V_0(H_y = 3kA/m) - V_0(H_y = 0)}{V_0(H_y = 6kA/m) - V_0(H_y = 0)} \right| * 100\%$$

5) The temperature coefficient of sensitivity is defined as the percentage change of the sensitivity per K referred to the value at T<sub>1</sub> = -25 °C; T<sub>2</sub>= operating temperature:

$$TCS = \frac{1}{(T_2 - T_1)} * \frac{S(T_2) - S(T_1)}{S(T_1)} * 100\%$$

- 6) The temperature coefficient of resistance is defined as the percentage change of the resistance per K referred to the value at  $T_1 = -25\text{ }^\circ\text{C}$ ;  $T_2 =$  operating temperature:

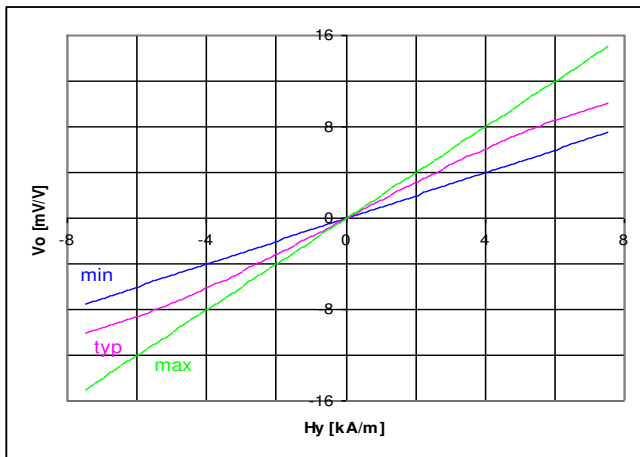
$$TCBR = \frac{1}{(T_2 - T_1)} * \frac{R(T_2) - R(T_1)}{R(T_1)} * 100\%$$

- 7) Temperature coefficient of offset voltage is defined as the voltage change per K expressed in  $\mu\text{V/V}$ :

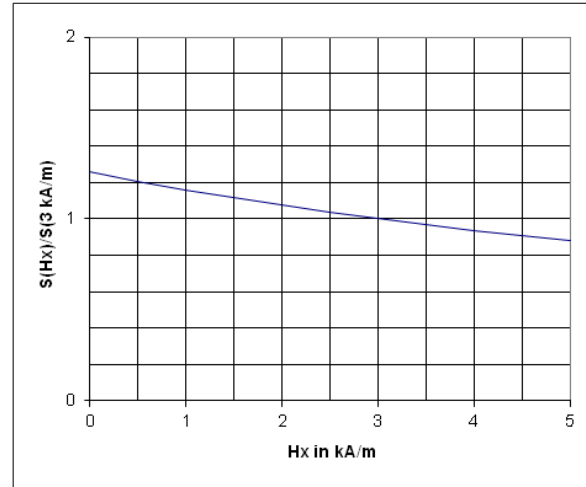
$$TCV_{off} = \frac{V_{off}(T_2) - V_{off}(T_1)}{(T_2 - T_1)}$$

- 8) Linear behaviour assumed

## TYPICAL PERFORMANCE CURVES



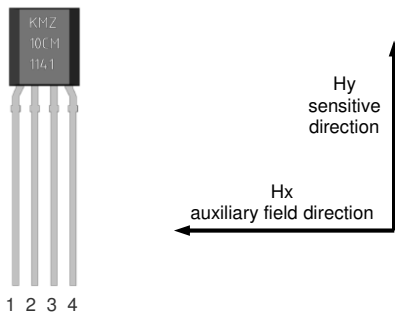
Typical output characteristic



Sensitivity as a function of auxiliary field strength

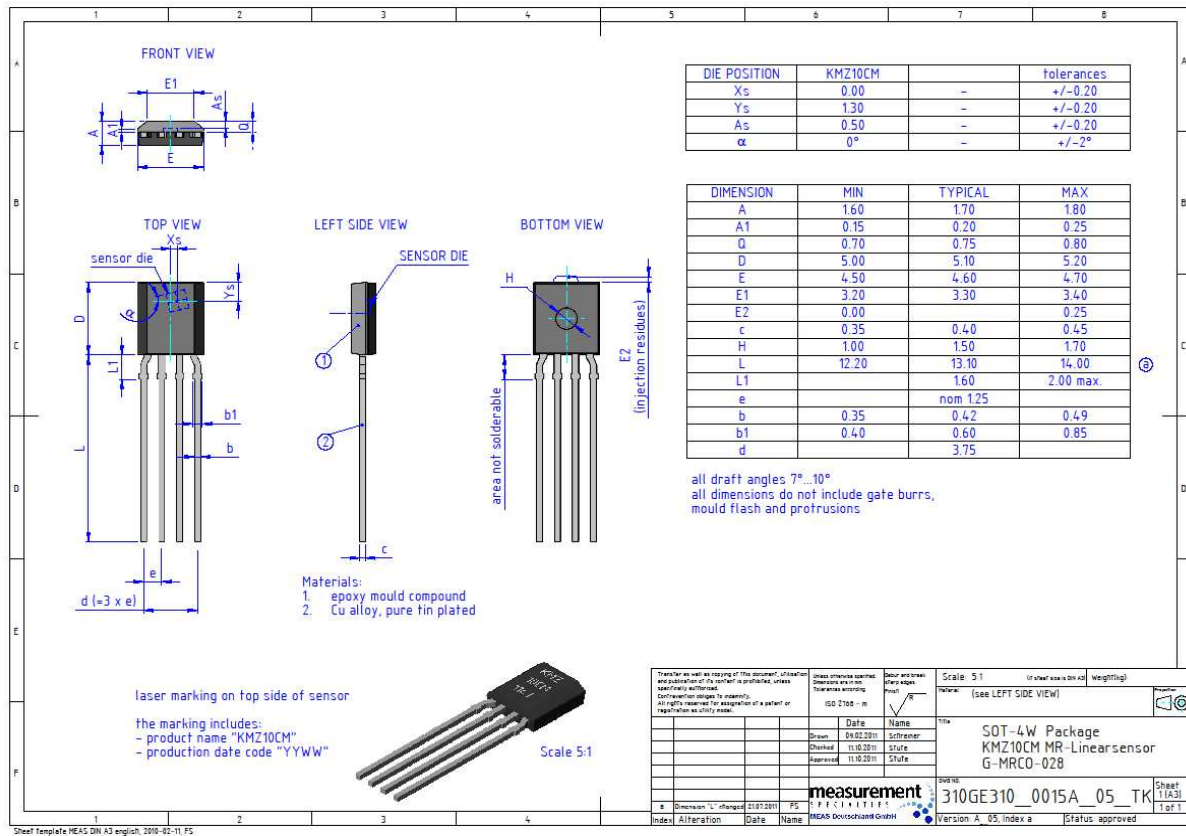
## FUNCTION

### TERMINAL CONNECTIONS



Pin	Symbol	Function
1	+Vo	positive output voltage
2	GND	negative supply voltage
3	-Vo	negative output voltage
4	+Vcc	positive supply voltage

## BLOCK DIAGRAM



## ORDERING CODE

Product	Description	Part number
KMZ10CM	KMZ10 CM Linear Field Sensor	G-MRCO-028