# KMZ10CM Linear Field Sensor


- **Magnetoresisitve sensor technology**
- **Linear signal output**
- **Over increased field range**
- **Very low hysteresis**
- **High sensititvity**
- **Substitutes KMZ10C / NXP**

## DESCRIPTION

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 detecting, and position measurement.

## FEATURES

- Wheatsone 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

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## PERFORMANCE SPECS

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **A. Operating Limits 1)** | | | | | | |
| max. supply voltage | $V_{CC,max}$ | | | | 10 | V |
| operating temperature | $T_{op}$ | | -40 | | +150 | °C |
| storage temperature | $T_{st}$ | | -65 | | +165 | °C |
| **B. Sensor Specifications (T = 25 °C ; $H_X$ = 3 kA/m)** | | | | | | |
| supply voltage | $V_{CC}$ | | | **5** | 10 | V |
| bridge resistance | $R_b$ | | 1000 | **1400** | 1800 | Ω |
| offset voltage | $V_{OFF}/V_{CC}$ | $H_x$=0 | -1.5 | **0** | +1.5 | mV/V |
| sensitivity | S | note 2 | 1 | **1.2** | 2 | (mV/V)/(kA/m) |
| hysteresis | $V_{HYST}$ | note 3 | - | **-** | 100 | µV/V |
| linearity deviation | FL | note 4 | - | **-** | 6.5 | % |
| **C. Sensor Specifications ($T_{low}$ = 30 °C ; $T_{high}$ = 80 °C ; $H_X$ = 3 kA/m ; $V_{CC}$ = 5 V)** | | | | | | |
| TC of sensitivity | TCS | note 5 | - | **- 0.35** | - | %/K |
| TC of resistance | TCBR | note 6 | - | **+ 0.45** | - | %/K |
| TC of offset | $TCV_{off}$ | note 7,8, $H_x$=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 Hy=0 and 6 kA/m and Hx=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 Hy-field after premagnetization by negative and positive Hy=±6 kA/m field:

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

4) The linearity error is the deviation of output voltage measured at Hy=3 kA/m from the average of Hy=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 $T_1$ = -25 °C; $T_2$= 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 °C; $T_2$= operating temperature:

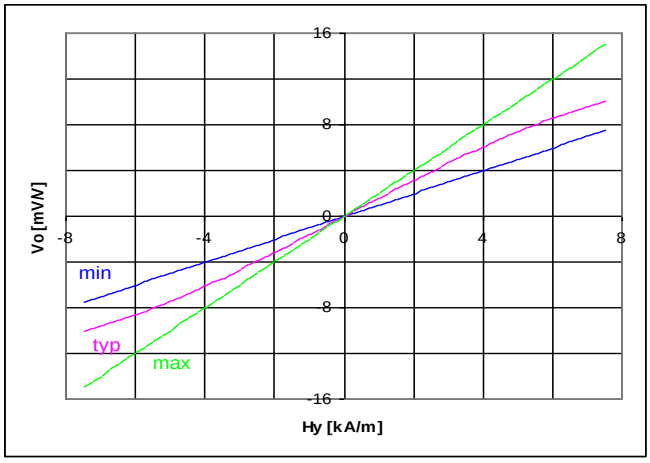
$$TCBR = \frac{1}{(T_2 - T_1)} * \frac{R(T_2) - R(T_1)}{R(T_1)} * 100\%$$

7) Temperature coefficient of offset voltage is defined as the voltage change per K expressed in µV/V:

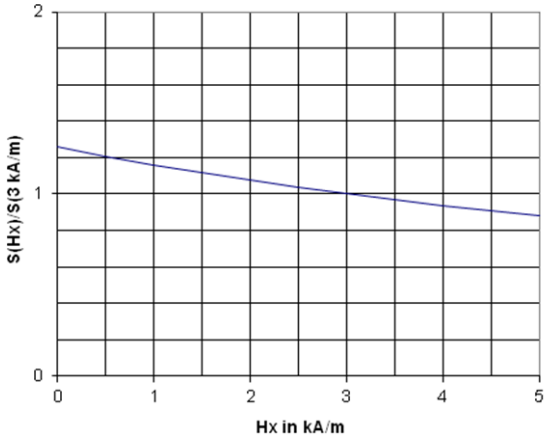
$$TCV_{off} = \frac{V_{off}(T_2) - V_{off}(T_1)}{(T_2 - T_1)}$$

8) Linear behaviour assumed

## TYPICAL PERFORMANCE CURVES



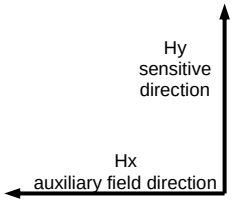

*Typical output characteristic*




*Sensitivity as a function of auxilliary field strength*

## FUNCTION

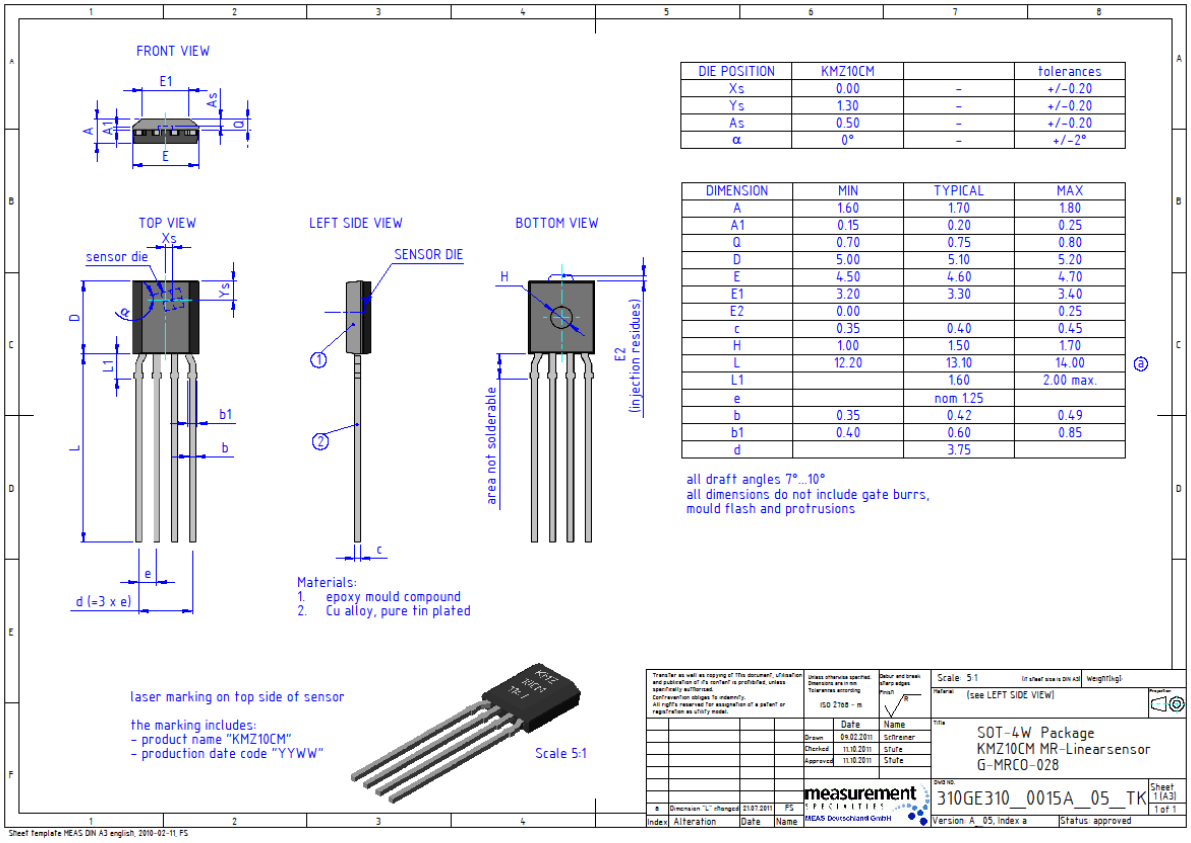
### TERMINAL CONNECTIONS


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

# KMZ10CM Linear Field Sensor

## BLOCK DIAGRAM




| DIE POSITION | KMZ10CM | | tolerances |
|---|---|---|---|
| Xs | 0.00 | - | +/-0.20 |
| Ys | 1.30 | - | +/-0.20 |
| As | 0.50 | - | +/-0.20 |
| α | 0° | - | +/-2° |

| DIMENSION | MIN | TYPICAL | MAX | |
|---|---|---|---|---|
| A | 1.60 | 1.70 | 1.80 | |
| A1 | 0.15 | 0.20 | 0.25 | |
| Q | 0.70 | 0.75 | 0.80 | |
| D | 5.00 | 5.10 | 5.20 | |
| E | 4.50 | 4.60 | 4.70 | |
| E1 | 3.20 | 3.30 | 3.40 | |
| E2 | 0.00 | | 0.25 | |
| c | 0.35 | 0.40 | 0.45 | |
| H | 1.00 | 1.50 | 1.70 | |
| L | 12.20 | 13.10 | 14.00 | a |
| L1 | | 1.60 | 2.00 max. | |
| e | | nom 1.25 | | |
| b | 0.35 | 0.42 | 0.49 | |
| b1 | 0.40 | 0.60 | 0.85 | |
| d | | 3.75 | | |

all draft angles 7°...10°
all dimensions do not include gate burrs, mould flash and protrusions

Scale: 5:1 (if sheet size is DIN A3) Weight(kg)
Material: (see LEFT SIDE VIEW)
Title: SOT-4W Package KMZ10CM MR-Linearsensor G-MRCO-028
DWG NO. 310GE310__0015A__05__TK
Sheet 1 (A3) 1 of 1
Version: A_05, Index a Status: approved
Drawn 09.02.2011 Schreiner
Checked 11.10.2011 Stute
Approved 11.10.2011 Stute
Index Alteration Date Name
a Dimension "L" changed 21.07.2011 PS
MEAS Deutschland GmbH
Sheet Template MEAS DIN A3 english, 2010-02-11, PS

## ORDERING CODE

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

## TECHNICAL CONTACT INFORMATION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