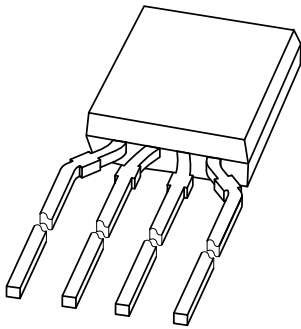


DATA SHEET



KMZ10B Magnetic field sensor

Product specification
Supersedes data of 1996 Nov 08
File under Discrete Semiconductors, SC17

1998 Mar 31

Magnetic field sensor

KMZ10B

DESCRIPTION

The KMZ10B is a sensitive magnetic field sensor, employing the magnetoresistive effect of thin-film permalloy. Its properties enable this sensor to be used in a wide range of applications for current and field measurement, revolution counters, angular or linear position measurement, proximity detectors, etc.

PINNING

| PIN | SYMBOL | DESCRIPTION |
|-----|-----------------|----------------|
| 1 | +V _O | output voltage |
| 2 | GND | ground |
| 3 | -V _O | output voltage |
| 4 | V _{CC} | supply voltage |

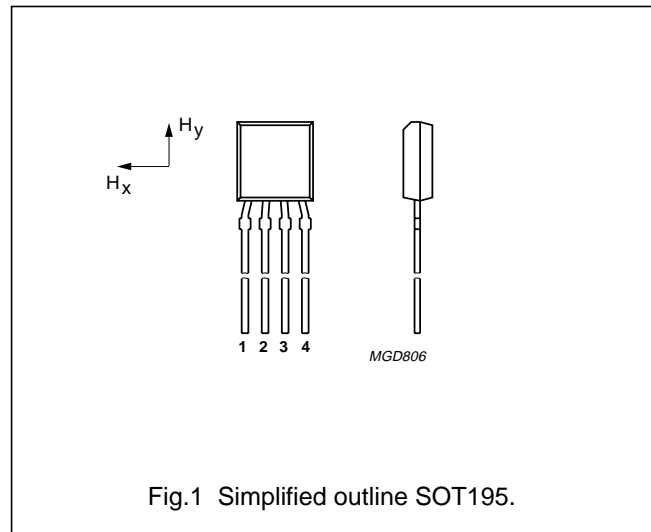


Fig.1 Simplified outline SOT195.

QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MIN. | TYP. | MAX. | UNIT |
|---------------------|-------------------------|------|------|------|---------------------|
| V _{CC} | bridge supply voltage | - | 5 | 12 | V |
| H _y | magnetic field strength | -2 | - | +2 | kA/m |
| H _x | auxiliary field | - | 3 | - | kA/m |
| S | sensitivity | - | 4 | - | $\frac{mV/V}{kA/m}$ |
| R _{bridge} | bridge resistance | 1.6 | - | 2.6 | kΩ |
| V _{offset} | offset voltage | -1.5 | - | +1.5 | mV/V |

CIRCUIT DIAGRAM

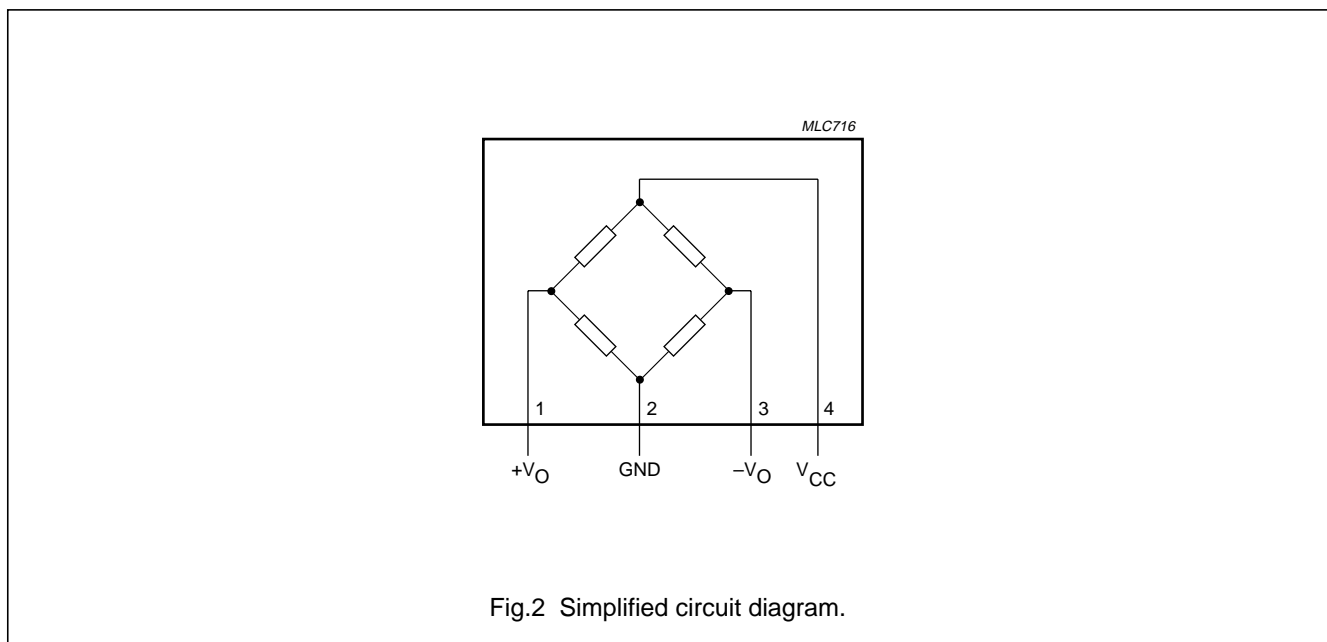


Fig.2 Simplified circuit diagram.

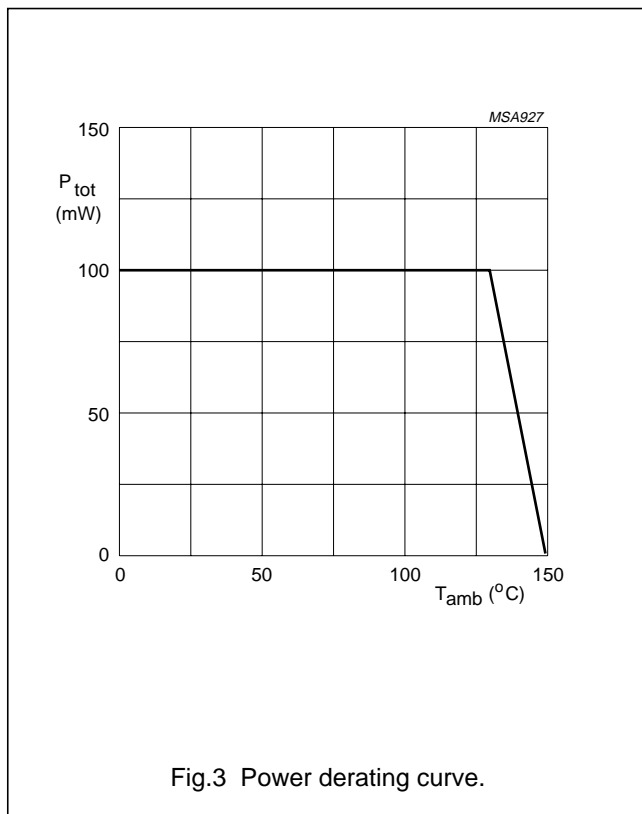
Magnetic field sensor

KMZ10B

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---------------------|------------------------------|---------------------------------|------|------|------|
| V _{CC} | bridge supply voltage | | – | 12 | V |
| P _{tot} | total power dissipation | up to T _{amb} = 130 °C | – | 120 | mW |
| T _{stg} | storage temperature | | –65 | +150 | °C |
| T _{bridge} | bridge operating temperature | | –40 | +150 | °C |



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THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | VALUE | UNIT |
|---------------|---|-------|------|
| $R_{th\ j-a}$ | thermal resistance from junction to ambient | 180 | K/W |

CHARACTERISTICS

$T_{amb} = 25\text{ °C}$; $H_x = 3\text{ kA/m}$; note 1.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|----------------|--|---|------|------|-----------|---------------------|
| V_{CC} | bridge supply voltage | | – | 5 | – | V |
| H_y | magnetic field strength | | –2 | – | +2 | kA/m |
| S | sensitivity | open circuit, notes 2 and 3 | 3.2 | – | 4.8 | $\frac{mV/V}{kA/m}$ |
| TCV_O | temperature coefficient of output voltage | $V_{CC} = 5\text{ V}$; $T_j = -25\text{ to }+125\text{ °C}$ | – | –0.4 | – | %/K |
| | | $I_B = 3\text{ mA}$; $T_j = -25\text{ to }+125\text{ °C}$ | – | –0.1 | – | %/K |
| R_{bridge} | bridge resistance | | 1.6 | – | 2.6 | k Ω |
| TCR_{bridge} | temperature coefficient of bridge resistance | $T_{bridge} = -25\text{ to }+125\text{ °C}$ | – | 0.3 | – | %/K |
| V_{offset} | offset voltage | | –1.5 | – | +1.5 | mV/V |
| TCV_{offset} | offset voltage drift | $T_j = -25\text{ to }+125\text{ °C}$ | –3 | – | +3 | $\frac{\mu V/V}{K}$ |
| FL | linearity deviation of output voltage | $H_y = 0\text{ to } \pm 1\text{ kA/m}$ | – | – | ± 0.5 | %-FS |
| | | $H_y = 0\text{ to } \pm 1.6\text{ kA/m}$ | – | – | ± 1.7 | %-FS |
| | | $H_y = 0\text{ to } \pm 2\text{ kA/m}$ | – | – | ± 2 | %-FS |
| FH | hysteresis of output voltage | | – | – | 0.5 | %-FS |
| f | operating frequency | | 0 | – | 1 | MHz |

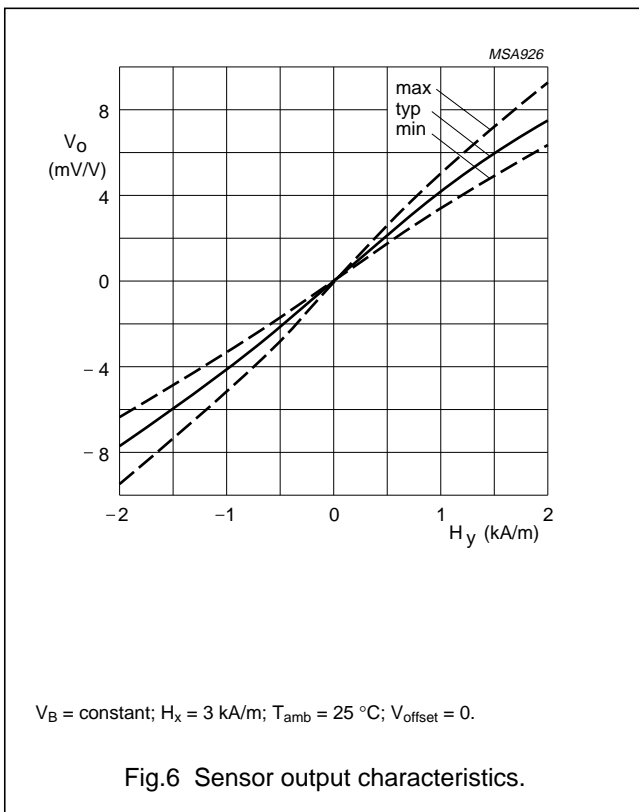
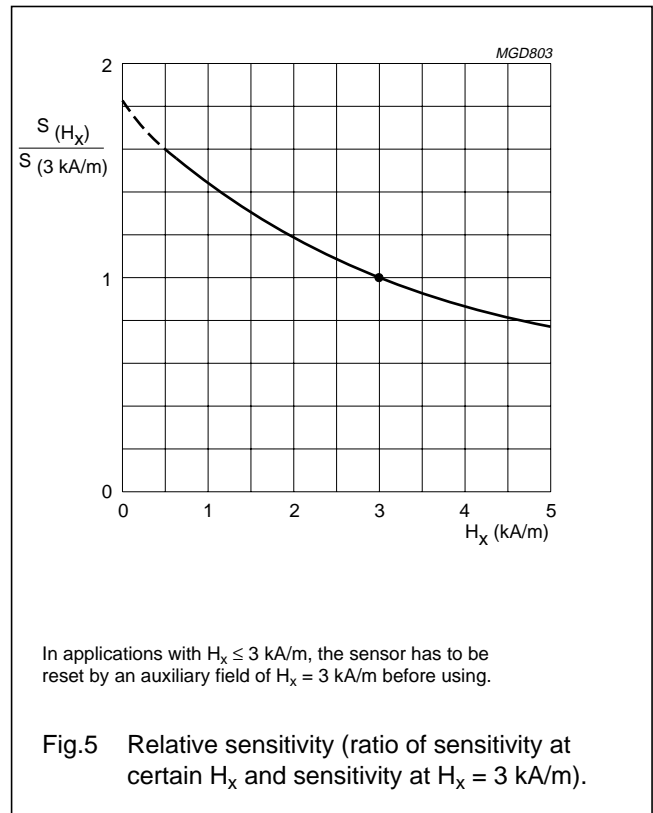
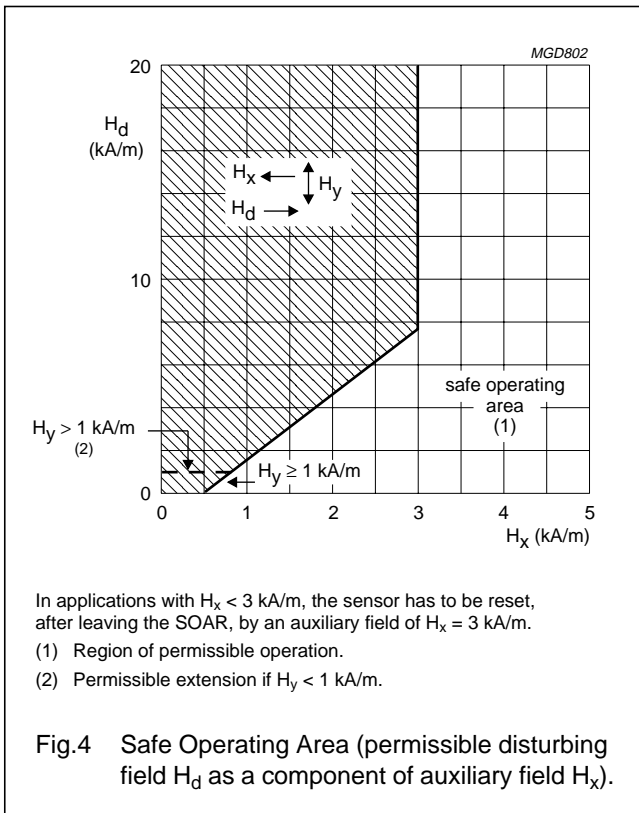
Notes

- In applications with $H_x < 3\text{ kA/m}$ the sensor has to be reset before first operation by application of an auxiliary field $H_x = 3\text{ kA/m}$.
- No disturbing field (H_d) allowed; for stable operation under disturbing conditions see Fig.4 (SOAR) and see Fig.5 for decrease of sensitivity.

$$3. \quad S = \frac{(V_O \text{ at } H_y = 1.6\text{ kA/m}) - (V_O \text{ at } H_y = 0)}{1.6 \times V_{CC}} .$$

Magnetic field sensor

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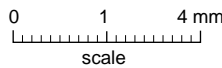
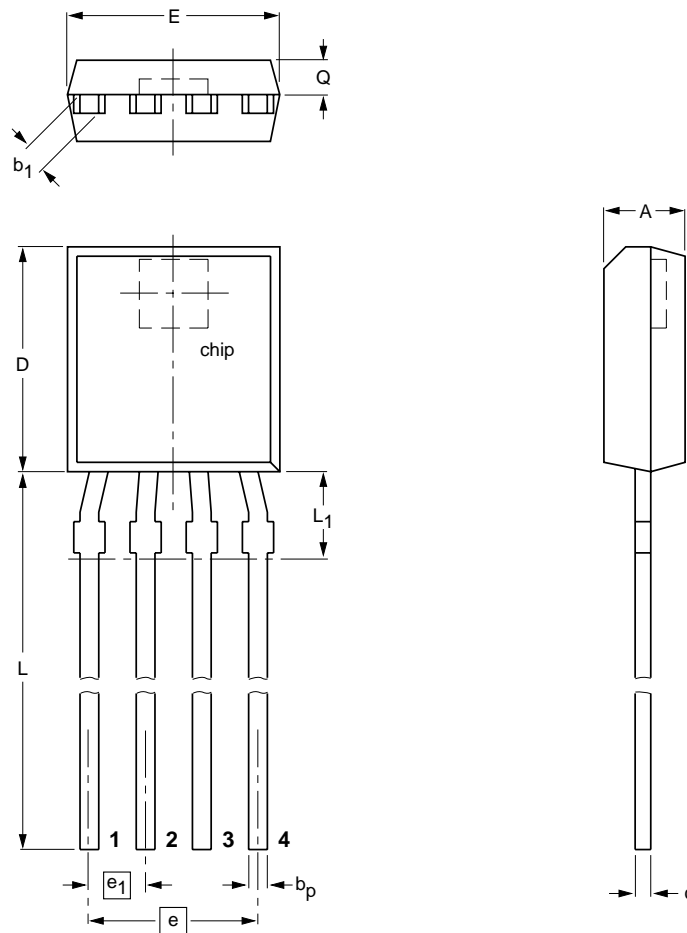
Magnetic field sensor

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PACKAGE OUTLINE

Plastic single-ended flat package; 4 in-line leads

SOT195



DIMENSIONS (mm are the original dimensions)

| UNIT | A | b _p | b ₁ | c | D | E | e | e ₁ | L | L ₁ ⁽¹⁾ max. | Q |
|------|------------|----------------|----------------|--------------|------------|------------|------|----------------|--------------|---------------------------------------|------------|
| mm | 1.8 1.6 | 0.48 0.40 | 0.7 0.5 | 0.45 0.39 | 5.2 5.0 | 4.8 4.4 | 3.75 | 1.25 | 14.5 12.7 | 2 | 0.8 0.7 |

Notes

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|--------------------|------------|-------|------|--|------------------------|------------|
| | IEC | JEDEC | EIAJ | | | |
| SOT195 | | | | | | 97-06-02 |

Magnetic field sensor

KMZ10B

DEFINITIONS

| Data Sheet Status | |
|---|---|
| Objective specification | This data sheet contains target or goal specifications for product development. |
| Preliminary specification | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification | This data sheet contains final product specifications. |
| Limiting values | |
| Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. | |
| Application information | |
| Where application information is given, it is advisory and does not form part of the specification. | |

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