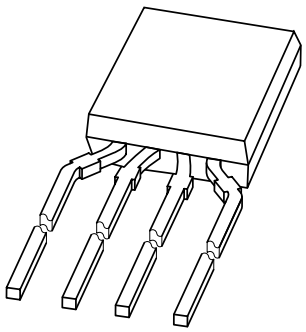
DATA SHEET



KMZ10A
Magnetic field sensor

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

1998 Mar 24

Philips
Semiconductors

PHILIPS

Magnetic field sensor KMZ10A

DESCRIPTION

The KMZ10A is an extremely 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 navigation, current and field measurement, revolution counters, angular or linear position measurement and proximity detectors, etc.

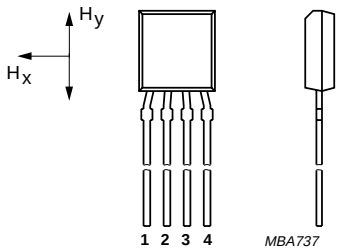


Fig.1 Simplified outline.

PINNING

PIN	SYMBOL	DESCRIPTION
1	$+V_O$	output voltage
2	GND	ground
3	$-V_O$	output voltage
4	V_{CC}	supply voltage

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_{CC}	bridge supply voltage	–	5	–	V
T_{bridge}	bridge operating temperature	–40	–	+150	°C
H_y	magnetic field strength	–0.5	–	+0.5	kA/m
H_x	auxiliary field	–	0.5	–	kA/m
S	sensitivity	–	16	–	$\frac{mV/V}{kA/m}$
R_{bridge}	bridge resistance	0.8	–	1.6	kΩ
V_{offset}	offset voltage	–1.5	–	+1.5	mV/V

CIRCUIT DIAGRAM

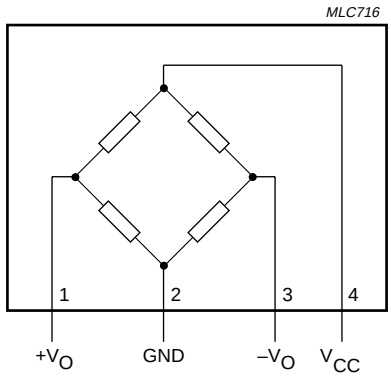


Fig.2 Simplified circuit diagram.

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CC}	bridge supply voltage		–	9	V
P_{tot}	total power dissipation	up to T_{amb} = 134 °C	–	90	mW
T_{stg}	storage temperature	note 1	−65	+150	°C
T_{bridge}	bridge operating temperature		−40	+150	°C

Note

1. Maximum operating temperature of the thin-film permalloy.

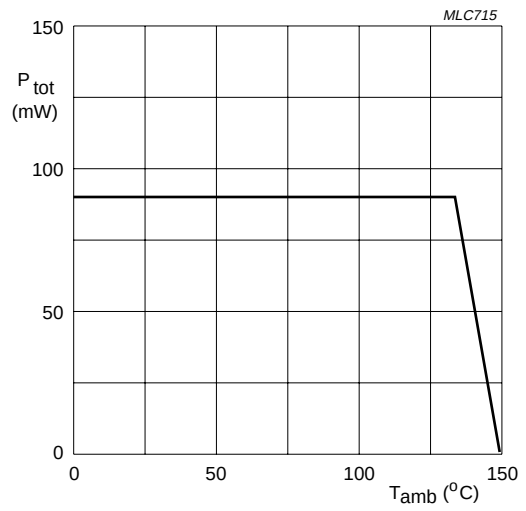


Fig.3 Power derating curve.

THERMAL CHARACTERISTICS

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

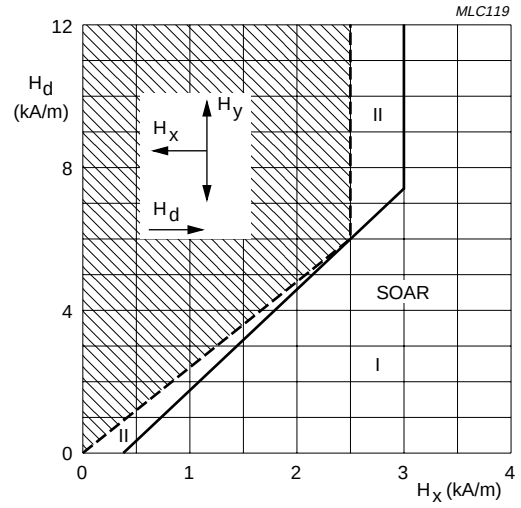
CHARACTERISTICS

T_{amb} = 25 °C; H_x = 0.5 kA/m; notes 1 and 2; V_{CC} = 5 V unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
H_y	magnetic field strength	note 2	–0.5	–	+0.5	kA/m
S	sensitivity	notes 2 and 3	13	–	19	$\frac{mV/V}{kA/m}$
TCV_O	temperature coefficient of output voltage	V_{CC} = 5 V; T_{amb} = –25 to +125 °C	–	–0.4	–	%/K
		I_{CC} = 3 mA; T_{amb} = –25 to +125 °C	–	–0.15	–	%/K
R_{bridge}	bridge resistance		0.8	–	1.6	kΩ
TCR_{bridge}	temperature coefficient of bridge resistance	T_{bridge} = –25 to +125 °C	–	0.25	–	%/K
V_{offset}	offset voltage		–1.5	–	+1.5	mV/V
TCV_{offset}	offset voltage drift	T_{bridge} = –25 to +125 °C	–6	–	+6	$\frac{\mu V/V}{K}$
FL	linearity deviation of output voltage	H_y = 0 to ±0.25 kA/m	–	–	0.8	%·FS
		H_y = 0 to ±0.4 kA/m	–	–	2.5	%·FS
		H_y = 0 to ±0.5 kA/m	–	–	4.0	%·FS
FH	hysteresis of output voltage		–	–	0.5	%·FS
f	operating frequency		0	–	1	MHz

Notes

1. Before first operation or after operation outside the SOAR (Fig.4) the sensor has to be reset by application of an auxiliary field H_x = 3 kA/m.
2. 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. $$S = \frac{(V_O \text{ at } H_y = 0.4\ kA/m) - (V_O \text{ at } H_y = 0)}{0.4 \times V_{CC}}.$$

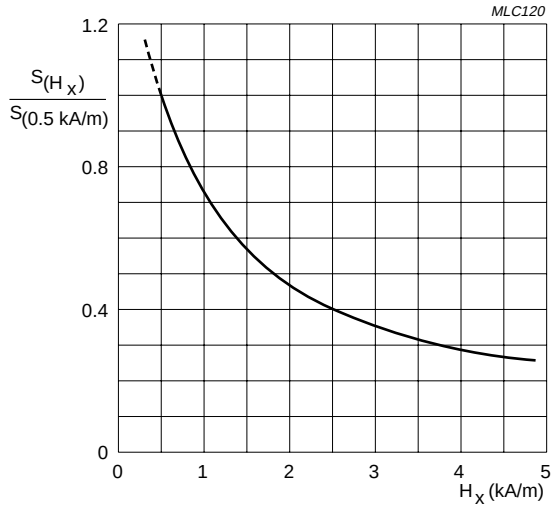


In applications with H_x < 3 kA/m, the sensor has to be reset, after leaving the SOAR, by an auxiliary field of H_x = 3 kA/m.

I = Region of permissible operation.

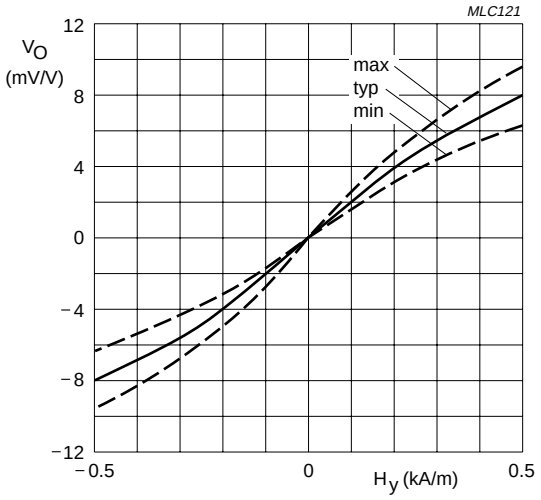
II = Permissible extension if H_y < 0.15 A/m.

Fig.4 Safe Operating Area (permissible disturbing field H_d as a component of auxiliary field H_x).



In applications with $H_x \leq 3$ kA/m, the sensor has to be reset by an auxiliary field of H_x = 3 kA/m before using.

Fig.5 Relative sensitivity (ratio of sensitivity at certain H_x and sensitivity at H_x = 0.5 kA/m).

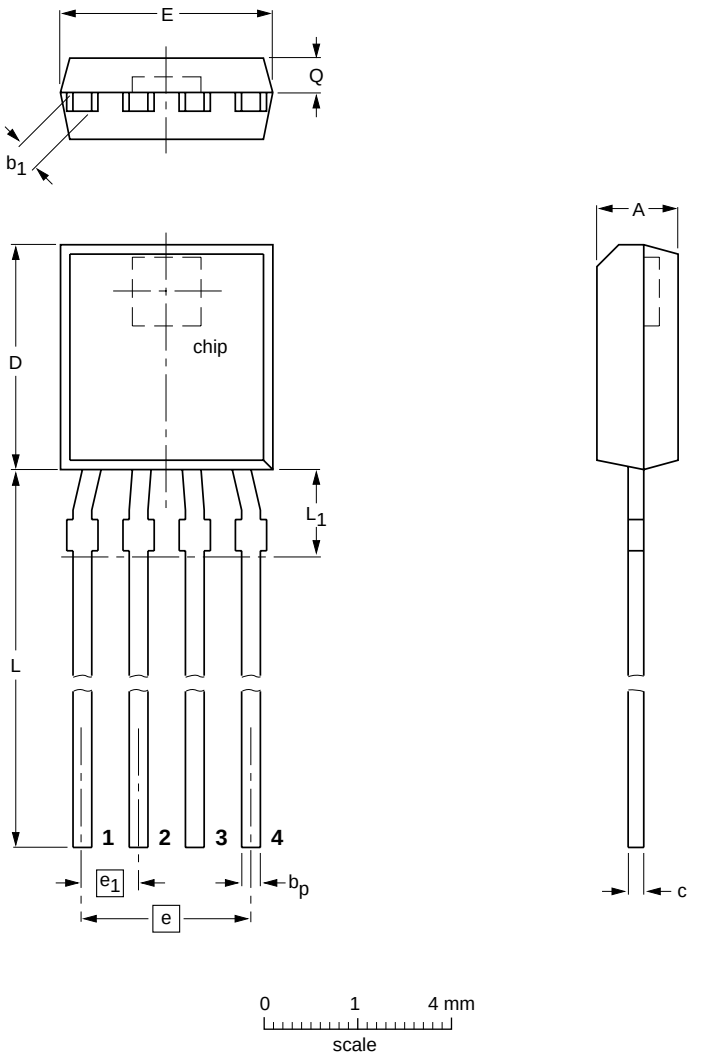


H_x = 0.5 kA/m; T_{amb} = 25 °C; V_{offset} = 0.

Fig.6 Sensor output characteristics.

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

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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