

ZMY20

MAGNETIC FIELD SENSOR

DESCRIPTION

The ZMY20 is an extremely sensitive magnetic sensor employing the magneto-resistive effect of thin film permalloy. It allows the measurement of magnetic fields or the detection of magnetic parts. The highly sensitive and small size magnetoresistive sensors consist of a chip covered with thin film permalloy stripes. These stripes form a Wheatstone bridge, whose output voltage is proportional to the magnetic field component H_y . A perpendicular field H_x is necessary to stabilize sensor operation. This can be done by using a small permanent magnet.

FEATURES

- Output voltage proportional to magnetic field H_y
- Adjustment of sensitivity and suppression of hysteresis by the auxiliary magnetic field H_x
- Magnetic fields vertical to the chip level are not effective

APPLICATIONS

- Linear position sensors for process control, door interlocks, proximity detectors, machine tool sensing
- Scalar measurement for compassing
- Automotive – door switches, engine position & speed sensing
- Metering of fluids by sensing rotation of impeller
- Traffic counting & vehicle-type sensing

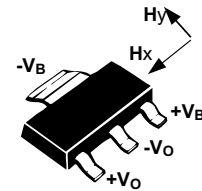
ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZMY20TA	7"	12mm	1000 units
ZMY20TC	13"	12mm	4000 units

- Measurement of current in a conductor without connection

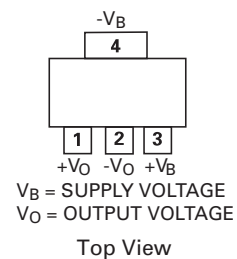
DEVICE MARKING

- ZMY20



SOT223S

PINOUT



ZMY20

ABSOLUTE MAXIMUM RATINGS.

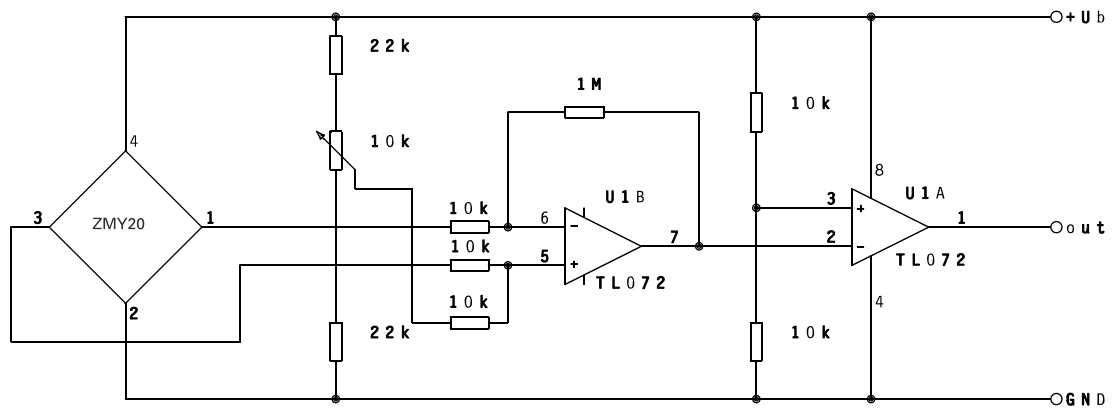
PARAMETER	SYMBOL	LIMIT	UNIT
Supply Voltage	V_B	12	V
Total power dissipation	P_{TOT}	120	mW
Operating Temperature Range	T_{amb}	-40 to +150	°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

ELECTRICAL CHARACTERISTICS.(at $T_{amb}=25^{\circ}\text{C}$ and $H_X=3\text{ kA/m}$ unless otherwise stated)

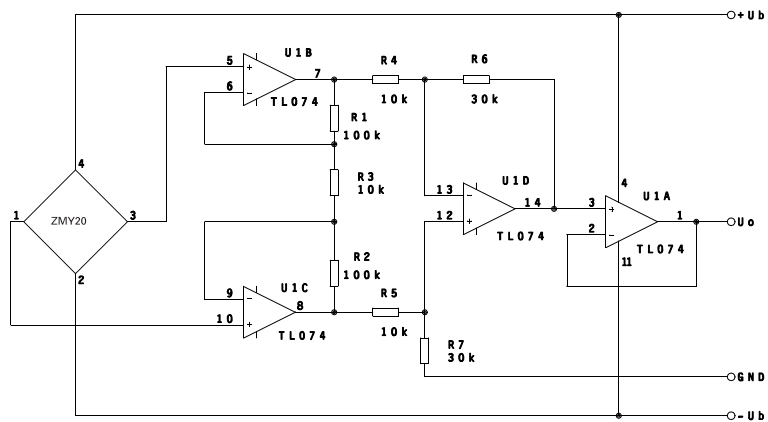
PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITIONS
Bridge resistance	R_{br}	1.2	1.7	2.2	$k\Omega$	
Output voltage range	V_O/V_B	16	20	24	mV/V	
Open circuit sensitivity	S	3.7	4.7	5.7	(mV/V)/(kA/m)	No disturbing field H_d allowed
Hysteresis of output voltage	V_{OH}/V_B	-	-	50	$\mu\text{V/V}$	$H_y \leq 2\text{ kA/m}$
Offset Voltage	V_{off}/V_B	-1.0	-	+1.0	mV/V	
Operating Frequency	f_{max}	0	-	1	MHz	
Temp. Coeff. of offset voltage	TCV_{off}	-3	-	+3	($\mu\text{V/V}$)/K	$T_{amb} = -25$ to $+125^{\circ}\text{C}$
Temp. Coeff. Of bridge resistance	TCR_{br}	0.25	0.3	0.35	%/K	$T_{amb} = -25$ to $+125^{\circ}\text{C}$
Temp. Coeff. of open circuit sensitivity $V_B=5\text{V}$	TCS_V	-0.25	-0.3	-0.35	%/K	$T_{amb} = -25$ to $+125^{\circ}\text{C}$
Temp. Coeff. of open circuit sensitivity $I_B=3\text{mA}$	TCS_I	-	-0.1	-	%/K	$T_{amb} = -25$ to $+125^{\circ}\text{C}$

ZMY20

Application 1 (digital output)

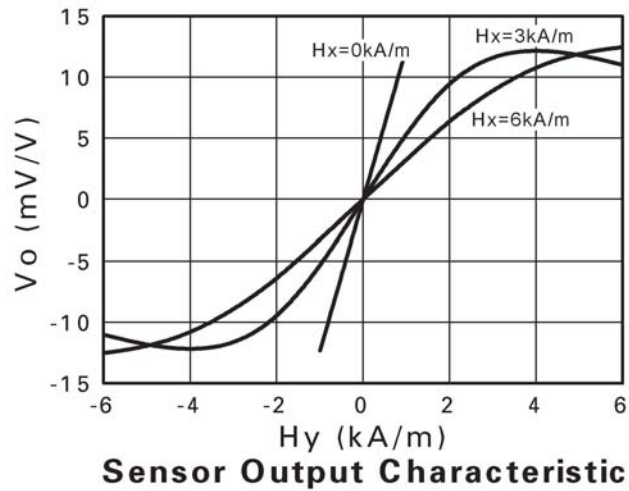


Application 2 (analog output)

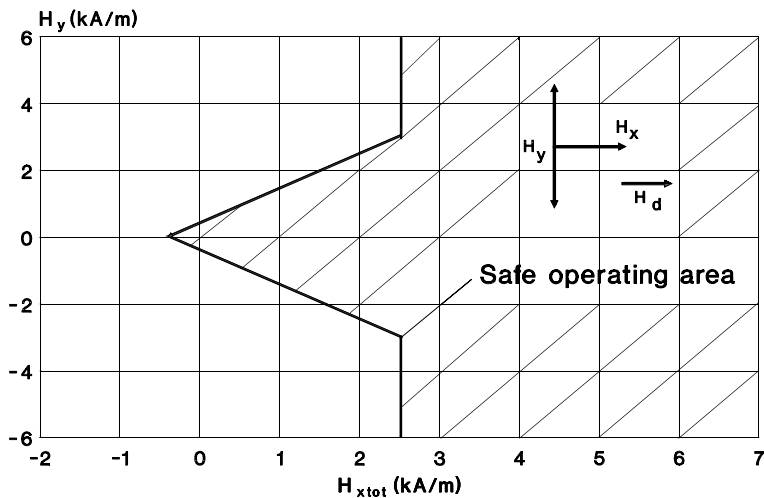


ZMY20

Sensor output characteristic
 $V_O = f(H_y)$; H_x -parameter
 $V_b = \text{const}$; $T_{\text{amb}} = 25^\circ\text{C}$



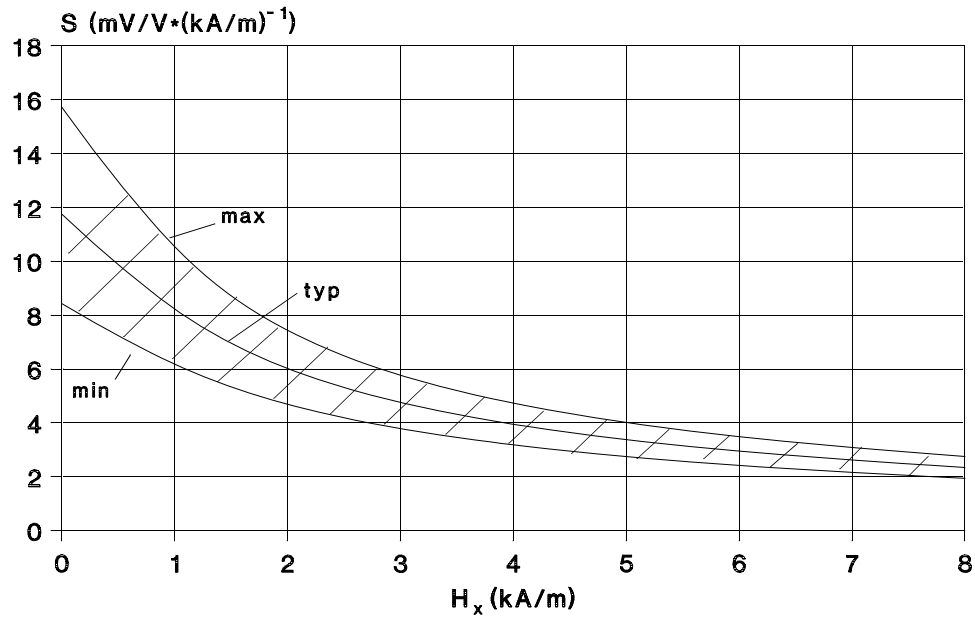
Safe operating area
 $H_{x\text{tot}} = H_x + H_d$; $T_{\text{amb}} = 25^\circ\text{C}$; (H_d =disturbing field)



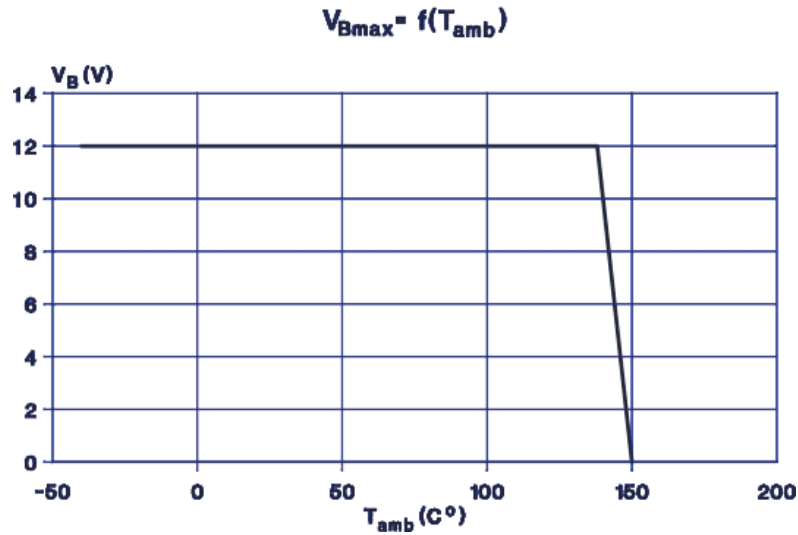
The sensor has to be reset after leaving the safe operating area by an auxiliary field of $H_x = 3 \text{ kA/m}$

ZMY20

Sensor sensitivity characteristic
 $S=f(H_x)$
 $V_b=\text{const}; T_{\text{amb}}=25^\circ\text{C}$



Supply voltage (maximum) derating curve
 $V_{B\text{max}}=f(T_{\text{amb}})$

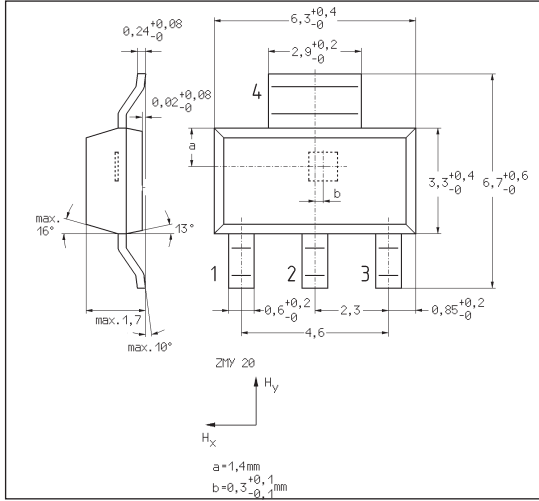


Device mounted on $40 \times 40 \text{ mm}^2$ board (copper area 600 mm^2)

ISSUE 3 - JUNE 2007

ZMY20

PACKAGE OUTLINE



CONTROLLING DIMENSIONS IN MILLIMETRES
APPROX CONVERSIONS INCHES.

Definitions

Product change

Zetex Semiconductors reserves the right to alter, without notice, specifications, design, price or conditions of supply of any product or service. Customers are solely responsible for obtaining the latest relevant information before placing orders.

Applications disclaimer

The circuits in this design/application note are offered as design ideas. It is the responsibility of the user to ensure that the circuit is fit for the user's application and meets with the user's requirements. No representation or warranty is given and no liability whatsoever is assumed by Zetex with respect to the accuracy or use of such information, or infringement of patents or other intellectual property rights arising from such use or otherwise. Zetex does not assume any legal responsibility or will not be held legally liable (whether in contract, tort (including negligence), breach of statutory duty, restriction or otherwise) for any damages, loss of profit, business, contract, opportunity or consequential loss in the use of these circuit applications, under any circumstances.

Life support

Zetex products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Zetex Semiconductors plc. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body
or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions
for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Reproduction

The product specifications contained in this publication are issued to provide outline information only which (unless agreed by the company in writing) may not be used, applied or reproduced for any purpose or form part of any order or contract or be regarded as a representation relating to the products or services concerned.

Terms and Conditions

All products are sold subjects to Zetex' terms and conditions of sale, and this disclaimer (save in the event of a conflict between the two when the terms of the contract shall prevail) according to region, supplied at the time of order acknowledgement.

For the latest information on technology, delivery terms and conditions and prices, please contact your nearest Zetex sales office.

Quality of product

Zetex is an ISO 9001 and TS16949 certified semiconductor manufacturer.

To ensure quality of service and products we strongly advise the purchase of parts directly from Zetex Semiconductors or one of our regionally authorized distributors. For a complete listing of authorized distributors please visit: www.zetex.com/salesnetwork

Zetex Semiconductors does not warrant or accept any liability whatsoever in respect of any parts purchased through unauthorized sales channels.

ESD (Electrostatic discharge)

Semiconductor devices are susceptible to damage by ESD. Suitable precautions should be taken when handling and transporting devices. The possible damage to devices depends on the circumstances of the handling and transporting, and the nature of the device. The extent of damage can vary from immediate functional or parametric malfunction to degradation of function or performance in use over time. Devices suspected of being affected should be replaced.

Green compliance

Zetex Semiconductors is committed to environmental excellence in all aspects of its operations which includes meeting or exceeding regulatory requirements with respect to the use of hazardous substances. Numerous successful programs have been implemented to reduce the use of hazardous substances and/or emissions.

All Zetex components are compliant with the RoHS directive, and through this it is supporting its customers in their compliance with WEEE and ELV directives.

Product status key:

"Preview"Future device intended for production at some point. Samples may be available

"Active"Product status recommended for new designs

"Last time buy (LTB)"Device will be discontinued and last time buy period and delivery is in effect

"Not recommended for new designs"Device is still in production to support existing designs and production

"Obsolete"Production has been discontinued

Datasheet status key:

"Draft version" This term denotes a very early datasheet version and contains highly provisional information, which may change in any manner without notice.

"Provisional version" This term denotes a pre-release datasheet. It provides a clear indication of anticipated performance. However, changes to the test conditions and specifications may occur, at any time and without notice.

"Issue" This term denotes an issued datasheet containing finalized specifications. However, changes to specifications may occur, at any time and without notice.

ZMY20

© Zetex Semiconductors plc 2007

Europe	Americas	Asia Pacific	Corporate Headquarters
Zetex GmbH Kustermann-Park Balanstraße 59 D-81541 München Germany Telefon: (49) 89 45 49 49 0 Fax: (49) 89 45 49 49 49 europa.sales@zetex.com	Zetex Inc 700 Veterans Memorial Hwy Hauppauge, NY 11788 USA Telephone: (1) 631 360 2222 Fax: (1) 631 360 8222 usa.sales@zetex.com	Zetex (Asia) Ltd 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong Telephone: (852) 26100 611 Fax: (852) 24250 494 asia.sales@zetex.com	Zetex Semiconductors plc Zetex Technology Park Chadderton, Oldham, OL9 9LL United Kingdom Telephone (44) 161 622 4444 Fax: (44) 161 622 4446 hq@zetex.com



ISSUE 3 - JUNE 2007