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
- Measurement of current in a conductor without connection

DEVICE MARKING
- ZMY20

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>REEL SIZE</th>
<th>TAPE WIDTH</th>
<th>QUANTITY PER REEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZMY20TA</td>
<td>7”</td>
<td>12mm</td>
<td>1000 units</td>
</tr>
<tr>
<td>ZMY20TC</td>
<td>13”</td>
<td>12mm</td>
<td>4000 units</td>
</tr>
</tbody>
</table>

\( V_B \) = SUPPLY VOLTAGE
\( V_O \) = OUTPUT VOLTAGE

Top View

SOT223S

V = SUPPLY VOLTAGE
V = OUTPUT VOLTAGE

SOT223S
### ABSOLUTE MAXIMUM RATINGS.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>LIMIT</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>$V_B$</td>
<td>12</td>
<td>V</td>
</tr>
<tr>
<td>Total power dissipation</td>
<td>$P_{TOT}$</td>
<td>120</td>
<td>mW</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>$T_{amb}$</td>
<td>-40 to +150</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>$T_{stg}$</td>
<td>-65 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
<th>TEST CONDITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge resistance</td>
<td>$R_{br}$</td>
<td>1.2</td>
<td>1.7</td>
<td>2.2</td>
<td>kΩ</td>
<td></td>
</tr>
<tr>
<td>Output voltage range</td>
<td>$V_O/V_B$</td>
<td>16</td>
<td>20</td>
<td>24</td>
<td>mV/V</td>
<td></td>
</tr>
<tr>
<td>Open circuit sensitivity</td>
<td>$S$</td>
<td>3.7</td>
<td>4.7</td>
<td>5.7</td>
<td>(mV/V)/(kA/m)</td>
<td>No disturbing field $H_d$ allowed</td>
</tr>
<tr>
<td>Hysteresis of output voltage</td>
<td>$V_{OIH}/V_B$</td>
<td>-</td>
<td>-</td>
<td>50</td>
<td>µV/V</td>
<td>$H_y \leq 2\text{kA/m}$</td>
</tr>
<tr>
<td>Offset Voltage</td>
<td>$V_{off}/V_B$</td>
<td>-1.0</td>
<td>-</td>
<td>+1.0</td>
<td>mV/V</td>
<td></td>
</tr>
<tr>
<td>Operating Frequency</td>
<td>$f_{max}$</td>
<td>0</td>
<td>-</td>
<td>1</td>
<td>MHz</td>
<td></td>
</tr>
<tr>
<td>Temp. Coeff. of offset voltage</td>
<td>$TC_{V_{off}}$</td>
<td>-3</td>
<td>-</td>
<td>+3</td>
<td>(µV/V)/K</td>
<td>$T_{amb} = -25$ to +125°C</td>
</tr>
<tr>
<td>Temp. Coeff. of bridge resistance</td>
<td>$TCR_{br}$</td>
<td>0.25</td>
<td>0.3</td>
<td>0.35</td>
<td>%/K</td>
<td>$T_{amb} = -25$ to +125°C</td>
</tr>
<tr>
<td>Temp. Coeff. of open circuit sensitivity $V_B=5V$</td>
<td>$TCS_{V}$</td>
<td>-0.25</td>
<td>-0.3</td>
<td>-0.35</td>
<td>%/K</td>
<td>$T_{amb} = -25$ to +125°C</td>
</tr>
<tr>
<td>Temp. Coeff. of open circuit sensitivity $I_B=3\text{mA}$</td>
<td>$TCS_{I}$</td>
<td>-</td>
<td>-0.1</td>
<td>-</td>
<td>%/K</td>
<td>$T_{amb} = -25$ to +125°C</td>
</tr>
</tbody>
</table>
Application 1 (digital output)

Application 2 (analog output)
Sensor output characteristic
\[ V_O = f(H_y); \ H_x \text{-parameter} \]
\[ V_b = \text{const}; \ T_{amb} = 25^\circ C \]

Safe operating area
\[ H_{xtot} = H_x + H_d; \ T_{amb} = 25^\circ C; \ (H_d = \text{disturbing field}) \]

The sensor has to be reset after leaving the safe operating area by an auxiliary field of \( H_x = 3kA/m \)
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 x 40 mm$^2$ board (copper area 600 mm$^2$)
ZMY20

PACKAGE OUTLINE

CONTROLLING DIMENSIONS IN MILLIMETRES
APPROX CONVERSIONS INCHES.
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