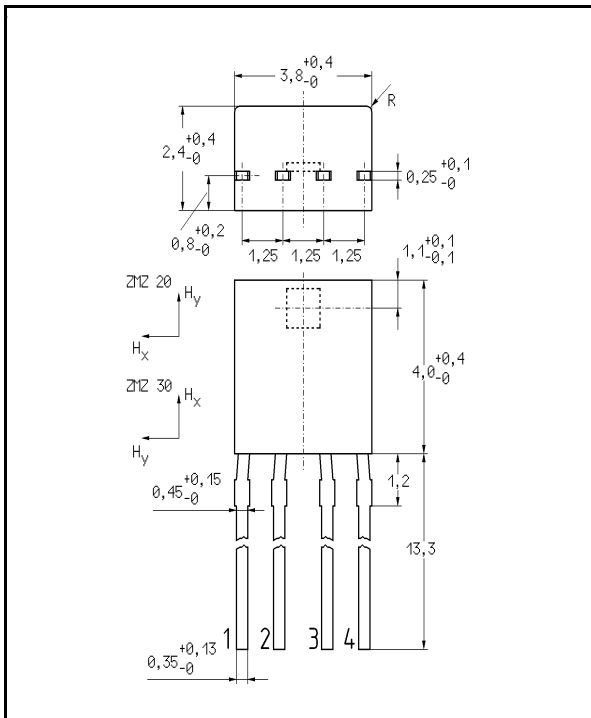


# Magnetic Field Sensors

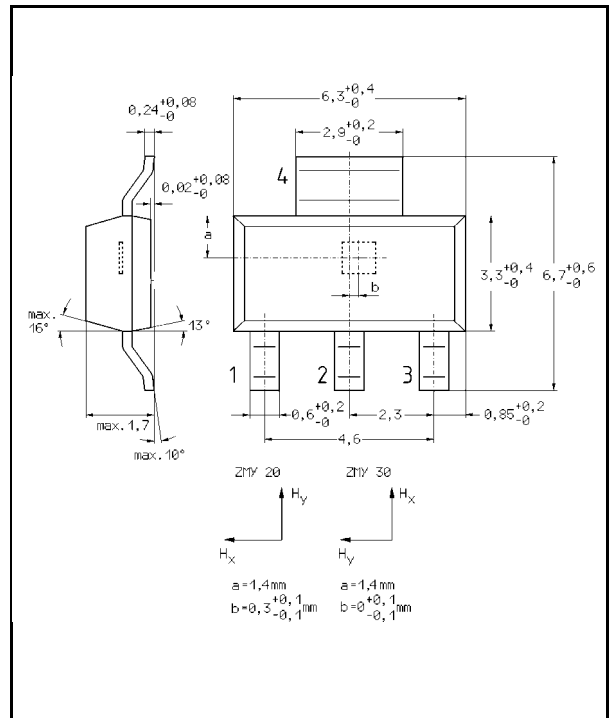
**ZMY20, ZMZ20  
ZMY30, ZMZ30**



**package : E-Line (4-Pin)**

1: +V<sub>O</sub> 2: -V<sub>B</sub> 3: -V<sub>O</sub> 4: +V<sub>B</sub>

V<sub>O</sub> - output voltage V<sub>B</sub> - supply voltage



**package : SOT223S (4-Pin)**

1: +V<sub>O</sub> 2: -V<sub>O</sub> 3: +V<sub>B</sub> 4: -V<sub>B</sub>

V<sub>O</sub> - output voltage V<sub>B</sub> - supply voltage

## FEATURES

- ZMZ20/30 (E-Line 4-Pin) and ZMY20/30 (SOT-223-S) are extremely sensitive magnetic sensors employing the magneto-resistive effect of thin film permalloy
- Packages : E-Line 4-Pin and SOT-223-S
- Output voltage proportional to the magnetic field H<sub>y</sub>
- Adjustment of sensitivity and suppression of the hysteresis by the auxiliary magnetic field H<sub>x</sub>
- Magnetic fields vertical to the chip level are not effective

## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol		Unit
Supply voltage ZMY20/ZMZ20	V <sub>B</sub>	12	V
Supply voltage ZMY30/ZMZ30	V <sub>B</sub>	15	V
Total power dissipation	P <sub>tot</sub>	120	mW
Operating temperature range	T <sub>amb</sub>	-40 to +150	°C
Storage temperature range	T <sub>stg</sub>	-65 to +150	°C

# ZMY20/30, ZMZ 20/30

**ELECTRICAL CHARACTERISTICS** (at  $T_{amb} = 25\text{ °C}$  and  $H_x = 3\text{ kA/m}$  unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Bridge resistance ZMY20/ZMZ20 ZMY30/ZMZ30	$R_{br}$	1.2 2.0	1.7 3.0	2.2 4.0	$k\Omega$	
Output voltage range ZMY20/ZMZ20 ZMY30/ZMZ30	$V_O/V_B$	16 12	20 16	24 20	mV/V	
Open circuit sensitivity ZMY20/ZMZ20 ZMY30/ZMZ30	S	3.7 2.0	4.7 3.0	5.7 4.0	(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	
Temperature coefficient of offset voltage	$TCV_{off}$	-3	-	+3	( $\mu\text{V/V}$ )/K	$T_{amb} = -25\dots+125\text{ °C}$
Temperature coefficient of bridge resistance	$TCR_{br}$	-	0.3	-	%/K	$T_{amb} = -25\dots+125\text{ °C}$
Temperature coefficient of open circuit sensitivity $V_B = 5\text{ V}$	$TCS_V$	-	-0.4	-	%/K	$T_{amb} = -25\dots+125\text{ °C}$
Temperature coefficient of open circuit sensitivity $I_B = 3\text{ mA}$	$TCS_I$	-	-0.1	-	%/K	$T_{amb} = -25\dots+125\text{ °C}$

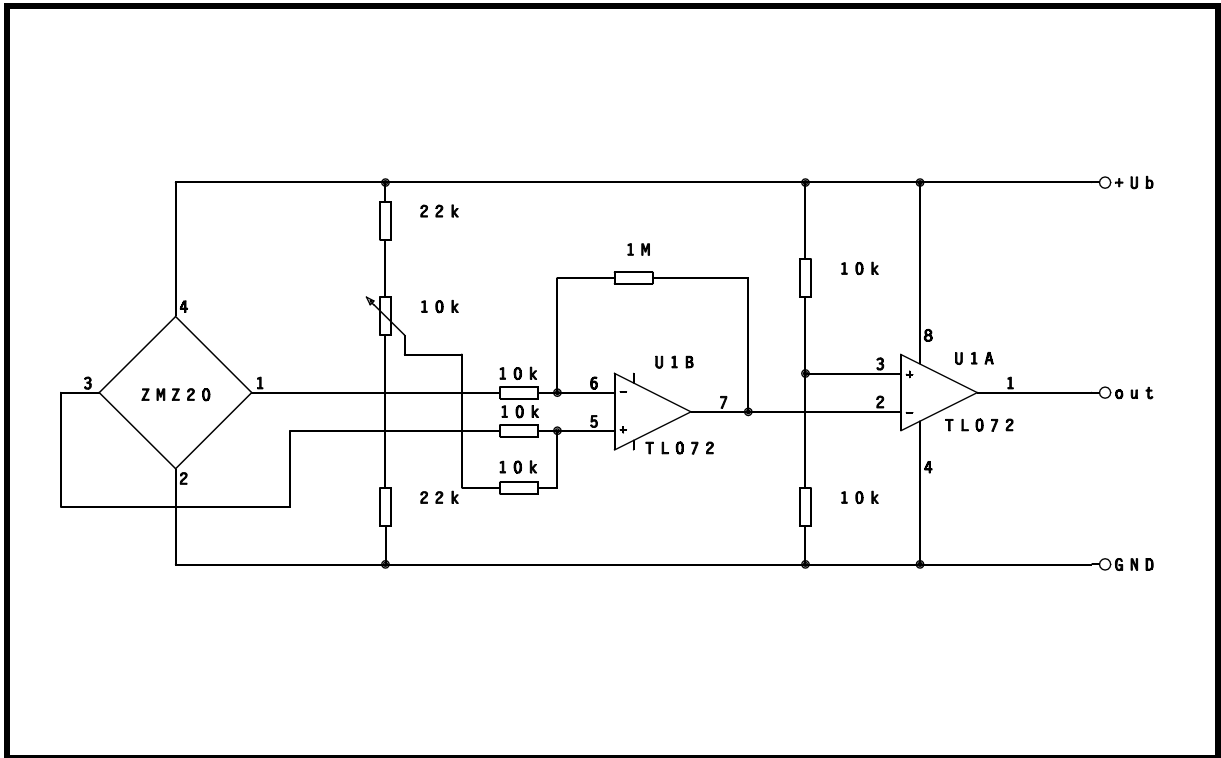
Devices are identified by a code on the body of the device

ZMY20/ZMZ20 ..... M20    ZMY30/ZMZ30 ..... M30
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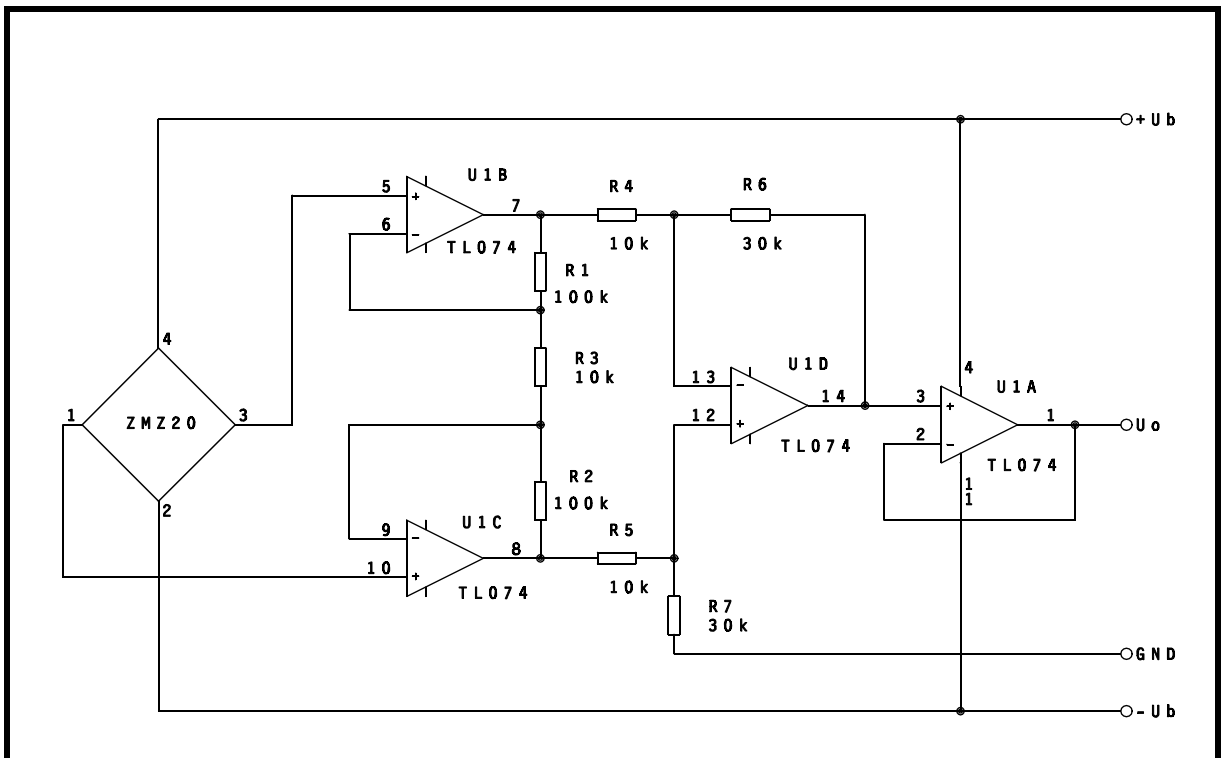
Ordering information:

ZMY20TA ..... 7" reel 1,000 components per reel
ZMY20TC ..... 13" reel 4,000 components per reel
ZMY30TA ..... 7" reel 1,000 components per reel
ZMY30TC ..... 13" reel 4,000 components per reel
ZMZ20 ..... bulk in box (2,000 components per box)
ZMZ30 ..... bulk in box (2,000 components per box)

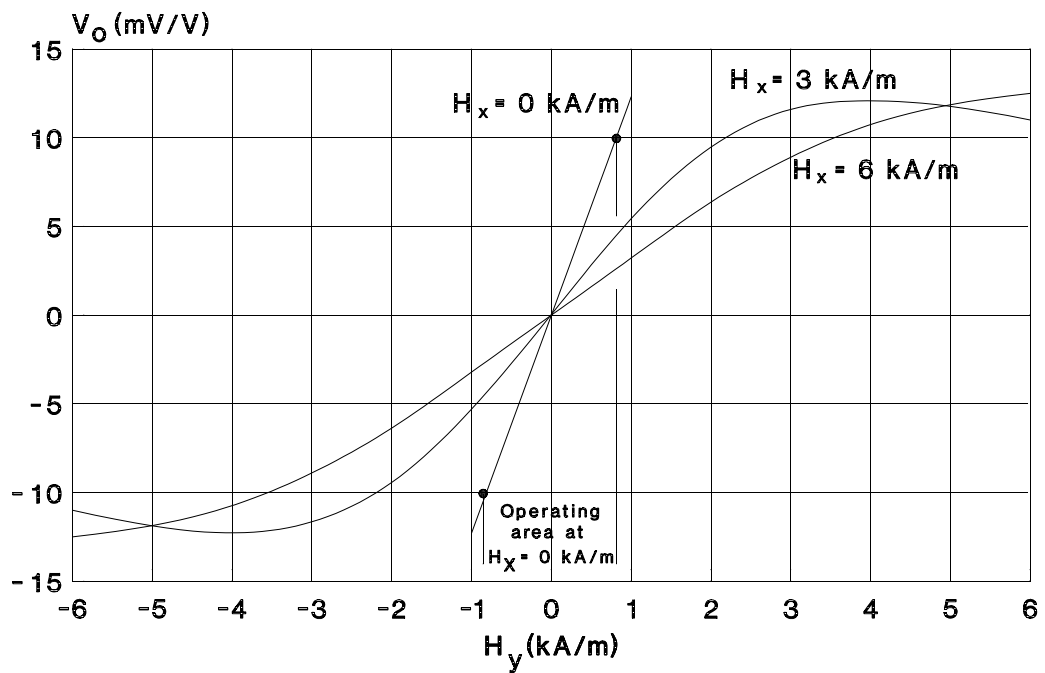
## Application 1 (digital output)



## Application 2 (analogue output)

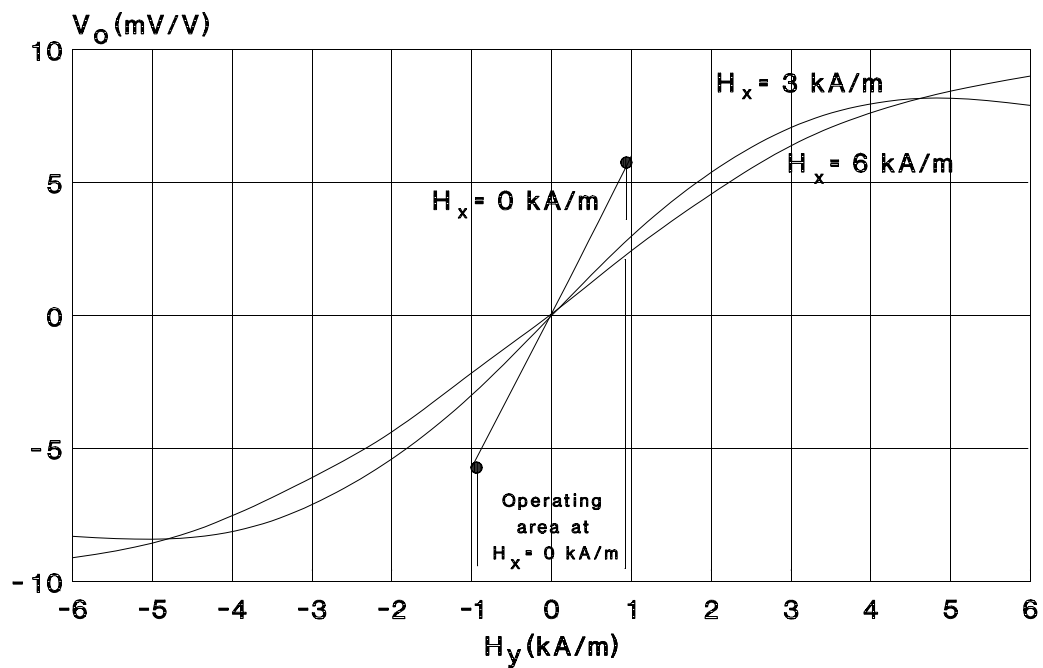


## Sensor output characteristic ZMZ 20 / ZMY 20 $V_o = f(H_y); H_x$ - parameter



$V_B = \text{const.}; T_{\text{amb}} = 25^\circ\text{C}$

## Sensor output characteristic ZMY 30 / ZMZ 30 $V_o = f(H_y); H_x$ - parameter



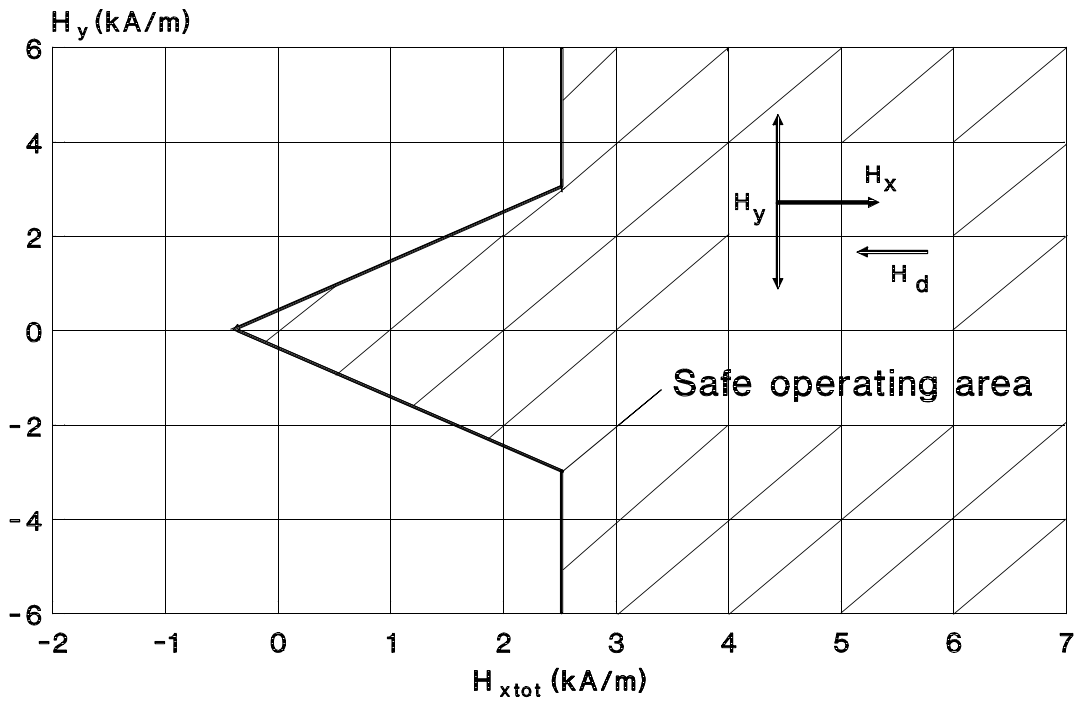
$V_B = \text{const.}; T_{\text{amb}} = 25^\circ\text{C}$

The sensor has to be reset after leaving the safe operating area by an auxiliary field of  $H_X = 3$  kA/m.

## Safe operating area ZMY20/ZMZ20

$$H_{xtot} = H_x + H_d, T_{amb} = 25\text{ }^\circ\text{C}$$

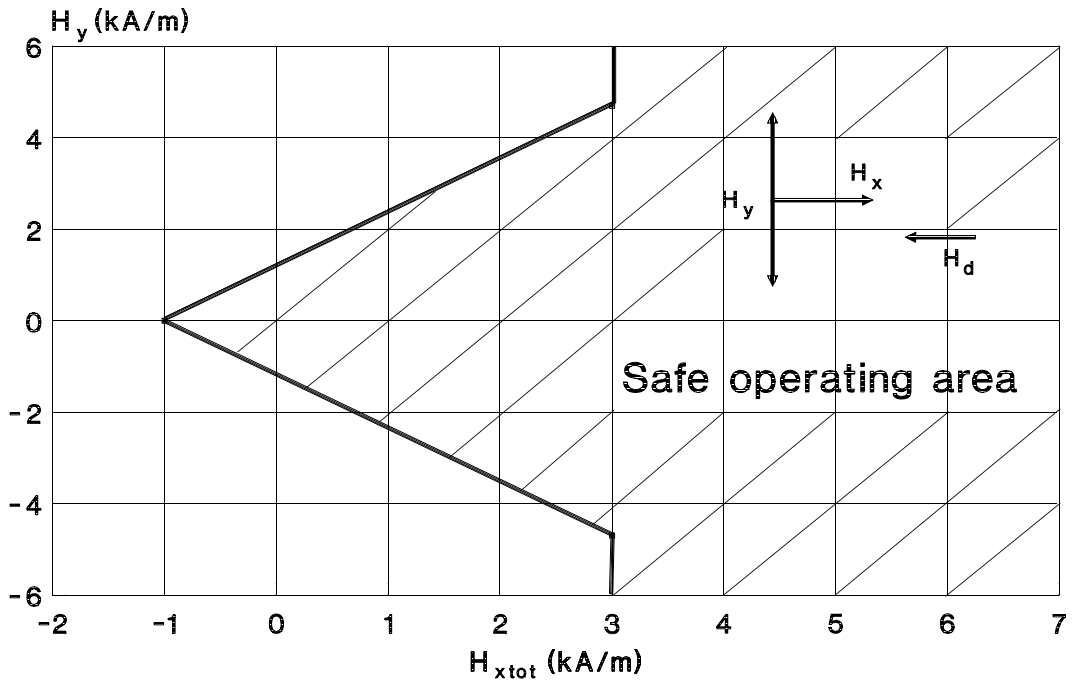
( $H_d$  - disturbing field)



## Safe operating area ZMY30/ZMZ30

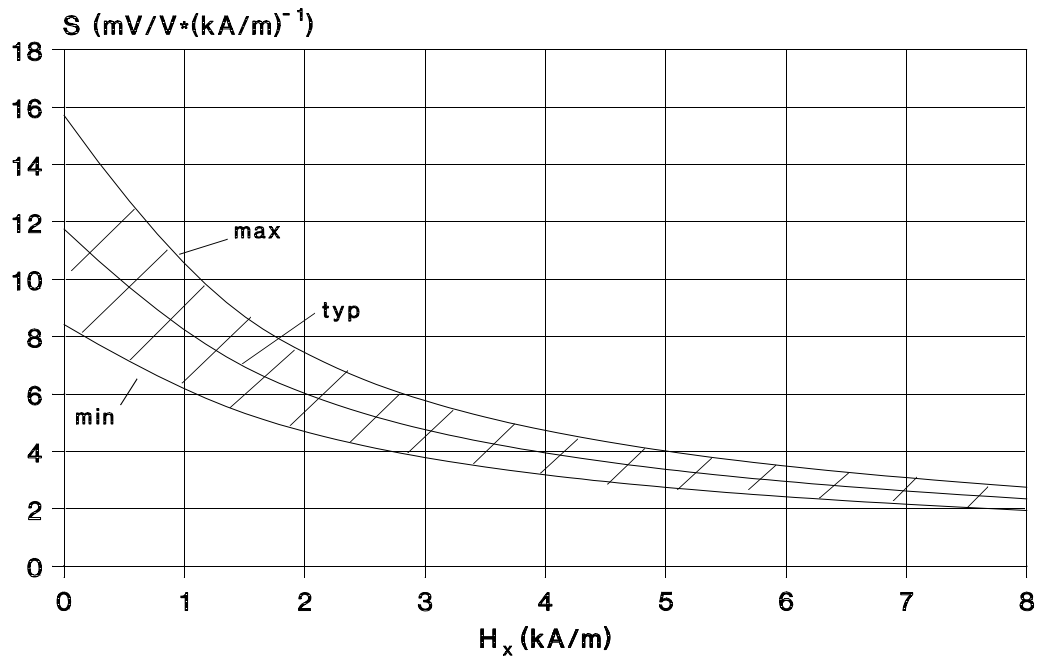
$$H_{xtot} = H_x + H_d, T_{amb} = 25\text{ }^\circ\text{C}$$

( $H_d$  - disturbing field)



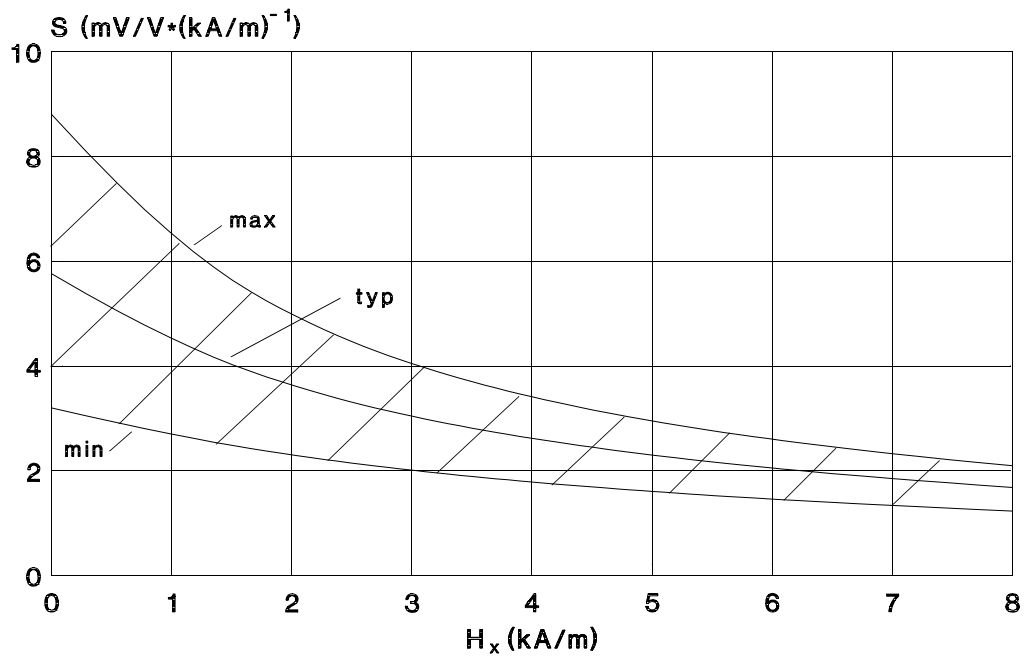
# ZMY20/30, ZMZ 20/30

## Sensor sensitivity characteristic ZMY 20 / ZMZ 20 $S = f(H_x)$



$V_B = \text{const.}; T_{\text{amb}} = 25^\circ\text{C}$

## Sensor sensitivity characteristic ZMY 30 / ZMZ 30 $S = f(H_x)$



$V_B = \text{const.}; T_{\text{amb}} = 25^\circ\text{C}$

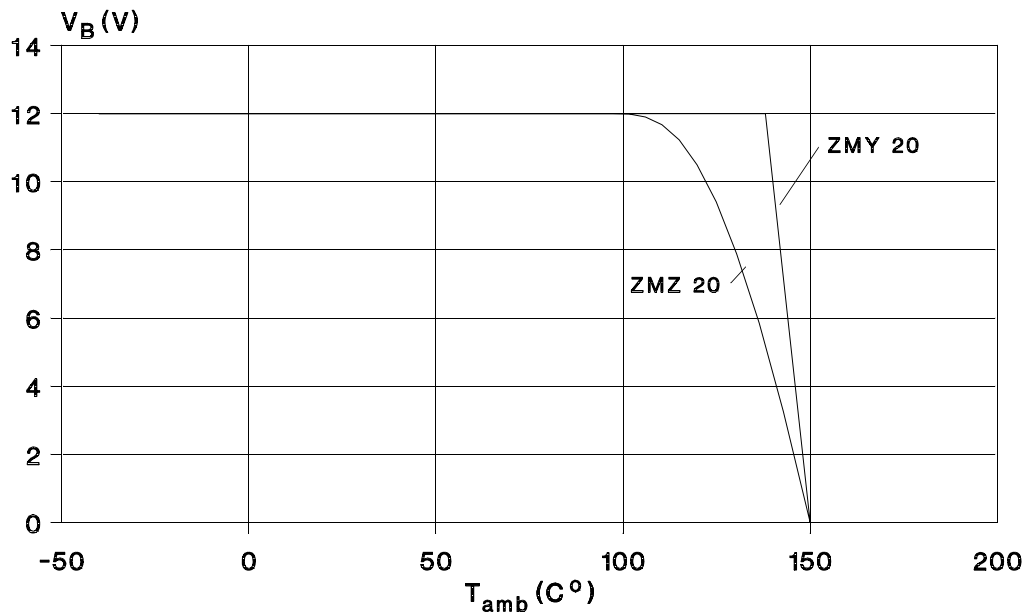
In applications with  $H_x < 3 \text{ kA/m}$ , the sensor has to be reset by an auxiliary field of  $H_x \geq 3 \text{ kA/m}$  before use.

# ZMY20/30, ZMZ 20/30

## Supply voltage (maximum) derating curve

ZMY 20 / ZMZ 20

$$V_{Bmax} = f(T_{amb})$$

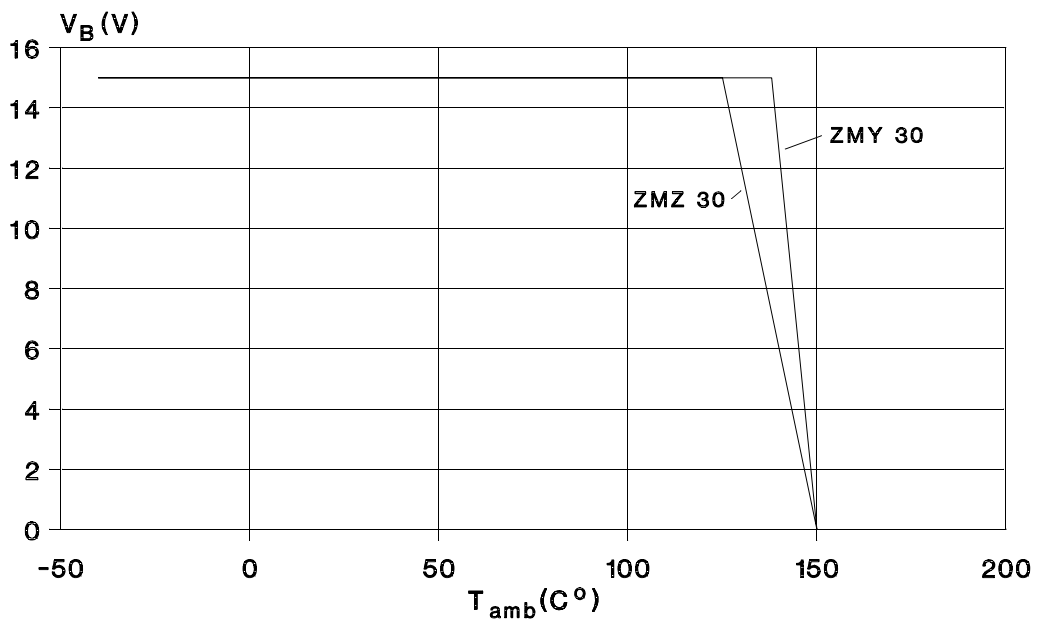


ZMY 20 : Device mounted on 40 x 40 mm<sup>2</sup> board (copper area 600 mm<sup>2</sup>)  
ZMZ 20 : Device mounted on board (copper area 100 mm<sup>2</sup>)

## Supply voltage (maximum) derating curve

ZMY 30 / ZMZ 30

$$V_{Bmax} = f(T_{amb})$$



ZMY 30 : Device mounted on 40 x 40 mm<sup>2</sup> board (copper area 600 mm<sup>2</sup>)  
ZMZ 30 : Device mounted on board (copper area 100 mm<sup>2</sup>)