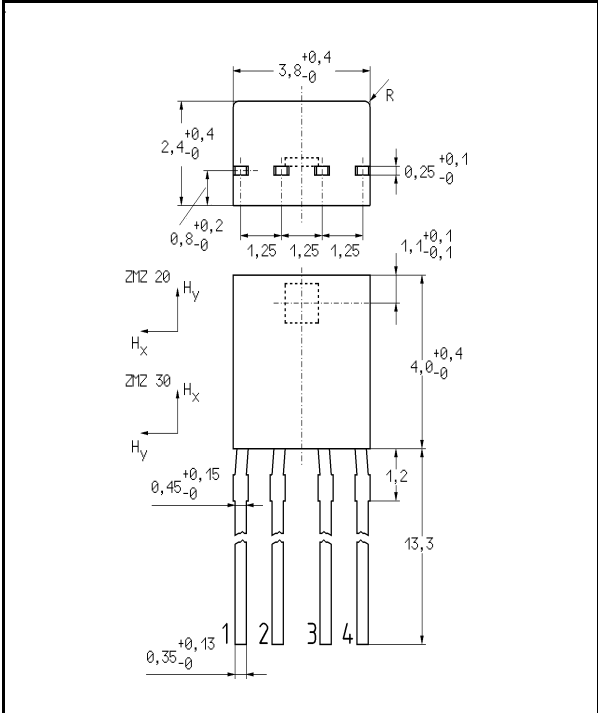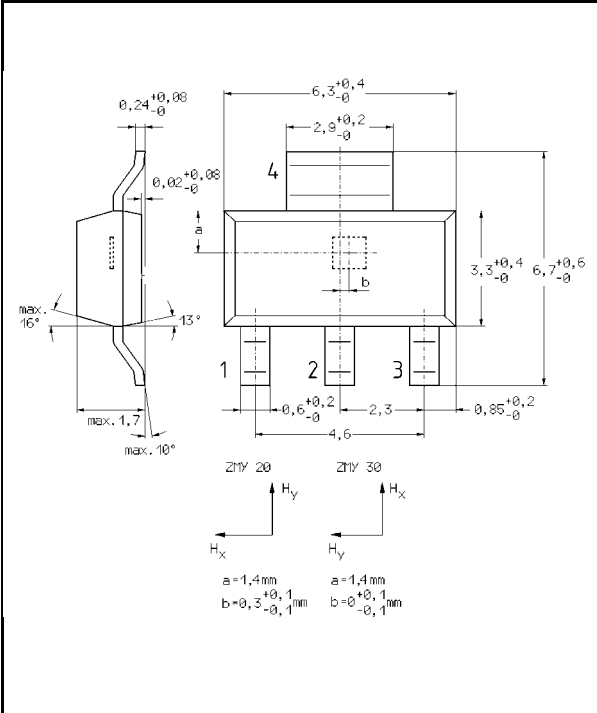# Magnetic Field Sensors

ZMY20, ZMZ20
ZMY30, ZMZ30

package : E-Line (4-Pin)
1: $+V_O$ 2: $-V_B$ 3: $-V_O$ 4: $+V_B$
V_O - output voltage V_B - supply voltage

package : SOT223S (4-Pin)
1: $+V_O$ 2: $-V_O$ 3: $+V_B$ 4: $-V_B$
V_O - output voltage V_B - 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_y
- Adjustment of sensitivity and suppression of the hysteresis by the auxiliary magnetic field H_x
- Magnetic fields vertical to the chip level are not effective

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol		Unit
Supply voltage ZMY20/ZMZ20	V_B	12	V
Supply voltage ZMY30/ZMZ30	V_B	15	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 °C and H_x = 3 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	kΩ	
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	µV/V	$H_y \leq 2$ 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	(µV/V)/K	T_{amb} = -25...+125°C
Temperature coefficient of bridge resistance	TCR_{br}	-	0.3	-	%/K	T_{amb} = -25...+125°C
Temperature coefficient of open circuit sensitivity V_B = 5 V	TCS_V	-	-0.4	-	%/K	T_{amb} = -25...+125°C
Temperature coefficient of open circuit sensitivity I_B = 3 mA	TCS_I	-	-0.1	-	%/K	T_{amb} = -25...+125°C

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

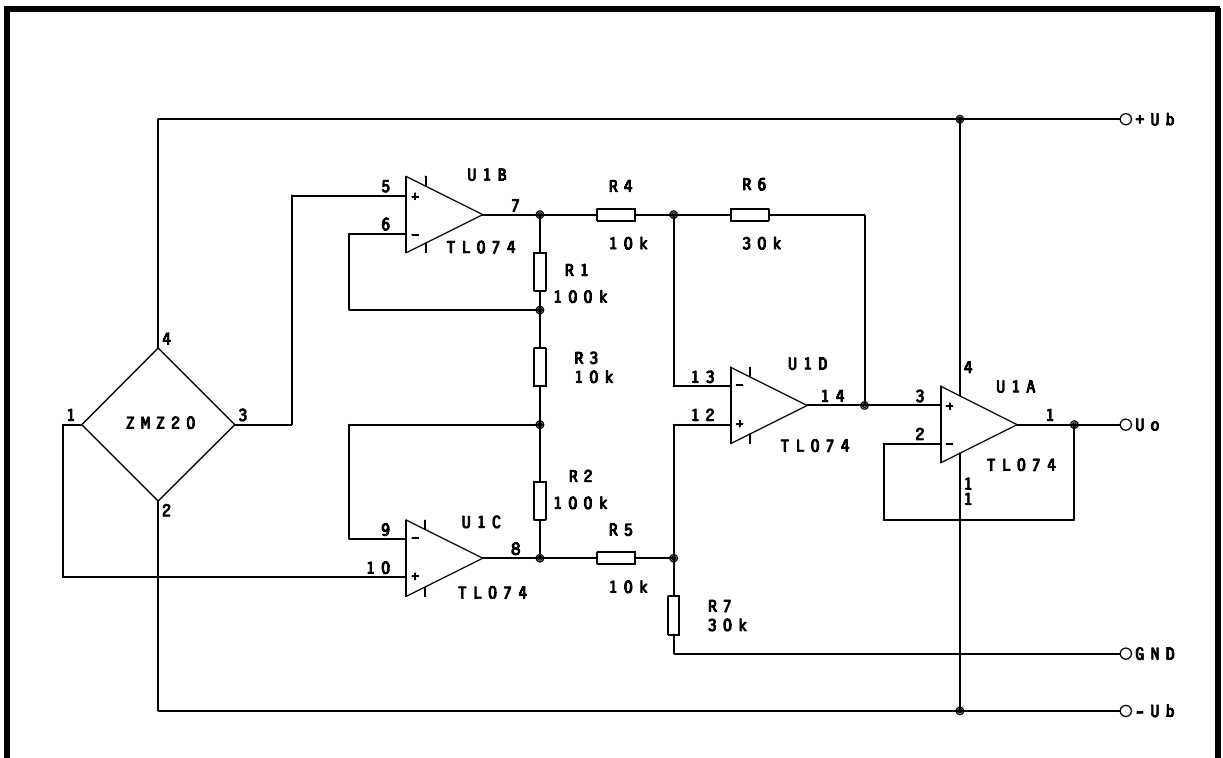ZMY20/ZMZ20 ..... M20   ZMY30/ZMZ30 ..... M30

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)
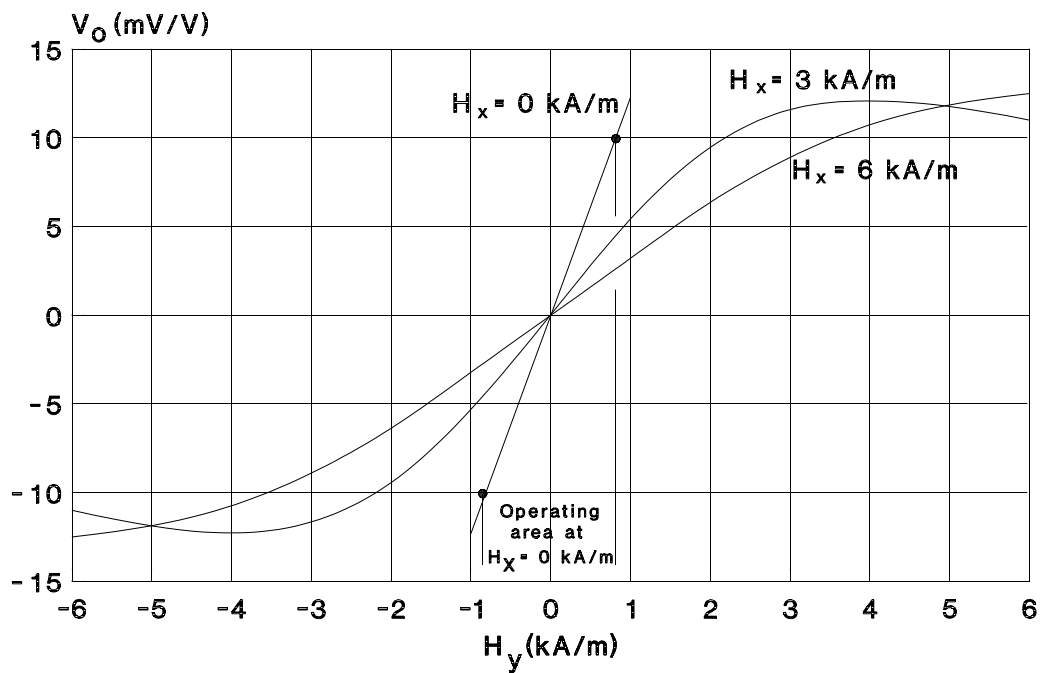ZMZ30 .... bulk in box (2,000 components per box)

Application 1 (digital output)
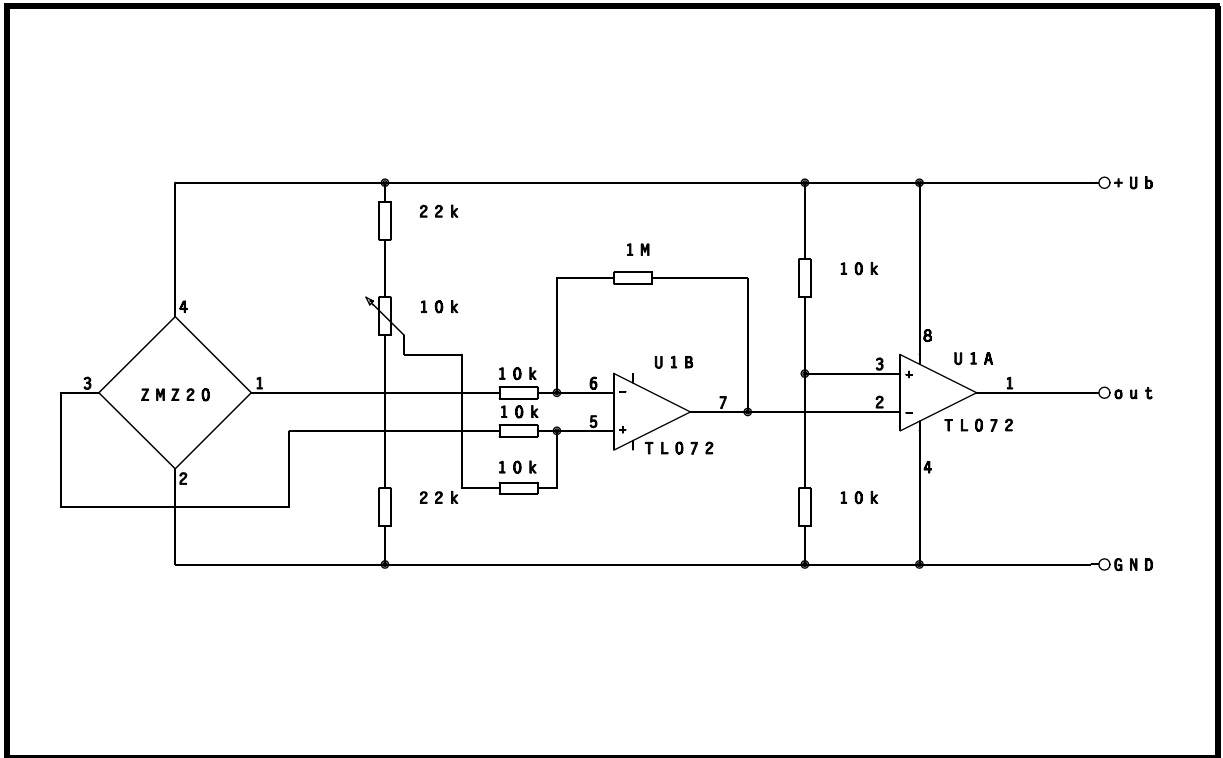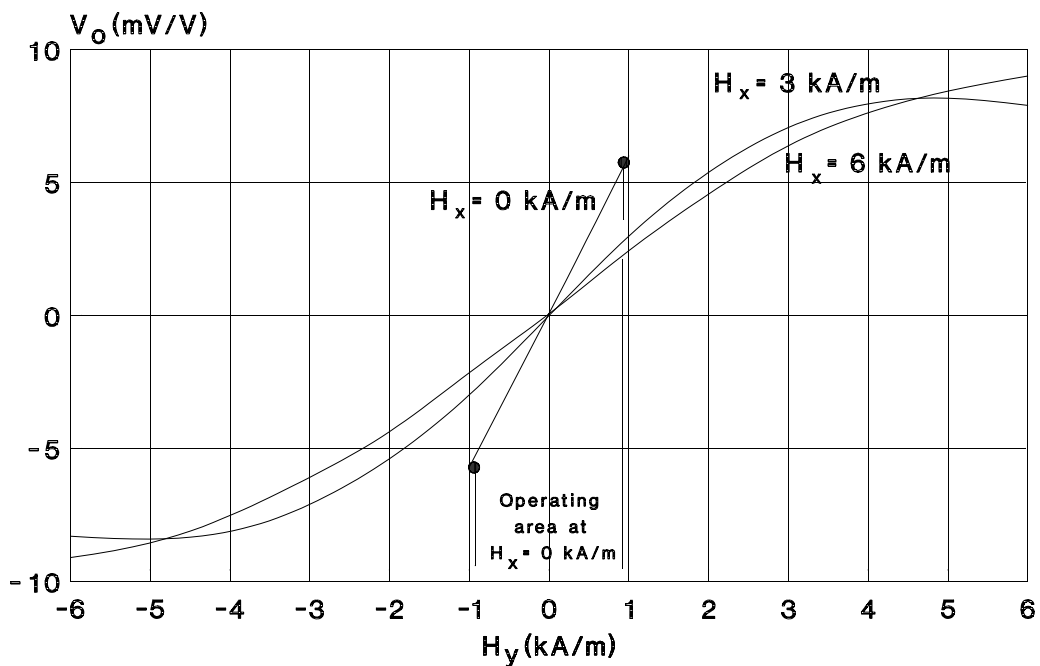

Application 2 (analogue output)

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

V_O (mV/V)

$H_x = 0$ kA/m

$H_x = 3$ kA/m

$H_x = 6$ kA/m

Operating
area at
$H_X = 0$ kA/m

H_y (kA/m)

V_B = const.; T_{amb} = 25 °C

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

V_O (mV/V)

$H_x = 3$ kA/m

$H_x = 6$ kA/m

$H_x = 0$ kA/m

Operating
area at
$H_x = 0$ kA/m

H_y (kA/m)

V_B = const.; T_{amb} = 25 °C

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

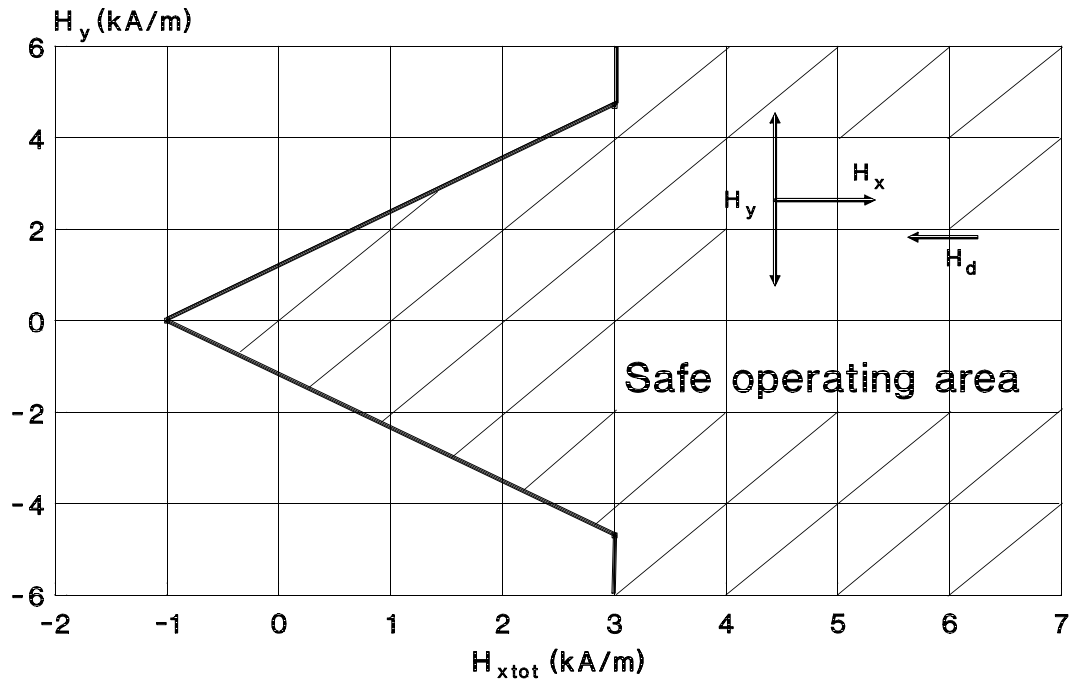## Safe operating area ZMY20/ZMZ20
$H_{xtot} = H_x + H_d, T_{amb} = 25\,^oC$
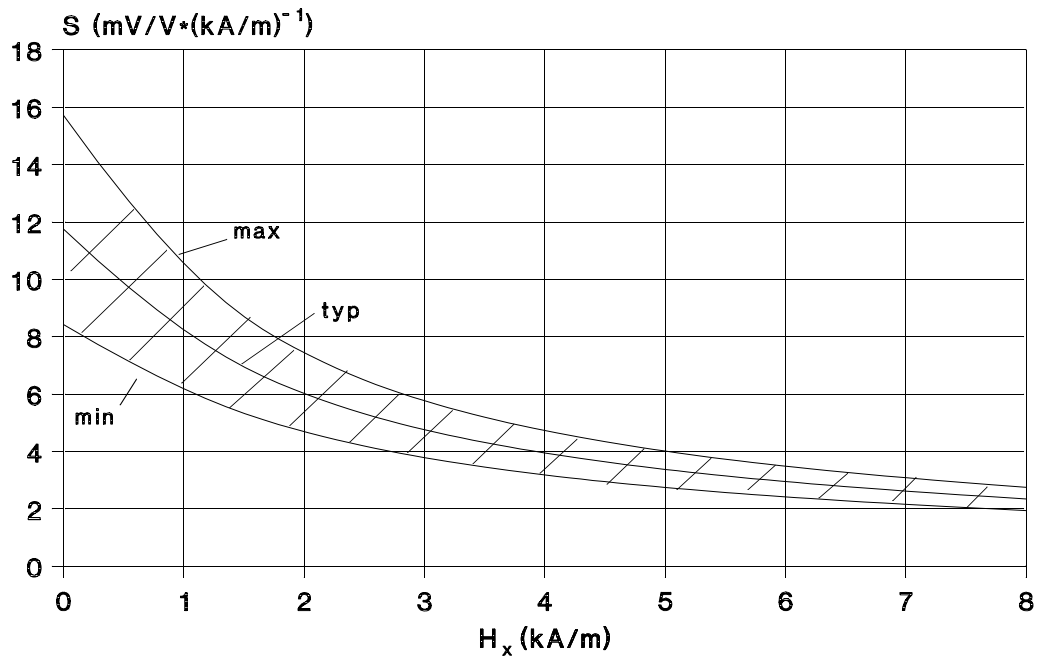(H_d – disturbing field)
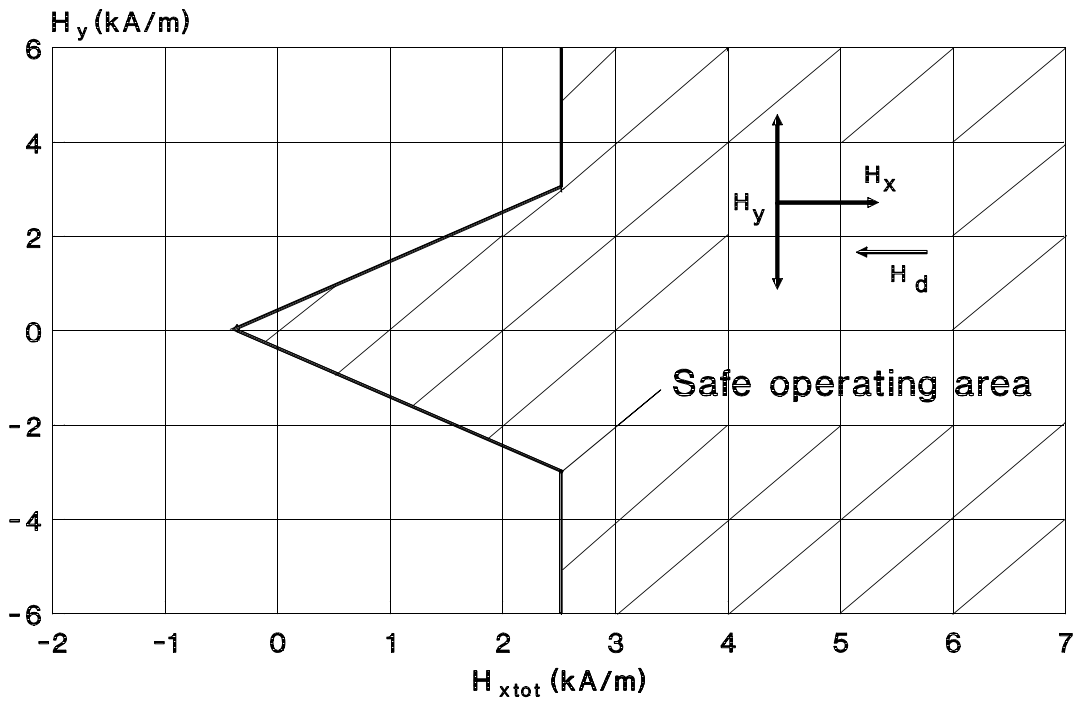
Safe operating area ZMY30/ZMZ30
$H_{xtot} = H_x + H_d, T_{amb} = 25\,^oC$
(H_d – disturbing field)

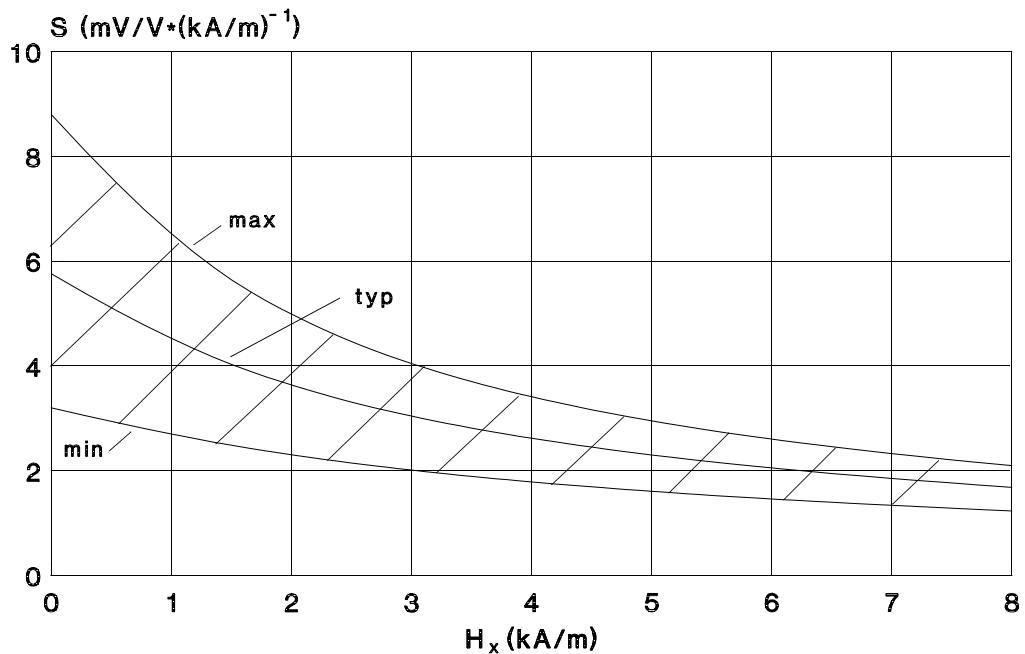## Sensor sensitivity characteristic
ZMY 20 / ZMZ 20
S = f(H$_X$)

V_B = const.; T_{amb} = 25 °C

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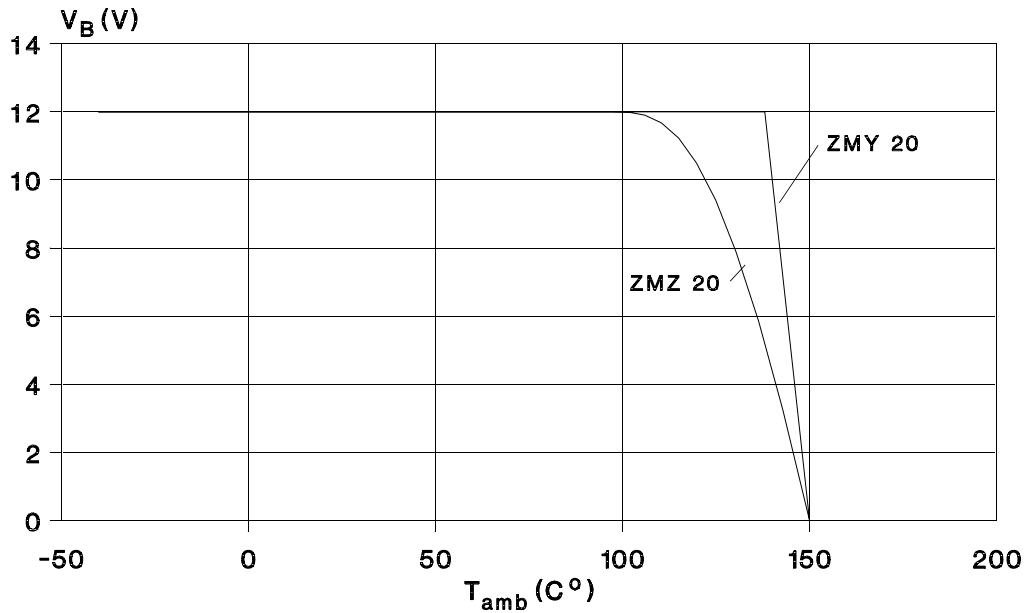## ZMY 30 / ZMZ 30
S = f(H$_X$)

V_B = const.; T_{amb} = 25 °C

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

Supply voltage (maximum) derating curve
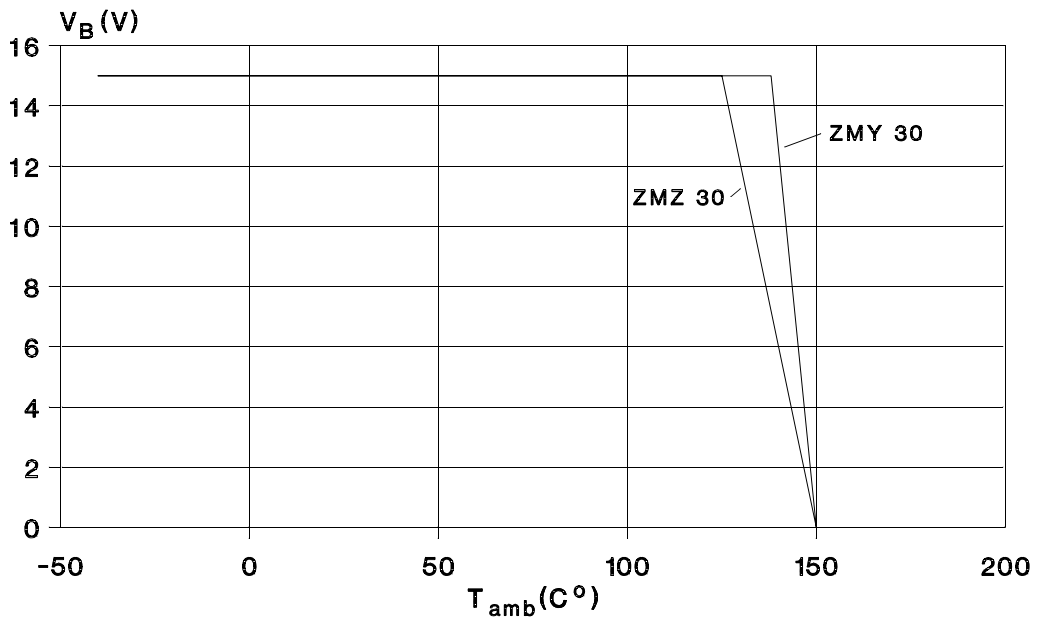## ZMY 20 / ZMZ 20
$V_{Bmax} = f(T_{amb})$

ZMY 20 : Device mounted on 40 x 40 mm^2 board (copper area 600 mm^2)
ZMZ 20 : Device mounted on board (copper area 100 mm^2)

Supply voltage (maximum) derating curve
ZMY 30 / ZMZ 30
$V_{Bmax} = f(T_{amb})$

ZMY 30 : Device mounted on 40 x 40 mm^2 board (copper area 600 mm^2)
ZMZ 30 : Device mounted on board (copper area 100 mm^2)