

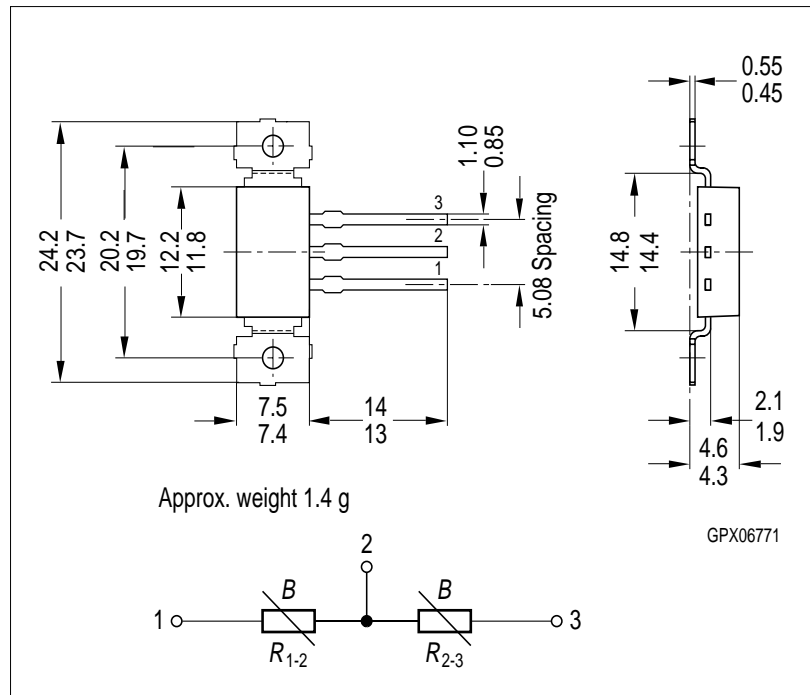
Version 2.0

Features

- Extremely high output voltage
- 2 independently biased magnetic circuits
- Robust housing
- Signal amplitude independent of operating speed
- Screw mounting possible

Typical applications

- Detection of speed
- Detection of position
- Detection of sense of rotation



Dimensions in mm

Type	Ordering Code
■ FP 201 L 100	Q65210-L101

■ not for new design

The differential magneto-resistive sensor FP 201 L 100 consists of two magnetically biased magneto resistors made from L-type InSb/NiSb, which in their unbiased state each have a basic resistance of about 125 Ω . They are series coupled as a voltage divider and are encapsulated in plastic as protection against mechanical stresses. This magnetically actuated sensor can be implemented as a direction dependent contactless switch where it shows a voltage change of about 1.3 V/mm in its linear region.

Absolute Maximum Ratings

Parameter	Symbol	Limit Values	Unit
Operating temperature	T_A	- 25 / + 100	°C
Storage temperature	T_{stg}	- 25 / + 110	°C
Power dissipation ¹⁾	P_{tot}	600	mW
Supply voltage ²⁾	V_{IN}	10	V
Insulation voltage between terminals and casing	V_I	> 100	V
Thermal conductivity	G_{thcase} G_{thA}	≥ 10 ≥ 5	mW/K mW/K

Electrical Characteristics ($T_A = 25\text{ °C}$)

Nominal supply voltage	$V_{IN N}$	5	V
Total resistance, ($\delta = \infty, I \leq 1\text{ mA}$)	R_{1-3}	700...1400	Ω
Center symmetry ³⁾ ($\delta = \infty$)	M	≤ 10	%
Offset voltage ⁴⁾ (at $V_{IN N}$ and $\delta = \infty$)	V_0	≤ 130	mV
Open circuit output voltage ⁵⁾ ($V_{IN N}$ and $\delta = 0.5\text{ mm}$)	$V_{out pp}$	> 2.2	V
Cut-off frequency	f_c	> 7	kHz

This sensor is operated by a permanent magnet. Using the arrangement as shown in **Figure 1**, the permanent magnet increases the internal biasing field through the righthand side magneto resistor (connections 2-3), and reduces the field through the left side magneto resistor (connections 1-2). As a result the resistance value of MR_{2-3} increases while that of MR_{1-2} decreases. When the permanent magnet is moved from left to right the above-mentioned process operates in reverse.

1) Corresponding to diagram $P_{tot} = f(T_{case})$

2) Corresponding to diagram $V_{IN} = f(T)$

3)

$$M = \frac{R_{1-2} - R_{2-3}}{R_{1-2}} \times 100\% \text{ for } R_{1-2} > R_{2-3}$$

4) Corresponding to measuring circuit in **Fig. 3**

5) Corresponding to measuring circuit in **Fig. 3** and arrangement as shown in **Fig. 2**

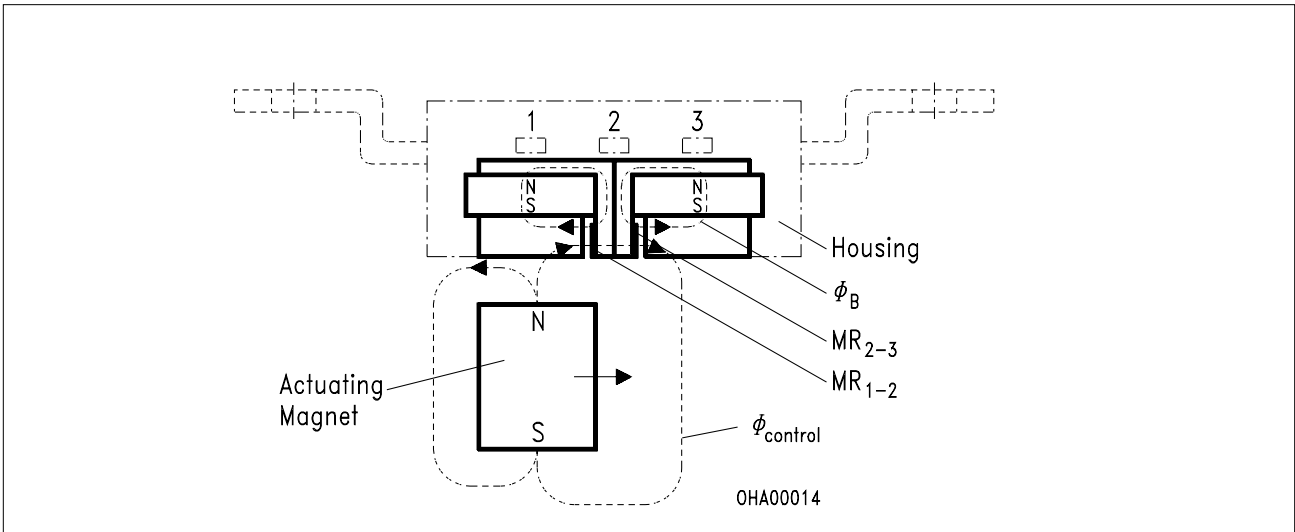


Figure 1
Sensor Operating by External Permanent Magnet

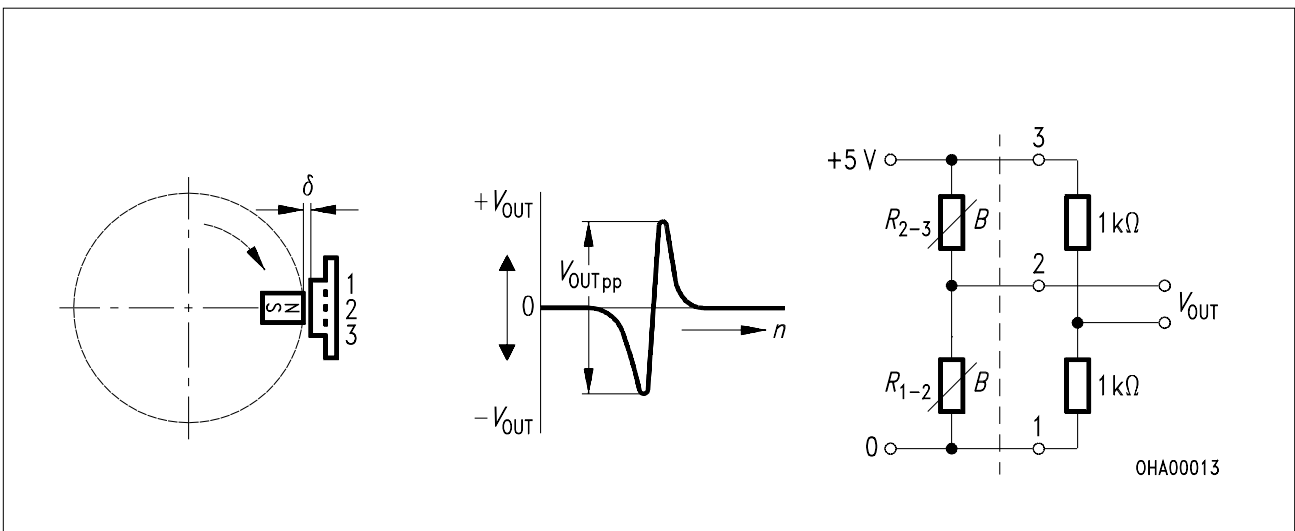


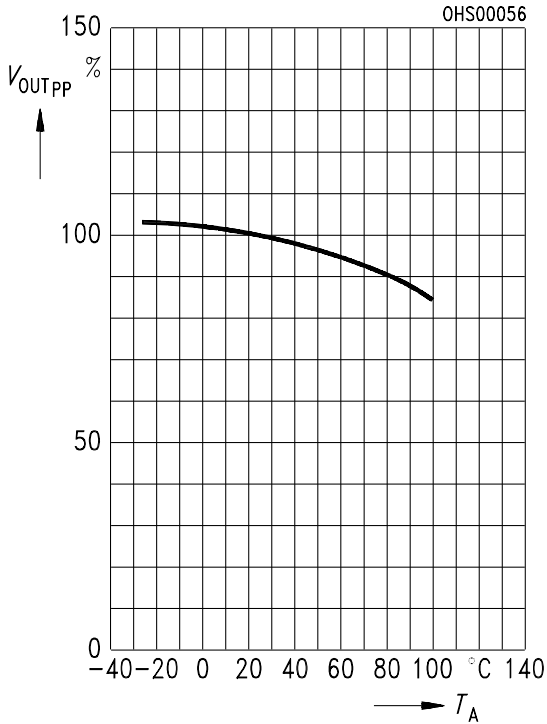
Figure 2
Measuring Arrangement with a Permanent Magnet Alnico 450

Ø = 4 mm, 6 mm long

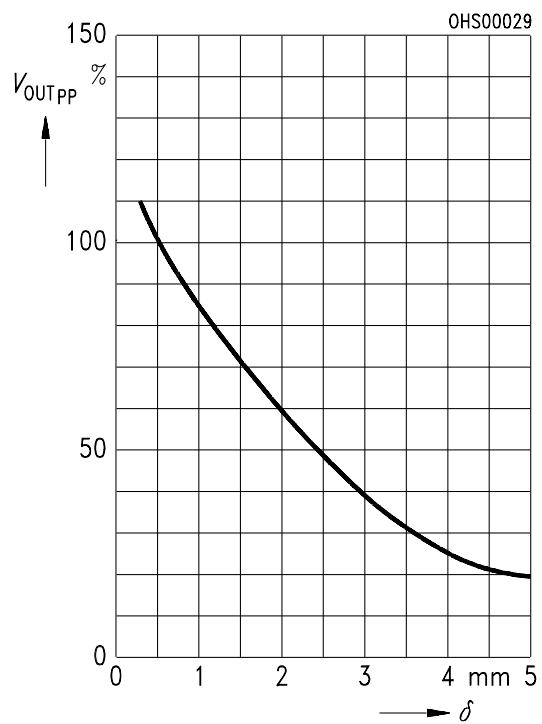
A steeper gradient is achieved when using a horseshoe magnet.

Figure 3
Measuring Circuit and Output Waveform

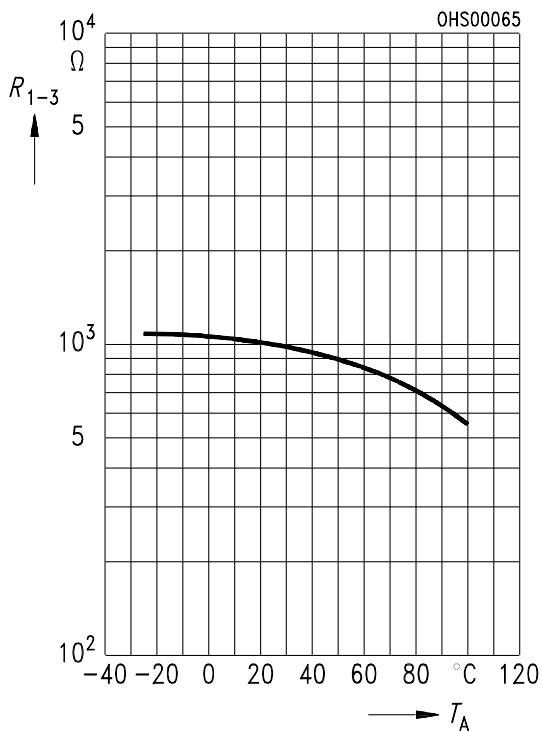
Output voltage (typical) versus temperature $V_{OUTpp} = f(T_A)$, $\delta = 0.5 \text{ mm}$
 V_{OUTpp} at $T_A = 25 \text{ }^\circ\text{C} \hat{=} 100\%$



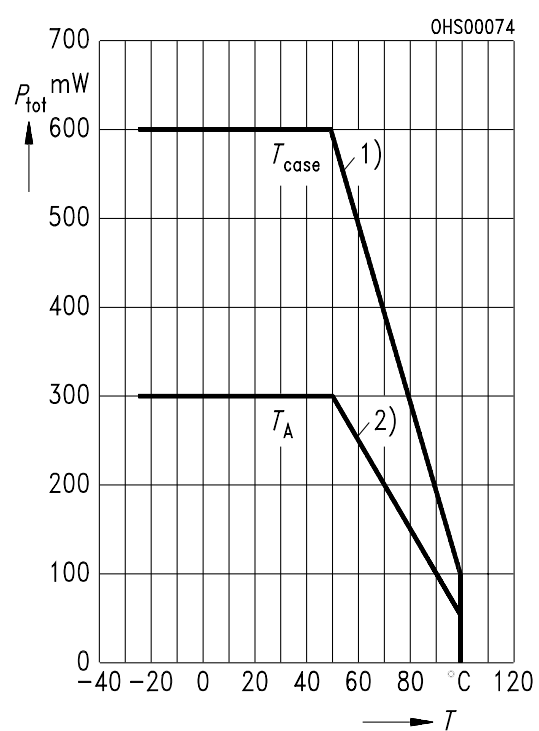
Output voltage (typical) versus airgap $V_{OUTpp} = f(\delta)$, $T_A = 25 \text{ }^\circ\text{C}$
 V_{OUTpp} at $\delta = 0.5 \text{ mm} \hat{=} 100\%$



Total resistance (typical) versus temperature
 $R_{1-3} = f(T_A)$, $\delta = \infty$

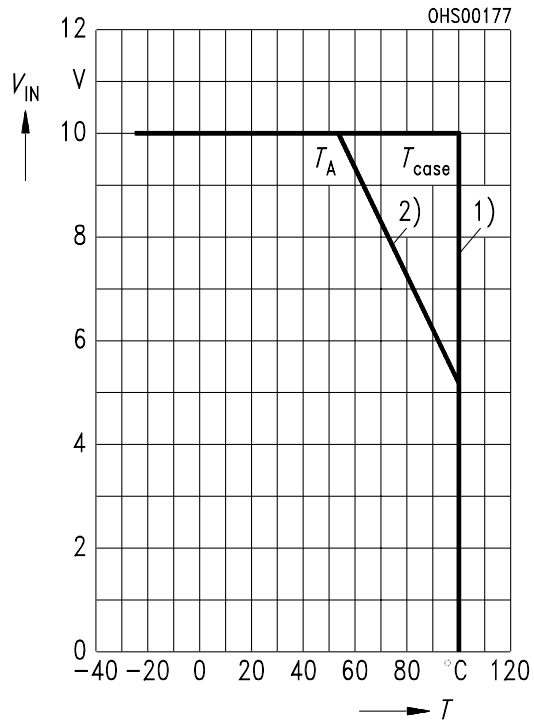


Max. power dissipation versus temperature
 $P_{tot} = f(T)$, $\delta = \infty$, $T = T_{case}$, T_A



**Maximum supply voltage
versus temperature**

$V_{IN} = f(T), \delta = \infty, T = T_{case}, T_A$



- 1) Sensor mounted with good thermal contact to a heat sink
- 2) Operation in still air



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