Absolute-pressure sensors

Micromechanical hybrid design

Input quantity: P
Output quantity: U

- High level of accuracy
- EMC protection better than 100 V m^{-1}.
- With temperature compensation.
- Version with additional integrated temperature sensor.

Application

This sensor is used to measure the absolute intake-manifold pressure. The version with integrated temperature sensor additionally measures the temperature of the intake-air flow.

Design and operation

The piezo-resistive pressure-sensor element and appropriate signal amplification and temperature compensation electronics are integrated on a silicon chip.
The measured pressure acts from above on the active side of the silicon diaphragm. A reference vacuum is enclosed between the rear side and a glass base. The temperature-sensor element is an NTC thermistor. Thanks to an appropriate coating method, the pressure and temperature sensor are resistant to the gases and liquids occurring in the intake manifold.

Installation instructions

The sensor is designed for attachment to a flat surface at the intake manifold of motor vehicles. The pressure connection and the temperature sensor jointly project into the intake manifold and are sealed off from the atmosphere by an O-ring. The sensor should be installed in the vehicle such that condensate cannot accumulate in the pressure cell (pressure sampling point at top of intake manifold, pressure connection angled downwards etc.).

Explanation of characteristic quantities

U_A Output voltage U_VSupply voltage k Tolerance multiplier DAfter endurance test NAs-new condition

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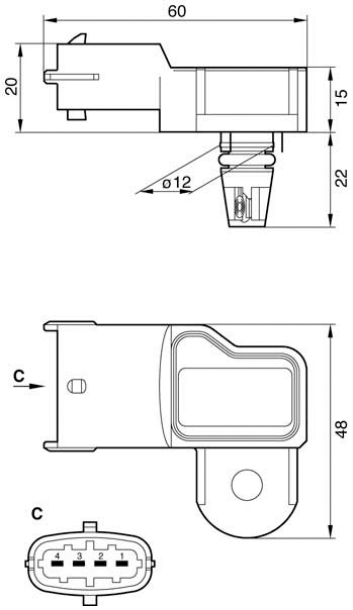
Part number 0 281 002 437

Technical data

Parameter		min	type	max	
Feature sensor				Integrated temperature	
Pressure range kPa (p_1...p_2)				20	300
Operating temperature	ϑ_B	°C		-40	+130
Supply voltage (1 min)	U_V	V		4,5	5	5,5
Current input at U_V = 5 V	I_V	mA		6	9	12,5
Load current at output	I_L	mA		-1		0,5
Load resistance to U_V or ground	$R_{pull-up}$	kΩ		5	680	
Load resistance to U_V or ground	$R_{pull-down}$	kΩ		10	100	
Response time	$\tau_{10/90}$	ms			1	
Voltage limitation at U_V = 5 V - lower limit		V		0,25	0,3	0,35
Voltage limitation at U_V = 5 V - upper limit		V		4,75	4,8	4,85
Limit data						
Supply voltage	$U_{V max}$	V				16
Storage temperature		°C		-40		+130
Temperature sensors						
Measuring range	ϑ_M	°C		-40		+130
Measurement current		mA				1 [1])
Rated resistance at +20 °C		kΩ			2,5 ± 5 %	
Temperature/time constant	τ_{63}	s			10 [2])	

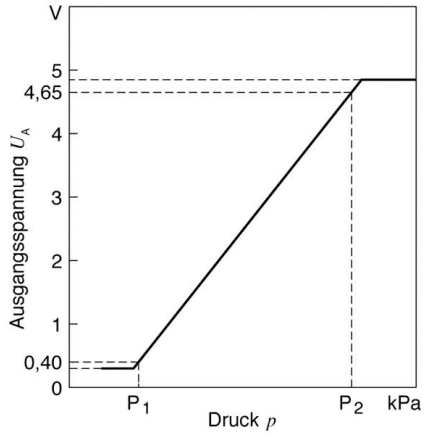
Accessories are not included in the scope of delivery of the sensor and are therefore to be ordered separately as required.

Dimensional drawing



Pin 1 Ground
Pin 2 NTC thermistor
Pin 3 +5 V
Pin 4 Output signal

Characteristic curve



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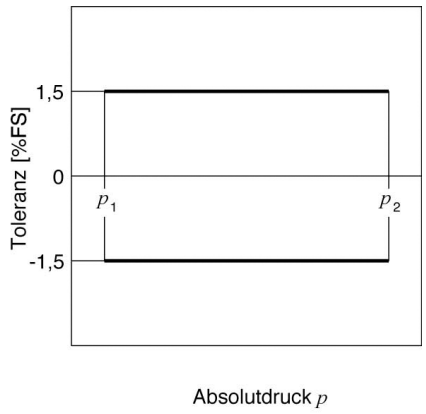
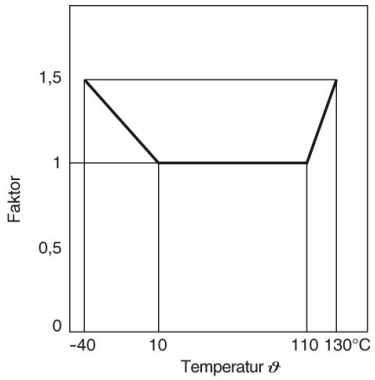
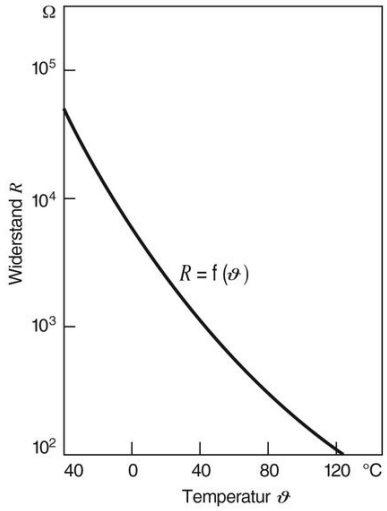
Characteristic-curve tolerance



Tolerance extension factor

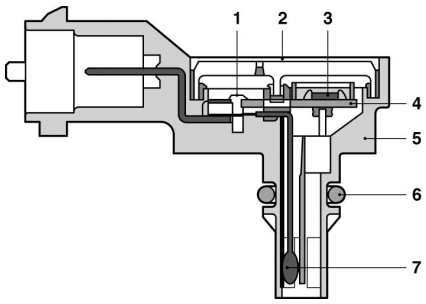


Characteristic curve for temperature sensor



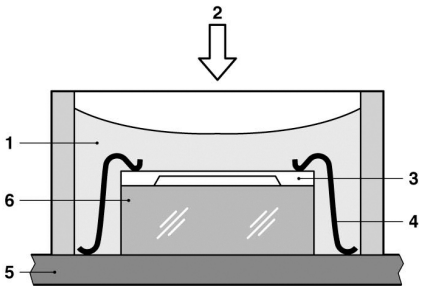
Applies to products with integrated temperature sensor.

Section through pressure sensor



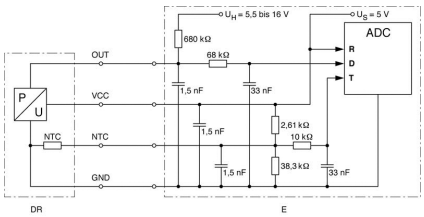
1	Bond
2	Cover
3	Sensor chip
4	Ceramic substrate
5	Housing with pressure-sensor connection
6	Seal 7NTC element.

Section through sensor cell



1	Protective gel
2	Pressure
3	Sensor chip
4	Bond
5	Ceramic substrate
6	Glass base.

Recommendation for signal evaluation.



R	Reference
D	Pressure signal
T	Temperature signal
Dr	Pressure sensor
E	Electronic control unit

Accessories

Accessories		Part number
Connector housing	Quantity required: 1 x	1 928 403 736
Contact pins	Quantity required: 4 x; Contents: 100 x	1 928 498 060
Individual seals	Quantity required: 4 x; Contents: 10 x	1 928 300 599

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