

## EPCOS Product Brief 2012

# Sensor Solutions

## for Medical Appliances

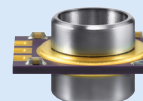
Medical technology is one of the most challenging markets for electronics. Very high demands are placed on the precision, reliability and long-term stability of electronic systems. The same also applies to the electronic components and sensors. We offer a broad spectrum of EPCOS brand piezoresistive pressure and NTC temperature sensors that satisfy the tough requirements of the medical sector. Some examples:

- Pressure sensor transmitters used in anesthesia and respiration apparatus are designed to be reliable and very precise.
- Special skin probes for long-term body temperature monitoring can withstand at least 100 sterilization cycles at 134 °C.

A wide range of pressure sensor dies, pressure transducers and pressure transmitters is available for pressure measurement in the most diverse applications.

The portfolio of NTC thermistors extends from SMD and leaded types via epoxy and glass-encapsulated NTC thermistors to ready-to-incorporate probes. Specimen application areas for our sensor solutions are:

- Anesthesia and respiration apparatus
- Cleaning equipment
- Clinical thermometers
- Dialysis apparatus
- Endoscopy devices
- Glucose meters
- Incubators
- Infusion pumps
- Patient monitoring

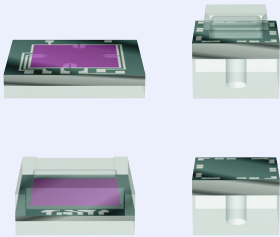


# Sensor Solutions for Medical Appliances



## Pressure sensors and transmitters

### Pressure sensor dies



#### Description

- Pressure sensor dies consist of a piezoresistive silicon element on a glue-free glass base
- Pressure measurement from the front and/or back
- Absolute, relative or differential pressure measurements
- Media-protected pressure dies for harsh environments
- Minimized die dimensions

#### Technical data

- Typical output: 120 mV
- Pressure range: 0.025 ... 40 bar

### SMD pressure sensors

#### SMD



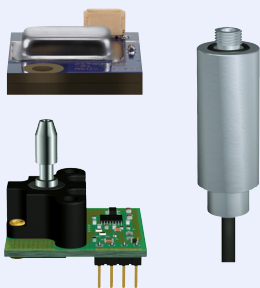
#### Description

- Compact packaged sensor
- SMD suitable design
- Gel protected

#### Technical data

- Dimensions of 4.3 x 4.3 x 2.4 mm<sup>3</sup>
- Absolute pressure measurement: 300 ... 1200 mbar

### Pressure transmitters



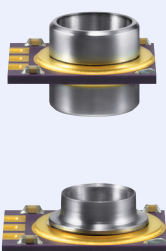
#### Description

- Calibrated and temperature compensated
- For PCB mounting or with industrial casing
- Compact design, high reliability, high accuracy

#### Technical data

- Pressure ranges:
  - 1.0 ... 25 bar absolute
  - 0.1 ... 25 bar relative
  - 0.1 ... 1.0 bar symmetrical
- Output signal: 0.5 ... 4.5 V, 4 ... 20 mA
- Interface: I<sup>2</sup>C

### Pressure transmitters, media-separated



#### Description

- Pressure element and signal conditioner mounted in a ceramic housing filled with oil
- High media resistance due to high-alloy steel
- Absolute, relative or differential pressure measurements
- Various flange geometries possible

#### Technical data

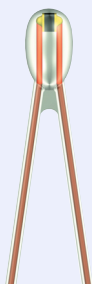
- Ratiometric analog output signal: 0.5 ... 4.5 V
- Broad range of operating temperatures up to 140 °C
- Small dimensions < 3 cm<sup>3</sup>
- 0.3% FS temperature error

# Sensor Solutions for Medical Appliances



## NTC thermistor based temperature sensors

### Glass-encapsulated NTC thermistors with insulation



#### Description

- Thermistor for precise and fast temperature measurement
- Excellent long-term stability
- Temperature measurement with media contact
- Simplified handling due to insulation of glass body and leads

#### Technical data

- Small dimensions, head diameter: 1.4 mm
- High electric strength: insulation voltage 500 V DC (1 s)
- Temperature range:  $-55 \dots +250 \text{ }^{\circ}\text{C}$

### Disposable temperature foil sensors



#### Description

- Thermistor suitable for oral and axillary measurements
- High accuracy in the body temperature range
- Very fast response time ( $\sim 7 \text{ s}$ )
- Flexible polypropylene foil, bendable

#### Technical data

- Tolerance:  $\pm 0.1 \text{ K}$  between 37 and 39  $^{\circ}\text{C}$
- Length: 100 mm, thickness: 0.45 mm, 1.3 mm with NTC sensor head, breadth: 6 mm
- Temperature range:  $-40 \dots +75 \text{ }^{\circ}\text{C}$

### Highly robust reusable skin probes



#### Description

- NTC element in stainless steel housing
- Highly resistant to disinfectants and chemicals
- Withstands at least 100 autoclave sterilization cycles
- Connected cable with double insulation
- Encapsulated by injection molding

#### Technical data

- Temperature tolerance:  $\pm 0.2 \text{ K}$  between 25 and 45  $^{\circ}\text{C}$
- Temperature range:  $0 \dots +80 \text{ }^{\circ}\text{C}$

### NTC thermistor potted in stainless steel cases



#### Description

- NTC thermistor potted in a compact stainless steel case
- Suitable for use in corrosive environments, e.g. purifiers
- UL approval (E69802)
- RAST 2.5-plug and 5-plug terminals available
- VDE protection class II
- Various R/T characteristics and tolerances available

#### Technical data

- Typical  $R_{25}$  values: 4.8, 12 and 20  $\text{k}\Omega$
- Insulation voltage: 3750 V AC
- Temperature range:  $-10 \dots +125 \text{ }^{\circ}\text{C}$

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