



NTC Thermistors

Glass-encapsulated NTC Sensor Elements

Sensors with faster response, more compact dimensions and higher temperature resistance are increasingly needed in the sector of temperature measurement with NTCs.

EPCOS offers an innovative solution: glass-encapsulated NTC sensor elements for temperature measurement with flexible electrical insulation (the G1541, G1551 and G1561 series). In addition to the benefits of the glass-encapsulated NTCs already available for some time, they offer insulation with a specified voltage resistance of 500 V DC/1s in NaCl solution. This assured voltage resistance obviates subsequent insulation, e.g. with Teflon tubes, and simplifies processing so that the costs incurred are significantly reduced. They can even be used in highly constrained

insertion situations, such as in sleeves.

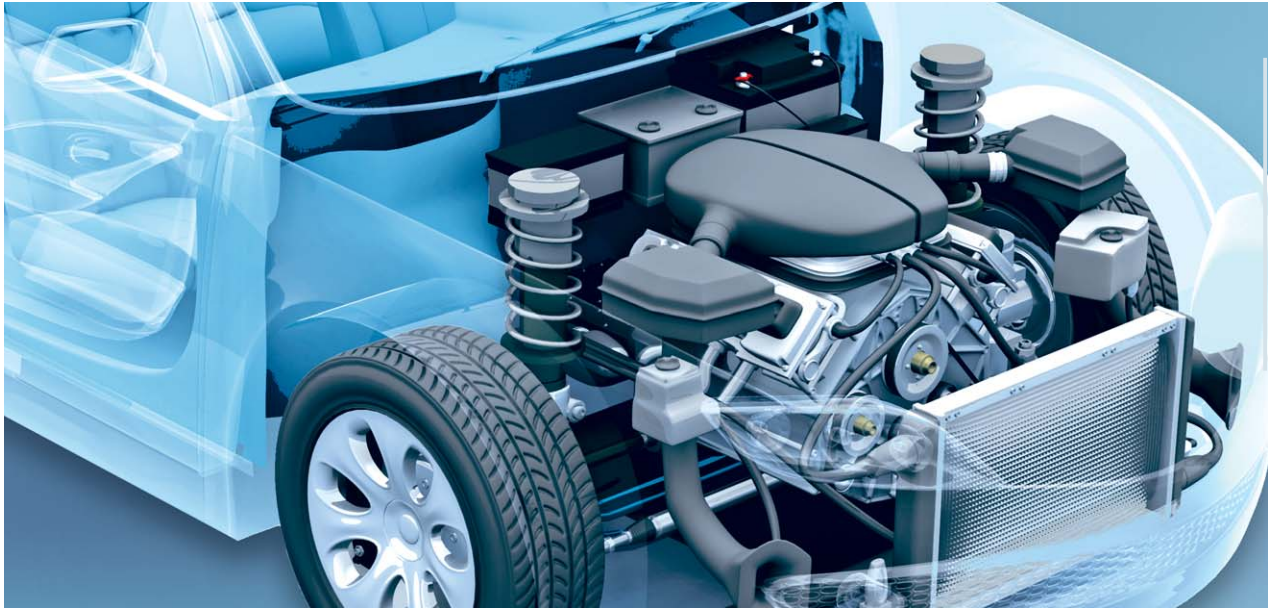
Typical applications

- Automotive (e.g. engine management)
- Home appliances
- Medical technology

Features

- Compact dimensions
- Very short response times
- High measurement accuracy and long-term stability
- High temperature resistance up to +300 °C
- Temperature tolerances from ± 0.1 Kelvin
- Wide range of resistance values from 2 k Ω to 1.4 M Ω
- Series with various geometries and wire diameters

Typical Applications of Glass-encapsulated Temperature Sensors



Automotive – engine management

New environmental regulations designed to reduce fuel consumption and improve exhaust-gas values in new motor vehicles make ever tougher demands on engine management. Optimum control of the engine parameters requires more precise knowledge of various engine states than in the past. This applies especially to the temperatures of the oil and coolant, the exhaust gas and the intake air. Today's sensors must record temperature changes more quickly while simultaneously being exposed to higher temperatures.

Thanks to their faster response and a temperature resistance of up to +300 °C, glass-encapsulated NTC sensor elements are particularly suited for air-flow sensors as well as for measuring oil temperatures and the gas temperature in the exhaust-gas recirculation system.

The insulated variants with a specified voltage resistance of 500 V DC also allow cost-effective use in constrained spaces such as sleeves without the need for complex additional insulation.

Medical technology

To measure temperatures in medical technology, fast response and high accuracy in the region of the body temperature (+37 °C) are required. EPCOS has developed a series of insulated glass-encapsulated NTC sensor elements specifically for this purpose in various sizes with a tolerance of ± 0.1 Kelvin between +25 °C and +45 °C. Apart from their high accuracy, compact size (B57542G3103F000: maximum head diameter 1.4 mm) and fast response, their maximum operating temperature of +150 °C assures reliable sterilization in clinical use. Typical applications for temperature sensors are in body temperature measurement, respiration equipment, dialysis equipment and incubators.



Typical Applications of Glass-encapsulated Temperature Sensors



Home appliances

Ever higher demands are being made on small home appliances. Whereas a simple coffee machine used to suffice, today people want an automatic espresso machine with its own steam generation. Higher performance and lower power consumption are also demanded of toasters, dryers, washing machines and irons. To satisfy these increased expectations, the temperatures prevailing in these appliances must be measured with high accuracy and short delays even in temperature ranges significantly over $+100\text{ }^{\circ}\text{C}$. Thus the water temperature required for brewing a perfect espresso must be precisely maintained, and the temperature of the steam used to froth the milk must be exactly controlled during the heating process.

This is where glass-encapsulated NTC sensor elements from EPCOS exploit their advantages to the full. Thanks to their high accuracy, fast response and optimum application temperatures, they deliver the convenience in the home desired by users.

The broad product range, compact dimensions and flexible insulation allow simple processing – even in constrained spaces such as occur in tube sensors – plus the choice of a temperature measuring component optimally suited to the respective requirements.

Glass-encapsulated NTCs

Technical data

For high-temperature measurement with extremely short response time. Particularly suitable for measuring sites with limited space and for rapid temperature changes, e.g. engine management.



Dimensional drawing	Type	Rated resistance R_{25} Ω	Tolerance ΔR_{25}	B value		Ordering code ¹⁾	Features
				$B_{0/100}$ K	$B_{25/100}$ K		
<p>TNT0401-4</p>	G540	5 k	±1%	3450	3497	B57540G0502+000	<ul style="list-style-type: none"> Heat-resistant and highly stable thanks to glass-encapsulation For temperature measurement up to 300 °C (G540/G1540 up to 250 °C) Dumet wires, copper-clad FeNi Climatic category (IEC 60068-1): 55/300/56, Type G540/G1540 = 55/250/56 Options: Ni-plated wires also available
		230 k	±3%	4537 ²⁾	4264	B57540G0234+000	
		1400 k	±5%	5133 ³⁾	4581	B57540G0145+000	
	G1540	10 k	±1%	3586	3625	B57540G1103+005	
		10 k	±2%	3450	3492	B57540G1103+000	
		20 k	±3%	3970	4012	B57540G1203+000	
		30 k		3944	3988	B57540G1303+005	
		30 k		3970	4012	B57540G1303+000	
		100 k		4036	4092	B57540G1104+000	
		<p>TNT0280-6</p>	G550	2 k	±1%	3390	
5 k	±3%			3450	3497	B57550G0502+000	
230 k	±5%			4537 ²⁾	4264	B57550G0234+000	
G1550	1400 k		±5%	5133 ³⁾	4581	B57550G0145+000	
	10 k		±1%	3586	3625	B57550G1103+005	
	10 k		±2%	3450	3492	B57550G1103+000	
	20 k		±3%	3970	4012	B57550G1203+000	
	30 k			3944	3988	B57550G1303+005	
	30 k			3970	4012	B57550G1303+000	
	100 k			4036	4092	B57550G1104+000	
<p>TNT0281-E</p>	G560	2 k	±1%	3390	3436	B57560G0202+000	
		5 k	±3%	3450	3497	B57560G0502+000	
		1400 k	±5%	5133 ³⁾	4581	B57560G0145+000	
	G1560	10 k	±1%	3586	3625	B57560G1103+005	
		10 k	±2%	3450	3492	B57560G1103+000	
		20 k	±3%	3970	4012	B57560G1203+000	
		30 k		3944	3988	B57560G1303+005	
		30 k		3970	4012	B57560G1303+000	
		100 k		4036	4092	B57560G1104+000	

¹⁾ Ordering code example:
e.g. B57540G0502H000
± Tolerance R_{25} of ±3%

+: $F = \Delta R_{25} = \pm 1\%$
G = $\Delta R_{25} = \pm 2\%$
H = $\Delta R_{25} = \pm 3\%$
J = $\Delta R_{25} = \pm 5\%$

²⁾ $B_{100/200}$

³⁾ $B_{200/300}$

Glass-encapsulated NTCs with Insulation

Technical data

For high-temperature measurement with extremely short response time and tight mounting situations. Easy processing due to insulation of head and wires.



Dimensional drawing	Type	Rated resistance R_{25} Ω	Tolerance ΔR_{25}	B value		Ordering code	Features
				$B_{0/100}$ K	$B_{25/100}$ K		
<p>TNT0465-A-E</p>	G1541	10 k	±1%	3586	3625	B57541G1103+005 B57541G1303+005 +: $F = \Delta R_{25} = \pm 1\%$ G = $\Delta R_{25} = \pm 2\%$ H = $\Delta R_{25} = \pm 3\%$	<ul style="list-style-type: none"> • Glass-encapsulated NTC thermistor, heat-resistant and highly stable • Coating of glass body and leads for electrical insulation • For temperature measurement up to 260 °C (G1541 up to 250 °C) • Fast response
		30 k	±2% ±3%	3944	3988		
<p>TNT0466-T-E</p>	G1551	10 k	±1%	3586	3625	B57551G1103+005 B57551G1303+005 +: $F = \Delta R_{25} = \pm 1\%$ G = $\Delta R_{25} = \pm 2\%$ H = $\Delta R_{25} = \pm 3\%$	<ul style="list-style-type: none"> • Small dimensions • Leads: dumet wires (copper-clad FeNi) • Climatic category (IEC 60068-1): Type G1541 = 55/250/56 Type G1551/G1561 = 55/260/56 • Options: Ni-plated dumet wires. Alternative dimensions available on request.
		30 k	±2% ±3%	3944	3988		
<p>TNT0467-R-E</p>	G1561	10 k	±1%	3586	3625	B57561G1103+005 B57561G1303+005 +: $F = \Delta R_{25} = \pm 1\%$ G = $\Delta R_{25} = \pm 2\%$ H = $\Delta R_{25} = \pm 3\%$	
		30 k	±2% ±3%	3944	3988		

Glass-encapsulated NTCs with Insulation for Medical Devices

Technical data

For precise and fast temperature measurement especially body temperatures e.g. in clinical thermometers, lung ventilators, renal dialysis units and incubators (Temperature tolerance ± 0.1 K between 25 °C and 45 °C).



Dimensional drawing	Type	Resistance R_{25} Ω	Tolerance ΔT	Ordering code	Features
<p>TNT0465-A-E</p>	G3542	10 k	± 0.1 K (25 ... 45 °C)	B57542G3103F000	<ul style="list-style-type: none"> Extremely high accuracy in the range of the body temperature (37 °C) Excellent long-term stability Glass-encapsulated NTC thermistor Simplified handling due to coating of glass body and leads for electrical insulation Fast response Small dimensions Leads: dumet wires (copper-clad FeNi) Climatic category (IEC 60068-1): 40/150/56 Options: Ni-plated dumet wires. Alternative dimensions available on request
<p>TNT0466-T-E</p>	G3552	10 k 22.52 k	± 0.1 K (25 ... 45 °C)	B57552G3103F000 B57552G3233F000	
<p>TNT0467-R-E</p>	G3562	10 k 22.52 k	± 0.1 K (25 ... 45 °C)	B57562G3103F000 B57562G3233F000	

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