

EPCOS Sample Kit 2016

# SMD NTC Thermistors

Temperature Measurement and Compensation  
in Automotive Applications



# Temperature measurement and compensation

NTC (negative temperature coefficient) thermistors are thermally sensitive semiconductor resistors which show a decrease in resistance as temperature increases. At  $-2\%/K$  to  $-6\%/K$ , the negative temperature coefficients of resistance are about ten times greater than those of metals and about five times greater than those of silicon temperature sensors. NTC thermistors are simple yet very sensitive and accurate sensing elements for measuring and control circuits.

## Features

- Qualification based on AEC-Q200, Rev. D
- Superior performance in high-stability applications
- Accurate temperature sensing up to  $+150\text{ }^{\circ}\text{C}$
- Excellent long-term aging stability in high-temperature and high humidity environment
- Short response time
- Alternative ratings available on request, e.g. resistance and B value

## Applications

- Electronic control units (ECU), e. g. for tire pressure, motor management, airbags
- Displays, e. g. dashboard instruments, car radios, navigation systems
- Temperature sensors for air-conditioning
- Battery pack in conventional, hybrid electric and full-electric vehicles
- Gear box control
- LED temperature control (head and rear lights)

**A short presentation with more details and applications examples can be found under:**  
**[www.epcos.com/smdntc\\_automotive](http://www.epcos.com/smdntc_automotive)**

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# Components

B57251 V5472J060		B57232 V5103F360	B57251 V5103J060		B57256 V5473F360		B57254 V5104F360	
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B57332 V5103F360	B57342 V5103H060	B57351 V5103H060	B57352 V5103H060	B57351 V5223J060	B57352 V5223H060	B57352 V5473H060	B57356 V5473F260	B57355 V5104F360
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B57442 V5472J062	B57452 V5472J062	B57442 V5103J062	B57451 V5103J062	B57452 V5103J062	B57451 V5333J062	B57451 V5473J062	B57452 V5104J062	
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## Electrical specifications and ordering codes

$R_{25}$ [kΩ]	$\Delta R_R/R_R$ %	$B_{25/50}$ [K]	$B_{25/85}$ [K]	$B_{25/100}$ [K]	Ordering code
<b>EIA case size 0402</b>					
4.7	±5	3940	3980	4000 ±3%	B57251V5472J060
10	±1, ±3, ±5	3380	3435	3455 ±1%	B57232V5103+360
10	±5	3940	3980	4000 ±3%	B57251V5103J060
47	±1, ±3, ±5	4050	4108	4131 ±1%	B57256V5473+360 <b>NEW</b>
100	±1, ±3, ±5	4250	4311	4334 ±1%	B57254V5104+360 <b>NEW</b>
<b>EIA case size 0603</b>					
10	±1, ±3, ±5	3380	3435	3455 ±1%	B57332V5103+360
10	±3, ±5	3590	3635	3650 ±3%	B57342V5103+060
10	±3, ±5	3940	3980	4000 ±3%	B57351V5103+060
10	±3, ±5	4386	4455	4480 ±3%	B57352V5103+060
22	±3, ±5	3940	3980	4000 ±3%	B57351V5223+060
22	±3, ±5	4386	4455	4480 ±3%	B57352V5223+060
47	±3, ±5	4386	4455	4480 ±3%	B57352V5473+060
47	±1, ±3, ±5	4050	4108	4131 ±1,5%	B57356V5473+260 <b>NEW</b>
47	±3, ±5	4050	4108	4131 ±2%	B57356V5473+160 <b>NEW</b>
100	±1, ±3, ±5	4200	4260	4282 ±1%	B57355V5104+360 <b>NEW</b>
100	±3, ±5	4250	4311	4334 ±2%	B57354V5104+160 <b>NEW</b>
<b>EIA case size 0805</b>					
4.7	±3, ±5	3590	3635	3650 ±3%	B57442V5472+062
4.7	±3, ±5	4386	4455	4480 ±3%	B57452V5472+062
10	±3, ±5	3590	3635	3650 ±3%	B57442V5103+062
10	±3, ±5	3940	3980	4000 ±3%	B57451V5103+062
10	±3, ±5	4386	4455	4480 ±3%	B57452V5103+062
33	±3, ±5	3940	3980	4000 ±3%	B57451V5333+062
47	±3, ±5	3940	3980	4000 ±3%	B57451V5473+062
100	±3, ±5	4386	4455	4480 ±3%	B57452V5104+062

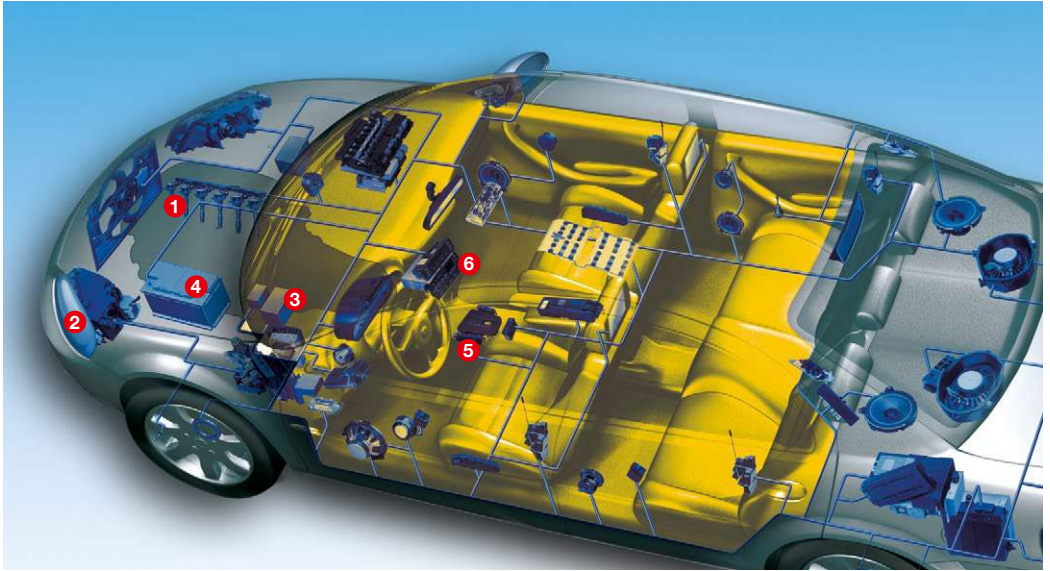
+ = Resistance tolerance:

F = ±1%

H = ±3%

J = ±5%

# Application examples for SMD NTC thermistors in automotive



- ❶ Electronic control units (ECU),  
e.g. tire pressure, motor management, airbags
- ❷ LED temperature control (head and rear lights)
- ❸ Gear box control
- ❹ Temperature control for the battery pack in conventional, hybrid electric and full-electric vehicles
- ❺ Temperature sensors for air-conditioning
- ❻ Display,  
e.g. dashboard instruments, car radios, navigation systems

