EPCOS Sample Kit 2016

SMD NTC Thermistors

Temperature Measurement and Compensation for General-Use

www.epcos.com

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

- Superior performance in high-stability applications
- Accurate temperature sensing up to +125 °C
- Excellent long-term aging stability in high temperature environment
- Short response time
- All SMD NTC thermistors are listed under UL (file number E69802)
- Alternative ratings available on request, e.g. resistance and B value

Applications

- Displays
- Smartphones and wearable devices
- Heating and air-conditioning, radiator cooling fan control units, thermostats
- Household electronics, e.g. refrigerators, washing machines, water boilers
- Battery management systems
- Healthcare
- Smart metering
- Electronic control unit
- Industrial automation
- Security and safety
- Lighting, e.g. LED lighting modules, LED retrofit bulbs and tubes

A short presentation with more details and applications examples can be found under: www.epcos.com/smdntc_gu

Components

B57230 V2103F260	B57221 V2103J060		B57261 V2223J060		B57221 V2473J060	B57250 V2473F560		B57250 V2104F360

B57330 V2103F260	B57321 V2103J060	B57371 V2223J060	B57371 V2473J060	B57357 V2473F560	B57374 V2104J060	B57350 V2104F460	B57371 V2474J060	

B57421 V2102J062	B57401 V2103J062	B57421 V2103J062	B57471 V2103J062	B57471 V2223J062	B57471 V2473J062	B57471 V2104J062	B57471 V2474J062	

Product range

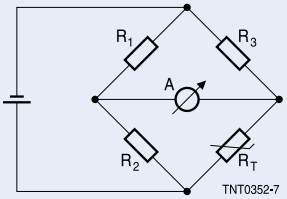
Electrical specifications and ordering codes

R_{25} [kΩ]	$\Delta R_R/R_R$ %	$B_{25/50}$ [K]	$B_{25/85}$ [K]	$B_{25/100}$ [K]	Ordering code	
EIA case size 0402						
10	±1, ±5	3380	3435	3455 ±1%	B57230V2103+260	
10	±5	3940	3980	4000 ±3%	B57221V2103J060	
22	±5	4473	4548	4575 ±3%	B57261V2223J060	
47	±5	3940	3980	4000 ±3%	B57221V2473J060	
47	±1, ±3, ±5	4050	4108	4131 ±1%	B57250V2473+560	NEW
100	±1, ±3, ±5	4250	4311	4334 ±1%	B57250V2104+360	NEW
EIA case size 0603						
10	±1, ±5	3380	3435	3455 ±1%	B57330V2103+260	
10	±3, ±5	3940	3980	4000 ±3%	B57321V2103+060	
22	±3, ±5	4386	4455	4480 ±3%	B57371V2223+060	
47	±3, ±5	4386	4455	4480 ±3%	B57371V2473+060	
47	±1, ±3, ±5	4050	4108	4131 ±1.5%	B57357V2473+560	NEW
47	±3, ±5	4050	4108	4131 ±2%	B57358V2473+560	NEW
100	±3, ±5	4386	4455	4480 ±1%	B57374V2104+060	
100	±1, ±3, ±5	4200	4260	4282 ±1%	B57350V2104+460	NEW
100	±3, ±5	4250	4311	4334 ±2%	B57358V2104+360	NEW
470	±3, ±5	4386	4455	4480 ±3%	B57371V2474+060	
EIA case size 0805						
1	±3, ±5	3940	3980	4000 ±3%	B57421V2102+062	
10	±3, ±5	3590	3635	3650 ±3%	B57401V2103+062	
10	±3, ±5	3940	3980	4000 ±3%	B57421V2103+062	
10	±3, ±5	4386	4455	4480 ±3%	B57471V2103+062	
22	±3, ±5	4386	4455	4480 ±3%	B57471V2223+062	
47	±3, ±5	4386	4455	4480 ±3%	B57471V2473+062	
100	±3, ±5	4386	4455	4480 ±3%	B57471V2104+062	
470	±3, ±5	4386	4455	4480 ±3%	B57471V2474+062	

+ = Resistance tolerance:
F = ±1%
H = ±3%
J = ±5%

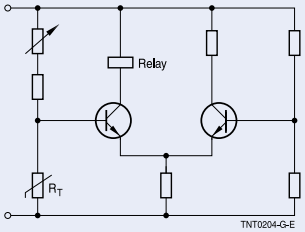
Application examples for SMD NTC thermistors

Industrial and medical thermometers

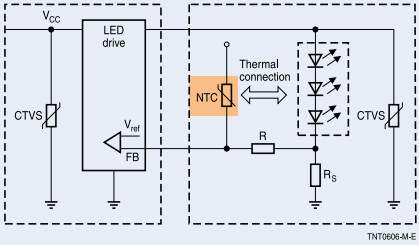


Wheatstone bridge circiut

Thermostats



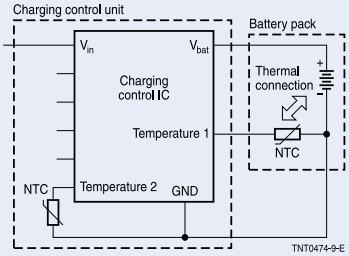
LEDs



Thermal connection with a NTC on LED

- No discoloration
- No reduction in lumens
- Extension of life time
- Performance efficiency optimization
- Optimum design (reduction in number of LEDs)

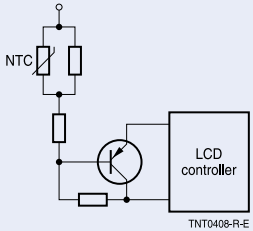
Battery packs



Charging control unit of a battery pack using NTC thermistors as temperature sensor

- Detects temperature rises of the battery cell during charging
- Detects the ambient temperature for optimized charging
- Detects heat generation of a battery cell caused by abnormal current
- Performs temperature compensation for voltage measurement for display of the remaining amount of energy

LCD displays



LCD using a NTC thermistor as temperature sensor

- LCDs are sensitive to temperature and have a limited operating temperature range
- LCD contrast increases with temperature, wasting power at high temperatures
- Low temperatures lead to low contrast
- LCD modules often use temperature compensation circuits with NTC thermistors and resistors

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