Application & Solution Notes Example

PTC Thermistor (POSISTOR®)

for Overheat sensing & Over current protection

0603 size 0402 size 0201 size
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Application & Solution examples for POSISTOR® (PTC Thermistor)

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Industrial machinery & FA sensor protection using POSISTOR® (PTC Thermistor) for Over current protection～PRG series～

Do you have any troubles by miss-wiring?

Leave it to PTC Thermistor!!

Spark!

PTC will be your great protector from abnormal current condition.

Application Note

Servo Drives
- for I/O sequence output circuit protection
- for encoder circuit

FA Sensor
- for sensors which have power module inside and feeder circuit.
- for open collector out-put circuit [example]

Solution Proposal

[ Photo coupler output protection ]
[ EX: line receiver circuit ]

[ Encoder connection circuit protection ]
[ EX: incremental encoder ]

[Open collector output protection]
[ EX: Relay circuit ]

Advantages of PTC Thermistor vs. Polymer PTC

✔ POSISTOR® is smaller than Polymer PTC.
✔ POSISTOR® operated faster than Polymer PTC.
✔ POSISTOR®s reliability is higher than Polymer PTC.
LIB protection using ~POSISTOR® (PTC Thermistor)~
for Over current protection ~PRG series~

Do you have any troubles by short circuit for LIB?

If a terminal short-circuits, NTC and IC may be broken!
Especially it is anxious with the LIB of high current capacity.

PTC will be your great protector from over current such as terminal short-circuit.

Application Note

☆ LIB of high current capacity type

- Power Tool
- Codeless cleaner
- E-bike

Solution Proposal

Whenever be troubled by over current, Murata will help you!!

Advantages of PTC Thermistor vs. Polymer PTC

- POSISTOR® is smaller than Polymer PTC.
- POSISTOR® operated faster than Polymer PTC.
- POSISTOR®'s reliability is higher than Polymer PTC.

PTC Catalog

THM-012
Telecom protection using ~POSISTOR® (PTC Thermistor)~ for Over current protection ~PRG series~

Do you have any troubles by miss-wiring?

- Equipments may be broken!
- Human body may be affected by breaking!

PTC will be your great protector from abnormal current condition.

Application Note

- **Key Telephone**
- **PoE**

POSISTOR® can protect over current such as improper connection!

POSISTOR® is resettable fuse, so maintenance-free is realized!

Solution Proposal

- **For Key Telephone**
  - 0805 size
  - 0603 size
  - 0402 size

- **For PoE**

Whenever be troubled by over current, Murata will help you!!

Advantages of PTC Thermistor vs. Polymer PTC

- POSISTOR® is **smaller** than Polymer PTC.
- POSISTOR® operated **faster** than Polymer PTC.
- POSISTOR®’s reliability is **higher** than Polymer PTC.

POSISTOR®

Polymer PTC

PTC Catalog
Smartphone protection using ~POSISTOR® (PTC Thermistor)~
for Overheat sensing & Overcurrent protection~PRF series~

Do you have any thermal troubles by using smartphone?

PTC will be your great protector from various thermal problem.

Application Note

⭐ = Overheat sensing ADC less ! “PRF”
⭐ = Over current protection “PRG”

Solution Proposal

Overheat Sensor PRF series

- Multi hot spots PRF15 series
- 0402 size PRF series
- 0201 size PRF03 series

- ADC (analog-digital) port is not required for each PRF.
- Multi PRFs can be connected in series.
- Wide sensing temperature series is available from 65degC to 130degC.
- 0201 size will be available in 2014.

Multi PRF can be connected into one ADC port.

Vout clearly changes even if only one of Multiple PTCs detects overheat due to dynamic resistance change.

*Bluetooth is a registered trademark or trademark of Bluetooth SIG, Inc.
**LED light protection using POSISTOR® (PTC Thermistor)**

**LED current control according to ambient temperature**

### Importance of temperature management

1. LED’s current should be controlled according to its permissible current.
2. By heat transfer from LED, voltage regulator and other parts are damaged.

To obtain long operating life and prevent damage, temperature management is important.

If IC is used for current control...
- Can be severe current control
- Need custom IC by LED light design change.

**We recommend PTC Thermistor solution to save the cost.**

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**Solution Proposal**

**Overheat Sensor PRF series**

**[Direct LED current control method]**

**[Indirect LED current control method]**

- LED thermal protection: No need any IC but PTC Thermistor.
- Current de-rating curve can be changed by different PTC products.
For FOD on Wireless Charger ~POSISTOR® (PTC Thermistor)~
for Overheat sensing ~PRF series~

Wireless power transfer system needs FOD system for safety.
*FOD : Foreign Object Detection

Application Note

✔ FOD in large area and high power charger is difficult.
☆ Miss judgment by some noise.
☆ Need much cost.

Best solution

<table>
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<th>Optical thermometer</th>
<th>Temperature sensor</th>
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<td>Temperature measuring</td>
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<td>N</td>
<td>Y</td>
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<td>Total system cost</td>
<td>Equipment is expansive</td>
<td>Equipment is expansive</td>
<td>Can use multi detection</td>
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</table>

Solution Proposal

Overheat Sensor PRF series

[Normal condition]

[Abnormal condition]

Normal condition on the charger table
Power transfer will continue

The resistance of PTC Thermistors in the charger is normal.

Foreign objection on the charger table
The objection is heated up by radial current

PTC Thermistor works so that power transfer will stop

PTC Catalog

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