

# ANTREX Electronics

## Electronic Components Sourcing Information

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### Product Reference Information

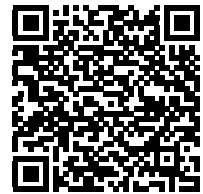
|                      |                                         |
|----------------------|-----------------------------------------|
| <b>Part Number:</b>  | PTCTL6NR100GTE                          |
| <b>Manufacturer:</b> | Vishay Beyschlag/Draloric/BC Components |
| <b>Package:</b>      | Radial, Disc                            |
| <b>Availability:</b> | Please confirm with sales               |

#### Product Page:

<https://antrexco.com/product/details/vishay-beyschlag-draloric-bc-components-ptctl6nr100gte.html>

#### Request a Quote:

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Email: [info@antrexco.com](mailto:info@antrexco.com)

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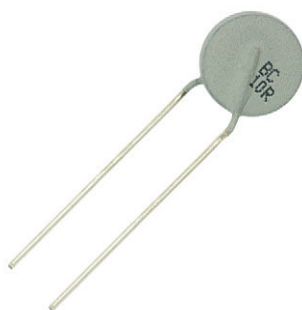
#### Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.

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# PTC Thermistors, Overload Protection for Telecommunication



## FEATURES

- Wide resistance range in telecom area from 4  $\Omega$  to 70  $\Omega$
- Fast protection against power contact faults
- Withstand high overload currents of up to 10 A
- High voltage withstanding capabilities for the larger sized thermistors (up to 600 V)
- Good tracking over a wide temperature range for all matched or binned thermistors (matching at 85 °C  $\leq$  2 x matching at 25 °C)
- UL1434 approved types available (XGPU2)
- All telecom PTCs are coated with a high temperature silicon lacquer (UL 94 V-0) to protect them from any harsh environments and to improve their lifetime
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

## APPLICATIONS

Over-temperature/over-load protection:

- Main distribution frame (MDF)
- Central office switching (C.O.)
- Subscriber terminal equipment (T.E.)
- Set-top box (S.B.)

## MARKING

Clear marking on a gray coated body  
BC and  $R_{25}$  value

| QUICK REFERENCE DATA                        |              |                  |
|---------------------------------------------|--------------|------------------|
| PARAMETER                                   | VALUE        | UNIT             |
| Maximum voltage (RMS or DC)                 | 220 to 600   | V <sub>RMS</sub> |
| Maximum holding current (I <sub>nt</sub> )  | 100 to 175   | mA               |
| Resistance at 25 °C (R <sub>25</sub> )      | 8 to 50      | $\Omega$         |
| Tolerance on R <sub>25</sub> value          | 15 to 25     | %                |
| Maximum overload current I <sub>ol</sub>    | 0.6 to 10.0  | A                |
| Tripping time at 1 A                        | 1 to 40      | s                |
| Operating temperature range at max. voltage | 0 to 70 (95) | °C               |

| ELECTRICAL DATA AND ORDERING INFORMATION |             |                          |                                          |                         |              |                        |              |                             |                                              |                         |                          |
|------------------------------------------|-------------|--------------------------|------------------------------------------|-------------------------|--------------|------------------------|--------------|-----------------------------|----------------------------------------------|-------------------------|--------------------------|
| RESISTANCE                               |             | MATCHING<br>( $\Omega$ ) | V <sub>max.</sub><br>(V <sub>RMS</sub> ) | NON-TRIP<br>CURRENT     |              | TRIP<br>CURRENT        |              | MAX.<br>TRIP TIME<br>at 1 A | I <sub>max.</sub><br>AT<br>V <sub>max.</sub> | APPLICATION<br>AREA (2) | ORDERING PART<br>NUMBERS |
| R <sub>25</sub><br>( $\Omega$ )          | TOL.<br>(%) |                          |                                          | I <sub>nt</sub><br>(mA) | at T<br>(°C) | I <sub>t</sub><br>(mA) | at T<br>(°C) |                             |                                              |                         |                          |
| 25                                       | ± 20        | 1.0                      | 220                                      | 70                      | 70           | 200                    | 25           | 2.5                         | 4.0                                          | C.O.                    | PTCTL4MR250GTE           |
| 10                                       | ± 20        | 1.0                      | 230                                      | 100                     | 70           | 250                    | 25           | 3.0                         | 2.0                                          | MDF; ISDN               | PTCTL3MR100GTE           |
| 25                                       | ± 15        | no                       | 245                                      | 70                      | 70           | 200                    | 25           | 5.0                         | 2.6                                          | C.O.                    | PTCTL4NR250GTE           |
| 16                                       | ± 20        | no                       | 245                                      | 140                     | 55           | 270                    | 25           | 8.0                         | 1.6                                          | T.E.                    | PTCTL6NR160GTE           |
| 10                                       | ± 20        | no                       | 245                                      | 140                     | 55           | 270                    | 25           | 8.0                         | 2.0                                          | T.E.                    | PTCTL6NR100GTE           |
| 25                                       | ± 20        | 1.0                      | 250                                      | 70                      | 70           | 175                    | 25           | 1.3                         | 3.2                                          | MDF; C.O.               | PTCTL3MR250HTE           |
| 10                                       | ± 20        | no                       | 250                                      | 100                     | 70           | 450                    | 0            | 40.0                        | 10.0                                         | T.E.                    | PTCTL8NR100HBE           |
| 8                                        | ± 25        | 0.5                      | 285                                      | 135                     | 95           | 400                    | 25           | 6.0                         | 0.6                                          | MDF; ISDN               | PTCTL4MR080JBE           |
| 16                                       | ± 25        | no                       | 300                                      | 100                     | 70           | 250                    | 25           | 2.0                         | 2.6                                          | MDF; T.E.               | PTCTL3NR160KTE           |
| 10                                       | ± 20        | no                       | 350                                      | 100                     | 70           | 270                    | 25           | 4.0                         | 1.0                                          | T.E.; S.B.              | PTCTL4NR100LBE           |
| 10                                       | ± 20        | 1.0                      | 350                                      | 100                     | 70           | 270                    | 25           | 4.0                         | 1.0                                          | C.O.                    | PTCTL4MR100LTE           |
| 50                                       | ± 20        | 1.0                      | 600                                      | 50                      | 70           | 140                    | 25           | 1.0                         | 1.0                                          | C.O.                    | PTCTL4MR500SBE           |
| 35                                       | ± 20        | 3.0                      | 600                                      | 70                      | 70           | 600                    | 0            | 3.0                         | 1.0                                          | C.O.                    | PTCTL4MR350STE           |
| 25                                       | ± 20        | 0.5                      | 600                                      | 70                      | 70           | 170                    | 25           | 2.5                         | 2.0                                          | C.O.                    | PTCTL4MR250STE           |
| 25                                       | ± 20        | 0.5                      | 600                                      | 70                      | 70           | 170                    | 25           | 5.0                         | 2.0                                          | C.O.                    | PTCTL6MR250STE           |
| 10                                       | ± 20        | 0.5                      | 600                                      | 175                     | 25           | 400                    | 25           | 7.0                         | 1.0                                          | C.O.                    | PTCTL7MR100SBE (1)       |
| 10                                       | ± 20        | no                       | 600                                      | 175                     | 25           | 400                    | 25           | 7.0                         | 1.0                                          | T.E.; S.B.              | PTCTL7NR100SBE (1)       |

## Notes

- All types pass ITU-T K20-21-45 telecommunication protection recommendation
- (1) UL 1434 approved types and compatible with UL1459 and GR1089
- (2) MDF: Main Distribution Frame; C.O.: Central Office Switching; T.E.: Subscriber Terminal Equipment; S.B.: Set-top Box

## OVERCURRENT PROTECTION OF TELECOMMUNICATION LINES

The PTC thermistor must protect the telephone line circuit against overcurrent which may be caused by the following events:

- Surges due to lightning strikes on or near to the line plant.
- Short-term induction of alternating voltages from adjacent power lines or railway systems, usually caused when these lines or systems develop faults.
- Direct contact between telephone lines and power lines.

To provide good protection under such conditions a PTC thermistor is connected in series with each line, usually as secondary protection; see Typical Telephone Line drawing fig. 1. However, even with primary line protection (usually a gas discharge tube), the PTC thermistor must fulfil severe requirements.

Surge pulses of up to 2 kV can occur and in order to withstand short-term power induction the PTC thermistor must withstand high voltages. If the line has primary protection a 220 V to 300 V PTC thermistor is adequate. Without primary protection, however, a 600 V PTC device is necessary. Vishay BCcomponents manufactures a range of PTC thermistors (see Electrical Data and Ordering Information Table) covering both requirements.

In the case of direct contact between the telephone line and a power line, the PTC thermistor must withstand very high inrush power at normal mains voltage. Under such conditions, overload currents of up to 10 A on a 230 V mains could occur for up to several hours. To handle this power, the resistance/temperature characteristic of the thermistor must have a very steep slope and the ceramic must be extremely homogeneous.

In case of overcurrent due to short-term induction of alternating voltages, currents of several amperes with voltages as high as 650 V<sub>RMS</sub> can be present for several seconds.

For standard high voltage applications, resistance values from 25  $\Omega$  to 50  $\Omega$  are available. However, ISDN networks which carry high-frequency sound and vision, need lower line impedance.

Telecommunication designers are therefore demanding high voltage thermistors with much lower  $R_{25}$  values, which places even greater demands on the manufacture of PTC thermistors. For these applications PTC thermistors which have a  $R_{25}$  value of 10  $\Omega$  with voltages in the 300 V<sub>RMS</sub> to 600 V<sub>RMS</sub> range are available.

In a typical telephone line application, two PTC thermistors are used, one each for the tip and ring (or A and B) wire together with their series resistors. For good line balance it is important that the thermistor and resistor pairs are matched.

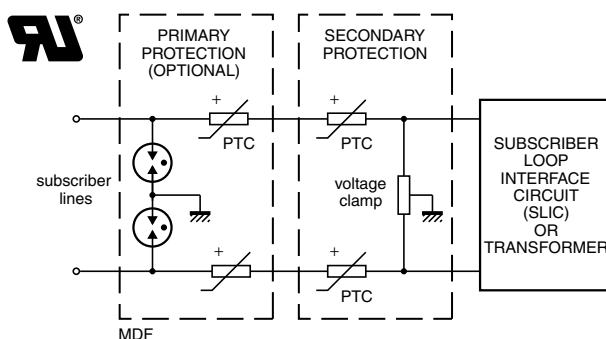
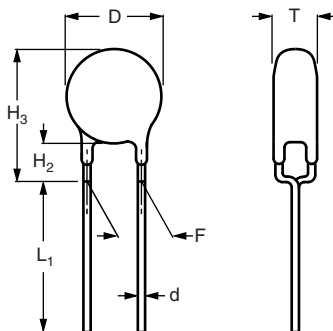


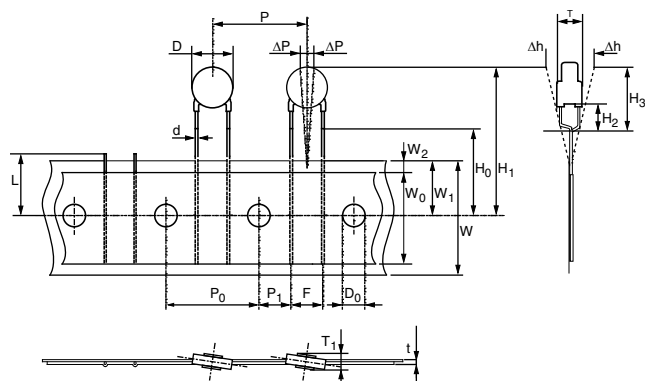
Fig. 1 - Typical telephone line showing where PTC thermistors can be used for overcurrent protection.

**PTC THERMISTORS IN BULK**


| <b>COMPONENT DIMENSIONS (in mm)</b> |                   |                      |                      |                               |                      |                                    |            |                                 |
|-------------------------------------|-------------------|----------------------|----------------------|-------------------------------|----------------------|------------------------------------|------------|---------------------------------|
| <b>D<br/>MAX.</b>                   | <b>T<br/>MAX.</b> | <b>H<sub>2</sub></b> | <b>L<sub>1</sub></b> | <b>H<sub>3</sub><br/>MAX.</b> | <b>H<sub>0</sub></b> | <b>PACKAGING <sup>(1)(2)</sup></b> |            | <b>ORDERING PART<br/>NUMBER</b> |
|                                     |                   |                      |                      |                               |                      | <b>TYPE</b>                        | <b>SPQ</b> |                                 |
| 8.5                                 | 5.0               | 1.5 to 3.0           | -                    | 11.5                          | 16                   | Taped on reel                      | 1500       | PTCTL4MR250GTE                  |
| 7.0                                 | 4.0               | 2.0 ± 0.5            | -                    | 9.8                           | 18                   | Taped on reel                      | 1500       | PTCTL3MR100GTE                  |
| 8.3                                 | 4.0               | 1.5 to 3.0           | -                    | 11.0                          | 18                   | Taped on reel                      | 1500       | PTCTL4NR250GTE <sup>(3)</sup>   |
| 11                                  | 4.5               | 4.0 ± 1.0            | -                    | 15.5                          | 16                   | Taped on reel                      | 1500       | PTCTL6NR160GTE                  |
| 11                                  | 4.5               | 4.0 ± 1.0            | -                    | 15.5                          | 16                   | Taped on reel                      | 1500       | PTCTL6NR100GTE <sup>(3)</sup>   |
| 7.0                                 | 4.0               | 2.0 ± 0.5            | -                    | 9.8                           | 18                   | Taped on reel                      | 1500       | PTCTL3MR250HTE                  |
| 13.6                                | 6.0               | 4.0 ± 1.0            | 20 ± 4.0             | 18.6                          | -                    | Bulk                               | 200        | PTCTL8NR100HBE <sup>(3)</sup>   |
| 8.3                                 | 5.0               | 1.5 ± 0.5            | 20 ± 3.0             | 10.3                          | -                    | Bulk                               | 250        | PTCTL4MR080JBE                  |
| 7.0                                 | 4.0               | 2.5 ± 0.5            | -                    | 10.0                          | 16                   | Taped on reel                      | 1500       | PTCTL3NR160KTE                  |
| 8.5                                 | 4.0               | 2.5 ± 0.5            | 4.1 ± 0.5            | 11.5                          | -                    | Bulk                               | 500        | PTCTL4NR100LBE                  |
| 8.5                                 | 4.0               | 2.5 ± 0.5            | -                    | 11.5                          | 16                   | Taped on reel                      | 1500       | PTCTL4MR100LTE                  |
| 8.5                                 | 4.0               | 2.5 ± 0.5            | 4.1 ± 0.5            | 11.5                          | -                    | Bulk                               | 500        | PTCTL4MR500SBE                  |
| 8.0                                 | 5.0               | 2.5 ± 0.5            | -                    | 11.0                          | 16                   | Taped on reel                      | 1500       | PTCTL4MR350STE                  |
| 8.5                                 | 4.0               | 2.0 ± 0.5            | -                    | 11.0                          | 16                   | Taped on reel                      | 1500       | PTCTL4MR250STE                  |
| 10.5                                | 5.0               | 2.0 ± 0.5            | -                    | 12.6                          | 16                   | Taped on reel                      | 1500       | PTCTL6MR250STE                  |
| 13                                  | 5.5               | 4.0 ± 1.0            | 20 min.              | 18.0                          | -                    | Bulk                               | 200        | PTCTL7MR100SBE                  |
| 13                                  | 5.5               | 4.0 ± 1.0            | 20 min.              | 18.0                          | -                    | Bulk                               | 200        | PTCTL7NR100SBE                  |

**Notes**

- (1) Taped in accordance with IEC 60286-2  
(2) Metallized ceramic pellet for clamping or substrate mounting, available on request  
(3) Insulated version is also available

**PTC THERMISTORS ON TAPE AND REEL**

**TAPE AND REEL ACCORDING TO  
IEC 60286-2 (in mm)**

| <b>SYMBOL</b>  | <b>PARAMETER</b>                                               | <b>DIMENSIONS</b> | <b>TOLERANCE</b> |
|----------------|----------------------------------------------------------------|-------------------|------------------|
| D              | Body diameter                                                  | see table         | max.             |
| d              | Lead diameter                                                  | 0.6               | ± 0.05           |
| P              | Pitch between thermistors                                      | 12.7              | ± 1              |
| P <sub>0</sub> | Feedhole pitch                                                 | 12.7              | ± 0.3            |
| F              | Leadcenter to leadcenter distance (between component and tape) | 5                 | + 0.5 / - 0.2    |
| H <sub>0</sub> | Lead wire clinch height                                        | see table         | ± 0.5            |
| H <sub>2</sub> | Component bottom to seating plane                              | see table         | see table        |
| H <sub>3</sub> | Component top to seating plane                                 | see table         | max.             |
| T              | Total thickness                                                | see table         | max.             |



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