

## PTC Thermistors, Time Delay for Lighting



### QUICK REFERENCE DATA

| PARAMETER                                    | VALUE      | UNIT             |
|--|------------|------------------|
| Rated voltage (RMS)                          | 80 to 200  | V <sub>RMS</sub> |
| Nominal switching current                    | 150 to 500 | mA               |
| Resistance at 25 °C ( $R_{25}$ )             | 100 to 625 | $\Omega$         |
| Tolerance on $R_{25}$ value                  | 20 to 30   | %                |
| Maximum overload current $I_{ol}$            | 0.5 to 1.0 | A                |
| Tripping time                                | 0.3 to 1   | s                |
| Operating temperature range at rated voltage | -20 to 105 | °C               |

### DESCRIPTION

Positive temperature coefficient (PTC) thermistors for overload protection have proved to be the ideal electronic ballast component for increased lamp life-time.

When the rectified mains is first applied, the PTC thermistor is cold, so its resistance is low. The lamp voltage will be below the necessary ignition value, so the current will flow through the cathodes, heating them to their emission temperature. At the same time, the PTC thermistor will heat up to its switch temperature, whereupon its resistance will rise rapidly, allowing the lamp voltage to reach its ignition value and light the lamp.

Once the lamp is lit, the cathodes are fed by a high-frequency lamp supply, to avoid flicker and improve efficiency. The PTC thermistor plays no further part until the lamp is switched off, whereupon it is ready to resume its smooth-starting function.

We supply a range of lighting PTC thermistors for this application offering a wide choice of voltage and switch times.

### FEATURES

- Reliable lamp starting, due to well defined inrush-current generated time delay
- Accurate resistance for ease of circuit design
- Small size and durable
- Available bulk-packed or taped-on-reel
- Long life: More than 20 000 starts for a 20 W CFL lamp
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### APPLICATIONS

Fluorescent lighting and lighting ballasts for:

- CFL 5 to 25 W range
- TL HF-ballasts

### MOUNTING

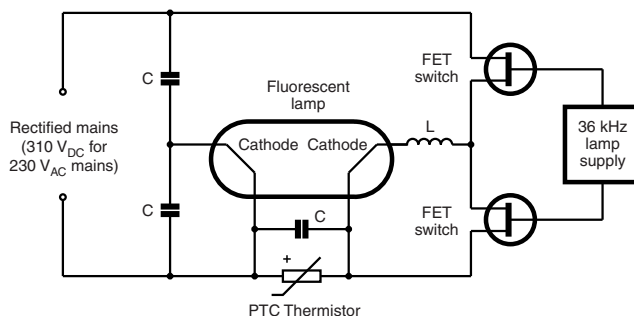
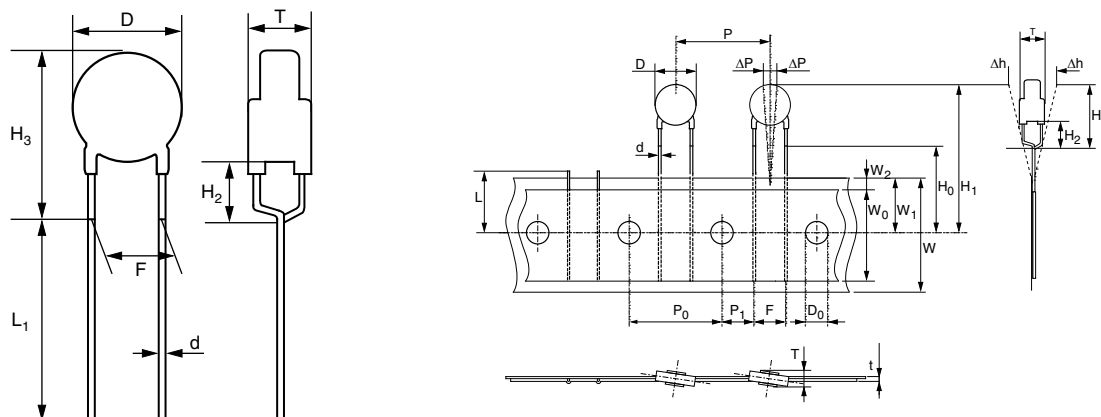
The leads are suitable for soldering in any position. The lacquer may cover the leads up to 1.0 mm from the seating plane.

### ELECTRICAL DATA AND ORDERING INFORMATION

| $R_{25}$<br>( $\Omega$ ) |      | SWITCH<br>TEMPERATURE<br>(°C) | MAXIMUM<br>PEAK VOLTAGE <sup>(4)</sup><br>(V <sub>peak</sub> ) | TYPICAL <sup>(1)</sup><br>TRIP TIME at 25 °C |                           | CATALOG NUMBER                |
|--------------------------|------|-------------------------------|--|--|---------------------------|-------------------------------|
| MIN.                     | MAX. |                               |  | t <sub>trip</sub><br>(s)                     | at I <sub>t</sub><br>(mA) |                               |
| 500                      | 750  | ≈ 110                         | 700  | 0.4  | 200                       | PTCLL05P131TBE <sup>(2)</sup> |
| 185                      | 300  | ≈ 120                         | 700  | 0.5  | 300                       | PTCLL05P211TTE <sup>(2)</sup> |
| 75                       | 125  | ≈ 80                          | 700  | 0.7  | 300                       | PTCLL05P251TTE <sup>(2)</sup> |
| 225                      | 375  | ≈ 105                         | 900  | 0.75   | 300                       | PTCLL07P261VTE <sup>(3)</sup> |
| 75                       | 125  | ≈ 105                         | 1 000  | 0.85   | 500                       | PTCLL07P421WTE <sup>(3)</sup> |

#### Notes

- (1) Ignition time of the lamp approximately equals the tripping time.
- (2) Specific for CFL lamp electronic starter.
- (3) Specific for HF-TL ballast.
- (4) Highest lamp ignition voltage should be smaller than the maximum allowable peak voltage.

**TYPICAL ELECTRONIC BALLAST CIRCUIT**

**DIMENSIONS** in millimeters


| D <sub>max.</sub> | T <sub>max.</sub> | H <sub>3</sub> | L <sub>1</sub> | WEIGHT (g) | FIGURES | PACKAGING | SPQ  | MATERIAL ORDERING NUMBER |
|-------------------|-------------------|----------------|----------------|------------|---------|-----------|------|--------------------------|
| 5.4               | 4.5               | 10             | 3.5 ± 0.5      | ≈ 0.33     | Fig. 1  | Bulk      | 500  | PTCLL05P131TBE           |
| 5.4               | 4.5               | 9              | -              | ≈ 0.45     | Fig. 2  | On tape   | 1500 | PTCLL05P211TTE           |
| 5.4               | 4.5               | 10             | -              | ≈ 0.45     | Fig. 2  | On tape   | 1500 | PTCLL05P251TTE           |
| 7.0               | 5.0               | 12             | -              | ≈ 0.66     | Fig. 2  | On tape   | 1500 | PTCLL07P261VTE           |
| 7.0               | 5.0               | 12             | -              | ≈ 0.66     | Fig. 2  | On tape   | 1500 | PTCLL07P421WTE           |

**TAPE AND OTHER DEVICE DIMENSIONS** in millimeters according IEC 60286 for tape on reel

| SYMBOL         | PARAMETER   | DIMENSIONS | TOLERANCE   |
|----------------|---|------------|-------------|
| d              | Lead diameter   | 0.6        | ± 0.05      |
| P              | Pitch between thermistors                                   | 12.7       | ± 1         |
| F              | Lead to lead distance guaranteed between component and tape | 5          | +0.5 / -0.2 |
| H <sub>2</sub> | Component body to seating plane                             | 4          | ± 1         |
| H <sub>0</sub> | Lead-wire clinch height                                     | 16         | ± 0.5       |



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