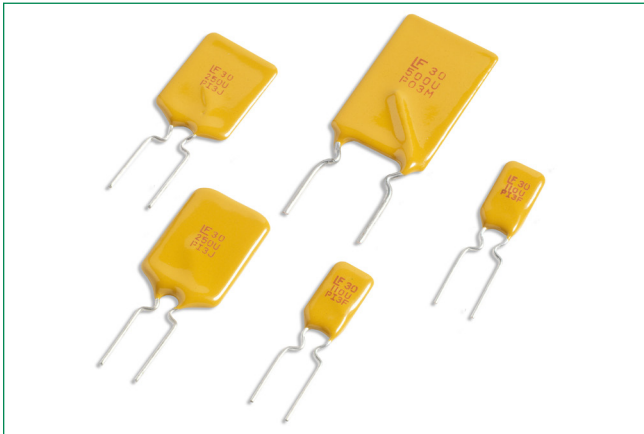


# 30R Series

## Radial Leaded



### Description

The 30R Series radial leaded device is designed to provide overcurrent protection for low voltage ( $\leq 30V$ ) applications where space is not a concern and resettable protection is preferred.

### Features & Benefits

- Cured, flame retardant epoxy polymer insulating material meets UL 94V-0 requirements
- Fast time-to-trip
- RoHS compliant, Lead-Free and Halogen-Free\*

### Applications

- USB hubs, ports and peripherals
- Computers & peripherals
- Motor protection
- General electronics
- Automotive applications

### Additional Information



Resources



Accessories



Samples

### Agency Approvals

| Agency | Agency File Number |
|--------|--------------------|
|        | E74889             |
|        | R72161784          |

### Electrical Characteristics

| Part Number | $I_{hold}$ (A) | $I_{trip}$ (A) | $V_{max}$ (Vdc) | $I_{max}$ (A) | $P_d$ typ. (W) | Maximum Time To Trip |             | Resistance             |                         | Agency Approvals |   |
|-------------|----------------|----------------|-----------------|---------------|----------------|----------------------|-------------|------------------------|-------------------------|------------------|---|
|             |                |                |                 |               |                | Current (A)          | Time (Sec.) | $R_{min}$ ( $\Omega$ ) | $R_{1max}$ ( $\Omega$ ) |                  |   |
| 30R090U     | 0.90           | 1.80           | 30              | 40            | 0.6            | 4.50                 | 5.90        | 0.070                  | 0.220                   | X                | X |
| 30R110U     | 1.10           | 2.20           | 30              | 40            | 0.7            | 5.50                 | 6.60        | 0.050                  | 0.170                   | X                | X |
| 30R135U     | 1.35           | 2.70           | 30              | 40            | 0.8            | 6.75                 | 7.30        | 0.040                  | 0.130                   | X                | X |
| 30R160U     | 1.60           | 3.20           | 30              | 40            | 0.9            | 8.00                 | 8.00        | 0.030                  | 0.110                   | X                | X |
| 30R185U     | 1.85           | 3.70           | 30              | 40            | 1.0            | 9.25                 | 8.70        | 0.030                  | 0.090                   | X                | X |
| 30R250U     | 2.50           | 5.00           | 30              | 40            | 1.2            | 12.50                | 10.30       | 0.020                  | 0.070                   | X                | X |
| 30R300U     | 3.00           | 6.00           | 30              | 40            | 2.0            | 15.00                | 10.80       | 0.020                  | 0.080                   | X                | X |
| 30R400U     | 4.00           | 8.00           | 30              | 40            | 2.5            | 20.00                | 12.70       | 0.010                  | 0.050                   | X                | X |
| 30R500U     | 5.00           | 10.00          | 30              | 40            | 3.0            | 25.00                | 14.50       | 0.010                  | 0.050                   | X                | X |
| 30R600U     | 6.00           | 12.00          | 30              | 40            | 3.5            | 30.00                | 16.00       | 0.005                  | 0.040                   | X                | X |
| 30R700U     | 7.00           | 14.00          | 30              | 40            | 3.8            | 35.00                | 17.50       | 0.005                  | 0.030                   | X                | X |
| 30R800U     | 8.00           | 16.00          | 30              | 40            | 4.0            | 40.00                | 18.80       | 0.005                  | 0.020                   | X                | X |
| 30R900U     | 9.00           | 18.00          | 30              | 40            | 4.2            | 40.00                | 20.00       | 0.005                  | 0.020                   | X                | X |

**Caution:** Operation beyond the specified rating may result in damage and possible arcing and flame.

$I_{hold}$  = Hold current: maximum current device will pass without tripping in 20°C still air.  
 $I_{trip}$  = Trip current: minimum current at which the device will trip in 20°C still air.  
 $V_{max}$  = Maximum voltage the device can withstand without damage at rated current ( $I_{max}$ )  
 $V_{op}$  = The device regular operation voltage  
 $I_{max}$  = Maximum fault current device can withstand without damage at rated voltage ( $V_{max}$ )  
 $P_d$  = Power dissipated from device when in the tripped state at 20°C still air.

$R_{min}$  = Minimum resistance of device in initial (un-soldered) state.  
 $R_{typ}$  = Typical resistance of device in initial (un-soldered) state.  
 $R_{1max}$  = Maximum resistance of device at 20°C measured one hour after tripping.

\* Effective February 11, 2010 onward, all 600R PTC products will be manufactured Halogen Free (HF). Existing Non-Halogen Free 600R PTC products may continue to be sold, until supplies are depleted. This change will have no effect on 600R product specifications or performance.

#### Warning

- Users shall independently assess the suitability of these devices for each of their applications
- Operation of these devices beyond the stated maximum ratings could result in damage to the devices and lead to electrical arcing and/or fire
- These devices are intended to protect against the effects of temporary over-current or over-temperature conditions and are not intended to perform as protective devices where such conditions are expected to be repetitive or prolonged in duration
- Exposure to silicon-based oils, solvents, electrolytes, acids, and similar materials can adversely affect the performance of these PPTC devices
- These devices undergo thermal expansion under fault conditions, and thus shall be provided with adequate space and be protected against mechanical stresses
- Circuits with inductance may generate a voltage ( $L di/dt$ ) above the rated voltage of the PPTC device.

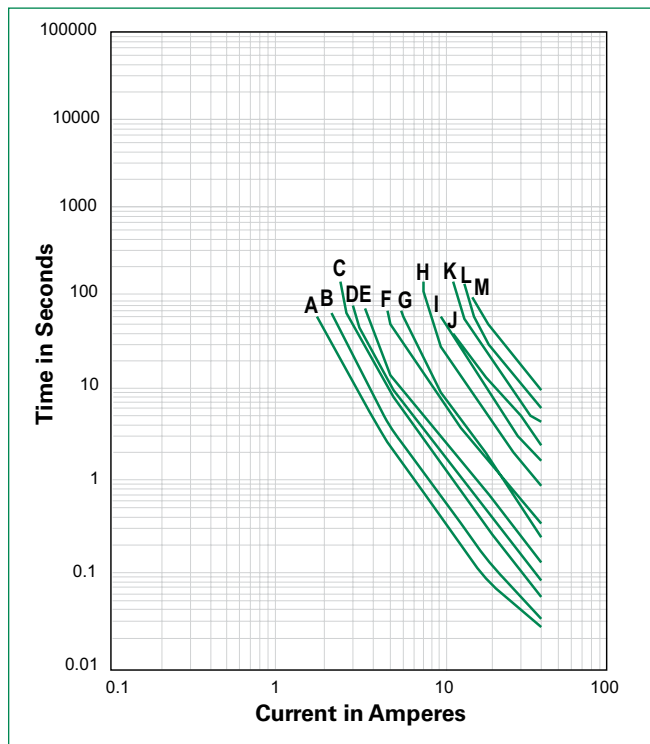
# 30R Series

## Radial Leaded

### Temperature Derating

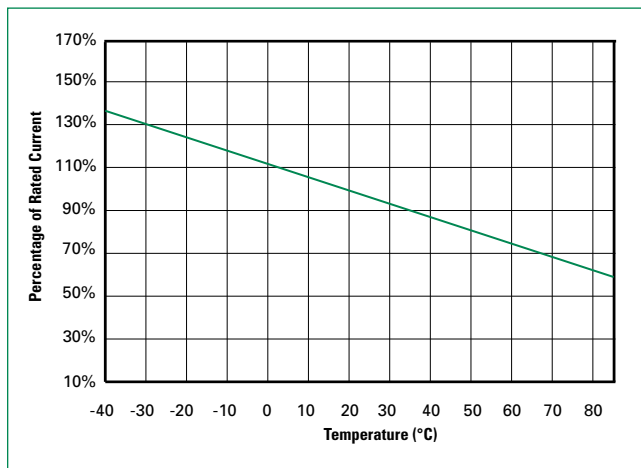
| Part Number | Ambient Operation Temperature |       |       |      |      |      |      |      |      |
|-------------|-------------------------------|-------|-------|------|------|------|------|------|------|
|             | -40°C                         | -20°C | 0°C   | 20°C | 40°C | 50°C | 60°C | 70°C | 85°C |
| 30R090U     | 1.31                          | 1.17  | 1.04  | 0.90 | 0.75 | 0.69 | 0.61 | 0.55 | 0.47 |
| 30R110U     | 1.60                          | 1.43  | 1.27  | 1.10 | 0.91 | 0.85 | 0.75 | 0.67 | 0.57 |
| 30R135U     | 1.96                          | 1.76  | 1.55  | 1.35 | 1.12 | 1.04 | 0.92 | 0.82 | 0.70 |
| 30R160U     | 2.32                          | 2.08  | 1.84  | 1.60 | 1.33 | 1.23 | 1.09 | 0.98 | 0.83 |
| 30R185U     | 2.68                          | 2.41  | 2.13  | 1.85 | 1.54 | 1.42 | 1.26 | 1.13 | 0.96 |
| 30R250U     | 3.63                          | 3.25  | 2.88  | 2.50 | 2.08 | 1.93 | 1.70 | 1.53 | 1.30 |
| 30R300U     | 4.35                          | 3.90  | 3.45  | 3.00 | 2.49 | 2.31 | 2.04 | 1.83 | 1.56 |
| 30R400U     | 5.80                          | 5.20  | 4.60  | 4.00 | 3.32 | 3.08 | 2.72 | 2.44 | 2.08 |
| 30R500U     | 7.25                          | 6.50  | 5.75  | 5.00 | 4.15 | 3.85 | 3.40 | 3.05 | 2.60 |
| 30R600U     | 8.70                          | 7.80  | 6.90  | 6.00 | 4.98 | 4.62 | 4.08 | 3.66 | 3.12 |
| 30R700U     | 10.15                         | 9.10  | 8.05  | 7.00 | 5.81 | 5.39 | 4.76 | 4.27 | 3.64 |
| 30R800U     | 11.60                         | 10.40 | 9.20  | 8.00 | 6.64 | 6.16 | 5.44 | 4.88 | 4.16 |
| 30R900U     | 13.05                         | 11.70 | 10.35 | 9.00 | 7.47 | 6.93 | 6.12 | 5.49 | 4.68 |

### Average Time Current Curves



The average time current curves and Temperature Derating curve performance is affected by a number of variables, and these curves provided as guidance only. Customer must verify the performance in their application.

### Temperature Derating Curve



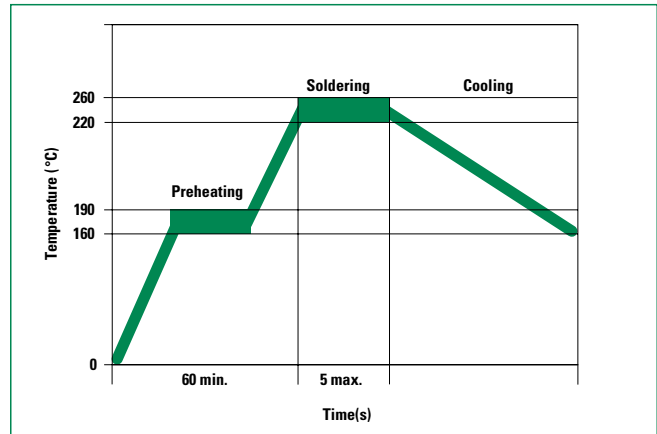
Note: Typical Temperature derating curve, refer to table for derating data

# 30R Series

## Radial Leaded

### Soldering Parameters - Wave Soldering

|                         |  |
|-------------------------|--|
| <b>Pre-Heating Zone</b> | Refer to the condition recommended by the flux manufacturer.<br>Max. ramping rate should not exceed 4°C/Sec.   |
| <b>Soldering Zone</b>   | Max. solder temperature should not exceed 260°C.<br>Time within 5°C of actual Max. solder temperature within 3 - 5 seconds.<br>Total time from 25°C room to Max. solder temperature within 5 minutes including Pre-Heating time. |
| <b>Cooling Zone</b>     | Cooling by natural convection in air.<br>Max. ramping down rate should not exceed 6°C/Sec.   |



### Physical Specifications

|                                  |   |
|----------------------------------|---|
| <b>Lead Material</b>             | 0.90-1.85A: Tin-plated Copper clad steel<br>2.50-9.00A: Tin-plated Copper |
| <b>Soldering Characteristics</b> | Solderability per MIL-STD-202, Method 208                                 |
| <b>Insulating Material</b>       | Cured, flame retardant epoxy polymer meets UL94V-0 requirements.          |
| <b>Device Labeling</b>           | Marked with 'LF', voltage, current rating, and date code.                 |

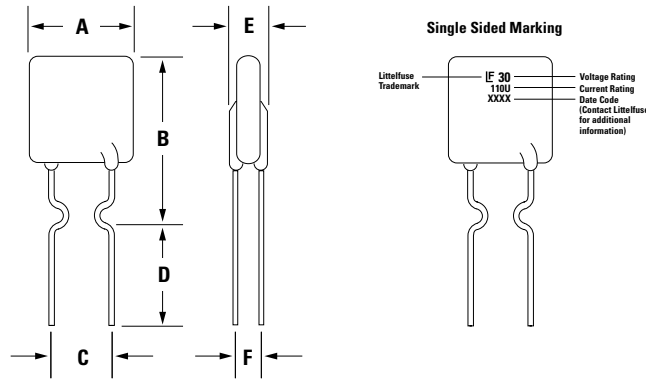
### Environmental Specifications

|  |  |
|--|--|
| <b>Operating Temperature</b>                               | -40°C to +85°C   |
| <b>Maximum Device Surface Temperature in Tripped State</b> | 125°C  |
| <b>Passive Aging</b>                                       | +85°C, 1000 hours<br>-/+5% typical resistance change           |
| <b>Humidity Aging</b>                                      | +85°C, 85% R.H., 1000 hours<br>-/+5% typical resistance change |
| <b>Thermal Shock</b>                                       | +85°C to -40°C 10 times<br>-/+5% typical resistance change     |
| <b>Solvent Resistance</b>                                  | MIL-STD-202, Method 215<br>No change                           |
| <b>Moisture Resistance Level</b>                           | Level 1, J-STD-020   |

# 30R Series

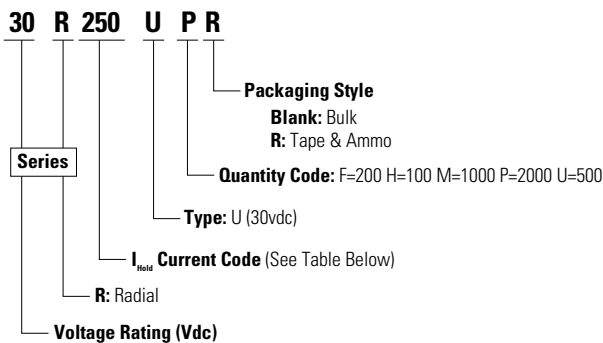
## Radial Leaded

### Dimensions & Part Marking System



| Part Number | A      |       | B      |       | C      |       | D      |      | E      |      | F      |      | Physical Characteristics |      |          |
|-------------|--------|-------|--------|-------|--------|-------|--------|------|--------|------|--------|------|--------------------------|------|----------|
|             | Inches | mm    | Inches | mm    | Inches | mm    | Inches | mm   | Inches | mm   | Inches | mm   | Lead (dia)               |      | Material |
|             | Max.   | Max.  | Max.   | Max.  | Typ.   | Typ.  | Min.   | Min. | Max.   | Max. | Typ.   | Typ. | Inches                   | mm   |          |
| 30R090U     | 0.29   | 7.40  | 0.48   | 12.20 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.039  | 1.0  | 0.02                     | 0.51 | Sn/CuFe  |
| 30R110U     | 0.29   | 7.40  | 0.56   | 14.20 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.039  | 1.0  | 0.02                     | 0.51 | Sn/CuFe  |
| 30R135U     | 0.35   | 8.90  | 0.53   | 13.50 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.039  | 1.0  | 0.02                     | 0.51 | Sn/CuFe  |
| 30R160U     | 0.35   | 8.90  | 0.60   | 15.20 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.039  | 1.0  | 0.02                     | 0.51 | Sn/CuFe  |
| 30R185U     | 0.40   | 10.20 | 0.62   | 15.70 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.039  | 1.0  | 0.02                     | 0.51 | Sn/CuFe  |
| 30R250U     | 0.45   | 11.40 | 0.72   | 18.30 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.039  | 1.0  | 0.02                     | 0.51 | Sn/Cu    |
| 30R300U     | 0.45   | 11.40 | 0.76   | 19.20 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.047  | 1.2  | 0.03                     | 0.81 | Sn/Cu    |
| 30R400U     | 0.55   | 14.00 | 0.87   | 22.00 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.047  | 1.2  | 0.03                     | 0.81 | Sn/Cu    |
| 30R500U     | 0.55   | 14.00 | 1.01   | 25.60 | 0.40   | 10.20 | 0.30   | 7.60 | 0.12   | 3.00 | 0.047  | 1.2  | 0.03                     | 0.81 | Sn/Cu    |
| 30R600U     | 0.65   | 16.50 | 1.06   | 26.80 | 0.40   | 10.20 | 0.30   | 7.60 | 0.12   | 3.00 | 0.047  | 1.2  | 0.03                     | 0.81 | Sn/Cu    |
| 30R700U     | 0.75   | 19.10 | 1.13   | 28.60 | 0.40   | 10.20 | 0.30   | 7.60 | 0.12   | 3.00 | 0.047  | 1.2  | 0.03                     | 0.81 | Sn/Cu    |
| 30R800U     | 0.85   | 21.60 | 1.22   | 31.10 | 0.40   | 10.20 | 0.30   | 7.60 | 0.12   | 3.00 | 0.047  | 1.2  | 0.03                     | 0.81 | Sn/Cu    |
| 30R900U     | 0.95   | 24.10 | 1.24   | 31.60 | 0.40   | 10.20 | 0.30   | 7.60 | 0.12   | 3.00 | 0.047  | 1.2  | 0.03                     | 0.81 | Sn/Cu    |

### Part Ordering Number System



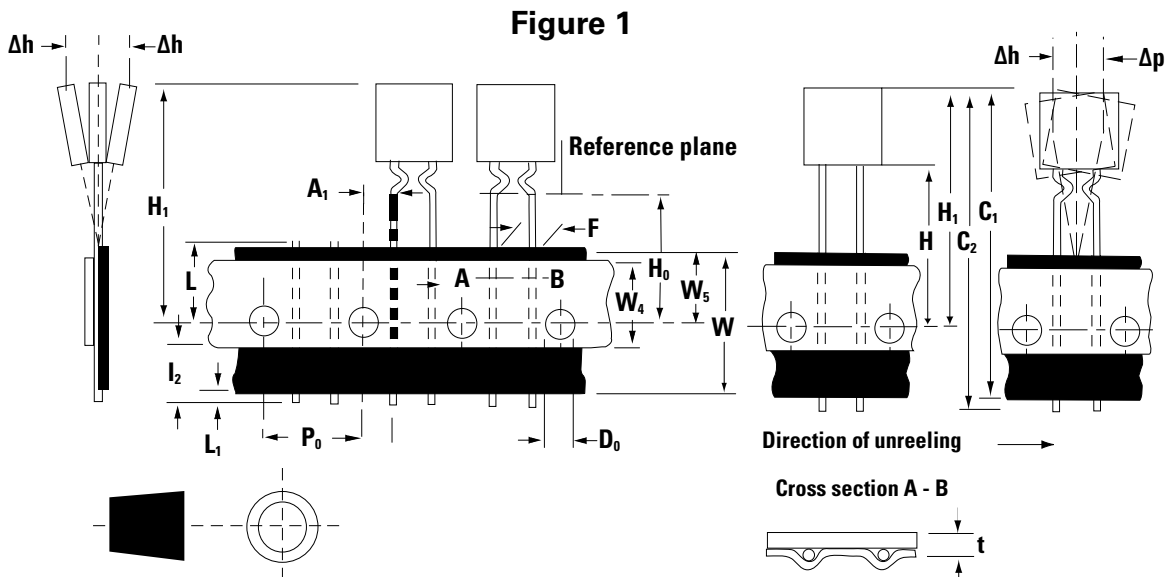
# 30R Series

## Radial Leaded

### Packaging

| Part Number | Ordering Number | $I_{hold}$ (A) | $I_{hold}$ Code | Packaging Option | Quantity | Quantity & Packaging Codes |
|-------------|-----------------|----------------|-----------------|------------------|----------|----------------------------|
| 30R090U     | 30R090UU        | 0.90           | 090             | Bulk             | 500      | U                          |
|             | 30R090UPR       |                |                 | Tape and Ammo    | 2000     | PR                         |
| 30R110U     | 30R110UU        | 1.10           | 110             | Bulk             | 500      | U                          |
|             | 30R110UPR       |                |                 | Tape and Ammo    | 2000     | PR                         |
| 30R135U     | 30R135UU        | 1.35           | 135             | Bulk             | 500      | U                          |
|             | 30R135UPR       |                |                 | Tape and Ammo    | 2000     | PR                         |
| 30R160U     | 30R160UU        | 1.60           | 160             | Bulk             | 500      | U                          |
|             | 30R160UPR       |                |                 | Tape and Ammo    | 2000     | PR                         |
| 30R185U     | 30R185UU        | 1.85           | 185             | Bulk             | 500      | U                          |
|             | 30R185UPR       |                |                 | Tape and Ammo    | 2000     | PR                         |
| 30R250U     | 30R250UU        | 2.50           | 250             | Bulk             | 500      | U                          |
|             | 30R250UPR       |                |                 | Tape and Ammo    | 2000     | PR                         |
| 30R300U     | 30R300UU        | 3.00           | 300             | Bulk             | 500      | U                          |
|             | 30R300UPR       |                |                 | Tape and Ammo    | 2000     | PR                         |
| 30R400U     | 30R400UF        | 4.00           | 400             | Bulk             | 200      | F                          |
|             | 30R400UMR       |                |                 | Tape and Ammo    | 1000     | MR                         |
| 30R500U     | 30R500UF        | 5.00           | 500             | Bulk             | 200      | F                          |
|             | 30R500UMR       |                |                 | Tape and Ammo    | 1000     | MR                         |
| 30R600U     | 30R600UF        | 6.00           | 600             | Bulk             | 200      | F                          |
|             | 30R600UMR       |                |                 | Tape and Ammo    | 1000     | MR                         |
| 30R700U     | 30R700UMR       | 7.00           | 700             | Tape and Ammo    | 1000     | MR                         |
| 30R800U     | 30R800UH        | 8.00           | 800             | Bulk             | 100      | H                          |
| 30R900U     | 30R900UH        | 9.00           | 900             | Bulk             | 100      | H                          |
|             | 30R900UMR       |                |                 | Tape and Ammo    | 1000     | MR                         |

### Tape and Ammo Diagram



# 30R Series

## Radial Leaded

### Tape and Ammo Specifications

Devices taped using EIA468-B/IE286-2 standards. See table below and Figure 1 for details.

| Dimension  | EIA Mark             | IEC Mark             | Dimensions      |              |
|--|----------------------|----------------------|-----------------|--------------|
|  |                      |                      | Dim. (mm)       | Tol. (mm)    |
| Carrier tape width                               | <b>W</b>             | <b>W</b>             | 18              | -0.5 / +1.0  |
| Hold down tape width:                            | <b>W<sub>4</sub></b> | <b>W<sub>0</sub></b> | 11              | min.         |
| Top distance between tape edges                  | <b>W<sub>6</sub></b> | <b>W<sub>2</sub></b> | 3               | max.         |
| Sprocket hole position                           | <b>W<sub>5</sub></b> | <b>W<sub>1</sub></b> | 9               | -0.5 / +0.75 |
| Sprocket hole diameter*                          | <b>D<sub>0</sub></b> | <b>D<sub>0</sub></b> | 4               | -0.32 / +0.2 |
| Abscissa to plane(straight lead)                 | <b>H</b>             | <b>H</b>             | 18.5            | -/+ 3.0      |
| Abscissa to plane(kinked lead)                   | <b>H<sub>0</sub></b> | <b>H<sub>0</sub></b> | 16              | -/+ 0.5      |
| Abscissa to top: 30R090-30R185                   | <b>H<sub>1</sub></b> | <b>H<sub>1</sub></b> | 32.2            | max.         |
| Abscissa to top: 30R250-30R900                   | -                    | -                    | 45.0            | max.         |
| Overall width w/o lead protrusion: 30R090-30R185 | <b>C<sub>1</sub></b> | -                    | 42.5            | max.         |
| Overall width w/o lead protrusion: 30R250-30R900 | -                    | -                    | 56              | max.         |
| Overall width w/ lead protrusion: 30R090-30R185  | <b>C<sub>2</sub></b> | -                    | 43.2            | max.         |
| Overall width w/ lead protrusion: 30R250-30R900  | -                    | -                    | 57              | max.         |
| Lead protrusion                                  | <b>L<sub>1</sub></b> | <b>L<sub>1</sub></b> | 1.0             | max.         |
| Protrusion of cut out                            | <b>L</b>             | <b>L</b>             | 11              | max.         |
| Protrusion beyond hold-down tape                 | <b>I<sub>2</sub></b> | <b>I<sub>2</sub></b> | Not specified   | -            |
| Sprocket hole pitch: 30R090-30R300               | <b>P<sub>0</sub></b> | <b>P<sub>0</sub></b> | 12.7            | -/+ 0.3      |
| Sprocket hole pitch on: 30R400-30R900            | <b>P<sub>0</sub></b> | <b>P<sub>0</sub></b> | 25.4            | -/+ 0.5      |
| Device pitch: 30R090-30R300                      | -                    | -                    | 12.7            | -            |
| Device pitch: 30R400-30R900                      | -                    | -                    | 25.4            | -            |
| Pitch tolerance                                  | -                    | -                    | 20 consecutive. | -/+ 1        |
| Tape thickness                                   | <b>t</b>             | <b>t</b>             | 0.9             | max.         |
| Tape thickness with splice: 30R090-30R250        | <b>t<sub>1</sub></b> | -                    | 1.5             | max.         |
| Tape thickness with splice: 30R300-30R900        | <b>t<sub>1</sub></b> | -                    | 2.0             | max.         |
| Splice sprocket hole alignment                   | -                    | -                    | 0               | -/+ 0.3      |
| Body lateral deviation                           | <b>Δh</b>            | <b>Δh</b>            | 0               | -/+ 1.0      |
| Body tape plane deviation                        | <b>Δp</b>            | <b>Δp</b>            | 0               | -/+ 1.3      |
| Ordinate to adjacent component lead*             | <b>P<sub>1</sub></b> | <b>P<sub>1</sub></b> | 3.81            | -/+ 0.7      |
| Ordinate to adjacent component lead*             | -                    | -                    | 7.62            | -/+ 0.7      |
| Lead spacing: 30R090-30R400                      | <b>F</b>             | <b>F</b>             | 5.08            | -/+ 0.8      |
| Lead spacing: 30R500-30R900                      | <b>F</b>             | <b>F</b>             | 10.18           | -/+ 0.8      |

**Note:** \*Differs from EIA Specification

#### Warning

- Users shall independently assess the suitability of these devices for each of their applications
- Operation of these devices beyond the stated maximum ratings could result in damage to the devices and lead to electrical arcing and/or fire
- These devices are intended to protect against the effects of temporary over-current or over-temperature conditions and are not intended to perform as protective devices where such conditions are expected to be repetitive or prolonged in duration
- Exposure to silicon-based oils, solvents, electrolytes, acids, and similar materials can adversely affect the performance of these PPTC devices
- These devices undergo thermal expansion under fault conditions, and thus shall be provided with adequate space and be protected against mechanical stresses
- Circuits with inductance may generate a voltage (L di/dt) above the rated voltage of the PPTC device.

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