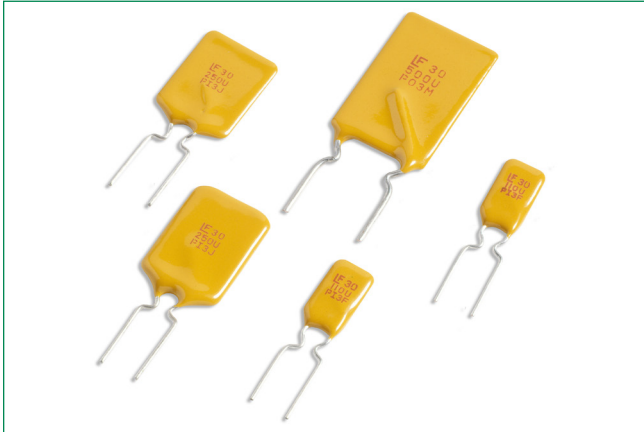


30R Series

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} (Ω) | R_{1max} (Ω) | | |
| 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_{int} = 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.

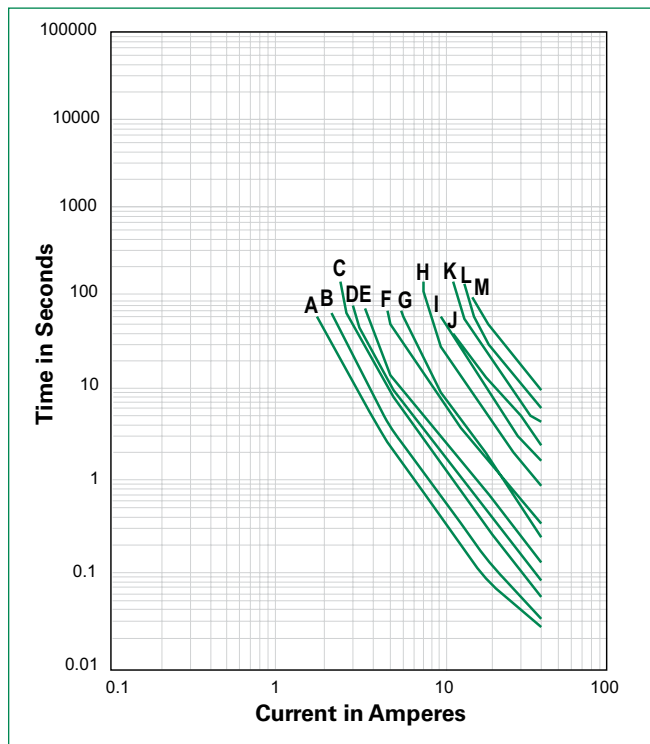
30R Series

Radial Leaded

Temperature Derating

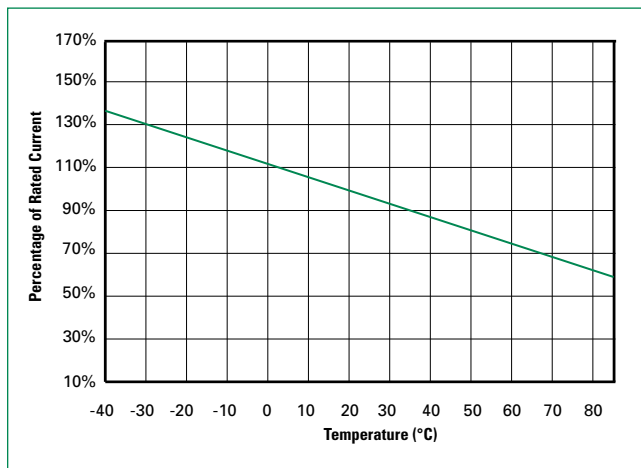
| Part Number | Ambient Operation Temperature | | | | | | | | |
|-------------|-------------------------------|-------|-------|------|------|------|------|------|------|
| | -40°C | -20°C | 0°C | 20°C | 40°C | 50°C | 60°C | 70°C | 85°C |
| 30R090U | 1.31 | 1.17 | 1.04 | 0.90 | 0.75 | 0.69 | 0.61 | 0.55 | 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



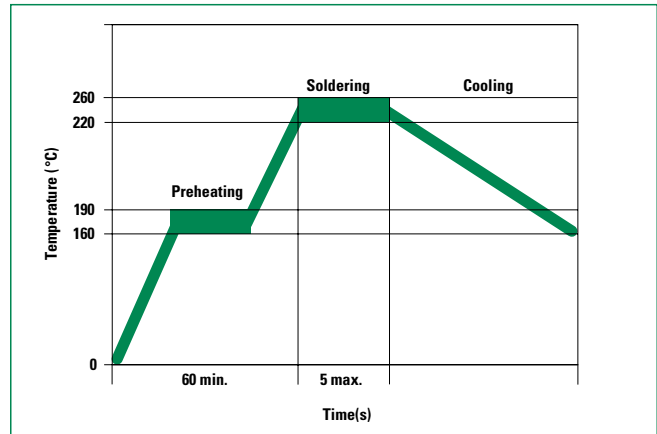
Note: Typical Temperature derating curve, refer to table for derating data

30R Series

Radial Leaded

Soldering Parameters - Wave Soldering

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



Physical Specifications

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

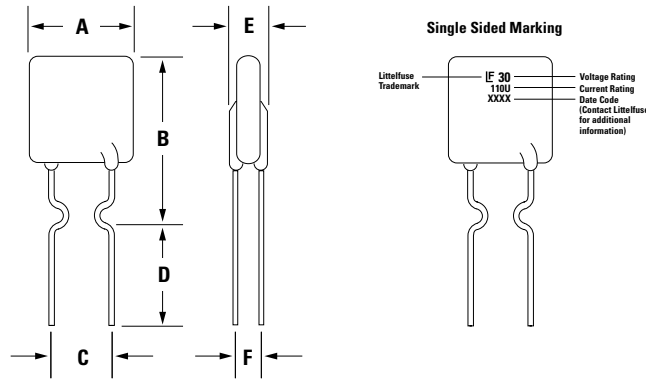
Environmental Specifications

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

30R Series

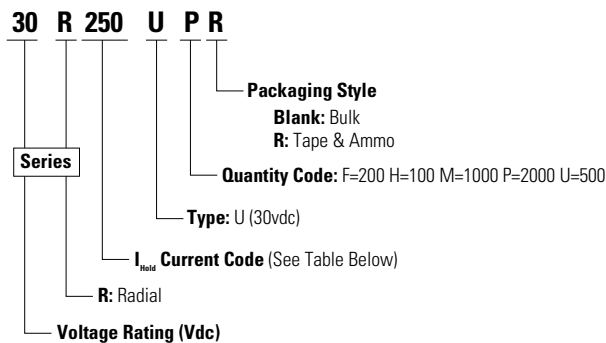
Radial Leaded

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



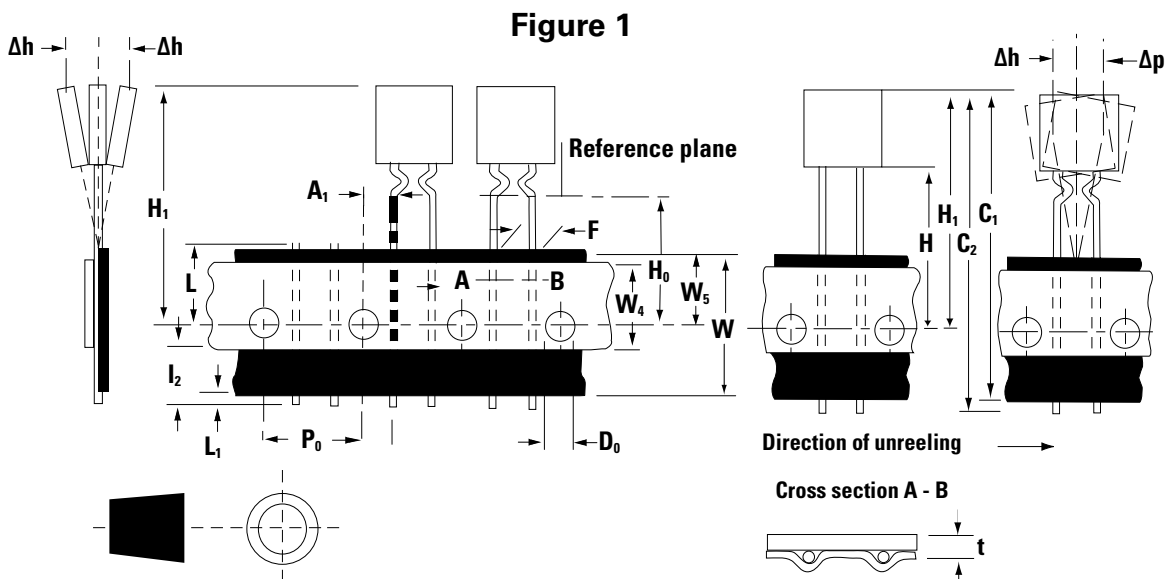
30R Series

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 | W | W | 18 | -0.5 / +1.0 |
| Hold down tape width: | W₄ | W₀ | 11 | min. |
| Top distance between tape edges | W₆ | W₂ | 3 | max. |
| Sprocket hole position | W₅ | W₁ | 9 | -0.5 / +0.75 |
| Sprocket hole diameter* | D₀ | D₀ | 4 | -0.32 / +0.2 |
| Abscissa to plane(straight lead) | H | H | 18.5 | -/+ 3.0 |
| Abscissa to plane(kinked lead) | H₀ | H₀ | 16 | -/+ 0.5 |
| Abscissa to top: 30R090-30R185 | H₁ | H₁ | 32.2 | max. |
| Abscissa to top: 30R250-30R900 | - | - | 45.0 | max. |
| Overall width w/o lead protrusion: 30R090-30R185 | C₁ | - | 42.5 | max. |
| Overall width w/o lead protrusion: 30R250-30R900 | - | - | 56 | max. |
| Overall width w/ lead protrusion: 30R090-30R185 | C₂ | - | 43.2 | max. |
| Overall width w/ lead protrusion: 30R250-30R900 | - | - | 57 | max. |
| Lead protrusion | L₁ | L₁ | 1.0 | max. |
| Protrusion of cut out | L | L | 11 | max. |
| Protrusion beyond hold-down tape | I₂ | I₂ | Not specified | - |
| Sprocket hole pitch: 30R090-30R300 | P₀ | P₀ | 12.7 | -/+ 0.3 |
| Sprocket hole pitch on: 30R400-30R900 | P₀ | P₀ | 25.4 | -/+ 0.5 |
| Device pitch: 30R090-30R300 | - | - | 12.7 | - |
| Device pitch: 30R400-30R900 | - | - | 25.4 | - |
| Pitch tolerance | - | - | 20 consecutive. | -/+ 1 |
| Tape thickness | t | t | 0.9 | max. |
| Tape thickness with splice: 30R090-30R250 | t₁ | - | 1.5 | max. |
| Tape thickness with splice: 30R300-30R900 | t₁ | - | 2.0 | max. |
| Splice sprocket hole alignment | - | - | 0 | -/+ 0.3 |
| Body lateral deviation | Δh | Δh | 0 | -/+ 1.0 |
| Body tape plane deviation | Δp | Δp | 0 | -/+ 1.3 |
| Ordinate to adjacent component lead* | P₁ | P₁ | 3.81 | -/+ 0.7 |
| Ordinate to adjacent component lead* | - | - | 7.62 | -/+ 0.7 |
| Lead spacing: 30R090-30R400 | F | F | 5.08 | -/+ 0.8 |
| Lead spacing: 30R500-30R900 | F | F | 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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