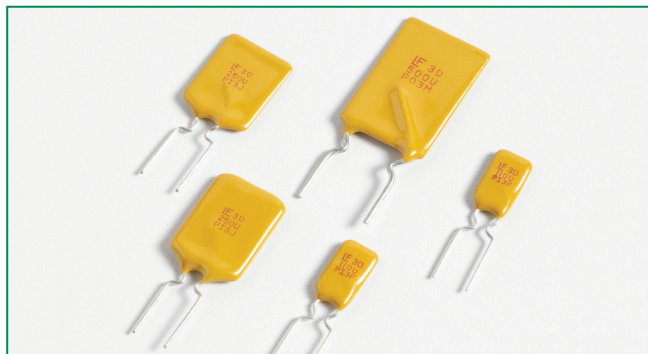




### Agency Approvals

AGENCY AGENCY FILE NUMBER



E183209



R50119318

### 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

- 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

### Electrical Characteristics

| Part Number | $I_{hold}$<br>(A) | $I_{trip}$<br>(A) | $V_{max}$<br>(Vdc) | $I_{max}$<br>(A) | $P_d$<br>typ.<br>(W) | Maximum Time To Trip |                | Resistance                |                            | Agency Approvals |            |
|-------------|-------------------|-------------------|--------------------|------------------|----------------------|----------------------|----------------|---------------------------|----------------------------|------------------|------------|
|             |                   |                   |                    |                  |                      | Current<br>(A)       | Time<br>(Sec.) | $R_{min}$<br>( $\Omega$ ) | $R_{1max}$<br>( $\Omega$ ) | <b>UL</b>        | <b>TÜV</b> |
| 30R090      | 0.90              | 1.80              | 30                 | 40               | 0.6                  | 4.50                 | 5.90           | 0.070                     | 0.220                      | X                | X          |
| 30R110      | 1.10              | 2.20              | 30                 | 40               | 0.7                  | 5.50                 | 6.60           | 0.050                     | 0.170                      | X                | X          |
| 30R135      | 1.35              | 2.70              | 30                 | 40               | 0.8                  | 6.75                 | 7.30           | 0.040                     | 0.130                      | X                | X          |
| 30R160      | 1.60              | 3.20              | 30                 | 40               | 0.9                  | 8.00                 | 8.00           | 0.030                     | 0.110                      | X                | X          |
| 30R185      | 1.85              | 3.70              | 30                 | 40               | 1.0                  | 9.25                 | 8.70           | 0.030                     | 0.090                      | X                | X          |
| 30R250      | 2.50              | 5.00              | 30                 | 40               | 1.2                  | 12.50                | 10.30          | 0.020                     | 0.070                      | X                | X          |
| 30R300      | 3.00              | 6.00              | 30                 | 40               | 2.0                  | 15.00                | 10.80          | 0.020                     | 0.080                      | X                | X          |
| 30R400      | 4.00              | 8.00              | 30                 | 40               | 2.5                  | 20.00                | 12.70          | 0.010                     | 0.050                      | X                | X          |
| 30R500      | 5.00              | 10.00             | 30                 | 40               | 3.0                  | 25.00                | 14.50          | 0.010                     | 0.050                      | X                | X          |
| 30R600      | 6.00              | 12.00             | 30                 | 40               | 3.5                  | 30.00                | 16.00          | 0.005                     | 0.040                      | X                | X          |
| 30R700      | 7.00              | 14.00             | 30                 | 40               | 3.8                  | 35.00                | 17.50          | 0.005                     | 0.030                      | X                | X          |
| 30R800      | 8.00              | 16.00             | 30                 | 40               | 4.0                  | 40.00                | 18.80          | 0.005                     | 0.020                      | X                | X          |
| 30R900      | 9.00              | 18.00             | 30                 | 40               | 4.2                  | 40.00                | 20.00          | 0.005                     | 0.020                      | X                | X          |

$I_{hold}$  = Hold current: maximum current device will pass without tripping in 23°C still air.

$I_{trip}$  = Trip current: minimum current at which the device will trip in 23°C still air.

$V_{max}$  = Maximum voltage device can withstand without damage at rated current ( $I_{max}$ )

$I_{max}$  = 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 23°C still air.

$R_{min}$  = Minimum resistance of device in initial (un-soldered) state.

$R_{1max}$  = Maximum resistance of device at 23°C measured one hour after tripping.

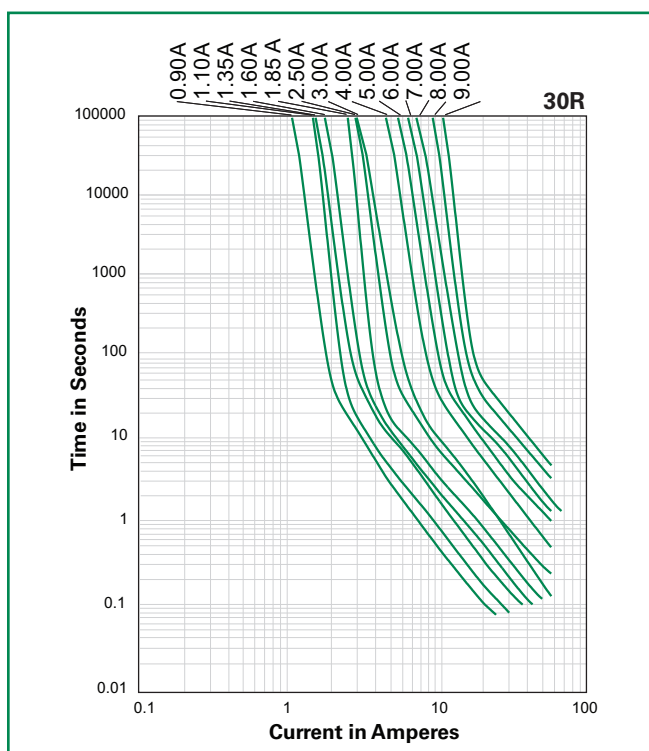
**Caution:** Operation beyond the specified rating may result in damage and possible arcing and flame.

\* Effective January 1, 2010, all 30R PTC products will be manufactured Halogen Free (HF). Existing Non-Halogen Free 30R PTC products may continue to be sold, until supplies are depleted.

## Temperature Derating

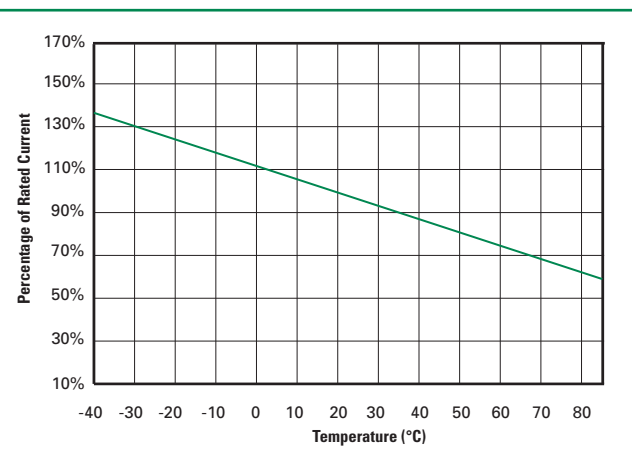
| Part Number      | Ambient Operation Temperature |       |       |      |      |      |      |      |      |
|------------------|-------------------------------|-------|-------|------|------|------|------|------|------|
|                  | -40°C                         | -20°C | 0°C   | 23°C | 40°C | 50°C | 60°C | 70°C | 85°C |
| Hold Current (A) |                               |       |       |      |      |      |      |      |      |
| 30R090           | 1.31                          | 1.17  | 1.04  | 0.90 | 0.75 | 0.69 | 0.61 | 0.55 | 0.47 |
| 30R110           | 1.60                          | 1.43  | 1.27  | 1.10 | 0.91 | 0.85 | 0.75 | 0.67 | 0.57 |
| 30R135           | 1.96                          | 1.76  | 1.55  | 1.35 | 1.12 | 1.04 | 0.92 | 0.82 | 0.70 |
| 30R160           | 2.32                          | 2.08  | 1.84  | 1.60 | 1.33 | 1.23 | 1.09 | 0.98 | 0.83 |
| 30R185           | 2.68                          | 2.41  | 2.13  | 1.85 | 1.54 | 1.42 | 1.26 | 1.13 | 0.96 |
| 30R250           | 3.63                          | 3.25  | 2.88  | 2.50 | 2.08 | 1.93 | 1.70 | 1.53 | 1.30 |
| 30R300           | 4.35                          | 3.90  | 3.45  | 3.00 | 2.49 | 2.31 | 2.04 | 1.83 | 1.56 |
| 30R400           | 5.80                          | 5.20  | 4.60  | 4.00 | 3.32 | 3.08 | 2.72 | 2.44 | 2.08 |
| 30R500           | 7.25                          | 6.50  | 5.75  | 5.00 | 4.15 | 3.85 | 3.40 | 3.05 | 2.60 |
| 30R600           | 8.70                          | 7.80  | 6.90  | 6.00 | 4.98 | 4.62 | 4.08 | 3.66 | 3.12 |
| 30R700           | 10.15                         | 9.10  | 8.05  | 7.00 | 5.81 | 5.39 | 4.76 | 4.27 | 3.64 |
| 30R800           | 11.60                         | 10.40 | 9.20  | 8.00 | 6.64 | 6.16 | 5.44 | 4.88 | 4.16 |
| 30R900           | 13.05                         | 11.70 | 10.35 | 9.00 | 7.47 | 6.93 | 6.12 | 5.49 | 4.68 |

## Average Time Current Curves



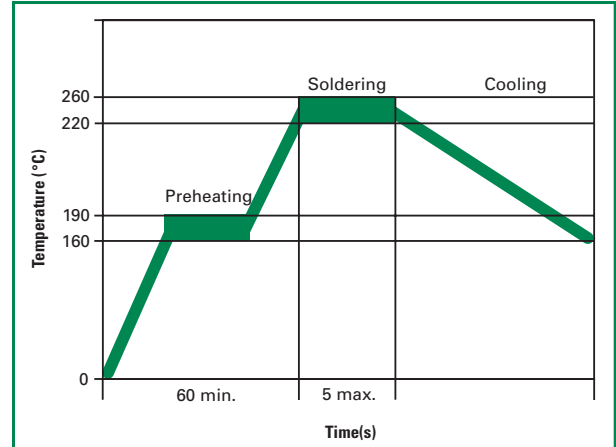
The average time current curves and Temperature Derating curve performance is affected by a number of variables, and these curves provided as guidance only. Customer must verify the performance in their application.

## Temperature Derating Curve



### 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                                                              |
| <b>Cooling Zone</b>     | Cooling by natural convection in air.                                                                        |



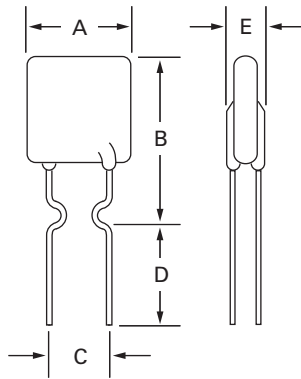
### Physical Specifications

|                                  |                                                                           |
|----------------------------------|---------------------------------------------------------------------------|
| <b>Lead Material</b>             | 0.90-2.50A: Tin-plated Copper clad steel<br>3.00-9.00A: Tin-plated Copper |
| <b>Soldering Characteristics</b> | Solderability per MIL-STD-202, Method 208E                                |
| <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.                 |

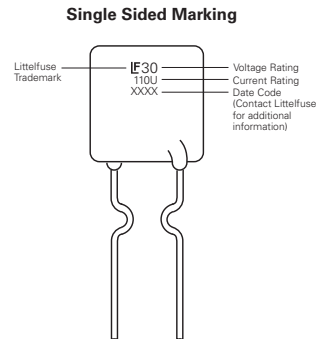
### Environmental Specifications

|                                                            |                                                                 |
|------------------------------------------------------------|-----------------------------------------------------------------|
| <b>Operating/Storage 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 215F<br>No change                           |
| <b>Moisture Resistance Level</b>                           | Level 1, J-STD-020C                                             |

## Dimensions

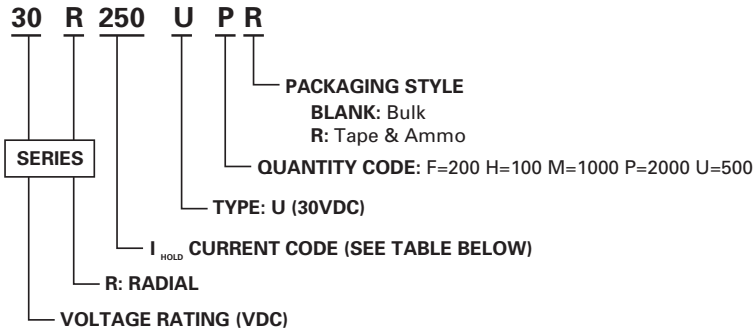


## Part Marking System



| Part Number | A      |       | B      |       | C      |       | D      |      | E      |      | Physical Characteristics |      |          |
|-------------|--------|-------|--------|-------|--------|-------|--------|------|--------|------|--------------------------|------|----------|
|             | Inches | mm    | Inches | mm    | Inches | mm    | Inches | mm   | Inches | mm   | Lead (dia)               |      | Material |
|             | Max.   | Max.  | Max.   | Max.  | Typ.   | Typ.  | Min.   | Min. | Max.   | Max. | Inches                   | mm   |          |
| 30R090      | 0.29   | 7.40  | 0.48   | 12.20 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.02                     | 0.51 | Sn/CuFe  |
| 30R110      | 0.29   | 7.40  | 0.56   | 14.20 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.02                     | 0.51 | Sn/CuFe  |
| 30R135      | 0.35   | 8.90  | 0.53   | 13.50 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.02                     | 0.51 | Sn/CuFe  |
| 30R160      | 0.35   | 8.90  | 0.60   | 15.20 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.02                     | 0.51 | Sn/CuFe  |
| 30R185      | 0.40   | 10.20 | 0.62   | 15.70 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.02                     | 0.51 | Sn/CuFe  |
| 30R250      | 0.45   | 11.40 | 0.72   | 18.30 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.02                     | 0.51 | Sn/Cu    |
| 30R300      | 0.45   | 11.40 | 0.76   | 19.20 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.03                     | 0.81 | Sn/Cu    |
| 30R400      | 0.55   | 14.00 | 0.87   | 22.00 | 0.20   | 5.10  | 0.30   | 7.60 | 0.12   | 3.00 | 0.03                     | 0.81 | Sn/Cu    |
| 30R500      | 0.55   | 14.00 | 1.01   | 25.60 | 0.40   | 10.20 | 0.30   | 7.60 | 0.12   | 3.00 | 0.03                     | 0.81 | Sn/Cu    |
| 30R600      | 0.65   | 16.50 | 1.06   | 26.80 | 0.40   | 10.20 | 0.30   | 7.60 | 0.12   | 3.00 | 0.03                     | 0.81 | Sn/Cu    |
| 30R700      | 0.75   | 19.10 | 1.13   | 28.60 | 0.40   | 10.20 | 0.30   | 7.60 | 0.12   | 3.00 | 0.03                     | 0.81 | Sn/Cu    |
| 30R800      | 0.85   | 21.60 | 1.22   | 31.10 | 0.40   | 10.20 | 0.30   | 7.60 | 0.12   | 3.00 | 0.03                     | 0.81 | Sn/Cu    |
| 30R900      | 0.95   | 24.10 | 1.24   | 31.60 | 0.40   | 10.20 | 0.30   | 7.60 | 0.12   | 3.00 | 0.03                     | 0.81 | Sn/Cu    |

### Part Ordering Number System



### Packaging

| Part Number | Ordering Number | I <sub>hold</sub> (A) | I <sub>hold</sub> Code | Packaging Option | Quantity | Quantity & Packaging Codes |
|-------------|-----------------|-----------------------|------------------------|------------------|----------|----------------------------|
| 30R090      | 30R090UU        | 0.90                  | 090                    | Bulk             | 500      | U                          |
|             | 30R090UPR       |                       |                        | Tape and Ammo    | 2000     | PR                         |
| 30R110      | 30R110UU        | 1.10                  | 110                    | Bulk             | 500      | U                          |
|             | 30R110UPR       |                       |                        | Tape and Ammo    | 2000     | PR                         |
| 30R135      | 30R135UU        | 1.35                  | 135                    | Bulk             | 500      | U                          |
|             | 30R135UPR       |                       |                        | Tape and Ammo    | 2000     | PR                         |
| 30R160      | 30R160UU        | 1.60                  | 160                    | Bulk             | 500      | U                          |
|             | 30R160UPR       |                       |                        | Tape and Ammo    | 2000     | PR                         |
| 30R185      | 30R185UU        | 1.85                  | 185                    | Bulk             | 500      | U                          |
|             | 30R185UPR       |                       |                        | Tape and Ammo    | 2000     | PR                         |
| 30R250      | 30R250UU        | 2.50                  | 250                    | Bulk             | 500      | U                          |
|             | 30R250UPR       |                       |                        | Tape and Ammo    | 2000     | PR                         |
| 30R300      | 30R300UU        | 3.00                  | 300                    | Bulk             | 500      | U                          |
|             | 30R300UPR       |                       |                        | Tape and Ammo    | 2000     | PR                         |
| 30R400      | 30R400UF        | 4.00                  | 400                    | Bulk             | 200      | F                          |
|             | 30R400UMR       |                       |                        | Tape and Ammo    | 1000     | MR                         |
| 30R500      | 30R500UF        | 5.00                  | 500                    | Bulk             | 200      | F                          |
|             | 30R500UMR       |                       |                        | Tape and Ammo    | 1000     | MR                         |
| 30R600      | 30R600UF        | 6.00                  | 600                    | Bulk             | 200      | F                          |
|             | 30R600UMR       |                       |                        | Tape and Ammo    | 1000     | MR                         |
| 30R700      | 30R700UF        | 7.00                  | 700                    | Bulk             | 200      | F                          |
|             | 30R700UMR       |                       |                        | Tape and Ammo    | 1000     | MR                         |
| 30R800      | 30R800UH        | 8.00                  | 800                    | Bulk             | 100      | H                          |
| 30R900      | 30R900UH        | 9.00                  | 900                    | Bulk             | 100      | H                          |

## Tape and Ammo Specifications

Devices taped using EIA468-B/E286-2 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>L<sub>2</sub></b> | <b>L<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      |

\*Differs from EIA Specification

**Tape and Ammo Diagram**

**Figure 1**

