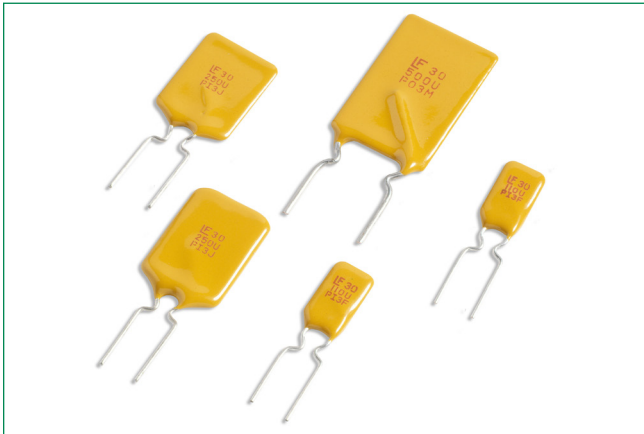


# 30R Series

## 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.
- $V_{int}$  = 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.

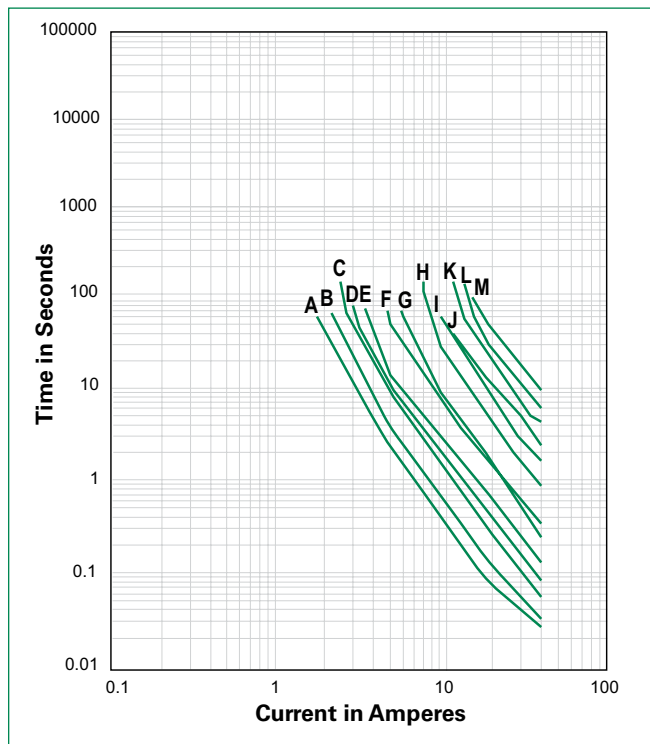
# 30R Series

## Radial Leaded

### Temperature Derating

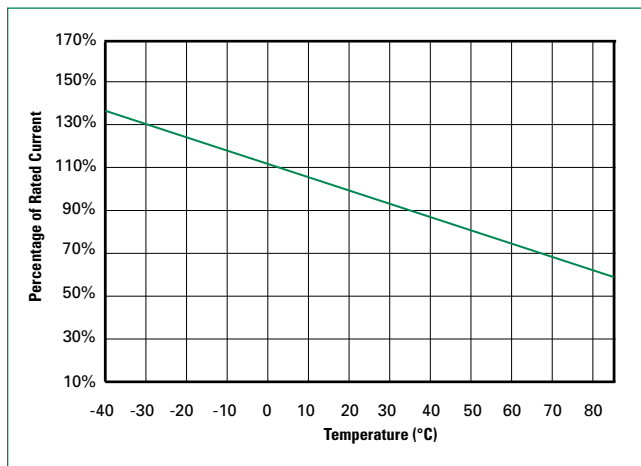
Part Number	Ambient Operation Temperature								
	-40°C	-20°C	0°C	20°C	40°C	50°C	60°C	70°C	85°C
30R090U	1.31	1.17	1.04	0.90	0.75	0.69	0.61	0.55	0.47
30R110U	1.60	1.43	1.27	1.10	0.91	0.85	0.75	0.67	0.57
30R135U	1.96	1.76	1.55	1.35	1.12	1.04	0.92	0.82	0.70
30R160U	2.32	2.08	1.84	1.60	1.33	1.23	1.09	0.98	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



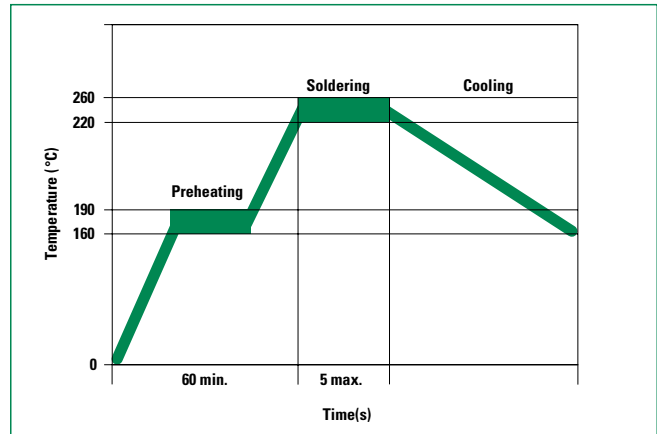
Note: Typical Temperature derating curve, refer to table for derating data

# 30R Series

## Radial Leaded

### Soldering Parameters - Wave Soldering

<b>Pre-Heating Zone</b>	Refer to the condition recommended by the flux manufacturer. Max. ramping rate should not exceed 4°C/Sec.
<b>Soldering Zone</b>	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.
<b>Cooling Zone</b>	Cooling by natural convection in air. 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 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.

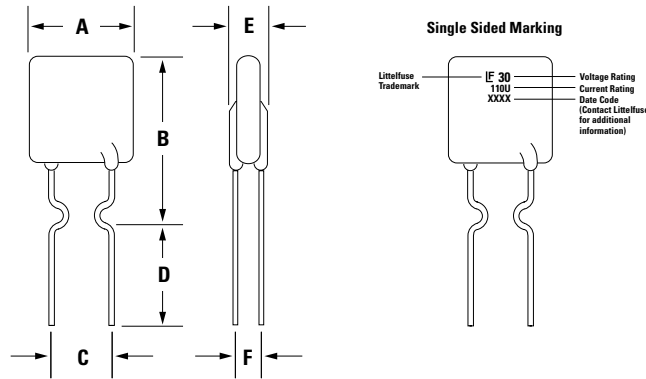
### Environmental Specifications

<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 -/+5% typical resistance change
<b>Humidity Aging</b>	+85°C, 85% R.H., 1000 hours -/+5% typical resistance change
<b>Thermal Shock</b>	+85°C to -40°C 10 times -/+5% typical resistance change
<b>Solvent Resistance</b>	MIL-STD-202, Method 215 No change
<b>Moisture Resistance Level</b>	Level 1, J-STD-020

# 30R Series

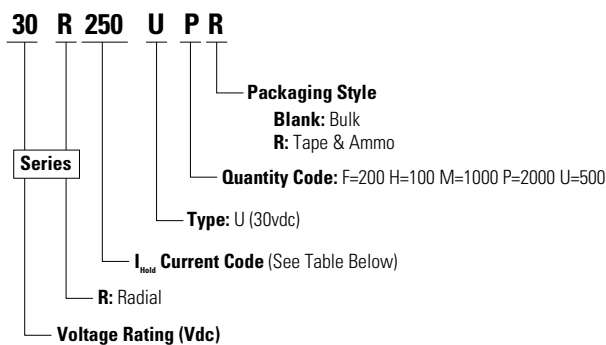
## Radial Leaded

### 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	
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



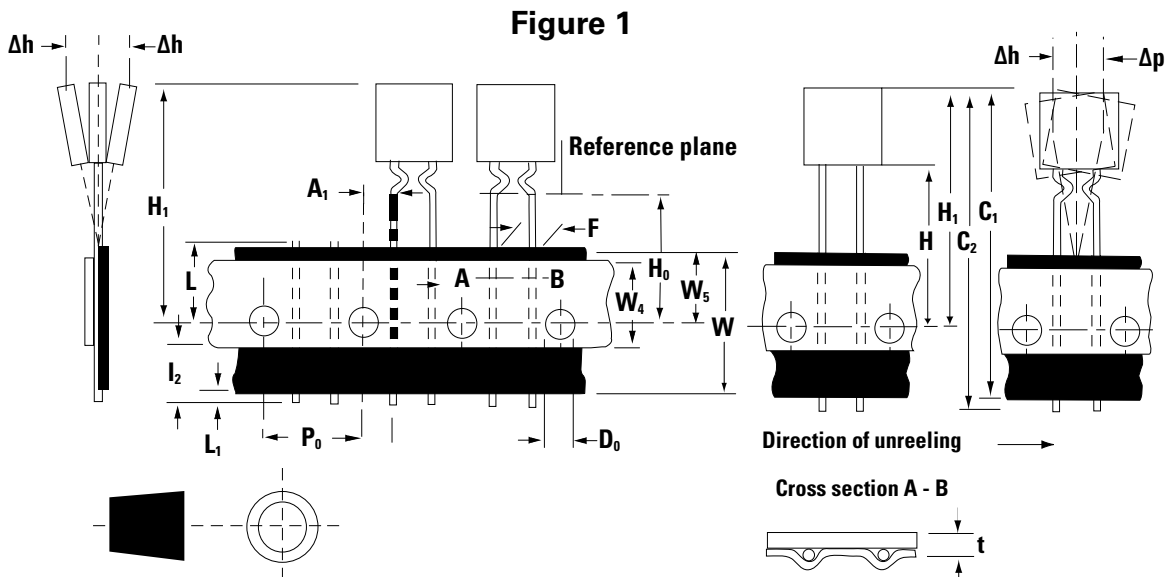
# 30R Series

## 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>I<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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