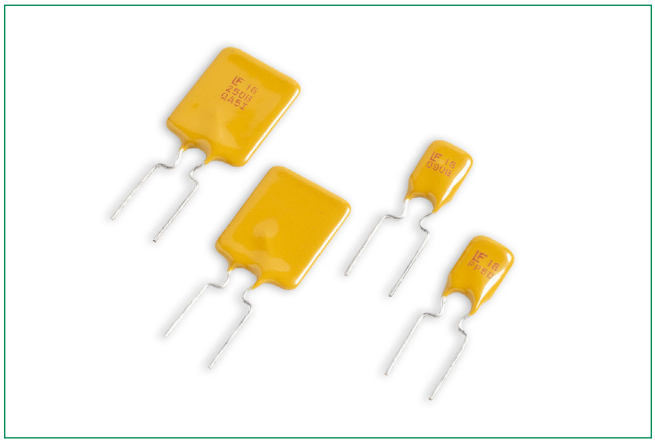
16R Series
Radial Leaded



Description

Littelfuse 16R Series Radial Leaded PTCs are designed to provide resettable overcurrent protection serving a wide range of electronics applications. With maximum 16 volts and maximum 100-ampere short circuit rating, they offer an ideal solution for USB protection.

Features & Benefits

- 100A short circuit rating
- 16V Operating voltages
- Fast time–to–trip
- Meets all USB protection requirements
- RoHS compliant, Lead- Free and Halogen-Free*

Applications

- Computers & peripherals
- Any USB application
- General Electronics

Additional Information

Resources | Accessories | Samples

Agency Approvals

Agency	Agency File Number
c UL us	E74889
TÜV	R72161783

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)	c UL us	TÜV
16R250G	2.5	4.7	16	100	1.0	12.5	5.0	0.0220	0.0530	X	X
16R300G	3.0	5.1	16	100	2.3	15.0	1.0	0.0380	0.0975	X	X
16R400G	4.0	6.8	16	100	2.4	20.0	1.7	0.0210	0.0600	X	X
16R500G	5.0	8.5	16	100	2.6	25.0	2.0	0.0150	0.0340	X	X
16R700G	7.0	11.9	16	100	3.0	35.0	3.5	0.0077	0.0200	X	X
16R800G	8.0	13.6	16	100	3.0	40.0	5.0	0.0056	0.0175	X	X
16R900G	9.0	15.3	16	100	3.3	45.0	5.5	0.0047	0.0135	X	X
16R1000G	10.0	17.0	16	100	3.6	50.0	6.0	0.0040	0.0102	X	X
16R1400G	14.0	23.8	16	100	4.6	70.0	9.0	0.0026	0.0064	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.

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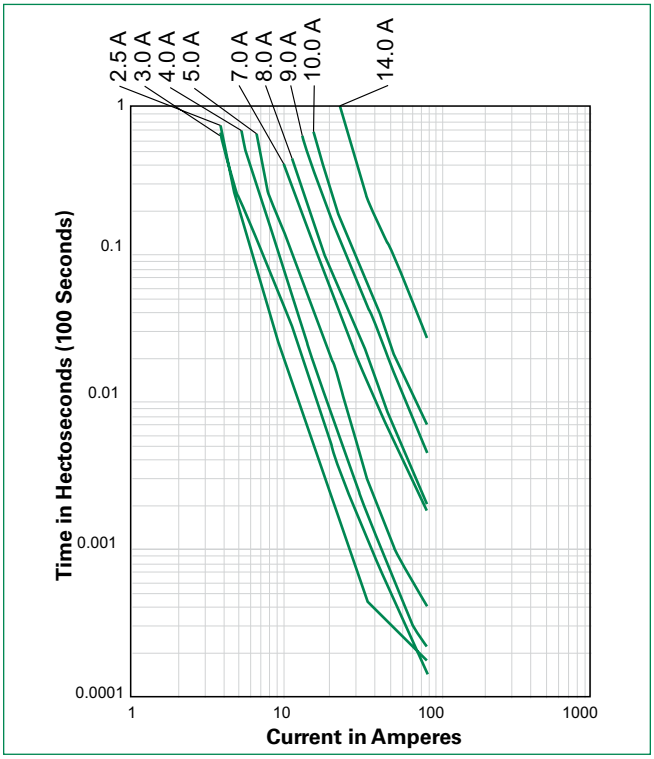
Temperature Rerating

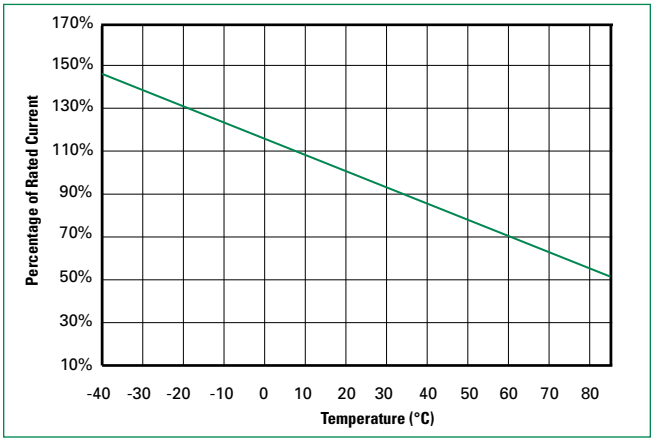
	Ambient Operation Temperature								
	-40°C	-20°C	0°C	20°C	40°C	50°C	60°C	70°C	85°C
Part Number	**Hold Current (A)**								
16R250G	3.7	3.3	2.9	2.5	2.2	2.0	1.8	1.6	1.3
16R300G	4.4	4.0	3.5	3.0	2.6	2.4	2.1	1.9	1.6
16R400G	5.9	5.3	4.7	4.0	3.5	3.2	2.9	2.6	2.1
16R500G	7.4	6.6	5.9	5.0	4.4	4.0	3.6	3.2	2.6
16R700G	10.4	9.3	8.2	7.0	6.1	5.6	5.0	4.5	3.7
16R800G	11.8	10.6	9.4	8.0	7.0	6.3	5.7	5.1	4.2
16R900G	13.3	12.0	10.6	9.0	7.8	7.1	6.5	5.8	4.7
16R1000G	14.8	13.3	11.8	10.0	8.7	7.9	7.1	6.4	5.3
16R1400G	20.7	18.6	16.5	14.0	12.2	11.1	10.0	9.0	7.4

Average Time Current Curves



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

Temperature Rerating Curve



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

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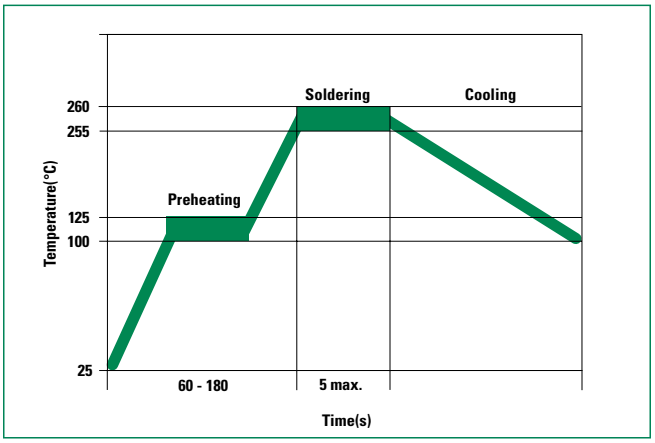
Soldering Parameters - Wave Soldering

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.



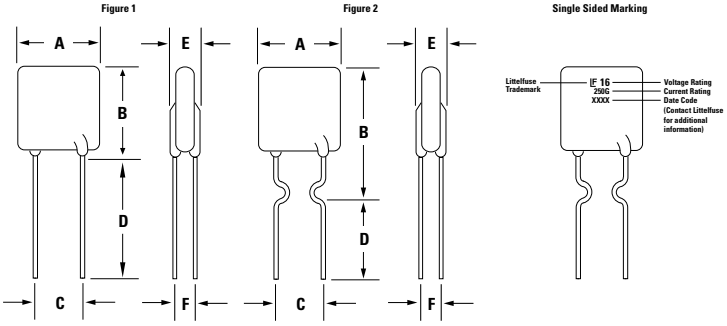
Physical Specifications

Lead Material	2.5A: Tin-plated Copper clad Steel 3.0 - 14.0A: 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/Storage 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

Dimensions & Part Marking System



Part Number	Figure	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	
16R250G	2	0.35	8.90	0.50	12.80	0.20	5.1	0.13	3.18	0.12	3.00	0.035	0.9	0.020	0.51	Sn/CuFe
16R300G	1	0.28	7.10	0.43	11.00	0.20	5.1	0.30	7.6	0.12	3.00	0.047	1.2	0.032	0.81	Sn/Cu
16R400G	1	0.35	8.90	0.50	12.80	0.20	5.1	0.30	7.6	0.12	3.00	0.047	1.2	0.032	0.81	Sn/Cu
16R500G	1	0.41	10.40	0.56	14.30	0.20	5.1	0.30	7.6	0.12	3.00	0.047	1.2	0.032	0.81	Sn/Cu
16R700G	1	0.44	11.20	0.78	19.70	0.20	5.1	0.30	7.6	0.12	3.00	0.047	1.2	0.032	0.81	Sn/Cu
16R800G	1	0.50	12.70	0.82	20.90	0.20	5.1	0.30	7.6	0.12	3.00	0.047	1.2	0.032	0.81	Sn/Cu
16R900G	1	0.55	14.00	0.85	21.70	0.20	5.1	0.30	7.6	0.12	3.00	0.047	1.2	0.032	0.81	Sn/Cu
16R1000G	1	0.65	16.50	0.99	25.20	0.20	5.1	0.30	7.6	0.12	3.00	0.047	1.2	0.032	0.81	Sn/Cu
16R1400G	1	0.93	23.50	1.10	27.90	0.40	10.2	0.30	7.6	0.14	3.50	0.055	1.4	0.039	1.00	Sn/Cu

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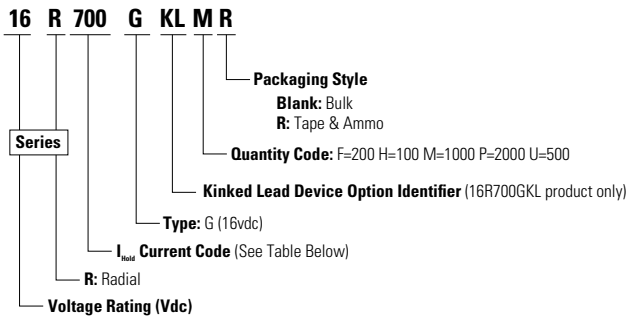
Part Ordering Number System



Packaging Options

Part Number	Ordering Number	I_{hold} (A)	I_{hold} Code	Packaging Option	Quantity	Quantity & Packaging Codes
16R250G	16R250GU	2.50	250	Bulk	500	U
16R300G	16R300GU	3.00	300	Bulk	500	U
	16R300GPR			Tape and Ammo	2000	PR
16R400G	16R400GU	4.00	400	Bulk	500	U
	16R400GPR			Tape and Ammo	2000	PR
16R500G	16R500GU	5.00	500	Bulk	500	U
	16R500GPR			Tape and Ammo	2000	PR
16R700G	16R700GMR	7.00	700	Tape and Ammo	1000	MR
16R800G	16R800GF	8.00	800	Bulk	200	F
16R900G	16R900GF	9.00	900	Bulk	200	F
	16R900GMR			Tape and Ammo	1000	MR
16R1000G	16R1000GMR	10.00	1000	Tape and Ammo	1000	MR
16R1400G	16R1400GH	14.00	1400	Bulk	100	H

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Tape and Ammo Specifications

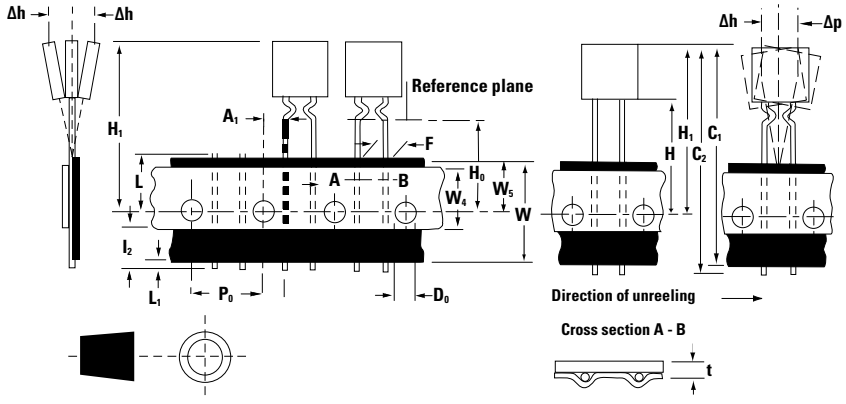
Devices taped using EIA468-B/IE286-2 standards. See table below and Figure 1 for details.

Dimension	EIA Mark	IEC Mark	Dimensions	
			Dim. (mm)	Tol. (mm)
Carrier tape width	**W**	**W**	18	-0.5 /+1.0
Hold down tape width:	**W_4**	**W_0**	11	min.
Top distance between tape edges	**W_6**	**W_2**	3	max.
Sprocket hole position	**W_5**	**W_1**	9	-0.5 /+0.75
Sprocket hole diameter*	**D_0**	**D_0**	4	-0.32 /+0.2
Abscissa to plane(straight lead)	**H**	**H**	18.5	-/+ 3.0
Abscissa to plane(kinked lead)	**H_0**	**H_0**	16	-/+ 0.5
Abscissa to top	-	-	45.0	max.
Overall width w/o lead protrusion	-	-	56	max.
Overall width w/ lead protrusion	-	-	57	max.
Lead protrusion	**L_1**	**I_1**	1.0	max.
Protrusion of cut out	**L**	**L**	11	max.
Protrusion beyond hold-down tape	**I_2**	**I_2**	Not specified	
Sprocket hole pitch	**P_0**	**P_0**	25.4	-/+ 0.5
Device pitch:	-	-	25.4	
Pitch tolerance	-	-	20 consecutive.	-/+ 1
Tape thickness	**t**	**t**	0.9	max.
Tape thickness with splice	**t_1**	-	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*	**P_1**	**P_1**	3.81	-/+ 0.7
Ordinate to adjacent component lead*	-	-	7.62	-/+ 0.7
Lead spacing:16R250G-16R1000G	**F**	**F**	5.08	-/+ 0.8
Lead spacing:16R1400G	**F**	**F**	10.18	-/+ 0.8

*Differs from EIA specification

Tape and Ammo Diagram

Figure 1



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