

Description

- The USBR Series radial leaded device is designed to provide overcurrent protection for USB applications where space is not a concern.



Features

- RoHS compliant and lead-free
- Fast time-to-trip
- Meets all USB protection requirements
- 40A short circuit rating
- Operating voltages of 6-16V



Applications

- Computers & peripherals
- Any USB application

Agency Approvals

| AGENCY | AGENCY FILE NUMBER |
|-----------------------------------------------------------------------------------|--------------------|
|  | E183209 |
|  | R50119318 |

Electrical Characteristics

| Part Number | I _{hold} (A) | I _{trip} (A) | V _{max} (Vdc) | I _{max} (A) | P _d max. (W) | Maximum Time To Trip | | Resistance | | Agency Approvals | |
|-------------|-----------------------|-----------------------|------------------------|----------------------|-------------------------|----------------------|-------------|----------------------|-----------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| | | | | | | Current (A) | Time (Sec.) | R _{min} (Ω) | R _{1max} (Ω) |  |  |
| 06R075B | 0.75 | 1.30 | 6 | 40 | 0.3 | 8.00 | 0.4 | 0.100 | 0.230 | X | X |
| 06R120B | 1.20 | 2.00 | 6 | 40 | 0.6 | 8.00 | 0.5 | 0.065 | 0.140 | X | X |
| 06R155B | 1.55 | 2.70 | 6 | 40 | 0.6 | 7.75 | 2.2 | 0.040 | 0.100 | X | X |
| 16R090B | 0.90 | 1.80 | 16 | 40 | 0.6 | 8.00 | 1.2 | 0.070 | 0.180 | X | X |
| 16R110B | 1.10 | 2.20 | 16 | 40 | 0.7 | 8.00 | 2.3 | 0.050 | 0.140 | X | X |
| 16R135B | 1.35 | 2.70 | 16 | 40 | 0.8 | 8.00 | 4.5 | 0.040 | 0.120 | X | X |
| 16R160B | 1.60 | 3.20 | 16 | 40 | 0.9 | 8.00 | 9.0 | 0.030 | 0.110 | X | X |
| 16R185B | 1.85 | 3.70 | 16 | 40 | 1.0 | 8.00 | 10.0 | 0.030 | 0.090 | X | X |
| 16R250B | 2.50 | 5.00 | 16 | 40 | 1.2 | 8.00 | 40.0 | 0.020 | 0.060 | X | X |

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 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 20°C still air.

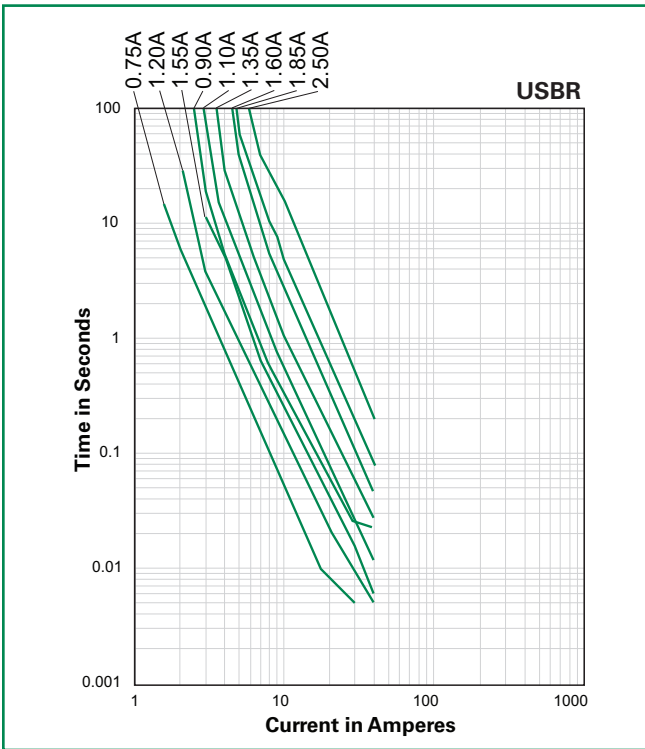
R_{min} = Minimum resistance of device in initial (un-soldered) state.
 R_{typ} = Typical resistance of device in initial (un-soldered) state.
 R_{1max} = Maximum resistance of device at 20°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

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

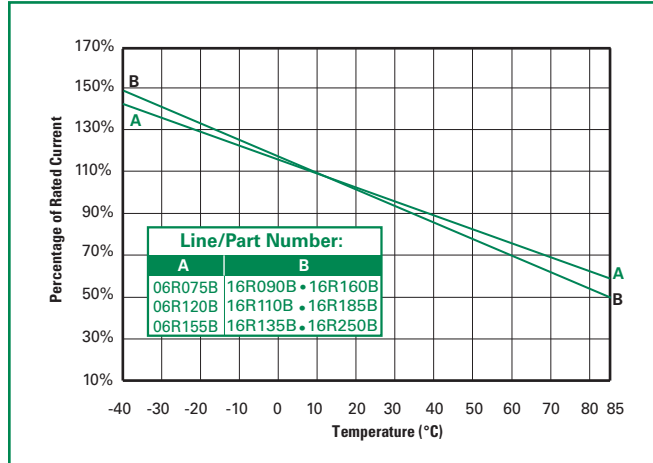
Temperature Derating

| 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) | | | | | | | | |
| 06R075B | 1.05 | 0.95 | 0.85 | 0.75 | 0.65 | 0.60 | 0.55 | 0.50 | 0.43 |
| 06R120B | 1.69 | 1.52 | 1.36 | 1.20 | 1.04 | 0.96 | 0.88 | 0.80 | 0.68 |
| 06R155B | 2.17 | 1.96 | 1.75 | 1.55 | 1.34 | 1.24 | 1.13 | 1.03 | 0.88 |
| 16R090B | 1.31 | 1.17 | 1.04 | 0.90 | 0.75 | 0.69 | 0.61 | 0.55 | 0.47 |
| 16R110B | 1.60 | 1.43 | 1.27 | 1.10 | 1.00 | 0.92 | 0.75 | 0.67 | 0.57 |
| 16R135B | 1.96 | 1.76 | 1.55 | 1.35 | 1.12 | 1.04 | 0.92 | 0.82 | 0.70 |
| 16R160B | 2.32 | 2.08 | 1.84 | 1.60 | 1.33 | 1.23 | 1.09 | 0.98 | 0.83 |
| 16R185B | 2.68 | 2.41 | 2.13 | 1.85 | 1.54 | 1.42 | 1.26 | 1.13 | 0.96 |
| 16R250B | 3.63 | 3.25 | 2.88 | 2.50 | 2.08 | 1.93 | 1.70 | 1.53 | 1.30 |

Average Time Current Curves

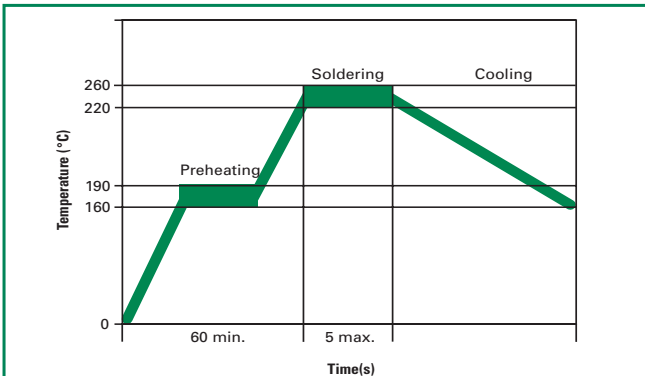


Temperature Derating Curve



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.

Soldering Parameters



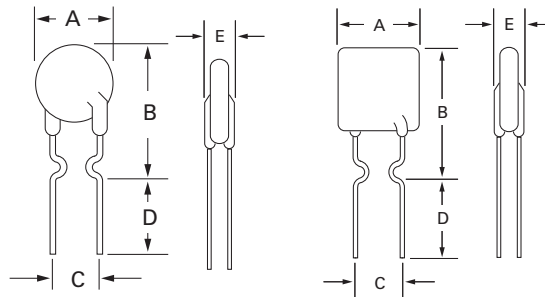
| | |
|-------------------------|-----------------------------------------------------------------------------------------------------------|
| Pre-Heating Zone | Refer to the condition recommended by the flux manufacturer. Max. ramping rate should not exceed 4°C/Sec. |
| Soldering Zone | Max. solder temperature should not exceed 260°C |
| Cooling Zone | Cooling by natural convection in air. |

Physical Specifications

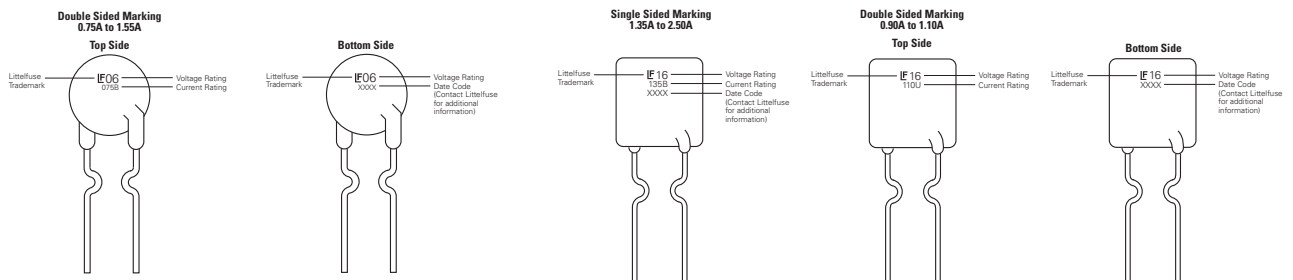
| | |
|----------------------------------|--------------------------------------------------------------------|
| Lead Material | .90-2.50A: Tin-plated Copper clad steel .75A: Tin-plated Copper |
| Soldering Characteristics | Solderability per MIL-STD-202, Method 208E |
| Insulating Material | Cured, flame retardant epoxy polymer meets UL 94V-0 requirements. |
| Device Labeling | Marked with 'LF', voltage, current rating, and date code. |

Environmental Specifications

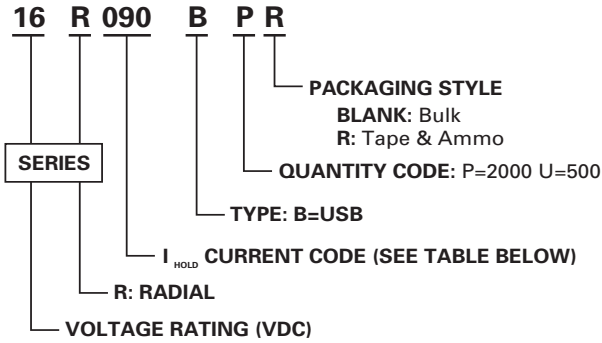
| | |
|------------------------------------------------------------|----------------------------------------------------------------|
| Operating/Storage Temperature | -40°C to +85°C |
| Maximum Device Surface Temperature in Tripped State | 125°C |
| Passive Aging | +85°C, 1000 hours -/+5% typical resistance 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 215F |
| Moisture Sensitivity Level | Level 1, J-STD-020C |

Dimensions (mm)

Figure 1
Figure 2

| Part Number | Figure | 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 |
| 06R075B | 1 | 0.27 | 6.9 | 0.45 | 11.4 | 0.20 | 5.1 | 0.30 | 7.6 | 0.12 | 3 | 0.020 | 0.51 | Sn/Cu |
| 06R120B | 1 | 0.27 | 6.9 | 0.46 | 11.7 | 0.20 | 5.1 | 0.30 | 7.6 | 0.12 | 3 | 0.020 | 0.51 | Sn/CuFe |
| 06R155B | 1 | 0.27 | 6.9 | 0.46 | 11.7 | 0.20 | 5.1 | 0.30 | 7.6 | 0.12 | 3 | 0.020 | 0.51 | Sn/CuFe |
| 16R090B | 2 | 0.29 | 7.4 | 0.48 | 12.2 | 0.20 | 5.1 | 0.30 | 7.6 | 0.12 | 3 | 0.020 | 0.51 | Sn/CuFe |
| 16R110B | 2 | 0.29 | 7.4 | 0.56 | 14.2 | 0.20 | 5.1 | 0.30 | 7.6 | 0.12 | 3 | 0.020 | 0.51 | Sn/CuFe |
| 16R135B | 2 | 0.35 | 8.9 | 0.53 | 13.5 | 0.20 | 5.1 | 0.30 | 7.6 | 0.12 | 3 | 0.020 | 0.51 | Sn/CuFe |
| 16R160B | 2 | 0.35 | 8.9 | 0.60 | 15.2 | 0.20 | 5.1 | 0.30 | 7.6 | 0.12 | 3 | 0.020 | 0.51 | Sn/CuFe |
| 16R185B | 2 | 0.40 | 10.2 | 0.62 | 15.7 | 0.20 | 5.1 | 0.30 | 7.6 | 0.12 | 3 | 0.020 | 0.51 | Sn/CuFe |
| 16R250B | 2 | 0.45 | 11.4 | 0.72 | 18.3 | 0.20 | 5.1 | 0.30 | 7.6 | 0.12 | 3 | 0.020 | 0.51 | Sn/CuFe |

Part Marking System


Part Ordering Number System



Ordering Information

| Part Number | Ordering Number | I _{hold} (A) | I _{hold} Code | Packaging Option | Quantity | Quantity & Packaging Codes |
|-------------|-----------------|-----------------------|------------------------|------------------|----------|----------------------------|
| 06R075B | 06R075BU | 0.75 | 075 | Bulk | 500 | U |
| | 06R075BPR | | | Tape and Ammo | 2000 | PR |
| 06R120B | 06R120BU | 1.20 | 120 | Bulk | 500 | U |
| | 06R120BPR | | | Tape and Ammo | 2000 | PR |
| 06R155B | 06R155BU | 1.55 | 155 | Bulk | 500 | U |
| | 06R155BPR | | | Tape and Ammo | 2000 | PR |
| 16R090B | 16R090BU | 0.90 | 090 | Bulk | 500 | U |
| | 16R090BPR | | | Tape and Ammo | 2000 | PR |
| 16R110B | 16R110BU | 1.10 | 110 | Bulk | 500 | U |
| | 16R110BPR | | | Tape and Ammo | 2000 | PR |
| 16R135B | 16R135BU | 1.35 | 135 | Bulk | 500 | U |
| | 16R135BPR | | | Tape and Ammo | 2000 | PR |
| 16R160B | 16R160BU | 1.60 | 160 | Bulk | 500 | U |
| | 16R160BPR | | | Tape and Ammo | 2000 | PR |
| 16R185B | 16R185BU | 1.85 | 185 | Bulk | 500 | U |
| | 16R185BPR | | | Tape and Ammo | 2000 | PR |
| 16R250B | 16R250BU | 2.50 | 250 | Bulk | 500 | U |
| | 16R250BPR | | | Tape and Ammo | 2000 | PR |

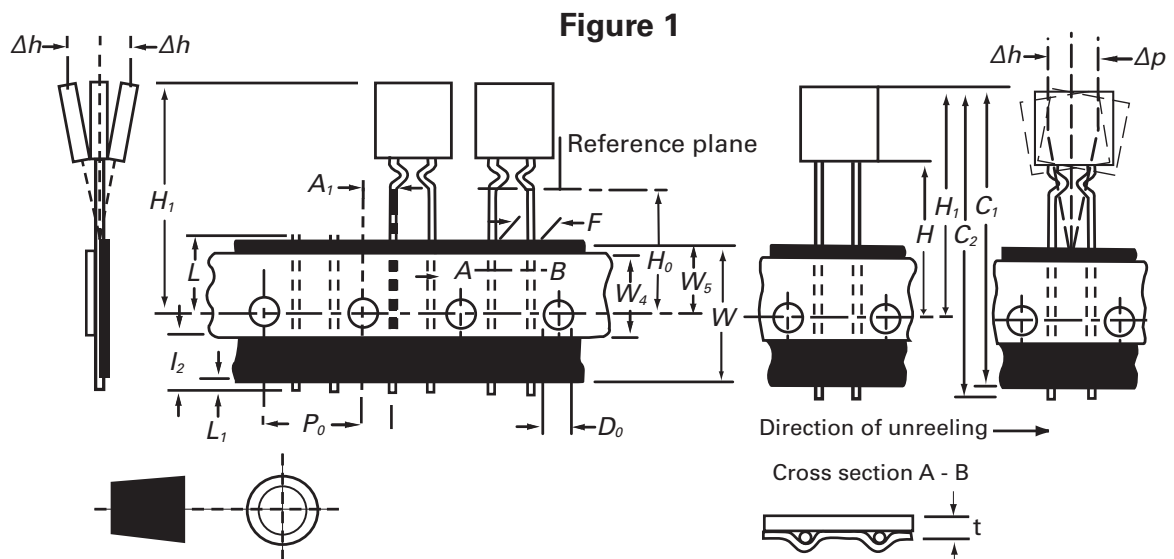
Tape and Ammo Specifications

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 |
| Abscissa to plane(straight lead) | H | H | 18.5 | -/+ 3.0 |
| Abscissa to plane(kinked lead) | H₀ | H₀ | 16 | -/+ 0.5 |
| Abscissa to top | H₁ | H₁ | 32.2 | max. |
| Overall width w/o lead protrusion | C₁ | | 42.5 | max. |
| Overall width w/ lead protrusion | C₂ | | 43.2 | max. |
| Lead protrusion | L₁ | I₁ | 1.0 | max. |
| Protrusion of cut out | L | L | 11 | max. |
| Protrusion beyond hold-down tape | I₂ | I₂ | Not specified | |
| Sprocket hole pitch | P₀ | P₀ | 12.7 | -/+ 0.35 |
| Pitch tolerance | | | 20 consecutive | -/+ 1 |
| Device pitch | | | 12.7 | |
| Tape thickness | t | t | 0.9 | max. |
| Tape thickness with splice | 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 | -/+ 1.0 |
| Lead spacing* | F | F | 5.08 | -/+ 0.8 |

*Differs from EIA specification.

Tape and Ammo Diagram



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