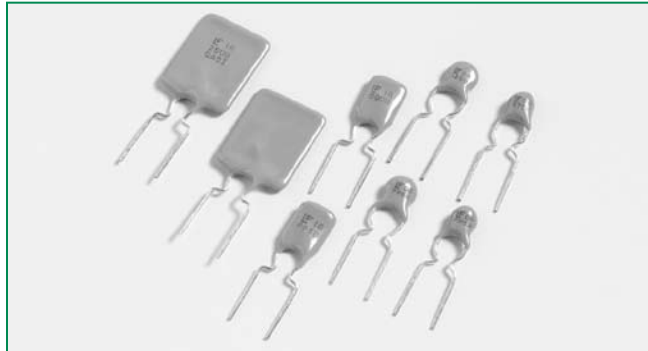




## Description

- 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



R50082521

## Electrical Characteristics

| Part Number | $I_{hold}$<br>(A) | $I_{trip}$<br>(A) | $V_{max}$<br>(Vdc) | $I_{max}$<br>(A) | $P_d$<br>max.<br>(W) | Maximum Time To Trip |                | Resistance                |                            | Agency Approvals                                                                      |                                                                                       |
|-------------|-------------------|-------------------|--------------------|------------------|----------------------|----------------------|----------------|---------------------------|----------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|             |                   |                   |                    |                  |                      | Current<br>(A)       | Time<br>(Sec.) | $R_{min}$<br>( $\Omega$ ) | $R_{1max}$<br>( $\Omega$ ) |  |  |
| 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.

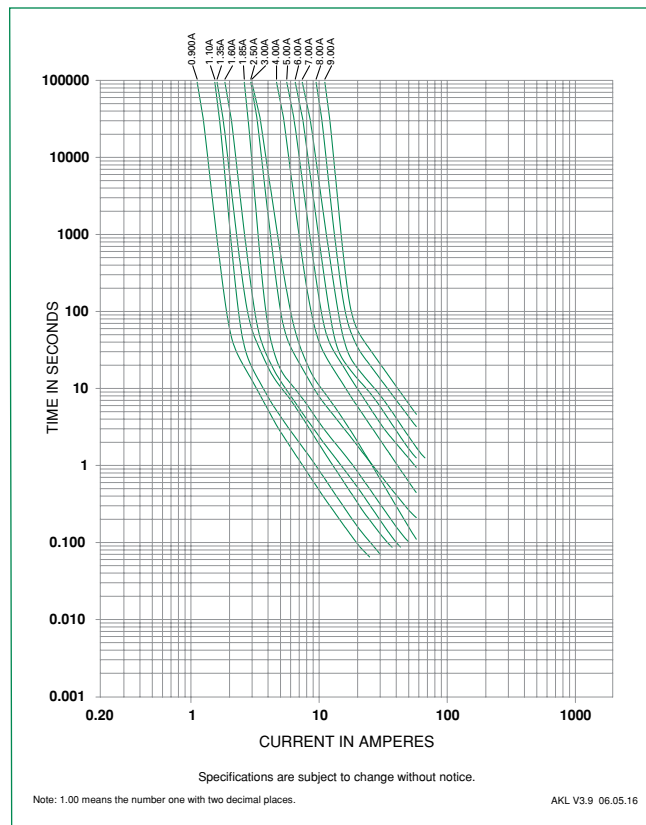
$R_{typ}$  = Typical resistance of device in initial (un-soldered) state.

$R_{1max}$  = Maximum resistance of device at 20°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

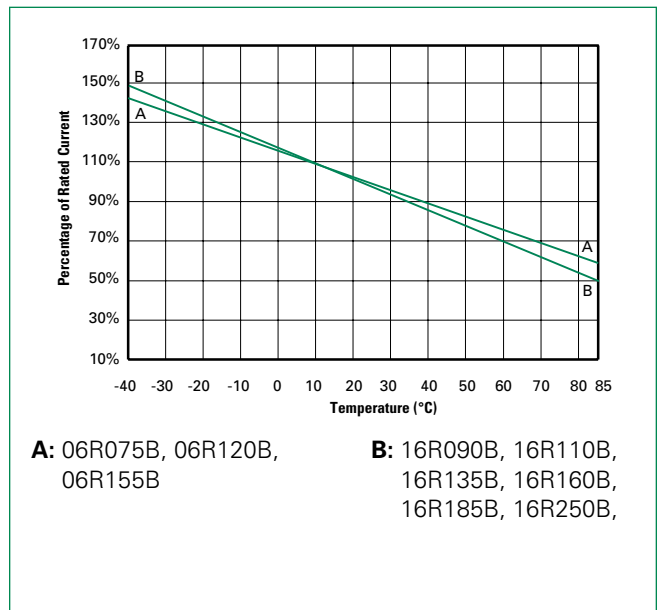
**Caution:** Operation beyond the specified rating may result in damage and possible arcing and flame.

**Temperature Derating**

|             | Ambient Operation Temperature |       |      |      |      |      |      |      |      |
|-------------|-------------------------------|-------|------|------|------|------|------|------|------|
|             | -40°C                         | -20°C | 0°C  | 23°C | 40°C | 50°C | 60°C | 70°C | 85°C |
| Part Number | 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 |

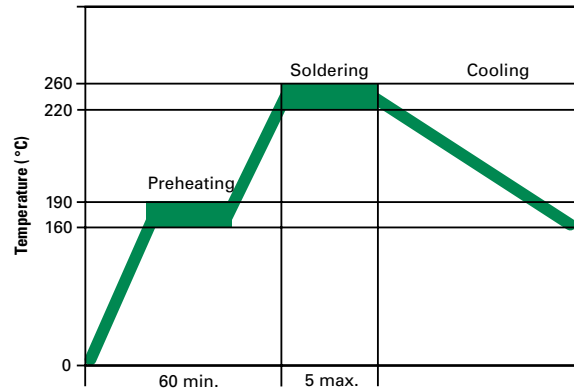
**Average Time Current Curves**


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><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.                                                                            |

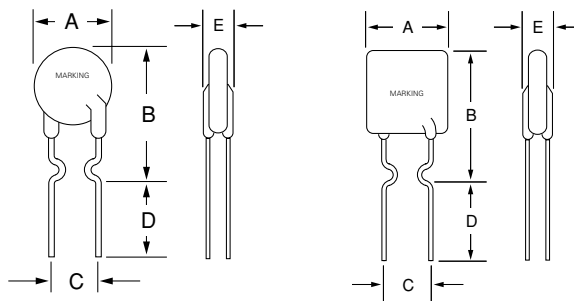

**Physical Specifications**

|                                  |                                                                    |
|----------------------------------|--------------------------------------------------------------------|
| <b>Lead Material</b>             | .90-2.50A: Tin-plated copper clad steel<br>.75A: 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                                    |

## Dimensions (mm)

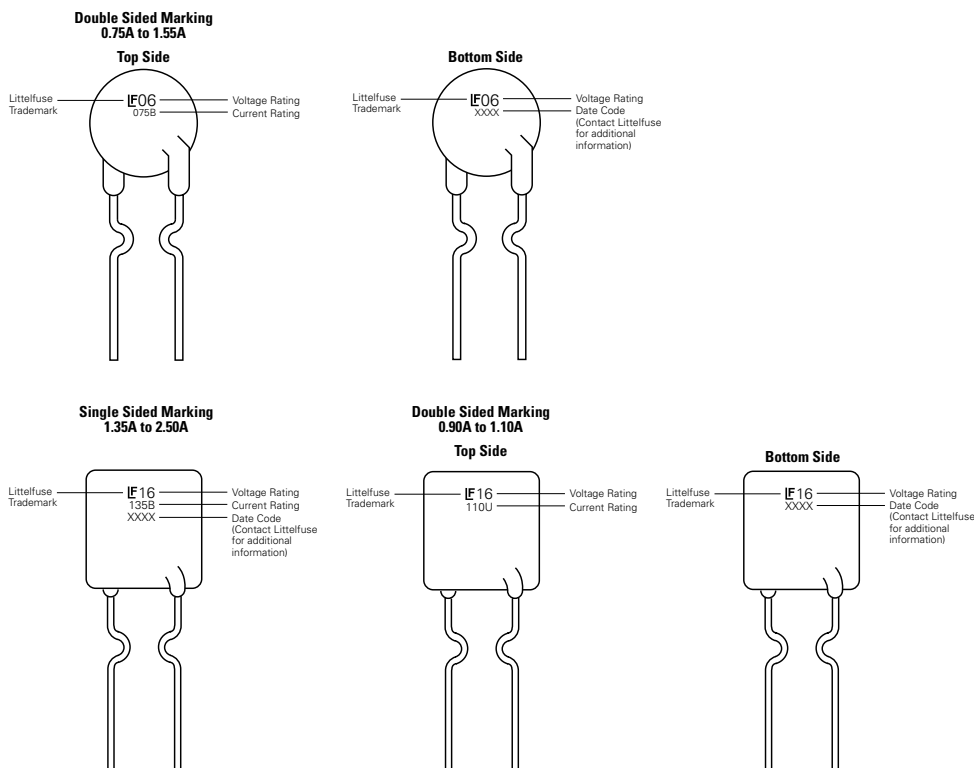


**Figure 1**

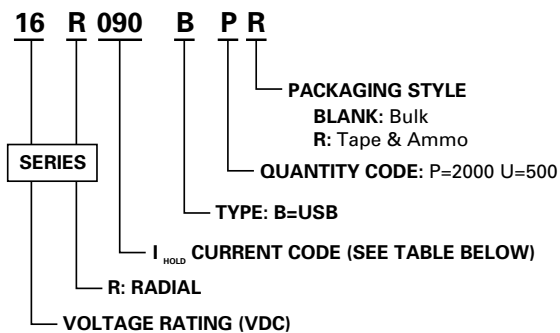
**Figure 2**

| Part Number | A      |      | B      |      | C      |      | D      |      | E      |      | Physical Characteristics |      |          |        |
|-------------|--------|------|--------|------|--------|------|--------|------|--------|------|--------------------------|------|----------|--------|
|             | Inches | mm   | Inches | mm   | Inches | mm   | Inches | mm   | Inches | mm   | Lead (dia)               |      | Material | Figure |
|             | Max.   | Max. | Max.   | Max. | Typ.   | Typ. | Min.   | Min. | Max.   | Max. | Inches                   | mm   |          |        |
| 06R075B     | 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    | 1      |
| 06R120B     | 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  | 1      |
| 06R155B     | 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  | 1      |
| 16R090B     | 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  | 2      |
| 16R110B     | 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  | 2      |
| 16R135B     | 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  | 2      |
| 16R160B     | 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  | 2      |
| 16R185B     | 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  | 2      |
| 16R250B     | 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  | 2      |

## Part Marking System



### Part Numbering System



### Packaging

| I <sub>hold</sub><br>(A) | I <sub>hold</sub><br>Code | Voltage | Packaging<br>Option | Quantity | Quantity &<br>Packaging Codes |
|--------------------------|---------------------------|---------|---------------------|----------|-------------------------------|
| 0.75                     | 075                       | 6       | Bulk                | 500      | U                             |
|                          |                           |         | Tape and Ammo       | 2000     | PR                            |
| 1.20                     | 120                       | 6       | Bulk                | 500      | U                             |
|                          |                           |         | Tape and Ammo       | 2000     | PR                            |
| 1.55                     | 155                       | 6       | Bulk                | 500      | U                             |
|                          |                           |         | Tape and Ammo       | 2000     | PR                            |
| 0.90                     | 080                       | 16      | Bulk                | 500      | U                             |
|                          |                           |         | Tape and Ammo       | 2000     | PR                            |
| 1.10                     | 110                       | 16      | Bulk                | 500      | U                             |
|                          |                           |         | Tape and Ammo       | 2000     | PR                            |
| 1.35                     | 135                       | 16      | Bulk                | 500      | U                             |
|                          |                           |         | Tape and Ammo       | 2000     | PR                            |
| 1.60                     | 160                       | 16      | Bulk                | 500      | U                             |
|                          |                           |         | Tape and Ammo       | 2000     | PR                            |
| 1.85                     | 185                       | 16      | Bulk                | 500      | U                             |
|                          |                           |         | Tape and Ammo       | 2000     | PR                            |
| 2.50                     | 250                       | 16      | Bulk                | 500      | U                             |
|                          |                           |         | Tape and Ammo       | 2000     | PR                            |