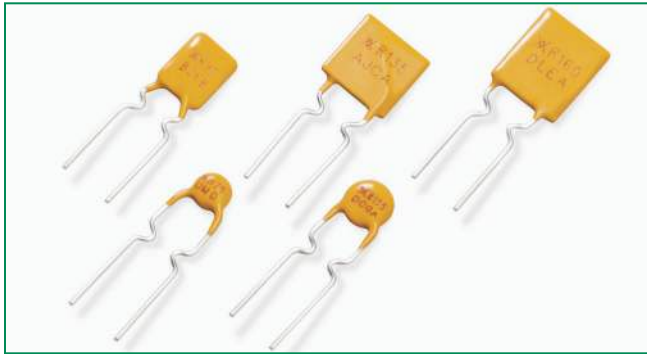


RUSBF Series



Description

Littelfuse PolySwitch radial-leaded devices represent the most comprehensive and complete set of PPTC products available in the industry today. RUSBF series is for fast time-to-trip and low-resistance computer applications.




Features

- Resettable and single-use overcurrent devices
- Wide range of form factor and termination methods
- Devices compatible with high-volume electronics assembly
- RoHS compliant, Lead-Free and Halogen-Free

Applications

- Satellite video receivers
- Industrial controls
- Transformers
- Computer motherboards
- Modems
- USB hubs, ports and peripherals
- IEEE 1394 ports
- CD-ROMs
- Game machines
- Battery packs
- Phones
- Fax machines
- Analog and digital line cards
- Printers

Agency Approvals

| AGENCY | AGENCY FILE NUMBER |
|---|--------------------|
|  | E74889 |
|  | 78165 |
|  | 72161784 |

Additional Information



Datasheet



Resources



Samples

Electrical Characteristics

| Part Number | I_H | I_T | V_{MAX} | | I_{MAX} | | $P_{D\ TYP}$ | Max Time-to-trip | | R_{MIN} | R_{MAX} | R_{1MAX} | Lead Size (mm ² /AWG) |
|--------------------|-------|-------|--------------------|------------------------|----------------------|-----------------------|--------------|------------------|------|-----------|-----------|------------|----------------------------------|
| | (A) | (A) | (V _{DC}) | (V _{AC RMS}) | (DC _{ADC}) | (AC _{ARMS}) | (W) | (A) | (s) | (Ω) | (Ω) | (Ω) | |
| RUSBF – 6V | | | | | | | | | | | | | |
| RUSBF075 | 0.75 | 1.30 | 6 | — | 40 | — | 0.3 | 8.0 | 0.4 | 0.110 | 0.1750 | 0.23 | 0.205/24 |
| RUSBF120 | 1.20 | 2.00 | 6 | — | 40 | — | 0.6 | 8.0 | 0.5 | 0.070 | 0.0975 | 0.14 | 0.205/24 |
| RUSBF155 | 1.55 | 2.65 | 6 | — | 40 | — | 0.6 | 7.8 | 2.2 | 0.040 | 0.0705 | 0.10 | 0.205/24 |
| RUSBF – 16V | | | | | | | | | | | | | |
| RUSBF090 | 0.90 | 1.8 | 16 | — | 40 | — | 0.6 | 8.0 | 1.2 | 0.070 | 0.120 | 0.180 | 0.205/24 |
| RUSBF110 | 1.10 | 2.2 | 16 | — | 40 | — | 0.7 | 8.0 | 2.3 | 0.050 | 0.095 | 0.140 | 0.205/24 |
| RUSBF135 | 1.35 | 2.7 | 16 | — | 40 | — | 0.8 | 8.0 | 4.5 | 0.040 | 0.074 | 0.112 | 0.205/24 |
| RUSBF160 | 1.60 | 3.2 | 16 | — | 40 | — | 0.9 | 8.0 | 9.0 | 0.030 | 0.061 | 0.110 | 0.205/24 |
| RUSBF185 | 1.85 | 3.7 | 16 | — | 40 | — | 1.0 | 8.0 | 10.0 | 0.030 | 0.051 | 0.090 | 0.205/24 |
| RUSBF250 | 2.50 | 5.0 | 16 | — | 40 | — | 1.2 | 8.0 | 40.0 | 0.020 | 0.036 | 0.060 | 0.205/24 |

Notes:

I_H : Hold current: maximum current device will pass without interruption in 20°C still air.
 I_T : Trip current: minimum current that will switch the device from low resistance to high resistance in 20°C still air.
 V_{MAX} : Maximum continuous voltage device can withstand without damage at rated current.
 I_{MAX} : Maximum fault current device can withstand without damage at rated voltage.
 P_D : Power dissipated from device when in the tripped state in 20°C still air.

R_{MIN} : Minimum resistance of device as supplied at 20°C unless otherwise specified.
 R_{MAX} : Maximum resistance of device as supplied at 20°C unless otherwise specified.
 R_{1MAX} : Maximum resistance of device when measured one hour post reflow (surface-mount device) or one hour post trip (radial-leaded device) at 20°C unless otherwise specified.

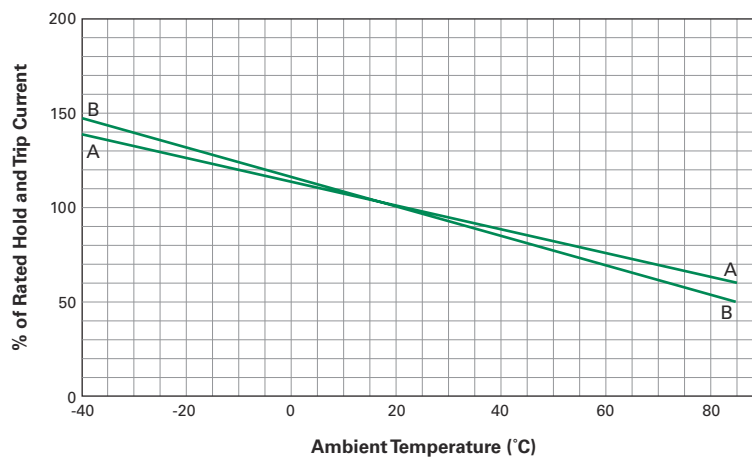
* Electrical characteristics determined at 25°C.

Temperature Derating

| Maximum Ambient Temperature | | | | | | | | | | |
|-----------------------------|-------|-------|------|------|------|------|------|------|------|------|
| | -40°C | -20°C | 0°C | 20°C | 25°C | 40°C | 50°C | 60°C | 70°C | 85°C |
| Hold Current (A) | | | | | | | | | | |
| RUSBF – 6V | | | | | | | | | | |
| RUSBF075 | 1.05 | 0.95 | 0.85 | 0.75 | 0.73 | 0.65 | 0.60 | 0.55 | 0.50 | 0.43 |
| RUSBF120 | 1.69 | 1.52 | 1.36 | 1.20 | 1.16 | 1.04 | 0.96 | 0.88 | 0.80 | 0.68 |
| RUSBF155 | 2.17 | 1.96 | 1.75 | 1.55 | 1.50 | 1.34 | 1.24 | 1.14 | 1.03 | 0.88 |
| RUSBF – 16V | | | | | | | | | | |
| RUSBF090 | 1.31 | 1.17 | 1.04 | 0.90 | 0.87 | 0.75 | 0.69 | 0.61 | 0.55 | 0.47 |
| RUSBF110 | 1.60 | 1.43 | 1.27 | 1.10 | 1.07 | 1.00 | 0.92 | 0.75 | 0.67 | 0.57 |
| RUSBF135 | 1.96 | 1.76 | 1.55 | 1.35 | 1.31 | 1.12 | 1.04 | 0.92 | 0.82 | 0.70 |
| RUSBF160 | 2.32 | 2.08 | 1.84 | 1.60 | 1.55 | 1.33 | 1.23 | 1.09 | 0.98 | 0.83 |
| RUSBF185 | 2.68 | 2.41 | 2.13 | 1.85 | 1.79 | 1.54 | 1.42 | 1.26 | 1.13 | 0.96 |
| RUSBF250 | 3.63 | 3.25 | 2.88 | 2.50 | 2.43 | 2.08 | 1.93 | 1.70 | 1.53 | 1.30 |

Temperature Derating Curve

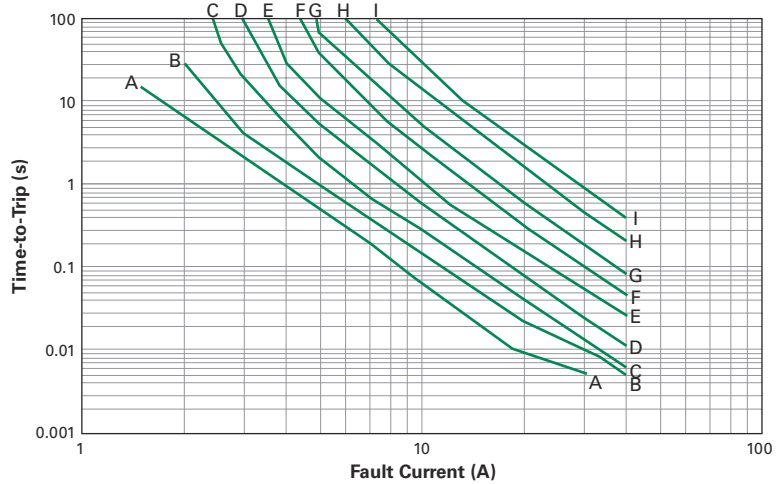
- A = RUSBF075,
RUSBF120,
RUSBF155
- B = all other RUSBF



Typical Time-to-Trip Curves at 20°C

RUSBF

- A = RUSBF075
- B = RUSBF090
- C = RUSBF110
- D = RUSBF120
- E = RUSBF135
- F = RUSBF155
- G = RUSBF160
- H = RUSBF185
- I = RUSBF250



Physical Specifications

| | |
|----------------------------------|--|
| Lead Material | RUSBF075: Tin-plated Nickel-copper Alloy, 0.205mm ² (24AWG), ø0.51mm/0.020in RUSBF090 to RUSBF250: Tin-plated Copper-clad Steel, 0.205mm ² (24AWG), ø0.51mm/0.020in |
| Soldering Characteristics | Solderability per ANSI/J-STD-002 Category 3 Except RUSBF075 Meet ANSI/J-STD-002 Category 1 |
| Solder Heat Withstand | RUSBF120: per IEC-STD 68-2-20, Test Tb, Method 1a, Condition a; Can Withstand 5s at 260°C ±5°C All Others : per IEC-STD 68-2-20, Test Tb, Method 1a, Condition b; Can Withstand 10s at 260°C ±5°C |
| Insulating Material | Cured, Flame-retardant Epoxy Polymer; Meets UL 94V-0 |
| Operation Temperature | -40°C~85°C |

Note: Devices are not designed to be placed through a reflow process.

Environmental Specifications

| Test | Conditions | Resistance Change |
|----------------------------------|--|-------------------|
| Passive Aging | 70°C, 1000 hrs | ±5% |
| | 85°C, 1000 hrs | ±5% |
| Humidity Aging | 85°C, 85% R.H., 1000 hrs | ±5% |
| Thermal Shock | 85°C, -40°C (10 Times) | ±5% |
| Solvent Resistance | MIL-STD-202, Method 215F | No change |
| Moisture Resistance Level | Level 1, J-STD-020 | |
| Storage Conditions | 40°C max, 70% RH max; devices should remain in original sealed bags prior to use. Devices may not meet specified values if these storage conditions are exceeded. | |

Dimension Figures

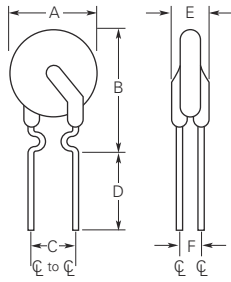


Figure 1

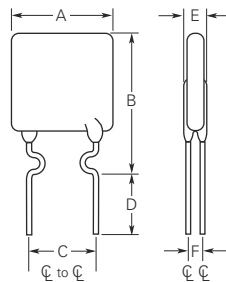


Figure 2

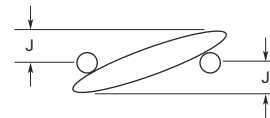


Figure 3

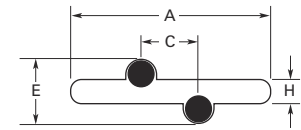


Figure 4

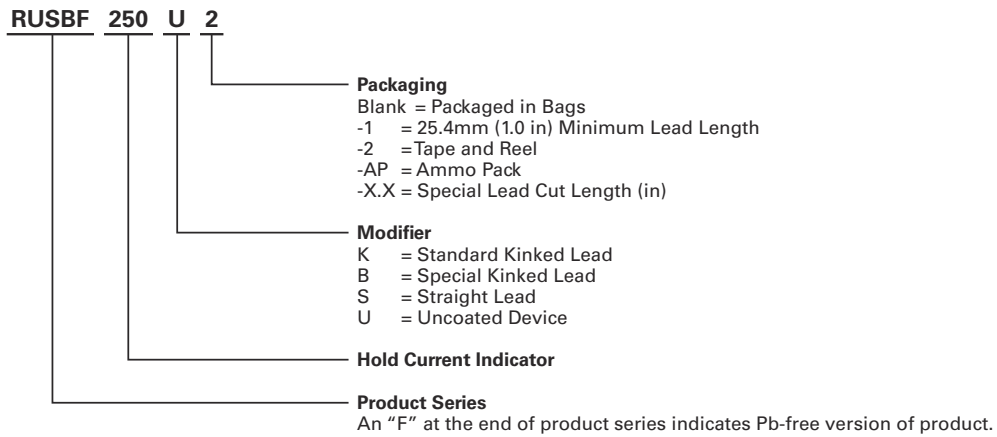
Dimensions and Weights

| Part Number | Dimensions in Millimeters (Inches) | | | | | | | | | | | | Figure | Device Mass (g) (Only for Reference) |
|--------------------|------------------------------------|----------------|-----|----------------|---------------|---------------|---------------|-----|-----|---------------|-----------------|---------------|--------|---|
| | A | | B | | C | | D | | E | | H | J | | |
| | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Typ | Typ | | |
| RUSBF – 6V | | | | | | | | | | | | | | |
| RUSBF075 | — | 6.9 (0.27) | — | 11.4 (0.45) | 4.3 (0.17) | 5.9 (0.23) | 7.6 (0.30) | — | — | 3.1 (0.12) | 0.91 (0.036) | 1.0 (0.04) | 1,3,4 | 0.123 |
| RUSBF120 | — | 6.9 (0.27) | — | 11.7 (0.46) | 4.3 (0.17) | 5.9 (0.23) | 7.6 (0.30) | — | — | 3.1 (0.12) | 0.91 (0.036) | 1.0 (0.04) | 1,3,4 | 0.111 |
| RUSBF155 | — | 6.9 (0.27) | — | 11.7 (0.46) | 4.3 (0.17) | 5.9 (0.23) | 7.6 (0.30) | — | — | 3.1 (0.12) | 0.91 (0.036) | 1.0 (0.04) | 1,3,4 | 0.135 |
| RUSBF – 16V | | | | | | | | | | | | | | |
| RUSBF090 | — | 7.4 (0.29) | — | 12.2 (0.48) | 4.3 (0.17) | 5.8 (0.23) | 7.6 (0.30) | — | — | 3.1 (0.12) | 0.89 (0.035) | 0.8 (0.03) | 2,3,4 | 0.183 |
| RUSBF110 | — | 7.4 (0.29) | — | 14.2 (0.56) | 4.3 (0.17) | 5.8 (0.23) | 7.6 (0.30) | — | — | 3.0 (0.12) | 0.89 (0.035) | 0.8 (0.03) | 2,3,4 | 0.204 |
| RUSBF135 | — | 8.9 (0.35) | — | 13.5 (0.53) | 4.3 (0.17) | 5.8 (0.23) | 7.6 (0.30) | — | — | 3.0 (0.12) | 0.89 (0.035) | 1.0 (0.04) | 2,3,4 | 0.240 |
| RUSBF160 | — | 8.9 (0.35) | — | 15.2 (0.60) | 4.3 (0.17) | 5.8 (0.23) | 7.6 (0.30) | — | — | 3.0 (0.12) | 0.89 (0.035) | 1.0 (0.04) | 2,3,4 | 0.300 |
| RUSBF185 | — | 10.2 (0.40) | — | 15.7 (0.62) | 4.3 (0.17) | 5.8 (0.23) | 7.6 (0.30) | — | — | 3.0 (0.12) | 0.89 (0.035) | 1.0 (0.04) | 2,3,4 | 0.368 |
| RUSBF250 | — | 11.4 (0.45) | — | 18.3 (0.72) | 4.3 (0.17) | 5.8 (0.23) | 7.6 (0.30) | — | — | 3.0 (0.12) | 0.89 (0.035) | 1.2 (0.05) | 2,3,4 | 0.467 |

Packaging and Marking Information

| Part Number | Bag Quantity | Tape and Reel Quantity | Ammo Pack Quantity | Standard Package Quantity | Part Marking | Agency Recognition |
|--------------------|--------------|------------------------|--------------------|---------------------------|--------------|--------------------|
| RUSBF – 6V | | | | | | |
| RUSBF075 | 500 | — | — | 10,000 | R75 | UL, CSA, TÜV |
| RUSBF075-2 | — | 3,000 | — | 15,000 | R75 | UL, CSA, TÜV |
| RUSBF075-AP | — | — | 2,000 | 10,000 | R75 | UL, CSA, TÜV |
| RUSBF120 | 500 | — | — | 10,000 | R120 | UL, CSA, TÜV |
| RUSBF120-2 | — | 3,000 | — | 15,000 | R120 | UL, CSA, TÜV |
| RUSBF120-AP | — | — | 2,000 | 10,000 | R120 | UL, CSA, TÜV |
| RUSBF155 | 500 | — | — | 10,000 | R155 | UL, CSA, TÜV |
| RUSBF155-2 | — | 3,000 | — | 15,000 | R155 | UL, CSA, TÜV |
| RUSBF155-AP | — | — | 2,000 | 10,000 | R155 | UL, CSA, TÜV |
| RUSBF160 | 500 | — | — | 10,000 | R160 | UL, CSA, TÜV |
| RUSBF160-2 | — | 3,000 | — | 15,000 | R160 | UL, CSA, TÜV |
| RUSBF160-AP | — | — | 2,000 | 10,000 | R160 | UL, CSA, TÜV |
| RUSBF – 16V | | | | | | |
| RUSBF090 | 500 | — | — | 10,000 | R90 | UL, CSA, TÜV |
| RUSBF090-2 | — | 3,000 | — | 15,000 | R90 | UL, CSA, TÜV |
| RUSBF090-AP | — | — | 2,000 | 10,000 | R90 | UL, CSA, TÜV |
| RUSBF110 | 500 | — | — | 10,000 | R110 | UL, CSA, TÜV |
| RUSBF110-2 | — | 3,000 | — | 15,000 | R110 | UL, CSA, TÜV |
| RUSBF110-AP | — | — | 2,000 | 10,000 | R110 | UL, CSA, TÜV |
| RUSBF135 | 500 | — | — | 10,000 | R135 | UL, CSA, TÜV |
| RUSBF135-2 | — | 3,000 | — | 15,000 | R135 | UL, CSA, TÜV |
| RUSBF135-AP | — | — | 2,000 | 10,000 | R135 | UL, CSA, TÜV |
| RUSBF160 | 500 | — | — | 10,000 | R160 | UL, CSA, TÜV |
| RUSBF160-2 | — | 3,000 | — | 15,000 | R160 | UL, CSA, TÜV |
| RUSBF160-AP | — | — | 2,000 | 10,000 | R160 | UL, CSA, TÜV |
| RUSBF185 | 500 | — | — | 10,000 | R185 | UL, CSA, TÜV |
| RUSBF185-2 | — | 3,000 | — | 15,000 | R185 | UL, CSA, TÜV |
| RUSBF185-AP | — | — | 2,000 | 10,000 | R185 | UL, CSA, TÜV |
| RUSBF250 | 500 | — | — | 10,000 | R250 | UL, CSA, TÜV |
| RUSBF250-2 | — | 3,000 | — | 15,000 | R250 | UL, CSA, TÜV |
| RUSBF250-AP | — | — | 2,000 | 10,000 | R250 | UL, CSA, TÜV |

Part Ordering Number System



Note: Kinked parts are recommended to control the height of the part on the PCB in non-auto PCB applications.

Tape and Reel Specifications

RUSBF devices are available in tape and reel packaging per EIA468-B/IEC60286-2 standards. See Figures 1 and 2 for details.

| Description | EIA Mark | Dimension (mm) | Tolerance |
|--|----------------|----------------|------------|
| Carrier Tape Width | W | 18 | -0.5/+1.0 |
| Hold-down Tape Width | W ₄ | 11 | Minimum |
| Top Distance between Tape Edges | W ₆ | 3 | Maximum |
| Sprocket Hole Position | W ₅ | 9 | -0.5/+0.75 |
| Sprocket Hole Diameter | W ₀ | 4 | ± 0.2 |
| Abscissa to Plane (Straight Lead)* | H | 18.5 | ± 2.5 |
| Abscissa to Plane (Kinked Lead) (RUSBF075 to RUSBF250) | H ₀ | 16.0 | ± 0.5 |
| Abscissa to Top (RUSBF075 to RUSBF250) | H ₁ | 32.2 | Maximum |
| Abscissa to Top* | H ₁ | 45.0 | Maximum |
| Overall Width with Lead Protrusion (RUSBF075 to RUSBF250) | C ₁ | 43.2 | Maximum |
| Overall Width with Lead Protrusion | C ₁ | 56 | Maximum |
| Overall Width without Lead Protrusion (RUSBF075 to RUSBF250) | C ₂ | 42.5 | Maximum |
| Overall Width without Lead Protrusion | C ₂ | 56 | Maximum |
| Lead Protrusion | L ₁ | 1.0 | Maximum |
| Protrusion of Cut-out | L | 11 | Maximum |
| Protrusion beyond Hold-down Tape | I ₂ | Not Specified | — |
| Sprocket Hole Pitch | P ₀ | 12.7 | ± 0.3 |
| Device Pitch (RUSBF075 to RUSBF250) | — | 12.7 | ± 0.3 |
| Device Pitch | — | 25.4 | ± 0.6 |
| Pitch Tolerance | — | 20 Consecutive | ± 1 |
| Tape Thickness | T | 0.9 | Maximum |
| Overall Tape and Lead Thickness (RUSBF075 to RUSBF250) | T ₁ | 1.5 | Maximum |
| Overall Tape and Lead Thickness* | T ₁ | 2.3 | Maximum |
| Splice Sprocket Hole Alignment | — | 0 | ± 0.3 |
| Body Lateral Deviation | Δh | 0 | ± 1.0 |
| Body Tape Plane Deviation | Δp | 0 | ± 1.3 |
| Ordinate to Adjacent Component Lead (RUSBF075 to RUSBF250) | P ₁ | 3.81 | ± 0.7 |
| Ordinate to Adjacent Component Lead | P ₁ | 7.62 | ± 0.7 |
| Lead Spacing* (RUSBF075 to RUSBF250) | F | 5.05 | ± 0.75 |
| Lead Spacing* | F | 10.15 | ± 0.75 |
| Reel Width (RUSBF075 to RUSBF250) | W ₂ | 56.0 | Maximum |
| Reel Width | W ₂ | 63.5 | Maximum |
| Reel Diameter | A | 370.0 | Maximum |
| Space between Flanges* (RUSBF075 to RUSBF250) | W ₁ | 48.0 | Maximum |
| Space between Flanges* | W ₁ | 55.0 | Maximum |
| Arbor Hold Diameter | C | 26.0 | ± 12.0 |
| Core Diameter* | N | 91.0 | Maximum |
| Box | — | 64/372/362 | Maximum |
| Consecutive Missing Places | — | None | — |
| Empty Places per Reel | — | 0.1% | Maximum |

*Differs from EIA specification.

Tape and Reel Diagrams

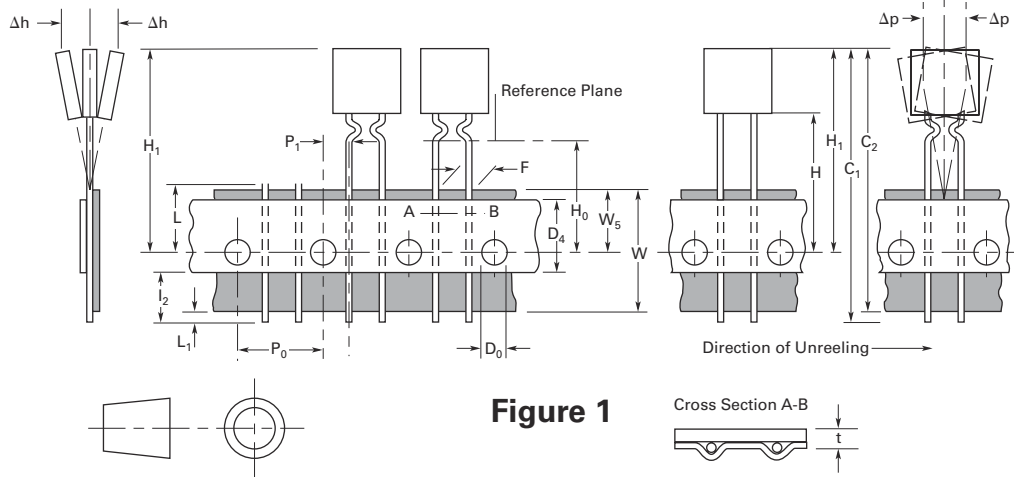


Figure 1

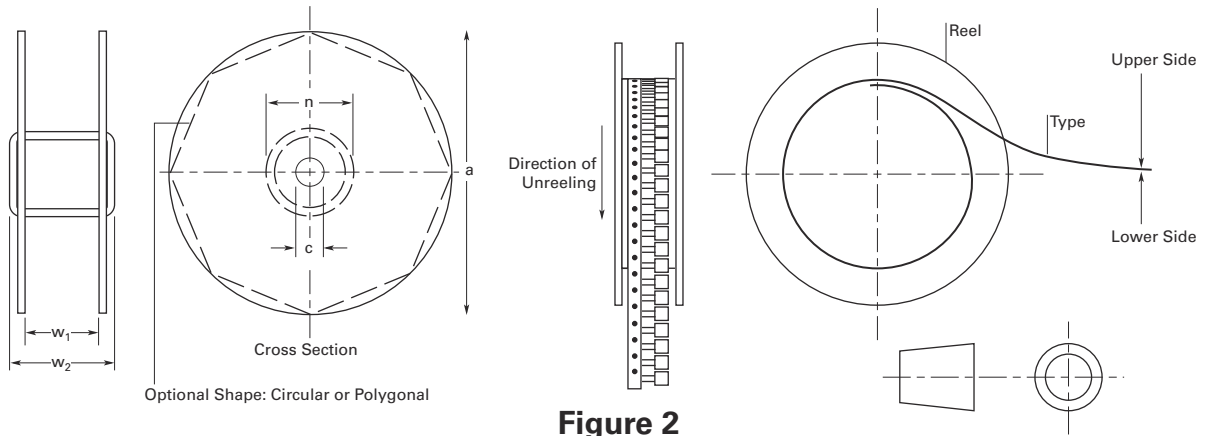


Figure 2

WARNING

- Users should independently evaluate the suitability of and test each product selected for their own application.
- Operation beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- These devices are intended for protection against damage caused by occasional overcurrent or overtemperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Contamination of the PPTC material with certain silicone-based oils or some aggressive solvents can adversely impact the performance of the devices.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- PPTC devices are not recommended for installation in applications where the device is constrained such that its PTC properties are inhibited, for example in rigid potting materials or in rigid housings, which lack adequate clearance to accommodate device expansion.
- Operation in circuits with a large inductance can generate a circuit voltage (Ldi/dt) above the rated voltage of the device.

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