

➤ Features

- 60Vdc max voltage
- RoHS compliant, lead-free and halogen-free
- Resettable feature
- Ideal for a broad range of general electronics using a low voltage power supply

➤ Applications

- Load protection on wide range of low voltage power supplies
- Computers, Computers peripherals
- General electronics

➤ Electrical Characteristics (25°C)

| Part Number | I_{hold} | I_{trip} | V_{max} | I_{max} | $P_{d\ typ}$ | Time to trip | | $R_{i\ min}$ | $R_{1\ max}$ |
|-------------|------------|------------|--------------------|-----------|--------------|--------------|-------|--------------|--------------|
| | (A) | (A) | (V _{dc}) | (A) | (W) | (A) | (Sec) | (Ω) | (Ω) |
| BH60-003 | 0.03 | 0.09 | 60 | 40 | 1.00 | 0.15 | 10.0 | 33.0 | 110.5 |
| BH60-005 | 0.05 | 0.15 | 60 | 40 | 1.00 | 0.25 | 10.0 | 7.50 | 44.2 |
| BH60-010 | 0.10 | 0.25 | 60 | 40 | 1.00 | 0.50 | 10.0 | 2.50 | 6.75 |
| BH60-017 | 0.17 | 0.35 | 60 | 40 | 1.00 | 0.85 | 10.0 | 2.00 | 4.80 |
| BH60-020 | 0.20 | 0.40 | 60 | 40 | 1.00 | 1.00 | 10.0 | 1.50 | 4.26 |
| BH60-025 | 0.25 | 0.50 | 60 | 40 | 1.00 | 1.25 | 10.0 | 1.00 | 2.93 |
| BH60-030 | 0.30 | 0.60 | 60 | 40 | 1.00 | 1.50 | 10.0 | 0.76 | 2.04 |
| BH60-040 | 0.40 | 0.80 | 60 | 40 | 1.00 | 2.00 | 10.0 | 0.52 | 1.29 |
| BH60-050 | 0.50 | 1.00 | 60 | 40 | 1.00 | 2.50 | 10.0 | 0.41 | 1.16 |
| BH60-065 | 0.65 | 1.30 | 60 | 40 | 1.00 | 3.25 | 10.0 | 0.27 | 0.72 |
| BH60-075 | 0.75 | 1.50 | 60 | 40 | 1.00 | 3.75 | 10.0 | 0.18 | 0.60 |
| BH60-090 | 0.90 | 1.80 | 60 | 40 | 1.00 | 4.50 | 10.0 | 0.14 | 0.465 |
| BH60-110 | 1.10 | 2.20 | 60 | 40 | 1.51 | 5.50 | 10.0 | 0.14 | 0.375 |
| BH60-135 | 1.35 | 2.70 | 60 | 40 | 1.71 | 6.75 | 10.0 | 0.12 | 0.285 |
| BH60-160 | 1.60 | 3.20 | 60 | 40 | 1.98 | 8.00 | 11.4 | 0.09 | 0.21 |
| BH60-185 | 1.85 | 3.70 | 60 | 40 | 2.10 | 9.25 | 12.6 | 0.08 | 0.18 |
| BH60-250 | 2.50 | 5.00 | 60 | 40 | 2.50 | 12.5 | 15.6 | 0.05 | 0.12 |
| BH60-300 | 3.00 | 6.00 | 60 | 40 | 2.80 | 15.0 | 19.8 | 0.04 | 0.09 |
| BH60-375 | 3.75 | 7.50 | 60 | 40 | 3.20 | 18.75 | 24.0 | 0.03 | 0.075 |
| BH60-500 | 5.00 | 10.0 | 60 | 40 | 3.50 | 25.00 | 30.0 | 0.015 | 0.075 |

➤ Vocabulary

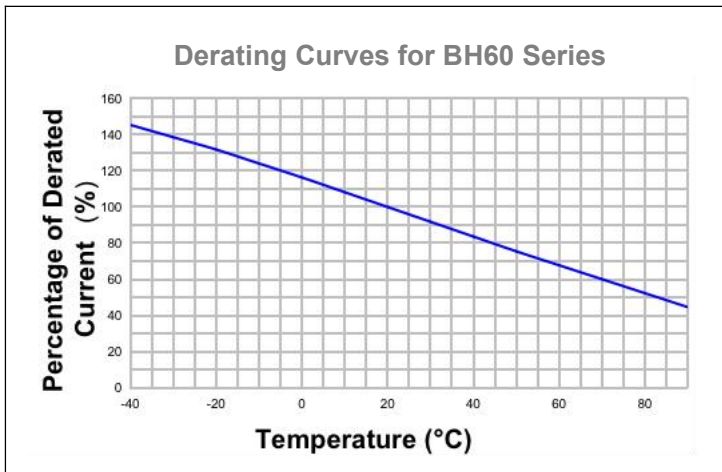
- I_{hold}** = Hold current: maximum current device will pass without tripping in 25°C still air.
- I_{trip}** = Trip current: minimum current at which the device will trip in 25°C still air.
- V_{max}** = Maximum voltage device can withstand without damage at rated current (**I_{max}**).
- I_{max}** = Maximum fault current device can withstand without damage at rated voltage (**V_{max}**).
- P_{d typ.}** = Typical power dissipated from device when in the tripped state at 25°C still air.
- R_{min}** = Minimum resistance of device in initial (un-soldered) state.
- R_{1max}** = Maximum resistance of device at 25°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

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

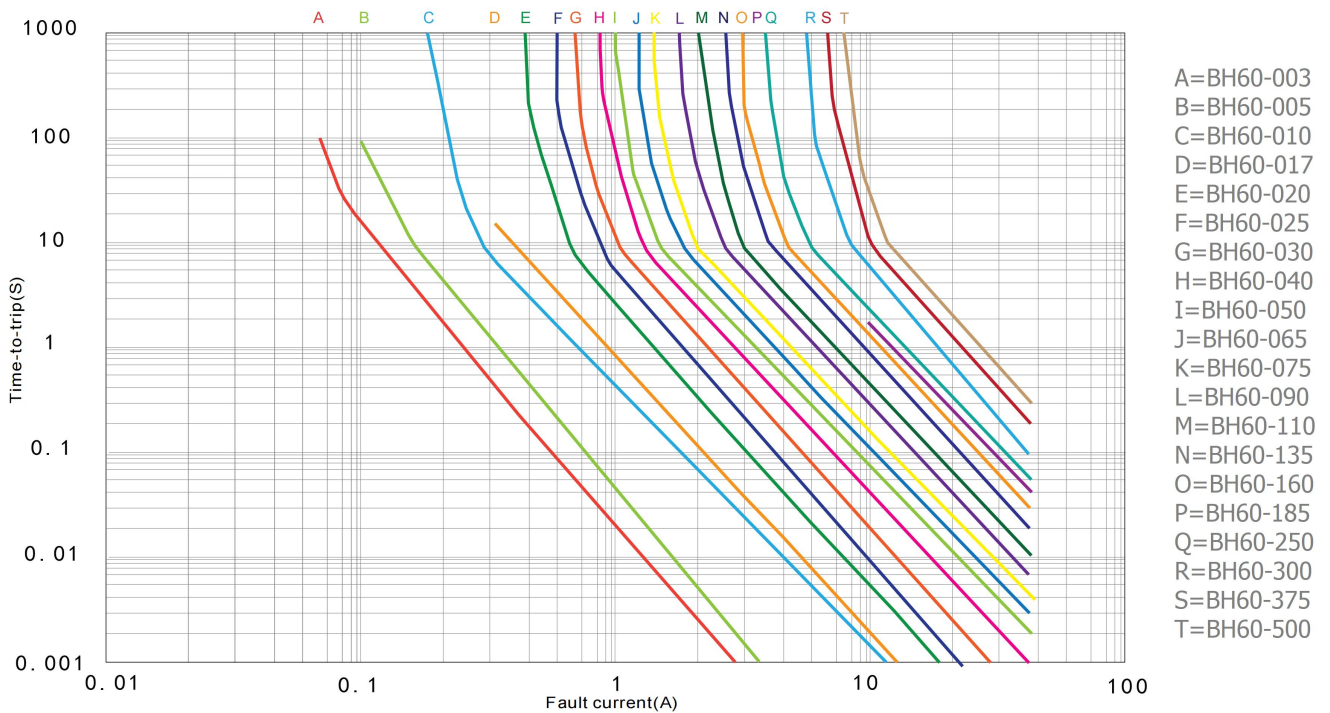
➤ Warning

- 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 prolonged 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.

➤ Thermal Derating Curve



➤ Average Time-Current Curve



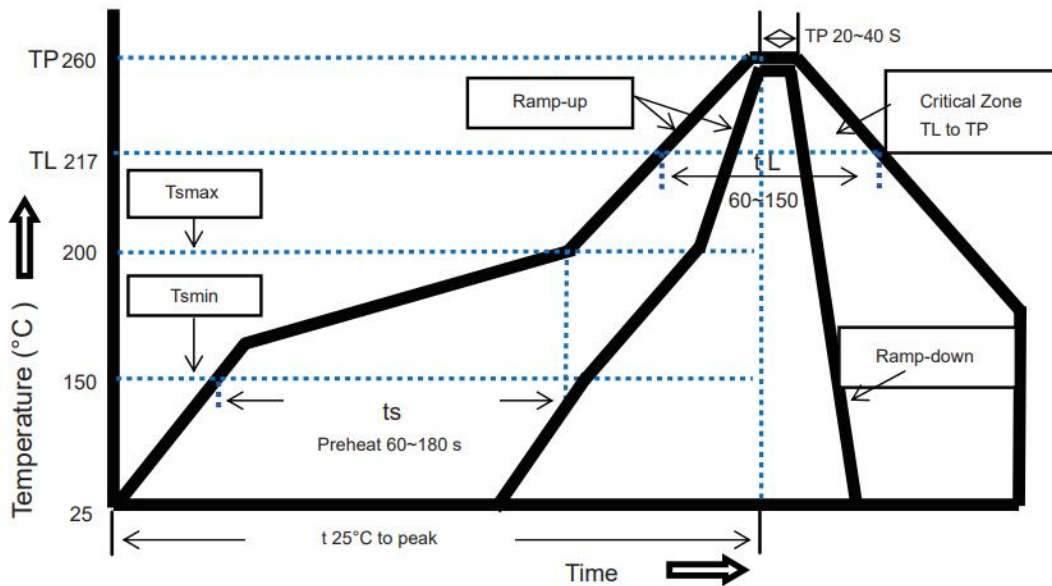
➤ Thermal Derating Chart

| Part Number | Ambient operating temperature hold current(I_{hold}) | | | | | | | | |
|-------------|--|-------|-------|-------|-------|-------|-------|-------|-------|
| | -40°C | -20°C | 0°C | 25°C | 40°C | 50°C | 60°C | 70°C | 85°C |
| BH60-003 | 0.047 | 0.041 | 0.036 | 0.030 | 0.024 | 0.021 | 0.018 | 0.015 | 0.011 |
| BH60-005 | 0.079 | 0.069 | 0.060 | 0.050 | 0.041 | 0.035 | 0.030 | 0.025 | 0.018 |
| BH60-010 | 0.158 | 0.138 | 0.119 | 0.100 | 0.081 | 0.070 | 0.060 | 0.050 | 0.036 |
| BH60-017 | 0.269 | 0.235 | 0.202 | 0.170 | 0.138 | 0.119 | 0.102 | 0.085 | 0.061 |
| BH60-020 | 0.316 | 0.276 | 0.238 | 0.200 | 0.162 | 0.140 | 0.120 | 0.100 | 0.072 |
| BH60-025 | 0.395 | 0.345 | 0.298 | 0.250 | 0.203 | 0.175 | 0.150 | 0.125 | 0.090 |
| BH60-030 | 0.474 | 0.414 | 0.357 | 0.300 | 0.243 | 0.210 | 0.180 | 0.150 | 0.108 |
| BH60-040 | 0.632 | 0.552 | 0.476 | 0.400 | 0.324 | 0.280 | 0.240 | 0.200 | 0.144 |
| BH60-050 | 0.790 | 0.690 | 0.595 | 0.500 | 0.405 | 0.350 | 0.300 | 0.250 | 0.180 |
| BH60-065 | 1.027 | 0.897 | 0.774 | 0.650 | 0.527 | 0.455 | 0.390 | 0.325 | 0.234 |
| BH60-075 | 1.185 | 1.035 | 0.893 | 0.750 | 0.608 | 0.525 | 0.450 | 0.375 | 0.270 |
| BH60-090 | 1.422 | 1.242 | 1.071 | 0.900 | 0.729 | 0.630 | 0.540 | 0.450 | 0.324 |
| BH60-110 | 1.738 | 1.518 | 1.309 | 1.100 | 0.891 | 0.770 | 0.660 | 0.550 | 0.396 |
| BH60-135 | 2.133 | 1.863 | 1.607 | 1.350 | 1.094 | 0.945 | 0.810 | 0.675 | 0.486 |
| BH60-160 | 2.528 | 2.208 | 1.904 | 1.600 | 1.296 | 1.120 | 0.960 | 0.800 | 0.576 |
| BH60-185 | 2.923 | 2.553 | 2.202 | 1.850 | 1.499 | 1.295 | 1.110 | 0.925 | 0.666 |
| BH60-250 | 3.950 | 3.450 | 2.975 | 2.500 | 2.025 | 1.750 | 1.500 | 1.250 | 0.900 |
| BH60-300 | 4.740 | 4.140 | 3.570 | 3.000 | 2.430 | 2.100 | 1.800 | 1.500 | 1.080 |
| BH60-375 | 5.925 | 5.175 | 4.463 | 3.750 | 3.038 | 2.625 | 2.250 | 1.875 | 1.350 |
| BH60-500 | 7.900 | 6.900 | 5.950 | 5.000 | 4.050 | 3.500 | 3.000 | 2.500 | 1.800 |

➤ Environmental Specifications

| Test | Conditions | Resistance change |
|--|-----------------------------|-------------------|
| Passive aging | +85°C, 1000 hours | ±5% typical |
| Humidity aging | +85°C, 85% R.H. , 168 hours | ±5% typical |
| Thermal shock | +85°C to -40°C, 20 times | ±33% typical |
| Resistance to solvent | MIL-STD-202, Method 215 | No change |
| Vibration | MIL-STD-202, Method 201 | No change |
| Ambient operating conditions : - 40 °C to +85 °C | | |
| Maximum surface temperature of the device in the tripped state is 125 °C | | |

➤ **Soldering Parameters**



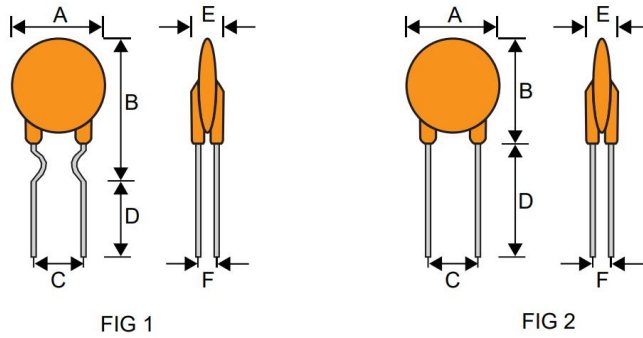
| Profile Feature | Pb-Free Assembly |
|--|--------------------|
| Average Ramp-Up Rate($T_{s_{max}}$ to T_p) | 3°C/second max |
| Preheat | |
| -Temperature Min($T_{s_{min}}$) | 150°C |
| -Temperature Max($T_{s_{max}}$) | 200°C |
| -Time($T_{s_{min}}$ to $T_{s_{max}}$) | 60~180 seconds |
| Time maintained above: | |
| -Temperature(T_L) | 217°C |
| -Time(t_L) | 60~150 seconds |
| Peak Temperature(T_p) | 260°C |
| Ramp-Down Rate | 6°C/second max |
| Time 25°C to Peak Temperature | 8 minutes max |
| Storage Condition | 0°C~30°C,30%-60%RH |

- Recommended reflow methods: IR, vapor phase oven, hot air oven, N₂ environment for lead-free.
- Recommended maximum paste thickness is 0.25mm.
- Devices can be cleaned using standard industry methods and solvents.

Note 1: All temperature refer to topside of the package, measured on the package body surface.

Note 2: If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

➤ **Physical Dimensions & Recommended Pad Layout (mm)**



| Part Number | Quantity | A | B | C | D | E | F | Lead | |
|-------------|----------|------|------|----------|-----|-----|-----|------|-----|
| | | Min | Max | Typ | Max | Min | Typ | φ | FIG |
| BH60-003 | 500 | 7.4 | 12.0 | 5.1±0.5 | 7.6 | 3.1 | 1.1 | 0.5 | 1 |
| BH60-005 | 500 | 7.4 | 12.0 | 5.1±0.5 | 7.6 | 3.1 | 1.1 | 0.5 | 1 |
| BH60-010 | 500 | 7.4 | 12.0 | 5.1±0.5 | 7.6 | 3.1 | 1.1 | 0.5 | 1 |
| BH60-017 | 500 | 7.4 | 12.0 | 5.1±0.5 | 7.6 | 3.1 | 1.1 | 0.5 | 1 |
| BH60-020 | 500 | 7.4 | 12.0 | 5.1±0.5 | 7.6 | 3.1 | 1.1 | 0.5 | 1 |
| BH60-025 | 500 | 7.4 | 12.0 | 5.1±0.5 | 7.6 | 3.1 | 1.1 | 0.5 | 1 |
| BH60-030 | 500 | 7.4 | 13.0 | 5.1±0.5 | 7.6 | 3.1 | 1.1 | 0.5 | 1 |
| BH60-040 | 500 | 7.6 | 13.5 | 5.1±0.5 | 7.6 | 3.1 | 1.1 | 0.5 | 1 |
| BH60-050 | 500 | 7.9 | 13.7 | 5.1±0.5 | 7.6 | 3.1 | 1.1 | 0.5 | 1 |
| BH60-065 | 500 | 9.4 | 15.6 | 5.1±0.5 | 7.6 | 3.1 | 1.2 | 0.6 | 1 |
| BH60-075 | 500 | 10.2 | 16.4 | 5.1±0.5 | 7.6 | 3.1 | 1.2 | 0.6 | 1 |
| BH60-090 | 500 | 11.2 | 16.7 | 5.1±0.5 | 7.6 | 3.1 | 1.2 | 0.6 | 1 |
| BH60-110 | 500 | 12.8 | 17.7 | 5.1±0.5 | 7.6 | 3.1 | 1.4 | 0.8 | 2 |
| BH60-135 | 500 | 14.5 | 18.7 | 5.1±0.5 | 7.6 | 3.1 | 1.4 | 0.8 | 2 |
| BH60-160 | 500 | 16.3 | 20.5 | 5.1±0.5 | 7.6 | 3.1 | 1.4 | 0.8 | 2 |
| BH60-185 | 500 | 17.5 | 21.6 | 5.1±0.5 | 7.6 | 3.1 | 1.4 | 0.8 | 2 |
| BH60-250 | 500 | 21.0 | 25.3 | 10.2±0.5 | 7.6 | 3.1 | 1.4 | 0.8 | 2 |
| BH60-300 | 500 | 24.5 | 28.6 | 10.2±0.5 | 7.6 | 3.1 | 1.4 | 0.8 | 2 |
| BH60-375 | 500 | 27.2 | 31.8 | 10.2±0.5 | 7.6 | 3.1 | 1.4 | 0.8 | 2 |
| BH60-500 | 500 | 27.2 | 31.8 | 10.2±0.5 | 7.6 | 3.1 | 1.4 | 0.8 | 2 |

➤ **Contact information**

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