



# R60 Series

### Features

- Radial Leaded Devices
- Cured, flame retardant epoxy polymer insulating material meets UL 94V-0 requirements
- Bulk packaging, or tape and reel available on most models

### Applications

Almost anywhere there is a low voltage power supply, up to 60V and a load to be protected, including:

- Industrial controls
- Automotive electronics
- Medical products

Alpha-Top (Sea & Land Alliance)

## Electrical Properties

| Model   | V <sub>max</sub><br>(Vdc) | I <sub>max</sub><br>(A) | I <sub>hold</sub><br>(A) | I <sub>trip</sub><br>(A) | P <sub>d</sub><br>Typ.<br>(W) | Maximum Time To Trip |               | Resistance               |                          |                          | Agency Approval |     |
|---------|---------------------------|-------------------------|--------------------------|--------------------------|-------------------------------|----------------------|---------------|--------------------------|--------------------------|--------------------------|-----------------|-----|
|         |                           |                         |                          |                          |                               | Current<br>(A)       | Time<br>(Sec) | Ri <sub>min</sub><br>(Ω) | Ri <sub>max</sub><br>(Ω) | R1 <sub>max</sub><br>(Ω) | UL              | TUV |
| R60-005 | 60                        | 40                      | 0.05                     | 0.10                     | 0.38                          | 0.25                 | 5.0           | 7.30                     | 18.00                    | 30.00                    |                 |     |
| R60-010 | 60                        | 40                      | 0.10                     | 0.20                     | 0.38                          | 0.50                 | 4.0           | 2.00                     | 4.50                     | 7.50                     | ✓               | ✓   |
| R60-017 | 60                        | 40                      | 0.17                     | 0.34                     | 0.48                          | 0.85                 | 3.0           | 2.50                     | 5.21                     | 8.00                     | ✓               | ✓   |
| R60-020 | 60                        | 40                      | 0.20                     | 0.40                     | 0.41                          | 1.00                 | 2.2           | 1.25                     | 2.75                     | 4.40                     | ✓               | ✓   |
| R60-025 | 60                        | 40                      | 0.25                     | 0.50                     | 0.45                          | 1.25                 | 2.5           | 0.65                     | 1.95                     | 3.00                     | ✓               | ✓   |
| R60-030 | 60                        | 40                      | 0.30                     | 0.60                     | 0.49                          | 1.50                 | 3.0           | 0.45                     | 1.33                     | 2.10                     | ✓               | ✓   |
| R60-040 | 60                        | 40                      | 0.40                     | 0.80                     | 0.56                          | 2.00                 | 3.8           | 0.40                     | 0.86                     | 1.29                     | ✓               | ✓   |
| R60-050 | 60                        | 40                      | 0.50                     | 1.00                     | 0.77                          | 2.50                 | 4.0           | 0.35                     | 0.77                     | 1.17                     | ✓               | ✓   |
| R60-065 | 60                        | 40                      | 0.65                     | 1.30                     | 0.88                          | 3.25                 | 5.3           | 0.25                     | 0.48                     | 0.72                     | ✓               | ✓   |
| R60-075 | 60                        | 40                      | 0.75                     | 1.50                     | 0.92                          | 3.75                 | 6.3           | 0.20                     | 0.40                     | 0.60                     | ✓               | ✓   |
| R60-090 | 60                        | 40                      | 0.90                     | 1.80                     | 0.99                          | 4.50                 | 7.2           | 0.15                     | 0.31                     | 0.47                     | ✓               | ✓   |
| R60-110 | 60                        | 40                      | 1.10                     | 2.20                     | 1.50                          | 5.50                 | 8.2           | 0.13                     | 0.25                     | 0.38                     | ✓               | ✓   |
| R60-135 | 60                        | 40                      | 1.35                     | 2.70                     | 1.70                          | 6.75                 | 9.6           | 0.10                     | 0.19                     | 0.30                     | ✓               | ✓   |
| R60-160 | 60                        | 40                      | 1.60                     | 3.20                     | 1.90                          | 8.00                 | 11.4          | 0.07                     | 0.14                     | 0.22                     | ✓               | ✓   |
| R60-185 | 60                        | 40                      | 1.85                     | 3.70                     | 2.10                          | 9.25                 | 12.6          | 0.06                     | 0.12                     | 0.19                     | ✓               | ✓   |
| R60-250 | 60                        | 40                      | 2.50                     | 5.00                     | 2.50                          | 12.50                | 15.6          | 0.04                     | 0.08                     | 0.13                     | ✓               | ✓   |
| R60-300 | 60                        | 40                      | 3.00                     | 6.00                     | 2.80                          | 15.00                | 19.8          | 0.03                     | 0.06                     | 0.10                     | ✓               | ✓   |
| R60-375 | 60                        | 40                      | 3.75                     | 7.50                     | 3.20                          | 18.75                | 24.0          | 0.02                     | 0.05                     | 0.08                     | ✓               | ✓   |

**Ihold** = Hold Current : maximum current device will sustain for 4 hours without tripping in 25°C still air.

**Itrip** = Trip Current : minimum current at which the device will trip in 25°C still air.

**V<sub>max</sub>** = Maximum voltage device can withstand without damage at rated current (I<sub>max</sub>).

**I<sub>max</sub>** = Maximum fault current device can withstand without damage at rated voltage (V<sub>max</sub>).

**Pd** = Power dissipated from device when in the tripped state at 25°C still air.

**Ri min/max** = Minimum/Maximum resistance of device in initial (un-soldered) state.

**R1 max** = Maximum resistance of device at 25°C measured one hour after tripping.

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

## Environmental Specifications

| Test                                                                | Conditions                |
|---------------------------------------------------------------------|---------------------------|
| Passive aging                                                       | +85°C, 1000 hrs           |
| Humidity aging                                                      | +85°C, 85% R.H., 1000 hrs |
| Thermal shock                                                       | +85°C to -40°C, 20 times  |
| Resistance to solvent                                               | MIL-STD-202, Method 215   |
| Vibration                                                           | MIL-STD-202, Method 201   |
| Ambient operating /storage conditions :                             | - 40 °C to +85 °C         |
| Maximum surface temperature of the device in the tripped state is   | 125 °C                    |
| <a href="#">In case of special use, please contact our engineer</a> |                           |

Agency Approvals :



E201504(Alpha-Top)/E319079(Sea&Land)



R 50274672

Regulation/Standard:



2015/863/EU



EN14582



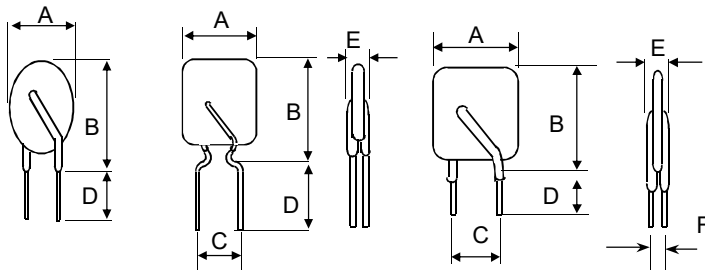
# R60 Series

Alpha-Top (Sea & Land Alliance)

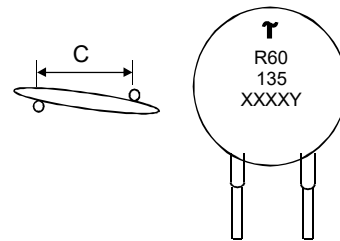
## Physical Dimensions (Unit: mm)

| Model   | A<br>Max. | B<br>Max. | C<br>Typ. | D<br>Min. | E<br>Max. | F<br>Max. | Lead<br>Style |
|---------|-----------|-----------|-----------|-----------|-----------|-----------|---------------|
| R60-005 | 7.4       | 12.7      | 5.1       | 7.6       | 3.1       | 1.0       | Kink          |
| R60-010 | 7.4       | 12.7      | 5.1       | 7.6       | 3.1       | 1.0       | Kink          |
| R60-017 | 7.4       | 12.7      | 5.1       | 7.6       | 3.1       | 1.7       | Kink          |
| R60-020 | 7.4       | 12.7      | 5.1       | 7.6       | 3.1       | 1.0       | Kink          |
| R60-025 | 7.4       | 12.7      | 5.1       | 7.6       | 3.1       | 1.0       | Kink          |
| R60-030 | 7.4       | 13.0      | 5.1       | 7.6       | 3.1       | 1.0       | Kink          |
| R60-040 | 7.6       | 13.5      | 5.1       | 7.6       | 3.1       | 1.2       | Kink          |
| R60-050 | 7.9       | 13.7      | 5.1       | 7.6       | 3.1       | 1.2       | Kink          |
| R60-065 | 9.7       | 14.5      | 5.1       | 7.6       | 3.1       | 1.5       | Kink          |
| R60-075 | 10.4      | 15.2      | 5.1       | 7.6       | 3.1       | 1.5       | Kink          |
| R60-090 | 11.7      | 15.8      | 5.1       | 7.6       | 3.1       | 1.5       | Kink          |
| R60-110 | 13.0      | 18.0      | 5.1       | 7.6       | 3.1       | 1.2       | Straight      |
| R60-135 | 14.5      | 19.6      | 5.1       | 7.6       | 3.1       | 1.2       | Straight      |
| R60-160 | 16.3      | 21.3      | 5.1       | 7.6       | 3.1       | 1.5       | Straight      |
| R60-185 | 17.8      | 22.9      | 5.1       | 7.6       | 3.1       | 1.5       | Straight      |
| R60-250 | 21.3      | 26.4      | 10.2      | 7.6       | 3.1       | 1.7       | Straight      |
| R60-300 | 24.9      | 30.0      | 10.2      | 7.6       | 3.1       | 2.0       | Straight      |
| R60-375 | 28.5      | 33.5      | 10.2      | 7.6       | 3.1       | 2.0       | Straight      |

## Dimensions



## Marking



T = Trademark

R60 = Radial type 60 Vrms

135 = 1.35A hold current

XXXX = Date code

Y = Factory code

## Physical Characteristics

### Lead Material :

R60-010: Tin-plated nickel-copper alloy, 0.205mm<sup>2</sup> (24AWG),  $\Phi$ 0.51mm(0.020 in).

R60-017 ~ 040: Tin-plated copper-clad steel, 0.205mm<sup>2</sup> (24AWG),  $\Phi$ 0.51mm(0.020 in).

R60-050 ~ 090: Tin-plated copper, 0.205mm<sup>2</sup> (24AWG),  $\Phi$ 0.51mm(0.020 in).

R60-110 ~ 375: Tin-plated copper, 0.52mm<sup>2</sup> (20AWG),  $\Phi$ 0.81mm(0.032 in).

**Lead Solderability :** MIL-STD-202, Method 208

## Order information

## Packing

| R60         | 185     | K or S       | R or U    | Model             | Reel Q'ty | Bag Q'ty |
|-------------|---------|--------------|-----------|-------------------|-----------|----------|
| Radial type | Hold    | K=Kink leads | R= Tape & | R60-005 ~ R60-090 | 3000      | 500      |
| 60 V        | Current |              | Reel      | R60-017           | 2500      | 500      |
|             | (A)     | S=Straight   | U= Bulk   | R60-110 ~ R60-185 | 1500      | 500      |
|             |         | leads        | packaged  | R60-250 ~ R60-375 | -         | 500      |

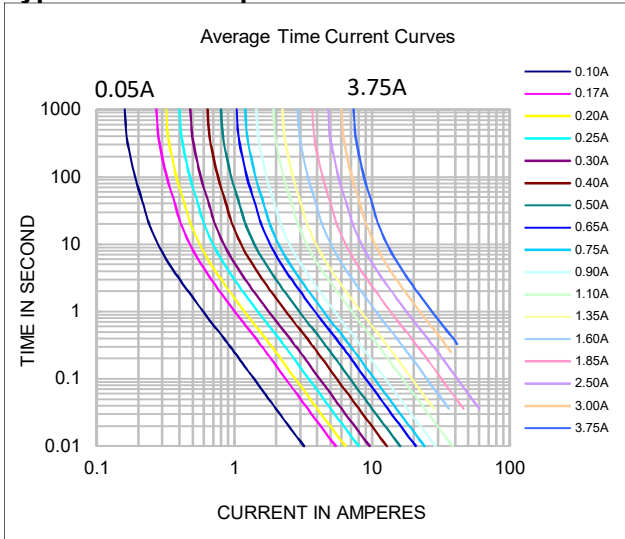
Devices taped with reference EIA468 standard.



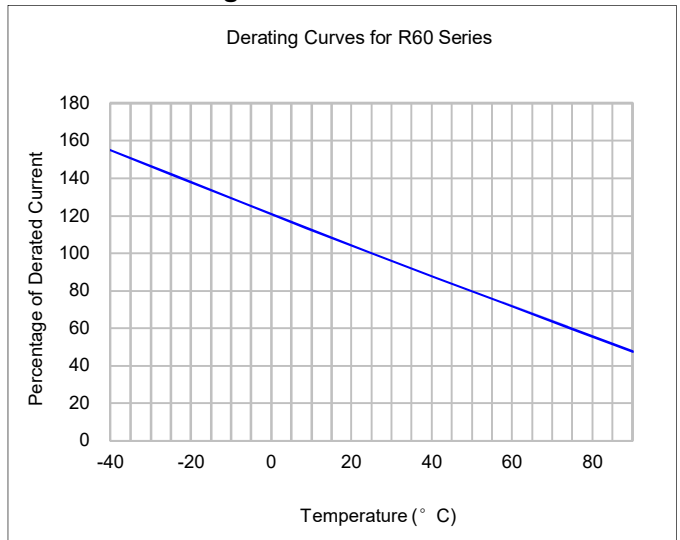
# R60 Series

Alpha-Top (Sea & Land Alliance)

## Typical time-to-trip curve at 25°C



## Thermal derating curve



## I<sub>hold</sub> versus temperature

| Model   | Maximum ambient operating temperature (T <sub>mao</sub> ) vs. hold current (I <sub>hold</sub> ) |       |      |      |      |       |       |       |      |
|---------|-------------------------------------------------------------------------------------------------|-------|------|------|------|-------|-------|-------|------|
|         | -40°C                                                                                           | -20°C | 0°C  | 25°C | 40°C | 50°C  | 60°C  | 70°C  | 85°C |
| R60-005 | 0.08                                                                                            | 0.068 | 0.06 | 0.05 | 0.04 | 0.036 | 0.032 | 0.027 | 0.02 |
| R60-010 | 0.16                                                                                            | 0.14  | 0.12 | 0.10 | 0.08 | 0.07  | 0.06  | 0.05  | 0.04 |
| R60-017 | 0.26                                                                                            | 0.23  | 0.20 | 0.17 | 0.14 | 0.12  | 0.11  | 0.09  | 0.07 |
| R60-020 | 0.31                                                                                            | 0.27  | 0.24 | 0.20 | 0.16 | 0.14  | 0.13  | 0.11  | 0.08 |
| R60-025 | 0.39                                                                                            | 0.34  | 0.30 | 0.25 | 0.20 | 0.18  | 0.16  | 0.14  | 0.10 |
| R60-030 | 0.47                                                                                            | 0.41  | 0.36 | 0.30 | 0.24 | 0.22  | 0.19  | 0.16  | 0.12 |
| R60-040 | 0.62                                                                                            | 0.54  | 0.48 | 0.40 | 0.32 | 0.29  | 0.25  | 0.22  | 0.16 |
| R60-050 | 0.78                                                                                            | 0.68  | 0.60 | 0.50 | 0.41 | 0.36  | 0.32  | 0.27  | 0.20 |
| R60-065 | 1.01                                                                                            | 0.88  | 0.77 | 0.65 | 0.53 | 0.47  | 0.41  | 0.35  | 0.26 |
| R60-075 | 1.16                                                                                            | 1.02  | 0.89 | 0.75 | 0.61 | 0.54  | 0.47  | 0.41  | 0.30 |
| R60-090 | 1.40                                                                                            | 1.22  | 1.07 | 0.90 | 0.73 | 0.65  | 0.57  | 0.49  | 0.36 |
| R60-110 | 1.71                                                                                            | 1.50  | 1.31 | 1.10 | 0.89 | 0.79  | 0.69  | 0.59  | 0.44 |
| R60-135 | 2.09                                                                                            | 1.84  | 1.61 | 1.35 | 1.09 | 0.97  | 0.85  | 0.73  | 0.54 |
| R60-160 | 2.48                                                                                            | 2.18  | 1.90 | 1.60 | 1.30 | 1.15  | 1.01  | 0.86  | 0.64 |
| R60-185 | 2.87                                                                                            | 2.52  | 2.20 | 1.85 | 1.50 | 1.33  | 1.17  | 1.00  | 0.74 |
| R60-250 | 3.88                                                                                            | 3.40  | 2.98 | 2.50 | 2.03 | 1.80  | 1.58  | 1.35  | 1.00 |
| R60-300 | 4.65                                                                                            | 4.08  | 3.57 | 3.00 | 2.43 | 2.16  | 1.89  | 1.62  | 1.20 |
| R60-375 | 5.81                                                                                            | 5.10  | 4.46 | 3.75 | 3.04 | 2.70  | 2.36  | 2.03  | 1.50 |



### WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage (L di/dt) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.

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