



## Description

R12.000 Series are the fuses set the industry standard for performance, reliability and quality. The solder-free design provides excellent on-off and temperature cycling characteristics during use and also makes our SMD fuses more heat and shock tolerant than typical subminiature fuses.

## Features

- Rapid interruption of excessive current
- Compatible with reflow and wave solder
- Ceramic and glass construction
- One time positive disconnect
- Lead free and Halogen free material

## Electrical Characteristics

| Rated Current | % of Amp Rating | Opening Time    |
|---------------|-----------------|-----------------|
| 250mA~30A     | 100%            | 4hours, min     |
| 1A~3A         | 200%            | 1.0s - 60 s     |
| 1A~5A         | 250%            | 5.0s max        |
| 1A~5A         | 300%            | 0.1s - 3.0 s    |
| 250mA~750mA   | 350%            | 5.0s max        |
| 6A~30A        | 350%            | 5.0s max        |
| 250mA~30A     | 1000%           | 0.2ms - 20.0 ms |

## Applications

- Secondary circuit protection
- Laptop, notebook, netbook
- Flat panel displays
- High definition television(HDTV)
- LCD/LED backlighting
- Computers and peripherals
- Gaming console systems
- Handheld/portable equipment
- Mobile device charges
- Automotive
- Central body control module
- Heating ventilation and air conditioning
- Doors,window lift and seat control
- Digital instrument cluster
- In-vehicle infotainment and navigation
- Electric pumps,motor control and
- Powertrain control module(PCU)/Engine
- Transimission Control Unit(TCU)

## Agency information

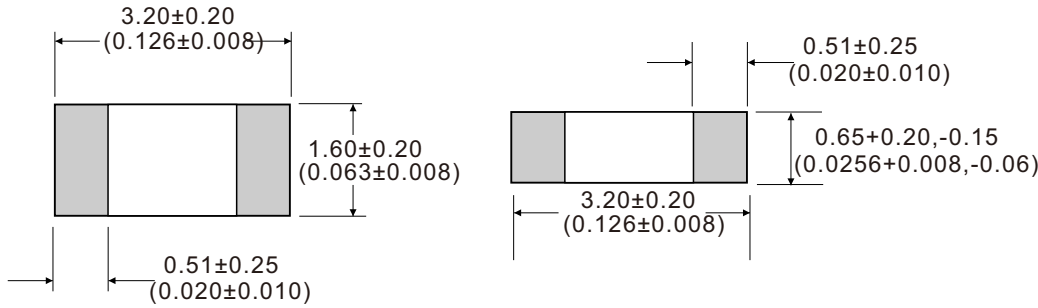
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## Specifications

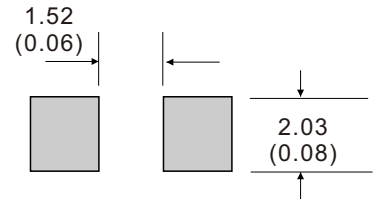
| Part No.      | Rated Voltage (V) |       |       | Rated Current (A) | Breaking Capacity (A) | Typical Cold Resistance (mOhms) | Typical Voltage Drop (mV) | Typical Pre-Arcing I <sup>2</sup> t (A <sup>2</sup> Sec) | Marking |     |
|---------------|-------------------|-------|-------|-------------------|-----------------------|---------------------------------|---------------------------|--|---------|-----|
| R12.000.0.25  | 125Vdc            | 72Vdc | 63Vdc | 250mA             | 100A@72Vdc            | 100A@32Vdc                      | 3700                      | 1350   | 0.00038 | .25 |
| R12.000.0.375 |                   |       |       | 375mA             |                       |                                 | 1850                      | 720  | 0.00077 | E   |
| R12.000.0.5   |                   |       |       | 500mA             |                       |                                 | 1050                      | 690  | 0.0019  | B   |
| R12.000.0.75  |                   |       |       | 750mA             |                       |                                 | 775                       | 680  | 0.15    | G   |
| R12.000.1     |                   |       |       | 1A                |                       |                                 | 485                       | 550  | 0.18    | H   |
| R12.000.1.5   |                   |       |       | 1.5A              |                       |                                 | 218                       | 355  | 0.4     | K   |
| R12.000.2     |                   |       |       | 2A                |                       |                                 | 133                       | 310  | 1.1     | N   |
| R12.000.2.5   |                   |       |       | 2.5A              |                       |                                 | 79                        | 230  | 1.7     | O   |
| R12.000.3     |                   |       |       | 3A                |                       |                                 | 49                        | 185  | 2.2     | P   |
| R12.000.3.5   |                   |       |       | 3.5A              |                       |                                 | 37                        | 175  | 2.7     | R   |
| R12.000.4     |                   |       |       | 4A                |                       |                                 | 33                        | 160  | 3.2     | S   |
| R12.000.4.5   |                   |       |       | 4.5A              |                       |                                 | 28                        | 150  | 4.2     | X   |
| R12.000.5     |                   |       |       | 5A                |                       |                                 | 22                        | 135  | 6       | T   |
| R12.000.6     |                   |       |       | 6A                |                       |                                 | 15.5                      | 140  | 12      | F   |
| R12.000.7     |                   |       |       | 7A                |                       |                                 | 11.5                      | 120  | 18      | J   |
| R12.000.8     | 8A                | 8.0   | 100   | 18                | V                     |                                 |                           |  |         |     |
| R12.000.10    | 10A               | 7.0   | 90    | 30                | U                     |                                 |                           |  |         |     |
| R12.000.12    | 12A               | 5.9   | 85    | 45                | W                     |                                 |                           |  |         |     |
| R12.000.15    | 15A               | 3.8   | 75    | 63                | Y                     |                                 |                           |  |         |     |
| R12.000.20    | 20A               | 2.9   | 70    | 80                | Q                     |                                 |                           |  |         |     |
| R12.000.25    | 25A               | 1.6   | 60    | 90                | 25                    |                                 |                           |  |         |     |
| R12.000.30    | 30A               | 1.3   | 60    | 100               | 30                    |                                 |                           |  |         |     |

## Dimensions

(Unit: mm/inch)



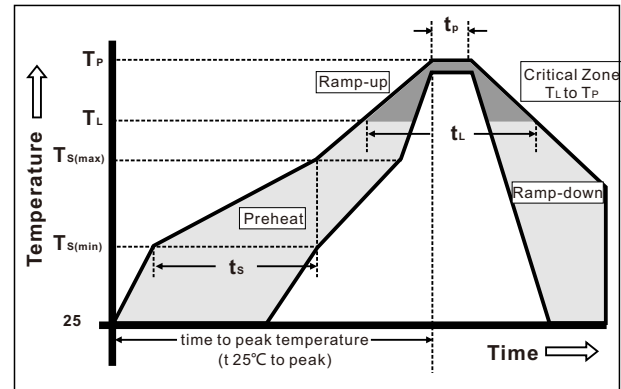
## Pad layout



## Installation Recommendations

### 1 Wave Soldering Parameters

| Reflow Conditon                                      | Pb-free assembly                   |                  |
|--|------------------------------------|------------------|
| Pre Heat   | - Temperature Min ( $T_{s(min)}$ ) | 150°C            |
|  | - Temperature Max ( $T_{s(max)}$ ) | 200°C            |
|  | - Time (Min to Max) ( $t_s$ )      | 60 – 120 seconds |
| Average Ramp-up Rate (Liquidus Temp (TL) to peak)    | 3°C/second max.                    |                  |
| TS(max) to TL - Ramp-up Rate                         | 5°C/second max.                    |                  |
| Reflow   | - Temperature (TL) (Liquidus)      | 217°C            |
|  | - Temperature (tL)                 | 60 – 150 seconds |
| Peak Temperature ( $T_P$ )                           | 260+0/-5°C                         |                  |
| Time within 5°C of actual peak Temperature ( $t_p$ ) | 30 seconds                         |                  |
| Ramp-down Rate                                       | 6°C/second max                     |                  |
| Time 25°C to peak Temperature ( $T_P$ )              | 8 minutes max.                     |                  |
| Do not exceed  | 260°C                              |                  |



Solder Pot Temperature: 260°C max  
 Solder Dwell Time: 10 Seconds max

### 2 Hand-Solder Parameters

Solder Iron Temperature: 280±5°C  
 Heating Time: 5 Seconds min  
 Generally, hand-soldering is not recommended

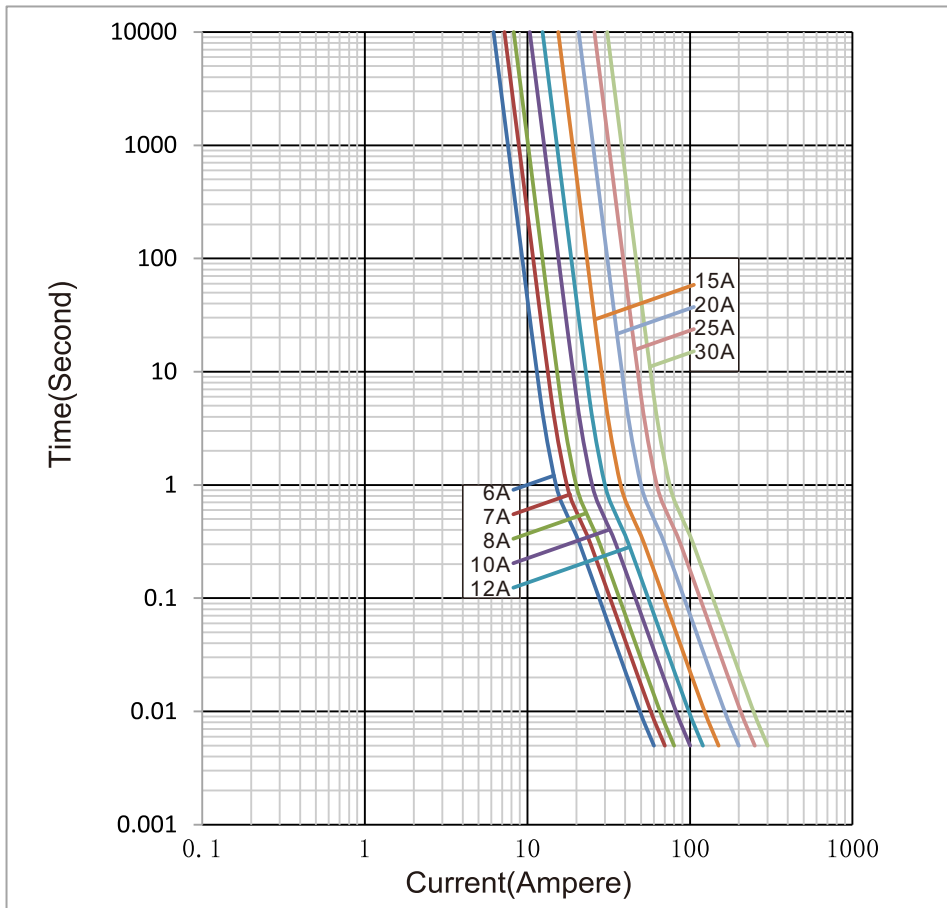
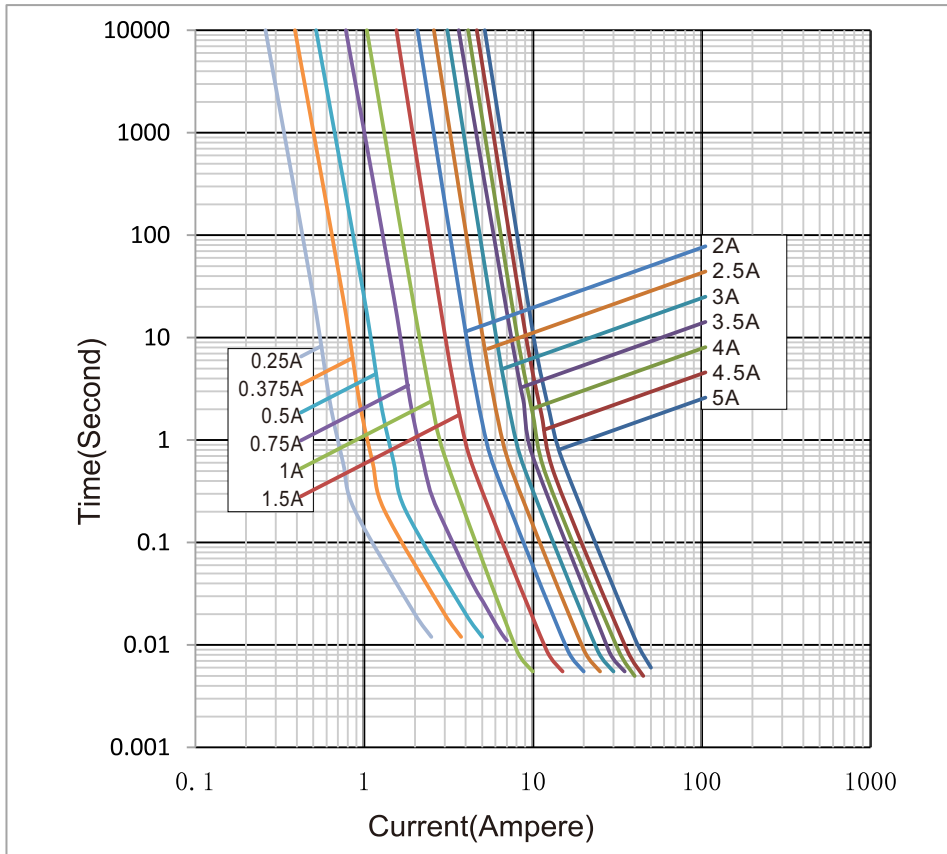
## Part Numbering System



## Product Characteristics

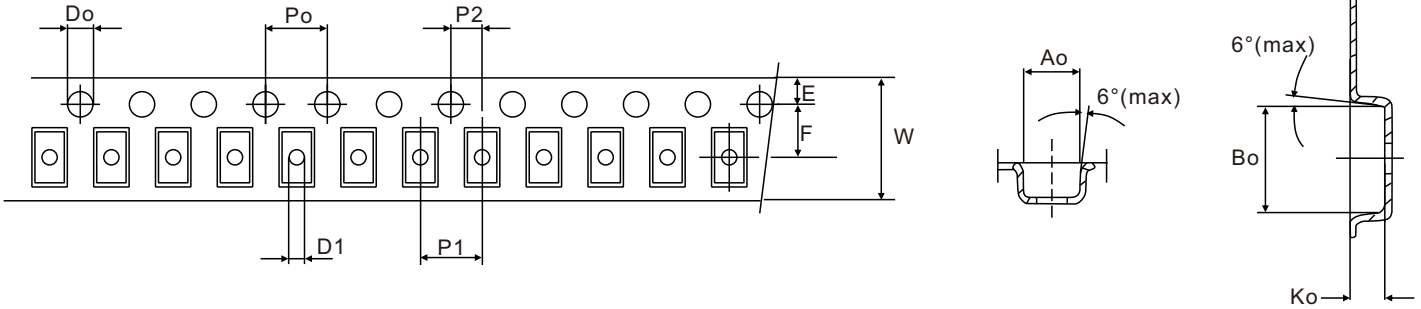
|                                       |   |
|---------------------------------------|---|
| Materials                             | Body: Ceramic<br>Terminations: Silver over-plated with tin<br>Element: Alloy(Ag,Cu,Zn)<br>Cover Coat: Glass |
| Operating Temperature                 | -55°C to 125°C<br>Consult temperature derating curve chart.   |
| Thermal Shock                         | 300 cycles -55°C to 125°C   |
| Humidity                              | MIL-STD-202F, Method 103B, Condition D  |
| Vibration                             | Per MIL-STD-202F, Method 201A   |
| Insulation Resistance (After Opening) | Greater than 10,000 ohms  |
| Resistance to Soldering Heat          | MIL-STD-202G, Method 210F, Condition D  |

## Time Current Curve



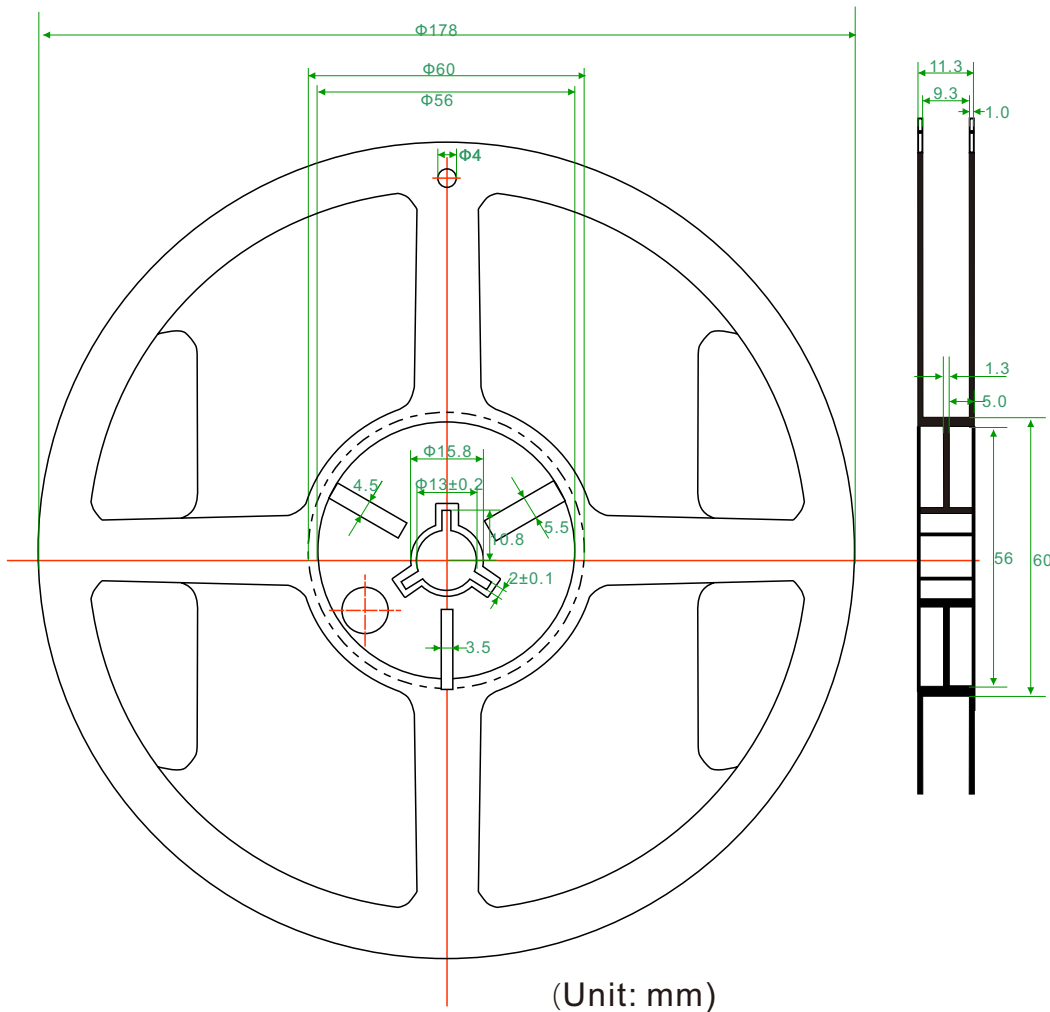
## Packaging

3,000 pieces of fuses in plastic or paper taper (3000pcs)



|        |           |           |           |           |           |           |
|--------|-----------|-----------|-----------|-----------|-----------|-----------|
| Symbol | Ao        | Bo        | Ko        | Po        | P1        | P2        |
| Spec   | 1.80±0.10 | 3.50±0.10 | 1.27±0.10 | 4.00±0.10 | 4.00±0.10 | 2.00±0.10 |
| Symbol | E         | F         | Do        | D1        | W         | T         |
| Spec   | 1.75±0.10 | 3.50±0.10 | 1.50±0.10 | 1.00(Max) | 8.00±0.10 | 0.25±0.05 |

(Unit: mm)



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