

# Axial Lead & Cartridge Fuses

5×20 mm > Medium-Acting > 233 Series

## 233 Series, 5×20 mm, Medium-Acting Fuse



### Description

5×20mm medium-acting glass body fuse designed to UL specification.

### Features

- Designed to UL/CSA/ ANCE 248-1 and 248-14 Standards
- Available in cartridge and axial lead format
- RoHS compliant and lead-free

### Applications

Used as supplementary protection in appliance or utilization equipment to provide individual protection for components or internal circuits.

### Agency Approvals

| Agency | Agency File Number                                   | Ampere Range        |
|--------|------------------------------------------------------|---------------------|
|        | Cartridge:<br>NBK190609-JP1021A<br>NBK030609-JP1021B | 1A – 5A<br>6A – 10A |
|        | Leaded:<br>NBK190609-JP1021B<br>NBK030609-JP1021D    | 1A – 5A<br>6A – 10A |
|        | N/A                                                  | 1A – 10A            |
|        | E10480                                               | 1A – 10A            |
|        | SU05001 - 2010                                       | 1A – 6.3A           |
|        | 29862                                                | 1A – 6A<br>8A – 10A |

### Electrical Characteristics for Series

| % of Ampere Rating | Ampere Rating | Opening Time                   |
|--------------------|---------------|--------------------------------|
| 100%               | 1A – 3.5A     | 4 hours, Minimum               |
|                    | 4A – 7A       | 1 hour, Minimum                |
|                    | 8A – 10A      | 1 hour, Minimum                |
| 135%               | 1A – 3.5A     | 15 sec., Min; 1500 sec., Max.  |
|                    | 4A – 7A       | 15 sec., Min; 1500 sec., Max.  |
|                    | 8A – 10A      | 3 sec., Min; 3600 sec., Max.   |
| 200%               | 1A – 3.5A     | .60 sec., Min; 3 sec., Max.    |
|                    | 4A – 7A       | .60 sec., Min; 3 sec., Max.    |
|                    | 8A – 10A      | 0.4 sec., Min; 2.25 sec., Max. |

### Additional Information



Datasheet



Resources



Samples



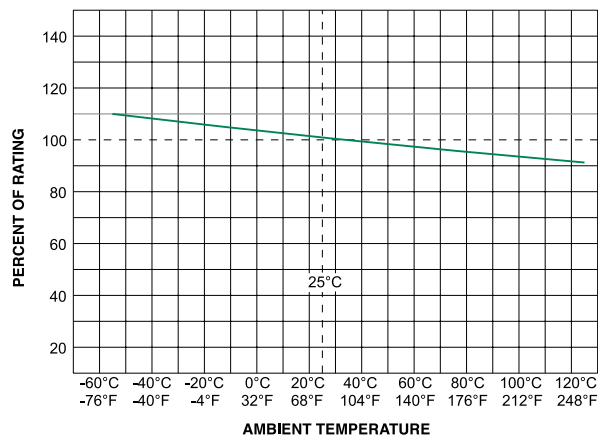
Accessories

For recommended fuse accessories for this product series, see '[Recommended Accessories](#)' section.

### Electrical Characteristic Specifications by Item

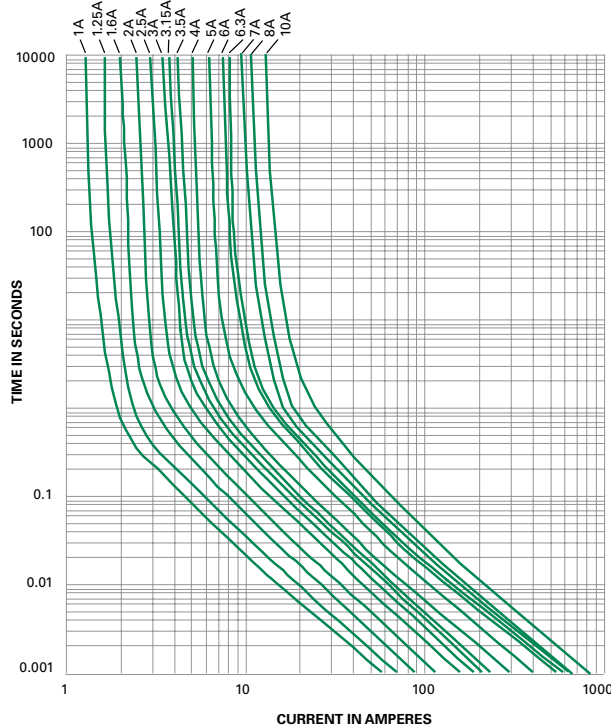
| Amp Code | Amp Rating (A) | Voltage Rating (V) | Interrupting Rating | Nominal Cold Resistance (Ohms) | Nominal Melting I <sup>2</sup> t (A <sup>2</sup> sec) | Agency Approvals |   |   |   |   |
|----------|----------------|--------------------|---------------------|--------------------------------|-------------------------------------------------------|------------------|---|---|---|---|
|          |                |                    |                     |                                |                                                       |                  |   |   |   |   |
| 001.     | 1              | 125                | 10 kA @ 125VAC      | 0.1750                         | 1.97500                                               | x                | x | x | x | x |
| 1.25     | 1.25           | 125                |                     | 0.1263                         | 3.39000                                               | x                | x | x | x | x |
| 01.6     | 1.6            | 125                |                     | 0.0880                         | 6.14000                                               | x                | x | x | x | x |
| 002.     | 2              | 125                |                     | 0.0684                         | 9.97000                                               | x                | x | x | x | x |
| 02.5     | 2.5            | 125                |                     | 0.0521                         | 17.04500                                              | x                | x | x | x | x |
| 003.     | 3              | 125                |                     | 0.0431                         | 26.24000                                              | x                | x | x | x | x |
| 3.15     | 3.15           | 125                |                     | 0.0380                         | 29.79500                                              | x                | x | x | x | x |
| 03.5     | 3.5            | 125                |                     | 0.0322                         | 36.27500                                              | x                | x | x | x | x |
| 004.     | 4              | 125                |                     | 0.0293                         | 51.61000                                              | x                | x | x | x | x |
| 005.     | 5              | 125                |                     | 0.0217                         | 89.97500                                              | x                | x | x | x | x |
| 006.     | 6              | 125                |                     | 0.0179                         | 131.45500                                             | x                | x | x | x | x |
| 06.3     | 6.3            | 125                |                     | 0.0166                         | 151.90500                                             | x                | x | x | x | x |
| 007.     | 7              | 125                |                     | 0.0137                         | 157.31000                                             | x                | x |   | x |   |
| 008.     | 8              | 125                |                     | 0.0084                         | 169.43500                                             | x                | x | x | x |   |
| 010.     | 10             | 125                |                     | 0.0066                         | 274.11500                                             | x                | x | x | x |   |

## Temperature Re-rating Curve

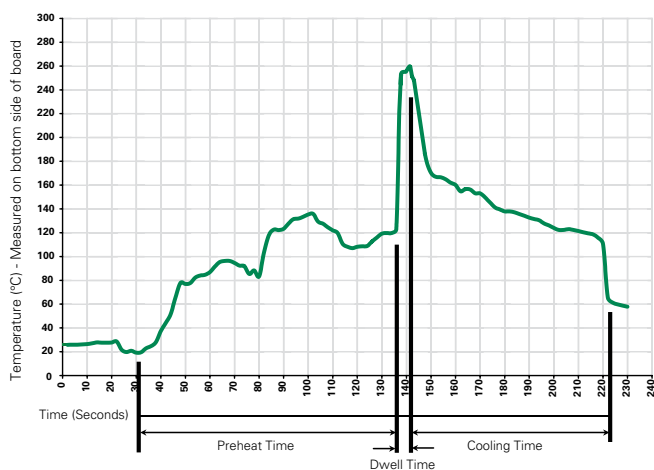


Note:  
Rerating depicted in this curve is in addition to the standard derating of 25% for continuous operation.

## Average Time Current Curves



## Soldering Parameters - Wave Soldering



### Recommended Process Parameters:

| Wave Parameter                                              | Lead-Free Recommendation |
|-------------------------------------------------------------|--------------------------|
| <b>Preheat:</b><br>(Depends on Flux Activation Temperature) |                          |
| Temperature Minimum:                                        | 100°C                    |
| Temperature Maximum:                                        | 150°C                    |
| Preheat Time:                                               | 60-180 seconds           |
| <b>Solder Pot Temperature:</b>                              | 260°C Maximum            |
| <b>Solder Dwell Time:</b>                                   | 2-5 seconds              |

### Recommended Hand-Solder Parameters:

Solder Iron Temperature: 350°C +/- 5°C  
Heating Time: 5 seconds max.

**Note: These devices are not recommended for IR or Convection Reflow process.**

## Packaging

| Packaging Option  | Packaging Specification | Quantity | Quantity & Packaging Code | Taping Width     |
|-------------------|-------------------------|----------|---------------------------|------------------|
| <b>233 Series</b> |                         |          |                           |                  |
| Bulk              | N/A                     | 1000     | MX                        | N/A              |
| Bulk              | N/A                     | 1000     | MXE                       | N/A              |
| Reel and Tape     | EIA 296-E               | 1000     | MRET1                     | T1=53mm (2.087") |
| Bulk              | N/A                     | 1000     | MXB                       | N/A              |

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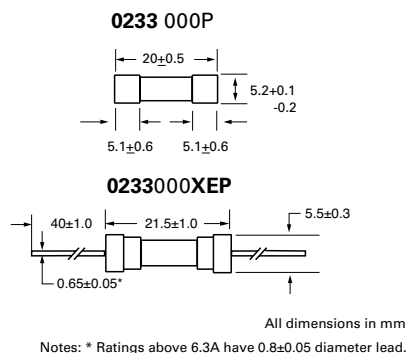
## 5×20 mm > Medium-Acting > 233 Series

### Product Characteristics

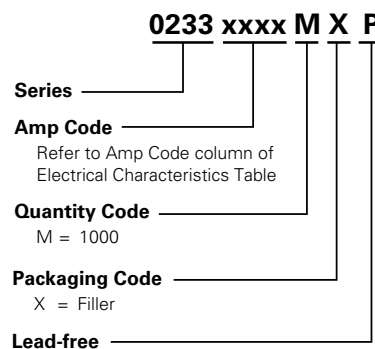
|                          |                                                                                             |
|--------------------------|---------------------------------------------------------------------------------------------|
| <b>Materials</b>         | Body: Glass<br>Cap: Nickel-plated brass<br>Leads: Tin-plated Copper                         |
| <b>Terminal Strength</b> | MIL-STD-202, Method 211, Test Condition A                                                   |
| <b>Solderability</b>     | MIL-STD-202 Method 208                                                                      |
| <b>Product Marking</b>   | Cap 1: Brand logo, current and voltage rating<br>Cap 2: Series and agency approval markings |
| <b>Packaging</b>         | Available in Bulk (M=1000 pcs/pkg) or on Tape/Reel (MRET1=1000 pcs/reel)                    |

|                              |                                                                                                 |
|------------------------------|-------------------------------------------------------------------------------------------------|
| <b>Operating Temperature</b> | –55°C to +125°C                                                                                 |
| <b>Thermal Shock</b>         | MIL-STD-202, Method 107, Test Condition B: (5 cycles –65°C to +125°C)                           |
| <b>Vibration</b>             | MIL-STD-202, Method 201                                                                         |
| <b>Humidity</b>              | MIL-STD-202, Method 103, Test Condition A: high RH (95%) and elevated temp (40°C) for 240 hours |
| <b>Salt Spray</b>            | MIL-STD-202, Method 101, Test Condition B                                                       |

### Dimensions



### Part Numbering System



### Recommended Accessories

| Accessory Type | Series                  | Description                                                               | Max Application Voltage | Max Application Amperage |
|----------------|-------------------------|---------------------------------------------------------------------------|-------------------------|--------------------------|
| Holder         | <a href="#">345_ISF</a> | Panel Mount Shock-Safe Fuseholder                                         | 250                     | 10                       |
|                | <a href="#">345</a>     | Shock-Safe Fuseholder with PC Mount, Solder Mount and Panel Mount options |                         | 20                       |
|                | <a href="#">830</a>     | PC Mount Shock-Safe Miniature Fuseholder                                  |                         | 16                       |
| Block          | <a href="#">520</a>     | Metric OMNI-BLOK® Fuse Block                                              |                         | 10                       |
|                | <a href="#">646</a>     | PC Mount Miniature Fuse Block                                             |                         | 6.3                      |
|                | <a href="#">658</a>     | Surface Mount Miniature Fuse Block                                        |                         | 10                       |
| Clip           | <a href="#">520_W</a>   | PC Mount Miniature Fuse Clip                                              |                         | 6.3                      |
|                | <a href="#">111</a>     | PC Board Mount Fuse Clip                                                  |                         | 10                       |
|                | <a href="#">445</a>     | PC Board Mount Fuse Clip                                                  |                         | 10                       |

Notes:  
 1. Do not use in applications above rating.  
 2. Please refer to fuseholder data sheet for specific re-rating information.  
 3. Please contact factory for applications greater than the max voltage and amperage shown.

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