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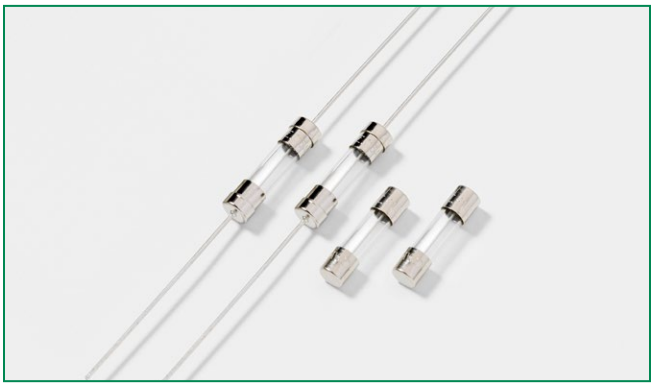
# 233 Series, 5×20 mm, Medium-Acting Fuse



## 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<br>Leaded:<br>NBK190609-JP1021B<br>NBK030609-JP1021D | 1A – 5A<br>6A – 10A<br>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 $I^2t$ ($A^2$ 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 | |

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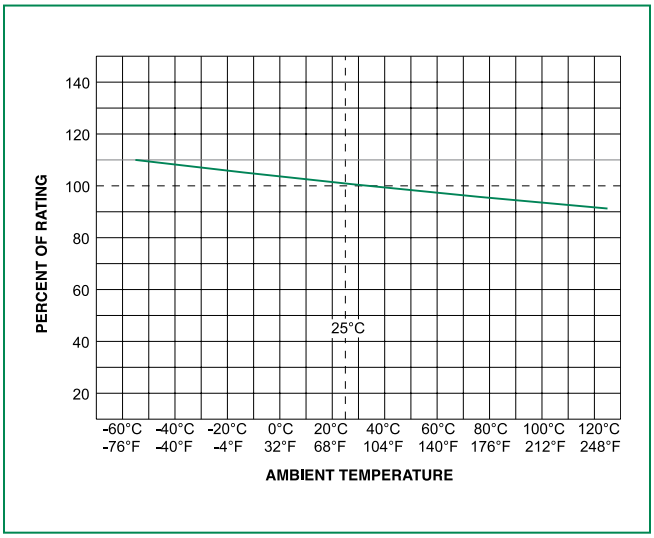
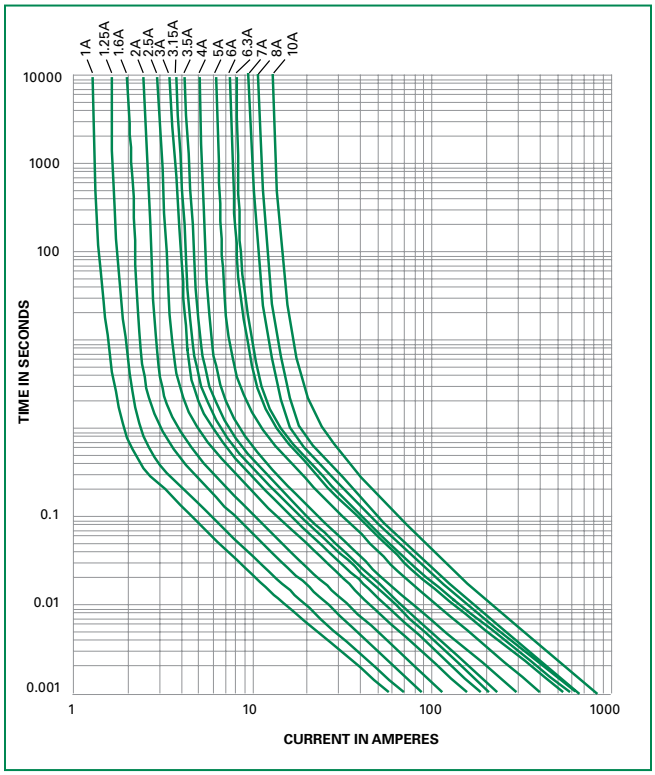
## Temperature Re-rating Curve

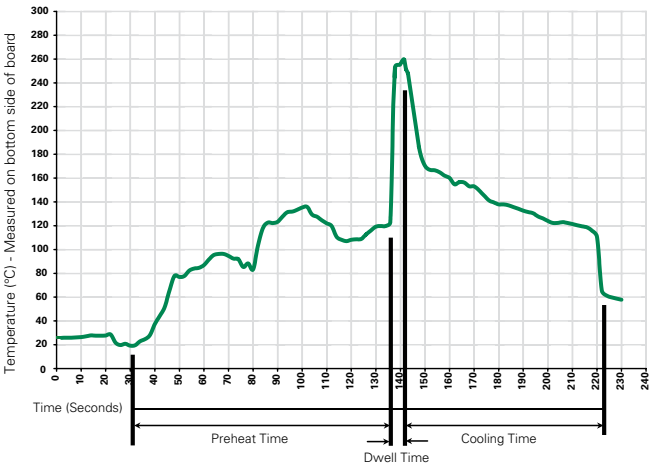



Note:
Rerating depicted in this curve is in addition to the standard derating of 25% for continuous operation.

## Average Time Current Curves




## Soldering Parameters - Wave Soldering




### Recommended Process Parameters:

| Wave Parameter | Lead-Free Recommendation |
|---|---|
| Preheat: (Depends on Flux Activation Temperature) | (Typical Industry Recommendation) |
| Temperature Minimum: | 100°C |
| Temperature Maximum: | 150°C |
| Preheat Time: | 60-180 seconds |
| Solder Pot Temperature: | 260°C Maximum |
| Solder Dwell Time: | 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 |
|---|---|---|---|---|
| **233 Series** | | | | |
| 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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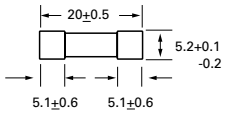
## Product Characteristics

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

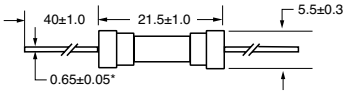
| | |
|---|---|
| **Operating Temperature** | –55°C to +125°C |
| **Thermal Shock** | MIL-STD-202, Method 107, Test Condition B: (5 cycles –65°C to +125°C) |
| **Vibration** | MIL-STD-202, Method 201 |
| **Humidity** | MIL-STD-202, Method 103, Test Condition A. high RH (95%) and elevated temp (40°C)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

## Dimensions

**0233** 000P




**0233**000**XEP**




All dimensions in mm

Notes: * Ratings above 6.3A have 0.8±0.05 diameter lead.

## Part Numbering System

**0233 xxxx M X P**

**Series**

**Amp Code**
Refer to Amp Code column of Electrical Characteristics Table

**Quantity Code**
M = 1000

**Packaging Code**
X = Filler

**Lead-free**

## Recommended Accessories

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