

### 220 Series, Lead-Free 2AG Special Fuse



#### Agency Approvals

| Agency | Agency File Number  | Ampere Range   |
|--------|---|--|
|        | E10480  | 0003,0004,0010,0011,<br>0025,0029,0030,0031,<br>0036 |
|        | E10480  | 0007,0012,0013,0019,<br>0044,0045,0059,0060,<br>0061 |
|        | NBK200405-E10480A/B/C/D<br>NBK110512-E10480A/B<br>NBK210405-E10480E/F | 1A - 3.5A<br>4A - 5A<br>6A - 7A                      |
|        | 29862   | 0003,0004,0007,0010,<br>0011,0013,0019,0029,<br>0044 |
|        |   | 0003-0061  |

#### Additional Information



Datasheet



Resources



Samples



Accessories

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

#### Description

The 2AG Special Fuses with various voltage ratings, provide special electric performance as required.

#### Features

- In accordance with Underwriters Laboratories Standard UL 248-14
- Available in cartridge and axial lead format with various forming dimensions
- RoHS compliant and Lead-free

#### Applications

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

#### Electrical Characteristics for Series

| % of Ampere Rating | Amp code   | Opening Time     |
|--------------------|--|------------------|
| 100%               | 0007,0012,0013,0019,<br>0031,0036,0037,0044,<br>0054,0060,0061 | 4 hours, Minimum |
| 135%               |  | 1 hour, Maximum  |
| 200%               |  | 1 sec., Maximum  |

| % of Ampere Rating | Amp code                          | Opening Time      |
|--------------------|-----------------------------------|-------------------|
| 100%               |                                   | 4 hours, Minimum  |
| 135%               | 0025,0030,0038,0040,<br>0045,0059 | 1 hour, Maximum   |
| 200%               |                                   | 3 secs., Minimum  |
|                    |                                   | 20 secs., Maximum |

| % of Ampere Rating/ Overload Current | Amp code | Opening Time      |
|--------------------------------------|----------|-------------------|
| 100%                                 |          | 4 hours, Minimum  |
| 150%                                 | 0010     | 15 mins, Maximum  |
| 0.9A                                 |          | 90 secs., Maximum |

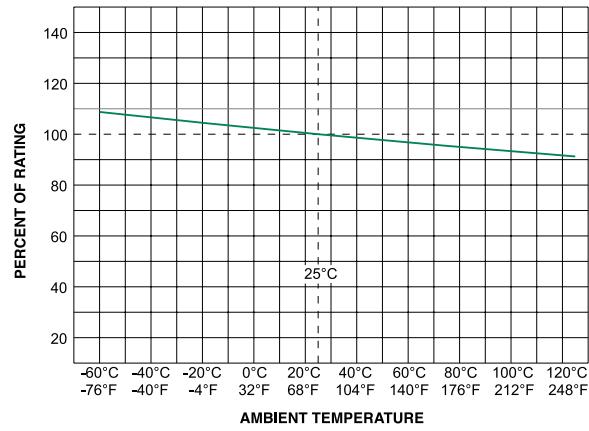
| Overload Current | Amp code       | Opening Time      |
|------------------|----------------|-------------------|
| 0.6A             | 0003,0004,0011 | 90 secs., Maximum |

| Overload Current | Amp code | Opening Time      |
|------------------|----------|-------------------|
| 0.6A             |          | 90 secs., Maximum |
| 2A               | 0029     | 2 secs., Maximum  |
| 6A               |          | 0.5 sec., Maximum |

### Electrical Characteristics

| Ampere Rating (A) | Amp Code | Max Voltage Rating (V) | Interrupting Rating                                | Nominal Cold Resistance (Ohms) | Nominal Melting $I^2t$ (A <sup>2</sup> sec) | Agency Approvals |     |      |     |    |
|-------------------|----------|------------------------|--|--------------------------------|---|------------------|-----|------|-----|----|
|                   |          |                        |  |                                |   | UL               | CSA | PS E | CSA | CE |
| 0.35              | 0003     | 250                    | 35A@250Vac, 10KA@125Vac                            | 1.3100                         | 0.490                                       | X                |     |      | X   | X  |
| 0.35              | 0004     | 250                    |  | 1.3100                         | 0.490                                       | X                |     |      | X   | X  |
| 3                 | 0007     | 350                    | 100A@350Vac, 60A@530Vac                            | 0.0317                         | 4.62  |                  | X   | X    | X   | X  |
| 0.55              | 0010     | 250                    | 35A@250Vac, 10KA@125Vac, 10KA@125Vdc               | 0.4945                         | 2.04  | X                |     |      | X   | X  |
| 0.35              | 0011     | 250                    | 35A@250Vac, 10KA@125Vac                            | 1.3100                         | 0.49  | X                |     |      | X   | X  |
| 2                 | 0012     | 350                    | 100A@350Vac  | 0.0497                         | 1.50  |                  | X   | X    |     | X  |
| 5                 | 0013     | 300                    |  | 0.0186                         | 17.0  |                  | X   | X    | X   | X  |
| 3                 | 0019     | 350                    | 100A@350Vac, 100A@125Vdc                           | 0.0317                         | 4.62  |                  | X   | X    | X   | X  |
| 1.25              | 0025     | 250                    | 100A@250Vac, 10KA@125Vac, 10KA@125Vdc              | 0.1460                         | 15.4  | X                |     | X    |     | X  |
| 0.35              | 0029     | 250                    | 35A@250Vac, 10KA@125Vac                            | 1.3100                         | 0.490                                       | X                |     |      | X   | X  |
| 0.375             | 0030     | 250                    | 35A@250Vac, 10KA@125Vac, 10KA@125Vdc               | 1.1685                         | 0.82  | X                |     |      |     | X  |
| 0.3               | 0031     | 250                    | 35A@300Vac, 10KA@125Vac                            | 0.5900                         | 0.0300                                      | X                |     |      |     | X  |
| 0.5               | 0036     | 300                    |  | 0.2650                         | 0.365                                       | X                |     |      |     | X  |
| 0.75              | 0037     | 300                    | 35A@300Vac, 10KA@125Vac                            | 0.1520                         | 1.05  |                  |     |      |     | X  |
| 5                 | 0038     | 250                    |  | 0.0186                         | 267   |                  |     |      |     | X  |
| 0.5               | 0040     | 250                    | 35A@250Vac, 10KA@125Vac, 10KA@125Vdc               | 0.6935                         | 1.58  |                  |     |      |     | X  |
| 1                 | 0044     | 350                    | 100A@350Vac  | 0.1027                         | 2.22  |                  | X   | X    | X   | X  |
| 2                 | 0045     | 350                    | 100A@250Vac, 100A@350Vac, 10KA@125Vac, 10KA@125Vdc | 0.0698                         | 30.0  |                  | X   | X    |     | X  |
| 7                 | 0059     | 350                    | 100A@350Vac / 160A@140Vdc                          | 0.0116                         | 464   |                  | X   | X    |     | X  |
| 0.5               | 0060     | 350                    | 35A@350Vac   | 0.2650                         | 0.365                                       |                  | X   |      |     | X  |
| 0.75              | 0061     | 350                    |  | 0.1520                         | 1.05  |                  | X   |      |     | X  |

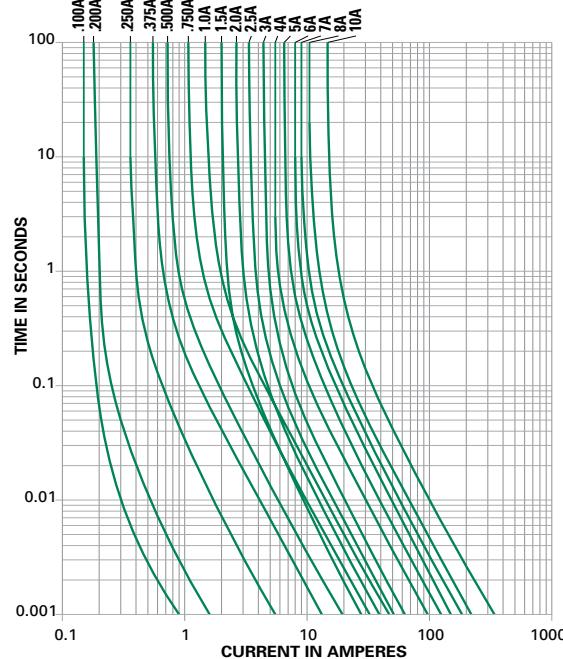
### Temperature Re-rating Curve



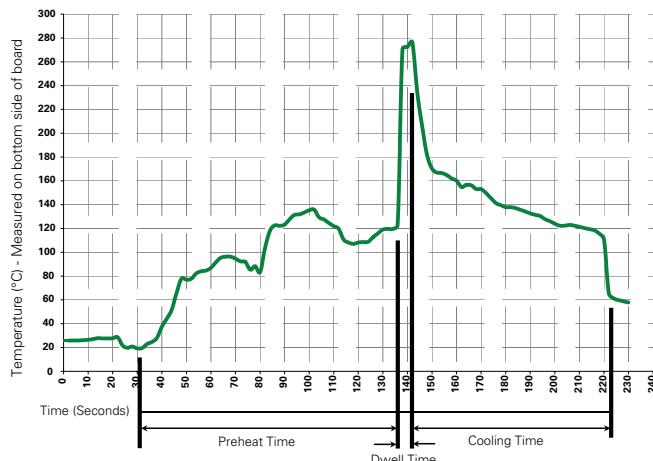
Note:

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   |
|-------------------------|--|
| 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 Max.   |
| Solder Dwell Time:      | 2-5 seconds  |

### Recommended Hand-Solder Parameters:

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

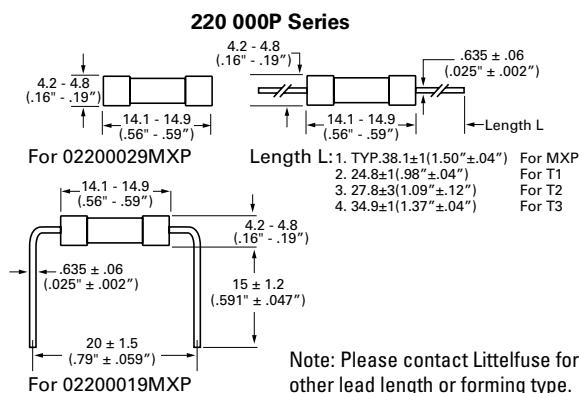
**Note: These devices are not recommended for IR or Convection Reflow process.**

### Product Characteristics

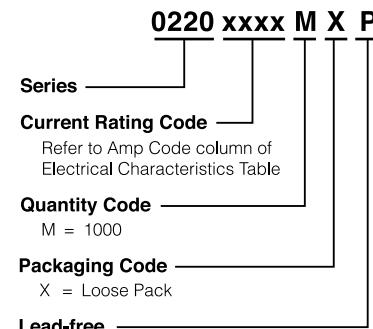
|                          |   |
|--------------------------|---|
| <b>Material</b>          | Body: Glass<br>Cap: Nickel-plated brass<br>Leads: Tin-plated Copper                     |
| <b>Terminal Strength</b> | MIL-STD-202, Method 211, Test Condition A   |
| <b>Solderability</b>     | MIL-STD-202 method 208  |
| <b>Product Marking</b>   | Cap1: Brand logo, current and voltage ratings<br>Cap2: Series and agency approval marks |

|                              |  |
|------------------------------|--|
| <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



### Packaging

| Packaging Option | Packaging Specification | Quantity | Quantity & Packaging Code | Reel Size     |
|------------------|-------------------------|----------|---------------------------|---------------|
| Bulk             | N/A                     | 1000     | MX                        | N/A           |
| Bulk             | N/A                     | 1000     | MXSL                      | N/A           |
| Reel and Tape    | EIA 296-E               | 1000     | MRT1                      | 53mm (2.087") |
| Reel and Tape    | EIA 296-E               | 1500     | DAT1                      | 53mm (2.087") |
| Reel and Tape    | EIA 296-E               | 1500     | DRT1                      | 53mm (2.087") |
| Reel and Tape    | EIA 296-E               | 1500     | DRT2                      | 63mm (2.500") |
| Reel and Tape    | EIA 296-E               | 1500     | DRT3                      | 73mm (2.874") |
| Reel and Tape    | EIA 296-E               | 2500     | ERT1                      | 53mm (2.087") |

| Recommended Accessories |                     |  |                         |                          |  |
|-------------------------|---------------------|--|-------------------------|--------------------------|--|
| Accessory Type          | Series              | Description                                | Max Application Voltage | Max Application Amperage |  |
| Holder                  | <a href="#">245</a> | Panel Mount Shock-Safe Fuseholder          | 300                     | 10                       |  |
|                         | <a href="#">150</a> | In-Line Fuseholder                         | 350                     | 10                       |  |
|                         | <a href="#">286</a> | Panel Mount Flip-Top Shock-Safe Fuseholder | 250                     | 10                       |  |
| Block                   | <a href="#">254</a> | OMNI-BLOK® Fuse Block                      | 400                     | 10                       |  |
| Clip                    | <a href="#">111</a> | PC Board Mount Fuse Clip                   | 250                     | 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.