

RoHS

**bel**

SMM Apr2013D

**Type SMM****Square Ceramic Surface Mount Medium Blow Fuse**3812 Size  
RoHS 6 Compliant**SMM Series Fuse****Features**

- Medium Blow
- Surface mount high current fuse
- Current rating from 20A to 30A
- Wide operating temperature range from -55°C to 125°C
- Tape and Reel for auto-insert SMD process
- Compatible with reflow process
- Halogen Free
- Leadfree

**Applications**

- Voltage regulator module
- PC server
- Office electronic equipment
- Industrial equipment
- Medical equipment
- POE, POE+
- Power supply
- DC-DC Converter

HALOGEN FREE =

LEAD FREE =

**Electrical Characteristics (UL / CSA / STD.248-14)**

| Testing Current | Blow Time |         |
|-----------------|-----------|---------|
|                 | Minimum   | Maximum |
| 100%            | 4 Hrs.    | N/A     |
| 200%            | N/A       | 60 Sec  |

**Safety Agency Approvals**

| SAFETY AGENCY | SAFETY AGENCY CERTIFICATE | AMPERE RANGE / VOLT @ I.R.ABILITY                                             |
|---------------|---------------------------|-------------------------------------------------------------------------------|
|               | E20624                    | 20A - 30A / 250V @100A AC<br>125V @ 150A AC<br>72V @ 130A DC<br>65V @ 300A DC |
|               |                           | 20A - 30A / 250V @100A AC<br>125V @ 150A AC<br>72V @ 130A DC<br>65V @ 300A DC |

Specifications Subject to change without notice.

# Type SMM

## Square Ceramic Surface Mount Medium Blow Fuse

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RoHS 6 Compliant  
HF Pb

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### Electrical Specifications

| Catalog Number | Ampere Rating (A) | Nominal Cold Resistance (ohm) | Nominal Volt-drop @100% In (volt) | Interrupting Rating                                                           | Max. Voltage Rating (V) | Melting I <sup>2</sup> T @ 10 In (A <sup>2</sup> Sec) Min. | Nominal Power Dissipation (W) | Agency Approvals |    |
|----------------|-------------------|-------------------------------|-----------------------------------|-------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------|-------------------------------|------------------|----|
|                |                   |                               |                                   |                                                                               |                         |                                                            |                               | UL               | CE |
| SMM 20         | 20A               | 0.0025                        | 0.09                              | 20A - 30A / 250V @100A AC<br>125V @ 150A AC<br>72V @ 130A DC<br>65V @ 300A DC | 250                     | 270                                                        | 1.8                           | Y                | Y  |
| SMM 25         | 25A               | 0.0019                        | 0.08                              |                                                                               | 250                     | 420                                                        | 2.0                           | Y                | Y  |
| SMM 30         | 30A               | 0.0013                        | 0.07                              |                                                                               | 250                     | 1000                                                       | 2.1                           | Y                | Y  |

### Soldering Guidelines

Reflow Conditions Recommended: 240°C, 30 sec. max.

### Pb-Free Process Compatibility:

When soldered to test boards using IR reflow in accordance with JEDEC J-STD-020 (260°C, 40 sec. max.), SMM samples exhibited DCR change of +10% to -20% from initial values.

Subsequent tests showed all samples complied with the stated electrical characteristics on this data sheet.

### NOT Recommended for Wave solder / Direct immersion / Hand Solder

### NOTES:

#### Test Conditions

For all SMM data, as well as UL Component investigation, all tests were conducted with fuse samples soldered on a PCB (1.6mm thick) test board with copper traces measuring 0.1 mm nominal thickness (3 oz.clad), 10mm wide and 100 mm overall length.

#### UL Condition of Acceptability

- the following information is contained in the UL Component Recognition for SMM Fuse Series:

The maximum temperature recorded in open air was 100 °C in a 21 °C ambient (79 °C rise). Consideration should be given to checking operating temperatures in end-use application with regard to thermal index of surrounding materials and components.

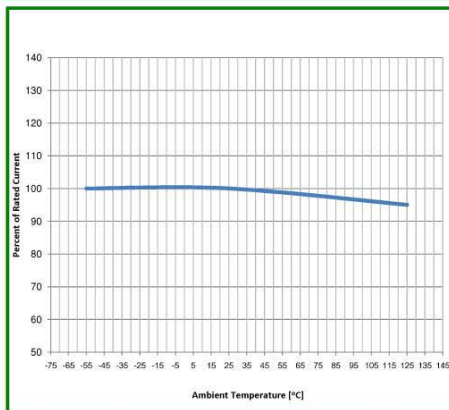
(Maximum temperature recorded at 80% of rating (24A) for the SMM30 rating was 69°C (48 °C rise).

#### Caution:

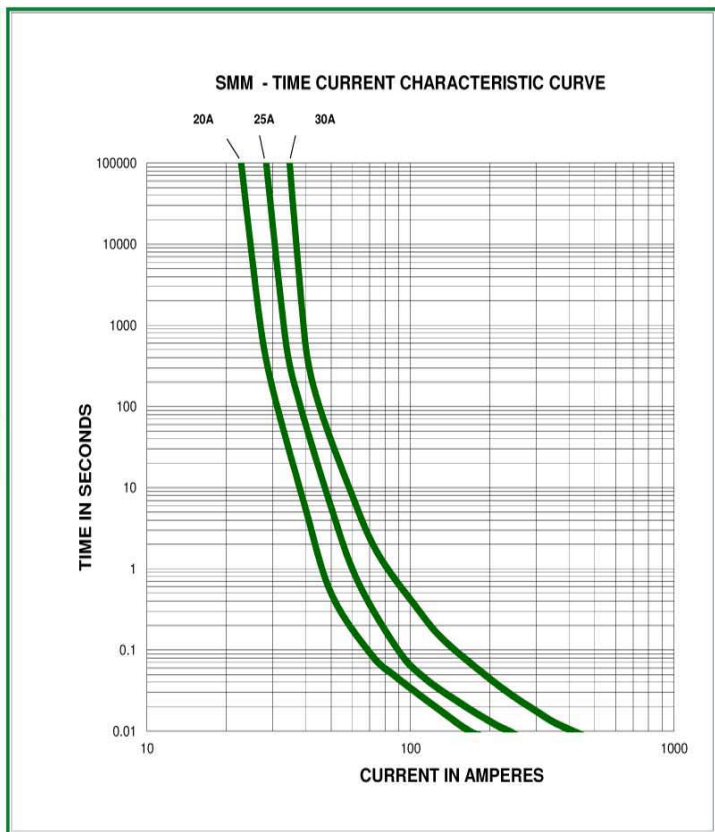
-Minimum fusing point:

The SMM Series fuses are NOT intended to be operated at currents between 100% and 200% of ampere rating. Prolonged operation at currents in this range may result in overheating of the fuse and/or desoldering of the fuse caps from the PCB pad.

Temperature Derating Curve



Average Time Current Curve



Specifications Subject to change without notice.

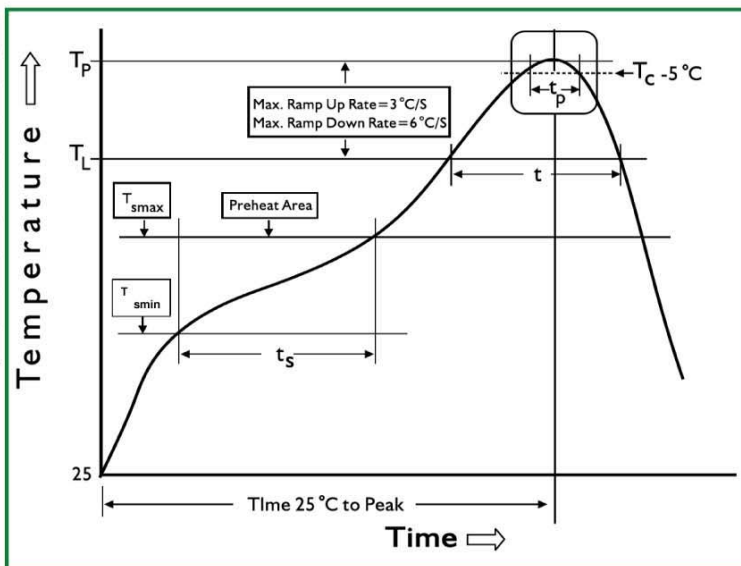
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## Soldering Parameters

| IR Reflow Profile                   |                       |
|-------------------------------------|-----------------------|
| Reflow Parameter                    |                       |
| Minimum preheat temperature(TsMIN)  | 130°C                 |
| Maximum preheat temperature(TsMAX)  | 170°C                 |
| Preheat Time                        | 60-180 seconds        |
| TsMAX to TL ramp-up rate            | 3°C / second max.     |
| Time above temperature TL(tL)       | 200 °C 60-120 seconds |
| Peak Temperature (TP)               | 240 °C max.           |
| Time Within +0 °C / -5°C of Peak TP | 20 - 30 seconds.      |
| Ramp-down rate                      | 6°C / second max.     |



## Physical Specifications

|                  |                                                                                                                                                                                                                                                                                                                   |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Materials</b> | Body : Ceramic                                                                                                                                                                                                                                                                                                    |
|                  | Terminations: Matte Tin Plated Brass Caps (100% Lead -free)                                                                                                                                                                                                                                                       |
| <b>Marking</b>   | On Fuse:                                                                                                                                                                                                                                                                                                          |
|                  | " bel ", "Current Rating" in black color                                                                                                                                                                                                                                                                          |
|                  | On label:                                                                                                                                                                                                                                                                                                         |
|                  | "bel" , "SMM", "Current Rating", "Voltage Rating", "Interrupting Rating", "Appropriate Safety Logos" and "  ", "  " (China RoHS compliant). |

## Environmental Specifications

|                                  |                                                                                                  |
|----------------------------------|--------------------------------------------------------------------------------------------------|
| <b>Shock Resistance</b>          | MIL-STD-202G, Method 213B, Test Condition I (100 G's peak for 6 milliseconds; Sawtooth Waveform) |
| <b>Vibration Resistance</b>      | MIL-STD-202G, Method 201A (10-55 Hz, 0.06 inch, total excursion).                                |
| <b>Salt Spray Resistance</b>     | MIL-STD-202G, Method 101E, Test condition B (48 hrs).                                            |
| <b>Insulation Resistance</b>     | MIL-STD-202G, Method 302, Test Condition A (After Opening) 10,000 ohms minimum.                  |
| <b>Solderability</b>             | MIL-STD-202G, Method 208H                                                                        |
| <b>Resistance to solder Heat</b> | MIL-STD-202G Method 210F                                                                         |
| <b>Thermal Shock</b>             | MIL-STD-202G, Method 107G, Test Condition B (-65 °C to +125 °C).                                 |
| <b>Operating Temperature</b>     | -55 °C to +125 °C                                                                                |

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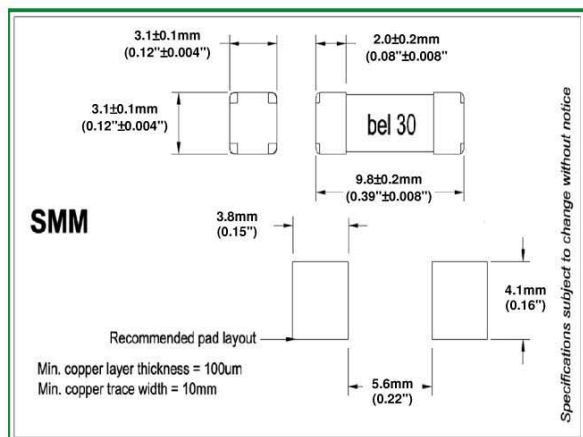
### Fuse FGNO Explanation

06XX-XXXX-XX, [XXXX]=Ampere Rating

| Fraction | Decimal | Milliamps | Bel FGNO[XXXX] |
|----------|---------|-----------|----------------|
| 1/32     | 0.032   | 32        | 0032           |
| 1/25     | .040    | 40        | 0040           |
| 1/20     | .050    | 50        | 0050           |
| 1/16     | .063    | 63        | 0063           |
| 8/100    | .080    | 80        | 0080           |
| 1/10     | .100    | 100       | 0100           |
| 1/8      | .125    | 125       | 0125           |
| 15/100   | .150    | 150       | 0150           |
|          | .160    | 160       | 0160           |
| 2/10     | .200    | 200       | 0200           |
| 1/4      | .250    | 250       | 0250           |
| 3/10     | .300    | 300       | 0300           |
|          | .315    | 315       | 0315           |
| 3/8      | .375    | 375       | 0375           |
| 4/10     | .400    | 400       | 0400           |
| 1/2      | .500    | 500       | 0500           |
| 6/10     | .600    | 600       | 0600           |
|          | .630    | 630       | 0630           |
| 7/10     | .700    | 700       | 0700           |
| 3/4      | .750    | 750       | 0750           |
| 8/10     | .800    | 800       | 0800           |

| Fraction | Decimal | Amps | Bel FGNO[XXXX] |
|----------|---------|------|----------------|
|          | 1.0     | 1    | 1000           |
| 1-1/4    | 1.25    | 1.25 | 1250           |
| 1-1/2    | 1.50    | 1.5  | 1500           |
|          | 1.60    | 1.6  | 1600           |
|          | 2.0     | 2    | 2000           |
| 2-1/4    | 2.25    | 2.25 | 2250           |
| 2-1/2    | 2.5     | 2.5  | 2500           |
|          | 3.0     | 3    | 3000           |
|          | 3.15    | 3.15 | 3150           |
| 3-1/2    | 3.5     | 3.5  | 3500           |
|          | 4.0     | 4    | 4000           |
|          | 5.0     | 5    | 5000           |
|          | 6.0     | 6    | 6000           |
|          | 6.3     | 6.3  | 6300           |
|          | 7.0     | 7    | 7000           |
| 7-1/2    | 7.5     | 7.5  | 7500           |
|          | 8.0     | 8    | 8000           |
|          |         | 10   | 9100           |
|          |         | 12   | 9120           |
|          |         | 15   | 9150           |
|          |         | 20   | 9200           |
|          |         | 25   | 9250           |
|          |         | 30   | 9300           |

### Mechanical Dimensions



### Ordering Information

**FUSE TYPE** — 0678

**AMPERE RATING** — Refer to fuse FGNO explanation table

**QUANTITY & PACKAGING CODE** — M2 = 2000 pcs with Tape and Reel

0678 - XXXX - XX

### Packaging

| Packaging Tape & Reel                        | Packaging Specification | Quantity | Quantity & Packaging Code |
|----------------------------------------------|-------------------------|----------|---------------------------|
| 16 mm wide tape with 13 inches Diameter reel | EIA Standard 481-D      | 2000     | 0678-XXXX-M2              |

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