

# Type 0678D

## Square Ceramic Surface Mount Fast Blow Fuse

**HF** 0678D Series - 3912 Size

RoHS 2 Compliant

### Features

- Fast blow
- Surface mount high breaking capacity (350V AC/125V DC)
- Current rating from 500mA to 5A
- Wide operating temperature range from -55 °C to 125 °C
- Tape & Reel for auto-insert SMD process
- Compatible with 260 °C, IR Pb-free solder process
- RoHS compliant with exemption 7a
- Halogen Free, (MSL = 1)

### Applications

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

HALOGEN FREE = **HF**



### 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 | VOLTAGE RATING (V)                                               | AMPERE RANGE / VOLT @ I.R. ABILITY*                                                                              |
|------------------------------------------------------------|---------------------------|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
|                                                            | E20624                    | 500mA - 1A / 350 VAC<br>250 VDC<br>>1A - 5A / 350 VAC<br>125 VDC | 500mA - 1A / 350V @ 100A AC<br>250V @ 100A DC<br>125V @ 2000A DC<br>>1A - 5A / 350V @ 100A AC<br>125V @ 2000A DC |
| * I.R. = INTERRUPTING RATING = SHORT CIRCUIT RATING (AMPS) |                           |                                                                  |                                                                                                                  |

### Physical Specifications

|           |                                                                                                                                           |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Materials | Body : Ceramic                                                                                                                            |
|           | Terminations : Silver Plated Caps                                                                                                         |
| Marking   | On Fuse :                                                                                                                                 |
|           | "Current Rating", "D" in green color.<br>"bel" stamped in end caps.                                                                       |
|           | On Label :                                                                                                                                |
|           | "bel", "0678D", "Current Rating", "Voltage Rating", "Interrupting Rating",<br>" Appropriate Safety Logos" and  ,  (China RoHS compliant). |

Specifications subject to change without notice



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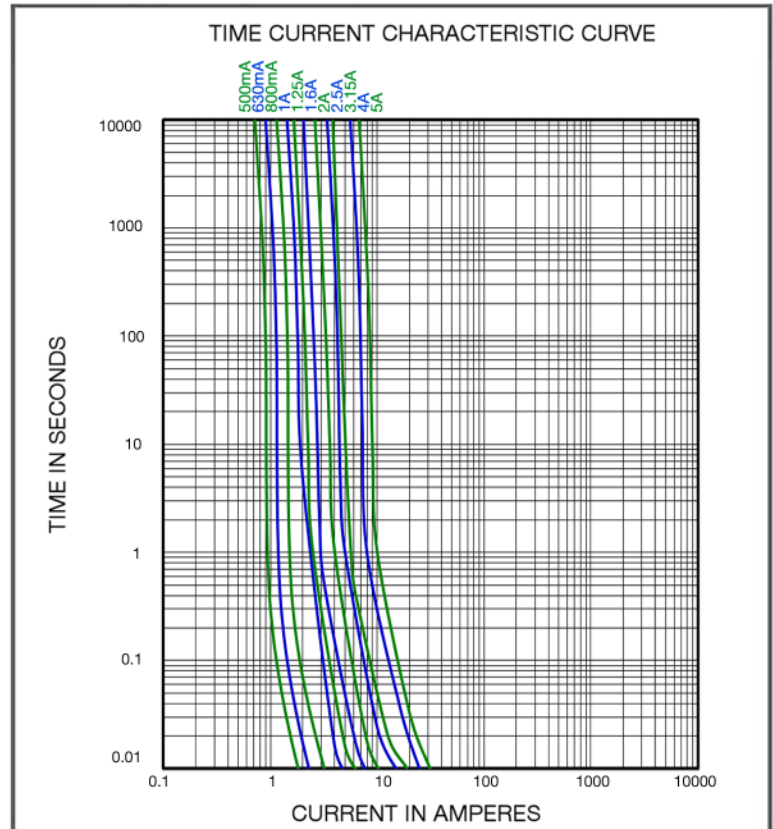
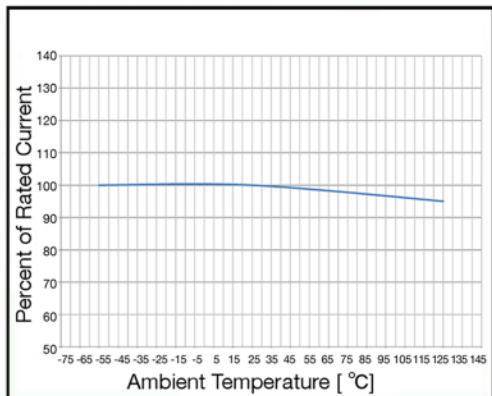
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### Environmental Specifications

### Temperature Derating Curve



### Electrical Specifications

| Part Number  | Ampere Rating | Nominal Cold Resistance (ohm) | Volt-drop @100% In (Volt) Max | Voltage and Interrupting Ratings                                                        | Melting I <sup>2</sup> T @10 In (A <sup>2</sup> Sec) | Power Dissipation (W) Max | Agency Approvals                                                                      |
|--------------|---------------|-------------------------------|-------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|---------------------------|---------------------------------------------------------------------------------------|
|              |               |                               |                               |                                                                                         |                                                      |                           |  |
| 0678D0500-02 | 500mA         | 0.66                          | 1.00                          | See Table of Safety Approvals on Page 1 for Voltage and associated Interrupting Ratings | 0.03                                                 | 0.5                       | Y                                                                                     |
| 0678D0630-02 | 630mA         | 0.54                          | 1.30                          |                                                                                         | 0.06                                                 | 0.8                       | Y                                                                                     |
| 0678D0800-02 | 800mA         | 0.38                          | 1.10                          |                                                                                         | 0.08                                                 | 0.9                       | Y                                                                                     |
| 0678D1000-02 | 1A            | 0.21                          | 0.70                          |                                                                                         | 0.3                                                  | 0.7                       | Y                                                                                     |
| 0678D1250-02 | 1.25A         | 0.10                          | 0.20                          |                                                                                         | 0.4                                                  | 0.3                       | Y                                                                                     |
| 0678D1600-02 | 1.6A          | 0.08                          | 0.19                          |                                                                                         | 0.5                                                  | 0.3                       | Y                                                                                     |
| 0678D2000-02 | 2A            | 0.059                         | 0.18                          |                                                                                         | 0.9                                                  | 0.4                       | Y                                                                                     |
| 0678D2500-02 | 2.5A          | 0.043                         | 0.18                          |                                                                                         | 1.6                                                  | 0.5                       | Y                                                                                     |
| 0678D3150-02 | 3.15A         | 0.035                         | 0.18                          |                                                                                         | 2.6                                                  | 0.6                       | Y                                                                                     |
| 0678D4000-02 | 4A            | 0.021                         | 0.18                          |                                                                                         | 7.5                                                  | 0.7                       | Y                                                                                     |
| 0678D5000-02 | 5A            | 0.016                         | 0.18                          |                                                                                         | 9.0                                                  | 0.9                       | Y                                                                                     |

Consult manufacturer for other ratings

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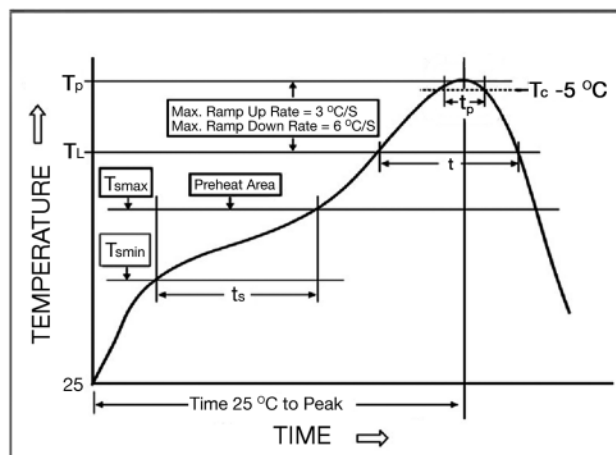
RoHS 2 Compliant

### Environmental Specifications

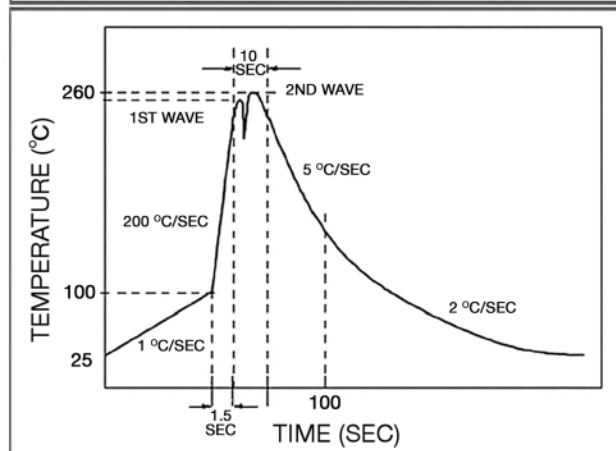
|                            |                                                                                                                                                |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Shock Resistance           | MIL-STD-202G, Method 213B, Test Condition 1 (100 G's peak for 6 milliseconds; Sawtooth waveform)                                               |
| Vibration Resistance       | MIL-STD-202G, Method 201A(10-55 Hz,0.06 inch, total excursion).                                                                                |
| Salt Spray Resistance      | MIL-STD-202G, Method 101E, Test Condition B(48 hrs).                                                                                           |
| Insulation Resistance      | MIL-STD-202G, Method 302, Test Condition A (After Opening) 10,000 ohms minimum.                                                                |
| Solderability              | MIL-STD-202G, Method 208H                                                                                                                      |
| Resistance to solder Heat  | MIL-STD-202G, Method 210F, Test Condition C.Top Side(260 °C, 20 sec)<br>MIL-STD-202G, Method 210F, Test Condition D.Bottom Side(260 °C,10 sec) |
| Thermal Shock              | MIL-STD-202G, Method 107G, Test Condition B (-65 °C to +125 °C ).                                                                              |
| Operating Temperature      | -55 °C to +125 °C                                                                                                                              |
| Moisture Sensitivity Level | 1 ( According to IPC J-Std-020 )                                                                                                               |

### Soldering Parameters

| IR Reflow Profile (IPC/JEDEC J-STD-020D)                                                         |                  |
|--------------------------------------------------------------------------------------------------|------------------|
| <b>Preheat &amp; Soak</b>                                                                        |                  |
| Temperature min (T <sub>min</sub> )                                                              | 150 °C           |
| Temperature max (T <sub>max</sub> )                                                              | 200 °C           |
| Time (T <sub>min</sub> to T <sub>max</sub> ) (t <sub>s</sub> )                                   | 60 -120 seconds  |
| Average ramp-up rate (T <sub>max</sub> to T <sub>p</sub> )                                       | 3 °C/second max. |
| Liquidous temperature (T <sub>L</sub> )                                                          | 217 °C           |
| Time at liquidous (t <sub>L</sub> )                                                              | 60 - 150 seconds |
| Peak temperature (T <sub>p</sub> )                                                               | 260 °C max       |
| Time (t <sub>p</sub> ) within 5 °C of the specified classification temperature (T <sub>c</sub> ) | 30 seconds       |
| Average ramp-down rate (T <sub>p</sub> to T <sub>max</sub> )                                     | 6 °C/second max. |
| Time 25 °C to peak temperature                                                                   | 8 minutes max.   |



| Lead-free Wave Soldering Profile                     |                                                |
|------------------------------------------------------|------------------------------------------------|
| Wave Soldering Parameter                             |                                                |
| Average ramp-up rate                                 | 200 °C / second                                |
| Heating rate during preheat                          | typical 1 - 2 °C / second<br>Max 4 °C / second |
| Final preheat temperature                            | within 125 °C of soldering temperature         |
| Peak temperature T <sub>p</sub>                      | 260 °C                                         |
| Time within +0 °C / -5 °C of actual peak temperature | 10 seconds                                     |
| Ramp-down rate                                       | 5 °C / second max.                             |



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### Fuse FGNO Explanation

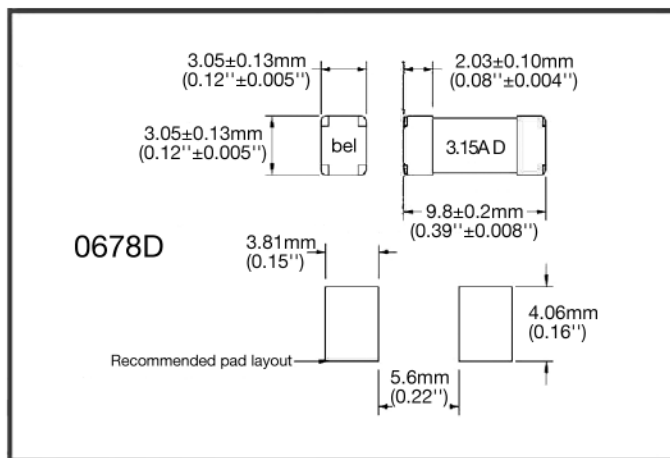
0678D [XXXX] - 02

0678D=0678D Series;[XXXX]=Ampere Rating; XX=See Ordering Information as below

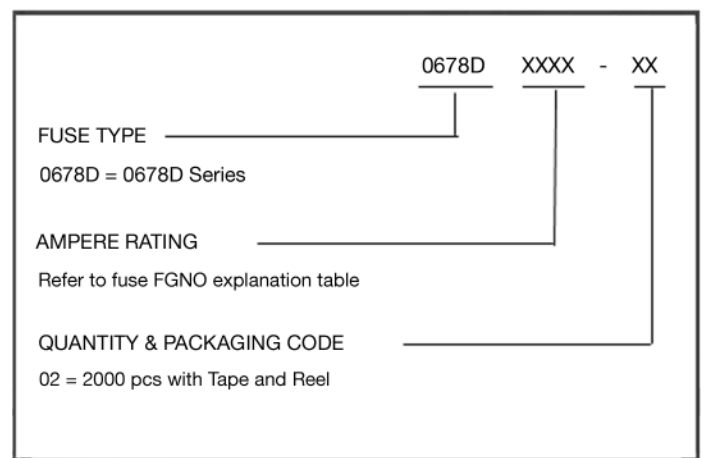
| Fraction | Decimal | Milliamps | Bel FGNO[XXXX] |
|----------|---------|-----------|----------------|
| 1/2      | .500    | 500       | 0500           |
|          | .630    | 630       | 0630           |
| 8/10     | .800    | 800       | 0800           |

| Fraction | Decimal | Amps | Bel FGNO[XXXX] |
|----------|---------|------|----------------|
|          | 1.0     | 1    | 1000           |
| 1-1/4    | 1.25    | 1.25 | 1250           |
|          | 1.60    | 1.6  | 1600           |
|          | 2.0     | 2    | 2000           |
| 2-1/2    | 2.5     | 2.5  | 2500           |
|          | 3.15    | 3.15 | 3150           |
|          | 4.0     | 4    | 4000           |
|          | 5.0     | 5    | 5000           |

### Mechanical Dimensions



### Ordering Information



### Packaging

| Packaging Tape & Reel                        | Packaging Specification | Quantity | Quantity & Packaging Code |
|----------------------------------------------|-------------------------|----------|---------------------------|
| 16 mm wide tape with 13 inches Diameter reel | EIA Standard 481-E      | 2000     | 0678DXXXX-02              |

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