# Type 0680L

## Square Ceramic Surface Mount Slow Blow Fuse

HF 0680L Series – 2410 Size RoHS Compliant

## Features

- Slow Blow, 2410 SMD
- Compatible with 260℃, IR Pb-free solder process
- Wide range of current rating from 375mA to 12A
- Wide operating temperature range, -55℃ to 125℃
- Tape & Reel for auto-insert SMD process
- AEC-Q Compliant
- RoHS compliant with exemption 7(a)
- Halogen Free, (MSL = 1)
- Meets Bel automotive qualification*

  * - Largely based on internal AEC-Q test plan

**AEC-Q Compliant**

## Applications

- Notebook
- LCD monitor
- PC computer
- Office electronic equipment
- Industrial equipment
- Medical equipment
- POE, POE+
- LCD / LED monitor
- Power supply
- LCD / LED TV
- Storage system
- Telecom system
- Wireless basestation
- White goods
- Game console
- Battery charging circuit protection

HALOGEN FREE = HF

## Electrical Characteristics

(UL/CSA/STD.248-14)

| Testing Current | Blow Time | |
|---|---|---|
| | Minimum | Maximum |
| 100% | 4 Hrs. | N/A |
| 200% | N/A | 120 Sec |
| 300% | 0.15 Sec | 3 Sec |
| 800% | 0.01 Sec | 0.1 Sec |

## Safety Agency Approvals

| Safety Agency | Safety Agency Certificate | Voltage Rating (V) | Ampere Range / Volt @ I.R. ability* |
|---|---|---|---|
| c UL us | E506667 | 375mA-7A/125V AC<br>125V DC<br>>7A-12A/50V AC<br>75V DC | 375mA-7A/125V AC @50A<br>125V DC @100A<br>75V DC @500A<br>>7A-12A/50V AC @100A<br>75V DC @500A |
| TÜV | 50268578<br>EN 60127-1: 2006+A1+A2<br>EN 60127-4: 2005+A1+A2 | 375mA-7A/125V AC<br>125V DC<br>>7A-12A/50V AC<br>75V DC | 375mA-7A/125V AC @50A<br>125V DC @100A<br>75V DC @500A<br>>7A-12A/50V AC @100A<br>75V DC @500A |

*I.R.= Interrupting Rating = Short Circuit Rating(Amps)

## Physical Specifications

| | |
|---|---|
| Materials | Body : Ceramic |
| | Terminations : Silver Plated Caps /Gold Plated Caps/Palladium Plated Caps |
| Marking | On Fuse : |
| | "Current Rating", "T", "L"—laser marked on ceramic tube, "bel" stamped in end caps. |
| | On Label : |
| | "bel", "0680L", "Current Rating", "Voltage Rating", "Interrupting Rating", "Appropriate Safety Logos" and " RoHS ", " 50 "(China RoHS compliant). |

Specifications subject to change without notice

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## Environmental Specifications

| | |
|---|---|
| Shock Resistance | MIL-STD-202G Method 213,Test condition A (50G's peak for 11 milliseconds : Half-sine 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. |
| Thermal Shock | MIL-STD-202G, Method 107G, Test Condition B (-65℃ to +125℃). |
| Operating Temperature | -55℃ to +125℃ |
| Moisture Sensitivity Level | 1 (According to IPC J-Std-020) |

| | |
|---|---|
| High temperature storage | MIL-STD-202 Method 108 |
| Temperature cycling | JESD22 Method JA-104,Test Condition B |
| Biased humidity | MIL-STD-202 Method 103, 85C/85% RH with 10% operating power for 1000 hrs. |
| Operational life | MIL-STD-202 Method 108, Test Condition D |
| Resistance to solvents | MIL-STD-202 Method 215 |
| Mechanical shock | MIL-STD-202 Method 213,Test Condition C |
| Vibration | MIL-STD-202G Method 204 Test condition D（10-2k HZ ,20G's for 20minutes） |
| Resistance to soldering heat | MIL-STD-202 Method 210,Test condition B |
| Thermal shock | MIL-STD-202 Method 107 |
| Solderability | J-STD-002 Test B |
| Board flex(SMD) | AEC-Q200-005 |
| Terminal strength | AEC-Q200-006 |
| Electrical characterization | 3 Temperature Electrical |

## Electrical Specifications

| Part Number | Ampere Rating | Typical Cold Resistance (ohms) | Volt-drop @100% In (Volt) max. | Voltage and Interrupting Ratings | Melting I²T @10 In (A² Sec) | Melting I²T <10ms (A² Sec) | Maximum Power Dissipation (W) | Agency Approvals | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | c UL us | TÜV |
| 0680L0375-XX | 375mA | 0.93 | 1.20 | See Table of Safety Approvals on Page 1 for Voltage and associated Interrupting Ratings | 0.14 | 0.10 | 0.45 | Y | Y |
| 0680L0500-XX | 500mA | 0.58 | 0.90 | | 0.27 | 0.35 | 0.45 | Y | Y |
| 0680L0630-XX | 630mA | 0.41 | 0.80 | | 0.43 | 0.42 | 0.50 | Y | Y |
| 0680L0750-XX | 750mA | 0.33 | 0.75 | | 0.62 | 0.61 | 0.56 | Y | Y |
| 0680L1000-XX | 1A | 0.175 | 0.60 | | 1.5 | 1.3 | 0.60 | Y | Y |
| 0680L1500-XX | 1.5A | 0.095 | 0.40 | | 3.3 | 3.2 | 0.60 | Y | Y |
| 0680L2000-XX | 2A | 0.068 | 0.35 | | 6 | 5 | 0.70 | Y | Y |
| 0680L2500-XX | 2.5A | 0.048 | 0.34 | | 9 | 7 | 0.85 | Y | Y |
| 0680L3000-XX | 3A | 0.037 | 0.27 | | 13 | 12 | 0.81 | Y | Y |
| 0680L3500-XX | 3.5A | 0.030 | 0.26 | | 18 | 17 | 0.91 | Y | Y |
| 0680L4000-XX | 4A | 0.026 | 0.25 | | 24 | 22 | 1.00 | Y | Y |
| 0680L5000-XX | 5A | 0.019 | 0.23 | | 37 | 36 | 1.15 | Y | Y |
| 0680L6300-XX | 6.3A | 0.015 | 0.22 | | 43 | 50 | 1.39 | Y | Y |
| 0680L7000-XX | 7A | 0.012 | 0.21 | | 68 | 77 | 1.47 | Y | Y |
| 0680L8000-XX | 8A | 0.0099 | 0.20 | | 108 | 105 | 1.60 | Y | Y |
| 0680L9100-XX | 10A | 0.0084 | 0.19 | | 170 | 150 | 1.90 | Y | Y |
| 0680L9120-XX | 12A | 0.0063 | 0.18 | | 244 | 180 | 2.16 | Y | Y |

Consult manufacturer for other ratings
XX - Packaging code (see "ordering information")

NOTES 1:
All tests were conducted with the fuses soldered to a printed circuit boards with a nominal thickness of 1.6 mm. The copper test circuit trace was a printed circuit with an overall length of 100 mm, copper thickness/width as described below. The printed circuit boards were mounted by screws to a test fixture having brass blocks for connection of the test leads. All samples were soldered to the test boards by the manufacturer.

| Fuse rating | Test Board Trace Dimensions |
|---|---|
| 375mA-5A | 1 oz. copper, 5.0mm wide. |
| 6A-12A | 3 oz. copper, 10mm wide. |

NOTES 2:
Conventional (Ambient Pressure) Reflow Process is recommended for this device. The sale and use of product is subject to bel terms and condition of sale，unless otherwise agreed .User should independently evaluate the suitability of and test each product selected for their own application. product are not designed for ， and may not be used in，all applications.



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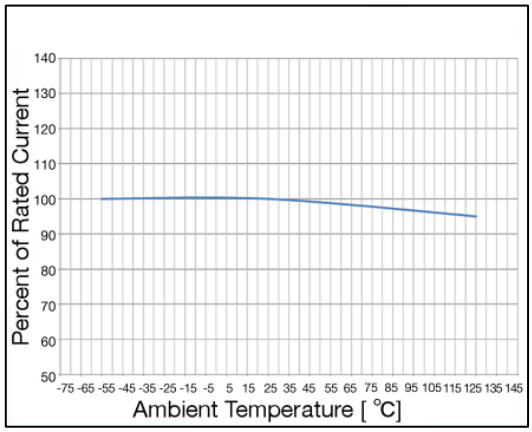
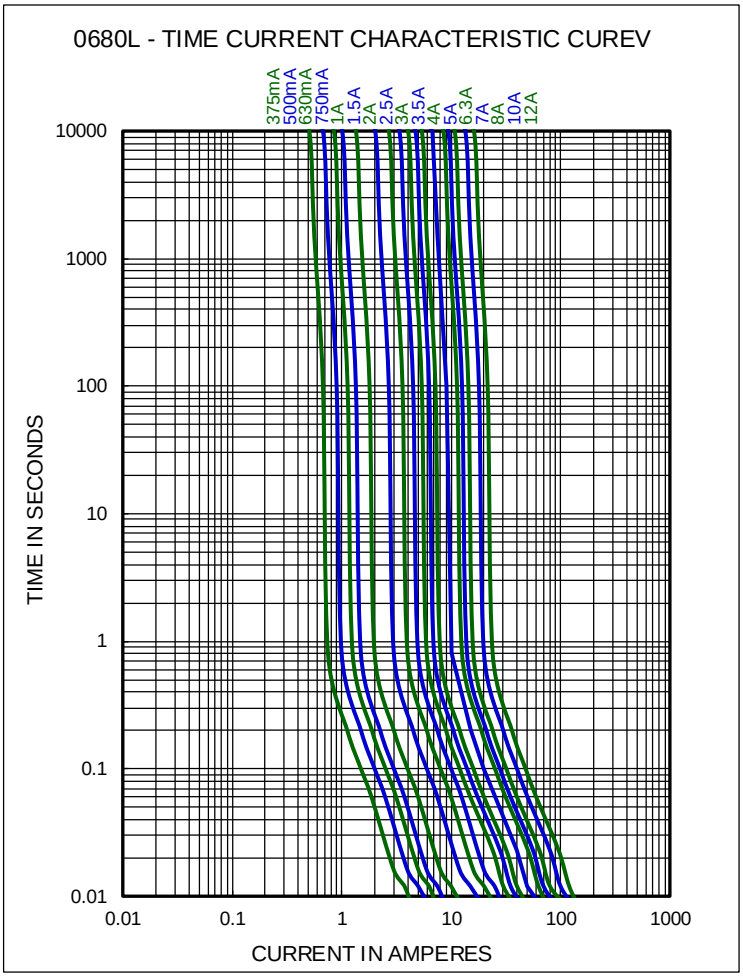
## Temperature Derating Curve

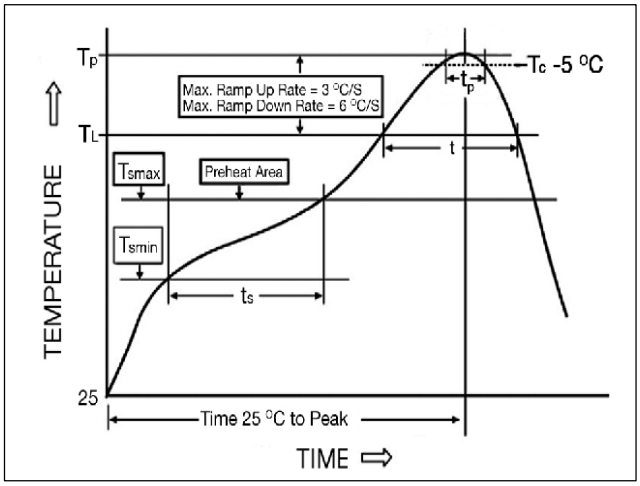



## Average Time Current Curve




## Soldering Parameters

| IR Reflow Profile (IPC/JEDEC J-STD-020D) | |
|---|---|
| **Preheat & Soak**<br>Temperature min ($T_{smin}$)<br>Temperature max ($T_{smax}$)<br>Time ($T_{smin}$ to $T_{smax}$) ($t_s$) | <br>150℃<br>200℃<br>60-120 seconds |
| Average ramp-up rate ($T_{smax}$ to $T_p$) | 3℃/second max. |
| Liquidous temperature ($T_L$)<br>Time at liquidous ($t_L$) | 217℃<br>60-150 seconds |
| Peak temperature ($T_p$) | 260℃ max |
| Time (tp) within 5℃ of the specified classification temperature (Tc) | 30 seconds |
| Average ramp-down rate ($T_p$ to $T_{smax}$) | 6℃/second max. |
| Time 25℃ to peak temperature | 8 minutes max. |



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## Fuse FGNO Explanation
## 0680 L [XXXX] -XX
## 0680L=0680L; [XXXX]=Ampere Rating; XX=See Ordering Information as below

| Fraction | Decimal | Milliamps | Bel FGNO[XXXX] |
|---|---|---|---|
| 3/8 | 0.375 | 375 | 0375 |
| 1/2 | .500 | 500 | 0500 |
| | .630 | 630 | 0630 |
| 3/4 | .750 | 750 | 0750 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
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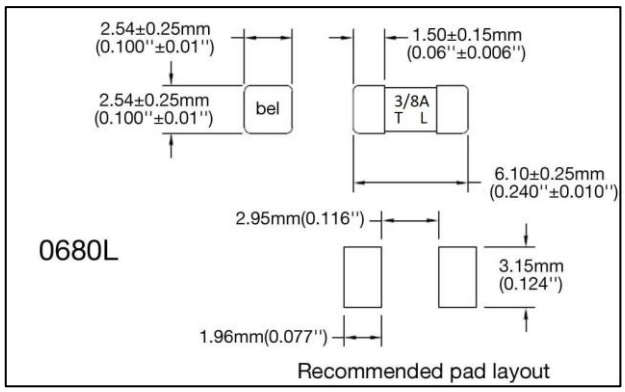
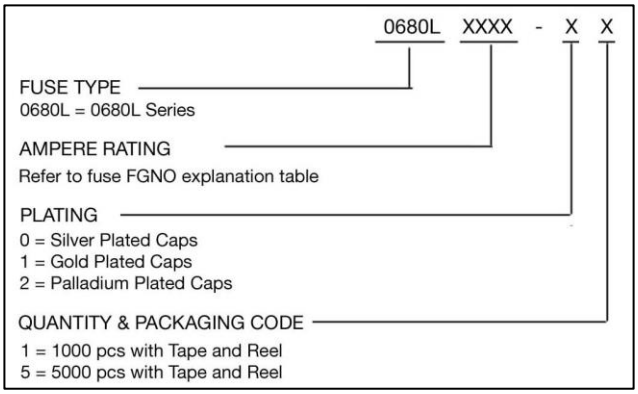
| | | | |
| | | | |
| | | | |

| Fraction | Decimal | Amps | Bel FGNO[XXXX] |
|---|---|---|---|
| | 1.0 | 1 | 1000 |
| 1-1/2 | 1.5 | 1.5 | 1500 |
| | 2.0 | 2 | 2000 |
| 2-1/2 | 2.5 | 2.5 | 2500 |
| | 3.0 | 3 | 3000 |
| 3-1/2 | 3.5 | 3.5 | 3500 |
| | 4.0 | 4 | 4000 |
| | 5.0 | 5 | 5000 |
| | 6.3 | 6.3 | 6300 |
| | 7.0 | 7 | 7000 |
| | 8.0 | 8 | 8000 |
| | | 10 | 9100 |
| | | 12 | 9120 |

## Mechanical Dimensions




## Ordering Information




## Packaging

| Packaging Tape & Reel | Packaging Specification | Quantity | Quantity & Packaging Code |
|---|---|---|---|
| 12 mm wide tape with 13 inches Diameter reel | EIA Standard 481-E | 5000 | 5 |
| 12 mm wide tape with 7 inches Diameter reel | EIA Standard 481-E | 1000 | 1 |



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