

Type 0680L

Square Ceramic Surface Mount Slow Blow Fuse

HF 0680L Series – 2410 Size

RoHS Compliant

Features

- Slow Blow, 2410 SMD
- Compatible with 260°C, IR Pb-free solder process
- Wide range of current rating from 375mA to 12A
- Wide operating temperature range, -55°C to 125°C
- 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

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



AEC-Q Compliant

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* |
|---------------|---------------------------|---|--|
| UL US | E506667 | 375mA-7A/125V AC 125V DC >7A-12A/50V AC 75V DC | 375mA-7A/125V AC @50A 125V DC @100A 75V DC @500A >7A-12A/50V AC @100A 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 "  ", "  " (China RoHS compliant). | |

Environmental Specifications

| | | | |
|----------------------------|--|------------------------------|---|
| Shock Resistance | MIL-STD-202G, Method 213B, Test Condition 1 (100 G's peak for 6 milliseconds; Sawtooth waveform) | High temperature storage | MIL-STD-202 Method 108 |
| Vibration Resistance | MIL-STD-202G, Method 201A (10-55 Hz, 0.06 inch, total excursion). | Temperature cycling | JESD22 Method JA-104, Test Condition B |
| Salt Spray Resistance | MIL-STD-202G, Method 101E, Test Condition B (48 hrs.). | Biased humidity | MIL-STD-202 Method 103, 85C/85% RH with 10% operating power for 1000 hrs. |
| Insulation Resistance | MIL-STD-202G, Method 302, Test Condition A (After Opening) 10,000 ohms minimum. | Operational life | MIL-STD-202 Method 108, Test Condition D |
| Solderability | MIL-STD-202G, Method 208H | Resistance to solvents | MIL-STD-202 Method 215 |
| Resistance to solder Heat | MIL-STD-202G, Method 210F, Test Condition C. Top Side (260°C, 20 sec) | Mechanical shock | MIL-STD-202 Method 213, Test Condition C |
| | MIL-STD-202G, Method 210F, Test Condition D. Bottom Side (260°C, 10 sec) | Vibration | MIL-STD-202 Method 204 |
| Thermal Shock | MIL-STD-202G, Method 107G, Test Condition B (-65°C to +125°C). | Resistance to soldering heat | MIL-STD-202 Method 210, Test condition B |
| Operating Temperature | -55°C to +125°C | Thermal shock | MIL-STD-202 Method 107 |
| Moisture Sensitivity Level | 1 (According to IPC J-Std-020) | Solderability | J-STD-002 |
| | | 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 I ² T @10 In (A ² Sec) | Melting I ² T <10ms (A ² Sec) | Maximum Power Dissipation (W) | Agency Approvals |
|--------------|---------------|--------------------------------|--------------------------------|---|--|---|-------------------------------|---|
| | | | | | | | |  |
| 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 |
| 0680L0500-XX | 500mA | 0.58 | 0.90 | | 0.27 | 0.35 | 0.45 | Y |
| 0680L0630-XX | 630mA | 0.41 | 0.80 | | 0.43 | 0.42 | 0.50 | Y |
| 0680L0750-XX | 750mA | 0.33 | 0.75 | | 0.62 | 0.61 | 0.56 | Y |
| 0680L1000-XX | 1A | 0.175 | 0.60 | | 1.5 | 1.3 | 0.60 | Y |
| 0680L1500-XX | 1.5A | 0.095 | 0.40 | | 3.3 | 3.2 | 0.60 | Y |
| 0680L2000-XX | 2A | 0.068 | 0.35 | | 6 | 5 | 0.70 | Y |
| 0680L2500-XX | 2.5A | 0.048 | 0.34 | | 9 | 7 | 0.85 | Y |
| 0680L3000-XX | 3A | 0.037 | 0.27 | | 13 | 12 | 0.81 | Y |
| 0680L3500-XX | 3.5A | 0.030 | 0.26 | | 18 | 17 | 0.91 | Y |
| 0680L4000-XX | 4A | 0.026 | 0.25 | | 24 | 22 | 1.00 | Y |
| 0680L5000-XX | 5A | 0.019 | 0.23 | | 37 | 36 | 1.15 | Y |
| 0680L6300-XX | 6.3A | 0.015 | 0.22 | | 43 | 50 | 1.39 | Y |
| 0680L7000-XX | 7A | 0.012 | 0.21 | | 68 | 77 | 1.47 | Y |
| 0680L8000-XX | 8A | 0.0099 | 0.20 | | 108 | 105 | 1.60 | Y |
| 0680L9100-XX | 10A | 0.0084 | 0.19 | | 170 | 150 | 1.90 | Y |
| 0680L9120-XX | 12A | 0.0063 | 0.18 | | 244 | 180 | 2.16 | Y |

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

NOTES:

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. |

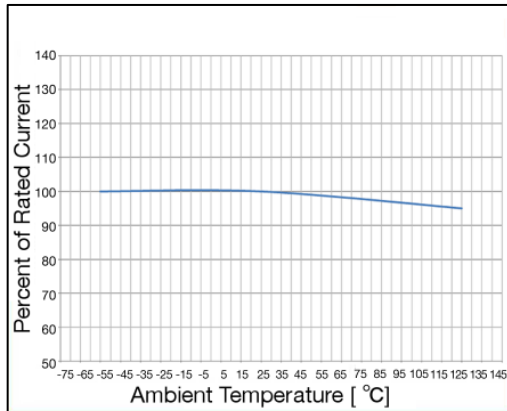


Specifications subject to change without notice

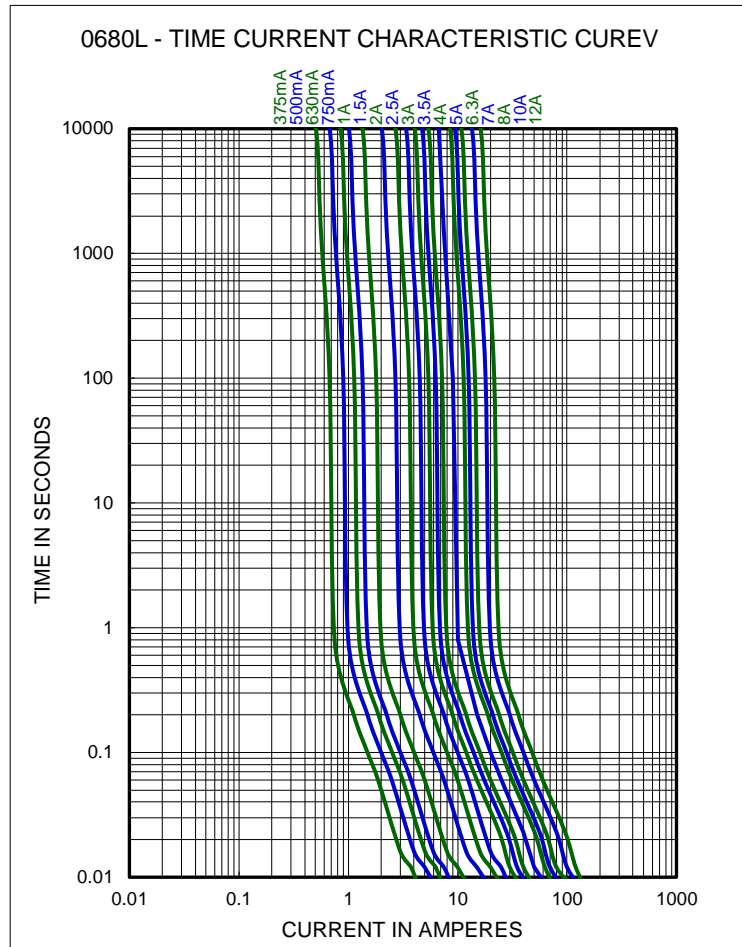
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Temperature Derating Curve

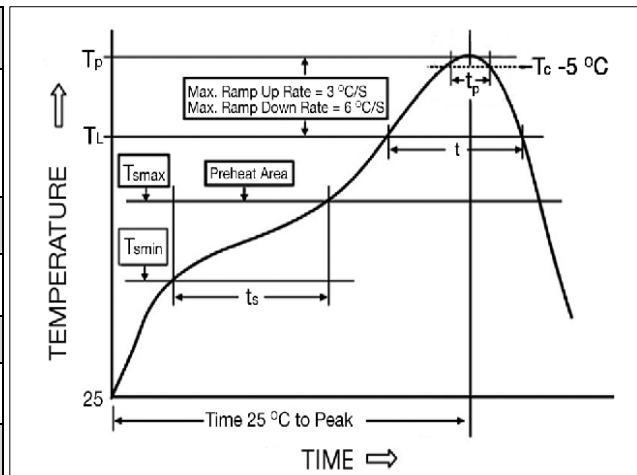


Average Time Current Curve



Soldering Parameters

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



Fuse FGNO Explanation

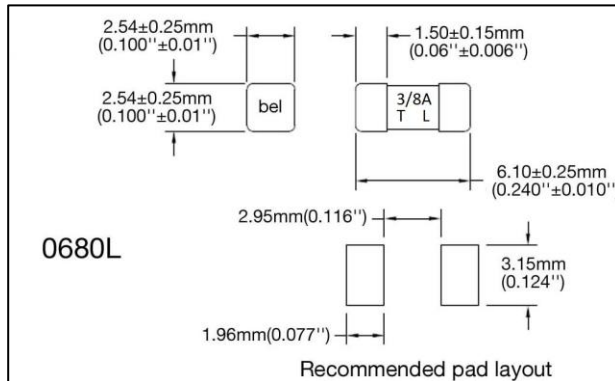
0680 L [XXXX] -XX

0680L=0680L; [XXXX]=Ampere Rating; XX=See Ordering Information as below

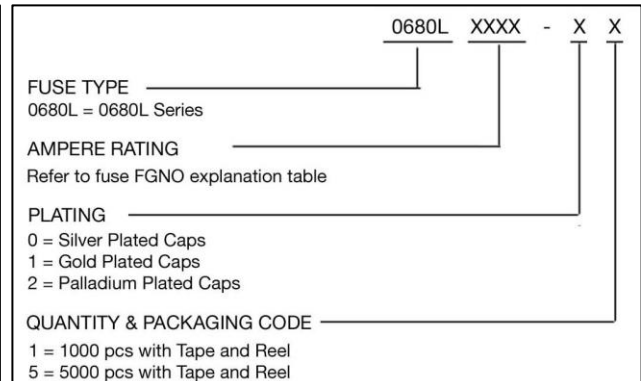
| Fraction | Decimal | Milliamps | Bel FGNO[XXXX] |
|----------|---------|-----------|----------------|
| 3/8 | 0.375 | 375 | 0375 |
| 1/2 | .500 | 500 | 0500 |
| | .630 | 630 | 0630 |
| 3/4 | .750 | 750 | 0750 |
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| Fraction | Decimal | Amps | Bel FGNO[XXXX]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



Specifications subject to change without notice

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