

# Type GSA / GSAP

## Slow Blow Fuse Series

HF (Pb) GSA/GSAP Series, 6x32mm Ceramic Tube Slow Blow Fuse

RoHS 6 Compliant

### Description

6x32mm Slow Blow , ceramic tube body cartridge fuse designed, approved and complied with UL and CSA standard 248-14.

### Features

- Meet UL and CSA standard 248-14
- Wide operating temperature range
- Bulk and Tape & Reel packing available
- RoHS 6 compliant
- Halogen Free
- Leadfree

### Applications

Provide individual protection for components or internal circuits.

- Power supplies
- Battery charger
- Monitor
- Adapter

LEAD FREE = (Pb)  
HALOGEN FREE = (HF)

### Physical Specifications

|           |                                                                                                                                                        |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Materials | Body : Ceramic                                                                                                                                         |
|           | Cap : Nickel Plated Brass Caps                                                                                                                         |
|           | Leads : Matte Tin Plated Copper                                                                                                                        |
| Marking   | On Fuse :                                                                                                                                              |
|           | "bel", "GSA", "Current Rating", "Voltage Rating",                                                                                                      |
|           | "Appropriate Safety Logos", "✓"(RoHS 6 compliant)                                                                                                      |
|           | On Label :                                                                                                                                             |
|           | "bel", "GSA" or "GSAP", "Current Rating", "Voltage Rating", "Interrupting Rating",<br>" Appropriate Safety Logos" and "☑", "Ⓢ" (China RoHS compliant). |



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

| Testing Current | Blow Time |         |
|-----------------|-----------|---------|
|                 | Minimum   | Maximum |
| 100%            | 4 Hrs.    | N/A     |
| 135%            | N/A       | 1 Hr    |
| 200%            | 5 sec     | 30 sec  |

### Safety Agency Approvals

| SAFETY AGENCY | SAFETY AGENCY CERTIFICATE NUMBER         | VOLTAGE RATING (V)   | AMPERE RANGE / VOLT @ I.R. ABILITY*                                                                                       |
|---------------|------------------------------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------|
| UL            | E20624<br>LR39772                        | 63mA - 15A / 250V AC | 63mA - 8A / 125V AC @ 10,000A<br>63mA - 1A / 250V AC @ 35A<br>> 1A - 3.5A / 250V AC @ 100A<br>> 3.5A - 8A / 250V AC @200A |
| SP            |                                          |                      | 10A - 15A / 125V AC @ 10,000A<br>10A - 15A / 250V AC @ 750A                                                               |
| UL            | JET1037-31003-1010<br>JET1037-31003-1011 |                      | 1A - 5A / 125V AC @ 500A                                                                                                  |
| PS            | JET1037-31003-1007                       |                      | >5A - 15A / 125V AC@ 300A                                                                                                 |

\* I.R. = INTERRUPTING RATING = SHORT CIRCUIT RATING (AMPS)

Specifications subject to change without notice



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### 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 B.(260+/-5 °C,10+/-1 sec)                              |
| Thermal Shock             | MIL-STD-202G, Method 107G, Test Condition B (-65 °C to +125 °C).                                 |
| Operating Temperature     | -55 °C to +125 °C                                                                                |
| Terminal Strength         | IEC-68-2-21                                                                                      |

### Electrical Specifications

| Catalog Number | Ampere Rating | Typical Cold Resistance (ohm) | Volt-drop @100% In (Volt) max. | Voltage and Interrupting Ratings                                                        | Melting I <sup>2</sup> T <10 mSec (A <sup>2</sup> Sec) | Melting I <sup>2</sup> T @10 In (A <sup>2</sup> Sec) | Maximum Power Dissipation (W) | Agency Approvals                                                                      |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
|----------------|---------------|-------------------------------|--------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------|------------------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                |               |                               |                                |                                                                                         |                                                        |                                                      |                               |  |  |  |  |  |
| GSA (P) 63-R   | 63mA          | 75.5                          | 7.33                           | See Table of Safety Approvals on Page 1 for Voltage and associated Interrupting Ratings | 0.087                                                  | 0.098                                                | 0.71                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| GSA (P) 80-R   | 80mA          | 48.4                          | 6.27                           |                                                                                         | 0.135                                                  | 0.152                                                | 0.74                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| GSA (P) 100-R  | 100mA         | 29.4                          | 4.41                           |                                                                                         | 0.209                                                  | 0.238                                                | 0.55                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| GSA (P) 125-R  | 125mA         | 17.5                          | 3.45                           |                                                                                         | 0.323                                                  | 0.372                                                | 0.58                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| GSA (P) 160-R  | 160mA         | 12.3                          | 3.13                           |                                                                                         | 0.499                                                  | 0.581                                                | 0.60                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| GSA (P) 200-R  | 200mA         | 7.1                           | 2.13                           |                                                                                         | 0.773                                                  | 0.908                                                | 0.63                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| GSA (P) 250-R  | 250mA         | 5.0                           | 1.97                           |                                                                                         | 1.2                                                    | 1.4                                                  | 0.66                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| GSA (P) 300-R  | 300mA         | 3.17                          | 1.52                           |                                                                                         | 1.9                                                    | 2.2                                                  | 0.70                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| GSA (P) 375-R  | 375mA         | 2.14                          | 1.26                           |                                                                                         | 2.6                                                    | 3.2                                                  | 0.73                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| GSA (P) 500-R  | 500mA         | 1.38                          | 1.07                           |                                                                                         | 4.4                                                    | 5.4                                                  | 0.78                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| GSA (P) 600-R  | 600mA         | 1.05                          | 0.98                           |                                                                                         | 6.9                                                    | 8.5                                                  | 0.82                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| GSA (P) 700-R  | 700mA         | 0.648                         | 0.69                           |                                                                                         | 8.5                                                    | 11                                                   | 0.84                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| GSA (P) 750-R  | 750mA         | 0.642                         | 0.68                           |                                                                                         | 10                                                     | 12                                                   | 0.85                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| GSA (P) 1-R    | 1A            | 0.374                         | 0.59                           |                                                                                         | 16                                                     | 21                                                   | 0.91                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       | Y                                                                                     |
| GSA (P) 1.25-R | 1.25A         | 0.248                         | 0.43                           |                                                                                         | 25                                                     | 32                                                   | 0.96                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       | Y                                                                                     |
| GSA (P) 1.6-R  | 1.6A          | 0.155                         | 0.38                           |                                                                                         | 39                                                     | 50                                                   | 1.01                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       | Y                                                                                     |
| GSA (P) 2-R    | 2A            | 0.115                         | 0.36                           |                                                                                         | 61                                                     | 79                                                   | 1.06                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       | Y                                                                                     |
| GSA (P) 2.5-R  | 2.5A          | 0.079                         | 0.29                           |                                                                                         | 94                                                     | 123                                                  | 1.12                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       | Y                                                                                     |
| GSA (P) 3-R    | 3A            | 0.058                         | 0.27                           |                                                                                         | 146                                                    | 192                                                  | 1.18                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       | Y                                                                                     |
| GSA (P) 4-R    | 4A            | 0.039                         | 0.23                           |                                                                                         | 226                                                    | 300                                                  | 1.24                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       | Y                                                                                     |
| GSA (P) 5-R    | 5A            | 0.029                         | 0.22                           |                                                                                         | 349                                                    | 469                                                  | 1.31                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       | Y                                                                                     |
| GSA (P) 6-R    | 6A            | 0.018                         | 0.19                           |                                                                                         | 286                                                    | 455                                                  | 1.61                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       | Y                                                                                     |
| GSA (P) 7-R    | 7A            | 0.016                         | 0.18                           |                                                                                         | 372                                                    | 592                                                  | 1.81                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       | Y                                                                                     |
| GSA (P) 8-R    | 8A            | 0.013                         | 0.17                           |                                                                                         | 483                                                    | 769                                                  | 1.95                          | Y                                                                                     | Y                                                                                     |                                                                                       |                                                                                       | Y                                                                                     |
| GSA (P) 10-R   | 10A           | 0.010                         | 0.17                           |                                                                                         | 817                                                    | 1300                                                 | 2.26                          |                                                                                       |                                                                                       | Y                                                                                     | Y                                                                                     | Y                                                                                     |
| GSA (P) 12-R   | 12A           | 0.008                         | 0.15                           |                                                                                         | 1277                                                   | 2031                                                 | 2.56                          |                                                                                       |                                                                                       | Y                                                                                     | Y                                                                                     | Y                                                                                     |
| GSA (P) 15-R   | 15A           | 0.006                         | 0.15                           |                                                                                         | 2123                                                   | 3377                                                 | 2.96                          |                                                                                       |                                                                                       | Y                                                                                     | Y                                                                                     | Y                                                                                     |

Consult manufacturer for other ratings

Specifications subject to change without notice



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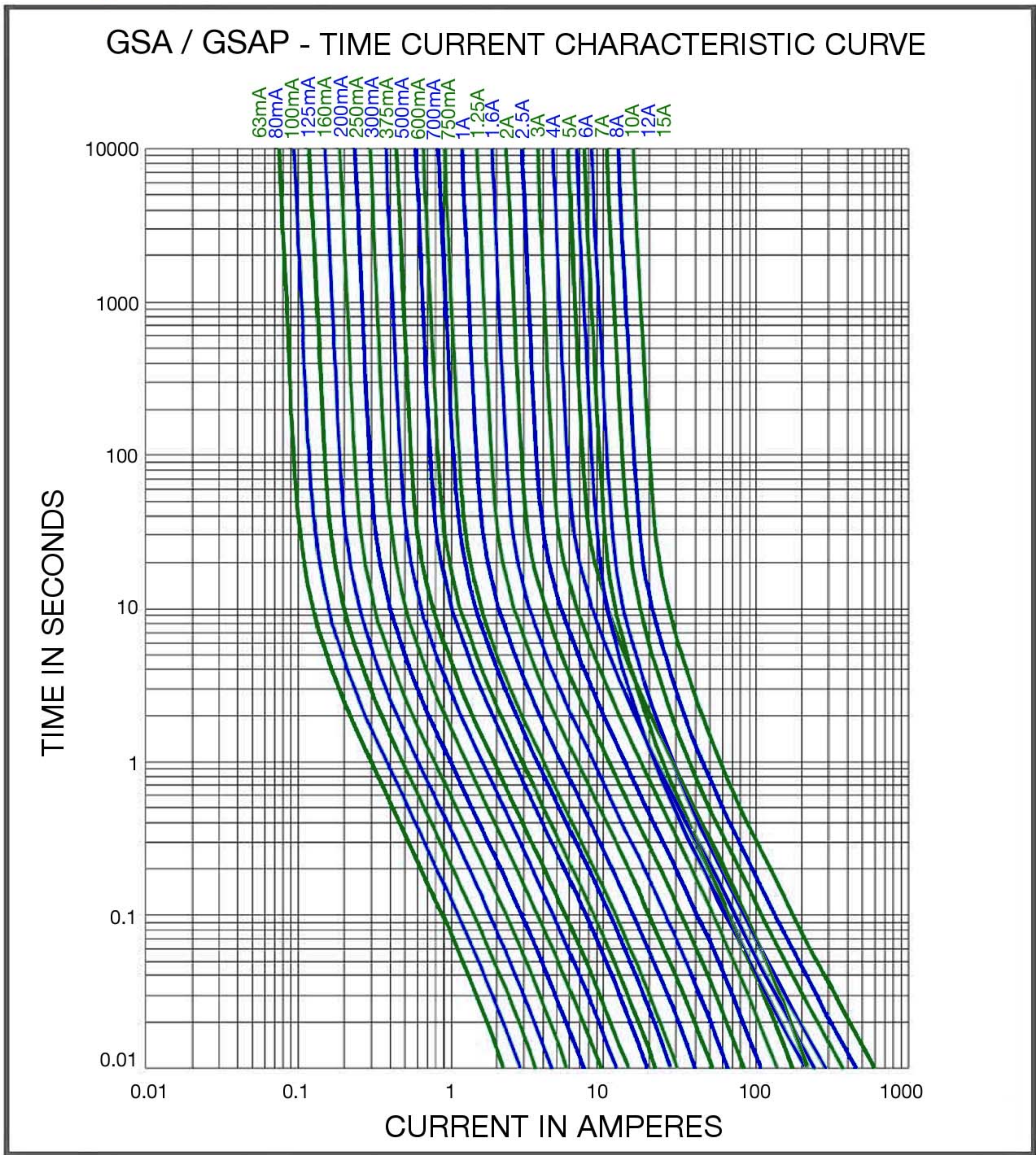
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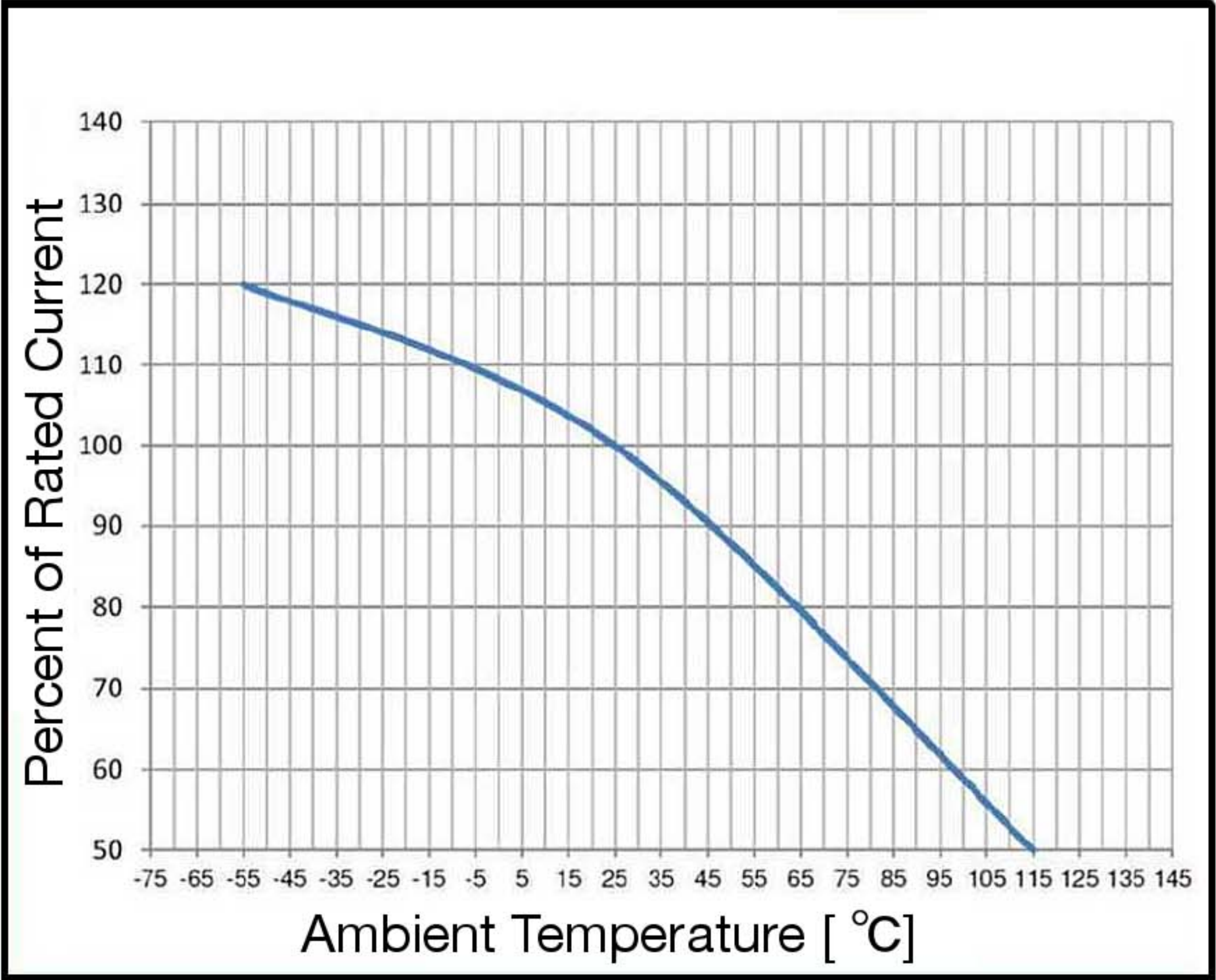
HF  GSA/GSAP Series, 6x32mm Ceramic Tube Slow Blow Fuse

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### Average Time Current Curve

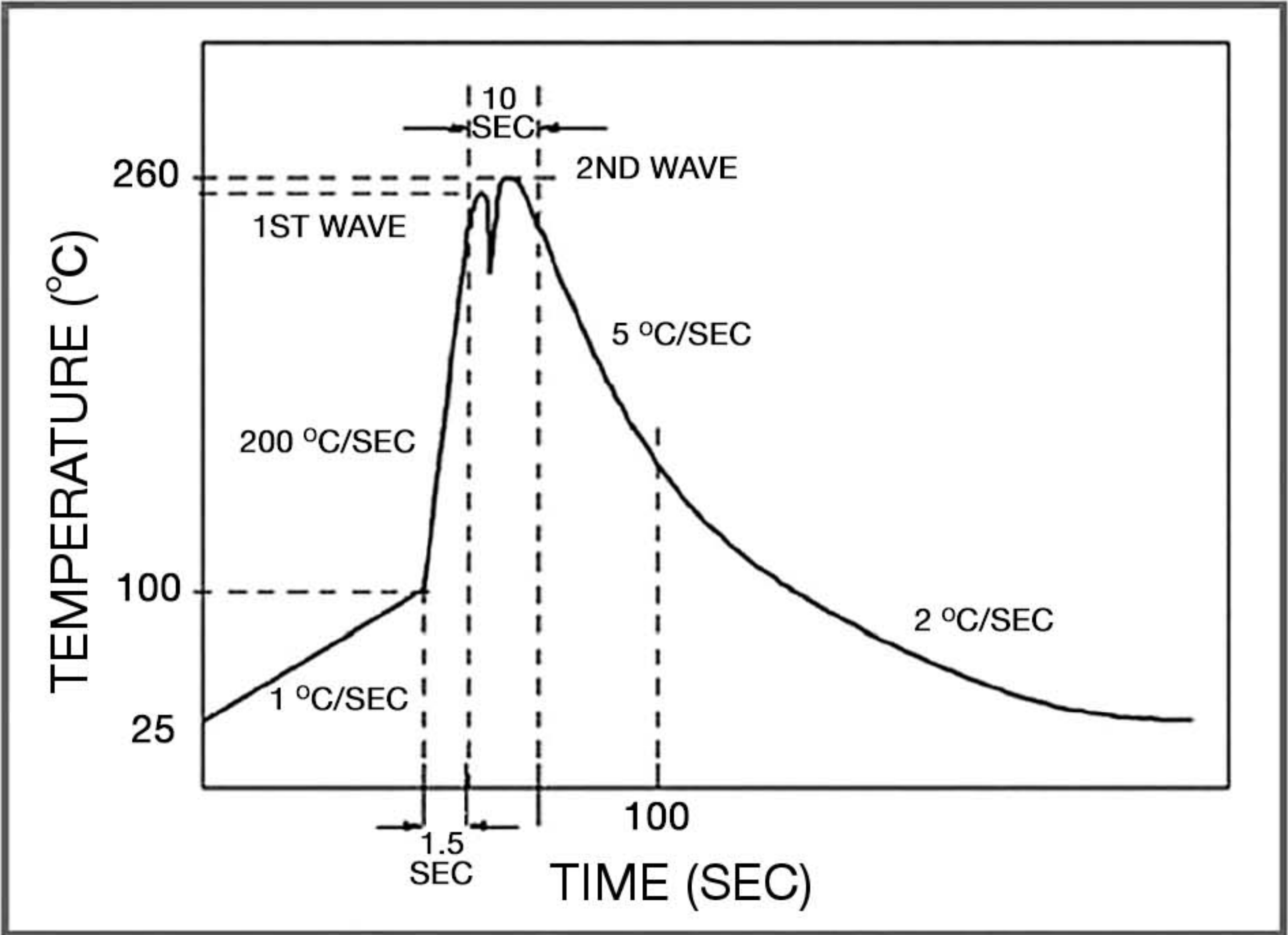


### Temperature Derating Curve



### Soldering Parameters

| 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 Tp                                  | 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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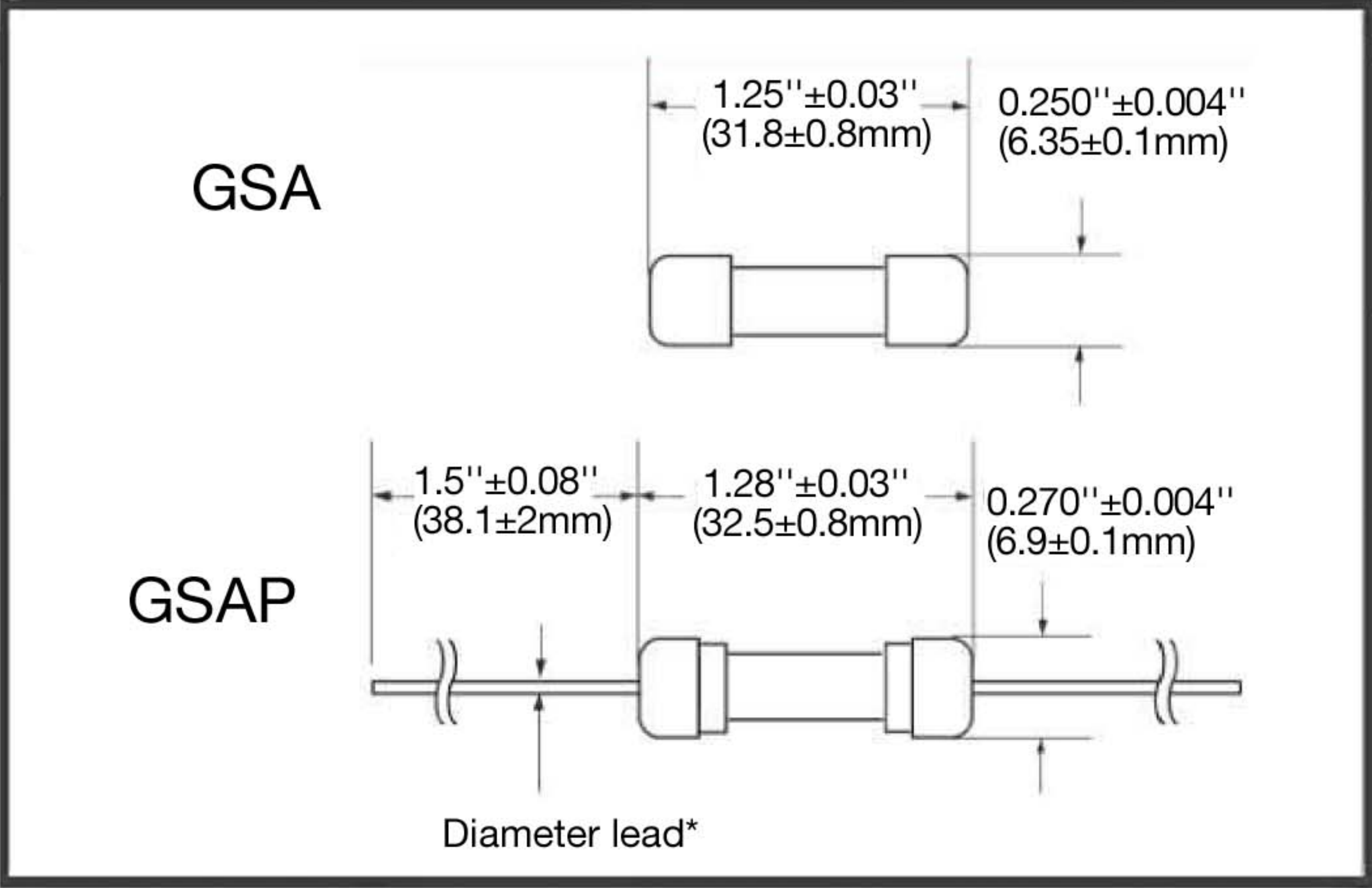
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### Fuse FGNO Explanation 06XX X [XXXX] X XX, [XXXX]=Ampere Rating

| Fraction | Decimal | Milliamps | Bel FGNO[XXXX] | Fraction | Decimal | Amps | Bel FGNO[XXXX] |
|----------|---------|-----------|----------------|----------|---------|------|----------------|
| 1/32     | 0.032   | 32        | 0032           |          | 1.0     | 1    | 1000           |
| 1/25     | .040    | 40        | 0040           | 1-1/4    | 1.25    | 1.25 | 1250           |
| 1/20     | .050    | 50        | 0050           | 1-1/2    | 1.50    | 1.5  | 1500           |
| 1/16     | .063    | 63        | 0063           |          | 1.60    | 1.6  | 1600           |
| 8/100    | .080    | 80        | 0080           |          | 2.0     | 2    | 2000           |
| 1/10     | .100    | 100       | 0100           | 2-1/4    | 2.25    | 2.25 | 2250           |
| 1/8      | .125    | 125       | 0125           | 2-1/2    | 2.5     | 2.5  | 2500           |
| 15/100   | .150    | 150       | 0150           |          | 3.0     | 3    | 3000           |
|          | .160    | 160       | 0160           |          | 3.15    | 3.15 | 3150           |
| 2/10     | .200    | 200       | 0200           | 3-1/2    | 3.5     | 3.5  | 3500           |
| 1/4      | .250    | 250       | 0250           |          | 4.0     | 4    | 4000           |
| 3/10     | .300    | 300       | 0300           |          | 5.0     | 5    | 5000           |
|          | .315    | 315       | 0315           |          | 6.0     | 6    | 6000           |
| 3/8      | .375    | 375       | 0375           |          | 6.3     | 6.3  | 6300           |
| 4/10     | .400    | 400       | 0400           |          | 7.0     | 7    | 7000           |
| 1/2      | .500    | 500       | 0500           | 7-1/2    | 7.5     | 7.5  | 7500           |
| 6/10     | .600    | 600       | 0600           |          | 8.0     | 8    | 8000           |
|          | .630    | 630       | 0630           |          |         | 10   | 9100           |
| 7/10     | .700    | 700       | 0700           |          |         | 12   | 9120           |
| 3/4      | .750    | 750       | 0750           |          |         | 15   | 9150           |
| 8/10     | .800    | 800       | 0800           |          |         | 20   | 9200           |
|          |         |           |                |          |         | 25   | 9250           |
|          |         |           |                |          |         | 30   | 9300           |

### Mechanical Dimensions



\*Diameter lead 0.040" for all ratings

### Ordering Information

06XX R XXXX - X X

FUSE TYPE \_\_\_\_\_

0606 = GSA

0616 = GSAP

R = RoHS Compliant \_\_\_\_\_

AMPERE RATING \_\_\_\_\_

Refer to fuse FGNO explanation table

PACKAGING CODE \_\_\_\_\_

3 = GSA Cartridge, 1K / box

3 = GSAP, Pigtail, Bulk, 1K / box

7 = GSAP, Pigtail, T&R, 1K / reel

VOLTAGE CODE \_\_\_\_\_

3 = 250V for 100mA - 20A

### Packaging

| Packaging Option        | Packaging Specification | Quantity | Packaging Code | Inside Tape Spacing |
|-------------------------|-------------------------|----------|----------------|---------------------|
| Bulk                    | N/A                     | 1000     | 33             | N/A                 |
| Bulk (Pigtail Type)     | N/A                     | 1000     | 33             | N/A                 |
| Tape & Reel, 10mm Pitch | EIA-296-F               | 1000     | 73             | 73                  |

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