

# Type 5HF / 5HFP

## Quick-acting Fuse Series (High -Breaking Capacity)

**HF** **Pb** 5HF/5HFP Series, 5x20mm Ceramic Tube Quick-acting Fuse

RoHS 2 Compliant

### Description

5x20mm quick-acting, high breaking capacity, ceramic body cartridge fuse designed, approved and complied with IEC 60127-2, standard sheet 1.

### Features

- High breaking capacity (250V ac @1500A)
- Meet IEC standard 60127-2, sheet 1
- Wide operating temperature range
- Bulk and Tape & Reel packing available
- RoHS 2 compliant
- Halogen Free
- Lead Free

### 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 : Glass                                                                                                                                             |
|           | Cap : Nickel Plated Brass Caps                                                                                                                           |
|           | Leads : Matte Tin Plated Copper                                                                                                                          |
| Marking   | On Fuse :                                                                                                                                                |
|           | "bel", "F", "Current Rating", "H", "250V",                                                                                                               |
|           | "Appropriate Safety Logos", "✓" ( RoHS 2 compliant)                                                                                                      |
|           | On Label :                                                                                                                                               |
|           | "bel", "5HF" or "5HFP", "Current Rating", "Voltage Rating", "Interrupting Rating",<br>"Appropriate Safety Logos" and "RoHS", "e" (China RoHS compliant). |

### Electrical Characteristics (IEC-127-2 STANDARD SHEET 1) Safety Agency Approvals

| Rated Current  | 1.5 In |      | 2.1 In |     | 2.75 In |      | 4 In |     | 10 In |
|----------------|--------|------|--------|-----|---------|------|------|-----|-------|
|                | MIN    | MAX  | MIN    | MAX | MIN     | MAX  | MIN  | MAX | MAX   |
| 100mA to 3.15A | 1      | 30   | 10     | 2   | 3       | 300  | 20   |     |       |
| 4A to 6.3A     | 1      | 30   | 10     | 3   | 3       | 300  | 20   |     |       |
| 8A to 12A      | 1      | 30   | 40     | 20  | 10      | 1000 | 30   |     |       |
|                | hr.    | min. | ms     | sec | ms      | ms   | ms   |     |       |

In clause 9.2, the test voltage for 5HFP ratings from 1A to 6.3A is 63VDC.

| Safety Agency                                                                       | Safety Agency Certificate                | Voltage Rating (V) | Ampere Range / Volt @ I.R. ability* |
|-------------------------------------------------------------------------------------|------------------------------------------|--------------------|-------------------------------------|
|  | 1808556                                  | 100mA-10A /250V AC | 1A-10A/250V AC@1500A                |
|  | 40000506                                 |                    | 1A-6.3A / 250V AC@1500A             |
|  | E20624                                   |                    | 100mA-10A/250V AC@1500A             |
|  | LR39772                                  |                    |                                     |
|  | JET1037-31003-1008<br>JET1037-31003-1009 |                    | 1A-5A/250V AC@1500A                 |
|  | 2002010207021529                         |                    | 100mA-10A/250V AC@1500A             |
| *I.R.= Interrupting Rating = Short Circuit Rating(Amps)                             |                                          |                    |                                     |

## Environmental Specifications

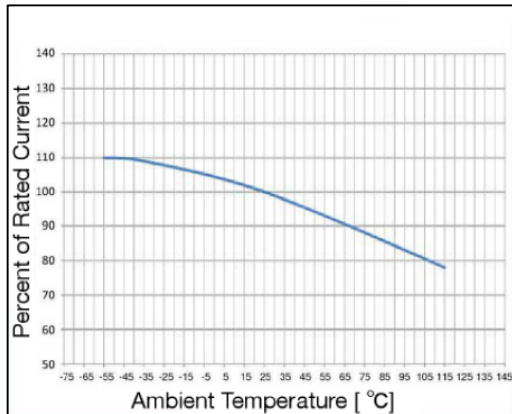
|                           |                                                                                                  |
|---------------------------|--------------------------------------------------------------------------------------------------|
| Shock Resistance          | MIL-STD-202G, 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 B (After Opening) 100,000 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

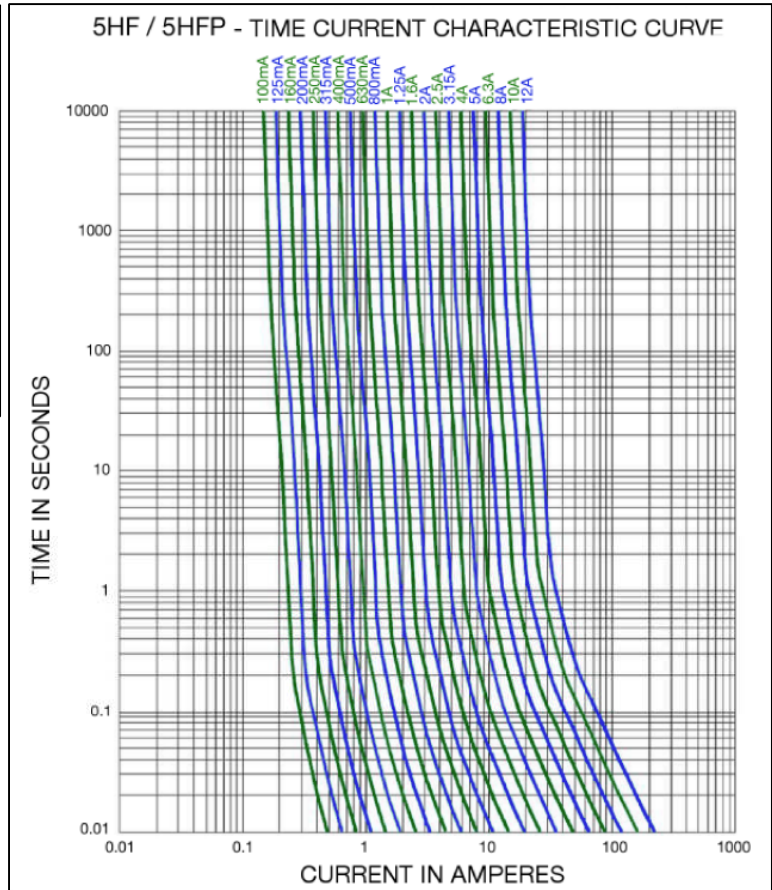
| Catalog Number | Ampere Rating | Typical Cold Resistance (ohms) | Volt-drop @100%In (Volt) max. | Voltage and Interrupting Ratings                                                        | Melting I <sup>2</sup> T <10 mSec (A <sup>2</sup> Sec) | Melting I <sup>2</sup> T @10 In (A <sup>2</sup> Sec) | Maximum Power Dissipation (W) | Agency Approvals                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|----------------|---------------|--------------------------------|-------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------|------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                |               |                                |                               |                                                                                         |                                                        |                                                      |                               |  |  |  |  |  |  |
| 5HF(P) 100-R   | 100mA         | 3.85                           | 0.55                          | See Table of Safety Approvals on Page 1 for Voltage and associated Interrupting Ratings | 0.003                                                  | 0.002                                                | 0.30                          | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| 5HF(P) 125-R   | 125mA         | 2.52                           | 0.51                          |                                                                                         | 0.005                                                  | 0.004                                                | 0.36                          | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| 5HF(P) 160-R   | 160mA         | 1.59                           | 0.44                          |                                                                                         | 0.009                                                  | 0.008                                                | 0.43                          | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| 5HF(P) 200-R   | 200mA         | 1.22                           | 0.40                          |                                                                                         | 0.016                                                  | 0.014                                                | 0.52                          | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| 5HF(P) 250-R   | 250mA         | 0.90                           | 0.38                          |                                                                                         | 0.028                                                  | 0.026                                                | 0.63                          | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| 5HF(P) 315-R   | 315mA         | 0.67                           | 0.37                          |                                                                                         | 0.05                                                   | 0.05                                                 | 0.76                          | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| 5HF(P) 400-R   | 400mA         | 0.46                           | 0.34                          |                                                                                         | 0.09                                                   | 0.08                                                 | 0.92                          | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| 5HF(P) 500-R   | 500mA         | 0.34                           | 0.32                          |                                                                                         | 0.16                                                   | 0.15                                                 | 1.11                          | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| 5HF(P) 630-R   | 630mA         | 0.225                          | 0.29                          |                                                                                         | 0.29                                                   | 0.27                                                 | 1.35                          | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| 5HF(P) 800-R   | 800mA         | 0.192                          | 0.23                          |                                                                                         | 0.36                                                   | 0.35                                                 | 0.58                          | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| 5HF(P) 1-R     | 1A            | 0.139                          | 0.19                          |                                                                                         | 0.65                                                   | 0.63                                                 | 0.69                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |
| 5HF(P) 1.25-R  | 1.25A         | 0.097                          | 0.17                          |                                                                                         | 1.2                                                    | 1.2                                                  | 0.81                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |
| 5HF(P) 1.6-R   | 1.6A          | 0.072                          | 0.16                          |                                                                                         | 2.1                                                    | 2.1                                                  | 0.96                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |
| 5HF(P) 2-R     | 2A            | 0.052                          | 0.14                          |                                                                                         | 3.8                                                    | 3.8                                                  | 1.1                           | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |
| 5HF(P) 2.5-R   | 2.5A          | 0.039                          | 0.13                          |                                                                                         | 6.8                                                    | 6.8                                                  | 1.3                           | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |
| 5HF(P) 3.15-R  | 3.15A         | 0.029                          | 0.13                          |                                                                                         | 12                                                     | 12                                                   | 1.6                           | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |
| 5HF(P) 4-R     | 4A            | 0.022                          | 0.13                          |                                                                                         | 22                                                     | 22                                                   | 1.9                           | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |
| 5HF(P) 5-R     | 5A            | 0.016                          | 0.13                          |                                                                                         | 39                                                     | 40                                                   | 2.2                           | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |
| 5HF(P) 6.3-R   | 6.3A          | 0.011                          | 0.10                          |                                                                                         | 70                                                     | 73                                                   | 2.7                           | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |
| 5HF(P) 8-R     | 8A            | 0.010                          | 0.11                          |                                                                                         | 126                                                    | 131                                                  | 3.1                           | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |                                                                                     |
| 5HF(P) 10-R    | 10A           | 0.007                          | 0.10                          |                                                                                         | 227                                                    | 238                                                  | 3.7                           | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |                                                                                     |
| 5HF(P) 12-R    | 12A           | 0.005                          | 0.09                          |                                                                                         | 408                                                    | 430                                                  | 4.4                           |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

Consult manufacturer for other ratings

## Temperature Derating Curve

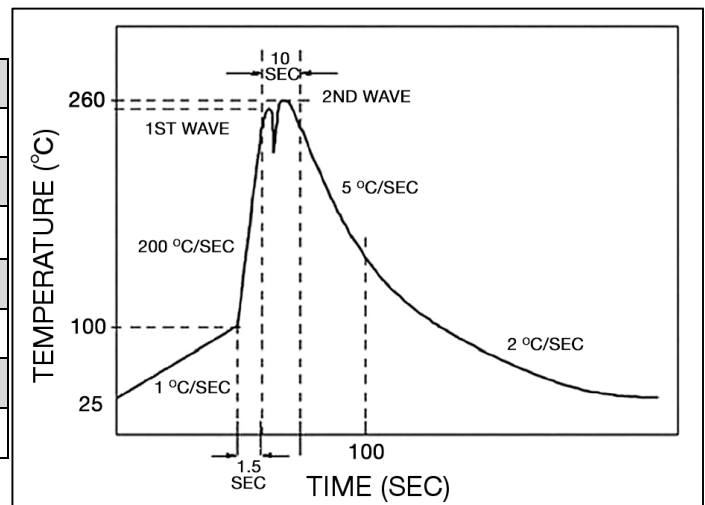


## Average Time Current Curve



## 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 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

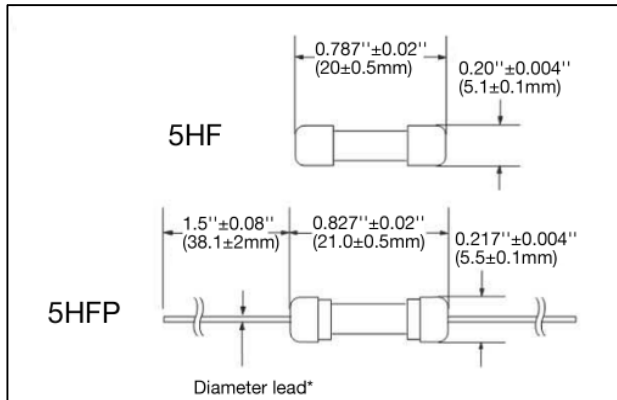
0650 R [XXXX] -XX

0650R=5HF/5HFP; [XXXX]=Ampere Rating; XX=See Ordering Information as below

| Fraction | Decimal | Milliamps | Bel FGNO[XXXX] |
|----------|---------|-----------|----------------|
| 1/10     | 0.100   | 100       | 0100           |
| 1/8      | .125    | 125       | 0125           |
|          | .160    | 160       | 0160           |
| 2/10     | .200    | 200       | 0200           |
| 1/4      | .250    | 250       | 0250           |
|          | .315    | 315       | 0315           |
| 4/10     | .400    | 400       | 0400           |
| 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           |
|          | 6.3     | 6.3  | 6300           |
|          | 8.0     | 8    | 8000           |
|          |         | 10   | 9100           |
|          |         | 12   | 9120           |

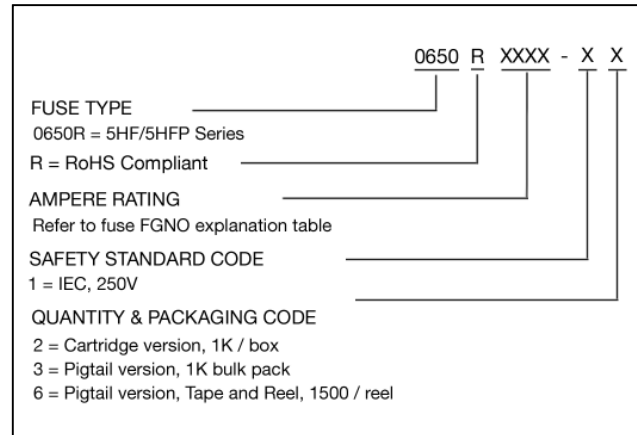
## Mechanical Dimensions



\*Ratings 6.3A and less have 0.032" diameter lead;

\*Ratings 8A and above have 0.040" diameter lead.

## Ordering Information



## Packaging

| Packaging Option        | Packaging Specification | Quantity | Packaging Code | Inside Tape Spacing |
|-------------------------|-------------------------|----------|----------------|---------------------|
| Bulk                    | N/A                     | 1000     | 12             | N/A                 |
| Bulk (Pigtail Type)     | N/A                     | 1000     | 13             | N/A                 |
| Tape & Reel, 10mm Pitch | EIA-296-F               | 1500     | 16             | 63                  |



Specifications subject to change without notice

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