

# Type 0659C / 0659P

## Time-lag Fuse Series (High -Breaking Capacity)

**HF** **Pb** 0659C/0659P Series, 5x20mm Ceramic Tube Time-Lag Fuse

RoHS 2 Compliant

### Description

5x20mm Time-Lag surge withstand, high breaking capacity, ceramic body cartridge fuse designed, approved and complied with IEC 60127-2, standard sheet 5.

### Features

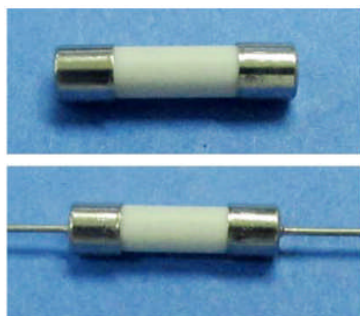
- High breaking capacity (250V ac @1500A)
- Meet IEC standard 60127-2, sheet 5
- Wide operating temperature range
- Bulk and Tape & Reel packing available
- RoHS 2 compliant
- Halogen Free
- Lead Free

### 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 : Ceramic                                                                                                                                                                                                                                                                                                                      |
|           | Cap : Nickel Plated Brass Caps                                                                                                                                                                                                                                                                                                      |
|           | Leads : Matte Tin Plated Copper                                                                                                                                                                                                                                                                                                     |
| Marking   | On Fuse :                                                                                                                                                                                                                                                                                                                           |
|           | "bel", "T", "Current Rating", "H", "250V",                                                                                                                                                                                                                                                                                          |
|           | "Appropriate Safety Logos"                                                                                                                                                                                                                                                                                                          |
|           | On Label :                                                                                                                                                                                                                                                                                                                          |
|           | "bel", "0659C" or "0659P", "Current Rating", "Voltage Rating", "Interrupting Rating",<br>"Appropriate Safety Logos" and "  ", "  "(China RoHS compliant). |

### Electrical Characteristics (IEC-127-2 STANDARD SHEET 5)

| Rated Current | 1.5 In |      | 2.1 In |     | 2.75 In |     | 4 In |     | 10 In |     |
|---------------|--------|------|--------|-----|---------|-----|------|-----|-------|-----|
|               | MIN    | MAX  | MIN    | MAX | MIN     | MAX | MIN  | MAX | MIN   | MAX |
| 1A to 3.15A   | 1      | 30   | 0.75   | 80  | 95      | 5   | 10   | 150 |       |     |
| 4A and above  | 1      | 30   | 0.75   | 80  | 150     | 5   | 10   | 150 |       |     |
|               | hr.    | min. | sec    | sec | ms      | sec | ms   | ms  |       |     |

In clause 9.2, the test voltage is 125VDC.

### Safety Agency Approvals

| Safety Agency                                                                       | Safety Agency Certificate                                | Voltage Rating (V)        | Ampere Range / Volt @ I.R. ability*                                                                                |
|-------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------|--------------------------------------------------------------------------------------------------------------------|
|  | 40039275                                                 | 0659C:<br>1A-6.3A/250V AC | 1A-6.3A/250V AC@1,500A                                                                                             |
|  | PSE14020742<br>PSE14020744<br>PSE14020747<br>PSE14020743 |                           | 0659C 1A-5A/250V AC@1,500A<br>0659C 6.3A/250V AC@1,500A<br>0659P 1A-5A/250V AC@1,500A<br>0659P 6.3A/250V AC@1,500A |
|  | 2014010207673750                                         |                           | 0659C 1A-6.3A/250V AC@1,500A                                                                                       |
|  | CQC14012105368                                           |                           | 0659P 1A-6.3A/250V AC@1,500A                                                                                       |
|  | E20624                                                   | 1A-6.3A/250V AC           | 1A-6.3A/250V AC@1,500A<br>1A-6.3A/600V AC@150A                                                                     |

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

## Environmental Specifications

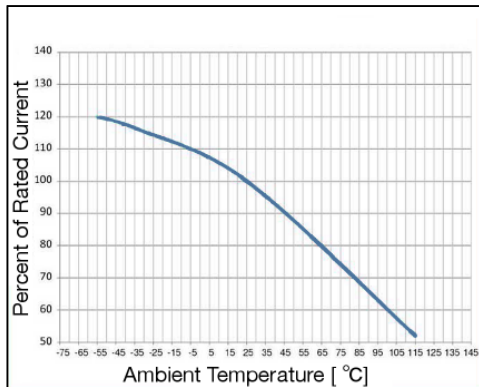
|                           |                                                                                                  |
|---------------------------|--------------------------------------------------------------------------------------------------|
| Shock Resistance          | MIL-STD-202G, 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

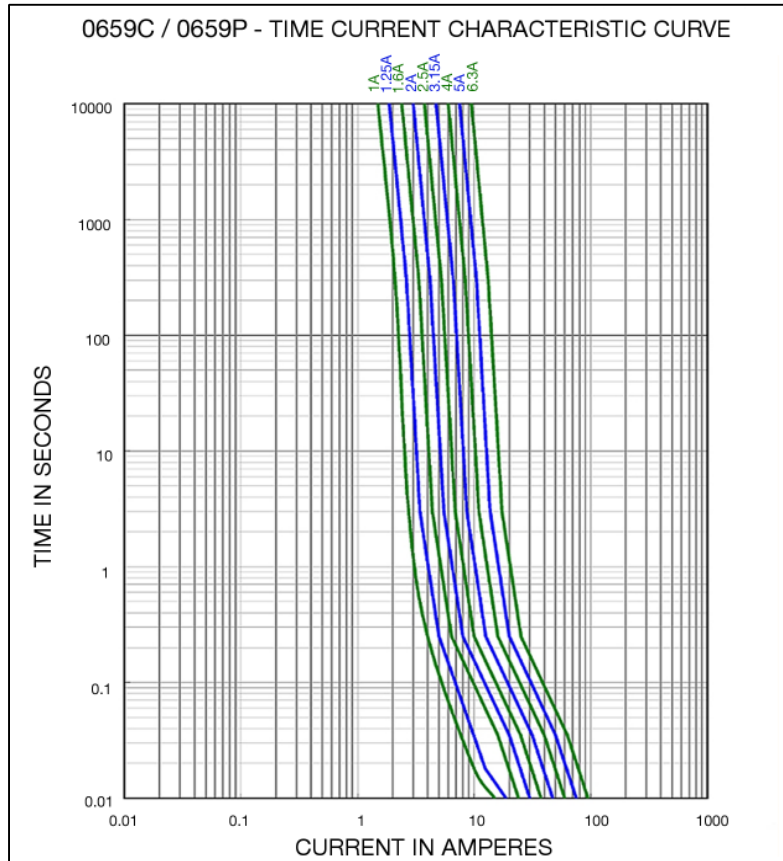
| Part Number  | Ampere Rating | Typical Cold Resistance (ohms) | Volt-drop @100%In (Volt) max. | Voltage and Interrupting Ratings                                                        | Melting I²T <10 mSec (A² Sec) | Melting I²T @10 In (A² Sec) | Maximum Power Dissipation (W) | Agency Approvals                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|--------------|---------------|--------------------------------|-------------------------------|-----------------------------------------------------------------------------------------|-------------------------------|-----------------------------|-------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|              |               |                                |                               |                                                                                         |                               |                             |                               |  |  |  |  |  |
| 0659C1000-XX | 1A            | 0.134                          | 0.191                         | See Table of Safety Approvals on Page 1 for Voltage and associated Interrupting Ratings | 2.3                           | 2.4                         | 0.45                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |
| 0659P1000-XX |               |                                |                               |                                                                                         |                               |                             |                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     | Y                                                                                   |
| 0659C1250-XX | 1.25A         | 0.103                          | 0.187                         |                                                                                         | 3.2                           | 3.3                         | 0.56                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |
| 0659P1250-XX |               |                                |                               |                                                                                         |                               |                             |                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     | Y                                                                                   |
| 0659C1600-XX | 1.6A          | 0.076                          | 0.178                         |                                                                                         | 5.6                           | 5.4                         | 0.60                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |
| 0659P1600-XX |               |                                |                               |                                                                                         |                               |                             |                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     | Y                                                                                   |
| 0659C2000-XX | 2A            | 0.049                          | 0.141                         |                                                                                         | 14.4                          | 14.0                        | 0.70                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |
| 0659P2000-XX |               |                                |                               |                                                                                         |                               |                             |                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     | Y                                                                                   |
| 0659C2500-XX | 2.5A          | 0.036                          | 0.133                         |                                                                                         | 28.1                          | 25.0                        | 0.87                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |
| 0659P2500-XX |               |                                |                               |                                                                                         |                               |                             |                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     | Y                                                                                   |
| 0659C3150-XX | 3.15A         | 0.024                          | 0.110                         |                                                                                         | 25.0                          | 24.8                        | 0.86                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |
| 0659P3150-XX |               |                                |                               |                                                                                         |                               |                             |                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     | Y                                                                                   |
| 0659C4000-XX | 4A            | 0.016                          | 0.095                         |                                                                                         | 56.3                          | 51.2                        | 0.89                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |
| 0659P4000-XX |               |                                |                               |                                                                                         |                               |                             |                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     | Y                                                                                   |
| 0659C5000-XX | 5A            | 0.013                          | 0.090                         |                                                                                         | 88.2                          | 92.5                        | 1.14                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |
| 0659P5000-XX |               |                                |                               |                                                                                         |                               |                             |                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     | Y                                                                                   |
| 0659C6300-XX | 6.3A          | 0.009                          | 0.086                         |                                                                                         | 139.2                         | 142.9                       | 1.39                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     |
| 0659P6300-XX |               |                                |                               |                                                                                         |                               |                             |                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     | Y                                                                                   |

Consult manufacturer for other ratings

## Temperature Derating Curve

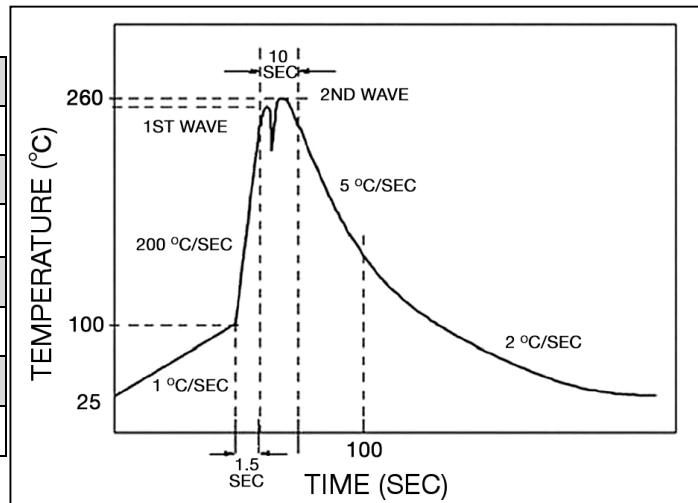


## Average Time Current Curve



## 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.                            |



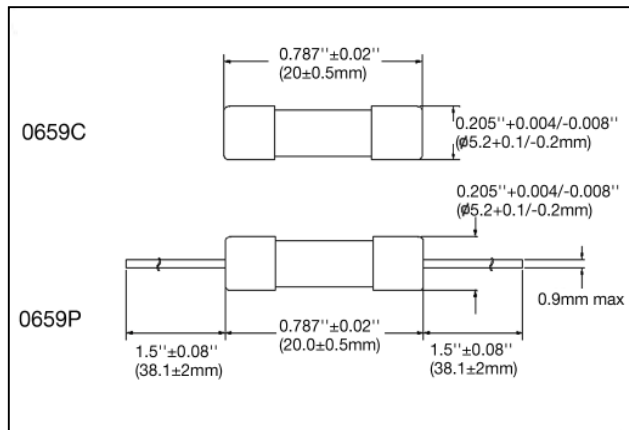
## Fuse FGNO Explanation

0659 X [XXXX] -XX

0659C/P=0659C/P; [XXXX]=Ampere Rating; XX=See Ordering Information as below

| 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           |

## Mechanical Dimensions



## Ordering Information

0659 X XXXX - X X

FUSE TYPE \_\_\_\_\_  
0659

CAP TYPE \_\_\_\_\_  
C = 0659C Series, Cap only  
P = 0659P Series, Pigtail cap

AMPERE RATING \_\_\_\_\_  
Refer to fuse FGNO explanation table

SAFETY STANDARD CODE \_\_\_\_\_  
1 = IEC, 250V, 1A - 6.3A

QUANTITY & PACKAGING CODE \_\_\_\_\_  
2 = Cartridge version, 1K / box  
3 = Pigtail version, 500 bulk pack  
6 = Pigtail version, Tape and Reel, 1500 / reel

## Packaging

| Packaging Option        | Packaging Specification | Quantity | Packaging Code | Inside Tape Spacing |
|-------------------------|-------------------------|----------|----------------|---------------------|
| Bulk                    | N/A                     | 1000     | 12             | N/A                 |
| Bulk (Pigtail Type)     | N/A                     | 500      | 13             | N/A                 |
| Tape & Reel, 10mm Pitch | EIA-296-F               | 1500     | 16             | 63                  |