

# Type MRT

## Time Lag Radial Lead Micro Fuse Series

HF  MRT Series

RoHS 2 Compliant

### Description

Sub-miniature, time lag type, 250V rated fuses designed, approved and complied with IEC 60127-3, standard sheet 4.

### Features

- Time lag (250V AC)
- Meet IEC standard 60127-3, sheet 4
- Wide operating temperature range
- Bulk and Tape & Reel packing available
- AEC-Q Compliant
- RoHS 2 compliant
- Halogen Free
- Lead Free
- Meets Bel automotive qualification\*
- \* - Largely based on internal AEC-Q test plan

### Applications

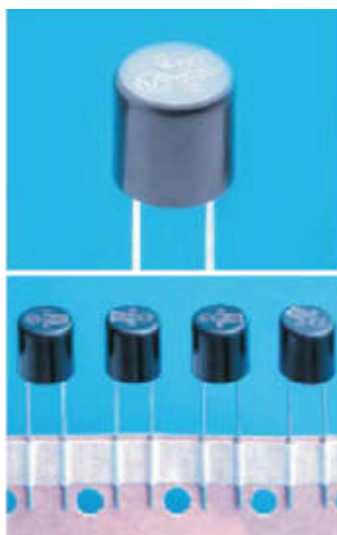
Provide individual protection for components or internal circuits.

- Power supplies
- Battery chargers
- Consumer electronics
- Adapter
- Industrial controllers

LEAD FREE =   
HALOGEN FREE = 

### Physical Specifications

|           |                                                                                                                                                                                                                                                                                                                    |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Materials | Base and Cover : Black thermoplastic, UL 94-V0                                                                                                                                                                                                                                                                     |
|           | Pins : 100% Matte Tin Plated Copper                                                                                                                                                                                                                                                                                |
| Marking   | On Fuse :                                                                                                                                                                                                                                                                                                          |
|           | "bel", "T", "Current Rating", "250V" & "Appropriate Safety Logos"                                                                                                                                                                                                                                                  |
|           | On Label :                                                                                                                                                                                                                                                                                                         |
|           | "bel", "MRT", "Current Rating", "Voltage Rating", "Interrupting Rating", "Appropriate Safety Logos" and "  , "  "(China RoHS compliant). |



**AEC-Q Compliant**

### Electrical Characteristics (IEC-127-3 STANDARD SHEET 4) Safety Agency Approvals

| Rated Current          | 1.5In |      | 2.1In |     | 2.75In |     | 4In |     | 10In |     |
|------------------------|-------|------|-------|-----|--------|-----|-----|-----|------|-----|
|                        | Min   | Max  | Min   | Max | Min    | Max | Min | Max | Min  | Max |
| 80mA to 6.3A inclusive | 1     | 2    | 400   | 10  | 150    | 3   | 20  | 150 | 1    | 2   |
|                        | hour  | min. | ms    | sec | ms     | sec | ms  | sec | ms   | ms  |

In clause 9.2, the test voltage for MRT ratings from 80mA to 6.3A is 64VDC.

| Safety Agency                                                                       | Safety Agency Certificate | Voltage Rating (V)    | Ampere Range / Volt @ I.R. ability*                 |
|-------------------------------------------------------------------------------------|---------------------------|-----------------------|-----------------------------------------------------|
|  | 1812914                   | 80mA-6.3A/<br>250V ac | 80mA-6.3A/250V ac@35A or 10 In whichever is greater |
|  | 139937                    |                       | 80mA-800mA/250V ac@35A<br>1A-4A/250V ac@100A        |
|  | 40001000                  |                       | 5A-6.3A/250V ac@100A                                |
|  | LR39772                   |                       | 80mA-6.3A/250V ac@50A                               |
|  | E20624                    |                       | 80mA-6.3A/277V ac@100A                              |
|  | JET 1037-31007-1001       |                       | 1A-5A/250V ac@100A                                  |
|  | 2002010207021532          |                       | 80mA-6.3A/250V ac@35A or 10 In whichever is greater |
| *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 X 3 axis / no load).                                         |
| Salt Spray Resistance     | MIL-STD-202G, Method 101E, Test Condition B (48 hrs.).                                           |
| Solderability             | MIL-STD-202G, Method 208H                                                                        |
| Resistance to solder Heat | MIL-STD-202G, Method 210F, Test Condition C. Top Side. (260°C, 20 sec)                           |
| Moisture Resistance       | MIL-STD-202G, Method 202G, Method 106G                                                           |
| Operating Temperature     | -55°C to +125°C                                                                                  |

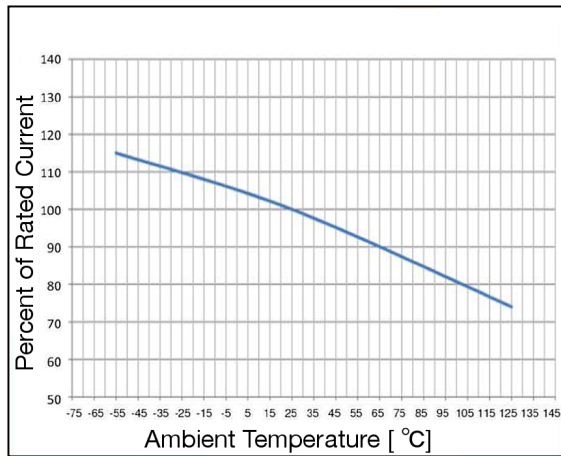
|                              |                                                                           |
|------------------------------|---------------------------------------------------------------------------|
| High temperature storage     | MIL-STD-202 Method 108                           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

## Electrical Specifications

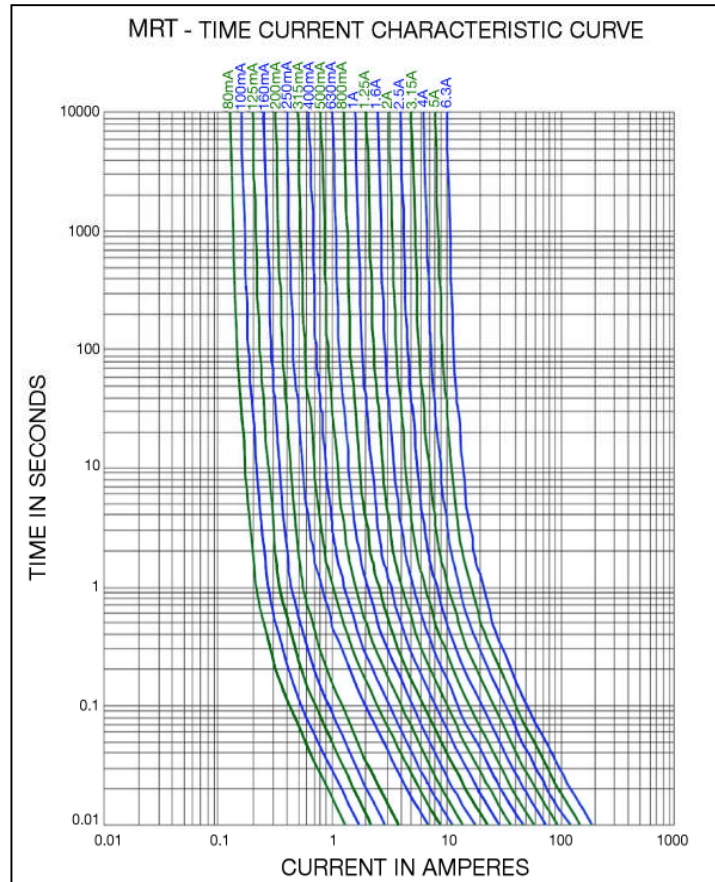
| Catalog Number | Ampere Rating | Typical Cold Resistance (ohms) | Volt-drop @100% In (Volt) max. | Voltage and Interrupting Ratings                                                        | Melting I <sup>2</sup> T <10 mSec (A <sup>2</sup> Sec) | Melting I <sup>2</sup> T @10 In (A <sup>2</sup> Sec) | Maximum Power Dissipation (W) | Agency Approvals                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |
|----------------|---------------|--------------------------------|--------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------|------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|
|                |               |                                |                                |                                                                                         |                                                        |                                                      |                               |  |  |  |  |  |  |  |  |
| MRT 80         | 80mA          | 3.5                            | 0.398                          | See Table of Safety Approvals on Page 1 for Voltage and associated Interrupting Ratings | 0.01                                                   | 0.01                                                 | 0.10                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   |                                                                                     |  |
| MRT 100        | 100mA         | 2.3                            | 0.329                          |                                                                                         | 0.02                                                   | 0.02                                                 | 0.11                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   |                                                                                     |  |
| MRT 125        | 125mA         | 1.6                            | 0.295                          |                                                                                         | 0.04                                                   | 0.04                                                 | 0.13                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   |                                                                                     |  |
| MRT 160        | 160mA         | 1.1                            | 0.252                          |                                                                                         | 0.07                                                   | 0.06                                                 | 0.15                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   |                                                                                     |  |
| MRT 200        | 200mA         | 0.73                           | 0.200                          |                                                                                         | 0.12                                                   | 0.11                                                 | 0.17                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   |                                                                                     |  |
| MRT 250        | 250mA         | 0.55                           | 0.188                          |                                                                                         | 0.38                                                   | 0.41                                                 | 0.19                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   |                                                                                     |  |
| MRT 315        | 315mA         | 0.36                           | 0.152                          |                                                                                         | 0.60                                                   | 0.66                                                 | 0.22                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   |                                                                                     |  |
| MRT 400        | 400mA         | 0.25                           | 0.129                          |                                                                                         | 0.90                                                   | 1.0                                                  | 0.25                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   |                                                                                     |  |
| MRT 500        | 500mA         | 0.18                           | 0.114                          |                                                                                         | 1.5                                                    | 1.7                                                  | 0.29                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   |                                                                                     |  |
| MRT 630        | 630mA         | 0.13                           | 0.109                          |                                                                                         | 2.4                                                    | 2.6                                                  | 0.33                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   |                                                                                     |  |
| MRT 800        | 800mA         | 0.095                          | 0.103                          |                                                                                         | 3.7                                                    | 4.2                                                  | 0.38                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   |                                                                                     |  |
| MRT 1          | 1A            | 0.070                          | 0.090                          |                                                                                         | 6                                                      | 7                                                    | 0.44                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   | Y                                                                                   |  |
| MRT 1.25       | 1.25A         | 0.053                          | 0.087                          |                                                                                         | 9                                                      | 11                                                   | 0.51                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   | Y                                                                                   |  |
| MRT 1.6        | 1.6A          | 0.038                          | 0.085                          |                                                                                         | 15                                                     | 17                                                   | 0.58                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   | Y                                                                                   |  |
| MRT 2          | 2A            | 0.029                          | 0.084                          |                                                                                         | 23                                                     | 27                                                   | 0.67                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   | Y                                                                                   |  |
| MRT 2.5        | 2.5A          | 0.022                          | 0.084                          |                                                                                         | 37                                                     | 43                                                   | 0.77                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   | Y                                                                                   |  |
| MRT 3.15       | 3.15A         | 0.017                          | 0.074                          |                                                                                         | 58                                                     | 69                                                   | 0.88                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   | Y                                                                                   |  |
| MRT 4          | 4A            | 0.013                          | 0.073                          |                                                                                         | 92                                                     | 110                                                  | 1.02                          | Y                                                                                   | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   | Y                                                                                   |  |
| MRT 5          | 5A            | 0.010                          | 0.073                          |                                                                                         | 145                                                    | 175                                                  | 1.17                          | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   | Y                                                                                   | Y                                                                                   |  |
| MRT 6.3        | 6.3A          | 0.008                          | 0.072                          |                                                                                         | 230                                                    | 281                                                  | 1.34                          | Y                                                                                   | Y                                                                                   | Y                                                                                   |                                                                                     | Y                                                                                   | Y                                                                                   |                                                                                     |  |

Consult manufacturer for other ratings

## Temperature Derating Curve

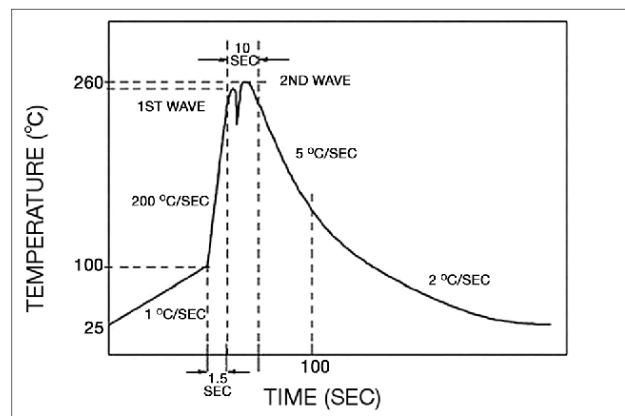


## Average Time Current Curve



## 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

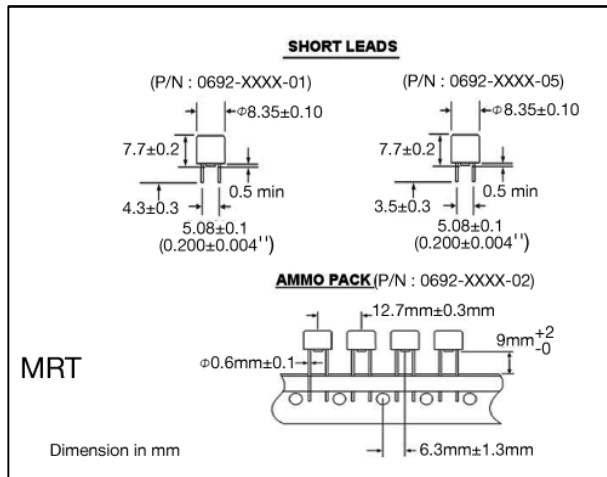
0692 - [XXXX] X XX

0692=MRT; [XXXX]=Ampere Rating; XX=See Ordering Information as below

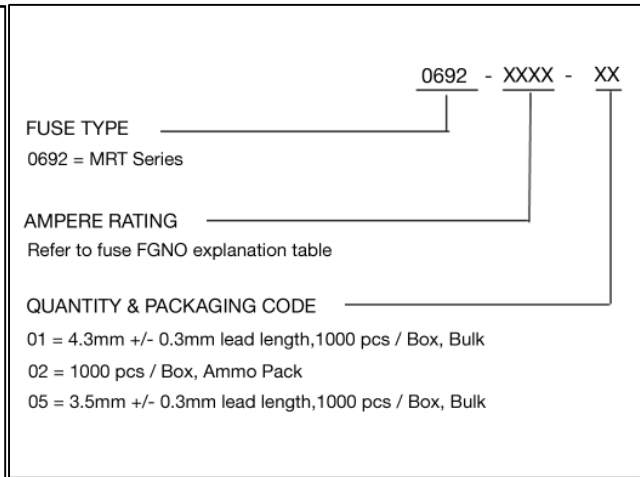
| Fraction | Decimal | Milliamps | Bel FGNO[XXXX] |
|----------|---------|-----------|----------------|
| 8/100    | 0.080   | 80        | 0080           |
| 1/10     | .100    | 100       | 0100           |
| 1/8      | .125    | 125       | 0125           |
|          | .160    | 160       | 0160           |
| 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           |
|          |         |      |                |
|          |         |      |                |

## Mechanical Dimensions



## Ordering Information



## Packaging

| Packaging Option             | Packaging Specification | Quantity | Packaging Code |
|------------------------------|-------------------------|----------|----------------|
| Bulk / bag, 1000 / box       | N/A                     | 1000     | 01 , 05        |
| 12.7 mm pitch, On Tape / box | IEC-286-2               | 1000     | 02             |

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