

Type MRF

Fast Acting Radial Lead Micro Fuse Series

HF  MRF Series

RoHS Compliant

Description

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

Features



- Fast Acting (250V AC@50A)
- Meet IEC standard 60127-3, sheet 3
- Wide operating temperature range
- Bulk and Tape & Reel packing available
- AEC-Q Compliant
- Full compliance with EU Directive 2011/65/EU and amending directive 2015/863
- Halogen Free
- Lead Free
- Meets Bel automotive qualification*
- * - Largely based on internal AEC-Q test plan

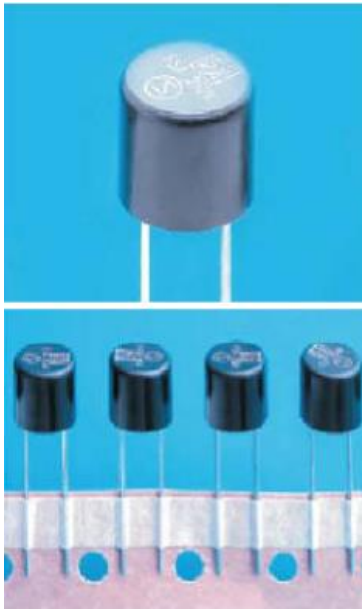
Applications

- 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", "F", "Current Rating", "250V" & "Appropriate Safety Logos" |
| | On Label : "bel", "MRF", "Current Rating", "Voltage Rating", "Interrupting Rating", "Appropriate Safety Logos" and "  ", "  " (China RoHS compliant). |










AEC-Q Compliant

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

| Rated Current | 1.5In | | 2.1In | | 2.75In | | 4In | | 10In |
|------------------------|-------|------|-------|-----|--------|-----|-----|-----|------|
| | Min | Max | Min | Max | Min | Max | Min | Max | Max |
| 50mA to 6.3A inclusive | 1 | 30 | 10 | 3 | 3 | 300 | | | 20 |
| | hour | min. | ms | sec | ms | ms | ms | | ms |

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

| Safety Agency | Safety Agency Certificate | Ampere Rating/ Voltage Rating | Ampere Range / Volt @ I.R. ability* |
|---|---------------------------|-------------------------------|---|
|  | SE-S-2100235 | 50mA-6.3A/ 250V ac | 50mA - 5A / 250V AC @ 35A or 10 In whichever is greater |
|  | 40017420 | | 6.3A/250V ac @ 63A |
|  | 40028500 | | 50mA-6.3 / 250V AC @ 50A |
|  | LR39772 | | 50mA-6.3A/350V AC @ 100A |
|  | E20624 | | 1A-5A/250V AC @ 100A |
|  | JET 1037-31007-1001 | | |

*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 ² T <10 mSec (A ² Sec) | Melting I ² T @10 In (A ² Sec) | Maximum Power Dissipation (W) | Agency Approvals | | | | | |
|----------------|---------------|--------------------------------|--------------------------------|---|--|--|-------------------------------|------------------|-----|----|---------|-----|------|
| | | | | | | | | UL US | CSA | SE | UL ENEC | VDE | PS E |
| MRF 50 | 50mA | 13.0 | 0.98 | See Table of Safety Approvals on Page 1 for Voltage and associated Interrupting Ratings | 0.0005 | 0.0005 | 0.05 | Y | Y | Y | Y | | |
| MRF 63 | 63mA | 8.5 | 0.66 | | 0.001 | 0.001 | 0.10 | Y | Y | Y | Y | | |
| MRF 80 | 80mA | 6.3 | 0.64 | | 0.002 | 0.002 | 0.11 | Y | Y | Y | Y | | |
| MRF 100 | 100mA | 4.0 | 0.49 | | 0.003 | 0.003 | 0.11 | Y | Y | Y | Y | | |
| MRF 125 | 125mA | 3.1 | 0.50 | | 0.007 | 0.007 | 0.13 | Y | Y | Y | Y | | |
| MRF 160 | 160mA | 2.3 | 0.46 | | 0.016 | 0.016 | 0.21 | Y | Y | Y | Y | | |
| MRF 200 | 200mA | 1.7 | 0.41 | | 0.027 | 0.027 | 0.19 | Y | Y | Y | Y | | |
| MRF 250 | 250mA | 0.42 | 0.17 | | 0.023 | 0.023 | 0.23 | Y | Y | Y | Y | | |
| MRF 315 | 315mA | 0.29 | 0.15 | | 0.044 | 0.044 | 0.22 | Y | Y | Y | Y | | |
| MRF 400 | 400mA | 0.21 | 0.14 | | 0.073 | 0.072 | 0.28 | Y | Y | Y | Y | | |
| MRF 500 | 500mA | 0.17 | 0.15 | | 0.20 | 0.18 | 0.42 | Y | Y | Y | Y | | |
| MRF 630 | 630mA | 0.10 | 0.08 | | 0.15 | 0.14 | 0.16 | Y | Y | Y | Y | | |
| MRF 800 | 800mA | 0.071 | 0.08 | | 0.4 | 0.4 | 0.20 | Y | Y | Y | Y | | |
| MRF 1 | 1A | 0.057 | 0.08 | | 0.7 | 0.6 | 0.38 | Y | Y | Y | Y | | Y |
| MRF 1.25 | 1.25A | 0.047 | 0.081 | | 1.3 | 1.2 | 0.69 | Y | Y | Y | Y | | Y |
| MRF 1.6 | 1.6A | 0.035 | 0.077 | | 1.4 | 1.3 | 0.62 | Y | Y | Y | Y | | Y |
| MRF 2 | 2A | 0.028 | 0.075 | | 2.1 | 2.0 | 0.72 | Y | Y | Y | Y | | Y |
| MRF 2.5 | 2.5A | 0.022 | 0.071 | | 4 | 3 | 0.92 | Y | Y | Y | Y | | Y |
| MRF 3.15 | 3.15A | 0.016 | 0.064 | | 6 | 4 | 0.82 | Y | Y | Y | Y | | Y |
| MRF 4 | 4A | 0.011 | 0.059 | | 8 | 6 | 0.65 | Y | Y | Y | Y | | Y |
| MRF 5 | 5A | 0.010 | 0.056 | | 15 | 11.8 | 0.91 | Y | Y | Y | Y | | Y |
| MRF 6.3 | 6.3A | 0.008 | 0.054 | | 25 | 19.8 | 1.05 | Y | Y | | | Y | |

Consult manufacturer for other ratings

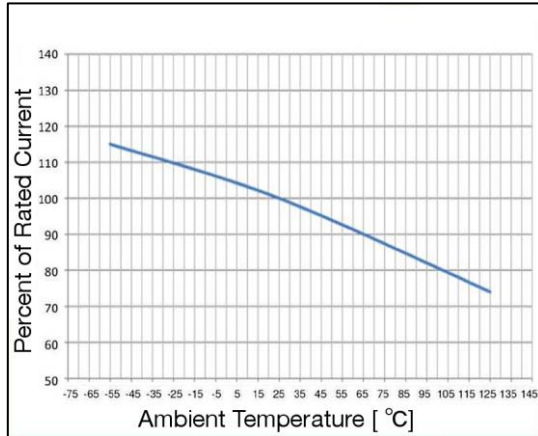


Specifications subject to change without notice

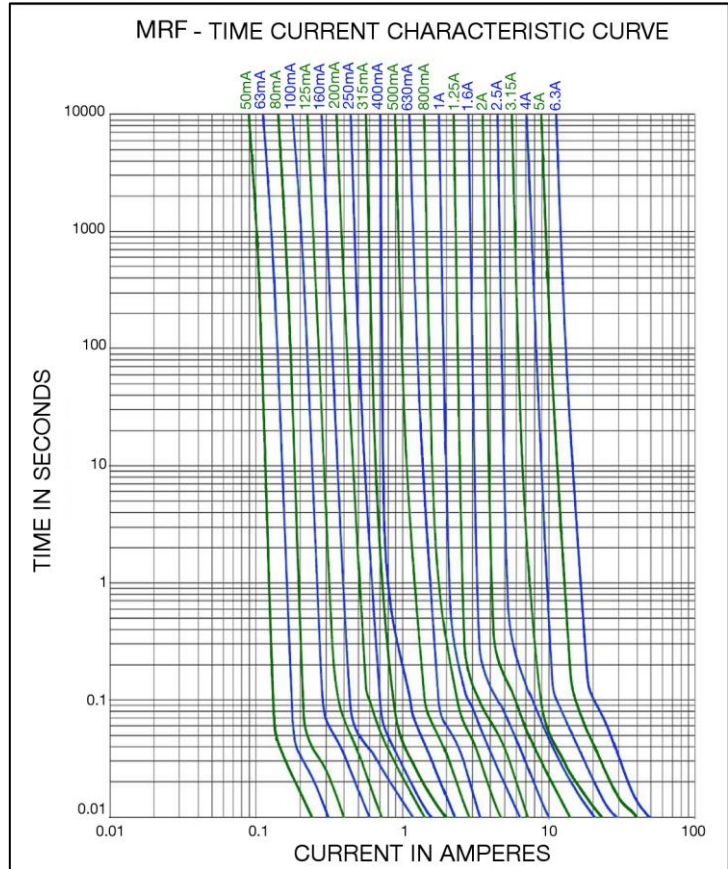
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Temperature Derating Curve

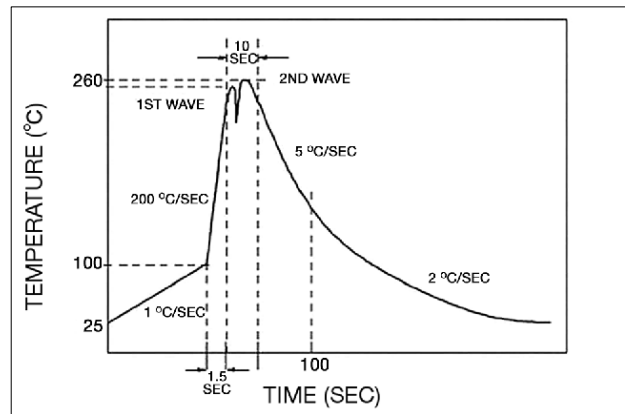


Average Time Current Curve



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 Max 4°C / second |
| Final preheat temperature | within 125°C of soldering temperature |
| Peak temperature T _p | 260°C |
| Time within +0°C / -5°C of actual peak temperature | 10 seconds |
| Ramp-down rate | 5°C / second max. |



Fuse FGNO Explanation

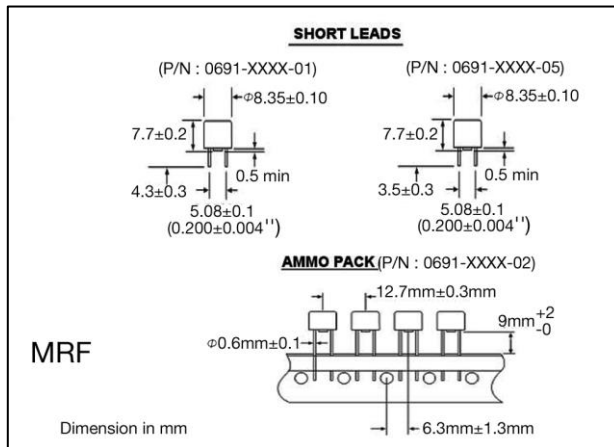
0691 - [XXXX] X XX

0691=MRF; [XXXX]=Ampere Rating; XX=See Ordering Information as below

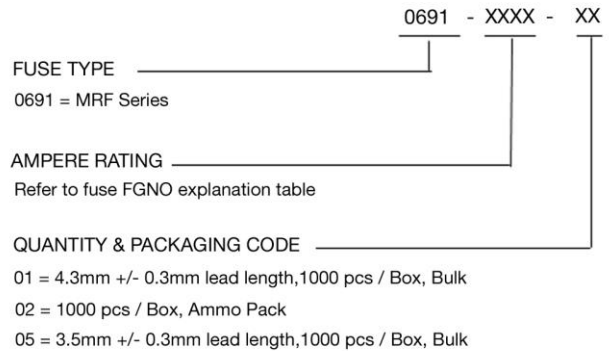
| Fraction | Decimal | Milliamps | Bel FGNO[XXXX] |
|----------|---------|-----------|----------------|
| 1/20 | 0.050 | 50 | 0050 |
| 1/16 | .063 | 63 | 0063 |
| 8/100 | .080 | 80 | 0080 |
| 1/10 | .100 | 100 | 0100 |
| 1/8 | .125 | 125 | 0125 |
| | .160 | 160 | 0160 |
| 2/10 | .200 | 200 | 0200 |
| 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 |
| | 1.6 | 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 |