Bourns

Multifuse® Shortform Catalog 2003

BOURNS®

Reliable Electronic Solutions

Multifuse® Products

Bourns® Multifuse® family of Polymer Positive Temperature Coefficient (PPTC) "resettable fuses" are used in a wide variety of circuit protection applications.

Under fault conditions the device resistance will rise exponentially and remain in a "tripped" state, providing continuous circuit protection until the fault is removed. Once the fault is removed and the power cycled the device will return to its normal low resistance state.

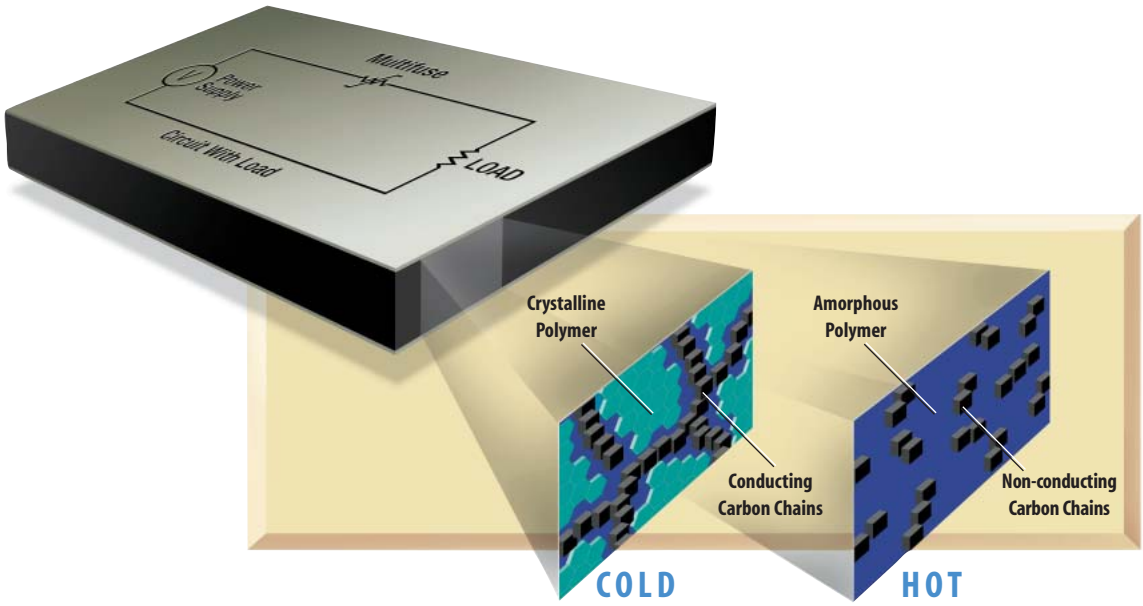
Features/Benefits
- Resettable circuit protection
- Agency approval - UL, CSA, TÜV
- Popular footprints and packaging options
- Low resistance
- Lead free options
- Custom designs available

Applications
- Computer
- Battery
- Automotive
- Telecommunications
- Industrial
- Consumer

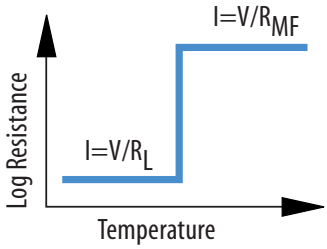
What's New in this Edition
- Telecom Rated Products
  - MF-R/90
  - MF-R/250
  - MF-R/600

What's Next
- Full line of SMD lead-free products
  - MF-MSMF - Available 3rd Quarter 2003

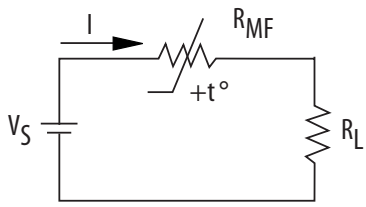
Multifuse® Products - How They Work



Multifuse® Products - How They're Used



PTC Response Characteristic



Typical Circuit Application

Definitions

Agency Approvals

Bourns® PTCs are certified under UL, CSA, IEC and TÜV registration programs.

Current, Hold (I_{hold})

The maximum current a PTC device can pass without interruption.

Current, Maximum (I_{max})

The maximum fault current a PTC device can withstand without damage at the rated voltage.

Current, Trip (I_{trip})

The minimum current that will switch a PTC from the low resistance to the high resistance state.

Fault Current

The peak current that flows through a PTC or wire during a short circuit or arc back.

Positive Temperature Coefficient (PTC)

A characteristic of the PTC device that describes the large increase in resistance as the device reaches its switching (trip) temperature.

Resistance, Post Trip (R_{1max})

The maximum resistance one hour after a PTC device has been tripped and power has been removed.

Resistance, Post Reflow (R_{1max})

The maximum resistance one hour after a PTC surface mount device has been reflow soldered.

Voltage, Maximum (V_{max})

The maximum voltage a PTC device can withstand without damage at the rated current.

Agency File Numbers

UL File Number .....E 174545S

CSA File Number .....CA 110338

TÜV File Number.....R2057213

Product Selection Worksheet

1. What is the normal circuit operating current (I_{hold})____
2. What is the maximum circuit voltage (V_{max})_____
3. What is the maximum fault current (I_{max})_____
4. What is the preferred form factor_____

Note: Other factors including thermal derating and time to trip characteristics may be important application considerations. Please refer to the full Bourns® data sheet of each product at www.bourns.com.

How To Order

MF - R 012/250 U - A 05 - 2

Multifuse® Product Designator

Series
- R = Radial Leaded
- RX = Radial Leaded
- SM = Surface Mount
- MSMD = Surface Mount
- ESMD = Surface Mount
- USMD = Surface Mount
- S = Axial Leaded Strap
- LR = Axial Leaded Strap
- LS = Axial Leaded Strap
- SVS = Axial Leaded Strap
- VSN = Axial Leaded Strap
- VS = Axial Leaded Strap

Hold Current, I_{hold}

Voltage Options:
Max. Interrupt Voltage, V

Construction Options:
- N = Narrow Device Option (3.6 mm)*
- S = Slotted Lead Option (one side)*
- SS = Slotted Lead Option (two sides)*
- L = Longer Lead Option*
- U = Uncoated
- T = Pretripped **

Resistance Sorted**
(see individual data sheets)

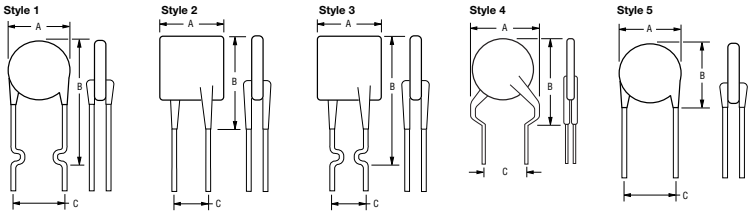
Resistance Bins of 0.5 Ω**
- 05 = 0.5 Ω

Packaging Options
- - 0 = Bulk Packaging
- - 2 = Tape and Reel
- - AP = Ammo-Pak

*Axial Leaded Strap products only.

**Telecom Radial Leaded products only.

Radial Leaded Low Voltage Products



Features
- Bulk and Tape and Reel Packaging
- Industry Standard Sizes

Applications
- Computers and Peripherals
- General Electronics
- Automotive
- Consumer Appliances
- Electronic Toys

MF-R Series 16-60 Volts
Radial Leaded 0.05-11 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	Initial Resistance Ohms at 23 °C Max.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C Max.	Dimensions mm/(in) A Max.	Dimensions mm/(in) B Max.	Dimensions mm/(in) C Nom.	Style
MF-R005	0.05	60	40	7.3	22.0		8.0 (0.315)	8.3 (0.327)	5.1 (0.201)	4
MF-R010	0.10	60	40	2.50	7.50		7.4 (0.291)	12.7 (0.500)	5.1 (0.201)	1
MF-R017	0.17	60	40	2.00	8.00		7.4 (0.291)	12.7 (0.500)	5.1 (0.201)	1
MF-R020	0.20	60	40	1.50	4.40		7.4 (0.291)	12.7 (0.500)	5.1 (0.201)	1
MF-R025	0.25	60	40	1.00	3.00		7.4 (0.291)	12.7 (0.500)	5.1 (0.201)	1
MF-R030	0.30	60	40	0.76	2.10		7.4 (0.291)	13.4 (0.528)	5.1 (0.201)	1
MF-R040	0.40	60	40	0.52	1.29		7.4 (0.291)	13.7 (0.539)	5.1 (0.201)	1
MF-R050	0.50	60	40	0.41	1.17		7.9 (0.311)	13.7 (0.539)	5.1 (0.201)	1
MF-R065	0.65	60	40	0.27	0.72		9.7 (0.382)	15.2 (0.598)	5.1 (0.201)	1
MF-R075	0.75	60	40	0.18	0.60		10.4 (0.409)	16.0 (0.630)	5.1 (0.201)	1
MF-R090	0.90	60	40	0.14	0.47		11.7 (0.461)	16.7 (0.657)	5.1 (0.201)	1
MF-R090-0-9	0.90	30	40	0.07	0.22		7.4 (0.291)	12.2 (0.480)	5.1 (0.201)	3
MF-R110	1.10	30	40	0.10	0.27		8.9 (0.350)	14.0 (0.551)	5.1 (0.201)	1
MF-R135	1.35	30	40	0.065	0.17		8.9 (0.350)	18.9 (0.744)	5.1 (0.201)	1
MF-R160	1.60	30	40	0.055	0.15		10.2 (0.402)	16.8 (0.661)	5.1 (0.201)	1
MF-R185	1.85	30	40	0.040	0.11		12.0 (0.472)	18.4 (0.724)	5.1 (0.201)	1
MF-R250	2.50	30	40	0.025	0.07		12.0 (0.472)	18.3 (0.720)	5.1 (0.201)	2
MF-R250-0-10	2.50	30	40	0.025	0.07		11.4 (0.449)	18.3 (0.720)	5.1 (0.201)	3
MF-R300	3.00	30	40	0.020	0.08		12.0 (0.472)	18.3 (0.720)	5.1 (0.201)	2
MF-R400	4.00	30	40	0.010	0.05		14.4 (0.567)	24.8 (0.976)	5.1 (0.201)	2
MF-R500	5.00	30	40	0.010	0.05		17.4 (0.685)	24.9 (0.980)	10.2 (0.402)	2
MF-R600	6.00	30	40	0.005	0.04		19.3 (0.760)	31.9 (1.256)	10.2 (0.402)	2
MF-R700	7.00	30	40	0.005	0.03		22.1 (0.870)	29.8 (1.173)	10.2 (0.402)	2
MF-R800	8.00	30	40	0.005	0.03		24.2 (0.953)	32.9 (1.295)	10.2 (0.402)	2
MF-R900	9.00	30	40	0.005	0.02		24.2 (0.953)	32.9 (1.295)	10.2 (0.402)	2
MF-R1100	11.00	16	100	0.003	0.014		24.2 (0.953)	32.9 (1.295)	10.2 (0.402)	2

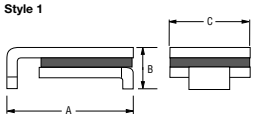
MF-RX Series 60 Volts
Radial Leaded 1.10-3.75 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	Initial Resistance Ohms at 23 °C Max.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C Max.	Dimensions mm/(in) A Max.	Dimensions mm/(in) B Max.	Dimensions mm/(in) C Nom.	Style
MF-RX110	1.10	60	40	0.15	0.38		13.0 (0.512)	18.0 (0.709)	5.1 (0.201)	5
MF-RX135	1.35	60	40	0.12	0.30		14.5 (0.571)	19.6 (0.772)	5.1 (0.201)	5
MF-RX160	1.60	60	40	0.09	0.22		16.3 (0.642)	21.3 (0.839)	5.1 (0.201)	5
MF-RX185	1.85	60	40	0.08	0.19		17.8 (0.701)	22.9 (0.902)	5.1 (0.201)	5
MF-RX250	2.50	60	40	0.05	0.13		21.3 (0.839)	26.4 (1.039)	10.2 (0.402)	5
MF-RX300	3.00	60	40	0.04	0.10		24.9 (0.980)	30.0 (1.181)	10.2 (0.402)	5
MF-RX375	3.75	60	40	0.03	0.08		28.4 (1.118)	33.5 (1.319)	10.2 (0.402)	5

MF-R and MF-RX Series are available lead-free on request. Contact your nearest Bourns representative.

Surface Mount Low Voltage Products

Style 1



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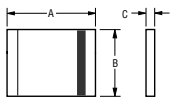

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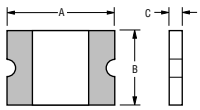


Features
- Tape and Reel Packaging
- Industry Standard Sizes

Applications
- Computers and Peripherals
- General Electronics
- Automotive

MF-SM Series (2920 package) — 6-60 Volts
Surface Mount — 0.30-2.60 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	Initial Resistance Ohms at 23 °C Max.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C Max.	Dimensions mm/(in) A Max.	Dimensions mm/(in) B Max.	Dimensions mm/(in) C Max.	Style
MF-SM030	0.30	60	40	0.90	4.80		7.98 (0.314)	3.18 (0.125)	5.44 (0.214)	1
MF-SM050	0.50	60	40	0.35	1.40		7.98 (0.314)	3.18 (0.125)	5.44 (0.214)	1
MF-SM075	0.75	30	80	0.23	1.00		7.98 (0.314)	3.18 (0.125)	5.44 (0.214)	1
MF-SM100	1.10	30	80	0.12	0.48		7.98 (0.314)	3.00 (0.118)	5.44 (0.214)	1
MF-SM100/33	1.10	33	40	0.12	0.41		7.98 (0.314)	3.00 (0.118)	5.44 (0.214)	1
MF-SM125	1.25	15	100	0.07	0.25		7.98 (0.314)	3.00 (0.118)	5.44 (0.214)	1
MF-SM260	2.60	6	100	0.025	0.075		7.98 (0.314)	3.00 (0.118)	5.44 (0.214)	1

MF-SM Series (3425 package) — 15-33 Volts
Surface Mount — 1.50-2.50 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	Initial Resistance Ohms at 23 °C Max.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C Max.	Dimensions mm/(in) A Max.	Dimensions mm/(in) B Max.	Dimensions mm/(in) C Max.	Style
MF-SM150	1.50	15	100	0.06	0.25		9.50 (0.374)	3.00 (0.118)	6.71 (0.264)	1
MF-SM150/33	1.50	33	40	0.06	0.23		9.50 (0.374)	3.00 (0.118)	6.71 (0.264)	1
MF-SM185/33	1.80	33	40	0.04	0.15		9.50 (0.374)	3.00 (0.118)	6.71 (0.264)	1
MF-SM200	2.00	15	100	0.045	0.125		9.50 (0.374)	3.00 (0.118)	6.71 (0.264)	1
MF-SM250	2.50	15	100	0.024	0.085		9.50 (0.374)	3.00 (0.118)	6.71 (0.264)	1

MF-MSMD Series (1812 package) — 6-60 Volts
Surface Mount — 0.10-2.60 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	Initial Resistance Ohms at 23 °C Max.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C Max.	Dimensions mm/(in) A Max.	Dimensions mm/(in) B Max.	Dimensions mm/(in) C Max.	Style
MF-MSMD010	0.10	60.0	40	0.70	15.00		4.73 (0.186)	3.41 (0.134)	0.81 (0.032)	2
MF-MSMD014	0.14	60.0	40	0.40	6.50		4.73 (0.186)	3.41 (0.134)	0.81 (0.032)	2
MF-MSMD020	0.20	30.0	80	0.40	6.00		4.73 (0.186)	3.41 (0.134)	0.81 (0.032)	2
MF-MSMD030	0.30	30.0	10	0.30	3.00		4.73 (0.186)	3.41 (0.134)	0.81 (0.032)	2
MF-MSMD050	0.50	15.0	100	0.15	1.00		4.73 (0.186)	3.41 (0.134)	0.62 (0.024)	2
MF-MSMD075	0.75	13.2	100	0.11	0.45		4.73 (0.186)	3.41 (0.134)	0.62 (0.024)	2
MF-MSMD075/24*	0.75	24.0	40	0.11	0.45		4.73 (0.186)	3.41 (0.134)	0.62 (0.024)	2
MF-MSMD110	1.10	6.0	100	0.04	0.21		4.73 (0.186)	3.41 (0.134)	0.62 (0.024)	2
MF-MSMD110/16	1.10	16.0	100	0.04	0.21		4.73 (0.186)	3.41 (0.134)	0.62 (0.024)	2
MF-MSMD125	1.25	6.0	100	0.035	0.14		4.73 (0.186)	3.41 (0.134)	0.48 (0.019)	2
MF-MSMD150	1.50	6.0	100	0.03	0.120		4.73 (0.186)	3.41 (0.134)	0.48 (0.019)	2
MF-MSMD160	1.60	8.0	100	0.035	0.099		4.73 (0.186)	3.41 (0.134)	0.48 (0.019)	2
MF-MSMD200	2.00	6.0	100	0.020	0.100		4.73 (0.186)	3.41 (0.134)	0.48 (0.019)	2
MF-MSMD260	2.60	6.0	100	0.015	0.080		4.73 (0.186)	3.41 (0.134)	0.48 (0.019)	2

*UL pending

MF-USMD Series (1210 package) — 6-30 Volts
Surface Mount — 0.05-1.10 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	Initial Resistance Ohms at 23 °C Max.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C Max.	Dimensions mm/(in) A Max.	Dimensions mm/(in) B Max.	Dimensions mm/(in) C Max.	Style
MF-USMD005	0.05	30.0	10	2.80	50.0		3.43 (0.135)	2.80 (0.110)	0.85 (0.033)	2
MF-USMD010	0.10	30.0	10	0.80	15.0		3.43 (0.135)	2.80 (0.110)	0.85 (0.033)	2
MF-USMD020	0.20	30.0	10	0.40	5.00		3.43 (0.135)	2.80 (0.110)	0.85 (0.033)	2
MF-USMD035	0.35	6.0	40	0.20	1.30		3.43 (0.135)	2.80 (0.110)	0.62 (0.024)	2
MF-USMD050	0.50	13.2	40	0.18	0.90		3.43 (0.135)	2.80 (0.110)	0.62 (0.024)	2
MF-USMD075	0.75	6.0	40	0.07	0.450		3.43 (0.135)	2.80 (0.110)	0.62 (0.024)	2
MF-USMD110	1.10	6.0	40	0.05	0.210		3.43 (0.135)	2.80 (0.110)	0.48 (0.019)	2

MF-ESMD Series (Low Resistance, Low Trip Temp.) — 16 Volts
Surface Mount — 1.9 Amps Hold Current

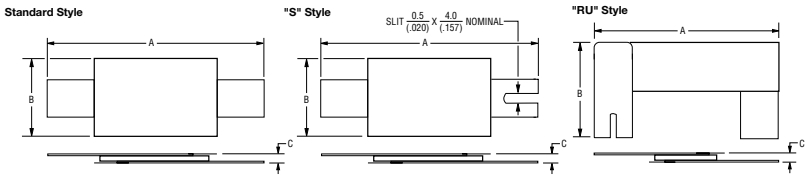
Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	Initial Resistance Ohms at 23 °C Max.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C Max.	Dimensions mm/(in) A Max.	Dimensions mm/(in) B Max.	Dimensions mm/(in) C Max.	Style
MF-ESMD190	1.9	16	100	0.010	0.08		11.61 (0.457)	5.33 (0.210)	0.63 (0.025)	2

Available 3rd Quarter 2003! Consult factory for details.

MF-MSMF Series (1812 package) — 6-13.2 Volts
Surface Mount — 0.50-1.50 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	Initial Resistance Ohms at 23 °C Max.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C Max.	Dimensions mm/(in) A Max.	Dimensions mm/(in) B Max.	Dimensions mm/(in) C Max.	Style
MF-MSMF050	0.50	15.0	100	0.15	1.00		4.73 (0.186)	3.41 (0.134)	0.75 (0.030)	3
MF-MSMF075	0.75	13.2	100	0.11	0.45		4.73 (0.186)	3.41 (0.134)	0.75 (0.030)	3
MF-MSMF110	1.10	6.0	100	0.04	0.21		4.73 (0.186)	3.41 (0.134)	0.75 (0.030)	3
MF-MSMF150	1.50	6.0	100	0.03	0.120		4.73 (0.186)	3.41 (0.134)	0.75 (0.030)	3

Strap Products



Features
- Axial/Radial Leaded
- Weldable Nickel Terminal
- Very Low Internal Resistance

Applications
- Rechargeable Battery Packs for Cellular Phones & Laptop Computers

MF-SVS Series (Lowest Available Resistance) — 10 Volts
Axial Leaded Strap — 1.7-2.3 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C Max.	Dimensions mm/(in) A Max.	B Max.	C Max.	Style
MF-SVS170	1.7	10	100	0.018	0.064	18.0 (0.709)	5.5 (0.216)	0.9 (0.035)	Std.
MF-SVS170N	1.7	10	100	0.018	0.064	24.0 (0.945)	3.9 (0.153)	0.9 (0.035)	Std.
MF-SVS175	1.75	10	100	0.017	0.060	18.0 (0.709)	5.5 (0.216)	0.9 (0.035)	Std.
MF-SVS175N	1.75	10	100	0.017	0.060	24.0 (0.945)	3.9 (0.153)	0.9 (0.035)	Std.
MF-SVS175NL	1.75	10	100	0.017	0.060	28.0 (1.102)	3.9 (0.153)	0.9 (0.035)	Std.
MF-SVS210	2.1	10	100	0.010	0.040	23.1 (0.909)	5.5 (0.216)	0.9 (0.035)	Std.
MF-SVS210N	2.1	10	100	0.010	0.040	32.0 (1.260)	3.9 (0.153)	0.9 (0.035)	Std.
MF-SVS230	2.3	10	100	0.010	0.036	23.1 (0.909)	5.5 (0.216)	0.9 (0.035)	Std.
MF-SVS230N	2.3	10	100	0.010	0.036	32.0 (1.260)	3.9 (0.153)	0.9 (0.035)	Std.

MF-VS Series (Low Resistance & Low Temp.) — 16 Volts
Axial Leaded Strap — 1.7-2.4 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C Max.	Dimensions mm/(in) A Max.	B Max.	C Max.	Style
MF-VS170	1.7	16	100	0.030	0.105	18.0 (0.709)	5.5 (0.217)	0.9 (0.035)	Std.
MF-VS170S	1.7	16	100	0.030	0.105	18.0 (0.709)	5.5 (0.217)	0.9 (0.035)	S
MF-VS210	2.1	16	100	0.018	0.060	23.1 (0.909)	5.5 (0.217)	0.9 (0.035)	Std.
MF-VS210L	2.1	16	100	0.018	0.060	26.5 (1.043)	5.5 (0.217)	0.9 (0.035)	Std.
MF-VS210S	2.1	16	100	0.018	0.060	23.1 (0.909)	5.5 (0.217)	0.9 (0.035)	S
MF-VS240	2.4	16	100	0.014	0.052	26.2 (1.031)	5.5 (0.217)	0.9 (0.035)	Std.
MF-VS240S	2.4	16	100	0.014	0.052	26.2 (1.031)	5.5 (0.217)	0.9 (0.035)	S

MF-VSN Series (Low Resistance Narrow) — 12 Volts
Axial Leaded Strap — 1.7-2.1 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C Max.	Dimensions mm/(in) A Max.	B Max.	C Max.	Style
MF-VS170N	1.7	12	100	0.030	0.105	24.0 (0.945)	3.9 (0.154)	0.9 (0.035)	Std.
MF-VS175NL	1.75	12	100	0.029	0.102	28.0 (1.102)	3.9 (0.154)	0.9 (0.035)	Std.
MF-VS210N	2.1	12	100	0.018	0.060	32.0 (1.260)	3.9 (0.154)	0.9 (0.035)	Std.

MF-LR Series (Low Resistance) — 10-16 Volts
Axial Leaded Strap — 1.90-6.00 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C Max.	Dimensions mm/(in) A Max.	B Max.	C Max.	Style
MF-LR190	1.90	15	100	0.039	0.102	22.1 (0.870)	5.2 (0.205)	1.0 (0.039)	Std.
MF-LR190S	1.90	15	100	0.039	0.102	22.1 (0.870)	5.2 (0.205)	1.0 (0.039)	S
MF-LR260	2.60	15	100	0.020	0.063	23.1 (0.909)	5.2 (0.205)	1.0 (0.039)	Std.
MF-LR260S	2.60	15	100	0.020	0.063	23.1 (0.909)	5.2 (0.205)	1.0 (0.039)	S
MF-LR380	3.80	15	100	0.013	0.037	26.0 (1.024)	7.5 (0.295)	1.0 (0.039)	Std.
MF-LR450	4.50	16	100	0.011	0.028	26.0 (1.024)	10.5 (0.414)	1.0 (0.039)	Std.
MF-LR550	5.50	10	100	0.009	0.022	37.0 (1.457)	7.5 (0.295)	1.0 (0.039)	Std.
MF-LR600	6.00	10	100	0.007	0.016	26.0 (1.024)	14.5 (0.571)	1.0 (0.039)	Std.

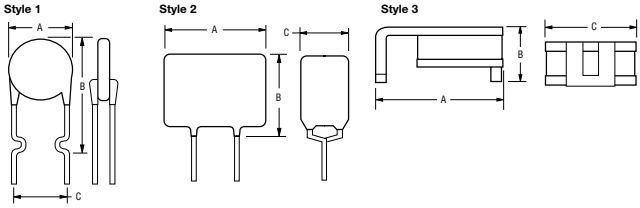
MF-LS Series (Lower Trip Temperature) — 15-24 Volts
Axial Leaded Strap — 0.7-3.4 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C Max.	Dimensions mm/(in) A Max.	B Max.	C Max.	Style
MF-LS070	0.7	15	100	0.100	0.340	22.1 (0.870)	5.2 (0.205)	1.2 (0.047)	Std.
MF-LS070S	0.7	15	100	0.100	0.340	22.1 (0.870)	5.2 (0.205)	1.2 (0.047)	S
MF-LS100S	1.0	24	100	0.070	0.260	23.1 (0.909)	5.2 (0.205)	1.0 (0.039)	S
MF-LS180	1.8	24	100	0.040	0.120	26.0 (1.024)	5.2 (0.205)	1.0 (0.039)	Std.
MF-LS180L	1.8	24	100	0.040	0.120	37.5 (1.48)	5.6 (0.22)	1.0 (0.039)	Std.
MF-LS180S	1.8	24	100	0.040	0.120	26.0 (1.024)	5.2 (0.205)	1.0 (0.039)	S
MF-LS190	1.9	24	100	0.030	0.100	23.4 (0.921)	11.0 (0.433)	1.1 (0.043)	Std.
MF-LS190RU	1.9	15	100	0.030	0.100	20.8 (0.819)	14.3 (0.563)	0.76 (0.030)	RU
MF-LS260	2.6	24	100	0.025	0.076	26.0 (1.024)	11.9 (0.469)	1.0 (0.039)	Std.
MF-LS300	3.0	24	100	0.015	0.055	31.8 (1.252)	13.5 (0.531)	1.1 (0.043)	Std.
MF-LS340	3.4	24	100	0.016	0.050	26.0 (1.024)	15.9 (0.626)	1.0 (0.039)	Std.

MF-S Series (Standard) — 15-30 Volts
Axial Leaded Strap — 1.20-4.20 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C Max.	Dimensions mm/(in) A Max.	B Max.	C Max.	Style
MF-S120	1.20	15	100	0.085	0.220	22.1 (0.870)	5.2 (0.205)	1.0 (0.039)	Std.
MF-S120S	1.20	15	100	0.085	0.220	22.1 (0.870)	5.2 (0.205)	1.0 (0.039)	S
MF-S150	1.50	15	100	0.050	0.110	23.4 (0.921)	11.0 (0.433)	1.1 (0.043)	Std.
MF-S175	1.75	15	100	0.050	0.120	23.1 (0.909)	5.2 (0.205)	1.0 (0.039)	Std.
MF-S175S	1.75	15	100	0.050	0.120	23.1 (0.909)	5.2 (0.205)	1.0 (0.039)	S
MF-S200	2.00	30	100	0.030	0.080	23.4 (0.921)	11.0 (0.433)	1.1 (0.043)	Std.
MF-S350	3.50	30	100	0.017	0.040	31.8 (1.252)	13.5 (0.531)	1.1 (0.043)	Std.
MF-S420	4.20	30	100	0.012	0.040	32.4 (1.276)	13.6 (0.535)	1.1 (0.043)	Std.

Telecom Products



Features
- Ability to Withstand Lightning Surge
- Ability to Withstand AC Power Cross
- Available in Matched Resistance "Bins"

Applications
- CPE and Central Office
- Access Equipment
- Hybrid-Fiber Coax

MF-R/90 Series 90 Volts
Radial Leaded 0.55-0.75 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	Initial Resistance Ohms at 23 °C Max.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C	Dimensions mm/(in) A Max.	Dimensions mm/(in) B Max.	Dimensions mm/(in) C Nom.	Style
MF-R055/90	0.55	90	10	0.45	2.0		10.9 (0.43)	14.0 (0.55)	5.1 (0.201)	1
MF-R055/90U	0.55	90	10	0.45	2.0		10.3 (0.4)	10.3 (0.4)	5.1 (0.201)	1
MF-R075/90	0.75	90	10	0.37	1.65		11.9 (0.47)	15.5 (0.61)	5.1 (0.201)	1

60 Volts
MF-R/600 Series 600 Vrms short duration interrupt
Radial Leaded 0.15-0.16 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	Initial Resistance Ohms at 23 °C Max.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C	Dimensions mm/(in) A Max.	Dimensions mm/(in) B Max.	Dimensions mm/(in) C Max.	Style
MF-R015/600	0.15	60	3.0	6.0	22.0		13.5 (0.531)	12.6 (0.496)	6.0 (0.236)	2
MF-R015/600-A	0.15	60	3.0	7.0	20.0		13.5 (0.531)	12.6 (0.496)	6.0 (0.236)	2
MF-R015/600-B	0.15	60	3.0	9.0	22.0		13.5 (0.531)	12.6 (0.496)	6.0 (0.236)	2
MF-R015/600-F	0.15	60	3.0	7.0	22.0		13.5 (0.531)	12.6 (0.496)	6.0 (0.236)	2
MF-R016/600	0.16	60	3.0	4.0	18.0		16.0 (0.629)	12.6 (0.496)	6.0 (0.236)	2
MF-R016/600-A	0.16	60	3.0	4.0	16.0		16.0 (0.629)	12.6 (0.496)	6.0 (0.236)	2
MF-R016/600-1	0.16	60	3.0	4.0	17.0		16.0 (0.629)	12.6 (0.496)	6.0 (0.236)	2

60 Volts
MF-SM013/250 Series 250 Vrms short duration interrupt
Surface Mount 0.13 Amps Hold Current

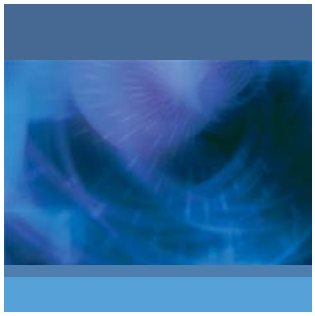
Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	Initial Resistance Ohms at 23 °C Max.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C	Dimensions mm/(in) A Max.	Dimensions mm/(in) B Max.	Dimensions mm/(in) C Max.	Style
MF-SM013/250-2	0.13	60	3.0	6.5	20.0		9.4 (0.370)	3.4 (0.133)	7.4 (0.291)	3
MF-SM013/250-A-2	0.13	60	3.0	6.5	20.0		9.4 (0.370)	3.4 (0.133)	7.4 (0.291)	3
MF-SM013/250-B-2	0.13	60	3.0	9.0	20.0		9.4 (0.370)	3.4 (0.133)	7.4 (0.291)	3
MF-SM013/250-C-2	0.13	60	3.0	7.0	20.0		9.4 (0.370)	3.4 (0.133)	7.4 (0.291)	3

MF-R/250 Series 60 Volts
(High Lightning Withstand) 250 Vrms short duration interrupt
Radial Leaded 0.08-0.18 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	Initial Resistance Ohms at 23 °C Max.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C	Dimensions mm/(in) A Max.	Dimensions mm/(in) B Max.	Dimensions mm/(in) C Max.	Style
MF-R008/250U	0.08	60	3.0	14.0	33.0		6.2 (0.244)	11.5 (0.453)	5.1 (0.201)	2
MF-R008/250	0.08	60	3.0	15.0	33.0		7.5 (0.295)	11.5 (0.453)	5.1 (0.201)	2
MF-R011/250U	0.11	60	3.0	5.0	16.0		6.2 (0.244)	11.5 (0.453)	5.1 (0.201)	2
MF-R012/250	0.12	60	3.0	4.0	16.0		7.5 (0.295)	11.5 (0.453)	5.1 (0.201)	2
MF-R012/250-A	0.12	60	3.0	7.0	16.0		7.5 (0.295)	11.5 (0.453)	5.1 (0.201)	2
MF-R012/250-C	0.12	60	3.0	5.5	14.0		7.5 (0.295)	11.5 (0.453)	5.1 (0.201)	2
MF-R012/250-F	0.12	60	3.0	6.0	16.0		7.5 (0.295)	11.5 (0.453)	5.1 (0.201)	2
MF-R012/250-1	0.12	60	3.0	6.0	16.0		7.5 (0.295)	11.5 (0.453)	5.1 (0.201)	2
MF-R012/250-2	0.12	60	3.0	8.0	16.0		7.5 (0.295)	11.5 (0.453)	5.1 (0.201)	2
MF-R012/250U	0.12	60	3.0	6.0	16.0		6.2 (0.244)	11.5 (0.453)	5.1 (0.201)	2
MF-R014/250	0.145	60	3.0	3.0	12.0		7.5 (0.295)	11.5 (0.453)	5.1 (0.201)	2
MF-R014/250-A	0.145	60	3.0	3.0	12.0		7.5 (0.295)	11.5 (0.453)	5.1 (0.201)	2
MF-R014/250-B	0.145	60	3.0	4.5	14.0		7.5 (0.295)	11.5 (0.453)	5.1 (0.201)	2
MF-R014/250U	0.145	60	3.0	3.5	12.0		6.2 (0.244)	11.5 (0.453)	5.1 (0.201)	2
MF-R018/250U	0.18	60	10.0	0.8	4.0		10.4 (0.409)	12.6 (0.496)	5.1 (0.201)	2

MF-RX/250 Series 60 Volts
(Fast Trip, Small Package) 250 Vrms short duration interrupt
Radial Leaded 0.12-0.18 Amps Hold Current

Model	I_{hold} Amperes at 23 °C	V max. Volts	I max. Amps	Initial Resistance Ohms at 23 °C Min.	Initial Resistance Ohms at 23 °C Max.	1 Hour (R_1) Post-Trip Resistance Ohms at 23 °C	Dimensions mm/(in) A Max.	Dimensions mm/(in) B Max.	Dimensions mm/(in) C Nom.	Style
MF-RX012/250	0.12	60	3.0	4.0	16.0		6.5 (0.256)	11.0 (0.433)	5.1 (0.201)	2
MF-RX012/250-A	0.12	60	3.0	7.0	16.0		6.5 (0.256)	11.0 (0.433)	5.1 (0.201)	2
MF-RX012/250-C	0.12	60	3.0	5.5	14.0		6.5 (0.256)	11.0 (0.433)	5.1 (0.201)	2
MF-RX012/250-F	0.12	60	3.0	6.0	16.0		6.5 (0.256)	11.0 (0.433)	5.1 (0.201)	2
MF-RX012/250-1	0.12	60	3.0	6.0	16.0		6.5 (0.256)	11.0 (0.433)	5.1 (0.201)	2
MF-RX012/250-2	0.12	60	3.0	8.0	16.0		6.5 (0.256)	11.0 (0.433)	5.1 (0.201)	2
MF-RX012/250-T	0.12	60	3.0	7.0	16.0		6.5 (0.256)	11.0 (0.433)	5.1 (0.201)	2
MF-RX012/250U	0.12	60	3.0	6.0	16.0		6.0 (0.236)	10.0 (0.394)	5.1 (0.201)	2
MF-RX014/250	0.145	60	3.0	3.0	14.0		6.5 (0.256)	11.0 (0.433)	5.1 (0.201)	2
MF-RX014/250-A	0.145	60	3.0	3.0	12.0		6.5 (0.256)	11.0 (0.433)	5.1 (0.201)	2
MF-RX014/250-B	0.145	60	3.0	4.5	14.0		6.5 (0.256)	11.0 (0.433)	5.1 (0.201)	2
MF-RX014/250-T	0.145	60	3.0	5.4	14.0		6.5 (0.256)	11.0 (0.433)	5.1 (0.201)	2
MF-RX014/250U	0.145	60	3.0	3.5	12.0		6.0 (0.236)	10.0 (0.394)	5.1 (0.201)	2
MF-RX018/250	0.18	60	10.0	0.8	4.0		11.0 (0.433)	13.6 (0.535)	5.1 (0.201)	2
MF-RX018/250U	0.18	60	10.0	0.8	4.0		10.4 (0.409)	12.6 (0.496)	5.1 (0.201)	2



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