



Features

- Surface Mount Devices
- High voltage surge capabilities
- Binned and sorted resistance ranges
- Assists in meeting ITU K.20/K.21 specifications
- Withstands lightning power induction
- Agency recognition:   

Applications

Used as a secondary overcurrent protection device in:

- Customer Premise Equipment (CPE)
- Central Office (CO)
- Subscriber Line Interface Cards (SLIC)

MF-SM013/250 - Telecom PTC Resettable Fuses

Electrical Characteristics

Model	Max. Oper. Voltage Volts	Max. Interrupt Ratings		Hold Current Amps at 23°C I_H	Initial Resistance		One Hour Post-Trip Resistance Ohms at 23°C Max.	Nom. Power Dissipation Watts at 650V, 23°C
		Volts (V)	Amps (A)		Ohms at 23°C Max.	Ohms at 23°C Min.		
		Max.	Max.		Max.	Min.		
MF-SM013/250-2	60	250	3.0	0.13	6.5	12.0	20.0	3.3
MF-SM013/250-A-2	60	250	3.0	0.13	6.5	9.0	20.0	3.3
MF-SM013/250-B-2	60	250	3.0	0.13	9.0	12.0	20.0	3.3
MF-SM013/250-C-2	60	250	3.0	0.13	7.0	10.0	20.0	3.3

Environmental Characteristics

Operating/Storage Temperature	-45°C to +85°C
Maximum Device Surface Temperature in Tripped State	125°C
Passive Aging	+85°C, 1000 hours±2% typical resistance change
	+60°C, 1000 hours±3% typical resistance change
Humidity Aging	+85°C, 85% R.H. 500 hours±3% typical resistance change
Thermal Shock	MIL-STD-202F, Method 107G,±10% typical resistance change
	+125°C to -55°C, 10 times±15% typical resistance change
Solvent Resistance	MIL-STD-202, Method 215B.....No change
Lead Solderability	ANSI/J-STD-002
Flammability	IEC 695-2-2No Flame for 60 secs.
Vibration	MIL-STD-883C, Method 2007.1, Condition A.....No change

Test Procedures And Requirements For Model SM013/250 Series

Test	Test Conditions	Accept/Reject Criteria
Visual/Mech.	Verify dimensions and materials	Per MF physical description
Resistance	In still air @ 23°C	$R_{min} \leq R \leq R_{max}$
Time to Trip	At specified current, V_{max} , 23°C	$T \leq \text{max. time to trip (seconds)}$
Hold Current	30 min. at I_{hold}	No trip
Trip Cycle Life	V_{max} , I_{max} , 100 cycles	No arcing or burning
Trip Endurance	V_{max} , 48 hours	No arcing or burning
Solderability	MIL-STD-202F, Method 208F	95% min. coverage
UL File Number	E 174545S	
CSA File Number	CA 110338	
TÜV File Number	R2057213	

Thermal Derating Chart - I_{hold} / I_{trip} (Amps)

Model	Ambient Operating Temperature								
	-40°C	-20°C	0°C	23°C	40°C	50°C	60°C	70°C	85°C
MF-SM013/250-2	0.21 / 0.42	0.18 / 0.37	0.16 / 0.31	0.13 / 0.26	0.10 / 0.23	0.09 / 0.18	0.08 / 0.15	0.07 / 0.12	0.05 / 0.10
MF-SM013/250-A-2	0.21 / 0.42	0.18 / 0.37	0.16 / 0.31	0.13 / 0.26	0.10 / 0.23	0.09 / 0.18	0.08 / 0.15	0.07 / 0.12	0.05 / 0.10
MF-SM013/250-B-2	0.21 / 0.42	0.18 / 0.37	0.16 / 0.31	0.13 / 0.26	0.10 / 0.23	0.09 / 0.18	0.08 / 0.15	0.07 / 0.12	0.05 / 0.10
MF-SM013/250-C-2	0.21 / 0.42	0.18 / 0.37	0.16 / 0.31	0.13 / 0.26	0.10 / 0.23	0.09 / 0.18	0.08 / 0.15	0.07 / 0.12	0.05 / 0.10

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Product Dimensions

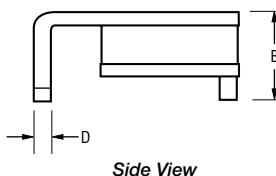
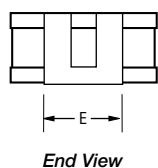
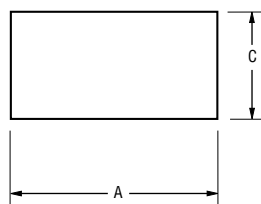
Model	A	B	C	D	E	G	H	I
	Max.	Max.	Max.	Nom.	Nom.	Nom.	Nom.	Nom.
MF-SM013/250-2	$\frac{9.4}{(0.370)}$	$\frac{3.4}{(0.133)}$	$\frac{7.4}{(0.291)}$	$\frac{0.3}{(0.012)}$	$\frac{3.8}{(0.149)}$	$\frac{9.7}{(0.383)}$	$\frac{4.6}{(0.18)}$	$\frac{1.8}{(0.071)}$
MF-SM013/250-A-2	$\frac{9.4}{(0.370)}$	$\frac{3.4}{(0.133)}$	$\frac{7.4}{(0.291)}$	$\frac{0.3}{(0.012)}$	$\frac{3.8}{(0.149)}$	$\frac{9.7}{(0.383)}$	$\frac{4.6}{(0.18)}$	$\frac{1.8}{(0.071)}$
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Packaging:

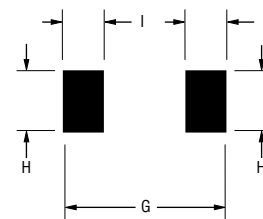
TAPE & REEL: 2000 pcs. per reel

DIMENSIONS = $\frac{\text{MM}}{(\text{INCHES})}$

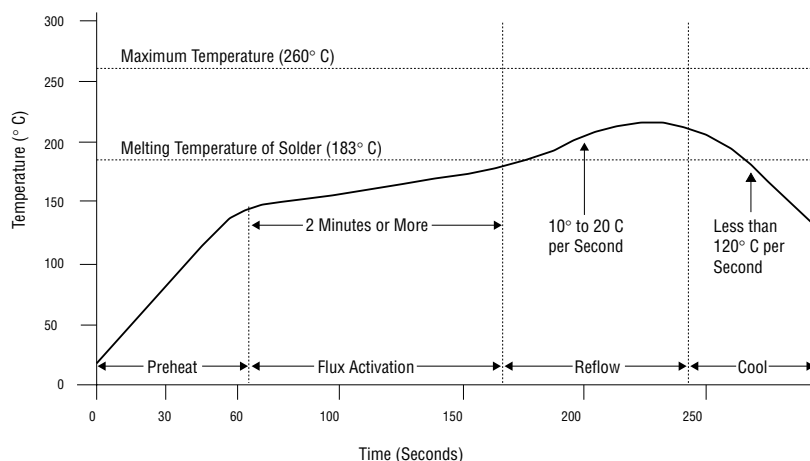
Recommended Pad Layout



Terminal material:
Tin-plated brass



Solder Reflow Recommendations



Solder reflow

- Recommended reflow methods: IR, vapor phase oven, hot air oven.
- Devices are not designed to be wave soldered to the bottom side of the board.
- Gluing the devices is not recommended.
- Recommended maximum paste thickness is 0.25 mm (.010 inch).
- Devices can be cleaned using standard industry methods and solvents.

Note:

- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

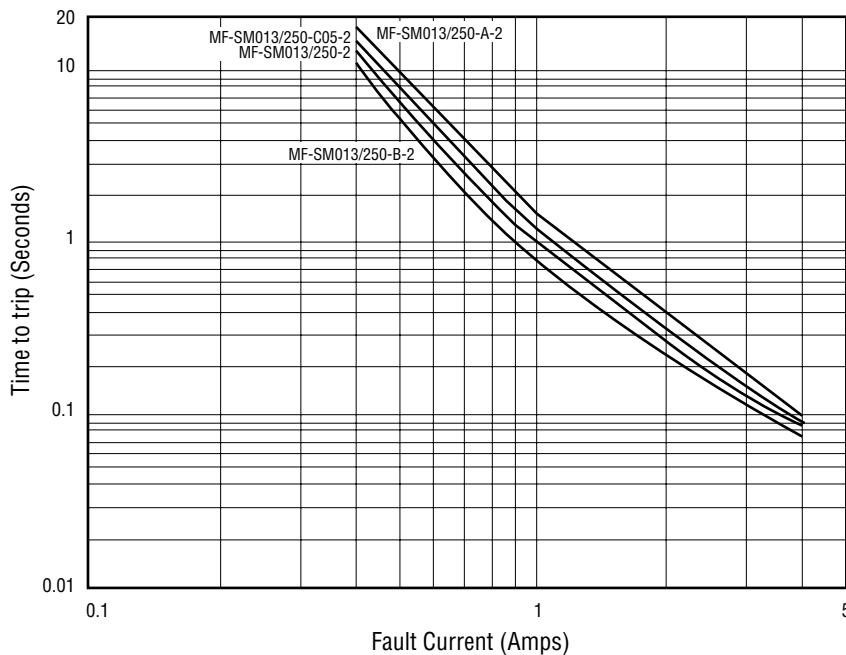
Rework

- A device should not be reworked.

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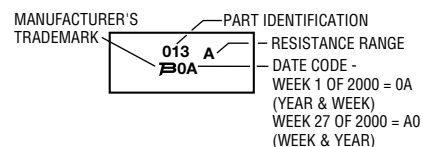
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Typical Time to Trip at 23°C



Typical Part Marking

Represents total content. Layout may vary.



How to Order

MF - SM 013/250 -

Multifuse®
 Product Designator
 Series
 R = Radial Leaded Component
 SM = Surface Mount Component
 Hold Current, I_{hold}
 013 (0.13 Amps)
 Max. Interrupt Voltage, V
 Resistance Range
 A = 6.5-9 Ω
 B = 9-12 Ω
 C = 7-10 Ω
 Resistance Sorted in Bins
 05 = 0.5 Ω
 Packaging Options
 - = Bulk Packaging
 - 2 = Tape and Reel*

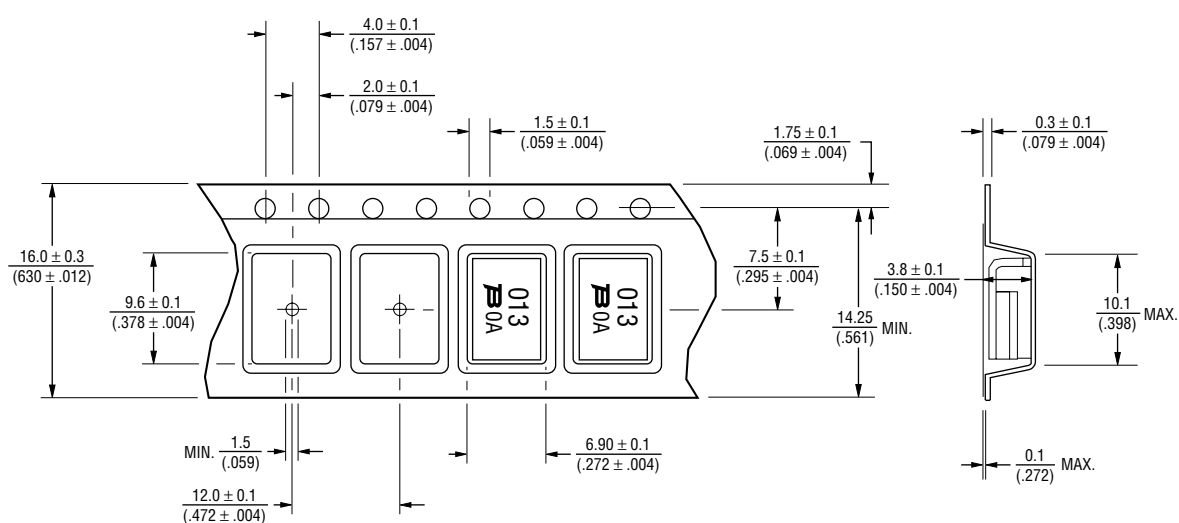
*Packaged per EIA486-B

NOTE: All parts are also available "binned". All parts within a package will be within 0.5Ω of each other within the initial resistance range.

MF-SM013/250 Series Tape and Reel Specifications

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Taped Component Dimensions



Reel Dimensions

