Features

- Surface Mount Device
- Reduced footprint size
- High voltage surge capabilities
- Assists in meeting ITU K.20/K.21/K.45 specifications
- RoHS compliant*
- Agency recognition:

Applications

Provides overcurrent protection in:

- Customer Premise Equipment (CPE)
- Central Office (CO)
- Access/Outside Plant Equipment

MF-SM013/250V - Telecom PTC Resettable Fuses

Electrical Characteristics

Model	Max. Operating Voltage	Max. Interrupt Ratings		Hold Current	Initial Resistance		One Hour Post-Trip Resistance	Tripped Power Dissipation
		Volts (V)	Amps (A)	Amps at 23 °C	Ohms at 23 °C	Ohms at 23 °C	Ohms at 23 °C	Watts at 23 °C
	Volts	Max.	Max.	I_H	Min.	Max.	Max.	Typ.
MF-SM013/250V	60	250	3.0	0.13	4.0	7.0	16.0	3.0
MF-SM013/250V-B5	60	250	3.0	0.13	9.0	12.0	20.0	3.0

Environmental Characteristics

Operating Temperature	-40 °C to +85 °C	
Storage Condition	+40 °C max. 70 % R.H. max.	
Passive Aging	+85 °C, 1000 hours	±15 % typical resistance change
Humidity Aging	+85 °C, 85 % R.H. 1000 hours	±15 % typical resistance change
Thermal Shock	MIL-STD-202F, Method 107G, -55 °C to +125 °C,10 times	±15 % typical resistance change
Solvent Resistance	MIL-STD-202, Method 215B	Marking still legible
Vibration	MIL-STD-883C, Method 2007.1, Condition A	±5 % typical resistance change
Moisture Sensitivity Level (MSL)	See Note	
ESD Classification - HBM	Class 6	

Test Procedures And Requirements

Test	Test Conditions	Accept/Reject Criteria
Visual/Mech.	Verify dimensions and materials	Per MF physical description
Resistance	In still air @ 23 °C	Rmin ≤ R ≤ Rmax
Time to Trip	At specified current, Vmax, 23 °C	T ≤ max. time to trip (seconds)
Hold Current	30 min. at Ihold	No trip
Trip Cycle Life	Vmax, Imax, 100 cycles	No arcing or burning
Trip Endurance	Vmax, 48 hours	No arcing or burning
Solderability	245 °C ±5 °C, 5 seconds	>95 % coverage

UL File Number	E174545
TÜV File Number	R50362083

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-SM013/250V	0.22	0.19	0.16	0.13	0.105	0.090	0.075	0.060	0.040
MF-SM013/250V-B5	0.22	0.19	0.16	0.13	0.105	0.090	0.075	0.060	0.040

I_{trip} is approximately two times I_{hold}.

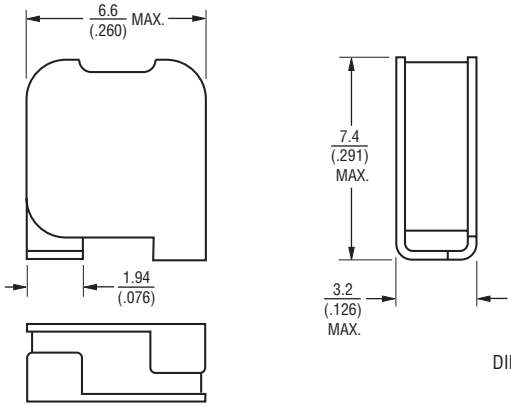
WARNING Cancer and Reproductive Harm - www.P65Warnings.ca.gov

*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.
Specifications are subject to change without notice.
Users should verify actual device performance in their specific applications.

MF-SM013/250V - Telecom PTC Resettable Fuses

BOURNS®

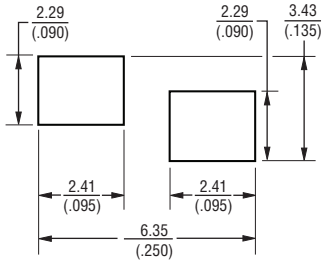
Product Dimensions



Terminal material:
Tin-plated brass

DIMENSIONS: MM / (INCHES)

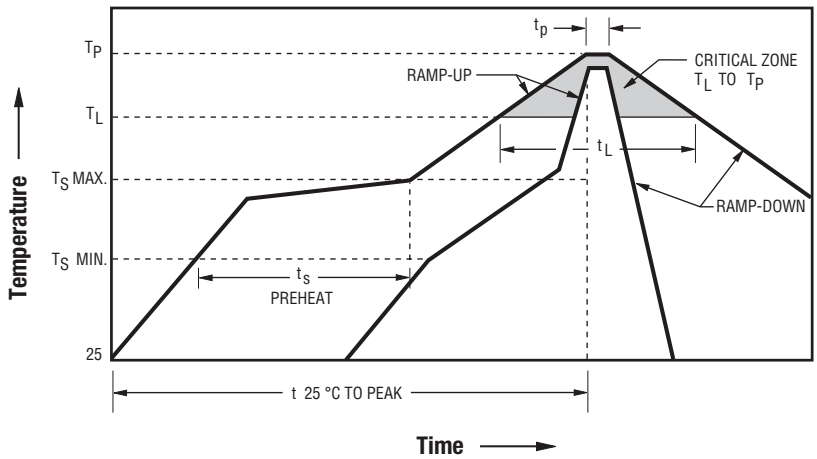
Recommended Pad Layout



Packaging Quantity

1,000 pieces per reel

Solder Reflow Recommendations

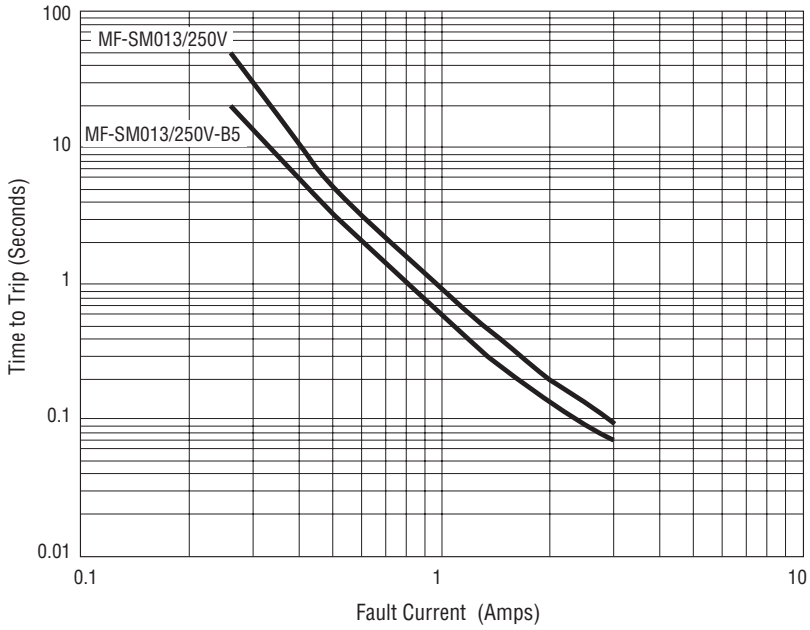


Notes:

- MF-SM013/250V models cannot be wave soldered or hand soldered. Please contact Bourns for soldering recommendations.
- All temperatures refer to topside of the package, measured on the package body surface.
- If reflow temperatures exceed the recommended profile, devices may not meet the published specifications.
- Compatible with Pb and Pb-free solder reflow profiles.
- Excess solder may cause a short circuit, especially during hand soldering. Please refer to the Multifuse® Polymer PTC Soldering Recommendation guidelines.

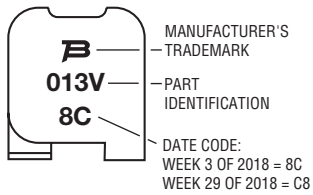
Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (Ts_{max} to T_p)	3 °C / second max.
PREHEAT: Temperature Min. (Ts_{min}) Temperature Max. (Ts_{max}) Time (Ts_{min} to Ts_{max}) (ts)	 150 °C 200 °C 60~180 seconds
TIME MAINTAINED ABOVE: Temperature (T_L) Time (t_L)	 217 °C 60~150 seconds
Peak Temperature (T_p)	260 °C
Time within 5 °C of Actual Peak Temperature (t_p)	20~40 seconds
Ramp-Down Rate	6 °C / second max.
Time 25 °C to Peak Temperature	8 minutes max.

Typical Time to Trip at 23 °C



Typical Part Marking

Represents total content. Layout may vary.



How to Order

MF - SM 013/250V - _ _ - 2

Multifuse® Product Designator

Series
SM = Surface Mount Component

Hold Current, I_{hold}
013 = 0.13 Amps

Max. Interrupt Voltage, V
250 = 250 Volts

Telecom Options
V = Vertical Profile
(Surface Mount Products Only)

Resistance Range
B = 9~12 Ohms

Resistance Sorted in Bins
5 = 0.5 Ohm

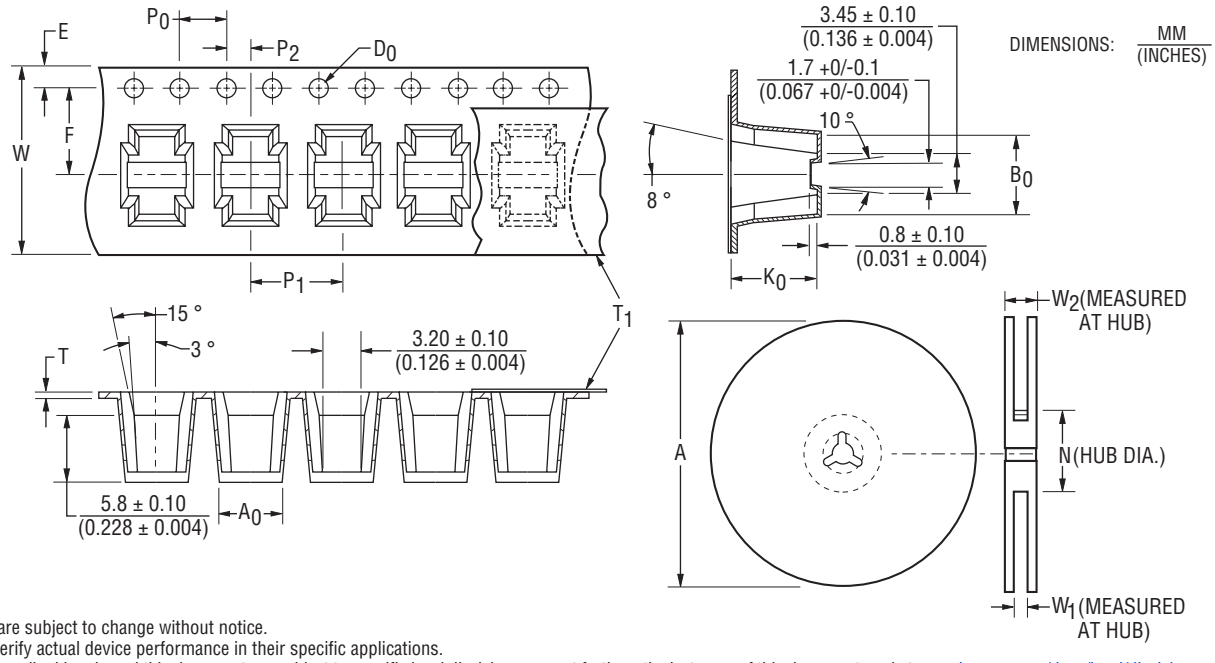
Packaging Options
- 0 = Bulk Packaging
- 2 = Tape and Reel*

*Packaged per EIA 481

MF-SM013/250V Series Tape and Reel Specifications

BOURNS®

Tape Dimensions	MF-SM013/250V Series per EIA 481
W max.	16.3 (0.642)
P_0	4.0 ± 0.1 (0.157 ± 0.004)
P_1	8.0 ± 0.1 (0.315 ± 0.004)
P_2	2.0 ± 0.1 (0.079 ± 0.004)
A_0	5.0 ± 0.1 (0.197 ± 0.004)
B_0	6.7 ± 0.1 (0.262 ± 0.004)
D_0	1.5 +0.1/-0.0 (0.059 +0.004/-0)
F	7.5 ± 0.1 (0.295 + 0.004)
E	1.75 ± 0.1 (0.069 ± 0.004)
T	0.5 ± 0.05 (0.020 ± 0.002)
T_1 max.	0.1 (0.004)
K_0	7.45 ± 0.1 (0.293 ± 0.004)
Leader min.	390 (15.35)
Trailer min.	160 (6.30)
Reel Dimensions	
A max.	332 (13.1)
N min.	98 (3.86)
W_1	16.4 +2.0/-0.0 (0.646 +0.079/-0)
W_2 max.	22.4 (0.882)



Application Notice

- Users are responsible for independent and adequate evaluation of Bourns® Multifuse® Polymer PTC devices in the user's application, including the PPTC device characteristics stated in the applicable data sheet.
- Polymer PTC devices must not be allowed to operate beyond their stated maximum ratings. Operation in excess of such maximum ratings could result in damage to the PTC device and possibly lead to electrical arcing and/or fire. Circuits with inductance may generate a voltage above the rated voltage of the polymer PTC device and should be thoroughly evaluated within the user's application during the PTC selection and qualification process.
- Polymer PTC devices are intended to protect against adverse effects of temporary overcurrent or overtemperature conditions up to rated limits and are not intended to serve as protective devices where overcurrent or overvoltage conditions are expected to be repetitive or prolonged.
- In normal operation, polymer PTC devices experience thermal expansion under fault conditions. Thus, a polymer PTC device must be protected against mechanical stress, and must be given adequate clearance within the user's application to accommodate such thermal expansion. Rigid potting materials or fixed housings or coverings that do not provide adequate clearance should be thoroughly examined and tested by the user, as they may result in the malfunction of polymer PTC devices if the thermal expansion is inhibited.
- Exposure to lubricants, silicon-based oils, solvents, gels, electrolytes, acids, and other related or similar materials may adversely affect the performance of polymer PTC devices.
- Aggressive solvents may adversely affect the performance of polymer PTC devices. Conformal coating, encapsulating, potting, molding, and sealing materials may contain aggressive solvents including but not limited to xylene and toluene, which are known to cause adverse effects on the performance of polymer PTCs. Such aggressive solvents must be thoroughly cured or baked to ensure their complete removal from polymer PTCs to minimize the possible adverse effect on the device.
- Recommended storage conditions should be followed at all times. Such conditions can be found on the applicable data sheet and on the Multifuse® Polymer PTC Moisture/Reflow Sensitivity Classification (MSL) note: https://www.bourns.com/docs/RoHS-MSL/msl_mf.pdf

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C1753 05/17/18R

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