

Features

- Very low profile
- Very fast tripping time
- High voltage
- RoHS compliant* and halogen free**
- 2018 footprint
- Agency recognition: c¶ us



Additional Information

Click these links for more information:











MF-SMDF Series – PTC Resettable Fuses

Electrical Characteristics

	Vmax Imax		I _{hold}	l _{trip}	Resis	stance		x. Time Trip	Tripped Power Dissipation		ency gnition
Model			at 2	3 °C		ms 3 °C	at 23 °C	at 23 °C	Watts at 23 °C	cUL	ΤÜV
	Volts	Amps	Amps	Amps	R _{min}	R _{1max}	Amps	Seconds	Тур.	E174545	R50256634
MF-SMDF030	60	20	0.30	0.8	0.45	2.15	1.5	1.2	0.8	/	
MF-SMDF050	60	10	0.55	1.2	0.20	1.00	2.5	3.0	0.9	/	1
MF-SMDF100/33X	33	40	1.1	2.2	0.06	0.40	8.0	0.5	1.4	/	
MF-SMDF150	15	40	1.5	3.0	0.05	0.17	8.0	0.8	1.1	/	1
MF-SMDF200	10	40	2.0	4.0	0.03	0.10	8.0	2.4	1.1		
MF-SMDF260/24X	24	20	2.6	5.2	0.015	0.075	8.0	5.0	1.5	/	✓

Environmental Characteristics

ŀ	tem	Condition	Criteria
Operating Temperature		-40 °C to +85 °C	
Recommended Storage		+40 °C max. / 70 % R.H. max.	
Passive Aging		+85 °C, 1000 hours	±5 % typical resistance change
Llumidity Aging	MF-SMDF030, 050, 150, 200	.05 %C 05 % D.H. 1000 bours	±1.2 % typical resistance change
Humidity Aging	MF-SMDF100/33X, 260/24X	+85 °C, 85 % R.H. 1000 hours	±5 % typical resistance change
Thermal Shock	MF-SMDF030, 050, 150, 200	40 °C to . 95 °C . 90 times	-20 % typical resistance change
Thermal Shock	MF-SMDF100/33X, 260/24X	-40 °C to +85 °C, 20 times	±10 % typical resistance change
Solvent Resistance		MIL-STD-202, Method 215	No change (marking still legible)
Vibration		MIL-STD-883C, Method 2007.1 Condition A	No change (R _{min} < R < R _{1 max}
Moisture Sensitivity Level (M	ISL)	See Note	
ESD Classification		Class 6 (per AEC-Q200-2, HBM)	

Test Procedures and Requirements

Item	Test Conditions	Accept/Reject Criteria
Visual/Mechanical	Verify dimensions and materials	Per MF physical description
Resistance	In still air @ 23 °C	$R_{min} \le R \le R_{max}$
Time to Trip	At specified current, V _{max} , 23 °C, still air	T ≤ max. time to trip (seconds)
Hold Current	30 min. at I _{hold} , still air	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	245 °C ±5 °C, 5 seconds	95 % min. coverage



^{**} Bourns considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less. Specifications are subject to change without notice. Users should verify actual device performance in their specific applications. The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

Applications

- Power Over Ethernet (IEEE 802.3 af) port protection
- Automotive electronic control module protection
- Telecom equipment low voltage protection

MF-SMDF Series – PTC Resettable Fuses

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Thermal Derating Table - Ihold (Amps)

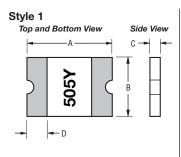
Model	Ambient Operating Temperature									
Wodel	-40 °C	-20 °C	0 °C	23 °C	40 °C	50 °C	60 °C	70 °C	85 °C	
MF-SMDF030	0.50	0.43	0.37	0.30	0.25	0.22	0.18	0.15	0.11	
MF-SMDF050	0.87	0.77	0.67	0.55	0.46	0.41	0.36	0.31	0.23	
MF-SMDF100/33X	1.66	1.47	1.29	1.10	0.91	0.83	0.73	0.64	0.50	
MF-SMDF150	2.38	2.10	1.82	1.50	1.27	1.13	0.99	0.85	0.64	
MF-SMDF200	2.95	2.65	2.35	2.00	1.74	1.59	1.44	1.29	1.06	
MF-SMDF260/24X	3.75	3.35	3.00	2.60	2.35	2.15	2.05	1.80	1.50	

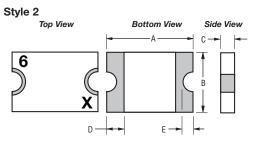
Itrip is approximately two times Ihold.

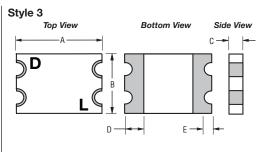
Product Dimensions

Model		4	E	3	(D	E	.	Chulo
Wodel	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.	Max.	Style
MF-SMDF030	4.72 (0.186)	<u>5.44</u> (0.214)	4.22 (0.166)	4.93 (0.194)	<u>0.79</u> (0.031)	1.09 (0.043)	0.30 (0.012)	N/A	N/A	1
MF-SMDF050	4.72 (0.186)	<u>5.44</u> (0.214)	4.22 (0.166)	4.93 (0.194)	<u>0.79</u> (0.031)	1.09 (0.043)	0.30 (0.012)	N/A	N/A	1
MF-SMDF100/33X	4.72 (0.186)	<u>5.44</u> (0.214)	4.22 (0.166)	4.93 (0.194)	<u>0.70</u> (0.028)	1.25 (0.049)	0.30 (0.012)	0.25 (0.010)	<u>0.70</u> (0.028)	2
MF-SMDF150	4.72 (0.186)	<u>5.44</u> (0.214)	4.22 (0.166)	4.93 (0.194)	<u>0.55</u> (0.022)	<u>0.85</u> (0.033)	0.30 (0.012)	N/A	N/A	1
MF-SMDF200	4.72 (0.186)	<u>5.44</u> (0.214)	4.22 (0.166)	4.93 (0.194)	<u>0.55</u> (0.022)	<u>0.85</u> (0.033)	0.30 (0.012)	N/A	N/A	1
MF-SMDF260/24X	4.72 (0.186)	<u>5.44</u> (0.214)	4.22 (0.166)	4.93 (0.194)	<u>0.70</u> (0.028)	2.00 (0.079)	0.30 (0.012)	0.25 (0.010)	<u>0.70</u> (0.028)	3

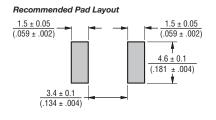
DIMENSIONS: $\frac{MM}{(INCHES)}$







Terminal material:Electroless Ni under immersion Au



MF-SMDF Series – PTC Resettable Fuses

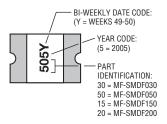
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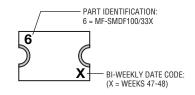
Packaging Quantity

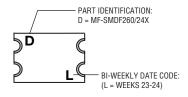
	Model		Unit Quantity (pcs.)	Unit
MF-SMDF030 MF-SMDF050	MF-SMDF100/33X MF-SMDF150	MF-SMDF200	6000	Reel
MF-SMDF260/24X			4000	Reel

Typical Part Marking

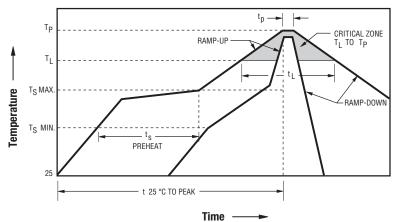
Represents total content. Layout may vary.







Solder Reflow Recommendations



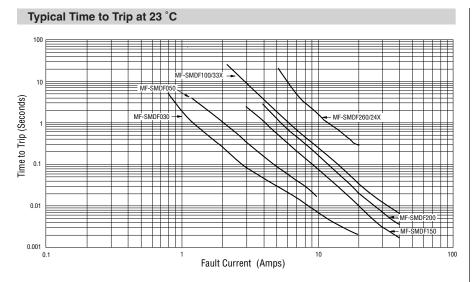
Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (Ts _{max} to T _p)	3 °C / second max.
PREHEAT:	
Temperature Min. (Ts _{min})	150 °C
Temperature Max. (Ts _{max})	200 °C
Time (Ts _{min} to Ts _{max}) (ts)	60~180 seconds
TIME MAINTAINED ABOVE:	
Temperature (T _L)	217 °C
Time (t _L)	60~150 seconds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

Notes:

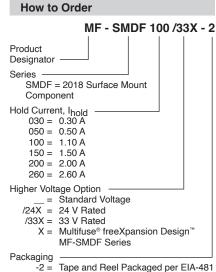
- MF-SMDF models are intended for reflow soldering (including but not limited to heating plate, hot air, IR, nitrogen, and vapor phase)
- Wave soldering is permissible only if the device is on the top of the PCB, opposite the heat source.
- · Hand soldering is not recommended for these devices.
- All temperatures refer to the topside of the device, measured on the device 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.
- Please refer to the <u>Multifuse® Polymer PTC Resettable Fuse Soldering Recommendations</u> document for more details.

MF-SMDF Series – PTC Resettable Fuses

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The Time to Trip curves represent typical performance of a device in a simulated application environment. Actual performance in specific customer applications may differ from these values due to the influence of other variables.



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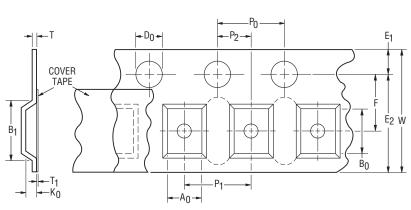
The Americas: Tel: +1-951 781-5500 • Email: americus@bourns.com

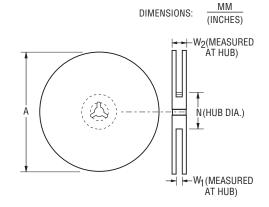
www.bourns.com

MF-SMDF Series Tape and Reel Specifications

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W 16.0 ± 0.3 (6.830 ± 0.012) (6.830 ± 0.012) (6.830 ± 0.012) 16.0 ± 0.3 (6.830 ± 0.012) (6.830 ± 0.012) P0 4.0 ± 0.1 (0.157 ± 0.004) (0.157 ± 0.004) 4.0 ± 0.1 (0.157 ± 0.004) 4.0 ± 0.1 (0.157 ± 0.004) 10P0 40 ± 0.2 (1.575 ± 0.008) (1.575 ± 0.008) 4.0 ± 0.2 (1.575 ± 0.008) 4.0 ± 0.2 (1.575 ± 0.008) P1 8.0 ± 0.1 (1.575 ± 0.008) (1.575 ± 0.008) (1.575 ± 0.008) (0.315 ± 0.004) 8.0 ± 0.1 (0.315 ± 0.004) 8.0 ± 0.1 (0.315 ± 0.004) P2 2.0 ± 0.1 (2.0 ± 0.1 (2.0 ± 0.006) (0.215 ± 0.004) 2.0 ± 0.1 (0.079 ± 0.004) (0.079 ± 0.004) (0.079 ± 0.004) A0 5.1 ± 0.15 (0.201 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.006) (0.221 ± 0.0	Tape Dimensions per EIA 481	MF-SMDF030, 050, 150, 200	MF-SMDF100/33X	MF-SMDF260/24X	
Po	W				
PO (0.157 ± 0.004) (0.157 ± 0.004) (0.157 ± 0.004) 10PO 40 ± 0.2 40 ± 0.2 40 ± 0.2 (1.575 ± 0.008) (1.575 ± 0.008) (1.575 ± 0.008) P1 8.0 ± 0.1 8.0 ± 0.1 8.0 ± 0.1 P2 2.0 ± 0.1 2.0 ± 0.1 2.0 ± 0.1 P2 2.0 ± 0.1 2.0 ± 0.1 2.0 ± 0.1 P3 5.1 ± 0.15 5.1 ± 0.15 5.4 ± 0.15 P4 (0.201 ± 0.006) (0.201 ± 0.006) (0.213 ± 0.006) P6 5.6 ± 0.15 5.6 ± 0.15 5.7 ± 0.15 P6 (0.220 ± 0.006) (0.221 ± 0.006) (0.234 ± 0.006) P1 max. (0.478) (0.478) (0.478) P0 1.5 ± 0.1/-0.0 1.5 ± 0.1/-0.0 1.5 ± 0.1/-0.0 P1 max. (0.478) (0.478) (0.478) P2 7.5 ± 0.10 7.5 ± 0.10 (0.59 ± 0.004/-0) P1 max. (0.04476) (0.059 ± 0.004/-0) (0.059 ± 0.004/-0) P1 max. (0.069 ± 0.0004) (0.069 ± 0.004/-0) (0.059 ± 0.004/-0)		(0.630 ± 0.012)	(0.630 ± 0.012)	(0.630 ± 0.012)	
10P ₀	D _o				
TOPO	1 0	(0.157 ± 0.004)	(0.157 ± 0.004)	(0.157 ± 0.004)	
P1 (1.578 ± 0.008) (1.578 ± 0.008) (1.578 ± 0.008) (1.578 ± 0.008) (1.578 ± 0.008) (1.578 ± 0.008) (1.578 ± 0.008) (1.578 ± 0.008) (1.578 ± 0.008) (0.201 ± 0.008) (0.218 ± 0.004) (0.315 ± 0.004) (0.315 ± 0.004) (0.315 ± 0.004) (0.079 ± 0.008) (0.213 ± 0.008) (0.079 ± 0.008) (0.079 ± 0.004) (0.273 ± 0.008) (0.273 ± 0.008) (0.273 ± 0.008) (0.273 ± 0.008) (0.273 ± 0.008) (0.273 ± 0.008) (0.273 ± 0.008) (0.074 ± 0.008) (0.059 ± 0.004) (0.059 ± 0.004) (0.059 ± 0.004) (0.059 ± 0.004) (0.059 ± 0.004) (0.059 ± 0.004) (0.059 ± 0.004) (0.059 ± 0.004) (0.059 ± 0.004) (0.059 ± 0.004) (0.059 ± 0.004) (0.059 ± 0.004) (0.059 ± 0.004) (0.059 ± 0.004) (0.059 ± 0.004)	10D-	40 ± 0.2	40 ± 0.2	40 ± 0.2	
P1 8.0 ± 0.1 (0.315 ± 0.004) P2 2.0 ± 0.1 (0.079 ± 0.004) 2.0 ± 0.1 (0.079 ± 0.004) 2.0 ± 0.1 (0.079 ± 0.004) A0 5.1 ± 0.15 (0.201 ± 0.006) 5.5 ± 0.15 (0.201 ± 0.006) 5.5 ± 0.15 (0.221 ± 0.006) 5.7 ± 0.15 (0.231 ± 0.006) B0 1.2.1 (0.476) 1.2.1 (0.476) 1.2.1 (0.476) 1.2.1 (0.476) 1.2.1 (0.476) D0 1.5 ± 0.1/0.0 (0.059 ± 0.004/0) F 7.5 ± 0.10 (0.059 ± 0.004/0) 1.5 ± 0.1/0.0 (0.059 ± 0.004/0) 1.75 ± 0.10 (0.059 ± 0.004/0) 1.75 ± 0.10 (0.059 ± 0.004/0) 1.75 ± 0.10 (0.059 ± 0.004/0) E1 1.75 ± 0.10 (0.069 ± 0.004) 1.75 ± 0.10 (0.0561) 1.75 ± 0.10 (0.0561) 1.75 ± 0.10 (0.0561) 1.0 ± 0.1 (0.0561) 1.1 ± 0.15 (0.0561) 1.1 ± 0.15 (0.0561) 2.1 ± 0.15 (0.0561) 1.5 ± 0.15 (1060	(1.575 ± 0.008)	(1.575 ± 0.008)	(1.575 ± 0.008)	
P2	D.	8.0 ± 0.1			
P2 (0.079 ± 0.004) (0.079 ± 0.004) (0.079 ± 0.004) A0 5.1 ± 0.15 (0.201 ± 0.006) 5.4 ± 0.15 (0.201 ± 0.006) 5.4 ± 0.15 (0.213 ± 0.006) B0 5.6 ± 0.15 (0.220 ± 0.006) 5.6 ± 0.15 (0.221 ± 0.006) 5.7 ± 0.15 (0.234 ± 0.006) B ₁ max. 12.1 (0.476) 12.1 (0.476) 12.1 (0.476) 12.1 (0.476) D0 1.5 + 0.1 + 0.0 (0.059 + 0.004/-0) F 7.5 ± 0.10 (0.0295 + 0.004) 7.5 ± 0.10 (0.295 + 0.004) 7.5 ± 0.10 (0.295 + 0.004) 1.75 ± 0.10 (0.0295 + 0.004) E ₂ min. 14.25 (0.561) 14.25 (0.561) 14.25 (0.561) 14.25 (0.561) T max. 0.6 (0.024) 0.06 (0.024) 0.024 (0.024) 0.024 (0.024) T ₁ max. 1.1 ± 0.1 (0.004) 1.1 ± 0.15 (0.004) 0.01 (0.004) K ₀ 1.1 ± 0.15 (0.004) 1.1 ± 0.15 (0.004) 0.004 (0.004) K ₀ 1.1 ± 0.15 (0.004) 1.1 ± 0.15 (0.004) 0.004 (0.004) K ₀ 1.1 ± 0.15 (0.004) 0.004 (0.004) 0.004 (0.004) Reel	P1	$\overline{(0.315 \pm 0.004)}$	$\overline{(0.315 \pm 0.004)}$	$\overline{(0.315 \pm 0.004)}$	
P2 (0.079 ± 0.004) (0.079 ± 0.004) (0.079 ± 0.004) A0 5.1 ± 0.15 (0.201 ± 0.006) 5.4 ± 0.15 (0.201 ± 0.006) 5.4 ± 0.15 (0.213 ± 0.006) B0 5.6 ± 0.15 (0.220 ± 0.006) 5.6 ± 0.15 (0.221 ± 0.006) 5.7 ± 0.15 (0.234 ± 0.006) B₁ max. 12.1 (0.476) 12.1 (0.476) 12.1 (0.476) 12.1 (0.476) D0 1.5 + 0.1 + 0.0 (0.059 + 0.004 + 0) 1.5 + 0.1 + 0.0 (0.059 + 0.004 + 0) 1.5 + 0.1 + 0.0 (0.059 + 0.004 + 0) F 7.5 ± 0.10 (0.295 + 0.004) 7.5 ± 0.10 (0.295 + 0.004) 7.5 ± 0.10 (0.295 + 0.004) 1.75 ± 0.10 (0.099 ± 0.004) E₂ min. 14.25 (0.561) 14.25 (0.561) 14.25 (0.561) 14.25 (0.561) T max. 0.6 (0.024) 0.024 (0.024) 0.024 (0.024) 0.024 (0.004) K₀ 1.1 ± 0.15 (0.043 ± 0.006) 1.1 ± 0.15 (0.043 ± 0.006) 2.15 ± 0.15 (0.035 ± 0.006) Leader min. 390 (0.043 ± 0.006) 390 (0.043 ± 0.006) 390 (0.085 ± 0.006) Reel Dimensions 331 (13.03) 13.31 (13.03) 13.03 (13.03) N min. 50 (0.044 ± 0.079/-0) (0.044 ± 0.079/-0) (0.044 ± 0.079/-0) (0.044 ± 0.079/-0) (0.044 ± 0.079/-0) (0.044 ± 0.079/-0) (0.044 ± 0.079/-	D	2.0 ± 0.1	2.0 ± 0.1	2.0 ± 0.1	
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AO (0.201 ± 0.006) (0.201 ± 0.006) (0.213 ± 0.006) BO 5.6 ± 0.15 5.6 ± 0.15 5.7 ± 0.15 (0.220 ± 0.006) (0.221 ± 0.006) (0.234 ± 0.006) B₁ max. 12.1 12.1 12.1 (0.476) (0.476) (0.476) (0.476) DO 1.5 + 0.1/-0.0 (0.059 + 0.004/-0) (0.059 + 0.004/-0) (0.059 + 0.004/-0) F 7.5 ± 0.10 7.5 ± 0.10 7.5 ± 0.10 7.5 ± 0.10 7.5 ± 0.10 E1 1.75 ± 0.10 1.75 ± 0.10 1.75 ± 0.10 (0.059 ± 0.004) (0.295 + 0.004) E2 min. 1.4.25 1.4.25 1.4.25 1.4.25 T max. 0.6 0.8 0.6 0.6 (0.024) (0.024) (0.024) (0.024) T1 max. 0.1 0.1 0.1 0.1 T2 max. 0.6 0.8 0.6 0.6 (0.024) (0.024) (0.024) (0.024) T1 max. 0.1 0.1 0.1 0.1 <td></td> <td></td> <td></td> <td></td>					
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	W				
	vv1	$\overline{(0.646 + 0.079/-0)}$	(0.646 + 0.079/-0)	(0.646 + 0.079/-0)	
	W- may	22.4	22.4	22.4	
	w2 max.				





MF-SMDF SERIES, REV. W, 02/23

Specifications are subject to change without notice.

Bourns® Multifuse® PPTC Resettable Fuses

BOURNS

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