

Description

The femtoSMDC series provides surface mount overcurrent protection for applications where space is at a premium and resettable protection is desired.



Features

- RoHS compliant, lead-free and halogen free
- Fast response to fault currents
- Compact design saves board space
- Low resistance, Low-profile
- Compatible with high temperature solders

Applications

- USB peripherals, Disk drives, CD-ROMs
- Plug and play protection for motherboards and peripherals
- PDAs / digital cameras
- Game console port protection
- Tablet and Notebook PCs
- E-readers

Performance Specification

Model	Marking	V _{max} (V dc)	I _{max} (A)	I _{hold} @25°C (A)	I _{trip} @25°C (A)	P _d Typ. (W)	Maximum Time To Trip		Resistance	
							Current (A)	Time (Sec)	R _{i min} (Ω)	R _{1max} (Ω)
SMD2920R030SF-1	R030	60	10	0.30	0.60	1.5	1.5	3.0	0.600	4.800
SMD2920R030SF72V-1	R030	72	10	0.30	0.60	1.5	1.5	3.0	0.600	4.800
SMD2920R050SF-1	R050	60	10	0.50	1.00	1.5	2.5	4.0	0.180	1.400
SMD2920R075SF-1	R075	33	40	0.75	1.50	1.5	8.0	0.3	0.100	1.000
SMD2920R075SF60V-1	R075	60	40	0.75	1.50	1.5	8.0	0.3	0.100	1.000
SMD2920R100SF-1	R100	33	40	1.10	2.20	1.5	8.0	0.5	0.065	0.410
SMD2920R100SF60V-1	R100	60	40	1.10	2.20	1.5	8.0	0.5	0.065	0.410
SMD2920R125SF-1	R125	33	40	1.25	2.50	1.5	8.0	2.0	0.050	0.250
SMD2920R150SF-1	R150	33	40	1.50	3.00	1.5	8.0	2.0	0.035	0.230
SMD2920R150SF42V-1	R150	42	40	1.50	3.00	1.5	8.0	2.0	0.035	0.230
SMD2920R185SF-1	R185	33	40	1.85	3.70	1.5	8.0	2.5	0.030	0.150
SMD2920R185SF42V-1	R185	42	40	1.85	3.70	1.5	8.0	2.5	0.030	0.150
SMD2920R200SF-1	R200	16	40	2.00	4.00	1.5	8.0	4.5	0.020	0.120
SMD2920R200SF24V-1	R200	24	40	2.00	4.00	1.5	8.0	4.5	0.020	0.120
SMD2920R200SF33V-1	R200	33	40	2.00	4.00	1.5	8.0	4.5	0.020	0.120
SMD2920R200SF42V-1	R200	42	40	2.00	4.00	1.5	8.0	4.5	0.020	0.120
SMD2920R250SF-1	R250	16	40	2.50	5.00	1.5	8.0	16.0	0.020	0.085
SMD2920R250SF24V-1	R250	24	40	2.50	5.00	1.5	8.0	16.0	0.020	0.085
SMD2920R250SF33V-1	R250	33	40	2.50	5.00	1.5	8.0	16.0	0.020	0.085
SMD2920R260SF-1	R260	6	40	2.60	5.20	1.5	8.0	10.0	0.014	0.075
SMD2920R260SF16V-1	R260	16	40	2.60	5.20	1.5	8.0	10.0	0.014	0.075
SMD2920R260SF24V-1	R260	24	40	2.60	5.20	1.5	8.0	10.0	0.014	0.075
SMD2920R300SF-1	R300	6	40	3.00	6.00	1.5	8.0	20.0	0.012	0.048
SMD2920R300SF16V-1	R300	16	40	3.00	6.00	1.5	8.0	20.0	0.012	0.048
SMD2920R300SF24V-1	R300	24	40	3.00	6.00	1.5	8.0	20.0	0.012	0.048
SMD2920R300SF30V-1	R300	30	40	3.00	6.00	1.5	8.0	20.0	0.012	0.048
SMD2920R300SF33V-1	R300	33	40	3.00	6.00	1.5	8.0	20.0	0.012	0.048
SMD2920R400SF-1	R400	6	40	4.00	8.00	1.5	20.0	4.0	0.006	0.030
SMD2920R400SF16V-1	R400	16	40	4.00	8.00	1.5	20.0	4.0	0.006	0.030
SMD2920R400SF24V-1	R400	24	40	4.00	8.00	1.5	20.0	4.0	0.006	0.030
SMD2920R500SF-1	R500	6	40	5.00	10.00	1.5	25.0	5.0	0.005	0.025
SMD2920R500SF12V-1	R500	12	40	5.00	10.00	1.5	25.0	5.0	0.005	0.025
SMD2920R500SF16V-1	R500	16	40	5.00	10.00	1.5	25.0	5.0	0.005	0.025
SMD2920R500SF24V-1	R500	24	40	5.00	10.00	1.5	25.0	5.0	0.005	0.025
SMD2920R600SF-1	R600	6	40	6.00	12.00	1.5	25.0	6.0	0.004	0.020
SMD2920R600SF12V-1	R600	12	40	6.00	12.00	1.5	25.0	6.0	0.004	0.020
SMD2920R600SF16V-1	R600	16	40	6.00	12.00	1.5	25.0	6.0	0.004	0.020
SMD2920R700SF-1	R700	6	40	7.00	14.00	1.5	25.0	6.0	0.0025	0.010
SMD2920R700SF12V-1	R700	12	40	7.00	14.00	1.5	25.0	6.0	0.0025	0.010

V_{max} = Maximum operating voltage device can withstand without damage at rated current (I_{max}).

I max = Maximum fault current device can withstand without damage at rated voltage (V max).

I hold = Hold Current. Maximum current device will not trip in 25°C still air.

I trip = Trip Current. Minimum current at which the device will always trip in 25°C still air.

Pd = Power dissipation when device is in the tripped state in 25°C still air environment at rated voltage.

Ri min/max = Minimum/Maximum device resistance prior to tripping at 25°C.

R1max = Maximum device resistance is measured one hour post reflow.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+85°C, 1000 hrs.	I HOLD/I TRIP PASS
Humidity aging	+85°C, 85% R.H. , 168 hours	I HOLD/I TRIP PASS
Thermal shock	+85°C to -40°C, 20 times	I HOLD/I TRIP PASS
Resistance to solvent	MIL-STD-202,Method 215	No change
Vibration	MIL-STD-202,Method 201	No change
Ambient operating conditions : - 40 °C to +85 °C		
Maximum surface temperature of the device in the tripped state is 125 °C		

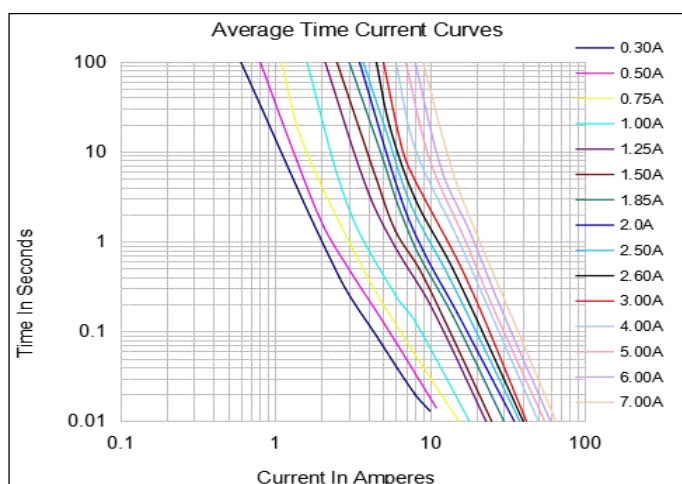
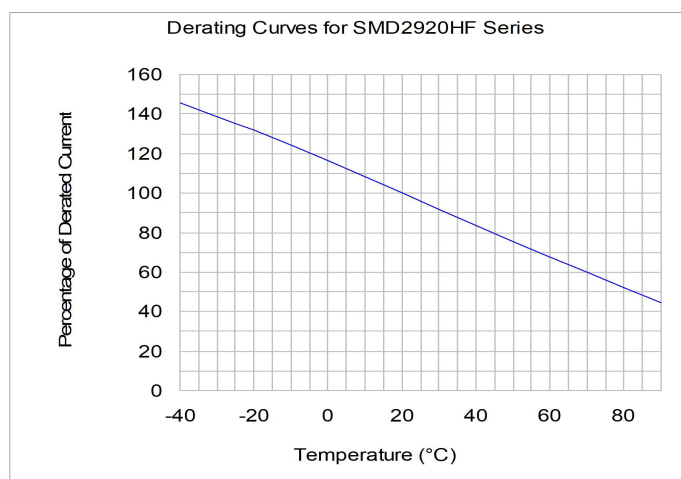
Thermal Derating Chart

Recommended Hold Current(A) at Ambient Temperature(°C)

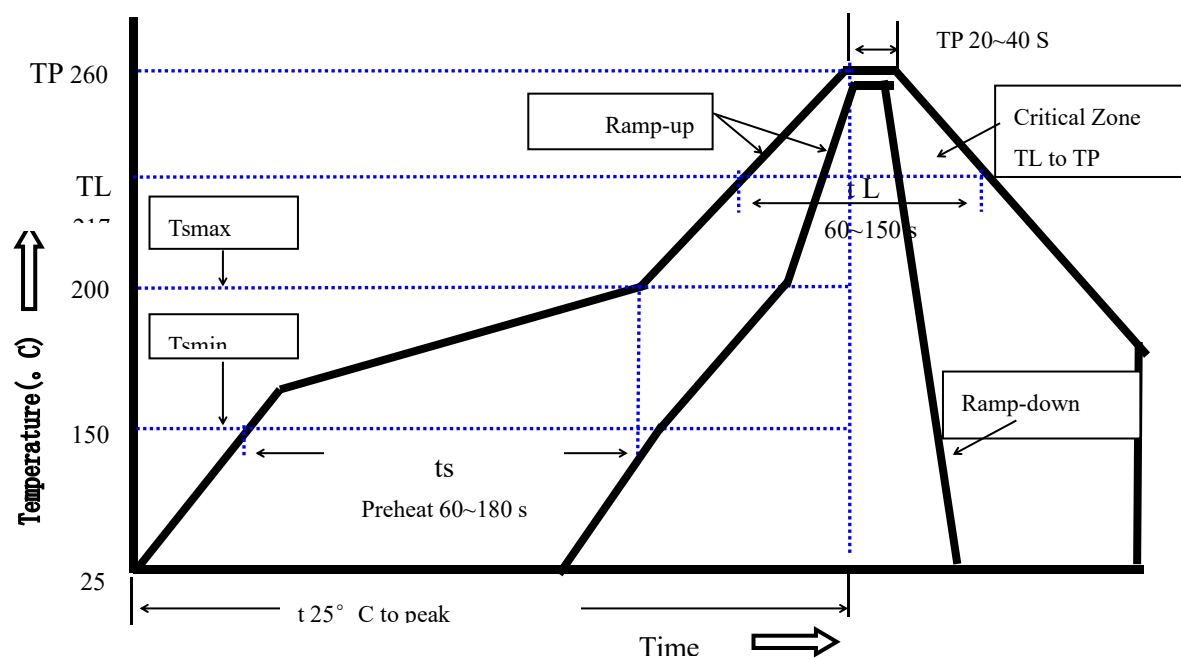
Model	Ambient Operation Temperature								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
SMD2920R030SF-1	0.45	0.40	0.35	0.30	0.25	0.23	0.20	0.17	0.14
SMD2920R050SF-1	0.76	0.67	0.59	0.50	0.42	0.38	0.33	0.29	0.23
SMD2920R075SF-1	1.13	1.01	0.88	0.75	0.62	0.56	0.50	0.44	0.34
SMD2920R100SF-1	1.66	1.47	1.29	1.10	0.91	0.83	0.73	0.64	0.50
SMD2920R125SF-1	1.89	1.68	1.46	1.25	1.04	0.94	0.83	0.73	0.56
SMD2920R150SF-1	2.27	2.01	1.76	1.50	1.25	1.13	1.00	0.87	0.74
SMD2920R185SF-1	2.80	2.47	2.17	1.85	1.54	1.39	1.22	1.07	0.85
SMD2920R200SF-1	3.02	2.68	2.34	2.00	1.66	1.50	1.32	1.16	0.90
SMD2920R250SF-1	3.78	3.35	2.93	2.50	2.08	1.88	1.65	1.45	1.13
SMD2920R260SF-1	3.64	3.25	2.91	2.60	2.26	2.08	1.95	1.74	1.13
SMD2920R300SF-1	4.53	4.02	3.51	3.00	2.52	2.26	1.99	1.75	1.34
SMD2920R400SF-1	6.04	5.36	4.68	4.00	3.36	3.01	2.65	2.33	1.79
SMD2920R500SF-1	7.55	6.70	5.85	5.00	4.20	3.77	3.32	2.92	2.23
SMD2920R600SF-1	8.60	7.70	6.80	6.00	4.95	4.60	4.06	3.65	3.15
SMD2920R700SF-1	10.03	8.98	7.93	7.00	5.77	5.36	4.73	4.26	3.68

Thermal Derating Curve

Average Time-Current Curve



Soldering Parameters



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)	60~180 seconds
Time maintained above:	
-Temperature(TL)	217°C
-Time(tL)	60~150 seconds
Peak Temperature(Tp)	260°C
Ramp-Down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max
Storage Condition	0°C~30°C,30%~60%RH

Recommended reflow methods: IR, vapor phase oven, hot air oven, N2 environment for lead-free

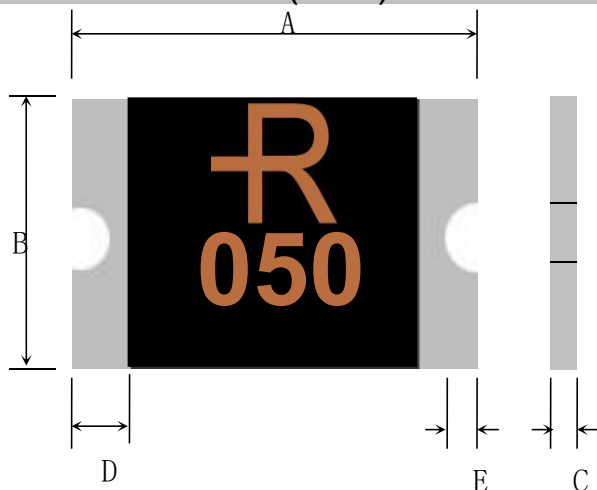
Recommended maximum paste thickness is 0.25mm

Devices can be cleaned using standard industry methods and solvents.

Note 1: All temperature refer to topside of the package, measured on the package body surface.

Note 2: If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

Physical Dimensions(mm.)



Model	A		B		C		D	E
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.
SMD2920R030SF-1	6.73	7.98	4.80	5.44	0.60	1.20	0.30	0.25
SMD2920R030SF72V-1	6.73	7.98	4.80	5.44	0.60	1.20	0.30	0.25
SMD2920R050SF-1	6.73	7.98	4.80	5.44	0.80	1.60	0.30	0.25
SMD2920R075SF-1	6.73	7.98	4.80	5.44	0.70	1.30	0.30	0.25
SMD2920R075SF60V-1	6.73	7.98	4.80	5.44	0.80	1.60	0.30	0.25
SMD2920R100SF-1	6.73	7.98	4.80	5.44	0.40	1.00	0.30	0.25
SMD2920R100SF60V-1	6.73	7.98	4.80	5.44	1.00	2.10	0.30	0.25
SMD2920R125SF-1	6.73	7.98	4.80	5.44	0.40	1.00	0.30	0.25
SMD2920R150SF-1	6.73	7.98	4.80	5.44	0.50	1.30	0.30	0.25
SMD2920R150SF42V-1	6.73	7.98	4.80	5.44	0.50	1.30	0.30	0.25
SMD2920R185SF-1	6.73	7.98	4.80	5.44	0.70	1.40	0.30	0.25
SMD2920R185SF42V-1	6.73	7.98	4.80	5.44	0.70	1.40	0.30	0.25
SMD2920R200SF-1	6.73	7.98	4.80	5.44	0.70	1.40	0.30	0.25
SMD2920R200SF24V-1	6.73	7.98	4.80	5.44	0.70	1.40	0.30	0.25
SMD2920R200SF33V-1	6.73	7.98	4.80	5.44	0.70	1.40	0.30	0.25
SMD2920R200SF42V-1	6.73	7.98	4.80	5.44	0.70	1.40	0.30	0.25
SMD2920R250SF-1	6.73	7.98	4.80	5.44	0.7	1.40	0.30	0.25
SMD2920R250SF24V-1	6.73	7.98	4.80	5.44	0.7	1.40	0.30	0.25

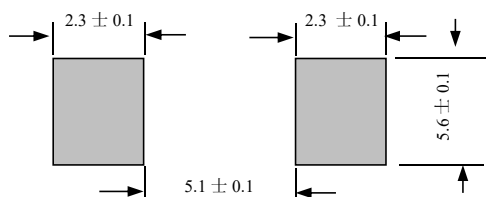
SMD2920R250SF33V-1	6.73	7.98	4.80	5.44	0.7	1.40	0.30	0.25
SMD2920R260SF-1	6.73	7.98	4.80	5.44	0.7	1.40	0.30	0.25
SMD2920R260SF16V-1	6.73	7.98	4.80	5.44	0.70	1.40	0.30	0.25
SMD2920R260SF24V-1	6.73	7.98	4.80	5.44	0.70	1.40	0.30	0.25
SMD2920R300SF-1	6.73	7.98	4.80	5.44	0.60	1.20	0.30	0.25
SMD2920R300SF16V-1	6.73	7.98	4.80	5.44	0.60	1.20	0.30	0.25
SMD2920R300SF24V-1	6.73	7.98	4.80	5.44	0.60	1.20	0.30	0.25
SMD2920R300SF30V-1	6.73	7.98	4.80	5.44	0.60	1.20	0.30	0.25
SMD2920R300SF33V-1	6.73	7.98	4.80	5.44	0.60	1.20	0.30	0.25
SMD2920R400SF-1	6.73	7.98	4.80	5.44	1.00	1.60	0.30	0.25
SMD2920R400SF16V-1	6.73	7.98	4.80	5.44	1.00	1.60	0.30	0.25
SMD2920R400SF24V-1	6.73	7.98	4.80	5.44	1.00	1.60	0.30	0.25
SMD2920R500SF-1	6.73	7.98	4.80	5.44	1.00	1.60	0.30	0.25
SMD2920R500SF12V-1	6.73	7.98	4.80	5.44	1.00	1.60	0.30	0.25
SMD2920R500SF16V-1	6.73	7.98	4.80	5.44	1.00	1.60	0.30	0.25
SMD2920R500SF24V-1	6.73	7.98	4.80	5.44	1.00	1.60	0.30	0.25
SMD2920R600SF-1	6.73	7.98	4.80	5.44	1.00	1.60	0.30	0.25
SMD2920R600SF12V-1	6.73	7.98	4.80	5.44	1.00	1.60	0.30	0.25
SMD2920R600SF16V-1	6.73	7.98	4.80	5.44	1.00	1.60	0.30	0.25
SMD2920R700SF-1	6.73	7.98	4.80	5.44	1.00	1.60	0.30	0.25
SMD2920R700SF12V-1	6.73	7.98	4.80	5.44	1.00	1.60	0.30	0.25

Termination Pad Characteristics

Terminal pad materials: Tin-plated Nickel-Copper

Terminal pad solder ability: Meets EIA specification RS186-9E and ANSI/J-STD-002 Category 3.

Recommended Pad Layout (mm.)



注：在此印锡面积条件下，推荐钢网厚度为 $\geq 0.12\text{MM}$ (钢网厚度不够要增大刷锡面积)

Packaging Quantity

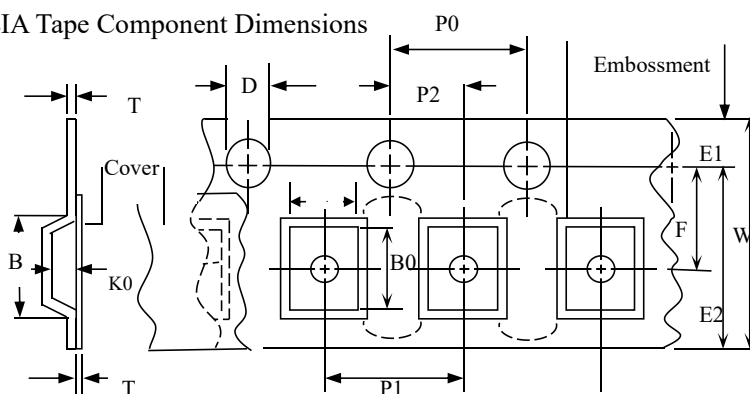
Part Number	Quantity
SMD2920 Series	1500 pcs/reel
SMD2920R100SF60V	1000 pcs/reel

Tape & reel packaging per EIA481-1

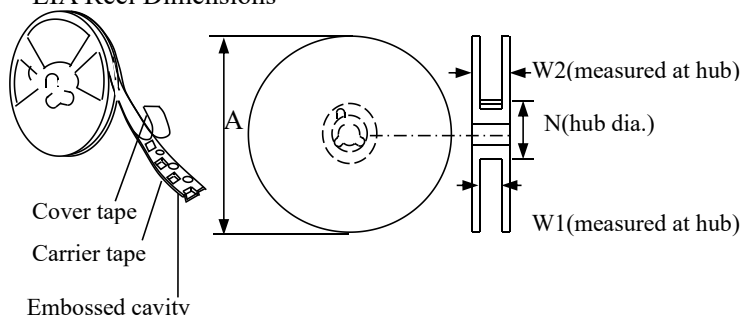
Tape And Reel Specifications (mm)

Governing Specifications	EIA 481-2
W	16.00 ± 0.3
P0	4.00 ± 0.10
P1	8.00 ± 0.10
P2	2.00 ± 0.05
A0	5.70 ± 0.10
B0	8.00 ± 0.10
B1max.	12.10
D0	$1.50 + 0.1, -0$
F	7.50 ± 0.05
E1	1.75 ± 0.10
E2min.	14.25
T	0.60
T1max.	0.10
K0	0.80 ± 0.1
Leader min.	390
Trailer min.	160
Reel Dimensions	
A max.	178
N min.	60
W1	16.40 ± 0.5
W2	22.40

EIA Tape Component Dimensions



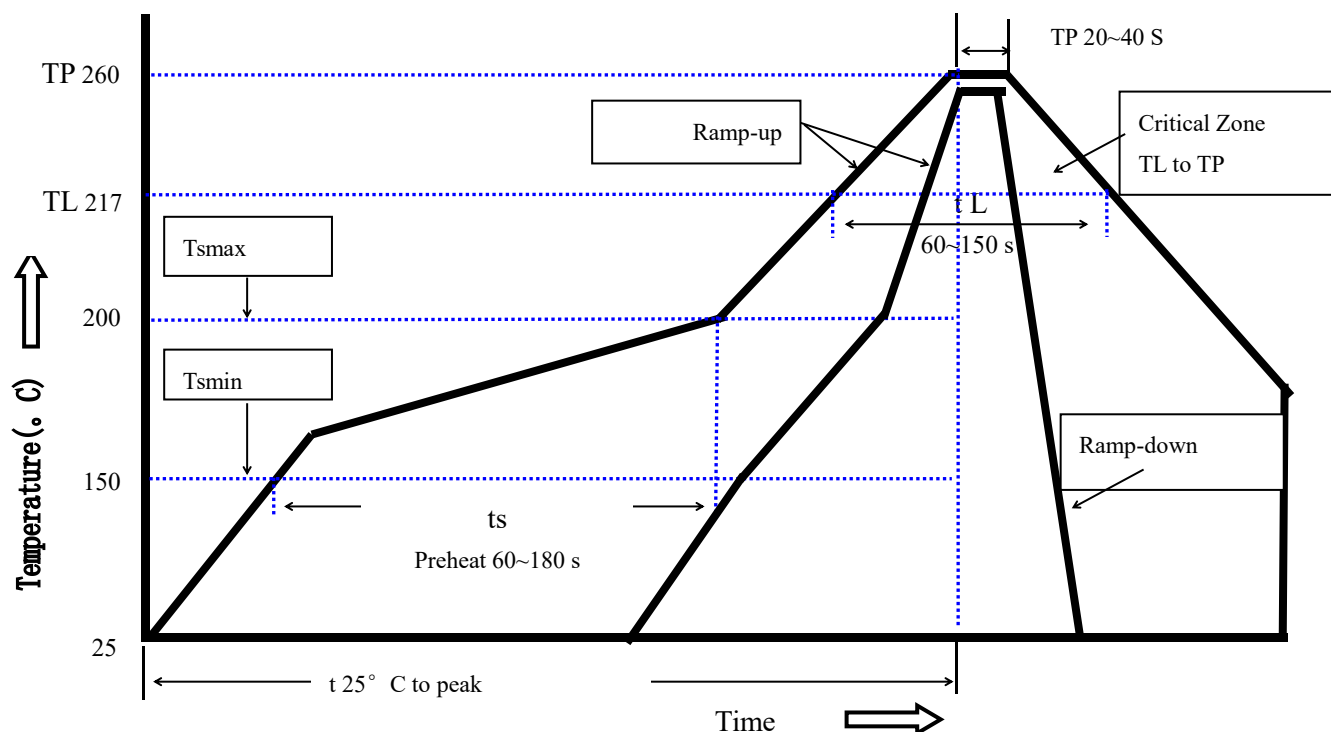
EIA Reel Dimensions



Storage And Handling

- Storage conditions: $0^{\circ}\text{C} - 30^{\circ}\text{C}$, 30%~60% R.H.
- Devices may not meet specified performance if storage conditions are exceeded.

Soldering Parameters



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)	60~180 seconds
Time maintained above:	
-Temperature(TL)	217°C
-Time(tL)	60~150 seconds
Peak Temperature(Tp)	260°C
Ramp-Down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max
Storage Condition	0°C~35°C,30%~60%RH

Recommended reflow methods: IR, vapor phase oven, hot air oven, N2 environment for lead-free

Recommended maximum paste thickness is 0.25mm

Devices can be cleaned using standard industry methods and solvents.

Note 1: All temperature refer to topside of the package, measured on the package body surface.

Note 2: If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

Storage And Handling

- Storage conditions: Blackout seal
- Devices may not meet specified performance if storage conditions are exceeded.

注意事项

PPTC 使用注意事项:

- PPTC 为热敏元件，对环境温度比较敏感，建议在 PPTC 周围不要设计热源元件，尽量减少外部热源的影响。
- 请在规格书规定的参数下(<10%)使用，超出电压电流规格值，会导致 PPTC 出现电弧，阻值升高，甚至烧片。
- 规格书的电气特性，均是基于在阿赛姆指定测试板经过一次回流焊之后的测试；如果客户有二次回流焊或者注塑点胶等其他热工序，会对上述参数有一定程度的衰减，需要验证其适用性。
- PPTC 贴片产品是为 SMT 工艺设计的封装形式，焊接工艺为回流焊；要求客户遵守我们推荐的焊盘布局和回流焊配置文件。不正确的电路板布局或回流配置可能会对 PPTC 的可焊性性能产生负面影响。焊接工艺可参考阿赛姆推荐的回流焊曲线。如果回流焊温度超过推荐的值，PPTC 将有可能受到损伤。使用手工焊及波峰焊接 PPTC 可能会导致产品焊后电阻超出规格。
- 某些注塑料、单组份、双组份固化胶粘剂、硅胶、侵蚀性溶剂、石蜡污染 PPTC 材料破坏芯片，需要对注塑料胶料等材料牌号以及应用参数（如温度、时间等）进行验证，以确保产品及工艺的匹配性，确认不会影响 PPTC 性能之后方可使用。PPTC 在充电线端应用中，建议使用 PP 类材料做内膜，禁止使用 TPE 类与 PVC 类等材料做内膜。
- PPTC 贴装或使用过程中，不建议使用洗板水或其他清洗剂进行清洗。如必须使用，需要验证各类清洗剂、洗板水以及溶剂的适用性，确认不会影响 PPTC 性能之后方可使用。已知对 PPTC 有影响的化学药品包括但不限于醚类、苯类、酮类以及脂类等较强溶解性、破坏性的有机化合物，清洗后将产品放置于敞开的环境中至少 24 小时，将残留的溶剂进行充分的挥发。
- 装配过程中，避免用暴力砸、挤、压、拉、扭、刺等方式作用 PPTC 本体，以免引起 PPTC 性能衰减。
- PPTC 元件是为电路中偶尔出现的过流而设计的，不建议用在连续且持续过流的电路中。
- 阿赛姆 SMD PPTC 湿敏等级为 2 级，为密封包装。客户如在库存中发现有包装破损的，立即将产品隔离处理；使用时如有余料，需恢复之前包装状态，做密封保存，否则会影响产品性能导致焊后电阻越规格。