

## Features

- ▶ compact design saves board space
- ▶ RoHS compliant and lead-free
- ▶ Halogen-free
- ▶ Fast reponse to fault current
- ▶ Symmetrical design

## Applications

- ▶ USB port protection - USB 2.0, 3.0&OTG
- ▶ HDMI 1.4 Source protection
- ▶ PDAs / digital cameras
- ▶ Game console port protection
- ▶ PC motherboards-plug and play protection

**HF RoHS REACH Pb Free**

## 1. Electrical Characteristics

Model	I-hold (A)	I-trip (A)	Vmax (Vdc)	Imax (A)	Pd typ (W)	Max. Time to trip		R0 min (Ohm)	R1max (Ohm)
						Current (A)	Time (Sec.)		
SMD1206P005TF	0.05	0.15	60.00	10.00	0.60	0.25	1.50	2.50	40.00
SMD1206P005TF/30	0.05	0.15	30.00	40.00	0.60	0.25	1.50	2.50	40.00
SMD1206P010TF	0.10	0.25	60.00	10.00	0.60	0.50	1.50	1.40	15.00
SMD1206P010TF/30	0.10	0.25	30.00	40.00	0.60	0.50	1.50	1.40	15.00
SMD1206P012TF	0.12	0.29	30.00	100.00	0.60	1.00	0.20	1.35	8.50
SMD1206P016TF	0.16	0.45	30.00	100.00	0.60	1.00	0.30	1.10	5.00
SMD1206P020TF/24	0.20	0.40	24.00	100.00	0.60	8.00	0.10	0.50	2.60
SMD1206P025TF	0.25	0.50	16.00	100.00	0.60	8.00	0.08	0.40	2.40
SMD1206P025TF/24	0.25	0.50	24.00	100.00	0.60	8.00	0.08	0.40	2.40
SMD1206P035TF/16	0.35	0.70	16.00	100.00	0.60	8.00	0.10	0.30	1.20
SMD1206P035TF/30	0.35	0.70	30.00	100.00	0.60	8.00	0.10	0.30	1.20
SMD1206P050TF	0.50	1.00	6.00	100.00	0.60	8.00	0.10	0.15	0.75
SMD1206P050TF/15	0.50	1.00	15.00	100.00	0.60	8.00	0.10	0.15	0.75
SMD1206P050TF/24	0.50	1.00	24.00	100.00	0.60	8.00	0.10	0.15	1.00
SMD1206P075TFT	0.75	1.50	8.00	100.00	0.60	8.00	0.20	0.09	0.40
SMD1206P075TF/13.2	0.75	1.50	13.20	100.00	0.60	8.00	0.20	0.09	0.40
SMD1206P075TF/16	0.75	1.50	16.00	100.00	0.60	8.00	0.20	0.09	0.50
SMD1206P110TFT	1.10	2.20	8.00	100.00	0.80	8.00	0.10	0.04	0.21
SMD1206P150TFT	1.50	3.00	8.00	100.00	0.80	8.00	0.30	0.03	0.15
SMD1206P175TF	1.75	3.50	6.00	100.00	0.80	8.00	0.50	0.02	0.09
SMD1206P200TF	2.00	4.00	6.00	100.00	0.80	8.00	0.50	0.018	0.085

I-hold: Holding Current: maximum current at which the device will not trip in 25°C still air.

I-trip: Tripping Current: minimum current at which the device will trip in 25°C still air.

Vmax: Maximum voltage device can withstand without damage at rated current(Imax).

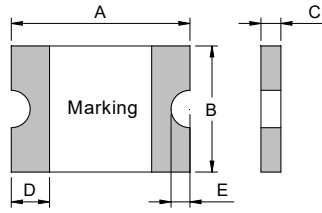
I max: Maximum fault current device can withstand without damage at rated voltage(Vmax).

Pd typ: Typical power dissipated from device when in the tripped state at 25°C still air.

R0 min: Minimum resistance of device in initial (un-soldered) state.

R1 max: Maximum resistance of device at 25°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

## 2. Product Dimensions(mm)&Marking



Model	A		B		C		D		E	Marking
	Min	Max	Min	Max	Min	Max	Min	Max	Min	
SMD1206P005TF	3.00	3.40	1.40	1.80	0.65	1.15	0.25	0.75	0.10	005
SMD1206P005TF/30	3.00	3.40	1.40	1.80	0.65	1.15	0.25	0.75	0.10	005
SMD1206P010TF	3.00	3.40	1.40	1.80	0.65	1.15	0.25	0.75	0.10	010
SMD1206P010TF/30	3.00	3.40	1.40	1.80	0.65	1.15	0.25	0.75	0.10	010
SMD1206P012TF	3.00	3.40	1.40	1.80	0.65	1.15	0.25	0.75	0.10	012
SMD1206P016TF	3.00	3.40	1.40	1.80	0.65	1.15	0.25	0.75	0.10	016
SMD1206P020TF/24	3.00	3.40	1.40	1.80	0.35	0.85	0.25	0.75	0.10	020
SMD1206P025TF	3.00	3.40	1.40	1.80	0.35	0.85	0.25	0.75	0.10	025
SMD1206P025TF/24	3.00	3.40	1.40	1.80	0.35	0.85	0.25	0.75	0.10	025
SMD1206P035TF/16	3.00	3.40	1.40	1.80	0.35	0.85	0.25	0.75	0.10	035
SMD1206P035TF/30	3.00	3.40	1.40	1.80	0.35	0.85	0.25	0.75	0.10	035
SMD1206P050TF	3.00	3.40	1.40	1.80	0.35	0.85	0.25	0.75	0.10	050
SMD1206P050TF/15	3.00	3.40	1.40	1.80	0.35	0.85	0.25	0.75	0.10	050
SMD1206P050TF/24	3.00	3.40	1.40	1.80	0.65	1.15	0.25	0.75	0.10	050
SMD1206P075TFT	3.00	3.40	1.40	1.80	0.35	0.85	0.25	0.75	0.10	075
SMD1206P075TF/13.2	3.00	3.40	1.40	1.80	0.35	0.85	0.25	0.75	0.10	075
SMD1206P075TF/16	3.00	3.40	1.40	1.80	0.65	1.15	0.25	0.75	0.10	075
SMD1206P110TFT	3.00	3.40	1.40	1.80	0.35	0.85	0.25	0.75	0.10	110
SMD1206P150TFT	3.00	3.40	1.40	1.80	0.65	1.15	0.25	0.75	0.10	150
SMD1206P175TF	3.00	3.40	1.40	1.80	0.65	1.15	0.25	0.75	0.10	175
SMD1206P200TF	3.00	3.40	1.40	1.80	0.65	1.15	0.25	0.75	0.10	200

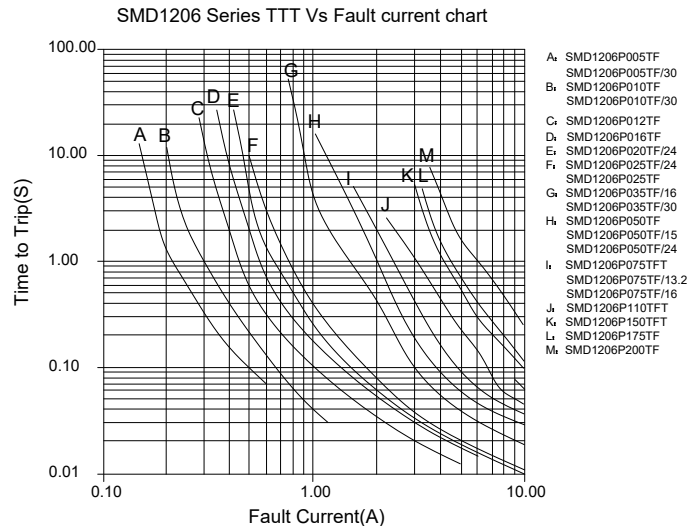
## 3. Thermal Derating Chart

Recommended hold current(A) at ambient Temperature(°C)

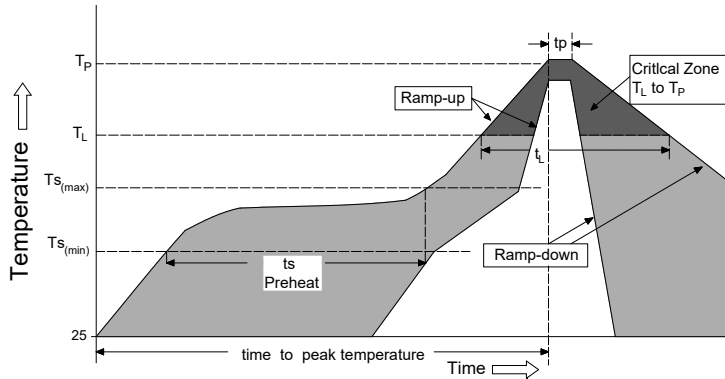
Model	Ambient Operating Temperature								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
SMD1206P005TF	0.076	0.068	0.060	0.050	0.043	0.039	0.034	0.030	0.023
SMD1206P005TF/30	0.076	0.068	0.060	0.050	0.043	0.039	0.034	0.030	0.023
SMD1206P010TF	0.156	0.139	0.120	0.100	0.083	0.074	0.065	0.056	0.042
SMD1206P010TF/30	0.156	0.139	0.120	0.100	0.083	0.074	0.065	0.056	0.042
SMD1206P012TF	0.18	0.16	0.14	0.12	0.10	0.09	0.08	0.07	0.05
SMD1206P016TF	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.09
SMD1206P020TF/24	0.28	0.25	0.23	0.20	0.17	0.15	0.14	0.12	0.09
SMD1206P025TF	0.37	0.33	0.29	0.25	0.22	0.2	0.17	0.15	0.12
SMD1206P025TF/24	0.37	0.33	0.29	0.25	0.22	0.2	0.17	0.15	0.12
SMD1206P035TF/16	0.50	0.45	0.40	0.35	0.30	0.27	0.24	0.21	0.15
SMD1206P035TF/30	0.50	0.45	0.40	0.35	0.30	0.27	0.24	0.21	0.15
SMD1206P050TF	0.71	0.64	0.57	0.50	0.42	0.39	0.35	0.31	0.25

SMD1206P050TF/15	0.71	0.64	0.57	0.50	0.42	0.39	0.35	0.31	0.25
SMD1206P050TF/24	0.71	0.64	0.57	0.50	0.42	0.39	0.35	0.31	0.25
SMD1206P075TFT	1.14	1.01	0.88	0.75	0.65	0.59	0.54	0.49	0.41
SMD1206P075TF/13.2	1.14	1.01	0.88	0.75	0.65	0.59	0.54	0.49	0.41
SMD1206P075TF/16	1.14	1.01	0.88	0.75	0.65	0.59	0.54	0.49	0.41
SMD1206P110TFT	1.64	1.46	1.30	1.10	0.92	0.83	0.80	0.65	0.52
SMD1206P150TFT	2.20	1.99	1.77	1.50	1.34	1.23	1.10	1.01	0.84
SMD1206P175TF	2.50	2.25	2.00	1.75	1.55	1.45	1.35	1.25	1.10
SMD1206P200TF	2.60	2.44	2.35	2.00	1.78	1.67	1.50	1.45	1.10

### 4. Typical time to trip at 25°C



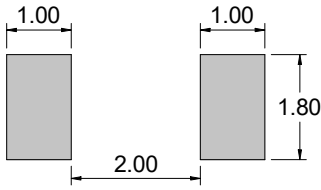
### 5. Soldering parameters



Profile Feature		Pb-Free Assembly
Average Ramp-Up Rate ( $T_{S(max)}$ to $T_P$ )		3°C/second max
Pre Heat:	Temperature Min ( $T_{S(min)}$ )	150°C
	Temperature Max ( $T_{S(max)}$ )	200°C
	Time (Min to Max) ( $t_s$ )	60 – 180 secs
Time Maintained Above:	Temperature ( $T_L$ )	217°C
	Temperature ( $t_L$ )	60 – 150 seconds
Peak / Classification Temperature ( $T_P$ )		260 <sup>+0/-5</sup> °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 ( $T_P$ )		8 minutes Max.

- ◆ All temperature refer to topside of the package, measured on the package body surface
- ◆ If reflow temperature exceeds the recommended profile, devices may not meet the performance requirements
- ◆ Recommended reflow methods: IR, vapor phase oven, hot air oven, N2 environment for lead
- ◆ Recommended maximum paste thickness is 0.25mm (0.010inch)
- ◆ Devices can be cleaned using standard industry methods and solvents

## 6. Recommended Pad Layout(mm) & Physical Specifications



Terminal Material	Tin-Plated Nickel-Copper (Solder Material: Matte Tin (Sn))
Lead Solderability	Meets EIA Specification RS186-9E, ANSI/J-STD-002 Category 3.

## 7. Environmental Specifications

Operating Temperature	-40 °C to +85 °C
Maximum Device Surface Temperature in Tripped State	125°C
Passive Aging	+85 °C, 1000 hours ; ±5 % typical resistance change
Humidity Aging	+85 °C, 85 % R.H. 1000 hours; ±5 % typical resistance change
Thermal Shock	MIL-STD-202, Method 107; +85 °C to -40 °C, 20 times;-30 % typical resistance change
Solvent Resistance	MIL-STD-202, Method 215 ; No change
Vibration	MIL-STD-883, Method 2007, Condition A; No change
Moisture Sensivity Level	Level 1, J-STD-020
Storage Conditions	+40 °C Max. 70% RH Max. Packed in original packaging.

## 8. Test Procedures And Requirements

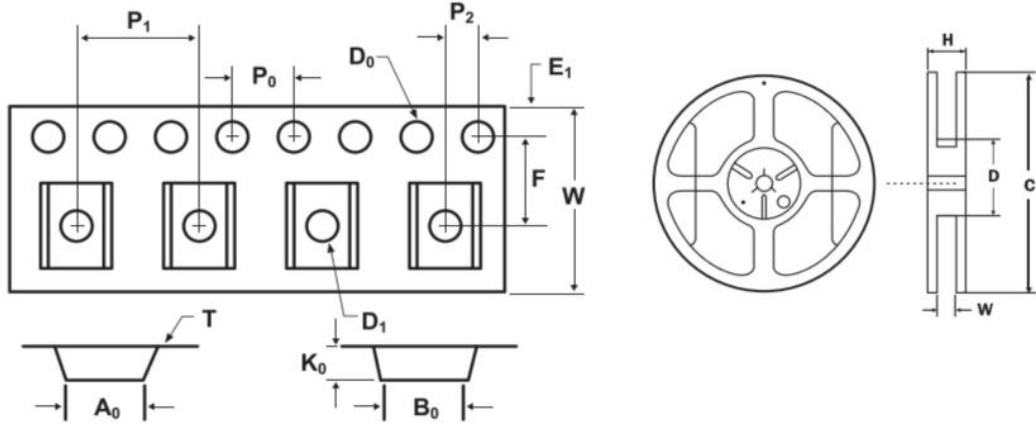
No.	Test	Test Conditions	Accept/Reject Criteria
1	R0 min	Resistance measurement at 25°C	R0min ≤ R ≤ R1max
2	R1 max	Resistance measurement one hour after post trip	R0min ≤ R ≤ R1max
3	I-hold	Hold rated current 1800 second without trip, @ 25°C	No trip
4	I-trip	Device must trip within 900 second under rated current, @25°C	Trip
5	Max. time to trip	At specified current, 25 °C	T ≤ max. time to trip (seconds)
6	Trip Cycle Life	Vmax, Imax, 100 cycles	No arcing or burning
7	Trip Endurance	Vmax, Imax 24 hours	No arcing or burning
8	Solderability	ANSI/J-STD-002	95 % min. coverage

## 9. Tape and Reel Specifications&Packaging quantity per Reel

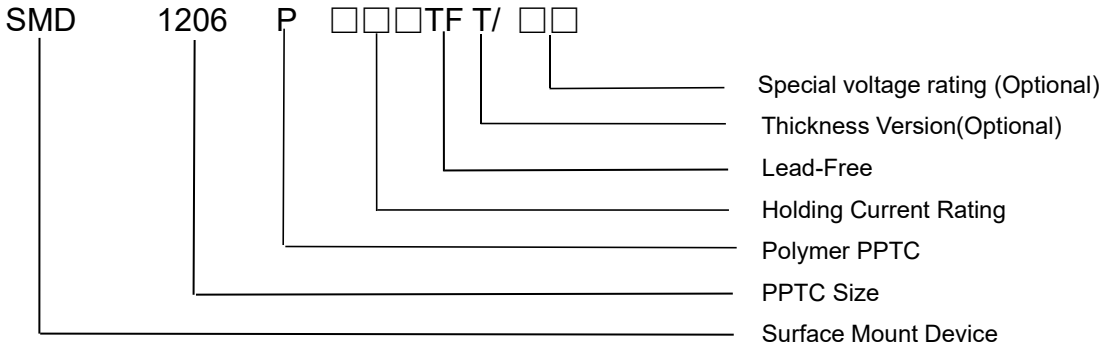
TAPE SPECIFICATIONS: EIA-481-1 (mm)				REEL DIMENSIONS: EIA-481-1 (mm)		
Item	SMD1206P020TF/24	SMD1206P025TF	SMD1206P005TF	SMD1206P005TF/30	C	Ø178±1.0
	SMD1206P025TF/24	SMD1206P035TF/16	SMD1206P010TF	SMD1206P010TF/30	D	Ø60.2±0.5
	SMD1206P035TF/30	SMD1206P050TF	SMD1206P012TF	SMD1206P016TF	W	9.0±1.5
	SMD1206P050TF/15	SMD1206P075TFT	SMD1206P050TF/24	SMD1206P075TF/16	H	11.0±0.5
	SMD1206P075TF/13.2	SMD1206P110TFT	SMD1206P150TFT	SMD1206P175TF		
		SMD1206P200TF				
W	8.10±0.10		8.10±0.10			
F	3.50±0.05		3.50±0.05			
E1	1.75±0.10		1.75±0.10			
D0	1.55±0.05		1.55±0.05			
D1	1.00 min		1.00 min			
P0	4.0±0.10		4.0±0.10			
P1	4.0±0.10		4.0±0.10			
P2	2.0±0.05		2.0±0.05			
A0	1.90±0.10		2.00±0.10			



B0	3.45±0.10	3.50±0.10
T	0.25±0.05	0.25±0.05
K0	0.80±0.10	1.30±0.10
Leader	390mm	390mm
Trailer	160mm	160mm
Q'ty	5,000pcs/Reel	3,500pcs/Reel



**10. Part Ordering Number System**



**Warning:**

- Users shall independently assess the suitability of these devices for each of their applications
- Operation of these devices beyond the stated maximum ratings could result in damage to the devices and lead to electrical arcing and/or fire
- These devices are intended to protect against the effects of temporary over-current or over-temperature conditions and are not intended to perform as protective devices where such conditions are expected to be repetitive or prolonged in duration
- Exposure to silicon-based oils, solvents, electrolytes, acids, and similar materials can adversely affect the performance of these PPTC devices
- These devices undergo thermal expansion under fault conditions, and thus shall be provided with adequate space and be protected against mechanical stresses
- Circuits with inductance may generate a voltage ( $L di/dt$ ) above the rated voltage of the PPTC device.