

- The SMD1812 Halogen and Lead(Pb) Free Series, a polymer-based Positive Temperature Coefficient (PTC) device to protect electrical circuits against overcurrent conditions with resettable feature, is fully compatible with current industrial standards.
- The new designed SMD1812 Halogen and Lead(Pb) Free Series provides surface mount overcurrent protection with superior performance that are compliant with IEC 61249-2-21:2003 and RoHS Directive 2002/95/EC.
- Application: The small sized SMD1812 Halogen and Lead(Pb) Free Series is ideal for computers and peripherals and can be applied to almost anywhere there is a low voltage power supply and a load to be protected.
- The solder plated termination is designed to meet or exceed solderability specifications and provide excellent solder joint inspectability.
- Agency Approval: **UL/CSA File No. E201431.**

TÜV Certificate # R50099121



POLYTRONICS TECHNOLOGY CORP.
REGISTERED TO ISO 9001, TL 9000,
ISO/TS 16949, AND ISO 14001
FILE NUMBER A8727 AND A10971

ELECTRICAL CHARACTERISTICS

Part Number	I _{hold} (A)	I _{trip} (A)	V _{max} (Vdc)	I _{max} (A)	P _{d max.} (W)	Maximum Time To Trip		Resistance		Agency Approval	
						Current (A)	Time (Sec.)	R _{min} (Ω)	R _{1max} (Ω)	UL/CSA	TÜV
SMD1812P010TF	0.10	0.30	30	100	0.8	0.50	1.50	1.600	15.000	✓	✓
SMD1812P014TF	0.14	0.34	60	10	0.8	1.50	0.15	1.500	6.000	✓	✓
SMD1812P020TF	0.20	0.40	30	100	0.8	8.00	0.02	0.800	5.000	✓	✓
SMD1812P035TF/30	0.35	0.75	30	40	0.8	8.00	0.15	0.400	1.700	✓	✓
SMD1812P050TF	0.50	1.00	15	100	0.8	8.00	0.15	0.150	1.000	✓	✓
SMD1812P050TF/30	0.50	1.00	30	100	0.8	8.00	0.15	0.150	1.000	✓	✓
SMD1812P075TF	0.75	1.50	13.2	100	0.8	8.00	0.20	0.100	0.450	✓	✓
SMD1812P075TF/24	0.75	1.50	24	100	0.8	8.00	0.20	0.110	0.290	✓	✓
SMD1812P075TF/33	0.75	1.50	33	20	0.8	8.00	0.20	0.110	0.400	✓	✓
SMD1812P110TF	1.10	2.20	8	100	0.8	8.00	0.30	0.040	0.210	✓	✓
SMD1812P110TF/16	1.10	1.95	16	100	0.8	8.00	0.30	0.060	0.180	✓	✓
SMD1812P110TF/24	1.10	1.95	24	20	0.8	8.00	0.50	0.060	0.200	✓	✓
SMD1812P110TF/33	1.10	1.95	33	20	0.8	8.00	0.50	0.060	0.200	✓	✓
SMD1812P125TF/16	1.25	2.50	16	100	0.8	8.00	0.40	0.050	0.140	✓	✓
SMD1812P125TF/6,4L	1.25	2.50	6	100	0.8	8.00	0.40	0.050	0.140	✓	✓
SMD1812P150TF/8	1.50	3.00	8	100	0.8	8.00	0.30	0.040	0.110	✓	✓
SMD1812P150TF/12	1.50	3.00	12	100	0.8	8.00	0.50	0.040	0.110	✓	✓
SMD1812P150TF/24	1.50	3.00	24	20	0.8	8.00	1.50	0.040	0.120	✓	✓
SMD1812P160TF/8(4L)	1.60	2.80	8	100	0.8	8.00	1.00	0.030	0.100	✓	✓
SMD1812P200TFT	2.00	3.50	8	100	0.8	8.00	2.00	0.020	0.070	✓	✓
SMD1812P260TFT	2.60	5.00	8	100	0.8	8.00	2.50	0.015	0.047	✓	✓
SMD1812P260TF/12	2.60	5.00	12	100	0.8	8.00	5.00	0.015	0.055	✓	✓
SMD1812P300TF	3.00	5.00	6	100	0.8	8.00	4.00	0.012	0.040	✓	✓



SMD1812 HF Series Surface Mount PTC Devices

Revision: H
U.S. Patent#6377467

Note: I_{hold} = Hold current: maximum current device will pass without tripping in 23°C still air.

I_{trip} = Trip current: minimum current at which the device will trip in 23°C still air.

V_{max} = Maximum 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})

P_{d} = Power dissipated from device when in the tripped state at 23°C still air.

R_{min} = Minimum resistance of device in initial (un-soldered) state.

$R_{1\text{max}}$ = Maximum resistance of device at 23°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

*Value specified were determined using the PWB with 0.030" * 1.5oz copper traces.

Caution: Operation beyond the specified rating may result in damage and possible arcing and flame.

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How to Select a Polymer PTC fuse

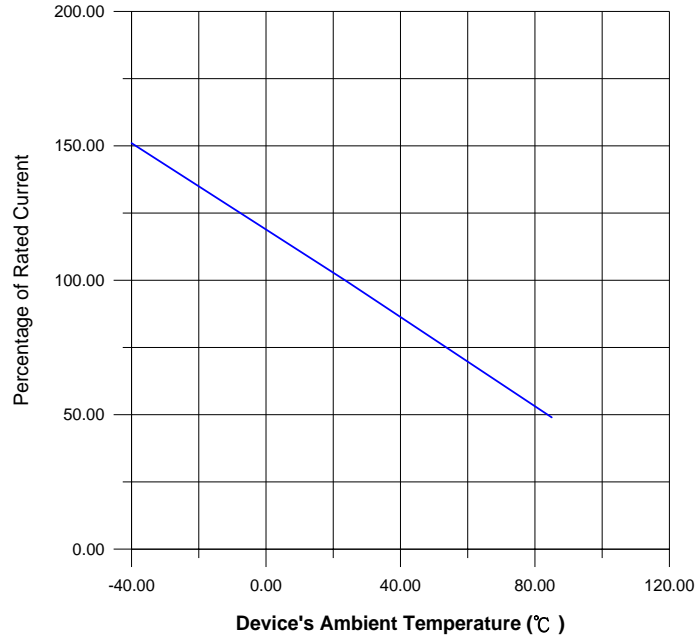
- (1) Determine the following operating parameters for the circuits:
 - (A) Normal operating current (I hold)
 - (B) Maximum circuit voltage (V max)
 - (C) Maximum interrupt current (I max)
 - (D) Normal operating temperature surrounding device (min°C/max°C)
- (2) Select the device form factor and dimension suitable for the application:
 - Surface Mount Device (SMD Series)
 - Radial Leaded Device (RLD Series)
 - Axial Leaded Strap Device (STD Series)
 - Other Custom-designed Device (Disc/Chip)
- (3) Compare the maximum ratings for V max and I max of the PTC device with the circuit in application and make sure that the circuit's requirement does not exceed the device ratings.
- (4) Check that the PTC device's trip time (time-to-trip) will protect the circuit.
- (5) Verify that the circuit operating temperatures are within the PTC device's normal operating temperature range.
- (6) Verify the performance and suitability of the chosen PTC device in the application.



Revision: H

SMD1812 HF Series Surface Mount PTC Devices U.S. Patent#6377467

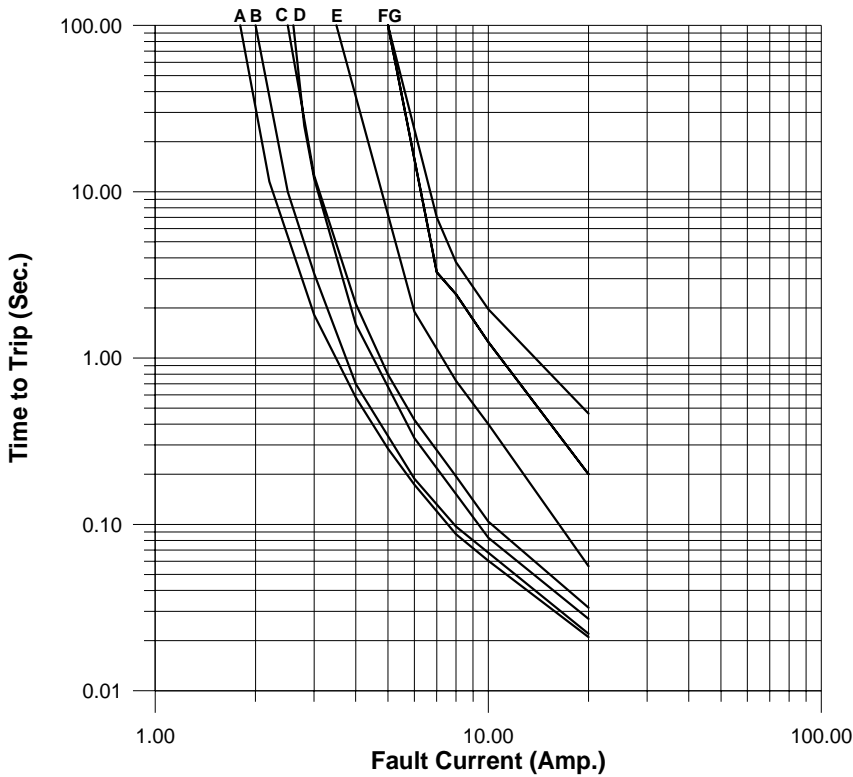
THERMAL DERATING CURVE FOR SMD1812 SERIES



THERMAL DERATING CHART FOR SMD1812 SERIES – Ihold(Amps)
RECOMMENDED DATA

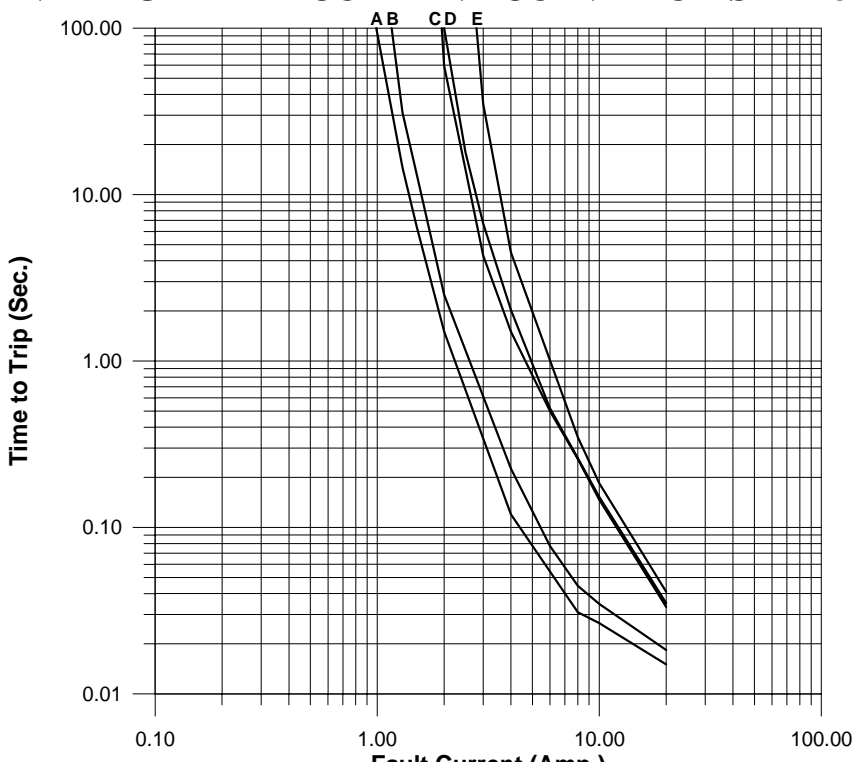
Model	Ambient Operation Temperature								
	-40°C	-20°C	0°C	23°C	40°C	50°C	60°C	70°C	85°C
SMD1812P010TF	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.03
SMD1812P014TF	0.23	0.19	0.17	0.14	0.12	0.10	0.09	0.08	0.06
SMD1812P020TF	0.29	0.26	0.23	0.20	0.17	0.15	0.14	0.12	0.10
SMD1812P035TF/30	0.50	0.45	0.40	0.35	0.30	0.26	0.24	0.20	0.16
SMD1812P050TF	0.77	0.68	0.59	0.50	0.44	0.40	0.37	0.33	0.29
SMD1812P050TF/30	0.77	0.68	0.59	0.50	0.44	0.40	0.37	0.33	0.29
SMD1812P075TF	1.15	1.01	0.88	0.75	0.65	0.60	0.55	0.49	0.43
SMD1812P075TF/24	1.06	0.95	0.84	0.75	0.60	0.55	0.50	0.45	0.37
SMD1812P075TF/33	1.10	1.00	0.88	0.75	0.66	0.60	0.56	0.47	0.36
SMD1812P110TF	1.59	1.43	1.26	1.10	0.95	0.87	0.80	0.71	0.60
SMD1812P110TF/16	1.58	1.43	1.27	1.10	0.95	0.85	0.77	0.71	0.58
SMD1812P110TF/24	1.55	1.40	1.25	1.10	0.93	0.83	0.73	0.63	0.50
SMD1812P110TF/33	1.55	1.40	1.25	1.10	0.93	0.83	0.73	0.63	0.50
SMD1812P125TF/16	2.00	1.75	1.52	1.25	1.00	0.95	0.90	0.75	0.53
SMD1812P125TF/6,4L	2.00	1.75	1.52	1.25	1.00	0.95	0.90	0.75	0.53
SMD1812P150TF/8	2.06	1.93	1.79	1.50	1.28	1.10	1.02	0.80	0.68
SMD1812P150TF/12	2.04	1.88	1.68	1.50	1.25	1.10	1.00	0.80	0.60
SMD1812P150TF/24	2.05	1.87	1.67	1.50	1.25	1.08	0.95	0.77	0.60
SMD1812P160TF/8(4L)	2.20	2.06	1.91	1.60	1.36	1.17	1.09	0.85	0.72
SMD1812P200TFT	2.60	2.44	2.22	2.00	1.78	1.67	1.50	1.45	1.29
SMD1812P260TFT	3.40	3.16	3.00	2.60	2.30	2.15	2.00	1.85	1.63
SMD1812P260TF/12	3.40	3.16	3.00	2.60	2.30	2.15	2.00	1.85	1.63
SMD1812P300TF	4.13	3.75	3.30	3.00	2.62	2.43	2.25	2.00	1.78

AVERAGE TIME-CURRENT CURVE FOR SMD1812 SERIES



- A — SMD1812P110TF
- B — SMD1812P125TF/6,4L
- C — SMD1812P150TF/8
- D — SMD1812P160TF/8(4L)
- E — SMD1812P200TFT
- F — SMD1812P260TFT
- SMD1812P260TF/12
- G — SMD1812P300TF

AVERAGE TIME-CURRENT CURVE FOR SMD1812 SERIES



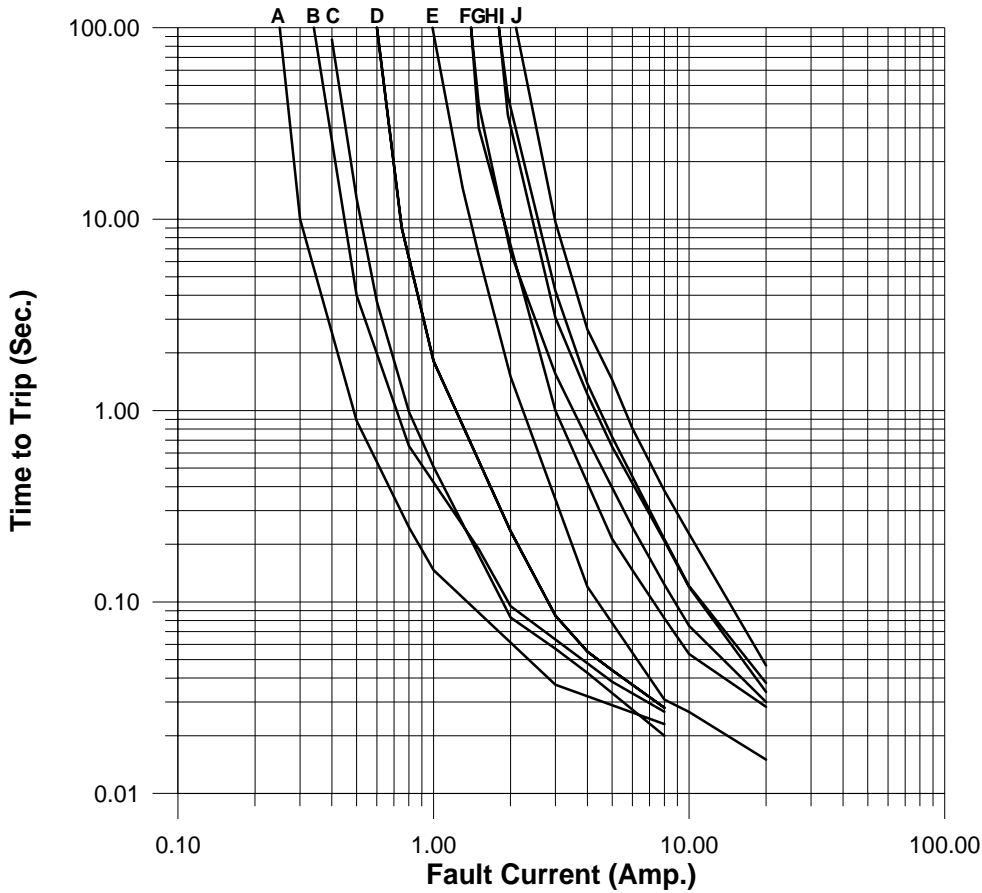
- A — SMD1812P050TF
- B — SMD1812P075TF
- C — SMD1812P110TF/16
- D — SMD1812P125TF/16
- E — SMD1812P150TF/12



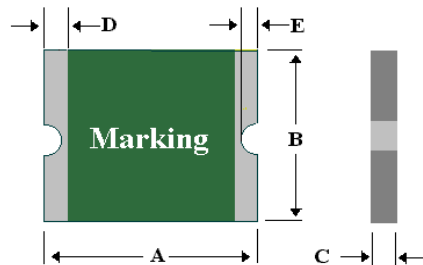
Revision: H

SMD1812 HF Series Surface Mount PTC Devices U.S. Patent#6377467

AVERAGE TIME-CURRENT CURVE FOR SMD1812 SERIES



FIGURE


PHYSICAL DIMENSIONS (mm)

Part Number	A		B		C		D		E	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
SMD1812P010TF	4.37	4.73	3.07	3.41	0.75	1.25	0.30	1.20	0.25	0.65
SMD1812P014TF	4.37	4.73	3.07	3.41	0.75	1.95	0.30	1.20	0.25	0.65
SMD1812P020TF	4.37	4.73	3.07	3.41	0.55	1.00	0.30	1.20	0.25	0.65
SMD1812P035TF/30	4.37	4.73	3.07	3.41	0.65	1.25	0.30	1.20	0.25	0.65
SMD1812P050TF	4.37	4.73	3.07	3.41	0.50	0.75	0.30	1.20	0.25	0.50
SMD1812P050TF/30	4.37	4.73	3.07	3.41	0.50	1.00	0.30	1.20	0.25	0.65
SMD1812P075TF	4.37	4.73	3.07	3.41	0.50	0.75	0.30	1.20	0.25	0.50
SMD1812P075TF/24	4.37	4.73	3.07	3.41	0.75	1.55	0.30	1.20	0.25	0.65
SMD1812P075TF/33	4.37	4.73	3.07	3.41	0.75	1.55	0.30	1.20	0.25	0.65
SMD1812P110TF	4.37	4.73	3.07	3.41	0.30	0.71	0.30	1.20	0.25	0.65
SMD1812P110TF/16	4.37	4.73	3.07	3.41	0.75	1.25	0.30	1.20	0.25	0.65
SMD1812P110TF/24	4.37	4.73	3.07	3.41	0.50	1.07	0.30	1.20	0.25	0.65
SMD1812P110TF/33	4.37	4.73	3.07	3.41	1.20	2.00	0.30	1.20	0.25	0.65
SMD1812P125TF/16	4.37	4.73	3.07	3.41	0.75	1.25	0.30	1.20	0.25	0.65
SMD1812P125TF/6,4L	4.37	4.73	3.07	3.41	0.45	0.75	0.30	1.20	0.25	0.65
SMD1812P150TF/8	4.37	4.73	3.07	3.41	0.40	0.71	0.30	1.20	0.25	0.65
SMD1812P150TF/12	4.37	4.73	3.07	3.41	0.75	1.25	0.30	1.20	0.25	0.65
SMD1812P150TF/24	4.37	4.73	3.07	3.41	0.80	1.80	0.30	1.20	0.25	0.65
SMD1812P160TF/8(4L)	4.37	4.73	3.07	3.41	0.40	0.75	0.30	1.20	0.25	0.65
SMD1812P200TFT	4.37	4.73	3.07	3.41	0.20	0.60	0.30	1.20	0.25	0.65
SMD1812P260TFT	4.37	4.73	3.07	3.41	0.50	1.00	0.30	1.20	0.25	0.65
SMD1812P260TF/12	4.37	4.73	3.07	3.41	0.80	1.34	0.30	1.20	0.25	0.65
SMD1812P300TF	4.37	4.73	3.07	3.41	0.80	1.50	0.30	1.20	0.25	0.65

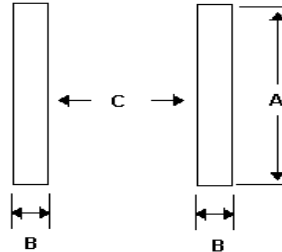
ENVIRONMENTAL SPECIFICATIONS

Operating/Storage 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 107G +85°C/-40°C 20 times	-30% typical resistance change
Solvent Resistance	MIL-STD-202, Method 215	No change
Vibration	MIL-STD-883C, Method 2007.1, Condition A	No change

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PACKAGING

SOLDER PAD LAYOUTS



Part Number	Tape & Reel Quantity	Recommended Pad layout Figure (mm)		
		Dimension (A)	Dimension (B)	Dimension (C)
SMD1812P010TF	1500	3.15	1.78	3.45
SMD1812P014TF	1500	3.15	1.78	3.45
SMD1812P020TF	2000	3.15	1.78	3.45
SMD1812P035TF/30	1500	3.15	1.78	3.45
SMD1812P050TF	2000	3.15	1.78	3.45
SMD1812P050TF/30	2000	3.15	1.78	3.45
SMD1812P075TF	2000	3.15	1.78	3.45
SMD1812P075TF/24	1500	3.15	1.78	3.45
SMD1812P075TF/33	1500	3.15	1.78	3.45
SMD1812P110TF	2000	3.15	1.78	3.45
SMD1812P110TF/16	1500	3.15	1.78	3.45
SMD1812P110TF/24	1500	3.15	1.78	3.45
SMD1812P110TF/33	1000	3.15	1.78	3.45
SMD1812P125TF/16	1500	3.15	1.78	3.45
SMD1812P125TF/6,4L	2000	3.15	1.78	3.45
SMD1812P150TF/8	2000	3.15	1.78	3.45
SMD1812P150TF/12	1500	3.15	1.78	3.45
SMD1812P150TF/24	1000	3.15	1.78	3.45
SMD1812P160TF/8(4L)	2000	3.15	1.78	3.45
SMD1812P200TFT	2000	3.15	1.78	3.45
SMD1812P260TFT	1500	3.15	1.78	3.45
SMD1812P260TF/12	1000	3.15	1.78	3.45
SMD1812P300TF	1000	3.15	1.78	3.45

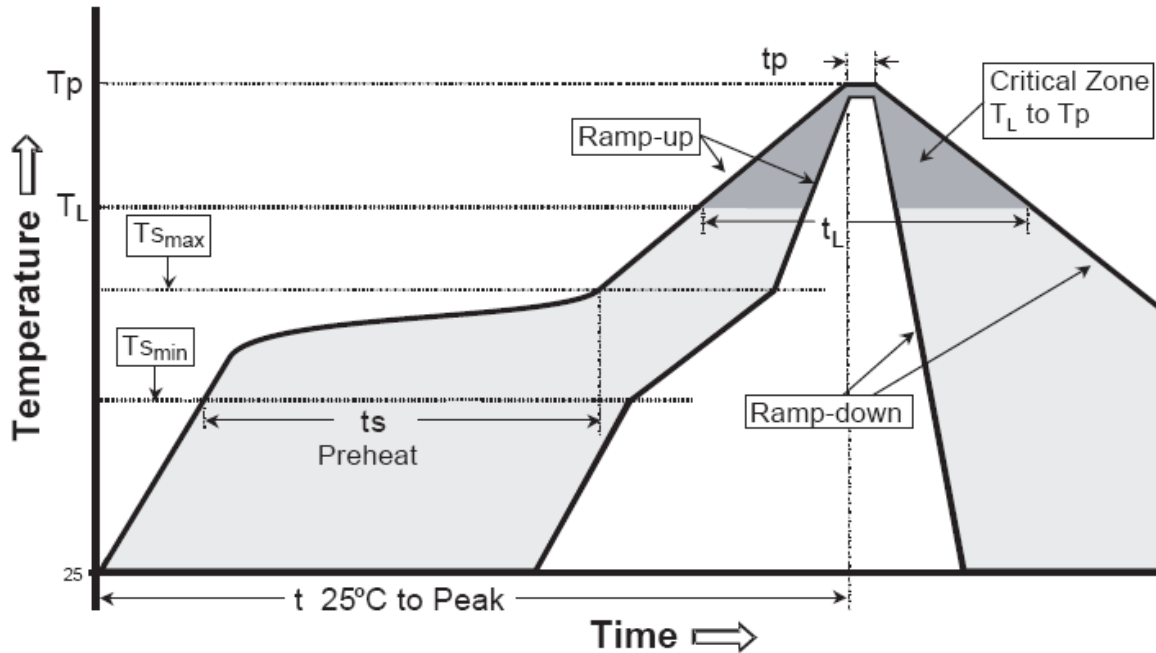
© 12mm tape on 7 inch reel per EIA-481-1(equivalent to IEC286, part3)

PHYSICAL SPECIFICATIONS

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

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SOLDER REFLOW



IPC-020c-5-1

RECOMMENDED CONDITIONS

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (T _{Smax} to T _p)	3°C/second max.
Preheat	
-Temperature Min (T _{Smin})	150°C
-Temperature Max (T _{Smax})	200°C
-Time (T _{Smin} to T _{Smax})	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 (t _p)	20-40 seconds
Ramp-Down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.
Storage Condition	0°C~35°C, ≤70%RH

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.

- Recommended reflow methods: IR, vapor phase oven, hot air oven, N₂ environment for lead-free
- Recommended maximum paste thickness is 0.25mm (0.010 inch)
- Devices can be cleaned using standard industry methods and solvents.
- Devices can be reworked using the standard industry practices.

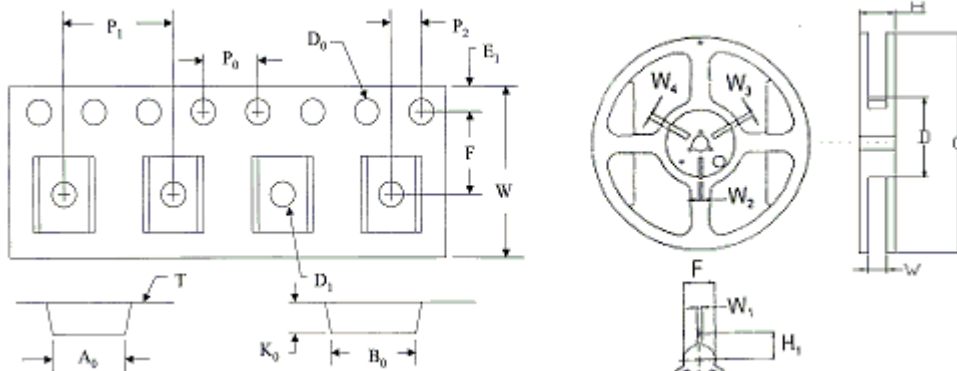
TAPE SPECIFICATIONS: EIA-481-1

REEL DIMENSIONS: EIA-481-1

	P020TF, P035TF/30	P010TF, P014TF	P110TF/33		
	P050TF, P075TF	P050TF/30	P150TF/24		
	P110TF	P075TF/24, P075TF/33	P260TF/12		
	P125TF/6,4L	P110TF/16, P110TF/24	P300TF		
	P160TF/8(4L)	P125TF/16, P150TF/12			
	P150TF/8	P260TFT			
	P200TFT				
W	12.00 ± 0.30	12.00 ± 0.30	12.00 ± 0.10	C	Ø178 ± 1.0
F	5.50 ± 0.05	5.50 ± 0.05	5.50 ± 0.05	D	Ø60.2 ± 0.5
E₁	1.75 ± 0.10	1.75 ± 0.10	1.75 ± 0.10	F	Ø13.0 ± 0.5
D₀	1.55 ± 0.05	1.55 ± 0.05	1.55 ± 0.05	W1	2.5 + 0.5
D₁	1.55 (MIN)	1.50 ± 0.10	1.50 (MIN)	W2	3.0 + 0.5
P₀	4.00 ± 0.10	4.00 ± 0.10	4.00 ± 0.08	W3	4.0 + 0.5
P₁	8.00 ± 0.10	8.00 ± 0.10	8.00 ± 0.10	W4	5.0 + 0.5
P₂	2.00 ± 0.05	2.00 ± 0.05	2.00 ± 0.05	W	13.2 ± 1.5
A₀	3.58 ± 0.10	3.50 ± 0.10	3.58 ± 0.10	H	16.0 ± 0.5
B₀	4.93 ± 0.10	4.85 ± 0.10	4.93 ± 0.10		
T	0.25 ± 0.10	0.25 ± 0.10	0.25 ± 0.10		
K₀	0.87 ± 0.06	1.25 ± 0.10	2.10 ± 0.10		
Leader min.	390	390	390		
Trailer min.	160	160	160		

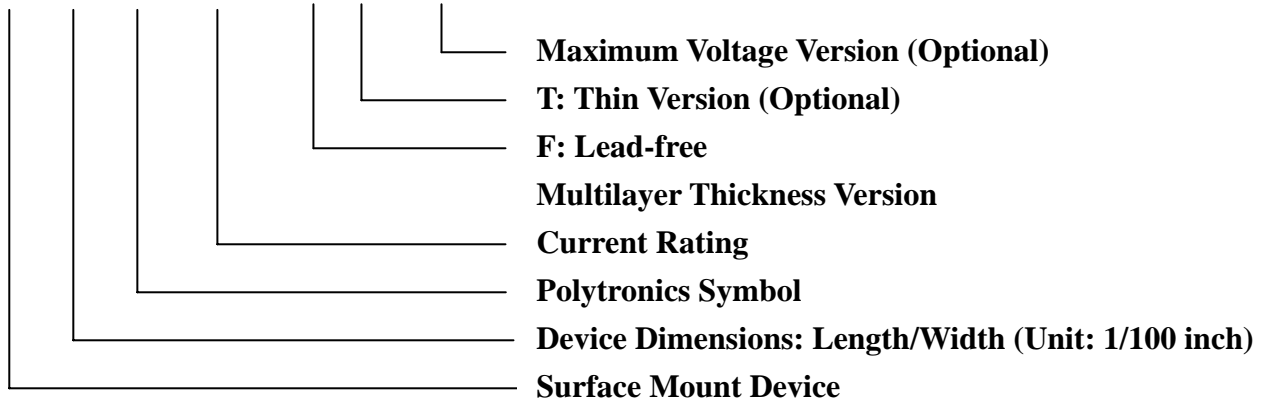
(mm)

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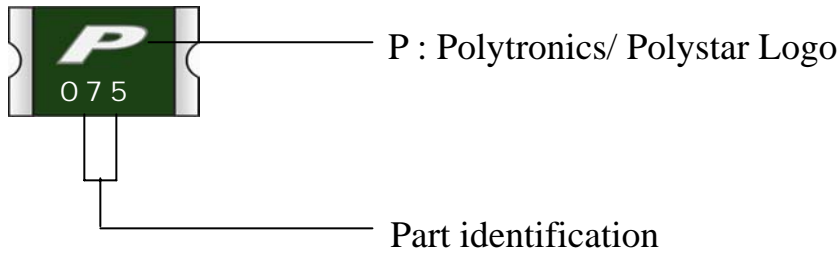


PART NUMBERING SYSTEM

SMD 1812 P TF T /



PART MARKING SYSTEM



Note: Polystar is Polytronics's manufacturing site in China. The Polystar ID marking shall appear on smallest package.