

SMD1812 Surface Mount PTC Devices

R.O.C. Patent#415624

- The SMD1812 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 Series provides surface mount overcurrent protection with superior performance.
- Application: The small sized SMD1812 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 gold or 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 # R9956421

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 _{typ} (Ω)	R _{1max} (Ω)	
SMD1812P010TS	0.10	0.30	30	10	0.8	0.50	1.50	1.600	7.000	15.000	UL/CSA/TÜV
SMD1812P014TS	0.14	0.34	60	10	0.8	1.50	0.15	1.500	4.000	6.000	UL/CSA/TÜV
SMD1812P020TS	0.20	0.40	30	10	0.8	8.00	0.02	0.800	2.900	5.000	UL/CSA/TÜV
SMD1812P050TS	0.50	1.00	15	40	0.8	8.00	0.15	0.150	0.600	1.000	UL/CSA/TÜV
SMD1812P075TS	0.75	1.50	13.2	40	0.8	8.00	0.20	0.100	0.260	0.450	UL/CSA/TÜV
SMD1812P075TS/24	0.75	1.50	24	40	0.8	8.00	0.20	0.110	0.200	0.290	UL/CSA/TÜV
SMD1812P075TS/33	0.75	1.50	33	20	0.8	8.00	0.20	0.110	0.260	0.400	UL/CSA
SMD1812P110TS	1.10	2.20	6	40	0.8	8.00	0.30	0.040	0.120	0.210	UL/CSA/TÜV
SMD1812P110TS/16	1.10	1.95	16	40	0.8	8.00	0.50	0.060	0.120	0.180	UL/CSA/TÜV
SMD1812P110TS/33	1.10	1.95	33	20	0.8	8.00	0.50	0.060	0.120	0.200	UL/CSA
SMD1812P125TS	1.25	2.50	15	40	0.8	8.00	0.40	0.050	0.160	0.250	UL/CSA/TÜV
SMD1812P150TS	1.50	3.00	6	40	0.8	8.00	0.50	0.040	0.070	0.110	UL/CSA/TÜV
SMD1812P150TS/24	1.50	3.00	24	20	0.8	8.00	1.50	0.040	0.070	0.120	UL/CSA
SMD1812P160TS	1.60	2.80	6	40	0.8	8.00	1.00	0.030	0.066	0.100	UL/CSA/TÜV
SMD1812P160TS/12	1.60	2.80	12	20	0.8	8.00	1.00	0.030	0.066	0.100	UL/CSA/TÜV
SMD1812P200TS	2.00	3.50	8	40	0.8	8.00	2.00	0.020	0.040	0.060	UL/CSA/TÜV
SMD1812P260TS	2.60	5.20	6	40	0.8	8.00	2.50	0.015	0.030	0.047	UL/CSA/TÜV

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Note: I_{hold} = Hold current: maximum current device will pass without tripping in 20°C still air.

I_{trip} = Trip current: minimum current at which the device will trip in 20°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 20°C still air.

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

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

R_{lmax} = Maximum resistance of device at 20°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

All products may be followed by suffix TG or TF

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

Recognitions: UL, CSA, TÜV recognized.

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Polytronics Technology Corp.
REGISTERED TO SERVICE FILE
RECORD NUMBER 2005, and ISO
CERTIFICATION AND LISTED

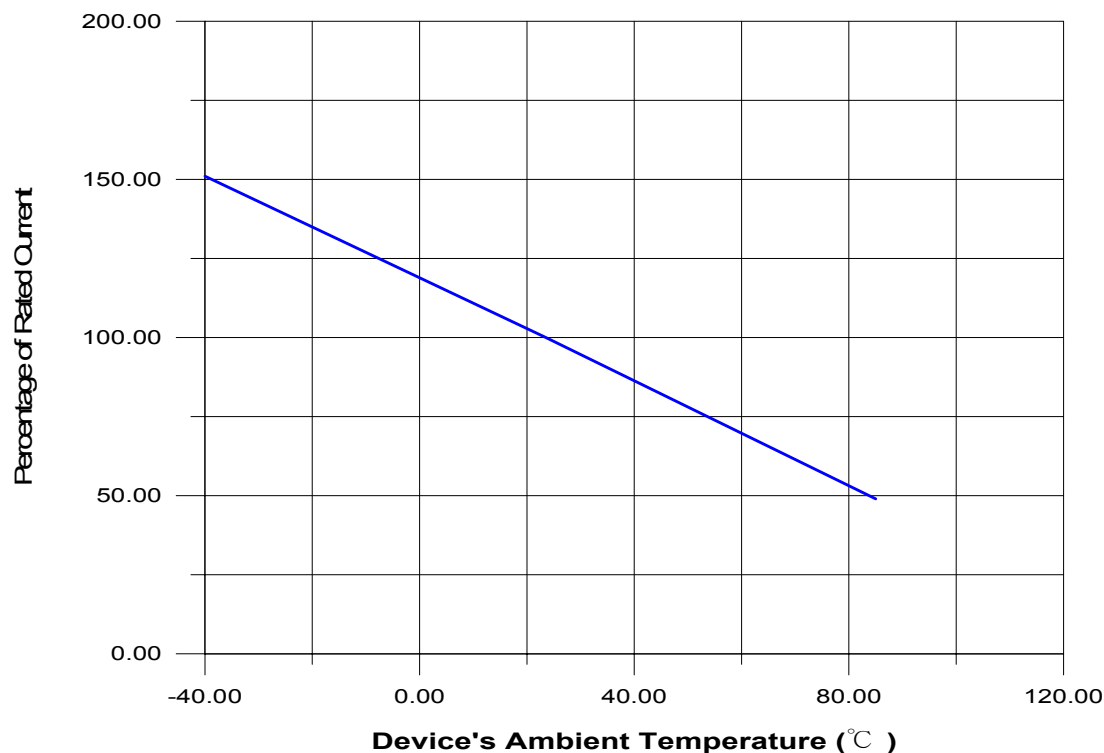
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How to Select a Polymer PTC fuse:

- (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 ($\min^{\circ}\text{C}/\max^{\circ}\text{C}$)
- (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.

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THERMAL DERATING CURVE FOR SMD1812 SERIES



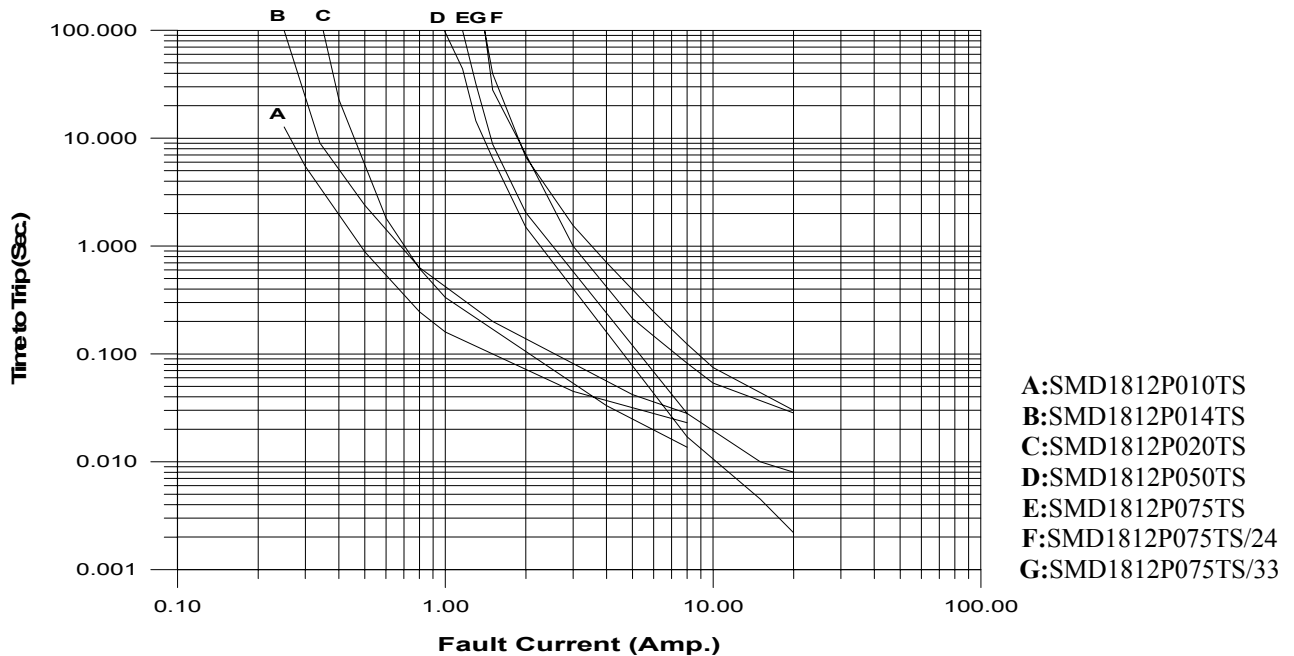
THERMAL DERATING CHART FOR SMD1812 SERIES – Ihold(Amps)

Model	Ambient Operation Temperature								
	-40°C	-20°C	0°C	23°C	40°C	50°C	60°C	70°C	85°C
SMD1812P010TS	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.03
SMD1812P014TS	0.23	0.19	0.17	0.14	0.12	0.10	0.09	0.08	0.06
SMD1812P020TS	0.29	0.26	0.23	0.20	0.17	0.15	0.14	0.12	0.10
SMD1812P050TS	0.77	0.68	0.59	0.50	0.44	0.40	0.37	0.33	0.29
SMD1812P075TS	1.15	1.01	0.88	0.75	0.65	0.60	0.55	0.49	0.43
SMD1812P075TS/24	1.06	0.95	0.84	0.75	0.60	0.55	0.50	0.45	0.37
SMD1812P075TS/33	TBD	TBD	TBD	0.75	TBD	TBD	TBD	TBD	TBD
SMD1812P110TS	1.59	1.43	1.26	1.10	0.95	0.87	0.80	0.71	0.60
SMD1812P110TS/16	1.58	1.43	1.27	1.10	0.95	0.85	0.77	0.71	0.58
SMD1812P110TS/33	TBD	TBD	TBD	1.10	TBD	TBD	TBD	TBD	TBD
SMD1812P125TS	2.00	1.75	1.52	1.25	1.00	0.95	0.90	0.75	0.53
SMD1812P150TS	2.30	2.03	1.76	1.50	1.25	1.10	1.00	0.80	0.06
SMD1812P150TS/24	TBD	TBD	TBD	1.50	TBD	TBD	TBD	TBD	TBD
SMD1812P160TS	2.27	2.05	1.83	1.60	1.35	1.25	1.15	1.00	0.85
SMD1812P160TS/12	TBD	TBD	TBD	1.60	TBD	TBD	TBD	TBD	TBD
SMD1812P200TS	3.08	2.71	2.35	2.00	1.80	1.60	1.50	1.07	0.80
SMD1812P260TS	4.00	3.52	3.06	2.60	2.34	2.08	1.95	1.39	1.04

All products may be followed by suffix TG or TF

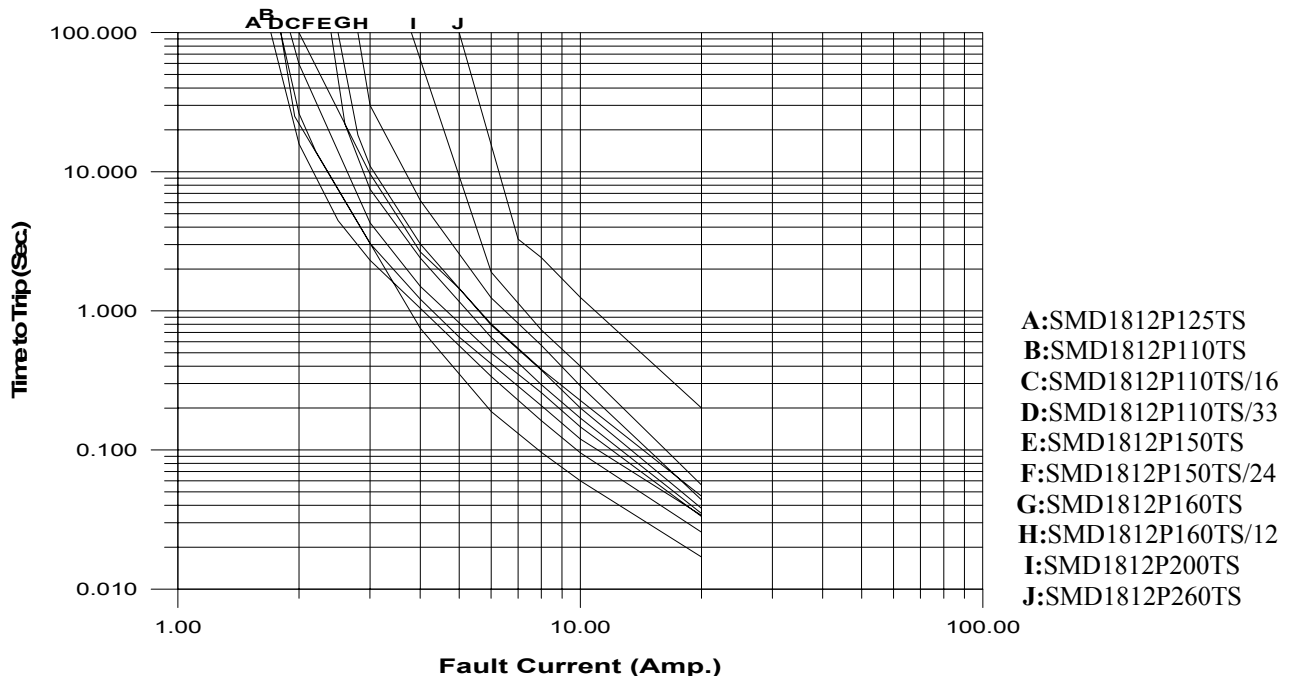
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AVERAGE TIME-CURRENT CURVE FOR SMD1812 SERIES



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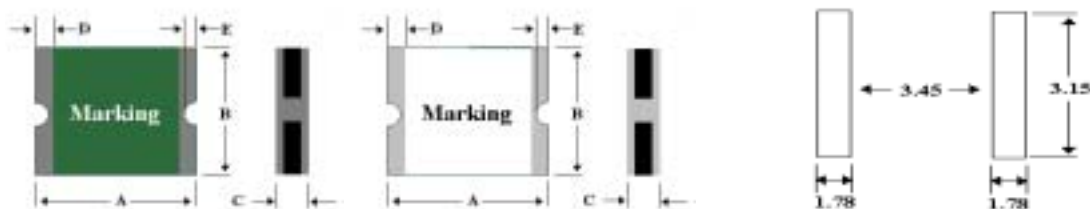
FIGURE

TS

TF

SOLDER PAD LAYOUTS

(Dimension in mm)



PHYSICAL DIMENSIONS (mm)

Part Number	A		B		C		D	E	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.	Max.
SMD1812P010TS	4.37	4.73	3.07	3.41	0.75	1.25	0.30	0.25	0.65
SMD1812P014TS	4.37	4.73	3.07	3.41	0.75	1.95	0.30	0.25	0.65
SMD1812P020TS	4.37	4.73	3.07	3.41	0.55	1.00	0.30	0.25	0.65
SMD1812P050TS	4.37	4.73	3.07	3.41	0.50	0.75	0.30	0.25	0.50
SMD1812P075TS	4.37	4.73	3.07	3.41	0.50	0.75	0.30	0.25	0.50
SMD1812P075TS/24	4.37	4.73	3.07	3.41	0.75	1.55	0.30	0.25	0.65
SMD1812P075TS/33	4.37	4.73	3.07	3.41	0.75	1.55	0.30	0.25	0.65
SMD1812P110TS	4.37	4.73	3.07	3.41	0.50	0.75	0.30	0.25	0.50
SMD1812P110TS/16	4.37	4.73	3.07	3.41	0.75	1.25	0.30	0.25	0.65
SMD1812P110TS/33	4.37	4.73	3.07	3.41	1.20	2.00	0.30	0.25	0.65
SMD1812P125TS	4.37	4.73	3.07	3.41	0.75	1.25	0.30	0.25	0.50
SMD1812P150TS	4.37	4.73	3.07	3.41	0.75	1.25	0.30	0.25	0.50
SMD1812P150TS/24	4.37	4.73	3.07	3.41	0.80	1.80	0.30	0.25	0.65
SMD1812P160TS	4.37	4.73	3.07	3.41	0.75	1.25	0.30	0.25	0.65
SMD1812P160TS/12	4.37	4.73	3.07	3.41	0.75	1.25	0.30	0.25	0.65
SMD1812P200TS	4.37	4.73	3.07	3.41	0.75	1.55	0.30	0.25	0.50
SMD1812P260TS	4.37	4.73	3.07	3.41	0.80	1.80	0.30	0.25	0.50

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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

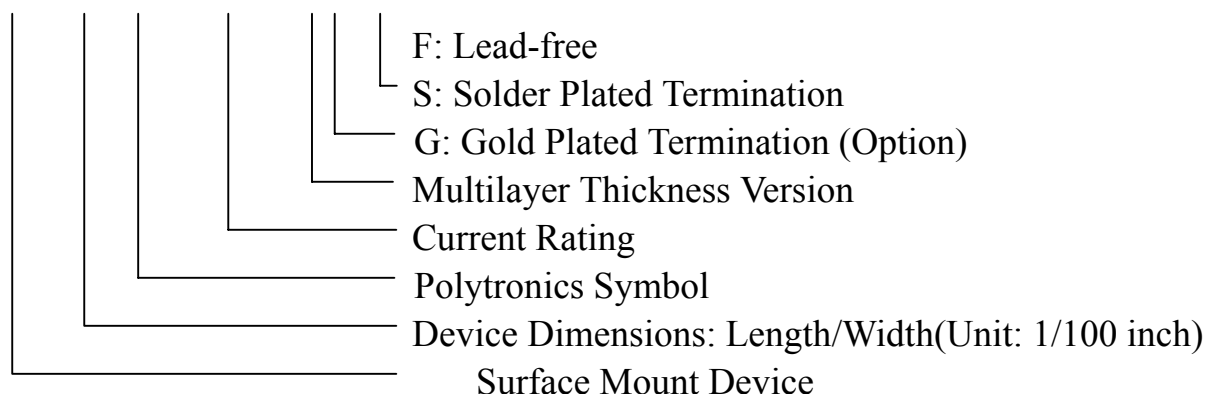
PHYSICAL SPECIFICATIONS

Terminal Material	Gold-Plated Copper or Solder-Plated Copper (Solder Material: 63/37 SnPb or Tin(Sn))
Lead Solderability	Meets EIA Specification RS186-9E, ANSI/J-STD-002 Category 3.
Packaging	12mm tape on 7 inch reel per EIA-481-1(equivalent to IEC286, part3) 1000 devices per reel for P110TS/33,P150TS/24&P260TS 2000 devices per reel for P020TS,P050TS,P075TS & P110TS for the others: 1500 devices per reel.

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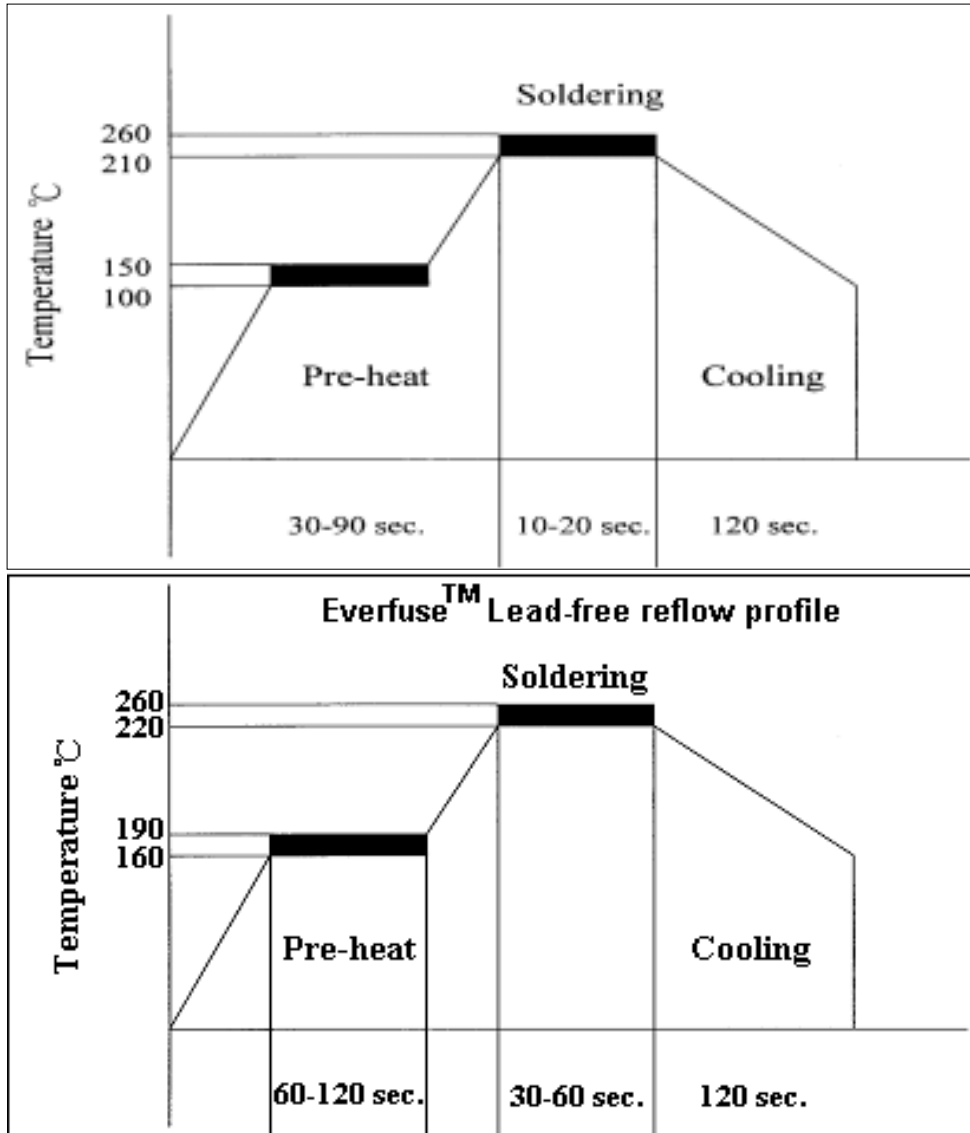
PART NUMBERING SYSTEM

SMD 1812 P ☐☐☐ TG / S / F



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SOLDER REFLOW



- Recommended reflow methods: IR, vapor phase oven, hot air oven, N₂ environment for lead-free
- Devices are not designed to be wave soldered to the bottom side of the board.
- Recommended maximum paste thickness is 0.25mm (0.010 inch)
- Devices can be cleaned using standard industry methods and solvents.

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

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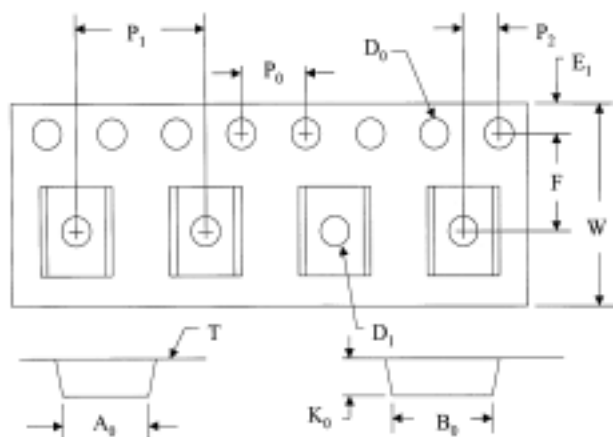
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TAPE SPECIFICATIONS: EIA-481-1

	P020TS	P010TS,P014TS	P110TS/33
	P050TS	P075TS/24,P125TS	P150TS/24
	P075TS	P075TS/33,P150TS	P260TS
	P110TS	P110TS/16,P200	
		P160,P160TS/12	
W	12.00+0.30-0.10	12.00+/-0.30	12.00+/-0.30
F	5.50+/-0.05	5.50+/-0.05	5.50+/-0.05
E ₁	1.75+/-0.10	1.75+/-0.10	1.75+/-0.10
D ₀	1.50+0.10	1.55+/-0.05	1.55+/-0.05
D ₁	1.50+0.25	1.50 (MIN)	1.50 (MIN)
P ₀	4.00+/-0.10	4.00+/-0.10	4.00+/-0.10
P ₁	8.00+/-0.10	8.00+/-0.10	8.00+/-0.10
P ₂	2.00+/-0.05	2.00+/-0.05	2.00+/-0.05
A ₀	3.58+/-0.10	3.58+/-0.10	3.58+/-0.10
B ₀	4.93+/-0.10	4.93+/-0.10	4.93+/-0.10
T	0.279+/-0.02	0.25+/-0.10	0.25+/-0.10
K ₀	1.02+/-0.10	1.30+/-0.10	2.10+/-0.10
Leader min.	390	390	390
Trailer min.	160	160	160

(mm)

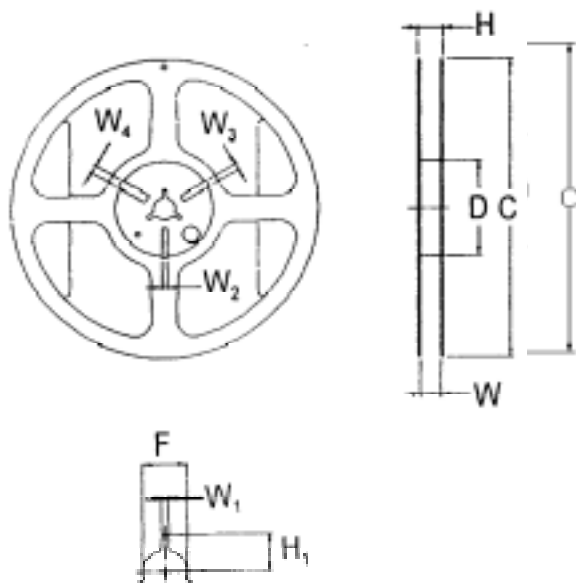
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REEL DIMENSIONS: EIA-481-1

H	16.0+/-0.2
W	13.2+/-1.5
D	Ø60.2+/-0.5
F	Ø13.0+/-0.5
C	Ø178+/-1.0
H ₁	11+/-0.5
W ₁	2.5+0.5
W ₂	3.0+0.5
W ₃	4.0+0.5
W ₄	5.0+0.5

(mm)



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CROSS REFERENCE

Polytronics/ EVERFUSE TM	Cross Reference	
	Raychem/ PolySwitch [®]	Bourns/ Multifuse [®]
SMD1812P010TS	miniSMDC010	MF-MSMD010
SMD1812P014TS	miniSMDC014	MF-MSMD014
SMD1812P020TS	miniSMDC020	MF-MSMD020
SMD1812P050TS	miniSMDC050	MF-MSMD050
SMD1812P075TS	miniSMDC075	MF-MSMD075
SMD1812P075TS/24	miniSMDC075/24	N/A
SMD1812P075TS/33	N/A	N/A
SMD1812P110TS	miniSMDC110	MF-MSMD110
SMD1812P110TS/16	miniSMDC110/16	N/A
SMD1812P11TS/33	N/A	N/A
SMD1812P125TS	miniSMDC125	MF-MSMD125
SMD1812P150TS	miniSMDC150	MF-MSMD150
SMD1812P150TS/24	miniSMDC150/24	N/A
SMD1812P160TS	miniSMDC160	MF-MSMD160
SMD1812P160TS/12	N/A	N/A
SMD1812P200TS	miniSMDC200	MF-MSMD200
SMD1812P260TS	miniSMDC260	MF-MSMD260

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“Multifuse” is a registered trademark of Bourns , Inc.

“PolySwitch” is a registered trademark of Raychem Corporation.

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