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# 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 File # E201431.

TÜV Certificate # R9956421.  
CSA File # CA115375-1



## ELECTRICAL CHARACTERISTICS

Part Number	I <sub>hold</sub> (A)	I <sub>trip</sub> (A)	V <sub>max</sub> (Vdc)	I <sub>max</sub> (A)	P <sub>d</sub> max. (W)	Maximum Time To Trip		Resistance		Agency Approval
						Current (A)	Time (Sec.)	R <sub>min</sub> (Ω)	R <sub>1max</sub> (Ω)	
SMD1812P010TS	0.10	0.30	30	10	0.8	0.50	1.50	1.600	15.000	Pending
SMD1812P014TS	0.14	0.34	30	10	0.8	1.50	0.15	1.500	6.000	Pending
SMD1812P020TS	0.20	0.40	30	10	0.8	8.00	0.02	0.800	5.000	Pending
SMD1812P050TG/S	0.50	1.00	15	40	0.8	8.00	0.15	0.150	1.000	UL CSA TÜV
SMD1812P075TG/S	0.75	1.50	13.2	40	0.8	8.00	0.20	0.110	0.450	UL CSA TÜV
SMD1812P075TS/24	0.75	1.50	24	40	0.8	8.00	0.20	0.110	0.290	Pending
SMD1812P110TG/S	1.10	2.20	6	40	0.8	8.00	0.30	0.040	0.210	UL CSA TÜV
SMD1812P110TS/15	1.10	1.95	15	40	0.8	8.00	0.50	0.060	0.180	UL CSA TÜV
SMD1812P125TS	1.25	2.50	15	40	0.8	8.00	0.40	0.070	0.250	UL CSA TÜV
SMD1812P150TS	1.50	3.00	6	40	0.8	8.00	0.50	0.040	0.110	UL CSA TÜV
SMD1812P160TG/S	1.60	2.80	6	40	0.8	8.00	1.00	0.030	0.100	UL CSA TÜV
SMD1812P200TS	2.00	3.50	8	40	0.8	8.00	2.00	0.020	0.060	UL CSA TÜV
SMD1812P260TS	2.60	5.20	6	40	0.8	8.00	2.50	0.015	0.047	UL CSA TÜV

Note: I<sub>hold</sub> = Hold current: maximum current device will pass without tripping in 20°C still air.

I<sub>trip</sub> = Trip current: minimum current at which the device will trip in 20°C still air.

V<sub>max</sub> = Maximum voltage device can withstand without damage at rated current (I<sub>max</sub>)

I<sub>max</sub> = Maximum fault current device can withstand without damage at rated voltage (V<sub>max</sub>)

P<sub>d</sub> = Power dissipated from device when in the tripped state at 20°C still air.

R<sub>min</sub> = Minimum resistance of device in initial (un-soldered) state.

R<sub>1max</sub> = Maximum resistance of device at 20°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

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

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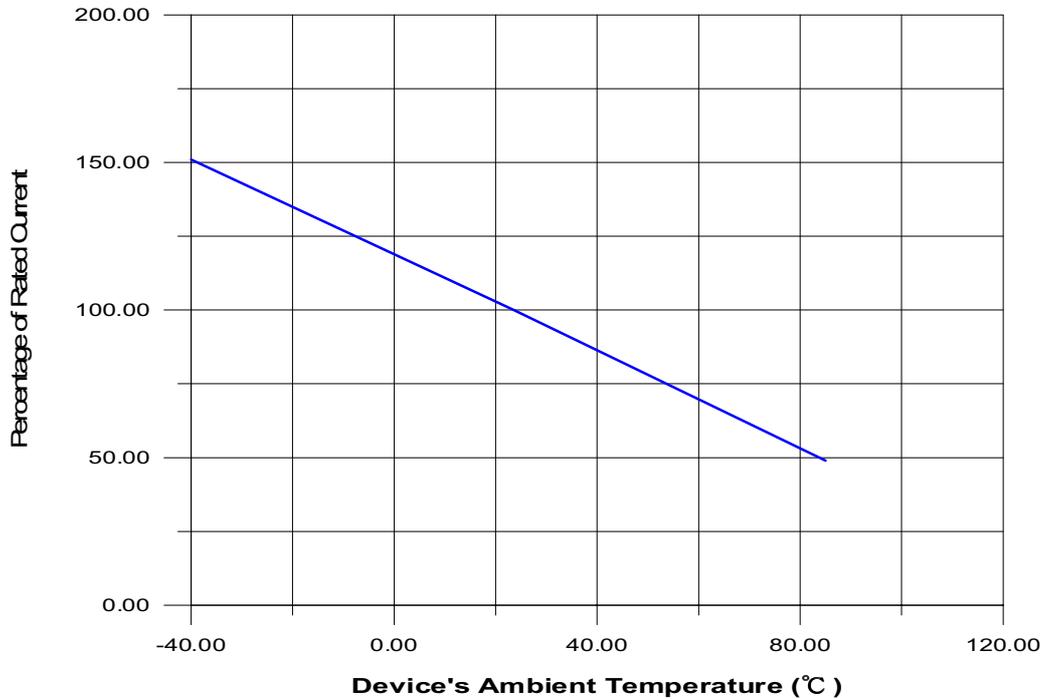
Polytronics Technology Corp  
REGISTERED TO ISO 9001  
FILE NO.A8727

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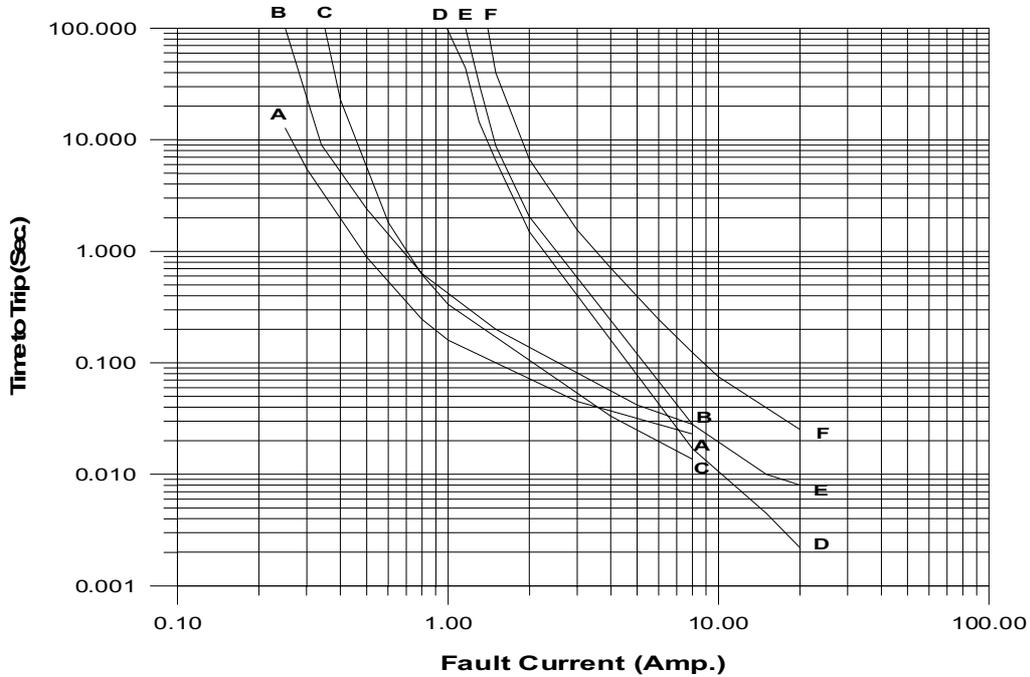
### **How to Select a Polymer PTC fuse:**

- (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<sup>°C</sup>/max<sup>°C</sup>)
- (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.

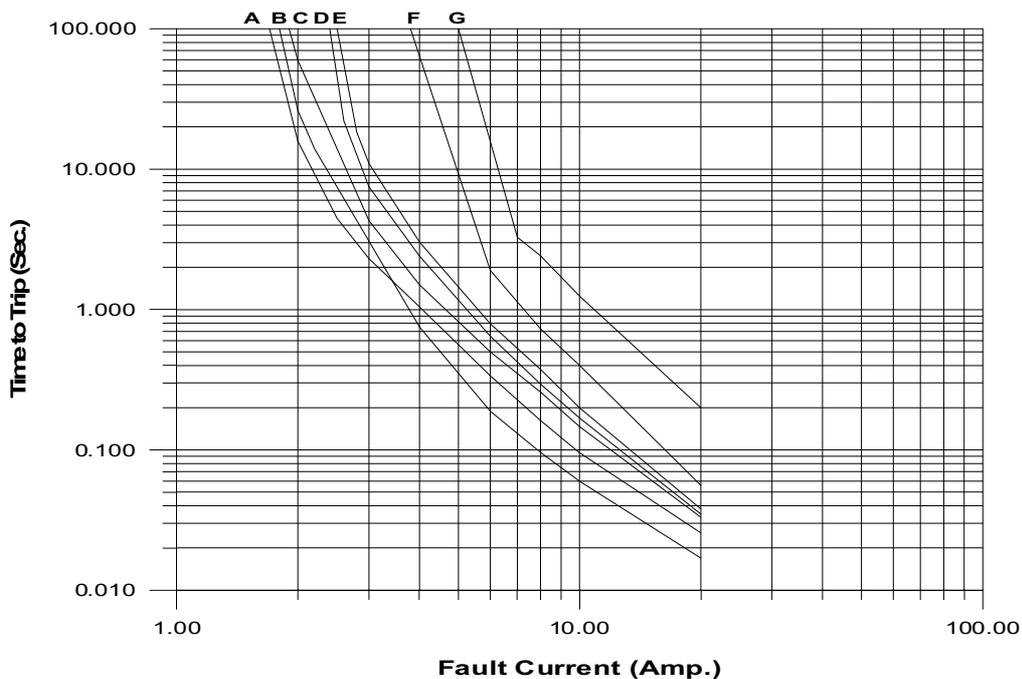
**THERMAL DERATING CURVE FOR SMD1812 SERIES**

**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	0.01	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
SMD1812P110TS	1.59	1.43	1.26	1.10	0.95	0.87	0.80	0.71	0.60
SMD1812P110TS/15	1.58	1.43	1.27	1.1	0.95	0.85	0.77	0.71	0.58
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
SMD1812P160TS	2.27	2.05	1.83	1.60	1.35	1.25	1.15	1.00	0.85
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

**AVERAGE TIME-CURRENT CURVE FOR SMD1812 SERIES**

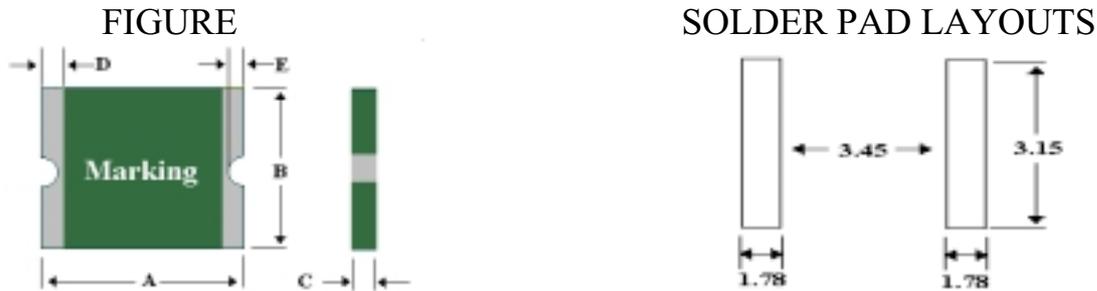


**AVERAGE TIME-CURRENT CURVE FOR SMD1812 SERIES**



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### 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
SMD1812P050TG/S	4.37	4.73	3.07	3.41	0.50	0.75	0.30	0.25	0.65
SMD1812P075TG/S	4.37	4.73	3.07	3.41	0.50	0.75	0.30	0.25	0.65
SMD1812P075TS/24	4.37	4.73	3.07	3.41	0.75	1.55	0.30	0.25	0.65
SMD1812P110TG/S	4.37	4.73	3.07	3.41	0.50	0.75	0.30	0.25	0.65
SMD1812P110TS/15	4.37	4.73	3.07	3.41	0.75	1.25	0.30	0.25	0.65
SMD1812P125TS	4.37	4.73	3.07	3.41	0.75	1.25	0.30	0.25	0.65
SMD1812P150TS	4.37	4.73	3.07	3.41	0.75	1.25	0.30	0.25	0.65
SMD1812P160TG/S	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	0.65
SMD1812P260TS	4.37	4.73	3.07	3.41	1.45	2.25	0.30	0.25	0.65

### ENVIRONMENTAL SPECIFICATIONS

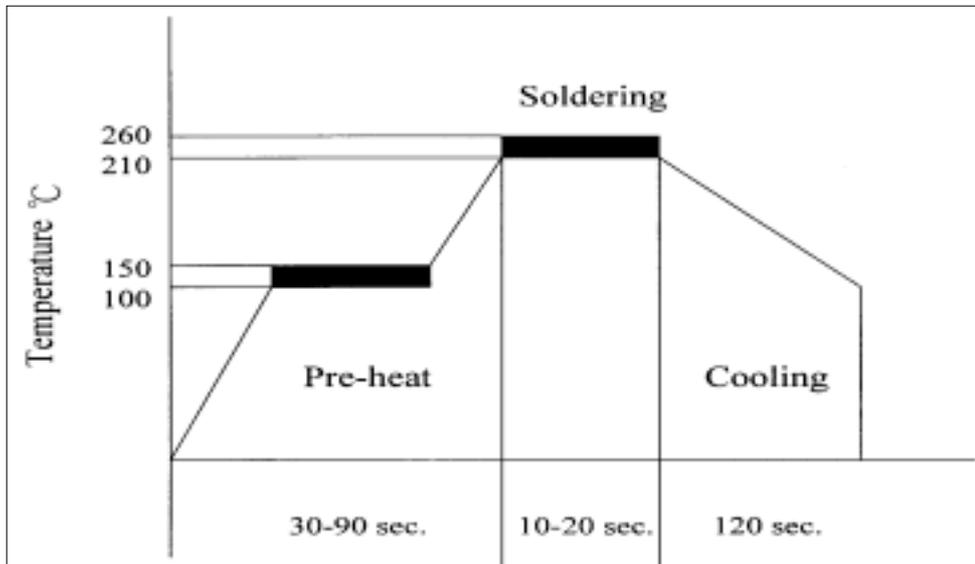
Operating/Storage Temperature	-40°C to +85°C
Maximum Device Surface Temperature in Tripped State	125°C
Passive Aging	+85°C, 1000 hours ±5% typical resistance change
Humidity Aging	+85°C, 85%R.H. 1000 hours ±5% typical resistance change
Thermal Shock	MIL-STD-202 Method 107G +85°C/-40°C 20 times -30% typical resistance change
Solvent Resistance	MIL-STD-202, Method 215 No change
Vibration	MIL-STD-883C, Method 2007.1, Condition A No change

### PHYSICAL SPECIFICATIONS

Terminal Material	Gold-Plated Copper or Solder-Plated Copper (Solder Material: 63/37 SnPb)
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 P260TS 2000 devices per reel for P020TS,P050TS, P075TS& P110TS for the others: 1500 devices per reel.

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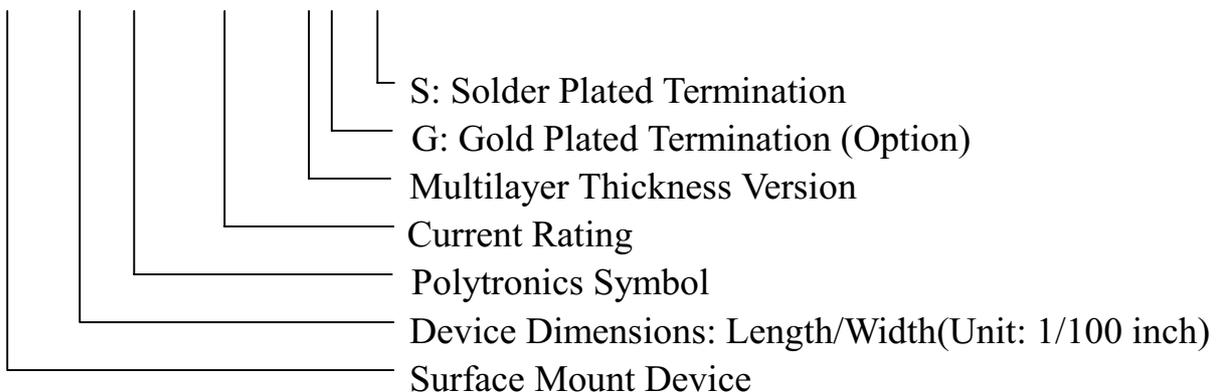
**SOLDER REFLOW**


- Recommended reflow methods: IR, vapor phase oven, hot air oven
- 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.*

**PART NUMBERING SYSTEM**

**SMD 1812 P**  **TG/S**



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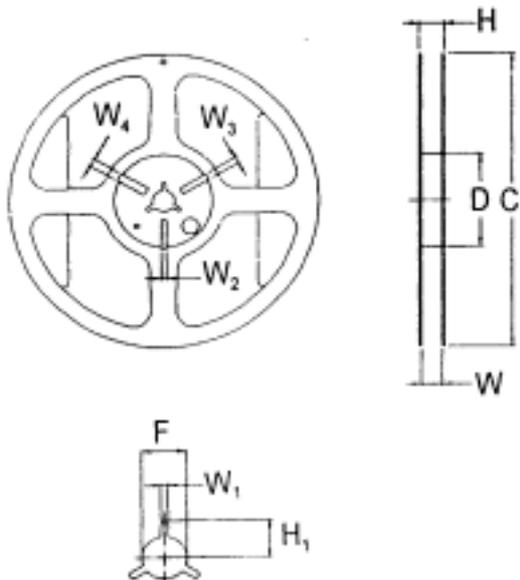
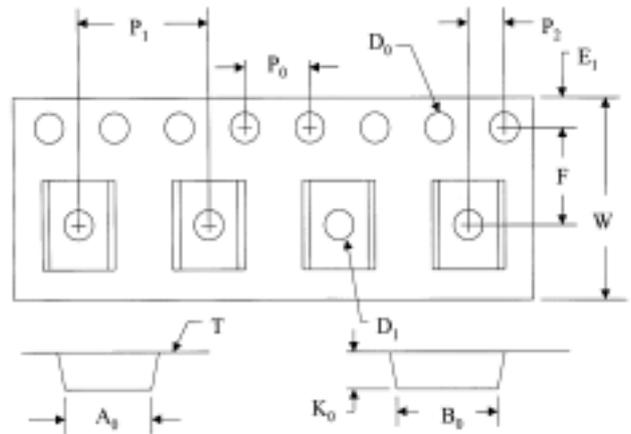
**SMD1812 Surface Mount PTC Devices**

R.O.C. Patent#415624

**TAPE SPECIFICATIONS: EIA-481-1**

	P020TS	P010TS,P014TS	P260TS
	P050TS	P125TS,P150TS	
	P075TS	P150TS,P160TS	
	P110TS	P200TS	
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 <sub>1</sub>	1.75+/-0.10	1.75+/-0.10	1.75+/-0.10
D <sub>0</sub>	1.50+0.10	1.55+/-0.05	1.55+/-0.05
D <sub>1</sub>	1.50+0.25	1.50 (MIN)	1.50 (MIN)
P <sub>0</sub>	4.00+/-0.10	4.00+/-0.10	4.00+/-0.10
P <sub>1</sub>	8.00+/-0.10	8.00+/-0.10	8.00+/-0.10
P <sub>2</sub>	2.00+/-0.05	2.00+/-0.05	2.00+/-0.05
A <sub>0</sub>	3.58+/-0.10	3.58+/-0.10	3.58+/-0.10
B <sub>0</sub>	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 <sub>0</sub>	1.02+/-0.10	1.30+/-0.10	2.10+/-0.10
Leader min.	390	390	390
Trailer min.	160	160	160

(mm)



**REEL DIMENSIONS: EIA-481-1**

H	16.0+/-0.2
W	13.2+/-1.5
D	60.2+/-0.5
F	13.0+1
C	178+/-1.0
H <sub>1</sub>	11
W <sub>1</sub>	2.5+0+0.5
W <sub>2</sub>	3.0+0+0.5
W <sub>3</sub>	4.0+0+0.5
W <sub>4</sub>	5.0+0+0.5

**CROSS REFERENCE**

Polytronics/ EVERFUSE™	Cross Reference	
	Raychem/ PolySwitch®	Bourns/ Multifuse®
SMD1812P010TS	MiniSMDC010	MF-MSMD010
SMD1812P014TS	MiniSMDC014	MF-MSMD014
SMD1812P020TS	MiniSMDC020	MF-MSMD020
SMD1812P050TG/S	MiniSMDC050	MF-MSMD050
SMD1812P075TG/S	MiniSMDC075	MF-MSMD075
SMD1812P110TG/S	MiniSMDC110	MF-MSMD110
SMD1812P110TS-15V	MiniSMDC110/16	N/A
SMD1812P125TS	MiniSMDC125	MF-MSMD125
SMD1812P150TS	MiniSMDC150	MF-MSMD150
SMD1812P160TG/S	MiniSMDC160	MF-MSMD160
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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