

- The SMD1206 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 SMD1206 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 SMD1206 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 <sub>hold</sub> (A)	I <sub>trip</sub> (A)	V <sub>max</sub> (Vdc)	I <sub>max</sub> (A)	P <sub>d max.</sub> (W)	Maximum Time To Trip		Resistance		Agency Approval	
						Current (A)	Time (Sec.)	R <sub>min</sub> (Ω)	R <sub>1max</sub> (Ω)	UL/CSA	TÜV
SMD1206P012TF	0.125	0.29	30	100	0.6	1.00	0.20	1.500	6.000	✓	✓
SMD1206P016TF	0.16	0.37	30	100	0.6	1.00	0.30	1.200	4.500	✓	✓
SMD1206P020TF/24	0.20	0.42	24	100	0.6	8.00	0.10	0.650	2.600	✓	✓
SMD1206P025TF	0.25	0.50	16	100	0.6	8.00	0.08	0.550	2.300	✓	✓
SMD1206P035TF/16	0.35	0.75	16	100	0.6	8.00	0.10	0.300	1.200	✓	✓
SMD1206P050TF	0.50	1.00	6	100	0.6	8.00	0.10	0.150	0.700	✓	✓
SMD1206P050TF/15	0.50	1.00	15	100	0.6	8.00	0.10	0.150	0.750	✓	✓
SMD1206P075TFT	0.75	1.50	8	100	0.6	8.00	0.20	0.090	0.290	✓	✓
SMD1206P075TF/13.2	0.75	1.50	13.2	100	0.6	8.00	0.20	0.090	0.350	✓	✓
SMD1206P110TFT	1.10	2.20	8	100	0.8	8.00	0.10	0.040	0.210	✓	✓
SMD1206P150TFT	1.50	3.00	6	100	0.8	8.00	0.30	0.040	0.120	✓	✓
SMD1206P175TF	1.75	3.50	6	100	0.8	8.00	0.50	0.020	0.090	✓	✓
<b>SMD1206P200TF</b>	<b>2.00</b>	<b>3.50</b>	<b>6</b>	<b>100</b>	<b>0.8</b>	<b>8.00</b>	<b>1.50</b>	<b>0.018</b>	<b>0.080</b>	✓	✓

Note: I<sub>hold</sub> = Hold current: maximum current device will pass without tripping in 23°C still air.

I<sub>trip</sub> = Trip current: minimum current at which the device will trip in 23°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 23°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 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.**

©Specifications are subject to change without notice.

\*Customer should verify the device performance in their specified conditions.

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

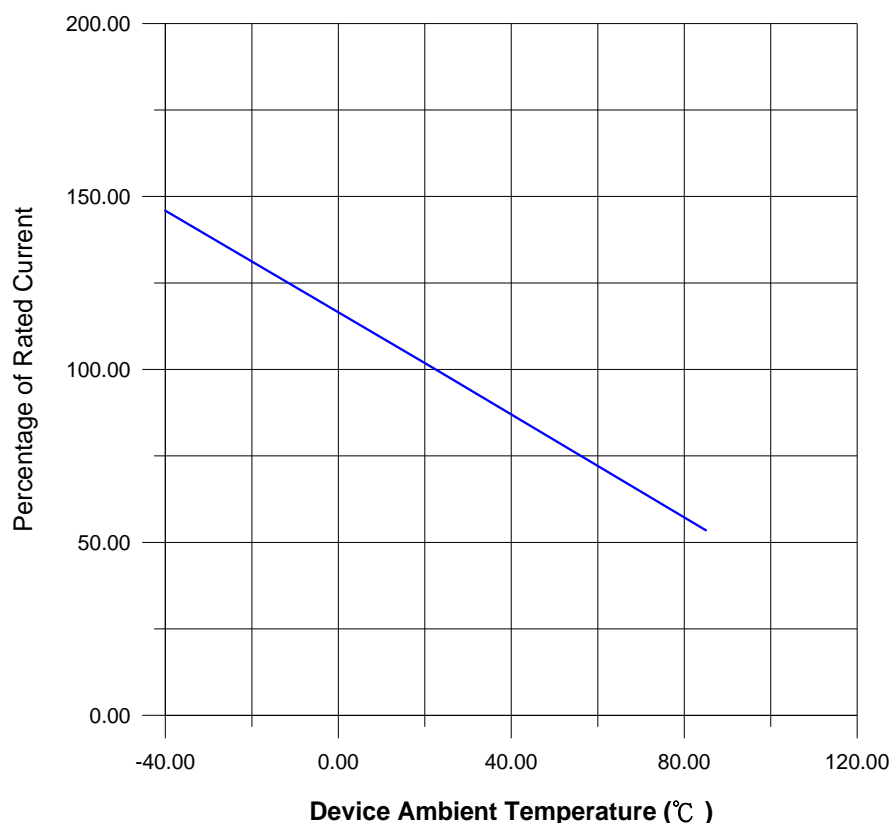
- (1) Determine the following operating parameters for the circuits:
  - (A) Normal operating current (I hold)
  - (B) Maximum circuit voltage (V max)
  - (C) Maximum interrupt current (I max)
  - (D) Normal operating temperature surrounding device (min°C/max°C)
- (2) Select the device form factor and 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.

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# THERMAL DERATING CURVE FOR SMD1206 SERIES



# THERMAL DERATING CHART FOR SMD1206 SERIES – Ihold(Amps)

## RECOMMENDED DATA

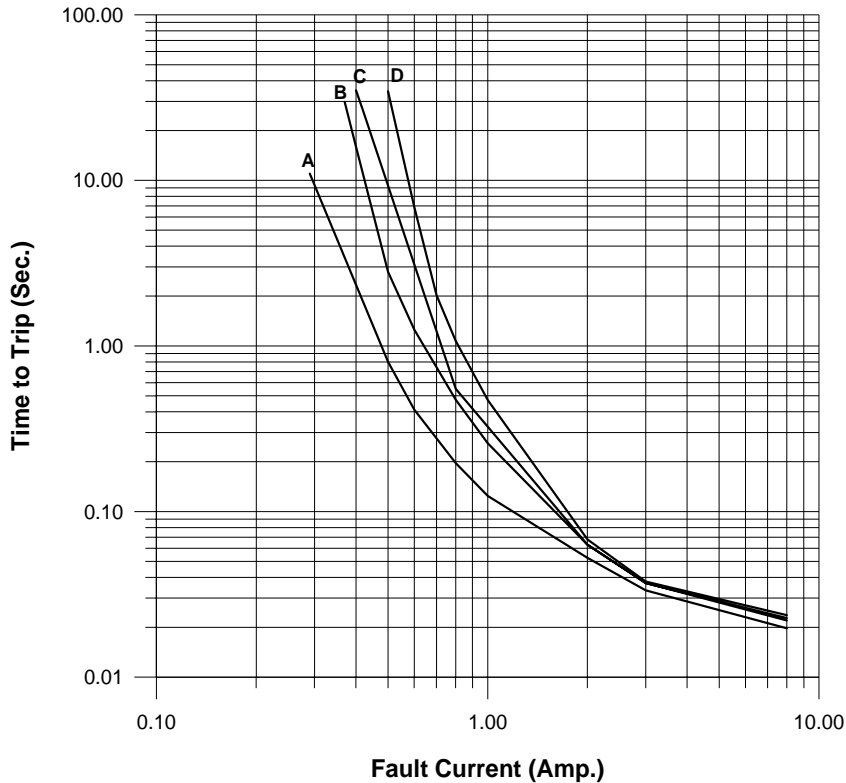
Model	Ambient Operation Temperature								
	-40°C	-20°C	0°C	23°C	40°C	50°C	60°C	70°C	85°C
SMD1206P012TF	0.18	0.16	0.14	0.125	0.10	0.09	0.08	0.07	0.05
SMD1206P016TF	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.09	0.08
SMD1206P020TF/24	0.28	0.25	0.23	0.20	0.17	0.15	0.14	0.12	0.09
SMD1206P025TF	0.37	0.33	0.29	0.25	0.22	0.20	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
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
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
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

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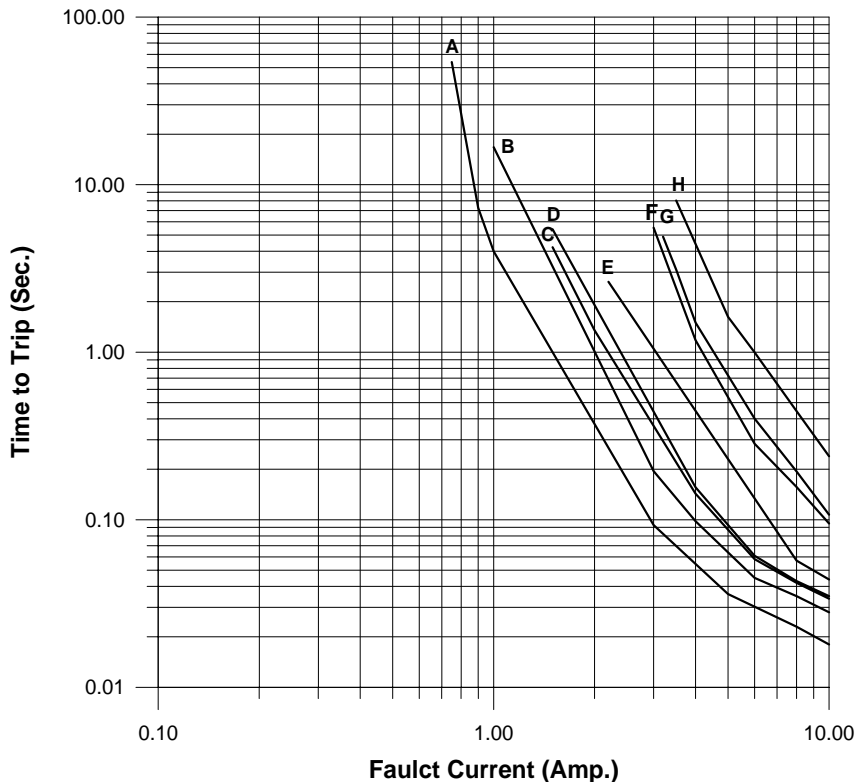
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## AVERAGE TIME-CURRENT CURVE FOR SMD1206 SERIES



- A — SMD1206P012TF
- B — SMD1206P016TF
- C — SMD1206P020TF/24
- D — SMD1206P025TF

## AVERAGE TIME-CURRENT CURVE FOR SMD1206 SERIES



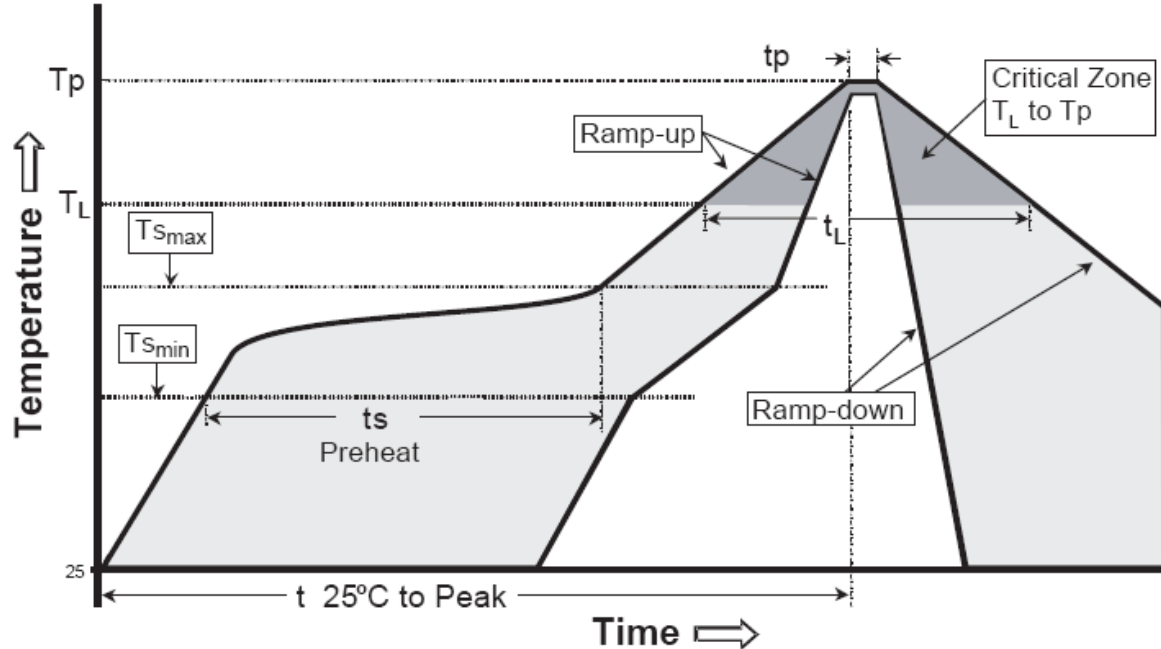
- A — SMD1206P035TF/16
- B — SMD1206P050TF/15
- C — SMD1206P075TFT
- D — SMD1206P075TF/13.2
- E — SMD1206P110TFT
- F — SMD1206P150TFT
- G — SMD1206P175TF
- H — SMD1206P200TF

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### SOLDER REFLOW



IPC-020c-5-1

### RECOMMENDED CONDITIONS

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (Tsmax to Tp)	3°C/second max.
<b>Preheat</b>	
-Temperature Min (Tsmin)	150°C
-Temperature Max (Tsmax)	200°C
-Time (Tsmin to Tsmax)	60-180 seconds
<b>Time maintained above:</b>	
-Temperature (Tl)	217°C
-Time (tL)	60-150 seconds
<b>Peak Temperature (Tp)</b>	260°C
<b>Time within 5°C of actual Peak</b>	
Temperature (tp)	20-40 seconds
<b>Ramp-Down Rate</b>	6°C/second max.
<b>Time 25°C to Peak Temperature</b>	8 minutes max.
<b>Storage Condition</b>	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, N<sub>2</sub> 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.

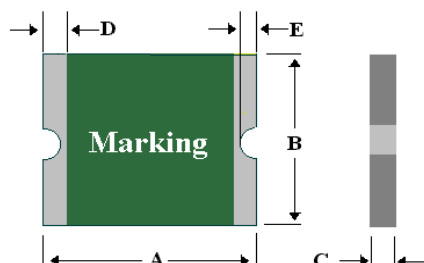
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FIGURE



### PHYSICAL DIMENSIONS (mm)

Part Number	A		B		C		D		E	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
SMD1206P012TF	3.00	3.40	1.50	1.80	0.65	1.45	0.25	0.75	0.10	0.45
SMD1206P016TF	3.00	3.40	1.50	1.80	0.65	1.45	0.25	0.75	0.10	0.45
SMD1206P020TF/24	3.00	3.40	1.50	1.80	0.50	1.00	0.25	0.75	0.10	0.45
SMD1206P025TF	3.00	3.40	1.50	1.80	0.50	1.00	0.25	0.75	0.10	0.45
SMD1206P035TF/16	3.00	3.40	1.50	1.80	0.45	0.75	0.25	0.75	0.10	0.45
SMD1206P050TF	3.00	3.40	1.50	1.80	0.45	0.75	0.25	0.75	0.10	0.45
SMD1206P050TF/15	3.00	3.40	1.50	1.80	0.45	0.75	0.25	0.75	0.10	0.45
SMD1206P075TFT	3.00	3.40	1.50	1.80	0.45	0.75	0.25	0.75	0.10	0.45
SMD1206P075TF/13.2	3.00	3.40	1.50	1.80	0.45	1.25	0.25	0.75	0.10	0.45
SMD1206P110TFT	3.00	3.40	1.50	1.80	0.30	0.60	0.25	0.75	0.10	0.45
SMD1206P150TFT	3.00	3.40	1.50	1.80	0.50	1.00	0.25	0.75	0.10	0.45
SMD1206P175TF	3.00	3.40	1.50	1.80	0.80	1.80	0.25	0.75	0.10	0.45
SMD1206P200TF	3.00	3.40	1.50	1.80	0.80	1.60	0.25	0.75	0.10	0.45

### 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

\*Customer should verify the device performance in their specified conditions.

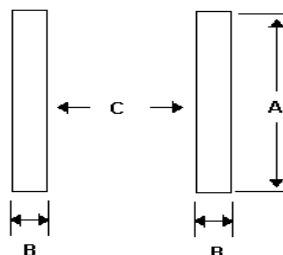
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## PACKAGING

### SOLDER PAD LAYOUTS

(Dimension in mm)



Part Number	Tape & Reel Quantity	Recommended Pad layout Figure (mm)		
		Dimension (A)	Dimension (B)	Dimension (C)
SMD1206P012TF	3000	1.80	1.00	1.80
SMD1206P016TF	3000	1.80	1.00	1.80
SMD1206P020TF/24	4000	1.80	1.00	1.80
SMD1206P025TF	4000	1.80	1.00	1.80
SMD1206P035TF/16	4000	1.80	1.00	1.80
SMD1206P050TF	4000	1.80	1.00	1.80
SMD1206P050TF/15	4000	1.80	1.00	1.80
SMD1206P075TFT	4000	1.80	1.00	1.80
SMD1206P075TF/13.2	3000	1.80	1.00	1.80
SMD1206P110TFT	4000	1.80	1.00	1.80
SMD1206P150TFT	3000	1.80	1.00	1.80
SMD1206P175TF	2000	1.80	1.00	1.80
SMD1206P200TF	2000	1.80	1.00	1.80

◎ 8 mm tape on 7 inch reel per EIA-481-1 (equivalent to IEC286, part 3)

## 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.

◎ Specifications are subject to change without notice.

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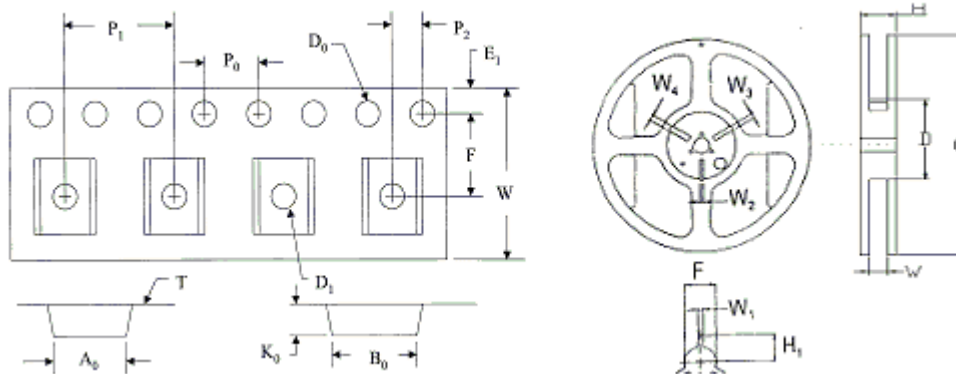
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### TAPE SPECIFICATIONS: EIA-481-1

### REEL DIMENSIONS: EIA-481-1

	P025TF,P020TF/24 P035TF,P035TF/16 P050TF,P050TF/15 P075TFT,P110TFT	P012TF,P016TF P075TF/13.2 P150TFT	P175TF P200TF		
W	8.20 +0.10/-0.30	8.15 +0.15/-0.30	8.20 +0.10/-0.30	C	Ø178.0 ± 1.0
F	3.50 ± 0.05	3.50 ± 0.05	3.50 ± 0.05	D	Ø60.0 + 0.2
E <sub>1</sub>	1.75 ± 0.10	1.75 ± 0.10	1.75 ± 0.10	F	Ø13.0 ± 0.5
D <sub>0</sub>	1.55 ± 0.05	1.55 ± 0.05	1.55 ± 0.05	W1	2.2 ± 0.5
D <sub>1</sub>	1.00 ± 0.10	1.00 ± 0.10	1.00 ± 0.10	W2	3.0 + 0.5
P <sub>0</sub>	4.00 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	W3	4.0 + 0.5
P <sub>1</sub>	4.00 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	W4	5.0 + 0.5
P <sub>2</sub>	2.00 ± 0.05	2.00 ± 0.05	2.00 ± 0.05	W	9.0 ± 1.5
A <sub>0</sub>	1.95 ± 0.10	1.92 ± 0.10	1.95 ± 0.10	H	11.0 ± 0.5
B <sub>0</sub>	3.65 ± 0.10	3.65 ± 0.10	3.65 ± 0.10		
T	0.20 ± 0.10	0.25 ± 0.10	0.25 ± 0.10		(mm)
K <sub>0</sub>	0.87 ± 0.10	1.30 ± 0.10	1.70 ± 0.10		
Leader min.	390	390	390		
Trailer min.	160	160	160		

(mm)



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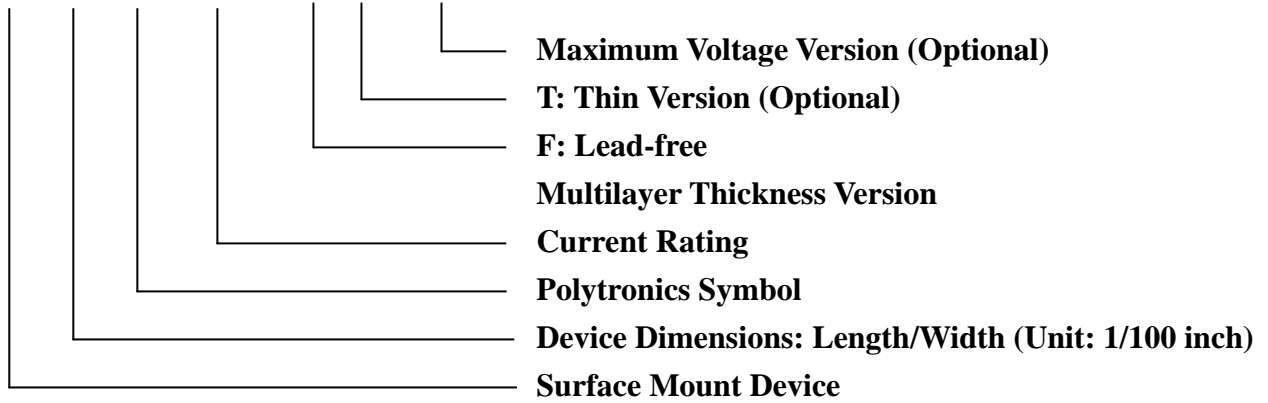
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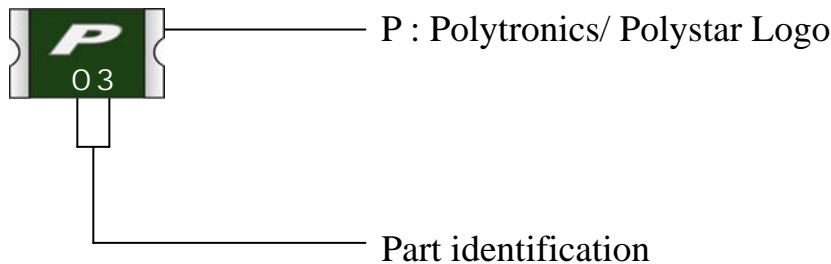


### PART NUMBERING SYSTEM

SMD 1206 P  TF T



### PART MARKING SYSTEM



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

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**CROSS REFERENCE**

Polytronics/ EVERFUSE®	Cross Reference	
	Raychem/ PolySwitch®	Bourns/ Multifuse®
SMD1206P012TF	nanoSMDC012F	MF-NSMF012
SMD1206P016TF	nanoSMDC016F	-
SMD1206P020TF/24	nanoSMDC020F	MF-NSMF020
SMD1206P025TF	-	-
SMD1206P035TF/16	nanoSMDC035F	MF-NSMF035
SMD1206P050TF	nanoSMDM050F	-
SMD1206P050TF/15	nanoSMDC050F/13.2	MF-NSMF050
SMD1206P075TFT	nanoSMDC075F	MF-NSMF075
SMD1206P075TF/13.2	-	-
SMD1206P110TFT	nanoSMDC110F	MF-NSMF110
SMD1206P150TFT	nanoSMDC150F	MF-NSMF150
SMD1206P175TF	-	-
SMD1206P200TF	nanoSMDC200F	MF-NSMF200

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

“PolySwitch” is a registered trademark of Raychem Corporation.

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