**Features**

- Radial Leaded Devices
- Cured, flame, retardant epoxy polymer insulating material meets UL 94V-0 requirements
- Bulk packaging, or tape and reel available on most models

Applications

- Almost anywhere there is a low voltage power supply, up to 16V and a load to be protected, including:
- Personal computer
 - Medical electronics
 - Personal care product

R16 Series

Alpha-Top (Sea & Land Alliance)

Model	V _{max} (Vdc)	I _{max} (A)	I _{hold} (A)	I _{trip} (A)	P _d Typ. (W)	Maximum Time To Trip		Resistance			Agency Approval	
						Current (A)	Time (Sec)	Ri min (Ω)	Ri max (Ω)	R1 max (Ω)	UL	TUV
R16-090	16	100	0.90	1.80	0.60	8.00	1.2	0.070	0.1200	0.180		
R16-110	16	100	1.10	2.20	0.70	8.00	2.3	0.050	0.0950	0.140		
R16-135	16	100	1.35	2.70	0.80	8.00	4.5	0.040	0.0740	0.120		
R16-160	16	100	1.60	3.20	0.90	8.00	9.0	0.030	0.0610	0.110		
R16-185	16	100	1.85	3.70	1.00	8.00	10.0	0.030	0.0510	0.090		
R16-250	16	100	2.50	5.00	1.20	12.50	5.0	0.020	0.0350	0.060		
R16-300	16	100	3.00	5.10	2.30	15.00	1.0	0.034	0.0650	0.105		
R16-400	16	100	4.00	6.80	2.40	20.00	1.7	0.020	0.0390	0.063		
R16-500	16	100	5.00	8.50	2.60	25.00	2.0	0.014	0.0230	0.044	✓	
R16-600	16	100	6.00	10.20	2.80	30.00	3.3	0.009	0.0190	0.030	✓	
R16-700	16	100	7.00	11.90	3.00	35.00	3.5	0.006	0.0130	0.021	✓	
R16-800	16	100	8.00	13.60	3.00	40.00	5.0	0.005	0.0110	0.018	✓	
R16-900	16	100	9.00	15.30	3.30	45.00	5.5	0.004	0.0092	0.015	✓	
R16-1000	16	100	10.00	17.00	3.60	50.00	6.0	0.003	0.0071	0.012	✓	
R16-1100	16	100	11.00	18.70	3.70	55.00	7.0	0.003	0.0062	0.010	✓	
R16-1200	16	100	12.00	20.40	4.20	60.00	7.5	0.002	0.0060	0.009	✓	
R16-1300	16	100	13.00	23.00	4.40	65.00	8.5	0.002	0.0060	0.009		
R16-1400	16	100	14.00	23.80	4.60	70.00	9.0	0.002	0.0045	0.008	✓	
R16-1500	16	100	15.00	25.50	4.80	75.00	9.5	0.002	0.0045	0.008		
R16-1600	16	100	16.00	27.20	4.80	80.00	10.0	0.002	0.0045	0.008		

I_{hold} = Hold Current : maximum current device will sustain for 4 hours without tripping in 25°C still air.**I_{trip}** = Trip Current : minimum current at which the device will trip in 25°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 25°C still air.**Ri min/max** = Minimum/Maximum resistance of device in initial (un-soldered) state.**R1 max** = Maximum resistance of device at 25°C measured one hour after tripping.**CAUTION** : Operation beyond the specified ratings may result in damage and possible arcing and flame.**Environmental Specifications**

Test	Conditions	Resistance change
Passive aging	+85°C, 1000 hrs.	±5% typical
Humidity aging	+85°C, 85% R.H.,1000 hrs	±5% typical
Thermal shock	+85°C to -40°C, 20 times	±10% typical
Resistance to solvent	MIL-STD-202,Method 215	No change
Vibration	MIL-STD-202,Method 201	No change
Ambient operating /storage conditions : - 40 °C to +85 °C		
Maximum surface temperature of the device in the tripped state is 125 °C		

Agency Approvals :

E201504(Alpha-Top)/E319079(Sea&Land)

Regulation/Standard:

2002/95/EC



EN14582

PHYSICAL SPECIFICATIONS :**Materials : Leads**

R16-090~250 : Tin plated copper-clad steel, 24 AWG (0.51mm/0.020" Dia.)

R16-300~1100 : Tin plated copper, 20 AWG (0.81mm/0.032" Dia.)

R16-1200~1600 : Tin plated copper, 18 AWG (1.0mm/0.04" Dia.)

Lead Solderability : MIL-STD-202, Method 208E**Device Labeling** : Device is marked with Logo, amperage rating , voltage rating & date code.

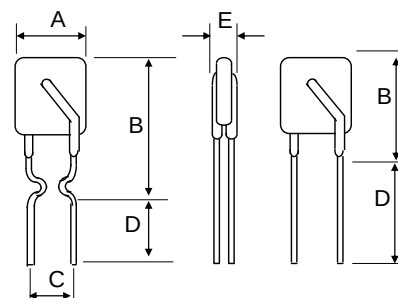


R16 Series

Alpha-Top (Sea & Land Alliance)

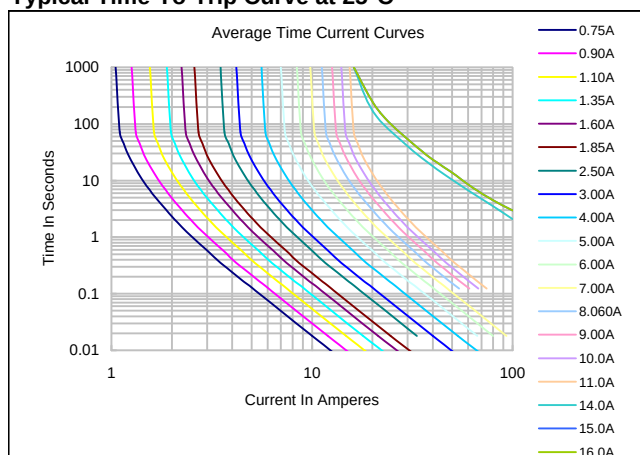
Physical Dimensions (Unit: mm)

Model	A Max.	B Max.	C Typ.	D Min.	E Max.	Lead Style
R16-090	7.40	12.20	5.10	7.6	3	Kink
R16-110	7.40	14.20	5.10	7.6	3	Kink
R16-135	8.90	13.50	5.10	7.6	3	Kink
R16-160	8.90	15.20	5.10	7.6	3	Kink
R16-185	10.20	15.70	5.10	7.6	3	Kink
R16-250	10.40	14.30	5.10	7.6	3	Kink
R16-300	7.10	11.00	5.10	7.6	3	Straight
R16-400	8.90	15.20	5.10	7.6	3	Straight
R16-500	10.40	15.70	5.10	7.6	3	Straight
R16-600	10.70	18.30	5.10	7.6	3	Straight
R16-700	12.70	19.70	5.10	7.6	3	Straight
R16-800	13.40	20.10	5.10	7.6	3	Straight
R16-900	14.00	24.90	5.10	7.6	3	Straight
R16-1000	16.50	24.90	5.10	7.6	3	Straight
R16-1100	17.50	24.90	5.10	7.6	3	Straight
R16-1200	18.50	26.70	10.20	7.6	3.5	Straight
R16-1300	23.50	27.90	10.20	7.6	3.5	Straight
R16-1400	23.50	27.90	10.20	7.6	3.5	Straight
R16-1500	24.10	28.70	10.20	7.6	3.5	Straight
R16-1600	24.10	28.70	10.20	7.6	3.5	Straight

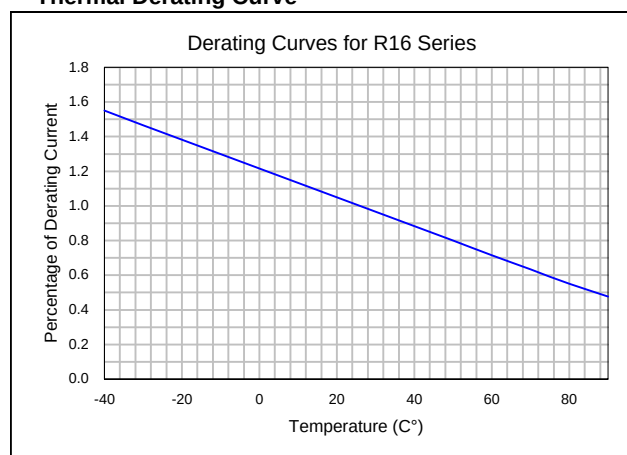


Note : Stand-offs only used for R16-090 ~ R16-250

Typical Time-To-Trip Curve at 25°C



Thermal Derating Curve



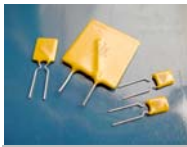
Packing :

Model	Reel QTY	Bag QTY
R16-090 ~ R16- 600	3000	500
R16-700 ~ R16- 900	1500	500
R16-1000 ~ R16-1600	-	500

Tape & Reel packaging per EIA468-B standard.

WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage ($L di/dt$) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space



R30 Series

Features

- Radial Leaded Devices
- Cured, flame retardant epoxy polymer insulating material meets UL 94V-0 requirements
- Bulk packaging, or tape and reel available on most models

Applications

- Almost anywhere there is a low voltage power supply, up to 30V and a load to be protected, including:
 - Personal computer
 - Toys
 - Industrial controls

Alpha-Top (Sea & Land Alliance)

Electrical Properties

Model	V_{max} (Vdc)	I_{max} (A)	I_{hold} (A)	I_{trip} (A)	P_d Typ. (W)	Maximum Time To Trip		Resistance			Agency Approval	
						Current (A)	Time (Sec)	Rimin (Ω)	Rimax (Ω)	R1max (Ω)	UL	TUV-PS
R30-030	30	40	0.30	0.60	0.44	8.00	0.3	0.370	0.720	1.080		
R30-040	30	40	0.40	0.80	0.45	8.00	0.3	0.250	0.430	0.645		
R30-050	30	40	0.50	1.00	0.46	8.00	0.3	0.150	0.400	0.600		
R30-065	30	40	0.65	1.30	0.47	8.00	0.4	0.120	0.300	0.450		
R30-075	30	40	0.75	1.50	0.48	8.0	0.4	0.100	0.250	0.375		
R30-090	30	40	0.90	1.80	0.6	4.50	5.9	0.070	0.145	0.220	✓	✓
R30-110	30	40	1.10	2.20	0.7	5.50	6.6	0.050	0.120	0.170	✓	✓
R30-135	30	40	1.35	2.70	0.8	6.75	7.3	0.040	0.085	0.130	✓	✓
R30-160	30	40	1.60	3.20	0.9	8.00	8.0	0.030	0.070	0.110	✓	✓
R30-185	30	40	1.85	3.70	1.0	9.25	8.7	0.030	0.060	0.090	✓	✓
R30-250	30	40	2.50	5.00	1.2	12.5	10.3	0.020	0.040	0.070	✓	✓
R30-300	30	40	3.00	6.00	2.0	15.0	10.8	0.020	0.050	0.080	✓	✓
R30-400	30	40	4.00	8.00	2.5	20.0	12.7	0.010	0.030	0.050	✓	✓
R30-500	30	40	5.00	10.00	3.0	25.0	14.5	0.010	0.030	0.050	✓	✓
R30-600	30	40	6.00	12.00	3.5	30.0	16.0	0.005	0.020	0.040	✓	✓
R30-700	30	40	7.00	14.00	3.8	35.0	17.5	0.005	0.020	0.030	✓	✓
R30-800	30	40	8.00	16.00	4.0	40.0	18.8	0.005	0.020	0.020	✓	✓
R30-900	30	40	9.00	18.00	4.2	40.0	20.0	0.005	0.010	0.020	✓	✓

Ihold = Hold Current : maximum current device will sustain for 4 hours without tripping in 25°C still air.

Itrip = Trip Current : minimum current at which the device will trip in 25°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 25°C still air.

Ri min/max = Minimum/Maximum resistance of device in initial (un-soldered) state.

R1 max = Maximum resistance of device at 25°C measured one hour after tripping.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+85°C, 1000 hrs.	±5% typical
Humidity aging	+85°C, 85% R.H., 1000 hrs	±5% typical
Thermal shock	+85°C to -40°C, 20 times	±10% typical
Resistance to solvent	MIL-STD-202, Method 215	No change
Vibration	MIL-STD-202, Method 201	No change
Ambient operating /storage conditions : - 40 °C to +85 °C		
Maximum surface temperature of the device in the tripped state is 125 °C		

Agency Approvals :

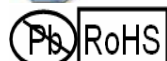


E201504(Alpha-Top)/E319079(Sea&Land)



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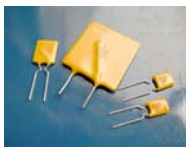
Regulation/Standard:



2002/95/EC



EN14582



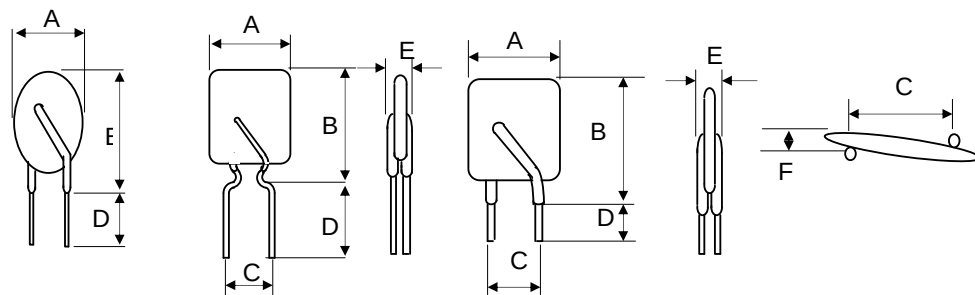
R30 Series

Alpha-Top (Sea & Land Alliance)

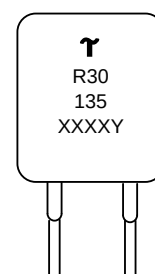
Physical Dimensions (Unit: mm/inch)

Model	A Max.	B Max.	C Typ.	D Min.	E Max.	F Max.	Lead Style
R30-030	7.4/0.29	10.2/0.4	5.1/0.20	7.6/0.3	3.0/0.12	1.2/0.05	Straight
R30-040	7.4/0.29	11.4/0.45	5.1/0.20	7.6/0.3	3.0/0.12	1.2/0.05	Straight
R30-050	7.4/0.29	11.4/0.45	5.1/0.20	7.6/0.3	3.0/0.12	1.2/0.05	Straight
R30-065	7.4/0.29	11.4/0.45	5.1/0.20	7.6/0.3	3.0/0.12	1.2/0.05	Straight
R30-075	7.4/0.29	11.4/0.45	5.1/0.20	7.6/0.3	3.0/0.12	1.2/0.05	Straight
R30-090	7.4/0.29	12.2/0.48	5.1/0.20	7.6/0.3	3.0/0.12	1.2/0.05	Kink
R30-110	7.4/0.29	14.2/0.56	5.1/0.20	7.6/0.3	3.0/0.12	1.2/0.05	Kink
R30-135	8.9/0.35	13.5/0.53	5.1/0.20	7.6/0.3	3.0/0.12	1.2/0.05	Kink
R30-160	8.9/0.35	15.2/0.60	5.1/0.20	7.6/0.3	3.0/0.12	1.2/0.05	Kink
R30-185	10.2/0.40	15.7/0.62	5.1/0.20	7.6/0.3	3.0/0.12	1.2/0.05	Kink
R30-250	11.4/0.45	18.3/0.72	5.1/0.20	7.6/0.3	3.0/0.12	1.2/0.05	Kink
R30-300	11.4/0.45	17.3/0.68	5.1/0.20	7.6/0.3	3.0/0.12	1.2/0.05	Straight
R30-400	14.0/0.55	20.1/0.79	5.1/0.20	7.6/0.3	3.0/0.12	1.2/0.05	Straight
R30-500	14.0/0.55	24.9/0.98	10.2/0.40	7.6/0.3	3.0/0.12	1.2/0.05	Straight
R30-600	16.5/0.65	24.9/0.98	10.2/0.40	7.6/0.3	3.0/0.12	1.2/0.05	Straight
R30-700	19.1/0.75	26.7/1.05	10.2/0.40	7.6/0.3	3.0/0.12	2.0/0.08	Straight
R30-800	21.6/0.85	29.2/1.15	10.2/0.40	7.6/0.3	3.0/0.12	2.0/0.08	Straight
R30-900	24.1/0.95	29.7/1.17	10.2/0.40	7.6/0.3	3.0/0.12	2.0/0.08	Straight

Dimensions



Marking



T = Trademark
 R30 = Radial type 30 Vrms
 135 = 1.35A hold current
 XXX = Date code
 Y = Factory code

Physical Characteristics

Lead Material :

R30-030 ~ 250: Tin-plated copper-clad steel, 0.205mm² (24AWG), Φ 0.51mm(0.020 in).

R30-300 ~ 900: Tin-plated copper, 0.52mm² (20AWG), Φ 0.81mm(0.032 in).

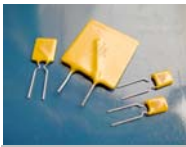
Lead Solderability : MIL-STD-202, Method 208E

Order Information

Packing

R30	135	K or S	R or U	Model	Reel Q'ty	Bag Q'ty
Radial type	Hold	K= Kink leads		R30-030 ~ R30-075	-	500
30 V	Current		R=Tape&reel	R30-090 ~ R30-250	3000	500
	(A)	S=Straight leads	U= Bulk packaged	R30-300 ~ R30-400	1500	500
				R30-500 ~ R30-900	-	500

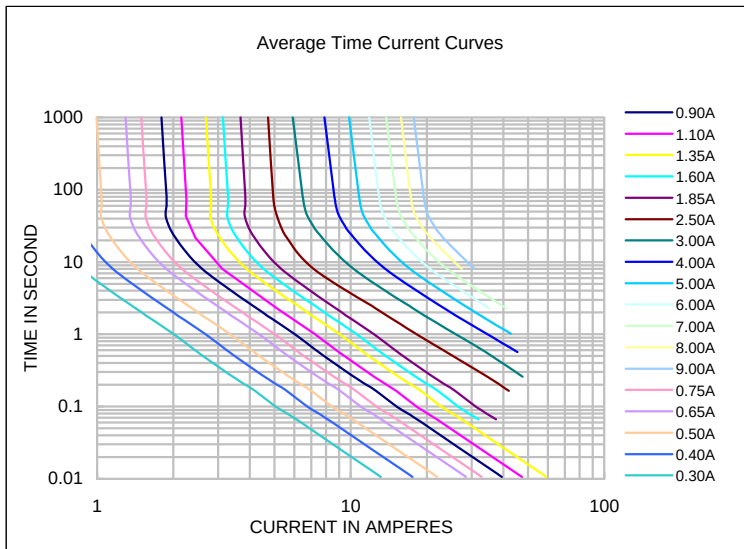
Tape & Reel packaging per EIA468-B standard.



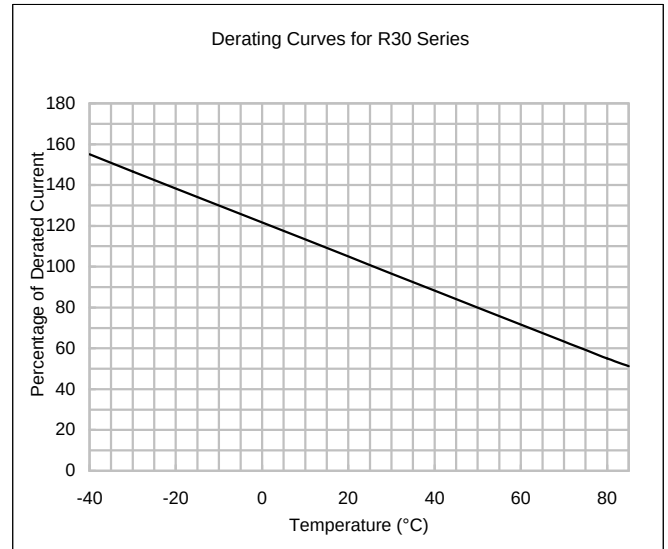
R30 Series

Alpha-Top (Sea & Land Alliance)

Typical Time-To-Trip Curve At 25°C



Thermal Derating Curve



I_{hold} Versus Temperature

Model	Maximum ambient operating temperature (T_{mao}) vs. hold current (I_{hold})								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
R30-030	0.44	0.39	0.35	0.30	0.25	0.23	0.20	0.18	0.16
R30-040	0.58	0.52	0.46	0.40	0.33	0.31	0.27	0.24	0.21
R30-050	0.73	0.65	0.58	0.50	0.42	0.38	0.34	0.31	0.26
R30-065	0.95	0.85	0.75	0.65	0.54	0.50	0.44	0.40	0.34
R30-075	0.00	0.00	0.00	0.75	0.00	0.00	0.00	0.00	0.00
R30-090	1.31	1.17	1.04	0.90	0.75	0.69	0.61	0.55	0.47
R30-110	1.60	1.43	1.27	1.10	0.91	0.85	0.75	0.67	0.57
R30-135	1.96	1.76	1.55	1.35	1.12	1.04	0.92	0.82	0.70
R30-160	2.32	2.08	1.84	1.60	1.33	1.23	1.09	0.98	0.83
R30-185	2.68	2.41	2.13	1.85	1.54	1.42	1.26	1.13	0.96
R30-250	3.63	3.25	2.88	2.50	2.08	1.93	1.70	1.53	1.30
R30-300	4.35	3.90	3.45	3.00	2.49	2.31	2.04	1.83	1.56
R30-400	5.80	5.20	4.60	4.00	3.32	3.08	2.72	2.44	2.08
R30-500	7.25	6.50	5.75	5.00	4.15	3.85	3.40	3.05	2.60
R30-600	8.70	7.80	6.90	6.00	4.98	4.62	4.08	3.66	3.12
R30-700	10.15	9.10	8.05	7.00	5.81	5.39	4.76	4.27	3.64
R30-800	11.60	10.40	9.20	8.00	6.64	6.16	5.44	4.88	4.16
R30-900	13.05	11.70	10.35	9.00	7.47	6.93	6.12	5.49	4.68



WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage ($L di/dt$) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.



Features

- Radial Leaded Devices
- Cured, flame retardant epoxy polymer insulating material meets UL 94V-0 requirements
- Bulk packaging, or tape and reel available on most models

Applications

- Almost anywhere there is a low voltage power supply, up to 60V and a load to be protected, including:
- Industrial controls
 - Automotive electronics
 - Medical products

R60 Series

Alpha-Top (Sea & Land Alliance)

Electrical Properties

Model	V _{max} (Vdc)	I _{max} (A)	I _{hold} (A)	I _{trip} (A)	P _d Typ. (W)	Maximum Time To Trip		Resistance			Agency Approval	
						Current (A)	Time (Sec)	R _{imin} (Ω)	R _{imax} (Ω)	R _{1max} (Ω)	UL	TUV-PS
R60-010	60	40	0.10	0.20	0.38	0.50	4.0	2.50	4.50	7.50	✓	✓
R60-017	60	40	0.17	0.34	0.48	0.85	3.0	2.50	5.21	8.00	✓	✓
R60-020	60	40	0.20	0.40	0.41	1.00	2.2	1.25	2.75	4.40	✓	✓
R60-025	60	40	0.25	0.50	0.45	1.25	2.5	0.65	1.95	3.00	✓	✓
R60-030	60	40	0.30	0.60	0.49	1.50	3.0	0.45	1.33	2.10	✓	✓
R60-040	60	40	0.40	0.80	0.56	2.00	3.8	0.40	0.86	1.29	✓	✓
R60-050	60	40	0.50	1.00	0.77	2.50	4.0	0.35	0.77	1.17	✓	✓
R60-065	60	40	0.65	1.30	0.88	3.25	5.3	0.25	0.48	0.72	✓	✓
R60-075	60	40	0.75	1.50	0.92	3.75	6.3	0.20	0.40	0.60	✓	✓
R60-090	60	40	0.90	1.80	0.99	4.50	7.2	0.15	0.31	0.47	✓	✓
R60-110	60	40	1.10	2.20	1.50	5.50	8.2	0.13	0.25	0.38	✓	✓
R60-135	60	40	1.35	2.70	1.70	6.75	9.6	0.10	0.19	0.30	✓	✓
R60-160	60	40	1.60	3.20	1.90	8.00	11.4	0.07	0.14	0.22	✓	✓
R60-185	60	40	1.85	3.70	2.10	9.25	12.6	0.06	0.12	0.19	✓	✓
R60-250	60	40	2.50	5.00	2.50	12.50	15.6	0.04	0.08	0.13	✓	✓
R60-300	60	40	3.00	6.00	2.80	15.00	19.8	0.03	0.06	0.10	✓	✓
R60-375	60	40	3.75	7.50	3.20	18.75	24.0	0.02	0.05	0.08	✓	✓

I_{hold} = Hold Current : maximum current device will sustain for 4 hours without tripping in 25°C still air.

I_{trip} = Trip Current : minimum current at which the device will trip in 25°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 25°C still air.

R_i min/max = Minimum/Maximum resistance of device in initial (un-soldered) state.

R₁ max = Maximum resistance of device at 25°C measured one hour after tripping.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+85°C, 1000 hrs	±5% typical
Humidity aging	+85°C, 85% R.H., 1000 hrs	±5% typical
Thermal shock	+85°C to -40°C, 20 times	±10% typical
Resistance to solvent	MIL-STD-202, Method 215	No change
Vibration	MIL-STD-202, Method 201	No change
Ambient operating /storage conditions : - 40 °C to +85 °C		
Maximum surface temperature of the device in the tripped state is 125 °C		

Agency Approvals :



E201504(Alpha-Top)/E319079(Sea&Land)



NO.43486

Regulation/Standard:



2002/95/EC



EN14582



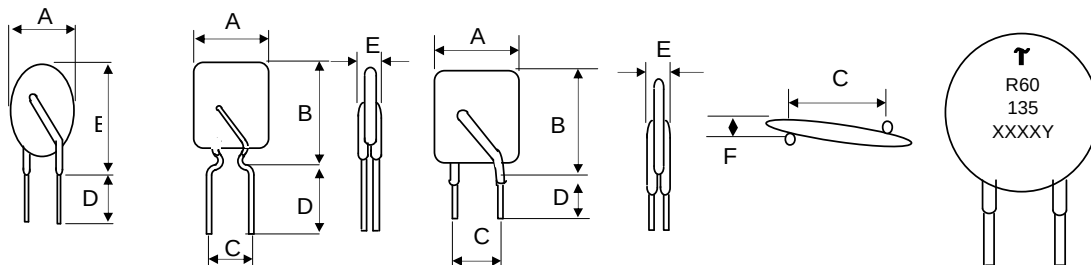
R60 Series

Alpha-Top (Sea & Land Alliance)

Physical Dimensions (Unit: mm/inch)

Model	A Max.	B Max.	C Typ.	D Min.	E Max.	F Max.	Lead Style
R60-010	7.4/0.29	12.7/0.50	5.1/0.20	7.6/0.3	3.1/0.12	1.0/0.04	Kink
R60-017	7.4/0.29	12.7/0.50	5.1/0.20	7.6/0.3	3.1/0.12	1.7/0.07	Kink
R60-020	7.4/0.29	12.7/0.48	5.1/0.20	7.6/0.3	3.1/0.12	1.0/0.04	Kink
R60-025	7.4/0.29	12.7/0.50	5.1/0.20	7.6/0.3	3.1/0.12	1.0/0.04	Kink
R60-030	7.4/0.29	13.0/0.51	5.1/0.20	7.6/0.3	3.1/0.12	1.0/0.04	Kink
R60-040	7.6/0.30	13.5/0.53	5.1/0.20	7.6/0.3	3.1/0.12	1.2/0.05	Kink
R60-050	7.9/0.31	13.7/0.54	5.1/0.20	7.6/0.3	3.1/0.12	1.2/0.05	Kink
R60-065	9.7/0.38	14.5/0.57	5.1/0.20	7.6/0.3	3.1/0.12	1.5/0.06	Kink
R60-075	10.4/0.41	15.2/0.60	5.1/0.20	7.6/0.3	3.1/0.12	1.5/0.06	Kink
R60-090	11.7/0.46	15.8/0.62	5.1/0.20	7.6/0.3	3.1/0.12	1.5/0.06	Kink
R60-110	13.0/0.51	18.0/0.71	5.1/0.20	7.6/0.3	3.1/0.12	1.2/0.05	Straight
R60-135	14.5/0.57	19.6/0.77	5.1/0.20	7.6/0.3	3.1/0.12	1.2/0.05	Straight
R60-160	16.3/0.64	21.3/0.84	5.1/0.20	7.6/0.3	3.1/0.12	1.5/0.06	Straight
R60-185	17.8/0.70	22.9/0.90	5.1/0.20	7.6/0.3	3.1/0.12	1.5/0.06	Straight
R60-250	21.3/0.84	26.4/1.04	10.2/0.40	7.6/0.3	3.1/0.12	1.7/0.07	Straight
R60-300	24.9/0.98	30.0/1.18	10.2/0.40	7.6/0.3	3.1/0.12	2.0/0.08	Straight
R60-375	28.5/1.12	33.5/1.32	10.2/0.40	7.6/0.3	3.1/0.12	2.0/0.08	Straight

Dimensions



↑ = Trademark

R60 = Radial type 60 Vrms

135 = 1.35A hold current

XXXX = Date code

Y = Factory code

Physical Characteristics

Lead Material :

R60-010: Tin-plated nickel-copper alloy, 0.205mm² (24AWG), Φ0.51mm(0.020 in).

R60-017 ~ 040: Tin-plated copper-clad steel, 0.205mm² (24AWG), Φ0.51mm(0.020 in).

R60-050 ~ 090: Tin-plated copper, 0.205mm² (24AWG), Φ0.51mm(0.020 in).

R60-110 ~ 375: Tin-plated copper, 0.52mm² (20AWG), Φ0.81mm(0.032 in).

Lead Solderability : MIL-STD-202, Method 208E

Order information

Packing

R60	185	K or S	R or U	Model	Reel Q'ty	Bag Q'ty
Radial type	Hold	K=Kink leads	R= Tape &	R60-010 ~ R60-090	3000	500
60 V	Current		Reel	R60-017	2500	500
	(A)	S=Straight	U= Bulk	R60-110 ~ R60-185	1500	500
		leads	packaged	R60-250 ~ R60-375	-	500

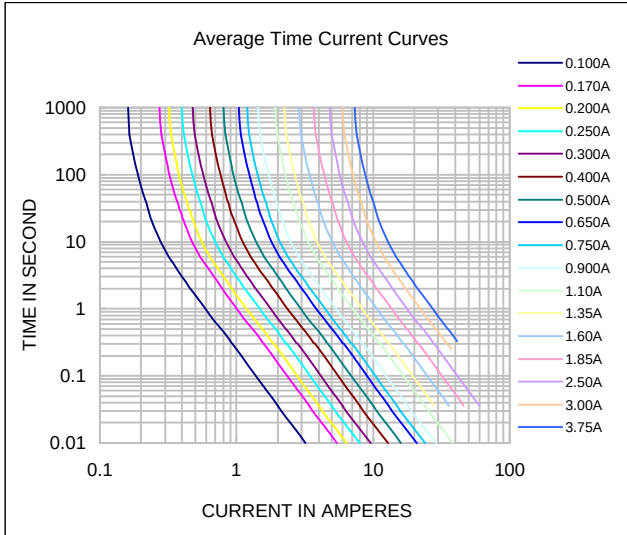
Tape & Reel packaging per EIA468-B standard.



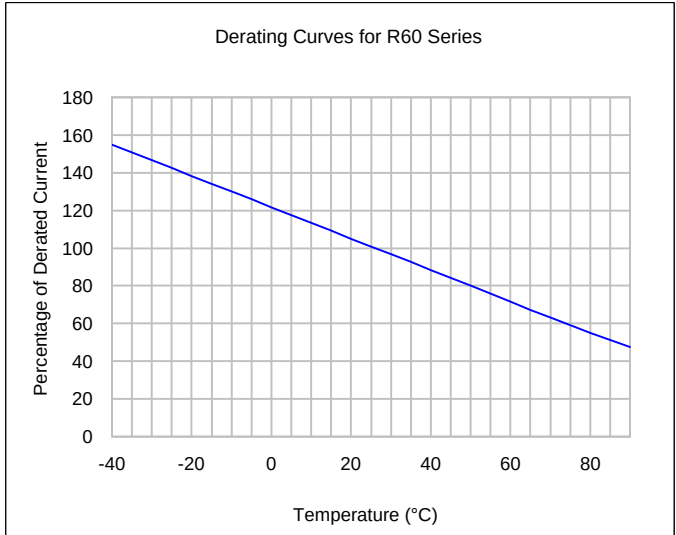
R60 Series

Alpha-Top (Sea & Land Alliance)

Typical time-to-trip curve at 25°C



Thermal derating curve



I_{hold} versus temperature

Model	Maximum ambient operating temperature (T_{mao}) vs. hold current (I_{hold})								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
R60-010	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.04
R60-017	0.26	0.23	0.20	0.17	0.14	0.12	0.11	0.09	0.07
R60-020	0.31	0.27	0.24	0.20	0.16	0.14	0.13	0.11	0.08
R60-025	0.39	0.34	0.30	0.25	0.20	0.18	0.16	0.14	0.10
R60-030	0.47	0.41	0.36	0.30	0.24	0.22	0.19	0.16	0.12
R60-040	0.62	0.54	0.48	0.40	0.32	0.29	0.25	0.22	0.16
R60-050	0.78	0.68	0.60	0.50	0.41	0.36	0.32	0.27	0.20
R60-065	1.01	0.88	0.77	0.65	0.53	0.47	0.41	0.35	0.26
R60-075	1.16	1.02	0.89	0.75	0.61	0.54	0.47	0.41	0.30
R60-090	1.40	1.22	1.07	0.90	0.73	0.65	0.57	0.49	0.36
R60-110	1.71	1.50	1.31	1.10	0.89	0.79	0.69	0.59	0.44
R60-135	2.09	1.84	1.61	1.35	1.09	0.97	0.85	0.73	0.54
R60-160	2.48	2.18	1.90	1.60	1.30	1.15	1.01	0.86	0.64
R60-185	2.87	2.52	2.20	1.85	1.50	1.33	1.17	1.00	0.74
R60-250	3.88	3.40	2.98	2.50	2.03	1.80	1.58	1.35	1.00
R60-300	4.65	4.08	3.57	3.00	2.43	2.16	1.89	1.62	1.20
R60-375	5.81	5.10	4.46	3.75	3.04	2.70	2.36	2.03	1.50



WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage ($L di/dt$) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.



R72 Series

Features

- Radial Leaded Devices
- Cured, flame retardant epoxy polymer insulating material meets UL 94V-0 requirements
- Bulk packaging, or tape and reel available on most models

Applications

- Almost anywhere there is a low voltage power supply, up to 72V and a load to be protected, including:
- Industrial controls
 - Automotive electronics
 - Medical products

Alpha-Top (Sea & Land Alliance)

Electrical Properties

Model	V _{max} (Vdc)	I _{max} (A)	I _{hold} (A)	I _{trip} (A)	P _d Typ. (W)	Maximum Time To Trip		Resistance		
						Current (A)	Time (Sec)	R _{imin} (Ω)	R _{imax} (Ω)	R _{1max} (Ω)
R72-020	72	40	0.20	0.40	0.41	1.00	2.2	1.25	2.75	4.40
R72-025	72	40	0.25	0.50	0.45	1.25	2.5	0.65	1.95	3.00
R72-030	72	40	0.30	0.60	0.49	1.50	3.0	0.45	1.33	2.10
R72-040	72	40	0.40	0.80	0.56	2.00	3.8	0.40	0.86	1.29
R72-050	72	40	0.50	1.00	0.77	2.50	4.0	0.35	0.77	1.17
R72-065	72	40	0.65	1.30	0.88	3.25	5.3	0.25	0.48	0.72
R72-075	72	40	0.75	1.50	0.92	3.75	6.3	0.20	0.40	0.60
R72-090	72	40	0.90	1.80	0.99	4.50	7.2	0.15	0.31	0.47
R72-110	72	40	1.10	2.20	1.50	5.50	8.2	0.13	0.25	0.38
R72-135	72	40	1.35	2.70	1.70	6.75	9.6	0.10	0.19	0.30
R72-160	72	40	1.60	3.20	1.90	8.00	11.4	0.07	0.14	0.22
R72-185	72	40	1.85	3.70	2.10	9.25	12.6	0.06	0.12	0.19
R72-250	72	40	2.50	5.00	2.50	12.50	15.6	0.04	0.08	0.13
R72-300	72	40	3.00	6.00	2.80	15.00	19.8	0.03	0.06	0.10
R72-375	72	40	3.75	7.50	3.20	18.75	24.0	0.02	0.05	0.08

I_{hold} = Hold Current : maximum current device will sustain for 4 hours without tripping in 25°C still air.

I_{trip} = Trip Current : minimum current at which the device will trip in 25°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 25°C still air.

R_i min/max = Minimum/Maximum resistance of device in initial (un-soldered) state.

R₁ max = Maximum resistance of device at 25°C measured one hour after tripping.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+85°C, 1000 hrs	±5% typical
Humidity aging	+85°C, 85% R.H., 1000 hrs	±5% typical
Thermal shock	+85°C to -40°C, 20 times	±10% typical
Resistance to solvent	MIL-STD-202, Method 215	No change
Vibration	MIL-STD-202, Method 201	No change
Ambient operating /storage conditions : - 40 °C to +85 °C		
Maximum surface temperature of the device in the tripped state is 125 °C		

Agency Approvals :

UL pending

Regulation/Standard:



2002/95/EC



EN14582

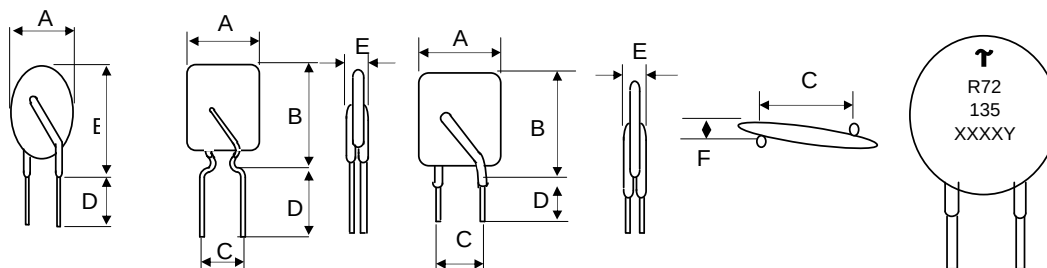


R72 Series

Alpha-Top (Sea & Land Alliance)

Physical Dimensions (Unit: mm/inch)

Model	A Max.	B Max.	C Typ.	D Min.	E Max.	F Max.	Lead Style
R72-020	7.4/0.29	12.7/0.48	5.1/0.20	7.6/0.3	3.1/0.12	1.0/0.04	Kink
R72-025	7.4/0.29	12.7/0.50	5.1/0.20	7.6/0.3	3.1/0.12	1.0/0.04	Kink
R72-030	7.4/0.29	13.0/0.51	5.1/0.20	7.6/0.3	3.1/0.12	1.0/0.04	Kink
R72-040	7.6/0.30	13.5/0.53	5.1/0.20	7.6/0.3	3.1/0.12	1.2/0.05	Kink
R72-050	7.9/0.31	13.7/0.54	5.1/0.20	7.6/0.3	3.1/0.12	1.2/0.05	Kink
R72-065	9.7/0.38	14.5/0.57	5.1/0.20	7.6/0.3	3.1/0.12	1.5/0.06	Kink
R72-075	10.4/0.41	15.2/0.60	5.1/0.20	7.6/0.3	3.1/0.12	1.5/0.06	Kink
R72-090	11.7/0.46	15.8/0.62	5.1/0.20	7.6/0.3	3.1/0.12	1.5/0.06	Kink
R72-110	13.0/0.51	18.0/0.71	5.1/0.20	7.6/0.3	3.1/0.12	1.2/0.05	Straight
R72-135	14.5/0.57	19.6/0.77	5.1/0.20	7.6/0.3	3.1/0.12	1.2/0.05	Straight
R72-160	16.3/0.64	21.3/0.84	5.1/0.20	7.6/0.3	3.1/0.12	1.5/0.06	Straight
R72-185	17.8/0.70	22.9/0.90	5.1/0.20	7.6/0.3	3.1/0.12	1.5/0.06	Straight
R72-250	21.3/0.84	26.4/1.04	10.2/0.40	7.6/0.3	3.1/0.12	1.7/0.07	Straight
R72-300	24.9/0.98	30.0/1.18	10.2/0.40	7.6/0.3	3.1/0.12	2.0/0.08	Straight
R72-375	28.5/1.12	33.5/1.32	10.2/0.40	7.6/0.3	3.1/0.12	2.0/0.08	Straight



 Sea&Land Logo
 R72 Radial Type 72V
 135 Hold Current
 XXXXY Date Code & Factory Code

Physical Characteristics

Lead Material :

R72-020 ~ 040: Tin-plated copper-clad steel, 0.205mm² (24AWG), Φ0.51mm(0.020 in).

R72-050 ~ 090: Tin-plated copper, 0.205mm² (24AWG), Φ0.51mm(0.020 in).

R72-110 ~ 375: Tin-plated copper, 0.52mm² (20AWG), Φ0.81mm(0.032 in).

Lead Solderability : MIL-STD-202, Method 208E

Order information

Packing

R72	185	K or S	R or U	Model	Reel Q'ty	Bag Q'ty
Radial type	Hold	K=Kink leads	R= Tape &	R72-020 ~ R72-090	3000	500
72 V	Current	S=Straight	Reel	R72-110 ~ R72-185	1500	500
	(A)	leads	U= Bulk	R72-250 ~ R72-375	-	500
			packaged			

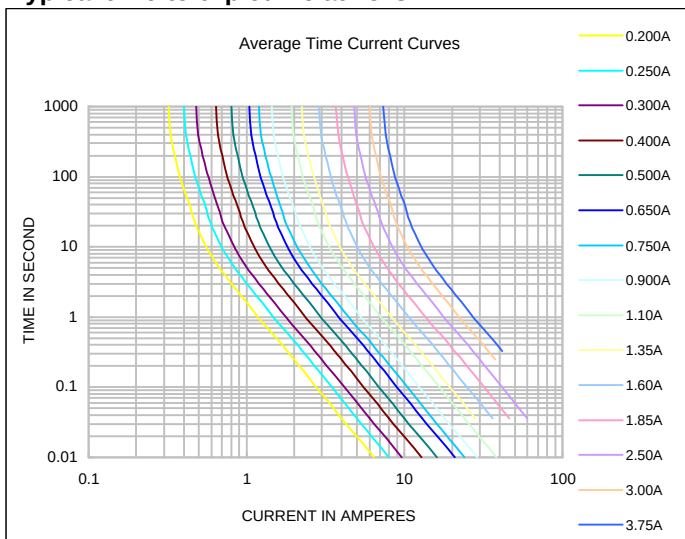
Tape & Reel packaging per EIA468-B standard.



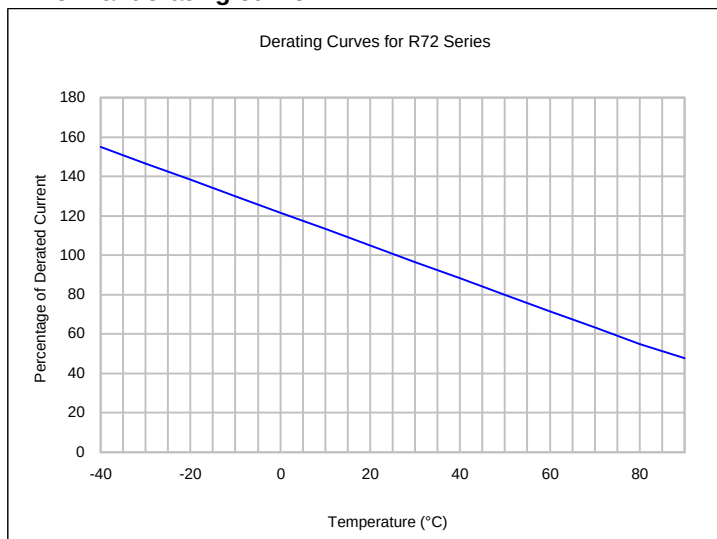
R72 Series

Alpha-Top (Sea & Land Alliance)

Typical time-to-trip curve at 25°C



Thermal derating curve



I_{hold} versus temperature

Model	Maximum ambient operating temperature (T_{mao}) vs. hold current (I_{hold})								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
R72-020	0.31	0.27	0.24	0.20	0.16	0.14	0.13	0.11	0.08
R72-025	0.39	0.34	0.30	0.25	0.20	0.18	0.16	0.14	0.10
R72-030	0.47	0.41	0.36	0.30	0.24	0.22	0.19	0.16	0.12
R72-040	0.62	0.54	0.48	0.40	0.32	0.29	0.25	0.22	0.16
R72-050	0.78	0.68	0.60	0.50	0.41	0.36	0.32	0.27	0.20
R72-065	1.01	0.88	0.77	0.65	0.53	0.47	0.41	0.35	0.26
R72-075	1.16	1.02	0.89	0.75	0.61	0.54	0.47	0.41	0.30
R72-090	1.40	1.22	1.07	0.90	0.73	0.65	0.57	0.49	0.36
R72-110	1.71	1.50	1.31	1.10	0.89	0.79	0.69	0.59	0.44
R72-135	2.09	1.84	1.61	1.35	1.09	0.97	0.85	0.73	0.54
R72-160	2.48	2.18	1.90	1.60	1.30	1.15	1.01	0.86	0.64
R72-185	2.87	2.52	2.20	1.85	1.50	1.33	1.17	1.00	0.74
R72-250	3.88	3.40	2.98	2.50	2.03	1.80	1.58	1.35	1.00
R72-300	4.65	4.08	3.57	3.00	2.43	2.16	1.89	1.62	1.20
R72-375	5.81	5.10	4.46	3.75	3.04	2.70	2.36	2.03	1.50



WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage ($L di/dt$) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.



C130 Series

Features

- Radial Leaded Devices
- Cured, flame retardant epoxy polymer insulating material meets UL 94V-0 requirements
- Bulk packaging, or tape and reel available on most models

Applications

- Almost anywhere there is a low voltage power supply, up to DC30V and a load to be protected, including:
- Security and fire alarm systems
 - Analog and digital line cards
 - Modems and DSL

Alpha-Top (Sea & Land Alliance)

Electrical Properties

Model	I _{hold} (A)	I _{trip} (A)	V _{max}	V _{max}	I _{max} (A)	Maximum Time		Resistance		Agency Approva	
			Operating	Interrupt		To Trip		Ri _{min.} (Ω)	Ri _{max.} (Ω)	UL	TUV
			(Vdc)	(Vrms)		Current (A)	Time (Sec)				
C130-050	0.05	0.10	30	130	20	0.15	15.0	20.00	60.00		
C130-080	0.08	0.16	30	130	20	0.24	15.0	12.00	24.00		
C130-100	0.10	0.20	30	130	20	0.30	15.0	9.00	18.00		
C130-120	0.12	0.24	30	130	20	0.36	15.0	6.00	12.00		
C130-160	0.16	0.32	30	130	20	0.48	15.0	3.50	7.50		
C130-200	0.20	0.40	30	130	20	0.60	20.0	2.50	5.00		
C130-250	0.25	0.50	30	130	20	0.75	20.0	1.90	3.80		
C130-300	0.30	0.60	30	130	20	0.90	20.0	1.30	2.60		
C130-400	0.40	0.80	30	130	20	1.20	20.0	0.90	1.80		
C130-500	0.50	1.00	30	130	20	1.50	25.0	0.80	1.60		
C130-650	0.65	1.30	30	130	10	1.95	25.0	0.50	1.00		
C130-750	0.75	1.50	30	130	10	2.25	25.0	0.40	0.80		
C130-900	0.90	1.80	30	130	10	2.70	25.0	0.30	0.60		
C130-1100	1.10	2.20	30	130	10	3.30	15.0	0.30	0.50		
C130-1350	1.35	2.70	30	130	10	4.05	25.0	0.20	0.40		
C130-1600	1.60	3.20	30	130	10	4.80	25.0	0.15	0.30		
C130-1850	1.85	3.70	30	130	10	5.55	25.0	0.12	0.25		
C130-2000	2.00	4.00	30	130	10	6.00	25.0	0.11	0.22		
C130-2500	2.50	5.00	30	130	10	7.50	30.0	0.08	0.16		
C130-3000	3.00	6.00	30	130	10	9.00	30.0	0.06	0.12		

I_{hold} = Hold Current. Maximum current device will not trip in 25°C still air.

I_{trip} = Trip Current. Minimum current at which the device will always trip in 25°C still air.

V_{max Operating} = Maximum operating voltage (Vdc) device can withstand without damage at rated current.

V_{max Interrupt} = Maximum interrupt voltage (Vac) device can withstand without damage at rated current.

I_{max} = Maximum fault current device can withstand without damage at rated voltage (V_{max}).

R_{imin/max} = Minimum/Maximum device resistance prior to tripping at 25°C

R_{1max} = Maximum device resistance one hour after it is tripped at 25°C.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.

Environmental Specifications

Test	Conditions
Passive aging	+85°C, 1000 hrs.
Humidity aging	+85°C, 85% R.H. , 1000 hrs.
Thermal shock	+125°C to -55°C, 10 times
Resistance to solvent	MIL-STD-202, Method 215F
	MIL-STD-202, Method 201
Ambient operating /storage conditions : - 40 °C to +85 °C	
Maximum surface temperature of the device in the tripped state is 125 °C	

Agency Approvals :

UL pending

Regulation/Standard:



2002/95/EC



EN14582



C130 Series

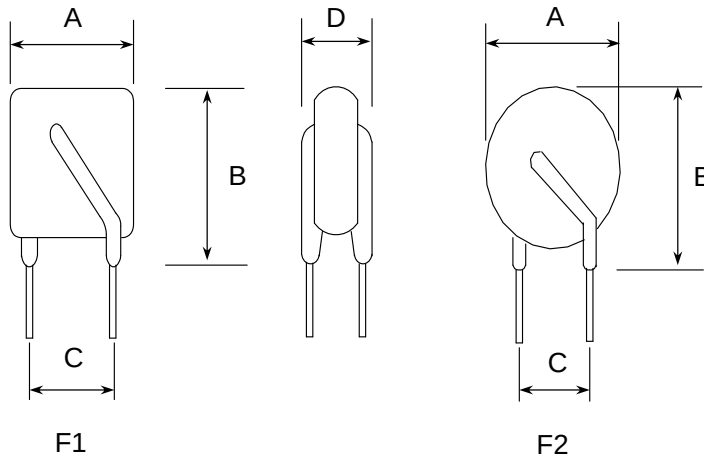
Alpha-Top (Sea & Land Alliance)

Physical Dimensions (Unit: mm)

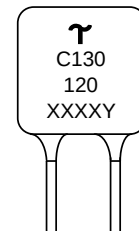
Model	A Max.	B Max.	C Typ.	D Min.	Lead TYP	Lead Style
C130-050	8.3	10.7	5.1	3.8	F2	Straight
C130-080	8.3	10.7	5.1	3.8	F2	Straight
C130-100	8.3	10.7	5.1	3.8	F2	Straight
C130-120	8.3	10.7	5.1	3.8	F2	Straight
C130-160	9.9	12.5	5.1	3.8	F2	Straight
C130-200	9.6	17.4	5.1	3.8	F1	Kink
C130-250	9.6	17.4	5.1	3.8	F1	Kink
C130-300	11.4	16.5	5.1	3.8	F1	Kink
C130-400	11.5	19.5	5.1	3.8	F1	Kink
C130-500	14.0	21.7	5.1	3.8	F1	Kink
C130-650	14.0	21.7	5.1	3.8	F1	Kink
C130-750	14.0	21.7	5.1	3.8	F1	Kink
C130-900	14.0	21.7	5.1	3.8	F1	Kink
C130-1100	13.2	16.2	5.1	3.8	F2	Straight
C130-1350	18.0	25.0	5.1	3.8	F1	Kink
C130-1600	18.0	25.0	10.2	3.8	F1	Kink
C130-1850	18.0	25.0	10.2	3.8	F1	Kink
C130-2000	18.0	25.0	10.2	3.8	F1	Kink
C130-2500	24.8	30.2	10.2	3.8	F1	Kink
C130-3000	26.2	32.8	10.2	3.8	F1	Kink

Unit:mm

Dimensions



Marking



T = Trademark
 C13 = Radial type 130 Vrms
 120 = 0.12A hold current
 XXXX = Date code
 Y = Factory code

Physical Characteristics

Lead Material :

C130- 050~160: Tin-plated copper, 24AWG, Φ 0.51mm(0.020 in).
 C130- 200~400: Tin-plated copper, 22AWG, Φ 0.65mm(0.026 in).
 C130- 500~3000: Tin-plated copper, 20AWG, Φ 0.81mm(0.032 in).

Lead Solderability : MIL-STD-202, Method 208E

Order Information

Packing

C130	120	Model	Bag Q`ty
Product	Hold	C130-050~650	1000
name	Current	C130-750~1350	500
250V	mA	C130-1600~2000	200
		C130-2500~3000	100

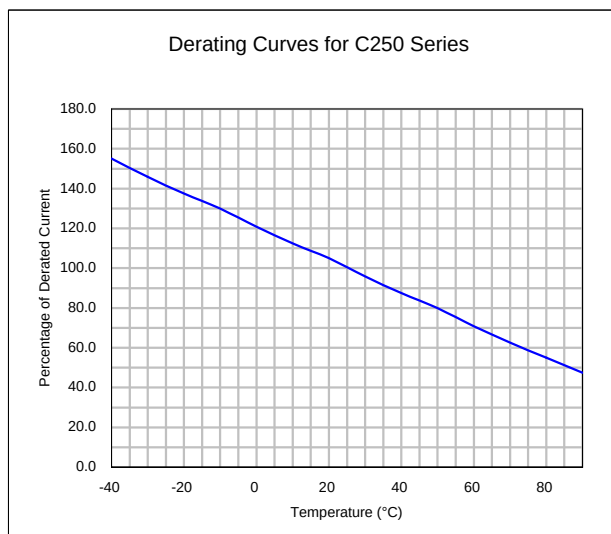
Devices taped with reference to EIA468-B standard.



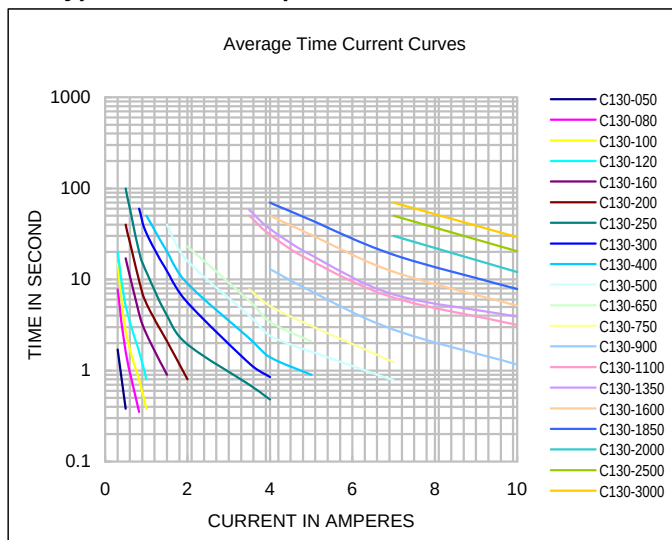
C130 Series

Alpha-Top (Sea & Land Alliance)

Thermal Derating Curve



Typical Time-To-Trip at 25°C



I_{hold} Versus Temperature

Model	Maximum ambient operating temperature (T_{mao}) vs. hold current (I_{hold})								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
C130-050	0.078	0.069	0.060	0.050	0.044	0.040	0.035	0.031	0.026
C130-080	0.124	0.110	0.097	0.080	0.070	0.064	0.057	0.050	0.041
C130-100	0.155	0.138	0.121	0.100	0.088	0.080	0.071	0.063	0.051
C130-120	0.186	0.165	0.145	0.120	0.105	0.096	0.085	0.075	0.062
C130-160	0.248	0.220	0.193	0.160	0.140	0.128	0.113	0.100	0.082
C130-200	0.310	0.275	0.242	0.200	0.175	0.160	0.142	0.125	0.103
C130-250	0.388	0.344	0.302	0.250	0.219	0.200	0.177	0.156	0.128
C130-300	0.465	0.413	0.362	0.300	0.263	0.240	0.212	0.188	0.154
C130-400	0.620	0.550	0.483	0.400	0.350	0.320	0.283	0.250	0.205
C130-500	0.775	0.688	0.604	0.500	0.438	0.400	0.354	0.313	0.256
C130-650	1.008	0.894	0.785	0.650	0.569	0.520	0.460	0.406	0.333
C130-750	1.163	1.031	0.906	0.750	0.656	0.600	0.531	0.469	0.384
C130-900	1.395	1.238	1.087	0.900	0.788	0.720	0.637	0.563	0.461
C130-1100	1.705	1.513	1.329	1.100	0.963	0.880	0.779	0.688	0.564
C130-1350	2.093	1.856	1.631	1.350	1.181	1.080	0.956	0.844	0.692
C130-1600	2.480	2.200	1.933	1.600	1.400	1.280	1.133	1.000	0.820
C130-1850	2.868	2.544	2.235	1.850	1.619	1.480	1.310	1.156	0.948
C130-2000	3.100	2.750	2.417	2.000	1.750	1.600	1.417	1.250	1.025
C130-2500	3.875	3.438	3.021	2.500	2.188	2.000	1.771	1.563	1.281
C130-3000	4.650	4.125	3.625	3.000	2.625	2.400	2.125	1.875	1.538



WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage ($L di/dt$) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.



C250 Series

Features

- Radial Leaded Devices
- Cured, flame retardant epoxy polymer insulating material meets UL 94V-0 requirements
- Bulk packaging, or tape and reel available on most models

Applications

- Almost anywhere there is a low voltage power supply, up to DC60V and a load to be protected, including:
- Security and fire alarm systems
 - Analog and digital line cards
 - Modems and DSL

Alpha-Top (Sea & Land Alliance)

Electrical Properties

Model	I _{hold} (A)	I _{trip} (A)	V _{max}	V _{max}	I _{max} (A)	Maximum Time		Resistance		Agency Approva	
			Operating	Interrupt		To Trip		Ri _{min.} (Ω)	Ri _{max.} (Ω)	UL	TUV
			(Vdc)	(Vrms)		Current (A)	Time (Sec)				
C250-030	0.03	0.06	60	250	1	0.09	15.0	35.0	90.0		
C250-040	0.04	0.08	60	250	1	0.12	15.0	27.0	65.0		
C250-050	0.05	0.10	60	250	1	0.15	15.0	20.0	45.0		
C250-060	0.06	0.12	60	250	3	0.35	2.0	20.0	45.0		
C250-080	0.08	0.16	60	250	3	0.35	3.0	10.0	22.0	✓	
C250-090	0.09	0.18	60	250	3	0.35	4.0	7.0	17.5	✓	
C250-110	0.11	0.22	60	250	3	1.00	1.1	6.0	12.0	✓	
C250-120	0.12	0.24	60	250	3	1.00	1.5	6.5	10.5	✓	
C250-145	0.15	0.29	60	250	3	1.00	2.5	3.5	6.5	✓	
C250-180	0.18	0.54	60	250	10	1.00	18.0	1.4	3.0	✓	
C250-200	0.20	0.40	60	250	10	1.00	15.0	3.0	6.0	✓	
C250-400	0.40	0.80	60	250	10	1.00	30.0	1.4	3.0	✓	
C250-600	0.60	1.20	60	250	10	2.00	10.0	1.0	2.0		
C250-800	0.80	1.60	60	250	10	3.00	12.0	0.5	1.0		
C250-1000	1.00	2.00	60	250	10	3.00	40.0	0.4	0.8		
C250-1500	1.50	3.00	60	250	10	4.50	60.0	0.3	0.6		
C250-2000	2.00	4.00	60	250	10	6.00	60.0	0.2	0.4		

I_{hold} = Hold Current. Maximum current device will not trip in 25°C still air.

I_{trip} = Trip Current. Minimum current at which the device will always trip in 25°C still air.

V_{max} Operating = Maximum operating voltage (Vdc) device can withstand without damage at rated current.

V_{max} Interrupt = Maximum interrupt voltage(Vac) device can withstand without damage at rated current .

I_{max} = Maximum fault current device can withstand without damage at rated voltage (V_{max}).

R_{imin/max} = Minimum/Maximum device resistance prior to tripping at 25°C

R_{1max} = Maximum device resistance one hour after it is tripped at 25°C.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.

Environmental Specifications

Test	Conditions
Passive aging	+85°C, 1000 hrs.
Humidity aging	+85°C, 85% R.H. , 1000 hrs.
Thermal shock	+125°C to -55°C, 10 times
Resistance to solvent	MIL-STD-202,Method 215F
	MIL-STD-202,Method 201
Ambient operating /storage conditions : - 40 °C to +85 °C	
Maximum surface temperature of the device in the tripped state is 125 °C	

Agency Approvals :



E201504(Alpha-Top)/E319079(Sea&Land)

Regulation/Standard:



2002/95/EC



EN14582



C250 Series

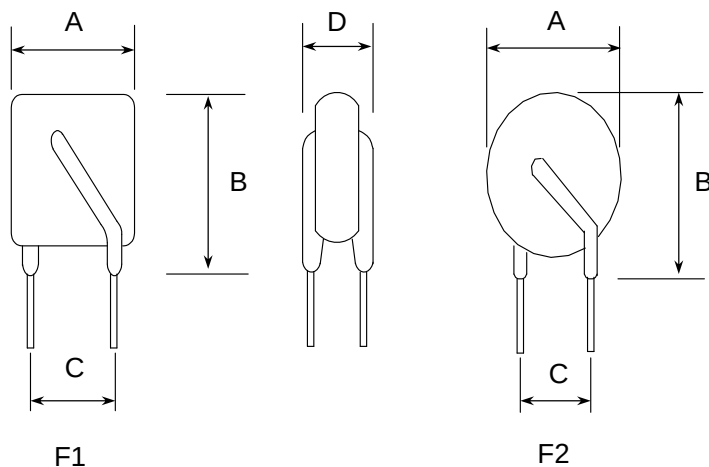
Alpha-Top (Sea & Land Alliance)

Physical Dimensions (Unit: mm)

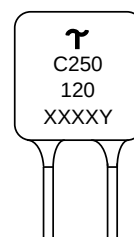
Model	A Max.	B Max.	C Typ.	D Min.	Lead TYP	Lead Style
C250-030	6.0	8.0	5.1	4.6	F2	Straight
C250-040	6.0	8.0	5.1	4.6	F2	Straight
C250-050	6.0	8.0	5.1	4.6	F2	Straight
C250-060	6.5	9.0	5.1	4.6	F2	Straight
C250-080	6.5	9.0	5.1	4.6	F2	Straight
C250-090	6.5	9.0	5.1	4.6	F2	Straight
C250-110	7.0	9.5	5.1	4.6	F1	Kink
C250-120	7.0	9.5	5.1	4.6	F1	Kink
C250-145	7.0	9.5	5.1	4.6	F1	Kink
C250-180	10.5	13.5	5.1	4.6	F2	Straight
C250-200	10.5	13.5	5.1	4.6	F2	Straight
C250-400	11.2	14.2	5.1	4.6	F1	Kink
C250-600	12.6	15.6	5.1	4.6	F1	Kink
C250-800	15.0	19.5	5.1	4.6	F1	Kink
C250-1000	21.1	23.6	10.2	4.6	F2	Straight
C250-1500	21.0	27.5	10.2	4.6	F1	Kink
C250-2000	26.2	32.8	10.2	4.6	F1	Kink

Unit:mm

Dimensions



Marking



T = Trademark
 C25 = Radial type 250 Vrms
 120 = 0.12A hold current
 XXXX = Date code
 Y = Factory code

Physical Characteristics

Lead Material :

C250- 030~090: Tin-plated copper, 24AWG, Φ 0.51mm(0.020 in).

C250- 110~200: Tin-plated copper, 22AWG, Φ 0.65mm(0.026 in).

C250- 400~2000: Tin-plated copper, 20AWG, Φ 0.81mm(0.032 in).

Lead Solderability : MIL-STD-202, Method 208E

Order Information

Packing

C250	120	Model	Bag Q`ty
Product	Hold	C250-030~800	500
name	Current	C250-1000~2000	200
250V	mA		

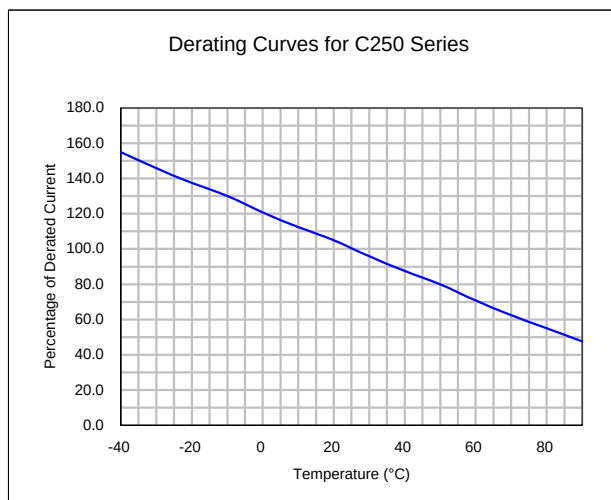
Devices taped with reference to EIA468-B standard.



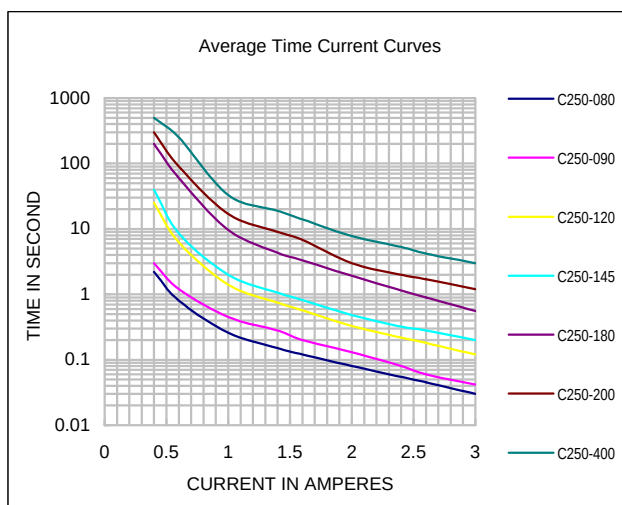
C250 Series

Alpha-Top (Sea & Land Alliance)

Thermal Derating Curve



Typical Time-To-Trip at 25°C



I_{hold} Versus Temperature

Model	Maximum ambient operating temperature (T_{mao}) vs. hold current (I_{hold})								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
C250-030	0.047	0.041	0.036	0.030	0.026	0.024	0.021	0.019	0.015
C250-040	0.062	0.055	0.048	0.040	0.035	0.032	0.028	0.025	0.021
C250-050	0.078	0.069	0.060	0.050	0.044	0.040	0.035	0.031	0.026
C250-060	0.093	0.083	0.072	0.060	0.053	0.048	0.042	0.038	0.031
C250-080	0.124	0.110	0.097	0.080	0.070	0.064	0.057	0.050	0.041
C250-090	0.140	0.124	0.109	0.090	0.079	0.072	0.064	0.056	0.046
C250-110	0.171	0.151	0.133	0.110	0.096	0.088	0.078	0.069	0.056
C250-120	0.186	0.165	0.145	0.120	0.105	0.096	0.085	0.075	0.062
C250-145	0.225	0.199	0.175	0.145	0.127	0.116	0.103	0.091	0.074
C250-180	0.279	0.248	0.217	0.180	0.158	0.144	0.127	0.113	0.092
C250-200	0.310	0.275	0.242	0.200	0.175	0.160	0.142	0.125	0.103
C250-400	0.620	0.550	0.483	0.400	0.350	0.320	0.283	0.250	0.205
C250-600	0.930	0.825	0.725	0.600	0.525	0.480	0.425	0.375	0.308
C250-800	1.240	1.100	0.967	0.800	0.700	0.640	0.567	0.500	0.410
C250-1000	1.550	1.375	1.208	1.000	0.875	0.800	0.708	0.625	0.513
C250-1500	1.860	1.650	1.450	1.200	1.050	0.960	0.850	0.750	0.615
C250-2000	3.100	2.750	2.417	2.000	1.750	1.600	1.417	1.250	1.025



WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage ($L di/dt$) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.



C600 Series

Features

- Radial Leaded Devices
- Cured, flame retardant epoxy polymer insulating material meets UL 94V-0 requirements
- Bulk packaging, or tape and reel available on all models

Applications

- Almost anywhere there is a low voltage power supply, up to 60V and a load to be protected, including:
- Telecommunications system
 - Network switching
 - Communication equipment
 - Power transformers

Alpha-Top (Sea & Land Alliance)

Electrical Properties

Model	I _{hold} (A)	I _{trip} (A)	V _{max}	V _{max}	I _{max} (A)	P _d Typ. (W)	Maximum Time To Trip		Resistance		
			Operating (Vdc)	Interrupt (Vrms)			Current (A)	Time (Sec)	R _{i min.} (Ω)	R _{i max.} (Ω)	R _{1 max} (Ω)
C600-150	0.150	0.300	60	600	3.0	1.00	1.00	5.00	6.00	12.00	22.00
C600-160	0.160	0.320	60	600	3.0	1.00	1.00	7.00	4.00	10.00	18.00

I_{hold} = Hold Current. Maximum current device will not trip in 25°C still air.

I_{trip} = Trip Current. Minimum current at which the device will always trip in 25°C still air.

V_{max} Operating = Maximum operating voltage (Vdc) device can withstand without damage at rated current (I_{max}).

V_{max} Interrupt = Maximum interrupt voltage (Vac) device can withstand without damage at rated current (I_{2t} = 1A2S).

I_{max} = Maximum fault current device can withstand without damage at rated voltage (V_{max}).

P_d = Typical power dissipated from device when in the tripped state in 25°C still air environment at rated voltage.

R_{imin}/max = Minimum/Maximum device resistance prior to tripping at 25°C

R_{1max} = Maximum device resistance one hour after it is tripped at 25°C.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.

Environmental Specifications

Test	Conditions
Passive aging	+85°C, 1000 hrs.
Humidity aging	+85°C, 85% R.H. , 1000 hours.
Thermal shock	+125°C to -55°C, 10 times
Resistance to solvent	MIL-STD-202, Method 215F
Ambient operating /storage condi	- 40 °C to 85 °C
Maximum surface temperature of the device in the tripped state	is 125 °C

AGENCY APPROVAL :

UL pending

Regulation/Standard:



2002/95/EC

EN14582



WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage (L di/dt) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.

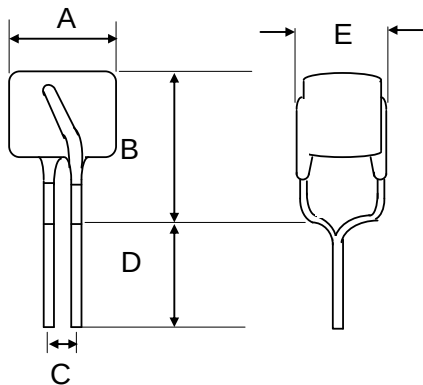


C600 Series

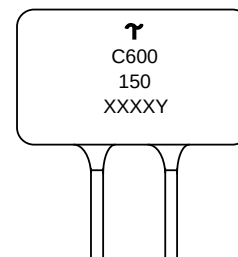
Alpha-Top (Sea & Land Alliance)

Physical Dimensions (Unit: mm)

Model	A Max.	B Max.	C Typ.	D Min.	E Max.	Lead Style
C600-150	13.5	12.6	5.1	4.7	6.0	Kink
C600-160	13.5	12.6	5.1	4.7	6.0	Kink



Marking



- T** = Trademark
- C60 = Radial type 600 Vrms
- 150 = 0.15A hold current
- XXXX = Date code
- Y = Factory code

Physical Characteristics

Lead Material :

C600: Tin-plated copper, 22AWG, Φ 0.65mm(0.026 in).

Lead Solderability : MIL-STD-202, Method 208E

Order Information

Packing

C600	150	RA	B-0.5	Reel Q'ty	Bag Q'ty
Product Series	Hold Current (mA)	Rx= Resistance range (Optional)	B-x.x= Resistance bin range within 0.5 ohms in one lot (Optional)	600	500

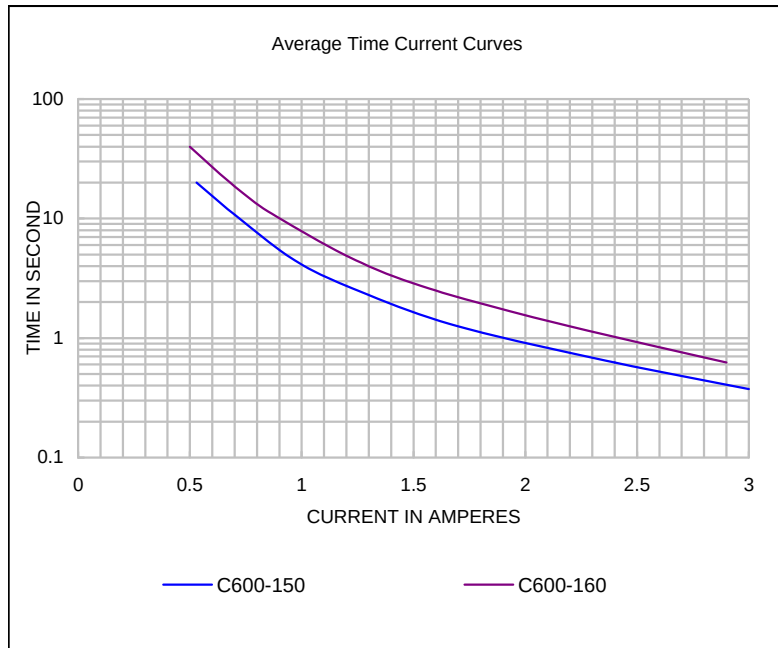
Device taped with reference to EIA468-B standard.



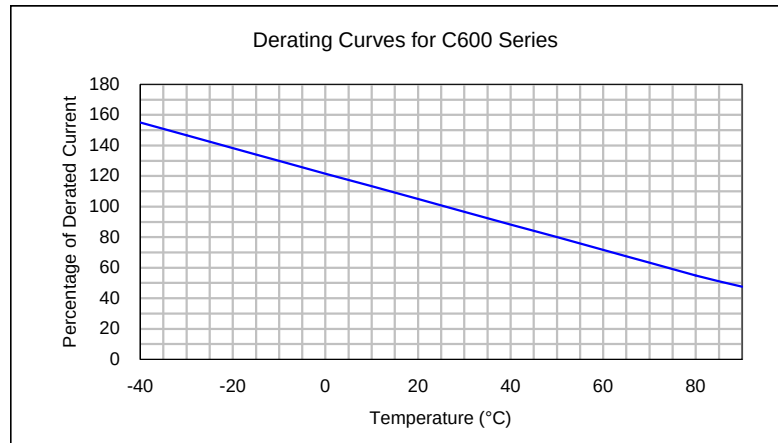
C600 Series

Alpha-Top (Sea & Land Alliance)

Typical Time-To-Trip At 25°C



Thermal Derating Curve



I_{hold} Versus Temperature

Model	temperature (T_{mao}) vs. hold current (I_{hold})								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
C600-150	0.233	0.206	0.178	0.150	0.124	0.110	0.096	0.083	0.062
C600-160	0.249	0.219	0.190	0.160	0.132	0.117	0.103	0.088	0.066



HPD Series

Features

- Axial Leaded Devices
- Nickel lead materials, polyester tape insulating material meets UL 94V-0 requirements
- Bulk packaging available on all models 1,000, 500 or 200 pieces/bag.

Applications

- Almost anywhere there is a low voltage power supply, up to 20V and a load to be protected, including:
- Notebook computer
 - Personal digital assistants
 - Walkie-talkie & toys
 - Camcorder battery packs

Alpha-Top (Sea & Land Alliance)

Electrical Properties

Model	V_{max} (Vdc)	I_{max} (A)	I_{hold} (A)	I_{trip} (A)	P_d Typ. (W)	Maximum Time To Trip		Resistance			Agency Approval	
						Current (A)	Time (Sec)	$R_{i_{min}}$ (Ω)	$R_{i_{max}}$ (Ω)	$R_{1_{max}}$ (Ω)	UL	TUV
HPD190(S)	15	100	1.9	3.9	1.2	9.5	5.0	0.039	0.072	0.102	✓	✓
HPD260(S)	15	100	2.6	5.8	2.5	13.0	5.0	0.020	0.042	0.063	✓	✓
HPD380	15	100	3.8	8.3	2.5	19.0	5.0	0.013	0.026	0.037	✓	✓
HPD450	20	100	4.5	8.9	2.5	22.5	5.0	0.011	0.020	0.028	✓	✓
HPD550	20	100	5.5	10.5	2.8	27.5	5.0	0.009	0.016	0.022	✓	✓
HPD600	20	100	6.0	11.7	2.8	30.0	5.0	0.007	0.014	0.019	✓	✓
HPD730	20	100	7.3	14.1	3.3	30.0	5.0	0.006	0.012	0.015	✓	✓
HPD730X	20	100	7.3	14.1	3.3	30.0	5.0	0.008	0.011	0.015	✓	
HPD900	20	100	9.0	16.7	3.8	45.0	5.0	0.006	0.010	0.014		
HPD1410	20	100	14.1	26.2	6.0	70.0	5.0	0.003	0.005	0.007		

I_{hold} = Hold Current : maximum current device will sustain for 4 hours without tripping in 25°C still air.

I_{trip} = Trip Current : minimum current at which the device will trip in 25°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 25°C still air.

$R_{i_{min/max}}$ = Minimum/Maximum resistance of device in initial (un-soldered) state.

$R_{1_{max}}$ = Maximum resistance of device at 25°C measured one hour after tripping.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.

I_{hold} Versus Temperature

Model	Maximum ambient operating temperature (T_{mao}) vs. hold current (I_{hold})									
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	80°C	85°C
HPD190(S)	2.8	2.5	2.3	1.9	1.6	1.5	1.4	1.2	1.1	1.0
HPD260(S)	3.8	3.4	3.1	2.6	2.2	2.0	1.9	1.7	1.4	1.3
HPD380	5.4	4.9	4.4	3.8	3.3	3.0	2.8	2.5	2.3	2.1
HPD450	6.5	5.8	5.3	4.5	3.9	3.6	3.3	2.9	2.6	2.4
HPD550	7.6	6.9	6.2	5.5	4.7	4.3	4.0	3.6	3.2	3.0
HPD600	8.7	7.8	7.1	6.0	5.2	4.7	4.4	3.9	3.4	3.2
HPD730	10.5	9.5	8.6	7.3	6.3	5.7	5.4	4.7	4.2	4.0
HPD730X	10.5	9.5	8.6	7.3	6.3	5.7	5.4	4.7	4.2	4.0
HPD900	12.7	11.4	10.0	9.0	7.5	6.8	6.2	5.5	4.9	4.5
HPD1410	19.7	17.8	15.7	14.1	12.3	11.3	9.7	9.1	8.5	7.9

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+70°C, 1000 hrs.	±10% typical
Humidity aging	+85°C, 85% R.H. , 168 hrs.	±5% typical
Resistance to solvent	MIL-STD-202, Method 215	No change
Vibration	MIL-STD-202, Method 201	No change
Ambient operating /storage conditions : -40°C to +85°C		
Maximum surface temperature of the device in the tripped state is 125 °C		

Agency Approvals :



E201504(Alpha-Top)/E319079(Sea&Land)



R-50186869

Regulation/Standard:



2002/95/EC



WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage ($L di/dt$) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.



HPD Series

Alpha-Top (Sea & Land Alliance)

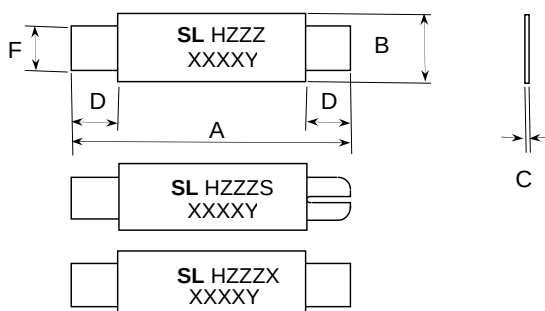
Physical Dimensions (Unit:mm)

Model	A		B		C		D		F	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
HPD190(S)	19.9	22.1	4.9	5.5	0.6	1.0	5.5	7.5	3.9	4.1
HPD260(S)	20.9	23.1	4.9	5.5	0.6	1.0	4.1	5.5	3.9	4.1
HPD380	24.0	26.0	6.9	7.5	0.6	1.0	4.1	5.5	4.9	5.1
HPD450	24.0	26.0	9.9	10.5	0.6	1.0	5.3	6.7	5.9	6.6
HPD550	35.0	37.0	6.9	7.5	0.6	1.0	5.3	6.7	4.9	5.1
HPD600	24.0	26.0	13.9	14.5	0.6	1.0	4.1	5.5	5.9	6.6
HPD730	27.1	29.1	13.9	14.5	0.6	1.0	4.1	5.5	5.9	6.6
HPD730X	45.4	47.6	7.9	8.5	0.6	1.0	4.6	6.2	5.9	6.1
HPD900	45.4	47.6	7.9	8.5	0.9	1.3	4.6	6.2	5.9	6.1
HPD1410	58.0	60.0	13.4	14.0	0.9	1.3	4.2	5.8	5.9	6.1

Physical Characteristics

Lead Material	190~730: 0.11mm thick nickel 900~1410: 0.3mm thick nickel
Insulating Material	Polyester tape, UL 94V-0
Slit	0.5mm X 4.0mm norm.
Lead - free device	

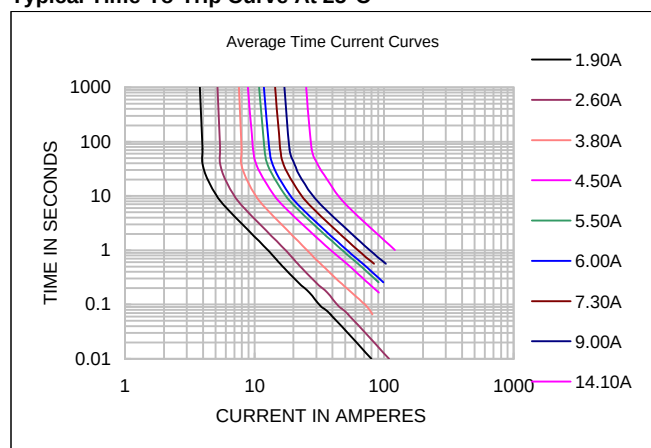
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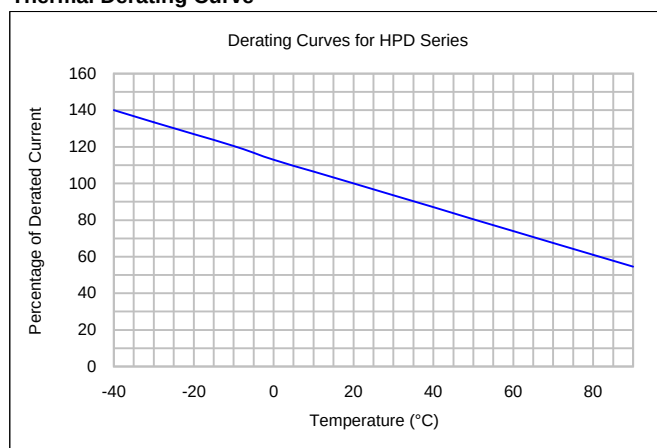
Marking

SL = Trademark
H = HPD Series
ZZZ = Hold Current
S = Single Slitted Lead
X = Extra Long
XXXX = Date Code
Y = Factory Code

Typical Time-To-Trip Curve At 25°C



Thermal Derating Curve



Ordering Information

HPD	190	S	Bag Q'ty
Product name	Hold Current (A)	S= Single slitted lead Blank = Standard	HPD 190(S), 260(S) : 1000 pieces / bag HPD 380, 450, 550, 600, 730 : 500 pieces / bag HPD 730X, 900, 1410 : 200 pieces / bag

Packing



MHD Series

Features

- Axial Leaded Devices
- Nickel lead materials, polyester tape insulating material meets UL 94V-0 requirements
- Bulk packaging available on all models 1,000 or 500 pieces/bag.

Applications

Almost anywhere there is a low voltage power supply, up to 24V and a load to be protected, including:

- Battery pack
- Personal digital assistants
- Walkie-talkie & toys

Alpha-Top (Sea & Land Alliance)

Electrical Properties

Model	V_{max} (Vdc)	I_{max} (A)	I_{hold} (A)	I_{trip} (A)	P_d Typ. (W)	Maximum Time To Trip		Resistance			Agency Approval	
						Current (A)	Time (Sec)	$R_{i min}$ (Ω)	$R_{i max}$ (Ω)	$R_{1 max}$ (Ω)	UL	TUV
MHD120(S)	15	100	1.20	2.7	1.2	6	5.0	0.085	0.160	0.220	✓	✓
MHD120LR(S)	15	100	1.70	3.8	1.2	9	5.0	0.050	0.090	0.120	✓	✓
MHD175(S)	15	100	1.75	3.8	1.5	9	4.0	0.050	0.090	0.120	✓	✓
MHD175LR(S)	15	100	2.20	4.5	1.5	11	4.0	0.030	0.050	0.080	✓	✓
MHD200	24	100	2.00	4.4	1.9	10	4.0	0.030	0.060	0.100	✓	✓
MHD200LR	24	100	2.80	6.0	1.9	14	5.0	0.018	0.036	0.055	✓	✓
MHD350	24	100	3.50	6.3	2.5	20	3.0	0.017	0.031	0.050	✓	✓
MHD420	24	100	4.20	7.6	2.9	20	6.0	0.012	0.024	0.040	✓	✓

I_{hold} = Hold Current : maximum current device will sustain for 4 hours without tripping in 25°C still air.

I_{trip} = Trip Current : minimum current at which the device will trip in 25°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 25°C still air.

$R_{i min/max}$ = Minimum/Maximum resistance of device in initial (un-soldered) state.

$R_{1 max}$ = Maximum resistance of device at 25°C measured one hour after tripping.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.

I_{hold} Versus Temperature

Model	Maximum ambient operating temperature (T_{mao}) vs. hold current (I_{hold})									
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	80°C	85°C
MHD120(S)	1.86	1.66	1.46	1.20	1.00	0.90	0.80	0.60	0.50	0.40
MHD120LR(S)	2.72	2.38	2.13	1.70	1.36	1.28	1.11	0.85	0.68	0.51
MHD175(S)	2.50	2.20	2.00	1.75	1.40	1.30	1.20	1.00	0.90	0.80
MHD175LR(S)	3.52	3.08	2.75	2.20	1.76	1.65	1.43	1.10	0.88	0.66
MHD200	3.10	2.77	2.50	2.00	1.70	1.50	1.43	1.20	1.00	0.90
MHD200LR	4.48	3.92	3.50	2.80	2.24	2.10	1.82	1.40	1.12	0.84
MHD350	5.30	4.84	4.25	3.50	3.00	2.70	2.50	2.10	1.80	1.70
MHD420	6.30	5.70	5.10	4.20	3.60	3.30	3.00	2.60	2.20	2.10

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+70°C, 1000 hrs.	±10% typical
Humidity aging	+85°C, 85% R.H. , 168 hrs.	±5% typical
Resistance to solvent	MIL-STD-202, Method 215	No change
Vibration	MIL-STD-202, Method 201	No change
Ambient operating /storage conditions : - 40 °C to +85 °C		
Maximum surface temperature of the device in the tripped state is 125 °C		

Agency Approvals :



E201504(Alpha-Top)/E319079(Sea&Land)



R-50186869

Regulation/Standard:



2002/95/EC



WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage ($L di/dt$) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.



MHD Series

Alpha-Top (Sea & Land Alliance)

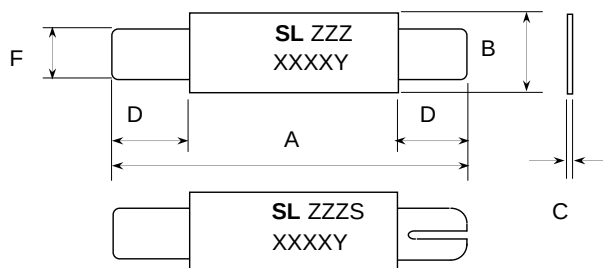
Physical Dimensions (Unit:mm)

Model	A		B		C		D		F	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
MHD120(S)	19.9	22.1	4.9	5.2	0.6	1.0	5.5	7.5	3.9	4.1
MHD120LR(S)	19.9	22.1	4.9	5.2	0.6	1.0	5.5	7.5	3.9	4.1
MHD175(S)	20.9	23.1	4.9	5.2	0.6	1.0	4.1	5.5	3.9	4.1
MHD175LR(S)	20.9	23.1	4.9	5.2	0.6	1.0	4.1	5.5	3.9	4.1
MHD200	21.3	23.4	10.2	11.0	0.5	1.1	5.0	7.6	4.8	5.4
MHD200LR	21.3	23.4	10.2	11.0	0.5	1.1	5.0	7.6	4.8	5.4
MHD350	28.4	31.8	13.0	13.5	0.5	1.1	6.3	8.9	6.0	6.6
MHD420	30.6	32.4	12.9	13.6	0.5	1.1	5.0	7.5	6.0	6.7

Physical Characteristics

Lead Material	0.11 mm thick nickel
Insulating Material	Polyester tape,UL 94V-0
Slit	0.5mm X 4.0mm norm.
Lead - free device	

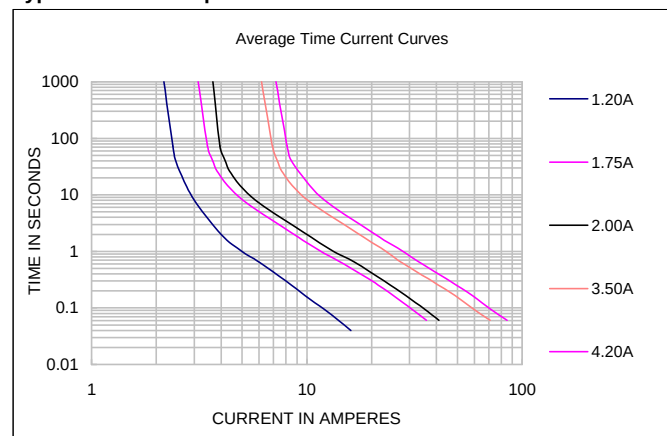
Dimensions



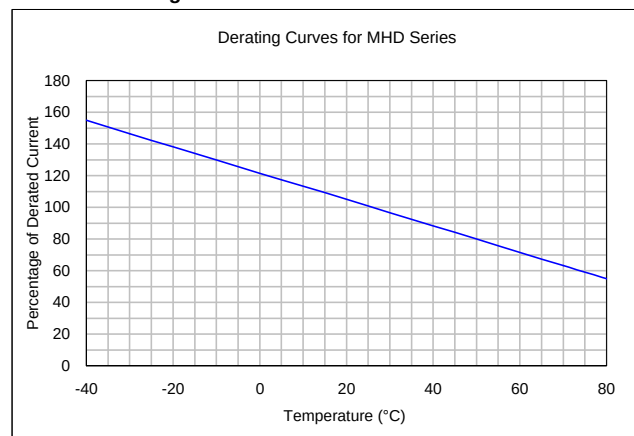
Marking

SL = Trademark
 ZZZ = Hold Current
 S = Single Slitted Lead
 XXXX = Date Code
 Y = Factory Code

Typical Time-To-Trip Curve At 25°C



Thermal Derating Curve



Ordering Information

MHD	120	LR	S	Bag Q'ty
Product Name	Hold Current (A)	Low Resistance	S= Single slitted lead Blank = Standard	MHD 120, 175 : 1000 pieces / bag MHD 200, 350, 420 : 500 pieces / bag

Packing



VLD Series

Features

- Axial Leaded Devices
- Nickel lead materials, polyester tape insulating material meets UL 94V-0 requirements
- Bulk packaging available on all models 1,000 pieces/bag.

Applications

- Almost anywhere there is a low voltage power supply, up to 16V and a load to be protected, including:
- Lithium cell and battery pack
 - Rechargeable battery pack

Alpha-Top (Sea & Land Alliance)

Electrical Properties

Model	V_{max} (Vdc)	I_{max} (A)	I_{hold} @25°C (A)	I_{trip} @25°C (A)	P_d Typ. (W)	Maximum Time To Trip		Resistance			Agency Approval	
						Current (A)	Time (Sec)	$R_{i min}$ (Ω)	$R_{i max}$ (Ω)	$R_{1 max}$ (Ω)	UL	TUV
VLD170(S)(SS)	16	100	1.70	3.4	1.4	8.50	3.0	0.027	0.051	0.102	✓	✓
VLD170X(S)	16	100	1.70	3.4	1.4	8.50	5.0	0.027	0.052	0.105	✓	✓
VLD170A	16	100	1.75	3.4	1.4	8.75	5.0	0.026	0.052	0.102	✓	✓
VLD175L	16	100	1.75	3.6	1.4	8.75	5.0	0.026	0.051	0.102	✓	✓
VLD175P	16	100	1.75	4.2	1.4	8.75	5.0	0.015	0.035	0.070	✓	✓
VLD175DII	16	100	1.75	3.6	1.4	8.75	5.0	0.026	0.040	0.080	✓	✓
VLD210(S)(SS)	16	100	2.10	4.7	1.5	10.00	5.0	0.015	0.030	0.060	✓	✓

I_{hold} = Hold Current : maximum current device will sustain for 4 hours without tripping in 25°C still air.

I_{trip} = Trip Current : minimum current at which the device will trip in 25°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 25°C still air.

$R_{i min/max}$ = Minimum/Maximum resistance of device in initial (un-soldered) state.

$R_{1 max}$ = Maximum resistance of device at 25°C measured one hour after tripping.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.

I_{hold} Versus Temperature

Model	Maximum ambient operating temperature (T_{max}) vs. hold current (I_{hold})									
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	80°C	85°C
VLD170(S)(SS)	3.20	2.70	2.20	1.70	1.30	1.00	0.80	0.50	0.30	0.10
VLD170X(S)	3.20	2.70	2.20	1.70	1.30	1.00	0.80	0.50	0.30	0.10
VLD170A	3.20	2.70	2.20	1.75	1.30	1.00	0.80	0.50	0.30	0.10
VLD175L	3.20	2.70	2.20	1.75	1.30	1.00	0.80	0.50	0.30	0.10
VLD175P	3.20	2.70	2.20	1.75	1.30	1.00	0.80	0.50	0.30	0.10
VLD175DII	3.20	2.70	2.20	1.75	1.30	1.00	0.80	0.50	0.30	0.10
VLD210(S)(SS)	4.10	3.50	2.90	2.10	1.60	1.30	1.00	0.70	0.40	0.10

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+60°C, 1000 hrs.	±10% typical
Humidity aging	+60°C, 95% R.H. , 1000 hrs.	±10% typical
Thermal shock	+85°C to -40°C, 10 times	±5% typical
Resistance to solvent	MIL-STD-202, Method 215	No change
Vibration	MIL-STD-202, Method 201	No change
Ambient operating /storage conditions : -40°C to +85°C		
Maximum surface temperature of the device in the tripped state is 110 °C		

Agency Approvals :



E201504(Alpha-Top)/E319079(Sea&Land)



R-50186869

Regulation/Standard:



2002/95/EC



WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage ($L di/dt$) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.



VLD Series

Alpha-Top (Sea & Land Alliance)

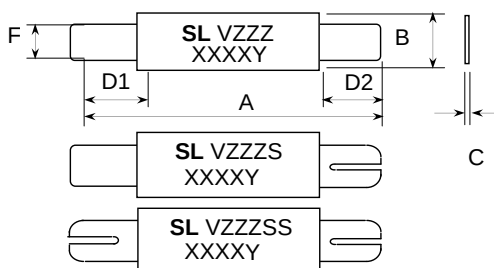
Physical Dimensions (Unit:mm)

Model	A		B		C		D		F	
	Min.	Max.	Min.	Max.	Min.	Max.	D1	D2	Min.	Max.
VLD170(S)(SS)	15.40	17.50	7.00	7.40	0.50	0.75	4.0-6.2	-	3.90	4.10
VLD170X(S)	20.80	22.90	4.90	5.30	0.50	0.75	6.0-8.6	-	3.90	4.10
VLD170A	22.00	24.00	3.50	3.90	0.60	0.80	5.0-7.0	-	2.40	2.60
VLD175L	25.80	28.00	3.50	3.90	0.60	0.80	6.0-7.0	9.0-11.0	2.40	2.60
VLD175P	22.00	24.50	3.00	3.40	0.60	0.80	3.5-5.0	-	2.40	2.60
VLD175DII	18.00	19.50	3.50	3.90	0.60	0.80	3.0-4.8	-	2.90	3.10
VLD210(S)(SS)	20.90	23.10	4.90	5.30	0.60	0.80	4.1-5.8	-	3.90	4.10

Physical Characteristics

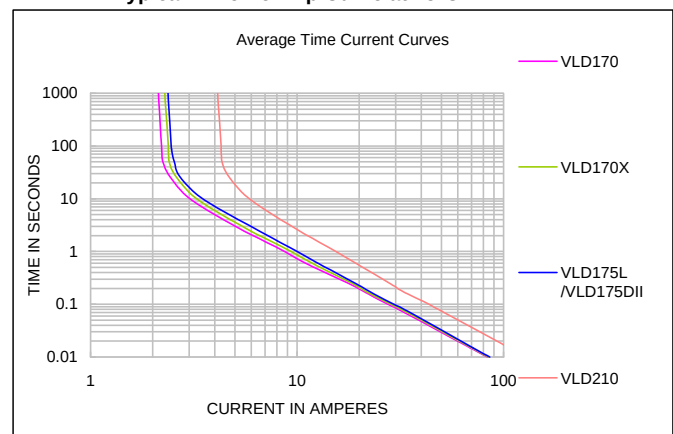
Lead Material	0.11 mm thick nickel
Insulating Material	Polyester tape, UL 94V-0
Slit	0.5mm X 4.0mm norm.
Lead - free device	

Dimensions

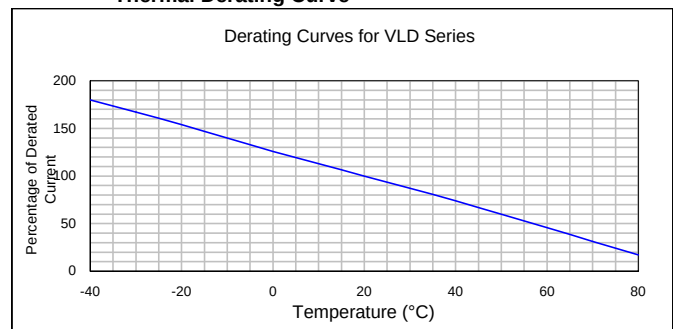


Marking SL = Trademark
V = VLD Series
ZZZ = Hold Current
S = Single Slitted Lead
SS = Double Slitted Lead
XXXX = Date Code
Y = Factory Code

Typical Time-To-Trip Curve at 25°C



Thermal Derating Curve



Ordering Information

VLD	210	S or SS	Packing
Product	Hold	S = Single slitted lead	Bag Q'ty 1000
Name	Current	SS = Double slitted lead	
	(A)	Blank=standard	



SMD0603 Series

Features

- Surface Mount Devices
- Lead free device
- Size 1.5*0.8 mm / 0.06*0.03 inch
- Surface Mount packaging for automated assembly

Applications

- Almost anywhere there is a low voltage power supply, up to 24V and a load to be protected, including:
- Computer mother board, Modem, USB hub
 - PDAs & Charger, Analog & digital line card
 - Digital cameras, Disk drivers, CD-ROMs,

Alpha-Top (Sea & Land Alliance)

Performance Specification

Model	Marking	V _{max} (Vdc)	I _{max} (A)	I _{hold} @25°C (A)	I _{trip} @25°C (A)	P _d Typ. (W)	Maximum Time To Trip		Resistance		Agency Approval	
							Current (A)	Time (Sec)	R _{i min} (Ω)	R _{1 max} (Ω)	UL	TUV
SMD0603-005	V	15	40	0.05	0.20	0.5	0.5	1.00	2.000	10.000		
SMD0603-005-24V	V	24	40	0.05	0.20	0.5	0.5	1.00	2.000	10.000		
SMD0603-010	1	15	40	0.10	0.30	0.5	0.5	1.00	0.900	6.000		
SMD0603-010-24V	1	24	40	0.10	0.30	0.5	0.5	1.00	0.900	6.000		
SMD0603-020	2	9	40	0.20	0.50	0.5	1.0	0.60	0.550	3.500	✓	
SMD0603-020-12V	2	12	40	0.20	0.50	0.5	1.0	0.60	0.550	3.500		
SMD0603-025	2	9	40	0.25	0.55	0.5	8.0	0.08	0.500	3.000	✓	
SMD0603-025-12V	2	12	40	0.25	0.55	0.5	8.0	0.08	0.500	3.000		
SMD0603-035	3	6	40	0.35	0.75	0.5	8.0	0.10	0.200	1.400	✓	
SMD0603-035-12V	3	12	40	0.35	0.75	0.5	8.0	0.10	0.200	1.400		
SMD0603-050	5	6	40	0.50	1.00	0.5	8.0	0.10	0.100	0.800	✓	
SMD0603-050-12V	5	12	40	0.50	1.00	0.5	8.0	0.10	0.100	0.800		
SMD0603-075	7	6	40	0.75	1.40	0.5	8.0	0.10	0.060	0.450	✓	
SMD0603-100	0	6	40	1.00	2.00	0.5	8.0	0.10	0.040	0.300		
SMD0603-110	0	6	40	1.10	2.20	0.5	8.0	0.10	0.040	0.280		

I_{hold} = Hold Current. Maximum current device will not trip in 25°C still air.

I_{trip} = Trip Current. Minimum current at which the device will always trip in 25°C still air.

V_{max} = Maximum operating 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 dissipation when device is in the tripped state in 25°C still air environment at rated voltage.

R_{i min}/R_{1 max} = Minimum/Maximum device resistance prior to tripping at 25°C.

R_{1 max} = Maximum device resistance is measured one hour post reflow.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+85°C, 1000 hrs.	±5% typical
Humidity aging	+85°C, 85% R.H. , 168 hours	±5% typical
Thermal shock	+85°C to -40°C, 20 times	±33% typical
Resistance to solvent	MIL-STD-202, Method 215	No change
Vibration	MIL-STD-202, Method 201	No change
Ambient operating conditions : - 40 °C to +85 °C		
Maximum surface temperature of the device in the tripped state is 125 °C		

AGENCY APPROVALS :



E201504(Alpha-Top)/E319079(Sea&Land)

Regulation/Standard:



2002/95/EC



EN14582

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SMD0603 Series

Alpha-Top (Sea & Land Alliance)

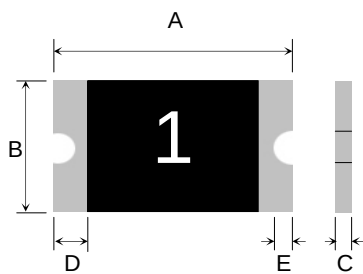
I_{hold} Versus Temperature

Model	Maximum ambient operating temperature (T _{mao}) vs. hold current (I _{hold})								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
SMD0603-005	0.072	0.065	0.058	0.05	0.041	0.037	0.033	0.03	0.024
SMD0603-010	0.13	0.12	0.11	0.10	0.08	0.07	0.06	0.05	0.03
SMD0603-020	0.27	0.25	0.23	0.20	0.17	0.14	0.12	0.10	0.07
SMD0603-025	0.32	0.29	0.27	0.25	0.21	0.18	0.16	0.05	0.03
SMD0603-035	0.47	0.41	0.38	0.35	0.29	0.26	0.24	0.20	0.14
SMD0603-050	0.67	0.59	0.54	0.50	0.41	0.37	0.34	0.29	0.20
SMD0603-075	0.96	0.84	0.78	0.75	0.61	0.56	0.47	0.43	0.35
SMD0603-100	1.30	1.12	1.08	1.00	0.80	0.72	0.58	0.53	0.42
SMD0603-110	1.40	1.22	1.13	1.10	0.90	0.82	0.68	0.63	0.52

Construction And Dimension (Unit:mm)

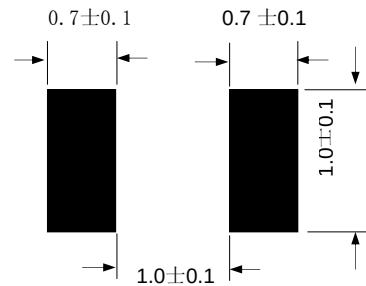
Model	A		B		C		D	E
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.
SMD0603-005	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603-005-24V	1.45	1.85	0.65	1.05	0.60	1.30	0.15	0.10
SMD0603-010	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603-010-24V	1.45	1.85	0.65	1.05	0.60	1.30	0.15	0.10
SMD0603-020	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603-020-12V	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603-025	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603-025-12V	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603-035	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603-035-12V	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603-050	1.45	1.85	0.65	1.05	0.50	1.10	0.15	0.10
SMD0603-050-12V	1.45	1.85	0.65	1.05	0.50	1.10	0.15	0.10
SMD0603-075	1.45	1.85	0.65	1.05	0.50	1.10	0.15	0.10
SMD0603-100	1.45	1.85	0.65	1.05	0.50	1.10	0.15	0.10
SMD0603-110	1.45	1.85	0.65	1.05	0.50	1.10	0.15	0.10

Dimensions & Marking



1 = Part identification

Recommended Pad Layout (mm)



Termination Pad Characteristics

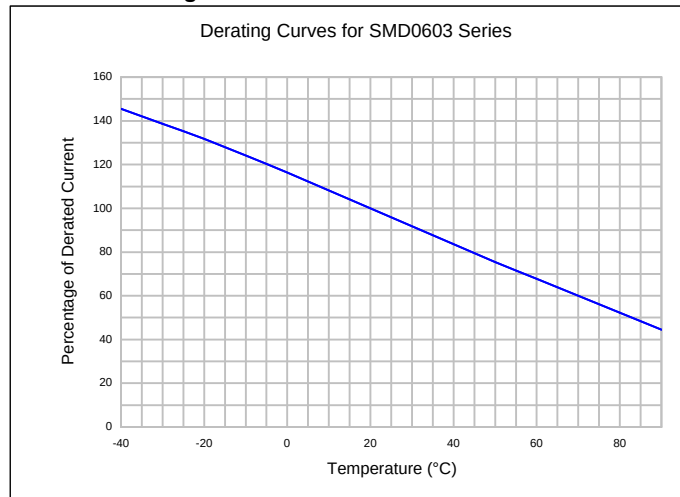
Terminal pad materials Gold-Plated Nickel-Copper or Tin-plated Nickel-Copper

Terminal pad solderability Meets EIA specification RS186-9E and ANSI/J-STD-002 Category 3.

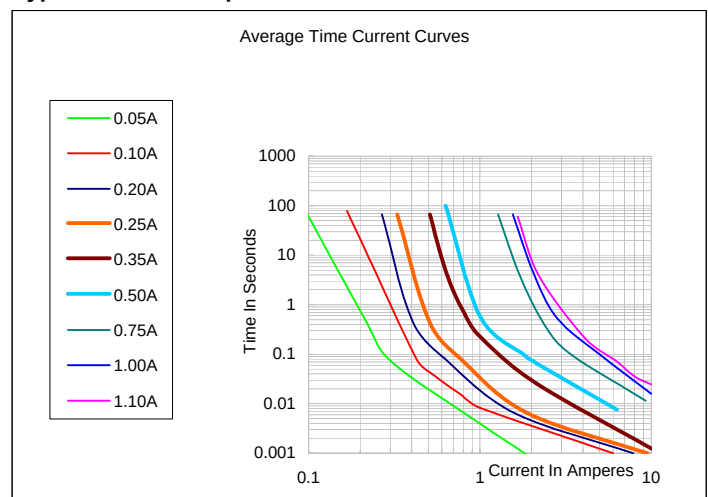
Rework

Use standard industry practices, the removal device must be replaced with a fresh one.

Thermal Derating Curve



Typical Time-To-Trip At 25°C



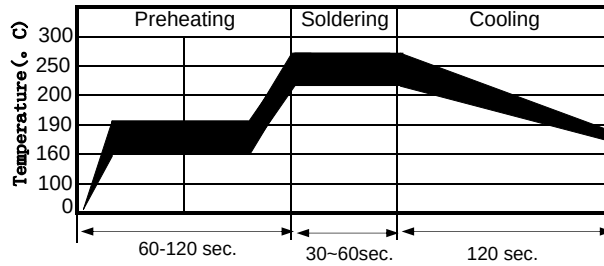
WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage ($L \frac{di}{dt}$) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.
- Contamination of the PPTC material with certain silicon based oils or some aggressive solvents can adversely impact the performance of the devices. PPTC SMD can be cleaned by standard methods.
- Requests that customers comply with our recommended solder pad layouts and recommended reflow profile. Improper board layouts or reflow profile could negatively impact solderability performance of our devices.

SMD0603 Series

Alpha-Top (Sea & Land Alliance)

Recommended Solder Reflow Conditions



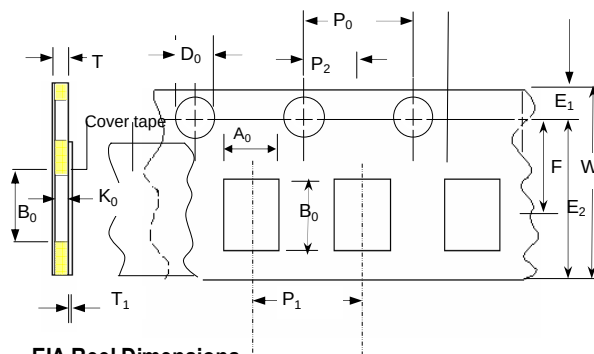
- Recommended reflow methods : IR, vapor phase oven, hot air oven.
 - Devices are not designed to be wave soldered to the bottom side of the board.
 - Recommended maximum paste thickness is 0.25 mm (0.010 inch).
 - Devices can be cleaned using standard method and solvents.
- Note : If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

Tape And Reel Specifications (mm)

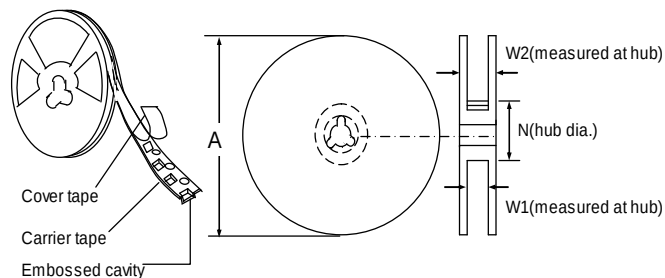
Governing Specifications

W	8.0 ± 0.2
P ₀	4.0 ± 0.10
P ₁	4.0 ± 0.10
P ₂	2.0 ± 0.05
A ₀	1.05 ± 0.10
B ₀	1.85 ± 0.10
D ₀	1.55 ± 0.05
F	3.5 ± 0.05
E ₁	1.75 ± 0.10
E ₂ min.	6.25
T	0.75
T ₁ max.	0.1
K ₀	0.75/0.95 ± 0.1
Leader min.	390
Trailer min.	160
Reel Dimensions	
A max.	178
N min.	60
W ₁	9.0 ± 0.5
W ₂	12.0 ± 0.05

Paper Tape Component Dimensions



EIA Reel Dimensions



Storage And Handling

- Storage conditions : 40°C max, 70% R.H.
- Devices may not meet specified performance if storage conditions are exceeded.

Order Information

Packaging

SMD0603	010	Tape & Reel Quantity
Product name	Hold	5,000 pcs/reel
Size 1508 mm / 0603 inch	Current	
SMD: surface mount device	0.10A	

Tape & reel packaging per EIA481-1



SMD0805 Series

Features

- Surface Mount Devices
- Lead free device
- Size 2.0*1.2 mm / 0.08*0.05 inch
- Surface Mount packaging for automated assembly

Applications

- Almost anywhere there is a low voltage power supply, up to 24V and a load to be protected, including:
- Computer mother board, Modem, USB hub
 - PDAs & Charger, Analog & digital line card
 - Digital cameras, Disk drivers, CD-ROMs,

Alpha-Top (Sea & Land Alliance)

Performance Specification

Model	Marking	V_{max}	I_{max}	I_{hold}	I_{trip}	P_d	Maximum		Resistance		Agency	
		(Vdc)	(A)	@25°C (A)	@25°C (A)	Typ. (W)	Time To Trip Current (A)	Time (Sec)	$R_{i_{min}}$ (Ω)	R_{1max} (Ω)	UL	TUV
SMD0805-005	V	15	100	0.05	0.20	0.5	0.5	1.50	2.000	10.000		
SMD0805-005-24V	V	24	100	0.05	0.20	0.5	0.5	1.50	2.000	10.000		
SMD0805-010	1	15	100	0.10	0.30	0.5	0.5	1.50	1.000	6.000		
SMD0805-010-24V	1	24	100	0.10	0.30	0.5	0.5	1.50	1.000	6.000		
SMD0805-020	2	9	100	0.20	0.50	0.5	8.0	0.02	0.650	3.500	✓	
SMD0805-020-13.2V	2	13.2	100	0.20	0.50	0.5	8.0	0.02	0.650	3.500		
SMD0805-020-16V	2	16	100	0.20	0.50	0.5	8.0	0.02	0.650	3.500		
SMD0805-025	2	9	100	0.25	0.55	0.5	8.0	0.02	0.600	3.000		
SMD0805-025-13.2V	2	13.2	100	0.25	0.55	0.5	8.0	0.02	0.600	3.000		
SMD0805-025-16V	2	16	100	0.25	0.55	0.5	8.0	0.02	0.600	3.000		
SMD0805-035	3	6	100	0.35	0.75	0.5	8.0	0.10	0.250	1.200	✓	
SMD0805-035-13.2V	3	13.2	100	0.35	0.75	0.5	8.0	0.10	0.250	1.200		
SMD0805-035-16V	3	16	100	0.35	0.75	0.5	8.0	0.10	0.250	1.200		
SMD0805-050	5	6	100	0.50	1.00	0.5	8.0	0.10	0.150	0.850	✓	
SMD0805-050-13.2V	5	13.2	100	0.50	1.00	0.5	8.0	0.10	0.150	0.850		
SMD0805-050-16V	5	16	100	0.50	1.00	0.5	8.0	0.10	0.150	0.850		
SMD0805-075	7	6	40	0.75	1.50	0.6	8.0	0.20	0.090	0.385	✓	
SMD0805-100	0	6	100	1.00	1.95	0.6	8.0	0.30	0.060	0.230	✓	✓
SMD0805-110	0	6	100	1.10	2.20	0.6	8.0	0.30	0.060	0.210	✓	
SMD0805-125	12	6	100	1.25	2.50	1.5	8.0	0.60	0.030	0.140		

Ihold = Hold Current. Maximum current device will not trip in 25°C still air.

Itrip = Trip Current. Minimum current at which the device will always trip in 25°C still air.

Vmax = Maximum operating 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}).

Pd = Power dissipation when device is in the tripped state in 25°C still air environment at rated voltage.

R_{imin}/max = Minimum/Maximum device resistance prior to tripping at 25°C.

R_{1max} = Maximum device resistance is measured one hour post reflow.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+85°C, 1000 hrs.	±5% typical
Humidity aging	+85°C, 85% R.H. , 168 hours	±5% typical
Thermal shock	+85°C to -40°C, 20 times	±33% typical
Resistance to solvent	MIL-STD-202,Method 215	No change
Vibration	MIL-STD-202,Method 201	No change
Ambient operating conditions : - 40 °C to +85 °C		
Maximum surface temperature of the device in the tripped state is 125 °C		

Agency Approvals :



E201504(Alpha-Top)/E319079(Sea&Land)



NO. R-50141892

Regulation/Standard:



2002/95/EC



EN14582

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V

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SMD0805 Series

Alpha-Top (Sea & Land Alliance)

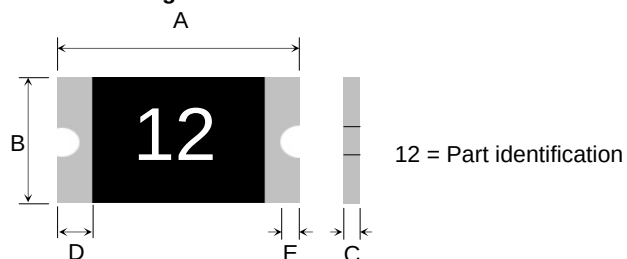
I_{hold} Versus Temperature

Model	Maximum ambient operating temperature (T_{max}) vs. hold current (I_{hold})								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
SMD0805-005	0.078	0.068	0.06	0.05	0.042	0.038	0.034	0.03	0.021
SMD0805-010	0.14	0.12	0.11	0.10	0.08	0.07	0.06	0.05	0.03
SMD0805-020	0.28	0.25	0.23	0.20	0.17	0.14	0.12	0.10	0.07
SMD0805-025	0.35	0.31	0.27	0.25	0.22	0.19	0.16	0.14	0.11
SMD0805-035	0.47	0.44	0.39	0.35	0.30	0.27	0.24	0.20	0.14
SMD0805-050	0.68	0.62	0.55	0.50	0.40	0.37	0.33	0.29	0.23
SMD0805-075	1.00	0.90	0.79	0.75	0.63	0.57	0.53	0.41	0.34
SMD0805-100	1.35	1.25	1.15	1.00	0.82	0.74	0.65	0.55	0.42
SMD0805-110	1.45	1.35	1.20	1.10	0.92	0.84	0.75	0.65	0.52
SMD0805-125	1.65	1.53	1.36	1.25	1.05	0.95	0.85	0.74	0.59

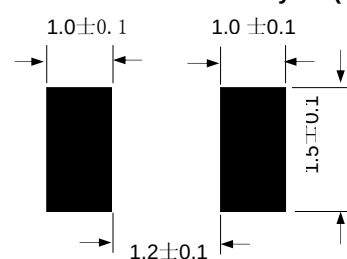
Construction And Dimension (Unit:mm)

Model	A		B		C		D	E
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.
SMD0805-005	1.90	2.20	1.20	1.50	0.50	1.00	0.20	0.10
SMD0805-005-24V	1.90	2.20	1.20	1.50	0.60	1.30	0.20	0.10
SMD0805-010	1.90	2.20	1.20	1.50	0.50	1.00	0.20	0.10
SMD0805-010-24V	1.90	2.20	1.20	1.50	0.60	1.30	0.20	0.10
SMD0805-020	1.90	2.20	1.20	1.50	0.50	1.00	0.20	0.10
SMD0805-020-13.2V	1.90	2.20	1.20	1.50	0.50	1.20	0.20	0.10
SMD0805-020-16V	1.90	2.20	1.20	1.50	0.50	1.20	0.20	0.10
SMD0805-025	1.90	2.20	1.20	1.50	0.50	1.00	0.20	0.10
SMD0805-025-13.2V	1.90	2.20	1.20	1.50	0.50	1.20	0.20	0.10
SMD0805-025-16V	1.90	2.20	1.20	1.50	0.50	1.20	0.20	0.10
SMD0805-035	1.90	2.20	1.20	1.50	0.50	1.00	0.20	0.10
SMD0805-035-13.2V	1.90	2.20	1.20	1.50	0.50	1.20	0.20	0.10
SMD0805-035-16V	1.90	2.20	1.20	1.50	0.50	1.20	0.20	0.10
SMD0805-050	1.90	2.20	1.20	1.50	0.30	0.60	0.20	0.10
SMD0805-050-13.2V	1.90	2.20	1.20	1.50	0.50	1.20	0.20	0.10
SMD0805-050-16V	1.90	2.20	1.20	1.50	0.50	1.20	0.20	0.10
SMD0805-075	1.90	2.20	1.20	1.50	0.50	1.10	0.20	0.10
SMD0805-100	1.90	2.20	1.20	1.50	0.50	1.10	0.20	0.10
SMD0805-110	1.90	2.20	1.20	1.50	0.50	1.10	0.20	0.10
SMD0805-125	1.90	2.20	1.20	1.50	0.50	1.20	0.20	0.10

Dimensions & Marking



Recommended Pad Layout (mm)



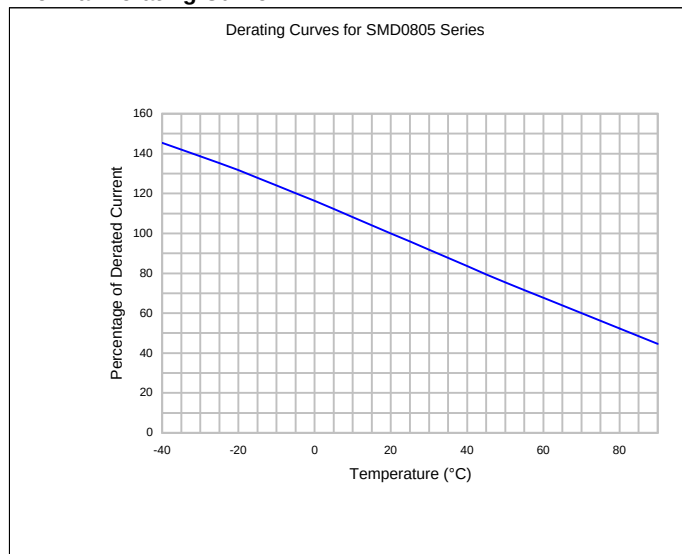
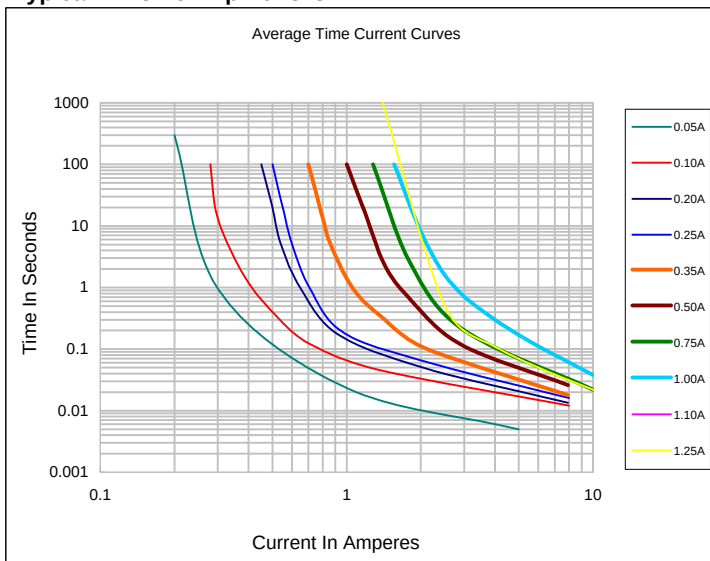
Termination Pad Characteristics

Terminal pad materials Gold-Plated Nickel-Copper or Tin-plated Nickel-Copper

Terminal pad solderability Meets EIA specification RS186-9E and ANSI/J-STD-002 Category 3.

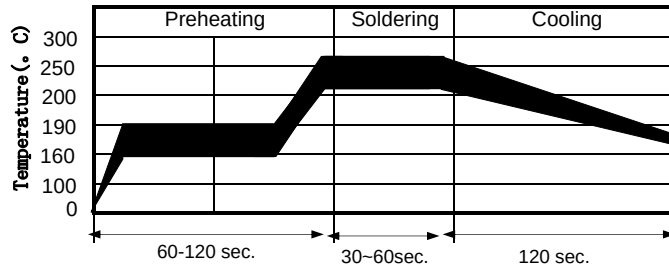
Rework

Use standard industry practices, the removal device must be replaced with a fresh one.

Thermal Derating Curve**Typical Time-To-Trip At 25°C****WARNING:**

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage ($L di/dt$) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.
- Contamination of the PPTC material with certain silicon based oils or some aggressive solvents can adversely impact the performance of the devices. PPTC SMD can be cleaned by standard methods.
- Requests that customers comply with our recommended solder pad layouts and recommended reflow profile. Improper board layouts or reflow profile could negatively impact solderability performance of our devices.

Recommended Solder Reflow Conditions

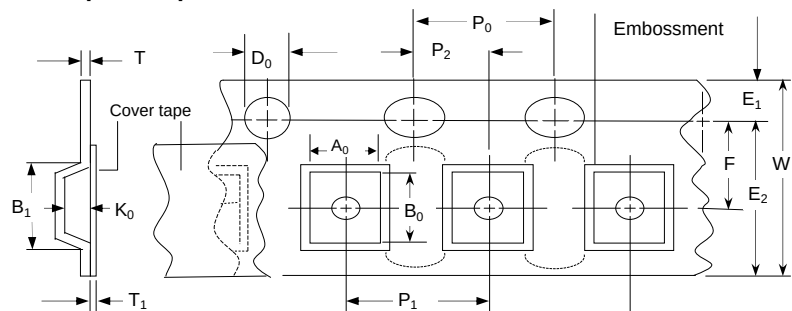


- Recommended reflow methods : IR, vapor phase oven, hot air oven.
 - Devices are not designed to be wave soldered to the bottom side of the board.
 - Recommended maximum paste thickness is 0.25 mm (0.010 inch).
 - Devices can be cleaned using standard method and solvents.
- Note : If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

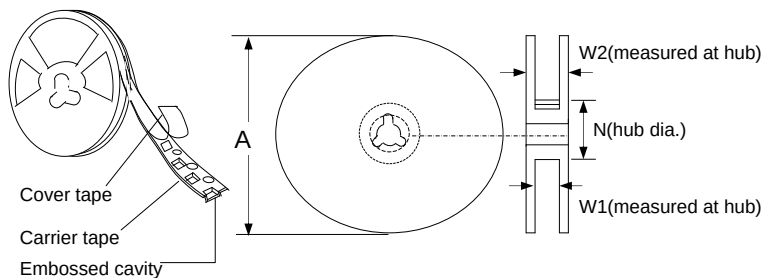
Tape And Reel Specifications (mm)

Governing Specifications	EIA 481-1
W	8.0 ± 0.3
P0	4.0 ± 0.10
P1	4.0 ± 0.10
P2	2.0 ± 0.05
A0	1.45 ± 0.10
B0	2.30 ± 0.10
B1max.	4.35
D0	$1.55 + 0.1, -0$
F	3.5 ± 0.05
E1	1.75 ± 0.10
E2min.	6.25
T	0.25
T1max.	0.1
K0	0.74 ± 0.1
Leader min.	390
Trailer min.	160
Reel Dimensions	
A max.	178
N min.	60
W1	9.0 ± 0.5
W2	12.0 ± 0.05

EIA Tape Component Dimensions



EIA Reel Dimensions



Storage And Handling

- Storage conditions : 40°C max, 70% R.H.
- Devices may not meet specified performance if storage conditions are exceeded.

Order Information

SMD0805	010	Tape & Reel Quantity
Product name	Hold	005,010,020,025,035,050 : 5,000 pcs/reel
Size 2012 mm / 0805 inch	Current	The others : 4,000 pcs/reel
SMD: surface mount device	0.10A	

Tape & reel packaging per EIA481-1



nSMD Series

Features

- Surface Mount Devices
- Lead free device
- Size 3.2*1.6 mm/0.12*0.06 inch
- Surface Mount packaging for automated assembly

Applications

- Almost anywhere there is a low voltage power supply, up to 60V and a load to be protected, including:
- Computer mother board, Modem, USB hub
 - PDAs & Charger, Analog & digital line card
 - Digital cameras, Disk drivers, CD-ROMs,

Alpha-Top (Sea&Land Alliance)

Performance Specification

Model	Marking	V _{max} (Vdc)	I _{max} (A)	I _{hold} @25°C (A)	I _{trip} @25°C (A)	P _d Max. (W)	Maximum Time To Trip		Resistance		Agency Approval	
							Current (A)	Time (Sec)	R _i _{min} (Ω)	R ₁ _{max} (Ω)	UL	TUV
nSMD005	αZ	60	100	0.05	0.15	0.4	0.25	1.50	3.600	50.000		
nSMD010	αN	60	100	0.10	0.25	0.4	0.50	1.00	1.600	15.000		
nSMD012	αN	60	100	0.12	0.29	0.4	0.50	1.00	1.600	15.000		
nSMD020	αA	24	100	0.20	0.46	0.6	8.00	0.08	0.350	2.700		
nSMD020-30V	αA	30	100	0.20	0.46	0.6	8.00	0.08	0.350	2.700		
nSMD025	αA	16	100	0.25	0.50	0.6	8.00	0.08	0.350	2.500	✓	
nSMD025-24V	αA	24	100	0.25	0.50	0.6	8.00	0.08	0.350	2.500		
nSMD025-30V	αA	30	100	0.25	0.50	0.6	8.00	0.08	0.350	2.500		
nSMD035	αB	6	100	0.35	0.75	0.6	8.00	0.10	0.250	1.300	✓	
nSMD035-13.2V	αB	13.2	100	0.35	0.75	0.6	8.00	0.10	0.250	1.300		
nSMD035-16V	αB	16	100	0.35	0.75	0.6	8.00	0.10	0.250	1.300		
nSMD035-24V	αB	24	100	0.35	0.75	0.6	8.00	0.10	0.250	1.300		
nSMD050	αF	6	100	0.50	1.00	0.6	8.00	0.10	0.150	0.700	✓	
nSMD050-13.2V	αF	13.2	100	0.50	1.00	0.6	8.00	0.10	0.150	0.700	✓	
nSMD050-16V	αF	16	100	0.50	1.00	0.6	8.00	0.10	0.150	0.700		
nSMD050-24V	αF	24	100	0.50	1.00	0.6	8.00	0.10	0.150	0.700		
nSMD075	αG	6	100	0.75	1.50	0.6	8.00	0.20	0.090	0.500	✓	
nSMD075-13.2V	αG	13.2	100	0.75	1.50	0.6	8.00	0.20	0.090	0.500		
nSMD075-16V	αG	16	100	0.75	1.50	0.6	8.00	0.20	0.090	0.500		
nSMD075-24V	αG	24	100	0.75	1.50	0.6	8.00	0.20	0.090	0.500		
nSMD100	αH	6	100	1.00	1.80	0.6	8.00	0.30	0.055	0.270	✓	✓
nSMD100-13.2V	αH	13.2	100	1.00	1.80	0.6	8.00	0.30	0.055	0.270		
nSMD100-16V	αH	16	100	1.00	1.80	0.6	8.00	0.30	0.055	0.270		
nSMD110	αH	6	100	1.10	2.20	0.6	8.00	0.30	0.050	0.250		
nSMD110-13.2V	αH	13.2	100	1.10	2.20	0.6	8.00	0.30	0.050	0.250		
nSMD110-16V	αH	16	100	1.10	2.20	0.6	8.00	0.30	0.050	0.250		
nSMD150	αI	6	100	1.50	3.00	0.8	8.00	0.30	0.040	0.130	✓	
nSMD150-13.2V	αI	13.2	100	1.50	3.00	0.8	8.00	0.30	0.040	0.130		
nSMD150-16V	αI	16	100	1.50	3.00	0.8	8.00	0.30	0.040	0.130		
nSMD200	αK	6	100	2.00	3.50	0.8	8.00	1.50	0.018	0.080		
nSMD200-13.2V	αK	13.2	100	2.00	3.50	0.8	8.00	1.50	0.018	0.080		

I_{hold} = Hold Current. Maximum current device will not trip in 25°C still air.

I_{trip} = Trip Current. Minimum current at which the device will always trip in 25°C still air.

V_{max} = Maximum operating 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 dissipation when device is in the tripped state in 25°C still air environment at rated voltage.

R_{imin}/max = Minimum/Maximum device resistance prior to tripping at 25°C.

R₁_{max} = Maximum device resistance is measured one hour post reflow.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+85°C, 1000 hrs.	±5% typical
Humidity aging	+85°C, 85% R.H., 168 hours	±5% typical
Thermal shock	+85°C to -40°C, 20 times	±33% typical
Resistance to solvent	MIL-STD-202, Method 215	No change
Vibration	MIL-STD-202, Method 201	No change
Ambient operating conditions : - 40 °C to 85 °C		
Maximum surface temperature of the device in the tripped state is 125 °C		

Agency Approvals :



E201504(Alpha-Top)/E319079(Sea&Land)



NO. R-50141892

Regulation/Standard:



2002/95/EC



EN14582

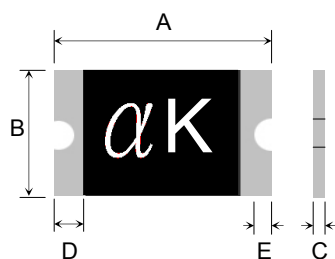
I_{hold} Versus Temperature

Model	Maximum ambient operating temperature (T _{mao}) vs. hold current (I _{hold})								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
nSMD005	0.074	0.066	0.058	0.05	0.0425	0.0375	0.035	0.03	0.0275
nSMD010	0.148	0.132	0.116	0.10	0.085	0.075	0.07	0.06	0.055
nSMD012	0.18	0.16	0.14	0.12	0.10	0.09	0.08	0.07	0.07
nSMD020	0.30	0.26	0.23	0.20	0.17	0.15	0.14	0.12	0.11
nSMD025	0.37	0.33	0.29	0.25	0.22	0.20	0.17	0.15	0.12
nSMD035	0.50	0.45	0.40	0.35	0.30	0.27	0.24	0.21	0.15
nSMD050	0.71	0.64	0.57	0.50	0.42	0.39	0.35	0.31	0.25
nSMD075	1.14	1.01	0.88	0.75	0.65	0.59	0.54	0.49	0.41
nSMD100	1.45	1.31	1.15	1.00	0.84	0.77	0.69	0.61	0.48
nSMD110	1.60	1.45	1.30	1.10	0.95	0.80	0.72	0.66	0.55
nSMD150	2.18	1.94	1.72	1.50	1.28	1.17	1.06	0.96	0.77
nSMD200	2.88	2.63	2.34	2.00	1.74	1.58	1.42	1.17	0.93

Construction And Dimension (Unit:mm)

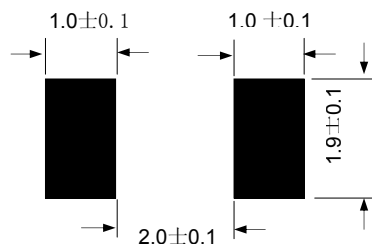
Model	A		B		C		D		E	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
nSMD005	3.00	3.50	1.50	1.80	0.60	1.10	0.15	0.10	0.10	0.10
nSMD010	3.00	3.50	1.50	1.80	0.60	1.10	0.15	0.10	0.10	0.10
nSMD012	3.00	3.50	1.50	1.80	0.60	1.10	0.15	0.10	0.10	0.10
nSMD020	3.00	3.50	1.50	1.80	0.40	0.90	0.15	0.10	0.10	0.10
nSMD020-30V	3.00	3.50	1.50	1.80	0.40	0.90	0.15	0.10	0.10	0.10
nSMD025	3.00	3.50	1.50	1.80	0.40	0.90	0.15	0.10	0.10	0.10
nSMD025-24V	3.00	3.50	1.50	1.80	0.40	0.90	0.15	0.10	0.10	0.10
nSMD025-30V	3.00	3.50	1.50	1.80	0.40	0.90	0.15	0.10	0.10	0.10
nSMD035	3.00	3.50	1.50	1.80	0.40	0.90	0.15	0.10	0.10	0.10
nSMD035-13.2V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD035-16V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD035-24V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD050	3.00	3.50	1.50	1.80	0.35	0.85	0.15	0.10	0.10	0.10
nSMD050-13.2V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD050-16V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD050-24V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD075	3.00	3.50	1.50	1.80	0.40	0.90	0.15	0.10	0.10	0.10
nSMD075-13.2V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD075-16V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD075-24V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD100	3.00	3.50	1.50	1.80	0.40	0.80	0.15	0.10	0.10	0.10
nSMD100-13.2V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD100-16V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD110	3.00	3.50	1.50	1.80	0.40	0.80	0.15	0.10	0.10	0.10
nSMD110-13.2V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD110-16V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD150	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD150-13.2V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD150-16V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD200	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10
nSMD200-13.2V	3.00	3.50	1.50	1.80	0.50	1.20	0.15	0.10	0.10	0.10

Dimensions & Marking



α = Trademark
K = Part identification

Recommended Pad Layout (mm)





nSMD Series

Alpha-Top (Sea&Land Alliance)

Termination Pad Characteristics

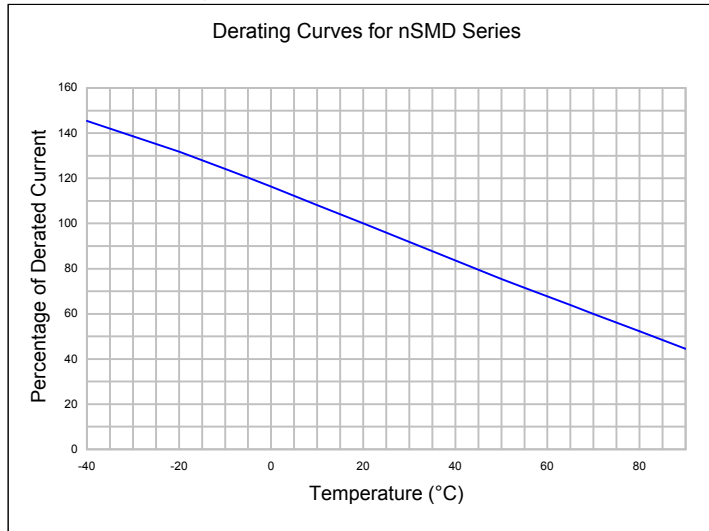
Terminal pad materials Gold-Plated Nickel-Copper or Tin-plated Nickel-Copper

Terminal pad solderability Meets EIA specification RS186-9E and ANSI/J-STD-002 Category 3.

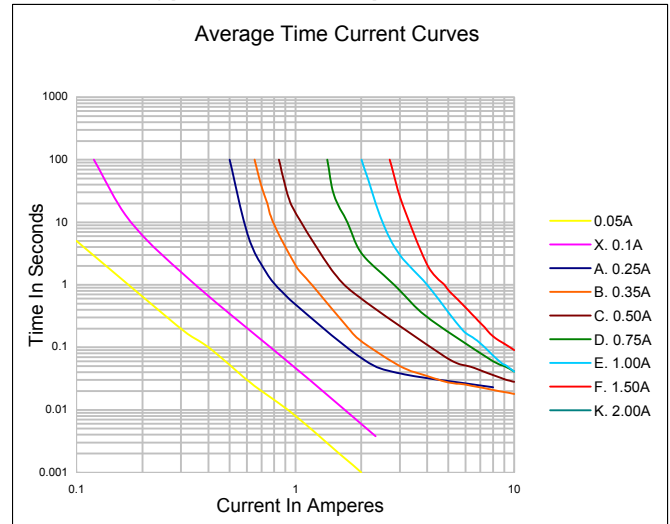
Rework

Use standard industry practices, the removal device must be replaced with a fresh one.

Thermal Derating Curve



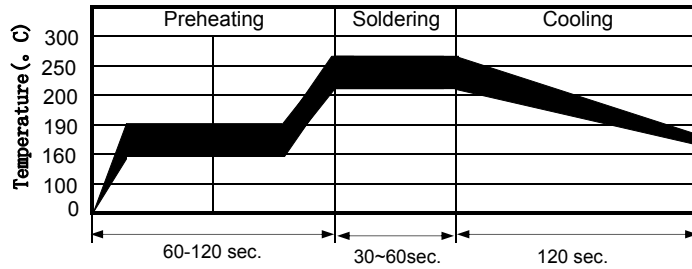
Typical Time-To-Trip At 25°C



WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage ($L di/dt$) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.
- Contamination of the PPTC material with certain silicon based oils or some aggressive solvents can adversely impact the performance of the devices. PPTC SMD can be cleaned by standard methods.
- Requests that customers comply with our recommended solder pad layouts and recommended reflow profile. Improper board layouts or reflow profile could negatively impact solderability performance of our devices.

Recommended Solder Reflow Conditions

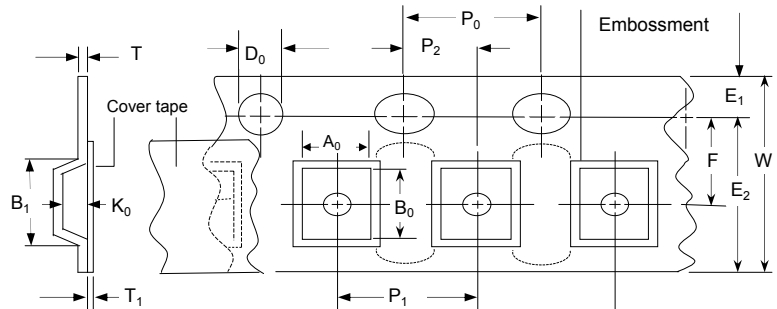


- Recommended reflow methods : IR, vapor phase oven, hot air oven.
 - Devices are not designed to be wave soldered to the bottom side of the board.
 - Recommended maximum paste thickness is 0.25 mm (0.010 inch).
 - Devices can be cleaned using standard method and solvents.
- Note : If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

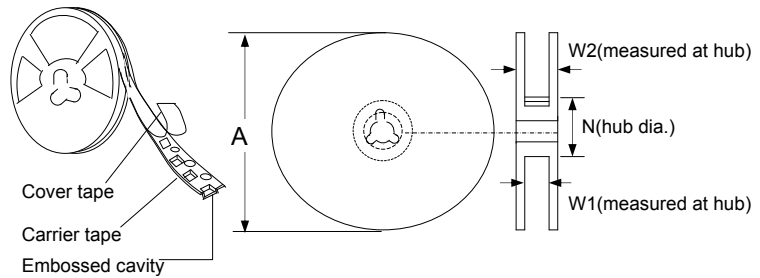
Tape And Reel Specifications (mm)

Governing Specifications	EIA 481-1
W	8.15 ± 0.3
P0	4.0 ± 0.10
P1	4.0 ± 0.10
P2	2.0 ± 0.05
A0	1.95 ± 0.10
B0	3.45 ± 0.10
B1max.	4.35
D0	1.5 + 0.1, -0
F	3.5 ± 0.05
E1	1.75 ± 0.10
E2min.	6.25
Tmax.	0.6
T1max.	0.1
K0	1.04 ± 0.1
Leader min.	390
Trailer min.	160
Reel Dimensions	
A max.	178
N min.	60
W1	9 ± 0.5
W2	12.6 ± 0.5

EIA Tape Component Dimensions



EIA Reel Dimensions



Storage And Handling

- Storage conditions : 40°C max, 70% R.H.
- Devices may not meet specified performance if storage conditions are exceeded.

Order Information

Packaging

nSMD	075	Tape & Reel Quantity
Product name	Hold	020,025,035,050,075,100,110 : 5,000 pcs/reel
Size 3216 mm / 1206 inch	Current	020-30V,025-24V,025-30V : 5,000 pcs/reel
SMD : surface mount device	0.75A	The others : 3,500 pcs/reel

Tape & reel packaging per EIA481-1



Features

- Surface Mount Devices
- Lead free device
- Size 3.2*2.5mm/0.12*0.10 inch
- Surface Mount packaging for automated assembly

Applications

- Almost anywhere there is a low voltage power supply, up to 60V and a load to be protected, including:
- Computer mother board, Modem.
 - Telecommunication equipments.

SMD1210 Series

Alpha-Top (Sea&Land Alliance)

Performance Specification

Model	Marking	V_{max}	I_{max}	I_{hold}	I_{trip}	P_d	Maximum Time To Trip		Resistance		Agency Approval	
		(Vdc)	(A)	@25°C (A)	@25°C (A)	(W)	Current (A)	Time (Sec)	$R_{i_{min}}$ (Ω)	$R_{1_{max}}$ (Ω)	UL	TUV
SMD1210-005	α A	30	100	0.05	0.15	0.6	0.25	1.50	2.800	50.000		
SMD1210-005-60V	α A	60	100	0.05	0.15	0.6	0.25	1.50	2.800	50.000		
SMD1210-010	α B	30	100	0.10	0.30	0.6	0.50	0.60	0.800	15.000		
SMD1210-010-60V	α B	60	100	0.10	0.30	0.6	0.50	0.60	0.800	15.000		
SMD1210-020	α C	30	100	0.20	0.40	0.6	8.0	0.02	0.400	5.000		
SMD1210-020-60V	α C	60	100	0.20	0.40	0.6	8.0	0.02	0.400	5.000		
SMD1210-025	α C	30	100	0.25	0.50	0.6	8.0	0.02	0.400	4.500		
SMD1210-025-60V	α C	60	100	0.25	0.50	0.6	8.0	0.02	0.400	4.500		
SMD1210-035	α D	6	100	0.35	0.75	0.6	8.0	0.20	0.200	1.300	✓	
SMD1210-035-13.2V	α D	13.2	100	0.35	0.75	0.6	8.0	0.20	0.200	1.300		
SMD1210-035-16V	α D	16	100	0.35	0.75	0.6	8.0	0.20	0.200	1.300		
SMD1210-035-24V	α D	24	100	0.35	0.75	0.6	8.0	0.20	0.200	1.300		
SMD1210-050	α F	13.2	100	0.50	1.00	0.6	8.0	0.10	0.180	0.900	✓	
SMD1210-050-16V	α F	16.0	100	0.50	1.00	0.6	8.0	0.10	0.180	0.900		
SMD1210-050-24V	α F	24.0	100	0.50	1.00	0.6	8.0	0.10	0.180	0.900		
SMD1210-075	α G	6	100	0.75	1.50	0.6	8.0	0.10	0.070	0.400		
SMD1210-075-13.2V	α G	13.2	100	0.75	1.50	0.6	8.0	0.10	0.070	0.400		
SMD1210-075-16V	α G	16	100	0.75	1.50	0.6	8.0	0.10	0.070	0.400		
SMD1210-075-24V	α G	24	100	0.75	1.50	0.6	8.0	0.10	0.070	0.400		
SMD1210-100	α H	6	100	1.00	2.00	0.6	8.0	0.30	0.050	0.230		
SMD1210-100-13.2V	α H	13.2	100	1.00	2.00	0.6	8.0	0.30	0.050	0.230		
SMD1210-100-16V	α H	16.0	100	1.00	2.00	0.6	8.0	0.30	0.050	0.230		
SMD1210-110	α H	6	100	1.10	2.20	0.6	8.0	0.30	0.050	0.210		
SMD1210-110-13.2V	α H	13.2	100	1.10	2.20	0.6	8.0	0.30	0.050	0.210		
SMD1210-110-16V	α H	16.0	100	1.10	2.20	0.6	8.0	0.30	0.050	0.210		
SMD1210-150	α L	6	100	1.50	3.00	0.6	8.0	0.50	0.030	0.110		
SMD1210-150-13.2V	α L	13.2	100	1.50	3.00	0.6	8.0	0.50	0.030	0.110		
SMD1210-175	α N	6	100	1.75	3.50	0.8	8.0	0.60	0.020	0.080		
SMD1210-175-13.2V	α N	13.2	100	1.75	3.50	0.8	8.0	0.60	0.020	0.080		
SMD1210-200	α S	6	100	2.00	4.00	0.8	8.0	1.00	0.015	0.070		
SMD1210-200-13.2V	α S	13.2	100	2.00	4.00	0.8	8.0	1.00	0.015	0.070		

I_{hold} = Hold Current. Maximum current device will not trip in 25°C still air.

I_{trip} = Trip Current. Minimum current at which the device will always trip in 25°C still air.

V_{max} = Maximum operating 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 dissipation when device is in the tripped state in 25°C still air environment at rated voltage.

R_{imin/max} = Minimum/Maximum device resistance prior to tripping at 25°C.

R_{1max} = Maximum device resistance is measured one hour post reflow.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+85°C, 1000 hrs.	±5% typical
Humidity aging	+85°C, 85% R.H. , 168 hours	±5% typical
Thermal shock	+85°C to -40°C, 20 times	±33% typical
Resistance to solvent	MIL-STD-202, Method 215	No change
Vibration	MIL-STD-202, Method 201	No change
Ambient operating conditions : - 40 °C to +85 °C		
Maximum surface temperature of the device in the tripped state is 125 °C		

AGENCY APPROVALS :



E201504(Alpha-Top)/E319079(Sea&Land)

Regulation/Standard:



2002/95/EC



EN14582



SMD1210 Series

Alpha-Top (Sea&Land Alliance)

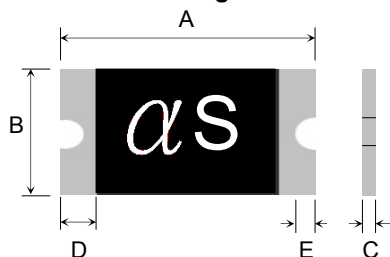
I_{hold} Versus Temperature

Model	Maximum ambient operating temperature (T _{mao}) vs. hold current (I _{hold})								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
SMD1210-005	0.08	0.07	0.06	0.05	0.04	0.04	0.03	0.03	0.02
SMD1210-010	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.03
SMD1210-020	0.29	0.26	0.22	0.20	0.16	0.14	0.13	0.11	0.08
SMD1210-025	0.34	0.31	0.28	0.25	0.21	0.19	0.17	0.15	0.12
SMD1210-035	0.47	0.45	0.40	0.35	0.33	0.28	0.24	0.21	0.18
SMD1210-050	0.76	0.67	0.58	0.50	0.43	0.40	0.36	0.32	0.28
SMD1210-075	1.00	0.97	0.86	0.75	0.64	0.59	0.54	0.48	0.40
SMD1210-100	1.54	1.35	1.18	1.00	0.76	0.67	0.53	0.45	0.31
SMD1210-110	1.69	1.48	1.29	1.10	0.88	0.76	0.65	0.57	0.43
SMD1210-150	2.13	1.92	1.71	1.50	1.26	1.14	1.01	0.89	0.71
SMD1210-175	2.54	2.30	2.02	1.75	1.47	1.33	1.18	1.05	0.86
SMD1210-200	2.90	2.63	2.31	2.00	1.68	1.52	1.35	1.20	0.98

Construction And Dimension (Unit:mm)

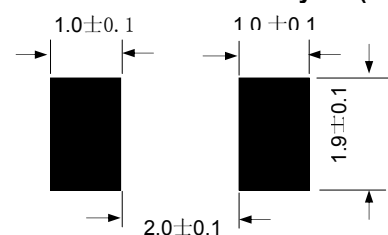
Model	A		B		C		D	E
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.
SMD1210-005	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-005-60V	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-010	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-010-60V	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-020	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-020-60V	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-025	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-025-60V	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-035	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-035-13.2V	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-035-16V	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-035-24V	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-050	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-050-16V	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-050-24V	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-075	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-075-13.2V	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-075-16V	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-075-24V	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-100	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-100-13.2V	3.00	3.43	2.35	2.80	0.50	1.20	0.30	0.10
SMD1210-100-16V	3.00	3.43	2.35	2.80	0.50	1.20	0.30	0.10
SMD1210-110	3.00	3.43	2.35	2.80	0.30	0.80	0.30	0.10
SMD1210-110-13.2V	3.00	3.43	2.35	2.80	0.50	1.20	0.30	0.10
SMD1210-110-16V	3.00	3.43	2.35	2.80	0.50	1.20	0.30	0.10
SMD1210-150	3.00	3.43	2.35	2.80	0.40	0.80	0.30	0.10
SMD1210-150-13.2V	3.00	3.43	2.35	2.80	0.40	0.80	0.30	0.10
SMD1210-175	3.00	3.43	2.35	2.80	0.50	1.20	0.30	0.10
SMD1210-175-13.2V	3.00	3.43	2.35	2.80	0.50	1.20	0.30	0.10
SMD1210-200	3.00	3.43	2.35	2.80	0.50	1.20	0.30	0.10
SMD1210-200-13.2V	3.00	3.43	2.35	2.80	0.50	1.20	0.30	0.10

Dimensions & Marking



α = Trademark
S = Part identification

Recommended Pad Layout (mm)





SMD1210 Series

Alpha-Top (Sea&Land Alliance)

Termination Pad Characteristics

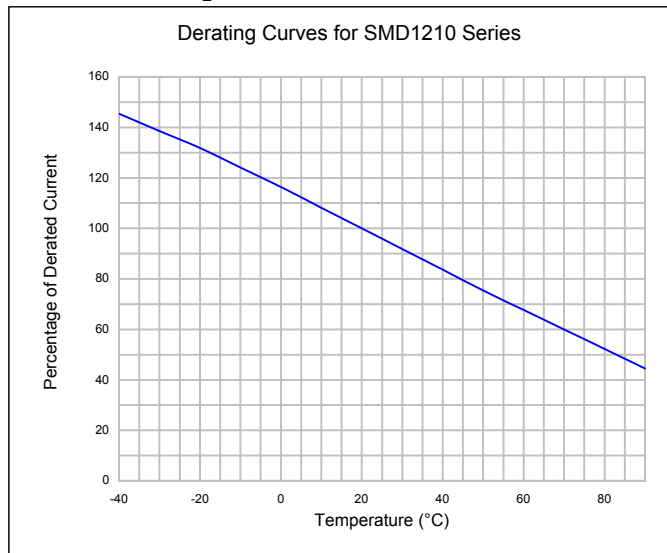
Terminal pad materials : Gold-Plated Nickel-Copper or Tin-plated Nickel-Copper

Terminal pad solderability : Meets EIA specification RS186-9E and ANSI/J-STD-002 Category 3.

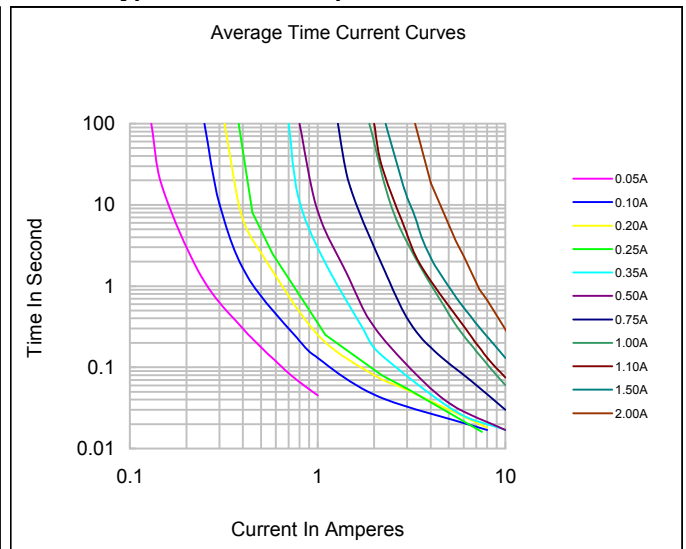
Rework

Use standard industry practices, the removal device must be replaced with a fresh one.

Thermal Derating Curve



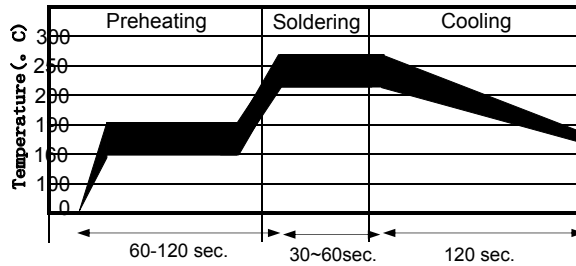
Typical Time-To-Trip At 25°C



WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage ($L di/dt$) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.
- Contamination of the PPTC material with certain silicon based oils or some aggressive solvents can adversely impact the performance of the devices. PPTC SMD can be cleaned by standard methods.
- Requests that customers comply with our recommended solder pad layouts and recommended reflow profile. Improper board layouts or reflow profile could negatively impact solderability performance of our devices.

Recommended Solder Reflow Conditions

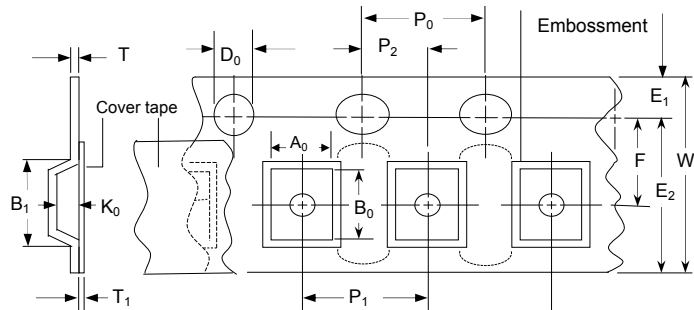


- Recommended reflow methods : IR, vapor phase oven, hot air oven.
 - Devices are not designed to be wave soldered to the bottom side of the board.
 - Recommended maximum paste thickness is 0.25 mm (0.010 inch).
 - Devices can be cleaned using standard method and solvents.
- Note : If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

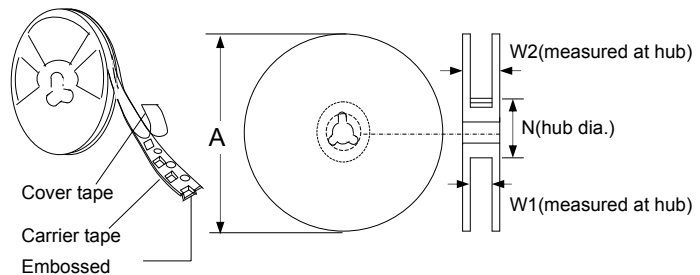
Tape And Reel Specifications (mm)

Governing Specifications	EIA 481-2
W	8.0 ± 0.20
P0	4.0 ± 0.10
P1	4.0 ± 0.10
P2	2.0 ± 0.10
A0	2.82 ± 0.10
B0	3.52 ± 0.10
B1max.	4.35
D0	1.5 + 0.1, -0.0
F	7.5 ± 0.05
E1	1.75 ± 0.10
E2min.	6.25
Tmax.	0.6
T1max.	0.1
K0	0.90 ± 0.1
Leader min.	390
Trailer min.	160
Reel Dimensions	
A max.	178
N min.	50
W1	8.4 + 1.5, -0.0
W2max.	22.4

EIA Tape Component Dimensions



EIA Reel



Storage And Handling

- Storage conditions : 40°C max, 70% R.H.
- Devices may not meet specified performance if storage conditions are exceeded.

Order Information

Packaging

SMD1210	050	Tape & Reel Quantity	
Product name	Hold	SMD1210 Series	4,500 pcs/reel
Size 3225 mm / 1210 inch	Current		
SMD : surface mount device	0.50A		

Tape & reel packaging per EIA481-1



mSMD Series

Features

- Surface Mount Devices
- Lead free device
- Size 4.5*3.2 mm/0.18*0.12 inch
- Surface Mount packaging for automated assembly

Applications

- Almost anywhere there is a low voltage power supply, up to 60V and a load to be protected, including:
- Computer mother board, Modem, USB hub
 - PDAs & Charger, Analog & digital line card
 - Digital cameras, Disk drivers, CD-ROMs,

Alpha-Top (Sea&Land Alliance)

Performance Specification

Model	V _{max} (Vdc)	I _{max} (A)	I _{hold} @25°C (A)	I _{trip} @25°C (A)	P _d Typ. (W)	Maximum Time To Trip		Resistance		Agency Approval	
						Current (A)	Time (Sec)	R _i _{min} (Ω)	R ₁ _{max} (Ω)	UL	TUV
mSMD010	30	100	0.10	0.30	0.8	0.5	1.50	0.750	15.000	✓	
mSMD010-60V	60	100	0.10	0.30	0.8	0.5	1.50	0.750	15.000		
mSMD014	60	100	0.14	0.34	0.8	1.5	0.15	0.650	6.000		
mSMD020	30	100	0.20	0.40	0.8	8.0	0.02	0.350	5.000		
mSMD020-60V	60	100	0.20	0.40	0.8	8.0	0.02	0.350	5.000		
mSMD030	30	100	0.30	0.60	0.8	8.0	0.10	0.250	3.000		
mSMD030-60V	60	100	0.30	0.60	0.8	8.0	0.10	0.250	3.000		
mSMD050	15	100	0.50	1.00	0.8	8.0	0.15	0.150	1.000	✓	
mSMD050-33V	33	100	0.50	1.00	0.8	8.0	0.15	0.150	1.000	✓	
mSMD050-60V	60	100	0.50	1.00	0.8	8.0	0.15	0.150	1.000		
mSMD075	13.2	100	0.75	1.50	0.8	8.0	0.20	0.090	0.450	✓	
mSMD075-16V	16	100	0.75	1.50	0.8	8.0	0.20	0.090	0.450		
mSMD075-24V	24	100	0.75	1.50	0.8	8.0	0.20	0.090	0.450		
mSMD075-33V	33	100	0.75	1.50	0.8	8.0	0.20	0.090	0.450		
mSMD100	8	100	1.00	1.80	0.8	8.0	0.30	0.055	0.270		
mSMD100-16V	16	100	1.00	1.80	0.8	8.0	0.30	0.055	0.270		
mSMD100-24V	24	100	1.00	1.80	0.8	8.0	0.30	0.055	0.270		
mSMD100-33V	33	100	1.00	1.80	0.8	8.0	0.30	0.055	0.270		
mSMD110	8	100	1.10	2.20	0.8	8.0	0.30	0.050	0.250	✓	
mSMD110-16V	16	100	1.10	2.20	0.8	8.0	0.30	0.050	0.250		
mSMD110-24V	24	100	1.10	2.20	0.8	8.0	0.30	0.050	0.250		
mSMD110-33V	33	100	1.10	2.20	0.8	8.0	0.30	0.050	0.250		
mSMD125	16	100	1.25	2.50	0.8	8.0	0.40	0.050	0.140		
mSMD150	8	100	1.50	3.00	0.8	8.0	0.50	0.040	0.160	✓	
mSMD150-16V	16	100	1.50	3.00	0.8	8.0	0.50	0.040	0.160		
mSMD150-24V	24	100	1.50	3.00	0.8	8.0	0.50	0.040	0.160		
mSMD160	8	100	1.60	2.80	0.8	8.0	1.00	0.030	0.130	✓	
mSMD160-13.2V	13.2	100	1.60	2.80	0.8	8.0	1.00	0.030	0.130		
mSMD160-16V	16	100	1.60	2.80	0.8	8.0	1.00	0.030	0.130		
mSMD200	8	100	2.00	4.00	0.8	8.0	2.00	0.020	0.100	✓	
mSMD200-13.2V	13.2	100	2.00	4.00	0.8	8.0	2.00	0.020	0.100		
mSMD200-16V	16.0	100	2.00	4.00	0.8	8.0	2.00	0.020	0.100		
mSMD260	8	100	2.60	5.00	0.8	8.0	2.50	0.015	0.050	✓	
mSMD260-13.2V	13.2	100	2.60	5.00	0.8	8.0	2.50	0.015	0.050		
mSMD300	8	100	3.00	5.00	0.8	8.0	4.00	0.012	0.040		
mSMD300-13.2V	13	100	3.00	5.00	0.8	8.0	4.00	0.012	0.040		
mSMD350	6	100	3.50	6.00	2.0	10.0	4.00	0.008	0.030		
mSMD375	6	100	3.75	7.00	2.0	12.0	4.00	0.007	0.028		

I_{hold} = Hold Current. Maximum current device will not trip in 25°C still air.

I_{trip} = Trip Current. Minimum current at which the device will always trip in 25°C still air.

V_{max} = Maximum operating 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 dissipation when device is in the tripped state in 25°C still air environment at rated voltage.

R_{imin}/max = Minimum/Maximum device resistance prior to tripping at 25°C.

R₁_{max} = Maximum device resistance is measured one hour post reflow.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.



mSMD Series

Alpha-Top (Sea&Land Alliance)

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+85°C, 1000 hrs.	±5% typical
Humidity aging	+85°C, 85% R.H. , 168 hours	±5% typical
Thermal shock	+85°C to -40°C, 20 times	±33% typical
Resistance to solvent	MIL-STD-202, Method 215	No change
Vibration	MIL-STD-202, Method 201	No change
Ambient operating conditions : - 40 °C to +85 °C		
Maximum surface temperature of the device in the tripped state is 125 °C		

Agency Approvals :



E201504(Alpha-Top)/E319079(Sea&Land)

Regulation/Standard:



2002/95/EC
EN14582

I_{hold} Versus Temperature

Model	Maximum ambient operating temperature (T _{mao}) vs. hold current (I _{hold})								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
mSMD010	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.03
mSMD014	0.23	0.19	0.17	0.14	0.12	0.10	0.09	0.08	0.06
mSMD020	0.29	0.26	0.23	0.20	0.17	0.15	0.14	0.12	0.10
mSMD030	0.44	0.39	0.35	0.30	0.26	0.23	0.21	0.18	0.15
mSMD050	0.59	0.57	0.55	0.50	0.45	0.43	0.35	0.30	0.23
mSMD075	1.10	0.99	0.87	0.75	0.63	0.57	0.49	0.45	0.35
mSMD100	1.45	1.32	1.16	1.00	0.84	0.75	0.68	0.60	0.48
mSMD110	1.60	1.45	1.28	1.10	0.92	0.83	0.71	0.66	0.52
mSMD125	2.00	1.75	1.52	1.25	1.00	0.95	0.90	0.75	0.53
mSMD150	2.30	2.05	1.77	1.50	1.23	1.09	0.95	0.82	0.61
mSMD160	2.10	1.96	1.88	1.60	1.26	1.12	0.98	0.84	0.63
mSMD200	2.88	2.61	2.25	2.00	1.80	1.66	1.45	1.09	0.80
mSMD260	3.90	3.42	2.96	2.60	2.33	2.07	1.94	1.35	1.00
mSMD300	4.15	3.76	3.46	3.00	2.55	2.28	2.01	1.61	1.33
mSMD350	4.84	4.39	4.04	3.50	2.98	2.66	2.35	1.88	1.55
mSMD375	5.45	4.94	4.36	3.75	3.14	2.83	2.54	2.25	1.82



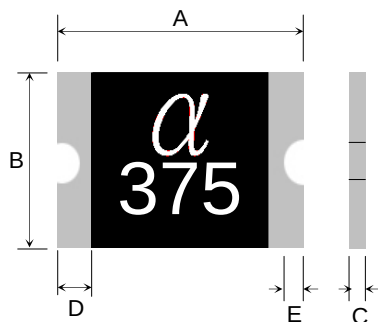
mSMD Series

Alpha-Top (Sea&Land Alliance)

Construction And Dimension (Unit:mm)

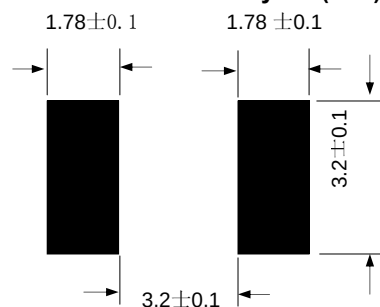
Model	A		B		C		D		E	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
mSMD010	4.37	4.73	3.07	3.41	0.50	1.00	0.30	0.30	0.25	0.25
mSMD010-60V	4.37	4.73	3.07	3.41	0.50	1.00	0.30	0.30	0.25	0.25
mSMD014	4.37	4.73	3.07	3.41	0.50	1.00	0.30	0.30	0.25	0.25
mSMD020	4.37	4.73	3.07	3.41	0.50	1.30	0.30	0.30	0.25	0.25
mSMD020-60V	4.37	4.73	3.07	3.41	0.50	1.30	0.30	0.30	0.25	0.25
mSMD030	4.37	4.73	3.07	3.41	0.50	1.00	0.30	0.30	0.25	0.25
mSMD030-60V	4.37	4.73	3.07	3.41	0.50	1.00	0.30	0.30	0.25	0.25
mSMD050	4.37	4.73	3.07	3.41	0.40	0.90	0.30	0.30	0.25	0.25
mSMD050-33V	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD050-60V	4.37	4.73	3.07	3.41	1.10	1.80	0.30	0.30	0.25	0.25
mSMD075	4.37	4.73	3.07	3.41	0.40	0.90	0.30	0.30	0.25	0.25
mSMD075-16V	4.37	4.73	3.07	3.41	0.40	0.90	0.30	0.30	0.25	0.25
mSMD075-24V	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD075-33V	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD100	4.37	4.73	3.07	3.41	0.40	0.90	0.30	0.30	0.25	0.25
mSMD100-16V	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD100-24V	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD100-33V	4.37	4.73	3.07	3.41	1.10	1.80	0.30	0.30	0.25	0.25
mSMD110	4.37	4.73	3.07	3.41	0.40	0.90	0.30	0.30	0.25	0.25
mSMD110-16V	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD110-24V	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD110-33V	4.37	4.73	3.07	3.41	1.10	1.80	0.30	0.30	0.25	0.25
mSMD125	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD150	4.37	4.73	3.07	3.41	0.40	0.90	0.30	0.30	0.25	0.25
mSMD150-16V	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD150-24V	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD160	4.37	4.73	3.07	3.41	0.40	0.90	0.30	0.30	0.25	0.25
mSMD160-13.2V	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD160-16V	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD200	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD200-13.2V	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD200-16V	4.37	4.73	3.07	3.41	1.10	1.80	0.30	0.30	0.25	0.25
mSMD260	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD260-13.2V	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.30	0.25	0.25
mSMD300	4.37	4.73	3.07	3.41	0.50	1.30	0.30	0.30	0.25	0.25
mSMD300-13.2V	4.37	4.73	3.07	3.41	1.10	1.80	0.30	0.30	0.25	0.25
mSMD350	4.37	4.73	3.07	3.41	0.50	1.30	0.30	0.30	0.25	0.25
mSMD375	4.37	4.73	3.07	3.41	0.50	1.30	0.30	0.30	0.25	0.25

Dimensions & Marking



α = Trademark
375 = Hold current

Recommended Pad Layout (mm)





mSMD Series

Alpha-Top (Sea&Land Alliance)

Termination Pad Characteristics

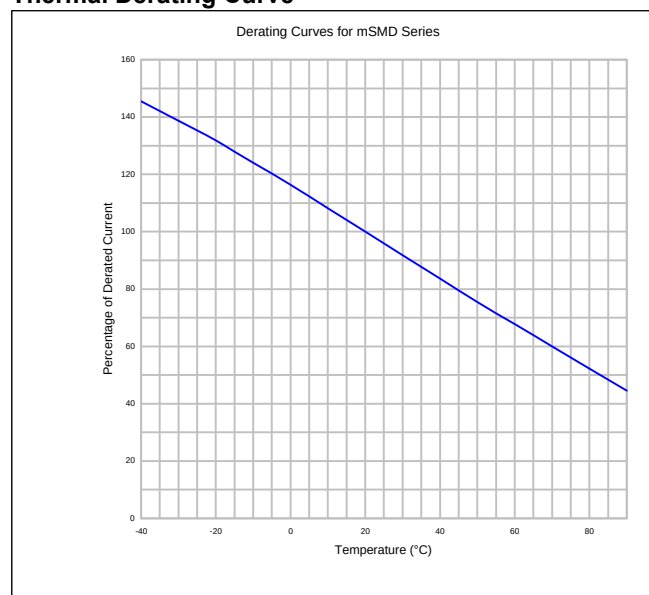
Terminal pad materials : Gold-Plated Nickel-Copper or Tin-plated Nickel-Copper

Terminal pad solderability : Meets EIA specification RS186-9E and ANSI/J-STD-002 Category 3.

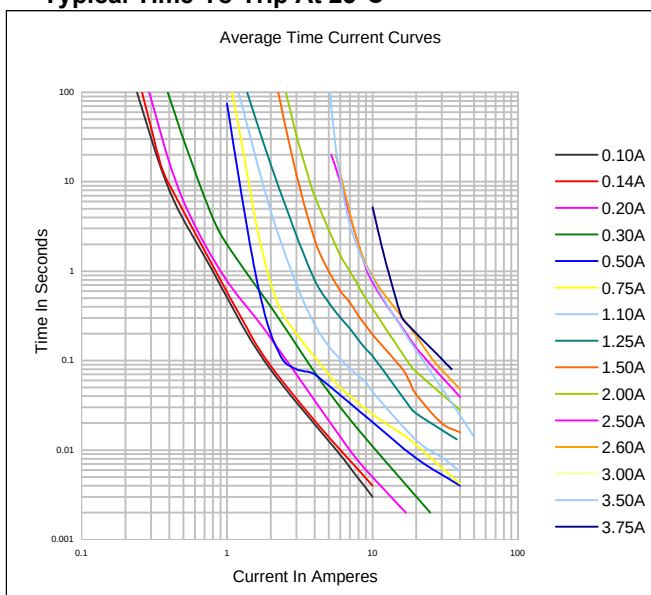
Rework

Use standard industry practices, the removal device must be replaced with a fresh one.

Thermal Derating Curve



Typical Time-To-Trip At 25°C



⚠ WARNING:

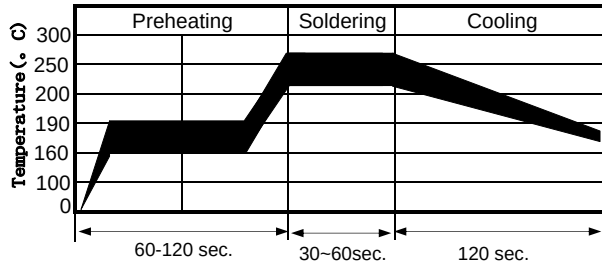
- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage ($L di/dt$) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.
- Contamination of the PPTC material with certain silicon based oils or some aggressive solvents can adversely impact the performance of the devices. PPTC SMD can be cleaned by standard methods.
- Requests that customers comply with our recommended solder pad layouts and recommended reflow profile. Improper board layouts or reflow profile could negatively impact solderability performance of our devices.



mSMD Series

Alpha-Top (Sea&Land Alliance)

Recommended Solder Reflow Conditions

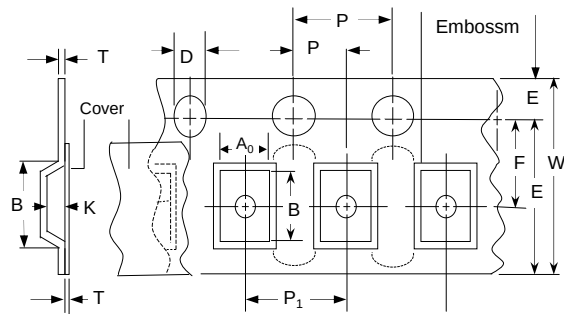


- Recommended reflow methods : IR, vapor phase oven, hot air oven.
 - Devices are not designed to be wave soldered to the bottom side of the board.
 - Recommended maximum paste thickness is 0.25 mm (0.010 inch).
 - Devices can be cleaned using standard method and solvents.
- Note : If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

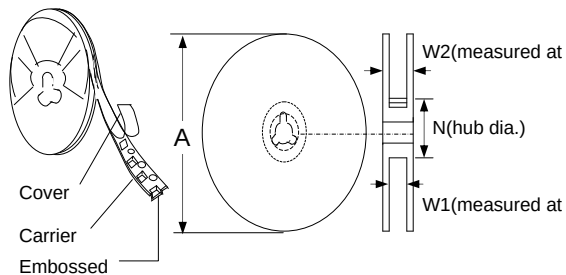
Tape And Reel Specifications (mm)

Governing Specifications	EIA 481-1
W	12 ± 0.3
P0	4.0 ± 0.10
P1	8.0 ± 0.10
P2	2.0 ± 0.05
A0	3.5 ± 0.23
B0	5.1 ± 0.15
B1max.	5.9
D0	$1.5 + 0.1, -0$
F	5.5 ± 0.05
E1	1.75 ± 0.10
E2min.	10.25
Tmax.	0.6
T1max.	0.1
K0	0.9 ± 0.15
Leader min.	390
Trailer min.	160
Reel Dimensions	
A max.	178
N min.	60
W1	$12.4 + 2.0, -0.0$
W2max.	18.4

EIA Tape Component



EIA Reel



Storage And Handling

- Storage conditions : 40°C max, 70% R.H.
- Devices may not meet specified performance if storage conditions are exceeded.

Order Information

mSMD	110	Packaging
Product name	Hold	Tape & Reel Quantity
Size 4532 mm / 1812 inch	Current	mSMD Series 1,500 pcs/reel
SMD : surface mount device	1.00A	

Tape & reel packaging per EIA481-1



SMD2018 Series

Features

- Surface Mount Devices
- Lead free device
- Size 5.0*4.5mm/0.20*0.18 inch
- Surface Mount packaging for automated assembly

Applications

Almost anywhere there is a low voltage power supply, up to 60V and a load to be protected, including:

- Computer mother board, Modem.
- Telecommunication equipments.

Alpha-Top (Sea & Land Alliance)

Performance Specification

Model	V _{max} (Vdc)	I _{max} (A)	I _{hold} @25°C (A)	I _{trip} @25°C (A)	P _d Typ. (W)	Maximum Time To Trip		Resistance		Agency Approval	
						Current (A)	Time (Sec)	R _{i_min} (Ω)	R _{1_max} (Ω)	UL	TUV
SMD2018-030	60	100	0.30	0.60	0.9	1.5	3.00	0.500	2.300		
SMD2018-050	60	100	0.55	1.20	1.0	2.5	3.00	0.200	1.000		
SMD2018-100	15	100	1.10	2.20	1.1	8.0	0.40	0.060	0.360		
SMD2018-100-24V	24	100	1.10	2.20	1.1	8.0	0.40	0.060	0.360		
SMD2018-100-33V	33	100	1.10	2.20	1.1	8.0	0.40	0.060	0.360		
SMD2018-150	15	100	1.50	3.00	1.1	8.0	0.80	0.050	0.170		
SMD2018-200	10	100	2.00	4.00	1.1	8.0	2.40	0.030	0.100		

I_{hold} = Hold Current. Maximum current device will not trip in 25°C still air.

I_{trip} = Trip Current. Minimum current at which the device will always trip in 25°C still air.

V_{max} = Maximum operating 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 dissipation when device is in the tripped state in 25°C still air environment at rated voltage.

R_{imin/max} = Minimum/Maximum device resistance prior to tripping at 25°C.

R_{1_max} = Maximum device resistance is measured one hour post reflow.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+85°C, 1000 hrs.	±5% typical
Humidity aging	+85°C, 85% R.H. , 168 hours	±5% typical
Thermal shock	+85°C to -40°C, 20 times	±33% typical
Resistance to solvent	MIL-STD-202, Method 215	No change
Vibration	MIL-STD-202, Method 201	No change
Ambient operating conditions : - 40 °C to +85 °C		
Maximum surface temperature of the device in the tripped state is 125 °C		

AGENCY APPROVALS :

UL pending

Regulation/Standard:



2002/95/EC

EN14582

I_{hold} Versus Temperature

Model	Maximum ambient operating temperature (T _{mao}) vs. hold current (I _{hold})								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
SMD2018-030	0.48	0.42	0.35	0.30	0.24	0.21	0.17	0.15	0.10
SMD2018-050	0.87	0.77	0.67	0.55	0.46	0.41	0.36	0.31	0.23
SMD2018-100	1.71	1.52	1.32	1.10	0.94	0.84	0.74	0.64	0.50
SMD2018-150	2.38	2.10	1.82	1.50	1.27	1.13	0.99	0.85	0.64
SMD2018-200	2.95	2.65	2.35	2.00	1.74	1.59	1.44	1.29	1.06



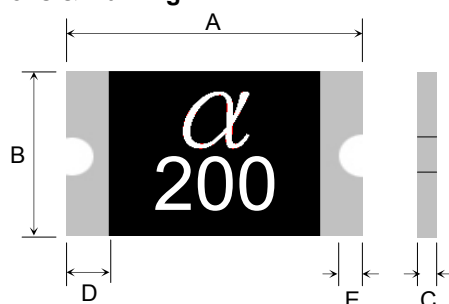
SMD2018 Series

Alpha-Top (Sea & Land Alliance)

Construction And Dimension (Unit:mm)

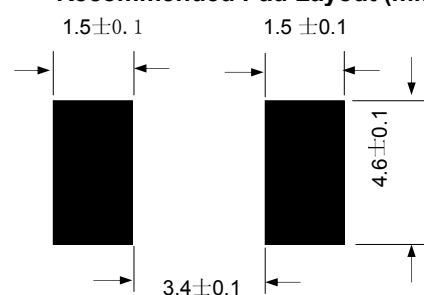
Model	A		B		C		D		E	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
SMD2018-030	4.72	5.44	4.22	4.93	0.60	1.10	0.30	0.30	0.30	0.30
SMD2018-050	4.72	5.44	4.22	4.93	0.70	1.30	0.30	0.30	0.30	0.30
SMD2018-100	4.72	5.44	4.22	4.93	0.45	0.80	0.30	0.30	0.30	0.30
SMD2018-100-24V	4.72	5.44	4.22	4.93	0.60	1.30	0.30	0.30	0.30	0.30
SMD2018-100-33V	4.72	5.44	4.22	4.93	0.60	1.30	0.30	0.30	0.30	0.30
SMD2018-150	4.72	5.44	4.22	4.93	0.45	0.80	0.30	0.30	0.30	0.30
SMD2018-200	4.72	5.44	4.22	4.93	0.40	0.80	0.30	0.30	0.30	0.30

Dimensions & Marking



α = Trademark
200 = Hold current

Recommended Pad Layout (mm)



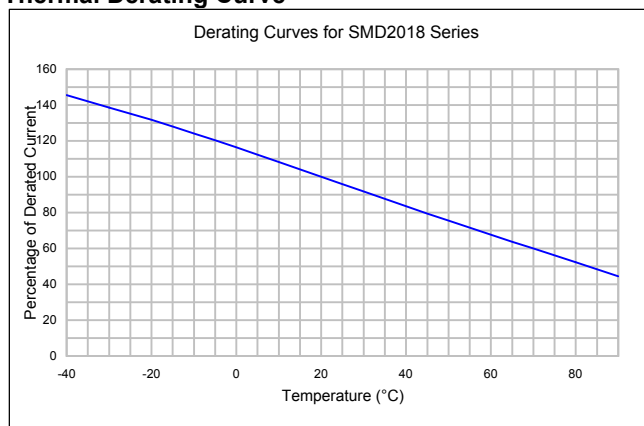
Termination Pad Characteristics

Terminal pad materials : Gold-Plated Nickel-Copper or Tin-plated Nickel-Copper
Terminal pad solderability : Meets EIA specification RS186-9E and ANSI/J-STD-002 Category 3.

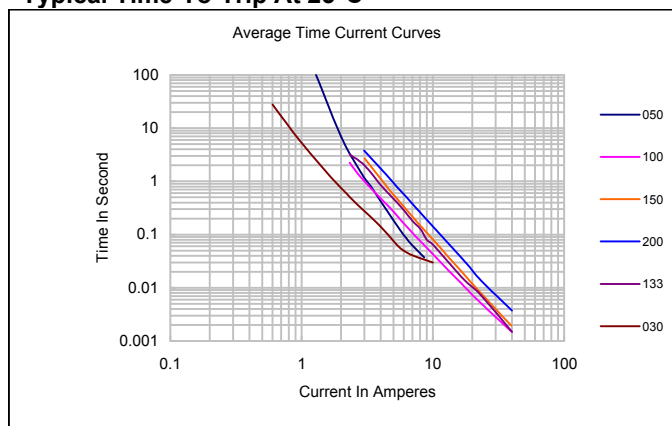
Rework

Use standard industry practices, the removal device must be replaced with a fresh one.

Thermal Derating Curve



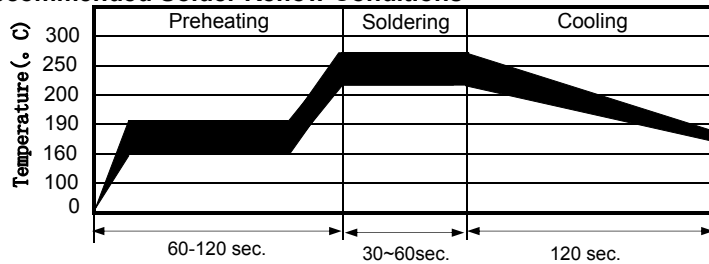
Typical Time-To-Trip At 25°C



WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage (L di/dt) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.
- Contamination of the PPTC material with certain silicon based oils or some aggressive solvents can adversely impact the performance of the devices. PPTC SMD can be cleaned by standard methods.
- Requests that customers comply with our recommended solder pad layouts and recommended reflow profile. Improper board layouts or reflow profile could negatively impact solderability performance of our devices.

Recommended Solder Reflow Conditions

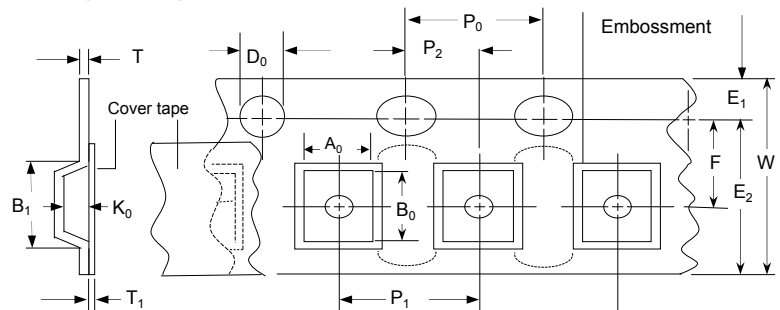


- Recommended reflow methods : IR, vapor phase oven, hot air oven.
 - Devices are not designed to be wave soldered to the bottom side of the board.
 - Recommended maximum paste thickness is 0.25 mm (0.010 inch).
 - Devices can be cleaned using standard method and solvents.
- Note : If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

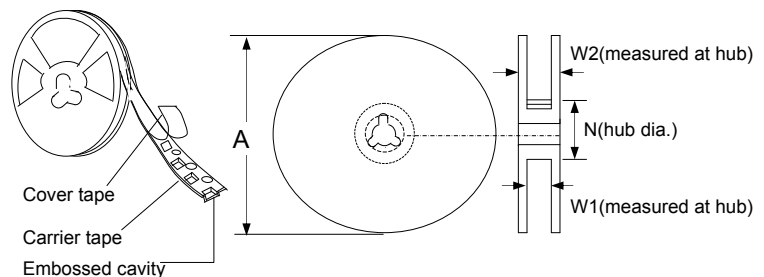
Tape And Reel Specifications (mm)

Governing Specifications	EIA 481-2
W	12.0 ± 0.20
P ₀	4.0 ± 0.10
P ₁	8.0 ± 0.10
P ₂	2.0 ± 0.05
A ₀	4.40 ± 0.10
B ₀	5.50 ± 0.10
B ₁ max.	8.2
D ₀	1.5 + 0.1, -0.0
F	5.5 ± 0.05
E ₁	1.75 ± 0.10
E ₂ min.	10.25
Tmax.	0.6
T ₁ max.	0.1
K ₀	1.36 ± 0.1
Leader min.	390
Trailer min.	160
Reel Dimensions	
A max.	178
N min.	50
W ₁	12.4 + 2.0, -0.0
W ₂ max.	18.4

EIA Tape Component Dimensions



EIA Reel Dimensions



Storage And Handling

- Storage conditions : 40°C max, 70% R.H.
- Devices may not meet specified performance if storage conditions are exceeded.

Order Information

Packaging

SMD2018	050	Tape & Reel Quantity
Product name	Hold	030, 050, 100-24V, 100-33V : 1,500 pcs/reel
Size 5045mm/2018 inch	Current	100, 150, 200 : 2,500 pcs/reel
SMD : surface mount device	0.50A	

Tape & reel packaging per EIA481-1



SMD Series

Features

- Surface Mount Devices
- Lead free device
- Size 7.5*5.5 mm 0.29*0.20 inch
- Surface Mount packaging for automated assembly

Applications

- Almost anywhere there is a low voltage power supply, up to 60V and a load to be protected, including:
- Computer mother board, Modem.
 - Telecommunication equipments.

Alpha-Top (Sea & Land Alliance)

Performance Specification

Model	V _{max} (Vdc)	I _{max} (A)	I _{hold} @25°C (A)	I _{trip} @25°C (A)	P _d Typ. (W)	Maximum Time To Trip		Resistance		Agency Approval	
						Current (A)	Time (Sec)	R _{i min} (Ω)	R _{1 max} (Ω)	UL	TUV
SMD030L	60	100	0.30	0.60	1.5	1.5	3.0	0.600	4.800		
SMD050L	60	100	0.50	1.00	1.5	2.5	4.0	0.180	1.400		
SMD075L	33	100	0.75	1.50	1.5	8.0	0.3	0.100	1.000	✓	
SMD075L-60V	60	100	0.75	1.50	1.5	8.0	0.3	0.100	1.000		
SMD100L	33	100	1.10	2.20	1.5	8.0	0.5	0.065	0.410		
SMD125L	33	100	1.25	2.50	1.5	8.0	2.0	0.050	0.250		
SMD150L	33	100	1.50	3.00	1.5	8.0	2.0	0.035	0.230		
SMD185L	33	100	1.85	3.70	1.5	8.0	2.5	0.030	0.150		
SMD200L	16	100	2.00	4.00	1.5	8.0	4.5	0.020	0.120		
SMD200L-24V	24	100	2.00	4.00	1.5	8.0	4.5	0.020	0.120		
SMD250L	16	100	2.50	5.00	1.5	8.0	16.0	0.020	0.085		
SMD260L	6	100	2.60	5.20	1.5	8.0	10.0	0.014	0.075		
SMD300L-6V	6	40	3.00	6.00	1.5	8.0	20.0	0.012	0.048	✓	
SMD300L	16	100	3.00	6.00	1.5	8.0	20.0	0.012	0.048		

I_{hold} = Hold Current. Maximum current device will not trip in 25°C still air.

I_{trip} = Trip Current. Minimum current at which the device will always trip in 25°C still air.

V_{max} = Maximum operating 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 dissipation when device is in the tripped state in 25°C still air environment at rated voltage.

R_{i min}/max = Minimum/Maximum device resistance prior to tripping at 25°C.

R_{1 max} = Maximum device resistance is measured one hour post reflow.

CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+85°C, 1000 hrs.	±5% typical
Humidity aging	+85°C, 85% R.H. , 168 hours	±5% typical
Thermal shock	+85°C to -40°C, 20 times	±33% typical
Resistance to solvent	MIL-STD-202,Method 215	No change
Vibration	MIL-STD-202,Method 201	No change
Ambient operating conditions : - 40 °C to +85 °C		
Maximum surface temperature of the device in the tripped state is 125 °C		

Agency Approvals :



E201504(Alpha-Top)/E319079(Sea&Land)

Regulation/Standard:



2002/95/EC



EN14582

I_{hold} Versus Temperature

Model	Maximum ambient operating temperature (T _{mao}) vs. hold current (I _{hold})								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
SMD030L	0.45	0.40	0.35	0.30	0.25	0.23	0.20	0.17	0.14
SMD050L	0.76	0.67	0.59	0.50	0.42	0.38	0.33	0.29	0.23
SMD075L	1.13	1.01	0.88	0.75	0.62	0.56	0.50	0.44	0.34
SMD100L	1.66	1.47	1.29	1.10	0.91	0.83	0.73	0.64	0.50
SMD125L	1.89	1.68	1.46	1.25	1.04	0.94	0.83	0.73	0.56
SMD150L	2.27	2.01	1.76	1.50	1.25	1.13	1.00	0.87	0.74
SMD185L	2.80	2.47	2.17	1.85	1.54	1.39	1.22	1.07	0.85
SMD200L	3.02	2.68	2.34	2.00	1.66	1.50	1.32	1.16	0.90
SMD250L	3.78	3.35	2.93	2.50	2.08	1.88	1.65	1.45	1.13
SMD260L	3.64	3.25	2.91	2.60	2.26	2.08	1.95	1.74	1.13
SMD300L	4.53	4.02	3.51	3.00	2.52	2.26	1.99	1.75	1.34



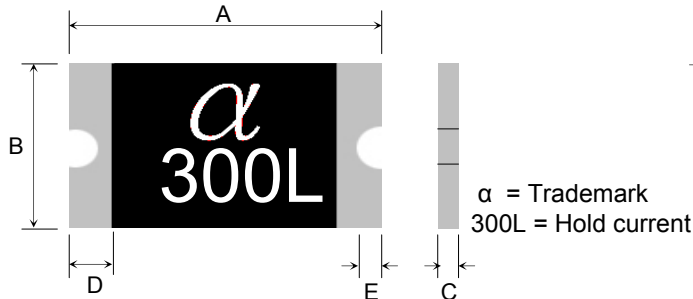
SMD Series

Alpha-Top (Sea & Land Alliance)

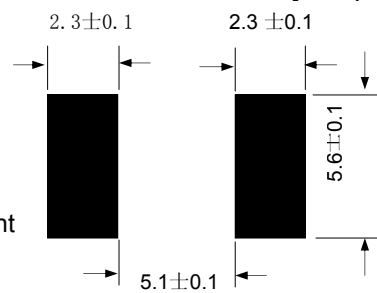
Construction And Dimension (Unit:mm)

Model	A		B		C		D		E
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
SMD030L	6.73	7.98	4.80	5.44	0.60	1.30	0.30	0.30	0.30
SMD050L	6.73	7.98	4.80	5.44	0.60	1.30	0.30	0.30	0.30
SMD075L	6.73	7.98	4.80	5.44	0.60	1.30	0.30	0.30	0.30
SMD075L-60V	6.73	7.98	4.80	5.44	0.60	1.30	0.30	0.30	0.30
SMD100L	6.73	7.98	4.80	5.44	0.40	1.00	0.30	0.30	0.30
SMD125L	6.73	7.98	4.80	5.44	0.40	0.90	0.30	0.30	0.30
SMD150L	6.73	7.98	4.80	5.44	1.10	1.80	0.30	0.30	0.30
SMD185L	6.73	7.98	4.80	5.44	0.30	0.90	0.30	0.30	0.30
SMD200L	6.73	7.98	4.80	5.44	0.30	0.90	0.30	0.30	0.30
SMD200L-24V	6.73	7.98	4.80	5.44	0.30	0.90	0.30	0.30	0.30
SMD250L	6.73	7.98	4.80	5.44	0.30	0.90	0.30	0.30	0.30
SMD260L	6.73	7.98	4.80	5.44	0.30	0.90	0.30	0.30	0.30
SMD300L	6.73	7.98	4.80	5.44	0.30	0.90	0.30	0.30	0.30

Dimensions & Marking



Recommended Pad Layout (mm)



Termination Pad Characteristics

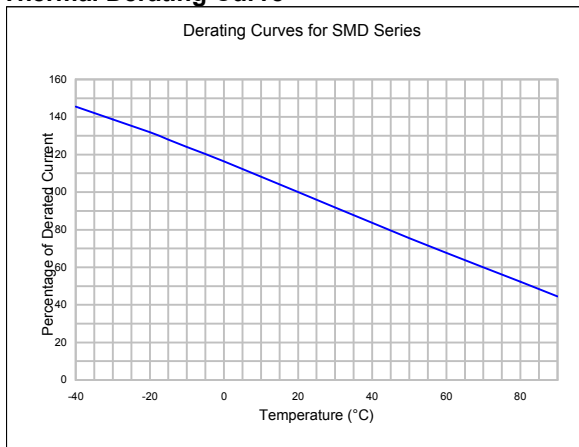
Terminal pad materials : Gold-Plated Nickel-Copper or Tin-plated Nickel-Copper

Terminal pad solderability : Meets EIA specification RS186-9E and ANSI/J-STD-002 Category 3.

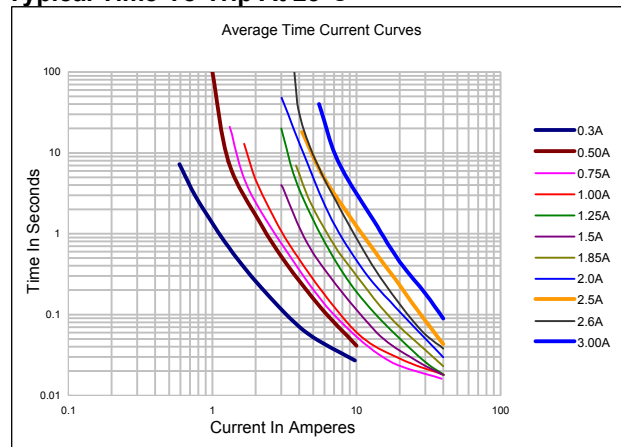
Rework

Use standard industry practices, the removal device must be replaced with a fresh one.

Thermal Derating Curve



Typical Time-To-Trip At 25°C



WARNING:

- Use PPTC beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- PPTC are intended for protection against occasional over current or over temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Use PPTC with a large inductance in circuit will generate a circuit voltage ($L di/dt$) above the rated voltage of the PPTC.
- Avoid impact PPTC device its thermal expansion like placed under pressure or installed in limited space.
- Contamination of the PPTC material with certain silicon based oils or some aggressive solvents can adversely impact the performance of the devices. PPTC SMD can be cleaned by standard methods.
- Requests that customers comply with our recommended solder pad layouts and recommended reflow profile. Improper board layouts or reflow profile could negatively impact solderability performance of our devices.



SMD Series

Alpha-Top (Sea & Land Alliance)

Recommended Solder Reflow Conditions

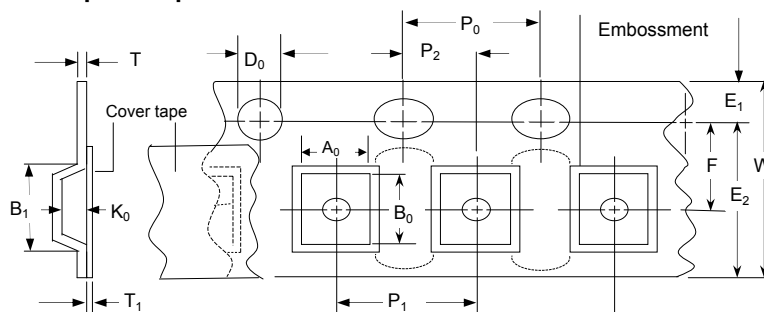


- Recommended reflow methods : IR, vapor phase oven, hot air oven.
 - Devices are not designed to be wave soldered to the bottom side of the board.
 - Recommended maximum paste thickness is 0.25 mm (0.010 inch).
 - Devices can be cleaned using standard method and solvents.
- Note : If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

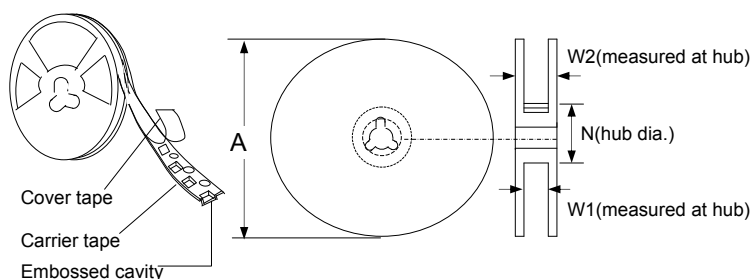
Tape And Reel Specifications (mm)

Governing Specifications	EIA 481-2
W	16.0 ± 0.3
P ₀	4.0 ± 0.10
P ₁	8.0 ± 0.10
P ₂	2.0 ± 0.05
A ₀	5.70 ± 0.10
B ₀	8.00 ± 0.10
B ₁ max.	12.1
D ₀	1.5 + 0.1, -0
F	7.5 ± 0.05
E ₁	1.75 ± 0.10
E ₂ min.	14.25
Tmax.	0.6
T ₁ max.	0.1
K ₀	0.80 ± 0.1
Leader min.	390
Trailer min.	160
Reel Dimensions	
A max.	178
N min.	60
W ₁	16.4 + 2.0, -0.0
W ₂ max.	22.4

EIA Tape Component Dimensions



EIA Reel Dimensions



Storage And Handling

- Storage conditions : 40°C max, 70% R.H.
- Devices may not meet specified performance if storage conditions are exceeded.

Order Information

SMD	050L	Packaging
Product name	Hold	Tape & Reel Quantity
Size 7555 mm /2920 inch	Current	2,000 pcs/reel
SMD : surface mount device	0.50A	

Tape & reel packaging per EIA481-1