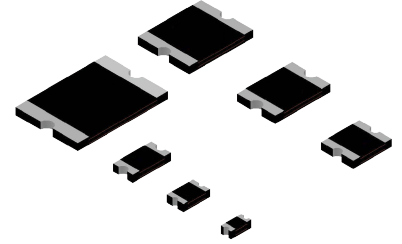


DW-1812 Series Surface Mount PPTC Devices

Features & Applications

- Compact design saves board space
- RoHS compliant and lead-free
- Halogen-free
- Fast response to fault current
- Symmetrical design
- USB port protection - USB 2.0, 3.0&OTG
- HDMI 1.4 Source protection
- PDAs / digital cameras
- Game console port protection
- PC motherboards-plug and play protection



Electrical Characteristics

Part Number	I-hold (A)	I-trip (A)	Vmax (Vdc)	Imax (A)	Pd typ (W)	Max. Time to trip		R0 min (Ω)	R1max (Ω)
						Current (A)	Time (Sec.)		
DW-1812-010-30	0.10	0.30	30.00	100.00	0.80	0.50	1.50	1.40	15.00
DW-1812-010-60	0.10	0.30	60.00	10.00	0.80	0.50	1.50	1.40	15.00
DW-1812-014-60	0.14	0.34	60.00	10.00	0.80	1.50	0.15	1.20	6.50
DW-1812-020-30	0.20	0.40	30.00	100.00	0.80	8.00	0.02	0.80	5.00
DW-1812-020-60	0.20	0.40	60.00	10.00	0.80	8.00	0.02	1.20	6.00
DW-1812-030-30	0.30	0.60	30.00	40.00	0.80	8.00	0.05	0.40	3.00
DW-1812-030-48	0.30	0.60	48.00	40.00	0.80	8.00	0.05	0.40	3.00
DW-1812-030-60	0.30	0.60	60.00	40.00	0.80	8.00	0.05	0.40	3.00
DW-1812-035-30	0.35	0.70	30.00	40.00	0.80	8.00	0.15	0.35	1.80
DW-1812-035-60	0.35	0.70	60.00	10.00	1.00	8.00	0.15	0.35	2.00
DW-1812-050-16	0.50	1.00	16.00	100.00	0.80	8.00	0.15	0.15	1.00
DW-1812-050-30	0.50	1.00	30.00	100.00	0.80	8.00	0.15	0.15	1.00
DW-1812-050-60D	0.50	1.00	60.00	10.00	1.50	8.00	0.15	0.15	1.40
DW-1812-075-16	0.75	1.50	16.00	100.00	0.80	8.00	0.20	0.11	0.45
DW-1812-075-24	0.75	1.50	24.00	100.00	0.80	8.00	0.20	0.11	0.45
DW-1812-075-33	0.75	1.50	33.00	40.00	0.80	8.00	0.20	0.11	0.45
DW-1812-075-33S	0.75	1.50	33.00	40.00	0.80	8.00	0.20	0.11	0.45
DW-1812-110-08	1.10	2.20	8.00	100.00	0.80	8.00	0.30	0.050	0.225
DW-1812-110-12	1.10	2.20	12.00	100.00	0.80	8.00	0.30	0.050	0.225
DW-1812-110-16	1.10	2.20	16.00	100.00	0.80	8.00	0.30	0.050	0.225
DW-1812-110-24	1.10	2.20	24.00	40.00	0.80	8.00	0.50	0.045	0.225
DW-1812-110-33	1.10	2.20	33.00	40.00	0.80	8.00	0.50	0.045	0.225
DW-1812-125-08	1.25	2.50	8.00	100.00	0.80	8.00	0.40	0.035	0.140
DW-1812-125-12	1.25	2.50	12.00	100.00	0.80	8.00	0.40	0.035	0.140
DW-1812-125-16	1.25	2.50	16.00	100.00	0.80	8.00	0.40	0.035	0.140



DW-1812-125-16S	1.25	2.50	16.00	100.00	0.80	8.00	0.40	0.035	0.140
DW-1812-125-24	1.25	2.50	24.00	100.00	0.80	8.00	0.40	0.035	0.180
DW-1812-125-33	1.25	2.50	33.00	100.00	0.80	8.00	0.40	0.035	0.180
DW-1812-150-08	1.50	3.00	8.00	100.00	0.80	8.00	0.30	0.030	0.120
DW-1812-150-12	1.50	3.00	12.00	100.00	0.80	8.00	0.50	0.030	0.120
DW-1812-150-16	1.50	3.00	16.00	100.00	0.80	8.00	0.50	0.030	0.120
DW-1812-150-16S	1.50	3.00	16.00	100.00	0.80	8.00	0.50	0.030	0.120
DW-1812-150-24	1.50	3.00	24.00	40.00	0.80	8.00	1.50	0.030	0.150
DW-1812-150-33	1.50	3.00	33.00	40.00	0.80	8.00	1.50	0.030	0.150
DW-1812-160-08	1.60	3.20	8.00	100.00	0.80	8.00	0.30	0.030	0.110
DW-1812-160-12	1.60	3.20	12.00	100.00	0.80	8.00	0.50	0.030	0.110
DW-1812-160-16	1.60	3.20	16.00	100.00	0.80	8.00	0.50	0.030	0.110
DW-1812-160-16S	1.60	3.20	16.00	100.00	0.80	8.00	0.50	0.030	0.110
DW-1812-160-24	1.60	3.20	24.00	40.00	0.80	8.00	0.50	0.030	0.130
DW-1812-160-33	1.60	3.20	33.00	40.00	0.80	8.00	0.50	0.030	0.130
DW-1812-200-08	2.00	4.00	8.00	100.00	0.80	8.00	2.00	0.020	0.080
DW-1812-200-12	2.00	4.00	12.00	100.00	1.00	8.00	2.00	0.020	0.080
DW-1812-200-16	2.00	4.00	16.00	100.00	1.00	8.00	2.00	0.020	0.080
DW-1812-200-24	2.00	4.00	24.00	100.00	1.00	8.00	2.00	0.02	0.11
DW-1812-200-30	2.00	4.00	30.00	100.00	1.00	8.00	2.00	0.02	0.11
DW-1812-250-08	2.50	5.00	8.00	100.00	0.80	8.00	5.00	0.015	0.075
DW-1812-250-12	2.50	5.00	12.00	100.00	0.80	8.00	5.00	0.015	0.075
DW-1812-250-16	2.50	5.00	16.00	100.00	1.00	8.00	5.00	0.015	0.075
DW-1812-250-24	2.50	5.00	24.00	40.00	1.00	8.00	5.00	0.015	0.075
DW-1812-260-08	2.60	5.20	8.00	100.00	0.80	8.00	5.00	0.015	0.075
DW-1812-260-12	2.60	5.20	12.00	100.00	0.80	8.00	5.00	0.015	0.075
DW-1812-260-16	2.60	5.20	16.00	100.00	1.00	8.00	5.00	0.015	0.075
DW-1812-260-24	2.60	5.20	24.00	40.00	1.00	8.00	5.00	0.015	0.075
DW-1812-300-12	3.00	6.00	12.00	100.00	1.00	8.00	4.00	0.012	0.060
DW-1812-300-08	3.00	6.00	8.00	100.00	1.00	8.00	4.00	0.012	0.060
DW-1812-300-16	3.00	6.00	16.00	100.00	1.00	8.00	4.00	0.012	0.060
DW-1812-300-24	3.00	6.00	24.00	40.00	1.00	8.00	4.00	0.012	0.060
DW-1812-350-12	3.50	7.00	12.00	100.00	1.00	10.00	4.00	0.008	0.035
DW-1812-350-06	3.50	7.00	6.00	100.00	1.00	10.00	4.00	0.008	0.035
DW-1812-350-16	3.50	7.00	16.00	100.00	1.00	10.00	4.00	0.008	0.035
DW-1812-400-06	4.00	8.00	6.00	100.00	2.00	10.00	4.00	0.005	0.025

I-hold: Holding Current: maximum current at which the device will not trip in 25°C still air.

I-trip: Tripping Current: minimum current at which the device will trip in 25°C still air.

Vmax: Maximum voltage device can withstand without damage at rated current(I_{max}).

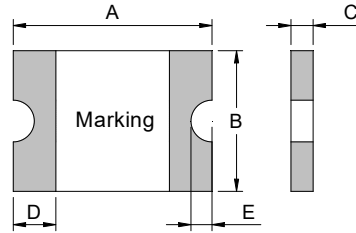
I_{max}: Maximum fault current device can withstand without damage at rated voltage(V_{max}).

Pd typ: Typical power dissipated from device when in the tripped state at 25°C still air.

R0 min: Minimum resistance of device in initial (un-soldered) state.

R1 max: Maximum resistance of device at 25°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

Product Dimensions(mm) & Marking



Part Number	A		B		C		D		E	Marking	Quantity pcs/R
	Min	Max	Min	Max	Min	Max	Min	Max	Min		
DW-1812-010-30	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D 010	1500
DW-1812-010-60	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D 010	1500
DW-1812-014-60	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D 014	1500
DW-1812-020-30	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D 020	1500
DW-1812-020-60	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D02	1500
DW-1812-030-30	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D 030	1500
DW-1812-030-48	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D 030	1500
DW-1812-030-60	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D 030	1500
DW-1812-035-30	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D 035	1500
DW-1812-035-60	4.37	4.73	3.07	3.41	0.65	1.35	0.30	1.20	0.20	D03	1000
DW-1812-050-16	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D 050	2000
DW-1812-050-30	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D 050	2000
DW-1812-050-60D	4.37	4.73	3.07	3.41	0.65	1.35	0.30	1.20	0.20	D05	1500
DW-1812-075-16	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D 075	2000
DW-1812-075-24	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D 075	2000
DW-1812-075-33	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D07	1500
DW-1812-075-33S	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D 075	2000
DW-1812-110-08	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D 110	2000
DW-1812-110-12	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D 110	2000
DW-1812-110-16	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D 110	2000
DW-1812-110-24	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D11	1500
DW-1812-110-33	4.37	4.73	3.07	3.41	0.85	1.35	0.30	1.20	0.20	D110 33	1000
DW-1812-125-08	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D 125	2000
DW-1812-125-12	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D 125	2000

DW-1812-125-16	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D12	1500
DW-1812-125-16S	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D ₁₂₅	2000
DW-1812-125-24	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D12	1500
DW-1812-125-33	4.37	4.73	3.07	3.41	0.85	1.35	0.30	1.20	0.20	D ₁₂₅ ₃₃	1000
DW-1812-150-08	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D ₁₅₀	2000
DW-1812-150-12	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D ₁₅₀	2000
DW-1812-150-16	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D15	1500
DW-1812-150-16S	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D ₁₅₀	2000
DW-1812-150-24	4.37	4.73	3.07	3.41	0.85	1.35	0.30	1.20	0.20	D ₁₅₀ ₂₄	1000
DW-1812-150-33	4.37	4.73	3.07	3.41	0.85	1.35	0.30	1.20	0.20	D ₁₅₀ ₃₃	1000
DW-1812-160-08	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D ₁₆₀	2000
DW-1812-160-12	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D ₁₆₀	2000
DW-1812-160-16	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D16	1500
DW-1812-160-16S	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D ₁₆₀	2000
DW-1812-160-24	4.37	4.73	3.07	3.41	0.85	1.35	0.30	1.20	0.20	D ₁₆₀ ₂₄	1000
DW-1812-160-33	4.37	4.73	3.07	3.41	0.85	1.35	0.30	1.20	0.20	D ₁₆₀ ₃₃	1000
DW-1812-200-08	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D ₂₀₀	2000
DW-1812-200-12	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D20	1500
DW-1812-200-16	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D20	1500
DW-1812-200-24	4.37	4.73	3.07	3.41	0.85	1.35	0.30	1.20	0.20	D ₂₀₀ ₂₄	1000
DW-1812-200-30	4.37	4.73	3.07	3.41	0.85	1.35	0.30	1.20	0.20	D ₂₀₀ ₃₀	1000
DW-1812-250-08	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D ₂₅₀	2000
DW-1812-250-12	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D25	1500
DW-1812-250-16	4.37	4.73	3.07	3.41	0.85	1.35	0.30	1.20	0.20	D ₂₅₀ ₁₆	1000
DW-1812-250-24	4.37	4.73	3.07	3.41	1.00	1.50	0.30	1.20	0.20	D ₂₅₀ ₂₄	1000
DW-1812-260-08	4.37	4.73	3.07	3.41	0.35	0.85	0.30	1.20	0.20	D ₂₆₀	2000
DW-1812-260-12	4.37	4.73	3.07	3.41	0.65	1.15	0.30	1.20	0.20	D26	1500
DW-1812-260-16	4.37	4.73	3.07	3.41	0.85	1.35	0.30	1.20	0.20	D ₂₆₀ ₁₆	1000
DW-1812-260-24	4.37	4.73	3.07	3.41	1.00	1.50	0.30	1.20	0.20	D ₂₆₀ ₂₄	1000
DW-1812-300-12	4.37	4.73	3.07	3.41	0.85	1.35	0.30	1.20	0.20	D ₃₀₀	1000
DW-1812-300-08	4.37	4.73	3.07	3.41	0.85	1.35	0.30	1.20	0.20	D ₃₀₀	1000
DW-1812-300-16	4.37	4.73	3.07	3.41	0.85	1.35	0.30	1.20	0.20	D ₃₀₀	1000
DW-1812-300-24	4.37	4.73	3.07	3.41	1.00	1.50	0.30	1.20	0.20	D ₃₀₀ ₂₄	1000
DW-1812-350-12	4.37	4.73	3.07	3.41	1.00	1.50	0.30	1.20	0.20	D ₃₅₀	1000
DW-1812-350-06	4.37	4.73	3.07	3.41	0.85	1.35	0.30	1.20	0.20	D35	1000
DW-1812-350-16	4.37	4.73	3.07	3.41	1.00	1.50	0.30	1.20	0.20	D ₃₅₀	1000
DW-1812-400-06	4.37	4.73	3.07	3.41	1.00	1.50	0.30	1.20	0.20	D ₄₀₀	1000

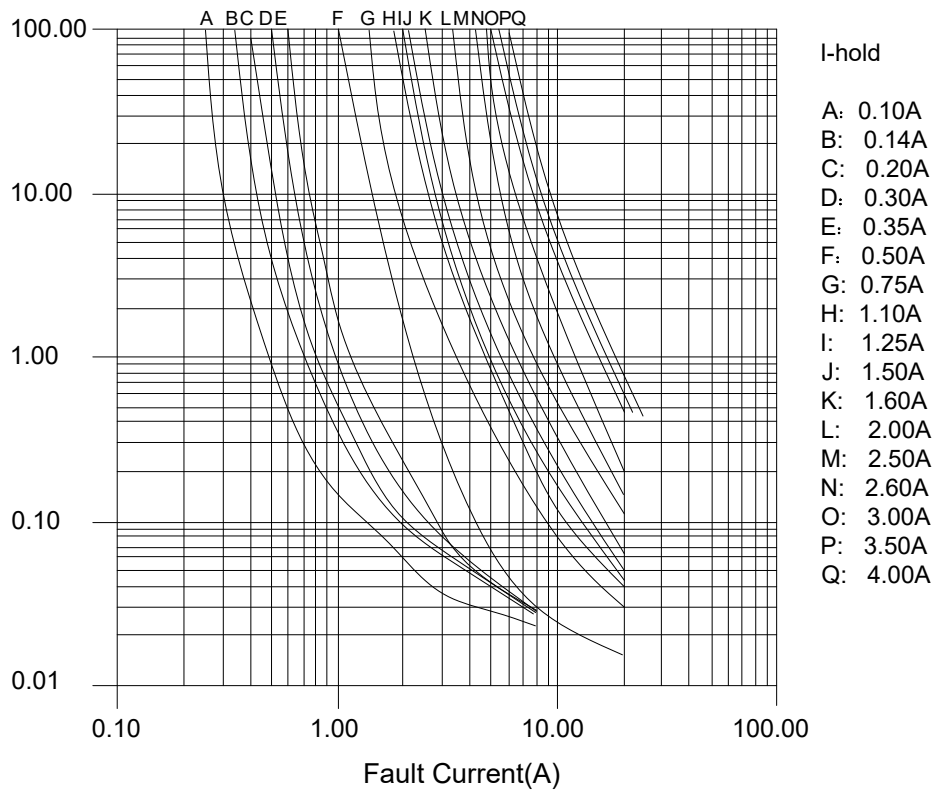
Thermal Derating Chart

Recommended hold current(A) at ambient Temperature(°C)

I-hold	Ambient Operating Temperature								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
0.10A	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.03
0.14A	0.23	0.19	0.17	0.14	0.12	0.10	0.09	0.08	0.06
0.20A	0.29	0.26	0.23	0.20	0.17	0.15	0.14	0.12	0.10
0.30A	0.43	0.39	0.34	0.30	0.26	0.22	0.21	0.17	0.14
0.35A	0.50	0.45	0.40	0.35	0.30	0.26	0.24	0.20	0.16
0.50A	0.77	0.68	0.59	0.50	0.44	0.40	0.37	0.33	0.29
0.75A	1.15	1.01	0.88	0.75	0.65	0.60	0.55	0.49	0.43
1.10A	1.59	1.43	1.26	1.10	0.95	0.87	0.80	0.71	0.60
1.25A	2.00	1.75	1.52	1.25	1.00	0.95	0.90	0.75	0.53
1.50A	2.06	1.93	1.79	1.50	1.28	1.10	1.02	0.80	0.68
1.60A	2.20	2.06	1.91	1.60	1.36	1.17	1.09	0.85	0.72
2.00A	2.60	2.44	2.22	2.00	1.78	1.67	1.50	1.45	1.29
2.50A	3.27	3.04	2.88	2.50	2.21	2.07	1.92	1.78	1.57
2.60A	3.40	3.16	3.00	2.60	2.30	2.15	2.00	1.85	1.63
3.00A	4.13	3.75	3.30	3.00	2.62	2.43	2.25	2.00	1.78
3.50A	4.84	4.39	4.04	3.50	2.98	2.66	2.35	1.88	1.55
4.00A	5.80	5.20	4.60	4.00	3.35	3.12	2.75	2.45	2.10

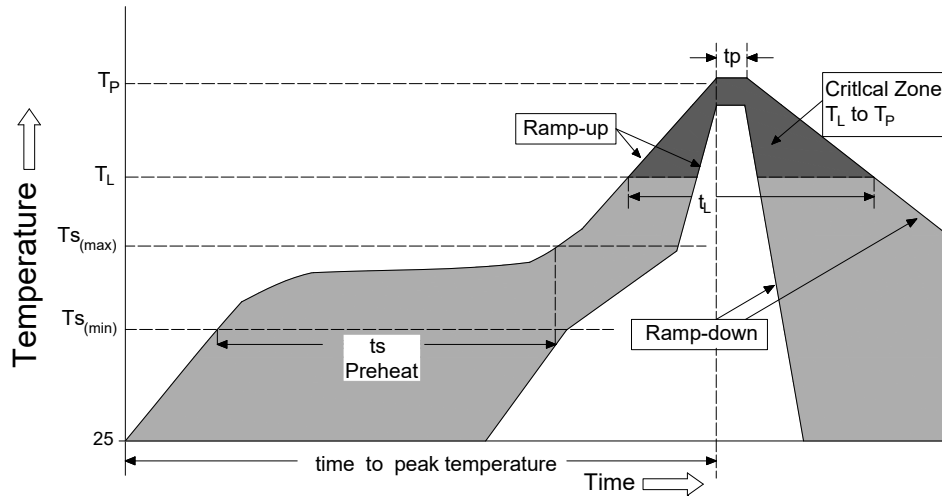
Typical Time To Trip at 25°C

1812 Series TTT Vs Fault current chart





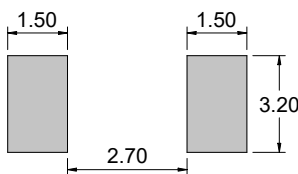
Soldering Parameters



Profile Feature		Pb-Free Assembly
Average Ramp-Up Rate ($T_{s(max)}$ to T_P)		3°C/second max
Pre Heat:	Temperature Min ($T_{s(min)}$)	150°C
	Temperature Max ($T_{s(max)}$)	200°C
	Time (Min to Max) (t_s)	60 – 180 secs
Time Maintained Above:	Temperature (T_L)	217°C
	Temperature (t_L)	60 – 150 seconds
Peak / Classification Temperature (T_P)		260 ^{+0/-5} °C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.

- ◆ All temperature refer to topside of the package, measured on the package body surface
- ◆ If reflow temperature exceeds the recommended profile, devices may not meet the performance requirements
- ◆ Recommended reflow methods: IR, vapor phase oven, hot air oven, N2 environment for lead
- ◆ Recommended maximum paste thickness is 0.25mm (0.010inch)
- ◆ Devices can be cleaned using standard industry methods and solvents

Recommended Pad Layout(mm) & Physical Specifications



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

Environmental Specifications

Operating Temperature	-40 °C to +85 °C
Maximum Device Surface Temperature in Tripped State	125°C
Passive Aging	+85 °C, 1000 hours ; ±5 % typical resistance change
Humidity Aging	+85 °C, 85 % R.H. 1000 hours; ±5 % typical resistance change
Thermal Shock	MIL-STD-202, Method 107; +85 °C to -40 °C, 20 times; -30 % typical resistance change
Solvent Resistance	MIL-STD-202, Method 215 ; No change
Vibration	MIL-STD-883, Method 2007, Condition A; No change
Moisture Sensivity Level	Level 1, J-STD-020
Storage Conditions	+40 °C Max. 70% RH Max. Packed in original packaging.



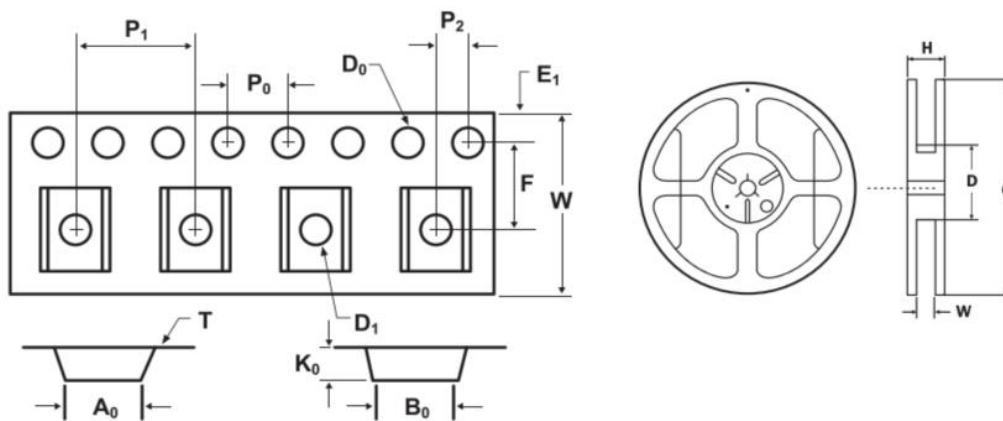
Test Procedures & Requirements

No.	Test	Test Conditions	Accept/Reject Criteria
1	R0 min	Resistance measurement at 25°C	$R0min \leq R \leq R1max$
2	R1 max	Resistance measurement one hour after post trip	$R0min \leq R \leq R1max$
3	I-hold	Hold rated current 1800 second without trip, @ 25°C	No trip
4	I-trip	Device must trip within 900 second under rated current, @25°C	Trip
5	Max. time to trip	At specified current, 25 °C	$T \leq \text{max. time to trip (seconds)}$
6	Trip Cycle Life	Vmax, Imax, 100 cycles	No arcing or burning
7	Trip Endurance	Vmax,Imax 24 hours	No arcing or burning
8	Solderability	ANSI/J-STD-002	95 % min. coverage

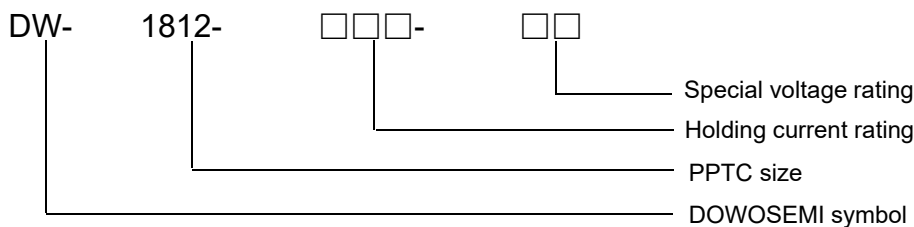
Tape and Reel Specifications & Packaging Quantity per Reel

Tape Specifications: EIA-481-1 (mm)			
Q'ty	2,000pcs/Reel	1,500pcs/Reel	1,000pcs/Reel
W	12.0±0.10	12.0±0.10	12.0±0.10
F	5.50±0.05	5.50±0.05	5.50±0.05
E1	1.75±0.10	1.75±0.10	1.75±0.10
D0	1.55±0.05	1.55±0.05	1.55±0.05
D1	1.50 min	1.50 min	1.50 min
P0	4.0±0.10	4.0±0.10	4.0±0.10
P1	8.0±0.10	8.0±0.10	8.0±0.10
P2	2.0±0.05	2.0±0.05	2.0±0.05
A0	3.58±0.10	3.58±0.10	3.50±0.10
B0	4.93±0.10	4.93±0.10	4.90±0.10
T	0.25±0.05	0.25±0.05	0.25±0.05
K0	0.87±0.10	1.30±0.10	1.70±0.10
Leader	390mm	390mm	390mm
Trailer	160mm	160mm	160mm

Reel Dimensions: EIA-481-1 (mm)	
C	Ø178±1.0
D	Ø60.2±0.5
W	13.2±1.5
H	16.0±0.5



Part Ordering Number System



Application Notice

1. Operation of these PPTC devices beyond the stated maximum ratings could result in damage to the devices and lead to electrical arcing and/or fire.
2. These PPTC devices are intended to protect against the effects of temporary over-current or over-temperature conditions and shall not be taken for use as switch, Multiple times tripping shall lower the PPTC hold current.
3. Exposure to lubricants, silicon-based oils, solvents, gels, electrolytes, acids, and other related or similar materials may adversely affect the performance of PPTC devices.
4. Circuits with inductance may generate a voltage above the rated voltage of the PPTC device and should be thoroughly evaluated within the user's application during the PPTC selection and qualification process.
5. Please do not smash, clamp, pull, dent or twist by tool during assembling process, as they may result in the PPTC damage.
6. The above parameters are concluded from one time of reflow soldering processing the PPTC. If there is any further heat generated process like injection or dispensing at the customer's premise, the aforementioned parameters will decrease at certain degree. Therefore the verification test to be conducted is necessary .
7. When mounting or using PPTC, all injection molding materials, curing adhesives, UV glue , silica gel and cleaning agents or solvents must be tested in terms of application parameters e.g. temperature, time, and etc to ensure the consistency between the product and the processing before use.
8. The PPTC is thermal sensitive device. It is recommended not to design any heat source devices around it to reduce the outside heat source impact.
9. SMD PPTC is designed for SMT processing which applies reflow soldering. Please refer to the recommended curve for reference. If the reflow soldering temperature exceeds the recommended value, the PPTC might be damaged. Hand welding PPTC is prohibited, if there is soldering iron welding process, it is suggested that the welding position should be more than 1.5mm away from PPTC, the welding tool temperature should be lower than 350°C, and the contact time between soldering iron and solder joint should not exceed 3sec.
10. In charging terminal application, PP type material is recommended to use as inner membrane and TPE and PVC type material is inhibited.