

Positive Temperature Coefficient (PTC) Datasheet

Features

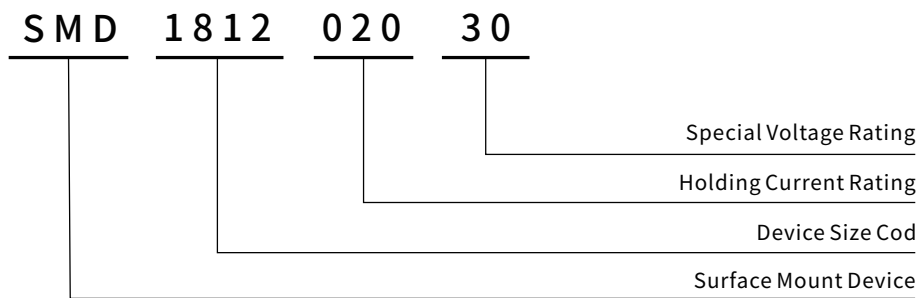
- I Hold: 0.1~3.5A
- Fast responding to fault current
- Size 1812 / 4.5*3.2mm
- Low resistance
- Low profile
- RoHS compliant & Lead-Free & Halogen Free

I Hold
0.1A to 4.0A

Applications

- USB hubs, ports and peripherals
- Computer, Mobile phones, Multimedia
- General electronics
- Disk drives
- Game machines, Portable electronics, Battery
- Plug and play protection for motherboards and peripherals

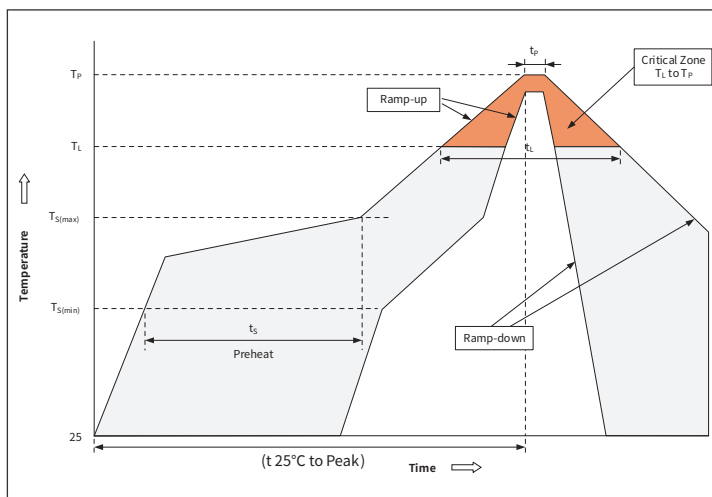
Part Number Code



SMD1812



Recommended Soldering Conditions



Profile Feature		Pb-Free Assembly
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.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3°C /sec. Max
$T_{S(max)}$ to T_L - Ramp-up Rate		3°C /sec. Max
Reflow	Temperature(T_L)(Liquid us)	+217°C
	Temperature(t_d)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_p)		20-40secs
Ramp-down Rate		6°C /sec. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C

Recommended reflow methods: IR, vapor phase oven, hot air oven, N2 environment for lead-free.

Recommended maximum paste thickness is 0.25mm.

Devices can be cleaned using standard industry methods and solvents.

Note 1: All temperature refer to topside of the package, measured on the package body surface.

Note 2: If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

● **Electrical Characteristics** (Ta=25°C Unless otherwise specified)

Part Number	Marking	I_{hold}	I_{trip}	V_{max}	I_{max}	$P_{d\ typ}$	Max. Time-to-trip		$R_{i\ min}$	$R_{1\ max}$
		(A)	(A)	(V)	(A)	(W)	(A)	(Sec)	(Ω)	(Ω)
SMD1812-010-30	R+O 01	0.10	0.30	30	30	0.8	0.50	1.50	0.750	15.00
SMD1812-010-33	R+O 01	0.10	0.30	33	30	0.8	0.50	1.50	0.750	15.00
SMD1812-010-60	R+O 01	0.10	0.30	60	30	0.8	0.50	1.50	0.750	15.00
SMD1812-010-90	R+O 01	0.10	0.30	90	30	0.8	0.50	1.50	0.750	15.00
SMD1812-014-33	R+O 01	0.14	0.34	33	30	0.8	1.50	0.15	0.65	6.00
SMD1812-014-60	R+O 01	0.14	0.34	60	30	0.8	1.50	0.15	0.65	6.00
SMD1812-014-72	R+O 01	0.14	0.34	72	30	0.8	1.50	0.15	0.65	6.00
SMD1812-020-30	R+O 02	0.20	0.40	30	30	0.8	8.0	0.04	0.35	5.00
SMD1812-020-33	R+O 02	0.20	0.40	33	30	0.8	8.0	0.02	0.35	5.00
SMD1812-020-60	R+O 02	0.20	0.40	60	40	0.8	8.0	0.04	0.35	5.00
SMD1812-020-72	R+O 02	0.20	0.40	72	40	0.8	8.0	0.04	0.35	5.00
SMD1812-030-30	R+O 03	0.30	0.60	30	40	0.8	8.0	0.10	0.25	3.00
SMD1812-030-33	R+O 03	0.3	0.60	33	40	0.8	8.0	0.10	0.25	3.00
SMD1812-030-60	R+O 03	0.30	0.60	60	40	0.8	8.0	0.10	0.250	3.00
SMD1812-035-30	R+O 03	0.35	0.75	30	40	0.8	8.0	0.15	0.40	2.70
SMD1812-035-60	R+O 03	0.35	0.75	60	40	1.0	8.0	0.15	0.40	2.70
SMD1812-050-15	R+O 05	0.50	1.0	15	40	0.8	8.0	0.15	0.15	1.40
SMD1812-050-24	R+O 05	0.50	1.0	24	40	0.8	8.0	0.15	0.15	1.40
SMD1812-050-30	R+O 05	0.50	1.0	30	40	0.8	8.0	0.15	0.15	1.40
SMD1812-050-33	R+O 05	0.50	1.0	33	40	1.0	8.0	0.15	0.15	1.40
SMD1812-050-60	R+O 05	0.50	1.0	60	40	1.0	8.0	0.15	0.15	1.40
SMD1812-075-13.2	R+O 07	0.75	1.5	13.2	40	0.8	8.0	0.20	0.09	0.45
SMD1812-075-16	R+O 07	0.75	1.5	13.2	40	0.8	8.0	0.20	0.09	0.45
SMD1812-075-24	R+O 07	0.75	1.5	24	40	0.8	8.0	0.20	0.09	0.45
SMD1812-075-33	R+O 07	0.75	1.5	33	40	1.0	8.0	0.20	0.09	0.45
SMD1812-110-8	R+O 11	1.10	2.2	8	40	0.8	8.0	0.30	0.045	0.25
SMD1812-110-16	R+O 11	1.10	2.2	16	40	0.8	8.0	0.30	0.045	0.25
SMD1812-110-24	R+O 11	1.10	2.2	24	40	1.0	8.0	0.30	0.045	0.25
SMD1812-110-33	R+O 11	1.10	2.2	33	40	1.0	8.0	0.30	0.045	0.25
SMD1812-125-6.4	R+O 12	1.25	2.5	6.4	40	0.8	8.0	0.40	0.05	0.18
SMD1812-125-8	R+O 12	1.25	2.5	8	40	0.8	8.0	0.40	0.05	0.18
SMD1812-125-16	R+O 12	1.25	2.5	16	40	1.0	8.0	0.40	0.05	0.18
SMD1812-150-8	R+O 15	1.50	3.0	8	40	1.0	8.0	0.50	0.04	0.16
SMD1812-150-12	R+O 15	1.50	3.0	12	40	0.8	8.0	0.50	0.04	0.16
SMD1812-150-16	R+O 15	1.50	3.0	16	40	1.0	8.0	0.50	0.04	0.16
SMD1812-150-24	R+O 15	1.50	3.0	24	40	1.0	8.0	0.50	0.04	0.16
SMD1812-150-33	R+O 15	1.50	3.0	33	40	1.0	8.0	0.50	0.04	0.16

● Electrical Characteristics (Ta=25°C Unless otherwise specified)

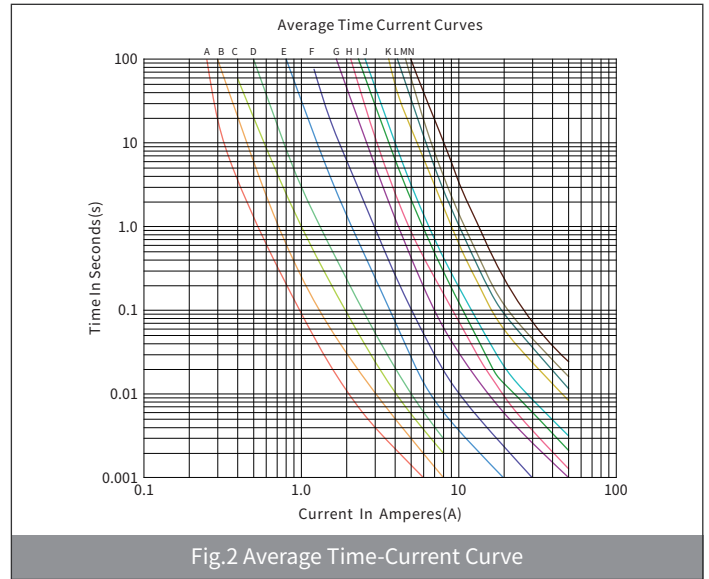
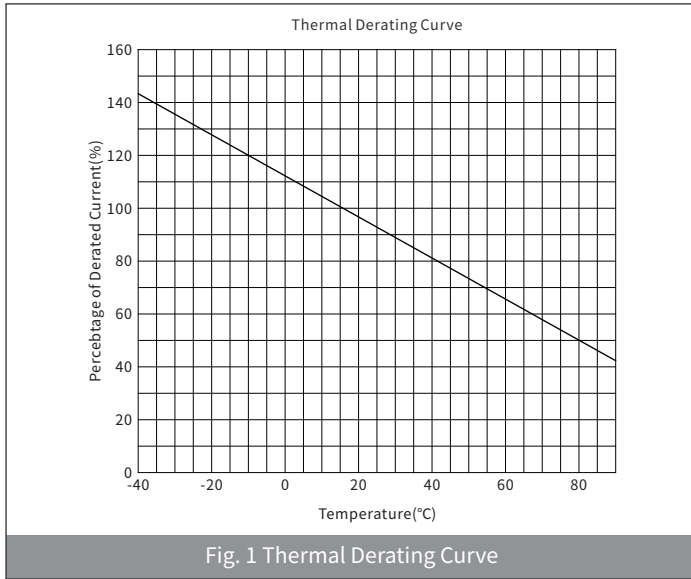
Part Number	Marking	I_{hold}	I_{trip}	V_{max}	I_{max}	$P_{d\ typ}$	Max. Time-to-trip		$R_{i\ min}$	$R_{1\ max}$
		(A)	(A)	(V)	(A)	(W)	(A)	(Sec)	(Ω)	(Ω)
SMD1812-160-8	R+O 16	1.60	3.20	8	40	1.0	8.0	1.0	0.03	0.13
SMD1812-160-16	R+O 16	1.60	3.20	16	40	1.0	8.0	1.0	0.03	0.13
SMD1812-200-8	R+O 20	2.0	4.0	8	40	1.0	8.0	2.0	0.02	0.10
SMD1812-200-12	R+O 20	2.0	4.0	12	40	1.0	8.0	2.0	0.02	0.10
SMD1812-200-16	R+O 20	2.0	4.0	16	40	1.0	8.0	2.0	0.02	0.10
SMD1812-200-24	R+O 20	2.0	4.0	24	40	1.0	8.0	2.0	0.02	0.10
SMD1812-200-30	R+O 20	2.0	4.0	30	40	1.0	8.0	2.0	0.02	0.10
SMD1812-200-33	R+O 20	2.0	4.0	33	40	1.0	8.0	2.0	0.02	0.10
SMD1812-260-8	R+O 26	2.60	5.20	8	40	1.0	8.0	2.50	0.01	0.07
SMD1812-260-12	R+O 26	2.60	5.0	12	40	0.8	8.0	2.50	0.01	0.07
SMD1812-260-13.2	R+O 26	2.60	5.0	13.2	40	0.8	8.0	2.50	0.01	0.07
SMD1812-260-16	R+O 26	2.60	5.20	16	40	1.2	8.0	2.50	0.01	0.07
SMD1812-260-24	R+O 26	2.60	5.20	24	40	1.2	8.0	2.50	0.01	0.07
SMD1812-260-30	R+O 26	2.60	5.20	30	40	1.2	8.0	2.50	0.01	0.07
SMD1812-300-6	R+O 30	3.0	6.0	6	40	1.2	8.0	4.0	0.01	0.05
SMD1812-300-8	R+O 30	3.0	6.0	8	40	1.2	8.0	4.0	0.01	0.05
SMD1812-300-12	R+O 30	3.0	6.0	12	40	1.2	8.0	4.0	0.01	0.05
SMD1812-300-16	R+O 30	3.0	6.0	16	40	1.4	8.0	4.0	0.01	0.05
SMD1812-300-24	R+O 30	3.0	6.0	24	40	1.4	8.0	4.0	0.01	0.05
SMD1812-350-6	35R+O	3.50	7.0	6	40	2.0	10.0	4.0	0.008	0.035
SMD1812-350-16	R+O 35	3.50	7.0	16	40	2.0	10.0	4.0	0.008	0.035
SMD1812-400-6	R+O 40	4.0	8.0	6	40	2.0	10.0	4.0	0.005	0.025
SMD1812-400-12	R+O 40	4.0	8.0	12	40	2.0	10.0	4.0	0.005	0.025
SMD1812-400-16	R+O 40	4.0	8.0	16	40	2.0	10.0	4.0	0.005	0.025

● Vocabulary

- I_{hold} = Hold current: maximum current device will pass 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}).
- $P_{d\ typ.}$ = Typical power dissipated from device when in the tripped state at 25°C still air.
- $R_{i\ min}$ = Minimum resistance of device in initial (un-soldered) state.
- $R_{1\ max}$ = Maximum resistance of device at 25°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

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

● Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)



Note: Fig.2 Average Time-Current Curve

A: SMD1812-010 B: SMD1812-014 C: SMD1812-020 D: SMD1812-030 E: SMD1812-050
 F: SMD1812-075 G: SMD1812-110 H: SMD1812-125 I: SMD1812-150 J: SMD1812-160
 K: SMD1812-200 L: SMD1812-260 M: SMD1812-300 N: SMD1812-350

● Thermal Derating Chart

Part Number	Ambient operating temperature hold current(Ihold)								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
SMD1812-010	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.03
SMD1812-014	0.23	0.19	0.17	0.14	0.12	0.10	0.09	0.08	0.06
SMD1812-020	0.29	0.26	0.23	0.20	0.17	0.15	0.14	0.12	0.10
SMD1812-030	0.44	0.39	0.35	0.30	0.26	0.23	0.21	0.18	0.15
SMD1812-035	0.50	0.45	0.40	0.35	0.30	0.26	0.24	0.20	0.16
SMD1812-050	0.69	0.59	0.55	0.50	0.45	0.43	0.35	0.30	0.23
SMD1812-075	1.10	0.99	0.87	0.75	0.63	0.57	0.49	0.45	0.35
SMD1812-110	1.60	1.45	1.28	1.10	0.92	0.83	0.71	0.66	0.52
SMD1812-125	2.00	1.75	1.52	1.25	1.00	0.95	0.90	0.75	0.53
SMD1812-150	2.10	1.96	1.77	1.50	1.23	1.09	0.95	0.82	0.61
SMD1812-160	2.30	2.05	1.88	1.60	1.26	1.12	0.98	0.84	0.63
SMD1812-200	2.88	2.61	2.25	2.00	1.80	1.66	1.45	1.09	0.80
SMD1812-260	3.90	3.42	2.96	2.60	2.22	2.07	1.94	1.35	1.00
SMD1812-300	4.15	3.76	3.46	3.00	2.55	2.28	2.01	1.61	1.33
SMD1812-350	4.84	4.39	4.04	3.50	2.98	2.66	2.35	1.88	1.55
SMD1812-400	4.97	4.62	4.32	4.00	3.48	3.16	2.85	2.38	2.05

SMD1812 SERIES

Surface Mount PTC Device

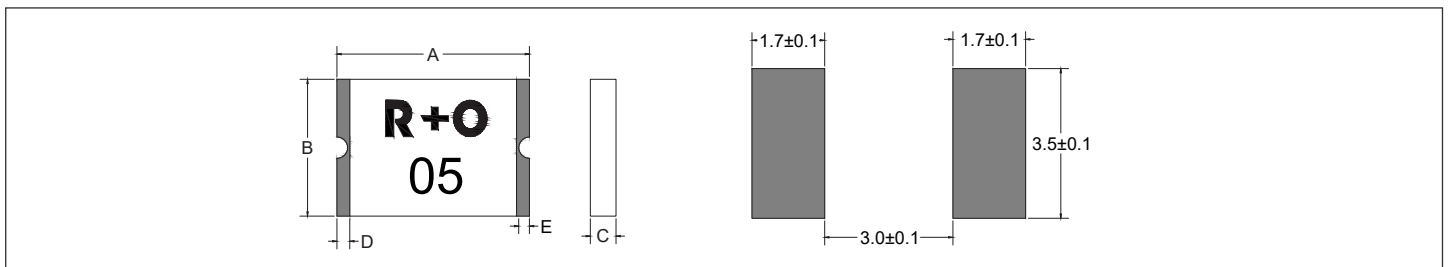
● Environmental Specifications

Operating / Storage temperature:	-40°C to +85°C
Passive Aging :	+85°C , 100hours
Humidity Aging :	+85°C , 85%R.H. 168 hours
Thermal Shock :	MIL-STD-202, Method 107G ; +85°C /-40°C 20 times
Solvent Resistance:	MIL-STD-202, Method 215 No change
Vibration:	MIL-STD-202,Method 201 No change
Maximum Device Surface Temperature in Tripped State :	125°C
Storage Conditions:	Light-proof, Hermetically Sealed, Moisture-proof

● Ordering Information

PACKAGE	SIZE(mm)	DELIVERY MODE	MPQ(PCS)
SMD1812	4.5*3.2	7" REEL	1,500

● Physical Dimensions & Recommended Pad Layout



Part Number	A		B		C		D	E
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.
SMD1812-010-30	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-010-33	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-010-60	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-010-90	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-014-33	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-014-60	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-014-72	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-020-30	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-020-33	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-020-60	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-020-72	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-030-30	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-030-33	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-030-60	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-035-30	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-035-60	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-050-15	4.37	4.73	3.07	3.41	0.40	1.00	0.30	0.25
SMD1812-050-24	4.37	4.73	3.07	3.41	0.40	1.00	0.30	0.25
SMD1812-050-30	4.37	4.73	3.07	3.41	0.40	1.00	0.30	0.25
SMD1812-050-33	4.37	4.73	3.07	3.41	0.40	1.00	0.30	0.25
SMD1812-050-60	4.37	4.73	3.07	3.41	0.60	1.50	0.30	0.25
SMD1812-075-13.2	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-075-16	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-075-24	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.25

● Physical Dimensions & Recommended Pad Layout

Part Number	A		B		C		D	E
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.
SMD1812-075-33	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.25
SMD1812-110-8	4.37	4.73	3.07	3.41	0.40	1.0	0.30	0.25
SMD1812-110-16	4.37	4.73	3.07	3.41	0.40	1.0	0.30	0.25
SMD1812-110-24	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.25
SMD1812-110-33	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.25
SMD1812-125-6.4	4.37	4.73	3.07	3.41	0.40	1.0	0.30	0.25
SMD1812-125-8	4.37	4.73	3.07	3.41	0.40	1.0	0.30	0.25
SMD1812-125-16	4.37	4.73	3.07	3.41	0.40	1.0	0.30	0.25
SMD1812-150-8	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-150-12	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-150-16	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-150-24	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-150-33	4.37	4.73	3.07	3.41	0.80	1.50	0.30	0.25
SMD1812-160-8	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-160-16	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-200-8	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-200-12	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-200-16	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.25
SMD1812-200-24	4.37	4.73	3.07	3.41	0.80	1.50	0.30	0.25
SMD1812-200-30	4.37	4.73	3.07	3.41	0.80	1.50	0.30	0.25
SMD1812-200-33	4.37	4.73	3.07	3.41	1.00	1.80	0.30	0.25
SMD1812-260-8	4.37	4.73	3.07	3.41	0.80	1.50	0.30	0.25
SMD1812-260-12	4.37	4.73	3.07	3.41	0.80	1.50	0.30	0.25
SMD1812-260-13.2	4.37	4.73	3.07	3.41	0.80	1.50	0.30	0.25
SMD1812-260-16	4.37	4.73	3.07	3.41	0.80	1.50	0.30	0.25
SMD1812-260-24	4.37	4.73	3.07	3.41	0.80	1.50	0.30	0.25
SMD1812-260-30	4.37	4.73	3.07	3.41	0.80	1.60	0.30	0.25
SMD1812-300-6	4.37	4.73	3.07	3.41	0.80	1.50	0.30	0.25
SMD1812-300-8	4.37	4.73	3.07	3.41	0.80	1.50	0.30	0.25
SMD1812-300-12	4.37	4.73	3.07	3.41	0.80	1.50	0.30	0.25
SMD1812-300-16	4.37	4.73	3.07	3.41	0.80	1.50	0.30	0.25
SMD1812-300-24	4.37	4.73	3.07	3.41	0.80	1.50	0.30	0.25
SMD1812-350-6	4.37	4.73	3.07	3.41	0.80	1.50	0.30	0.25
SMD1812-350-16	4.37	4.73	3.07	3.41	0.80	1.50	0.30	0.25
SMD1812-400-6	4.37	4.73	3.07	3.41	1.00	1.80	0.30	0.25
SMD1812-400-12	4.37	4.73	3.07	3.41	1.00	1.80	0.30	0.25
SMD1812-400-16	4.37	4.73	3.07	3.41	1.00	1.80	0.30	0.25

● Warning

- Users shall independently assess the suitability of these devices for each of their applications.
- Operation of these devices beyond the stated maximum ratings could result in damage to the devices and lead to electrical arcing and/or fire.
- These devices are intended to protect against the effects of temporary over-current or over-temperature conditions and are not intended to perform as protective devices where such conditions are expected to be repetitive or prolonged in duration.
- Exposure to silicon-based oils, solvents, electrolytes, acids, and similar materials can adversely affect the prolonged of these PPTC devices.
- These devices undergo thermal expansion under fault conditions, and thus shall be provided with adequate space and be protected against mechanical stresses.
- Circuits with inductance may generate a voltage (L di/dt) above the rated voltage of the PPTC device.