

Positive Temperature Coefficient (PTC) Data Sheet

Description

The 1210 series provides miniature surface mount resettable overcurrent protection withholding current from 0.05A to 2.0A. This series is suitable for wide range of applications in modern electronics where space is limited.

Features

- ROHS compliant and lead-free
- Fast response to fault current
- Low profile
- Low resistance
- Compatible with high temperature solders
- Compact design saves board space

Applications

- USB peripherals and Type-C
- Disk drives and CD-ROMs
- Plug and play protection for motherboards and peripherals
- Mobile phones-battery and port protection
- PDAs/digital cameras
- Game console port protection
- HDMI and Set-top-box

Electrical Characteristics

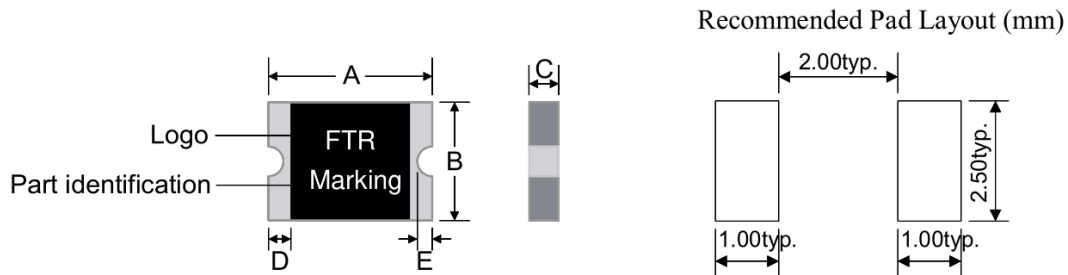
Part Number	Marking	I _{hold} (A)	I _{trip} (A)	V _{max} (V)	I _{max} (A)	Pd typ. (W)	Maximum time to trip		Resistance	
							Time(s)	Current(A)	R _{min} (Ω)	R _{1max} (Ω)
FTR1210-005	005	0.05	0.15	30.0	10	0.60	1.50	0.25	3.60	50.0
FTR1210-010	010	0.10	0.30	30.0	10	0.60	1.50	0.50	1.60	15.0
FTR1210-020	020	0.20	0.40	30.0	10	0.60	0.02	8.00	0.80	5.00
FTR1210-035	035	0.35	0.70	6.0	100	0.60	0.20	8.00	0.32	1.30
FTR1210-050	050	0.50	1.00	13.2	100	0.60	0.05	8.00	0.25	0.90
FTR1210-075	075	0.75	1.50	6.0	100	0.60	0.10	8.00	0.07	0.40
FTR1210-075/24	074	0.75	1.50	24	100	0.60	0.10	8.00	0.070	0.400
FTR1210-110	110	1.10	2.20	8	100	0.60	0.30	8.00	0.050	0.210
FTR1210-110/12	112	1.10	2.20	12	100	0.60	0.30	8.00	0.050	0.210
FTR1210-110/16	116	1.10	2.20	16	100	0.60	0.30	8.00	0.050	0.210
FTR1210-150	150	1.50	3.00	6	100	0.80	0.30	8.00	0.030	0.120
FTR1210-150/12	152	1.50	3.00	12	100	0.80	0.30	8.00	0.030	0.120
FTR1210-150/16	156	1.50	3.00	16	100	0.80	0.30	8.00	0.030	0.120
FTR1210-175	175	1.75	3.50	6	100	0.80	1.00	8.00	0.020	0.080
FTR1210-200	200	2.00	4.00	6	100	0.80	1.00	8.00	0.015	0.075

- I_{hold}= Hold current: maximum current device will pass without tripping in 23°C still air.
- I_{trip}= Trip current: minimum current at which the device will trip in 23°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})
- Pd typ.= Typical power dissipated from device when in the tripped state at 23°C still air.
- R_{min}= Minimum resistance of device in initial (un-soldered) state.
- R_{1max}= Maximum resistance of device at 23°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.
- Caution: Operation beyond the specified rating may result in damage and possible arcing and flame.

Thermal Derating Chart

Part Number	Ambient Operation Temperature								
	-40°C	-20°C	0°C	23°C	40°C	50°C	60°C	70°C	85°C
FTR1210-005	0.08	0.07	0.06	0.05	0.04	0.04	0.03	0.03	0.02
FTR1210-010	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.05
FTR1210-020	0.29	0.26	0.22	0.20	0.16	0.14	0.13	0.11	0.08
FTR1210-035	0.47	0.45	0.40	0.35	0.33	0.28	0.24	0.21	0.18
FTR1210-050	0.76	0.67	0.58	0.50	0.43	0.40	0.36	0.32	0.28
FTR1210-075	1.00	0.97	0.86	0.75	0.64	0.59	0.54	0.48	0.40
FTR1210-075/24	1.00	0.97	0.86	0.75	0.64	0.59	0.54	0.48	0.40
FTR1210-110	1.60	1.42	1.26	1.10	0.94	0.86	0.80	0.70	0.58
FTR1210-110/12	1.60	1.42	1.26	1.10	0.94	0.86	0.80	0.70	0.58
FTR1210-110/16	1.60	1.42	1.26	1.10	0.94	0.86	0.80	0.70	0.58
FTR1210-150	2.30	2.02	1.76	1.50	1.24	1.11	1.00	0.85	0.65
FTR1210-150/12	2.30	2.02	1.76	1.50	1.24	1.11	1.00	0.85	0.65
FTR1210-150/16	2.30	2.02	1.76	1.50	1.24	1.11	1.00	0.85	0.65
FTR1210-175	2.45	2.22	2.01	1.75	1.45	1.26	1.10	0.98	0.80
FTR1210-200	2.60	2.44	2.35	2.00	1.78	1.67	1.50	1.45	1.10

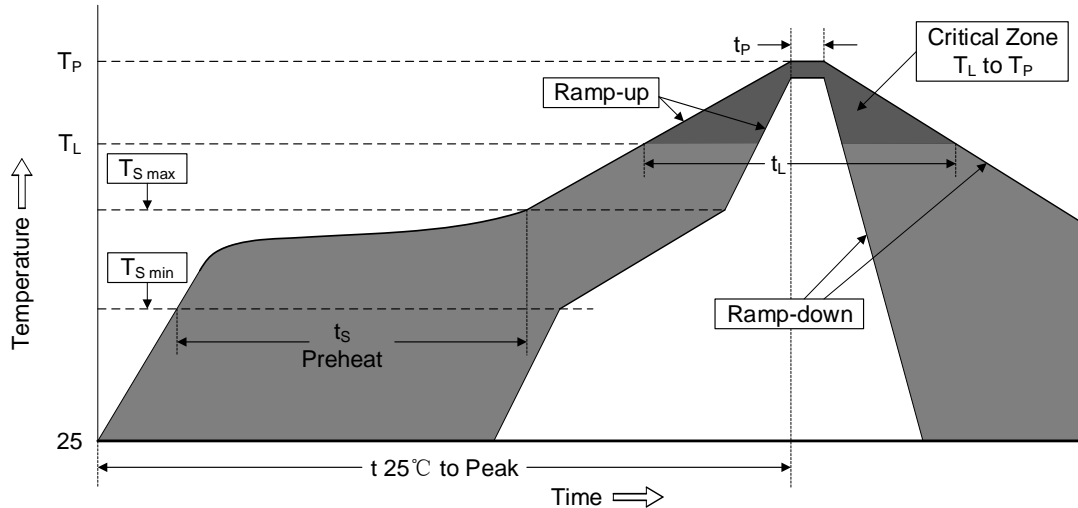
Dimensions and PAD Size



Part Number	Dimensions(mm)									
	A		B		C		D		E	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
FTR1210-005	3.00	3.43	2.35	2.80	0.75	1.25	0.25	0.75	0.10	0.50
FTR1210-010	3.00	3.43	2.35	2.80	0.75	1.25	0.25	0.75	0.10	0.50
FTR1210-020	3.00	3.43	2.35	2.80	0.60	1.00	0.25	0.75	0.10	0.50
FTR1210-035	3.00	3.43	2.35	2.80	0.50	0.85	0.25	0.75	0.10	0.50
FTR1210-050	3.00	3.43	2.35	2.80	0.50	0.85	0.25	0.75	0.10	0.50
FTR1210-075	3.00	3.43	2.35	2.80	0.30	0.85	0.25	0.75	0.10	0.50
FTR1210-075/24	3.00	3.43	2.35	2.80	1.20	1.80	0.25	0.75	0.10	0.50
FTR1210-110	3.00	3.43	2.35	2.80	0.30	0.85	0.25	0.75	0.10	0.50
FTR1210-110/12	3.00	3.43	2.35	2.80	0.50	1.25	0.25	0.75	0.10	0.50
FTR1210-110/16	3.00	3.43	2.35	2.80	0.50	1.25	0.25	0.75	0.10	0.50
FTR1210-150	3.00	3.43	2.35	2.80	0.75	1.07	0.25	0.75	0.10	0.50
FTR1210-150/12	3.00	3.43	2.35	2.80	0.75	1.80	0.25	0.75	0.10	0.50
FTR1210-150/16	3.00	3.43	2.35	2.80	0.75	1.80	0.25	0.75	0.10	0.50
FTR1210-175	3.00	3.43	2.35	2.80	0.80	1.60	0.25	0.75	0.10	0.50
FTR1210-200	3.00	3.43	2.35	2.80	0.80	1.60	0.25	0.75	0.10	0.50

Recommended Soldering Conditions

Reflow Soldering



Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	3°C/second max.
Preheat	
-Temperature Min ($T_{S\ min}$)	150°C
-Temperature Max ($T_{S\ max}$)	200°C
-Time (min to max) (t_s)	60-180 seconds
$T_{S\ max}$ to T_L	
-Ramp-up Rate	3°C/second max.
Time maintained above:	
-Temperature (T_L)	217°C
-Time (t_L)	60-150 seconds
Peak Temperature (T_P)	260°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	8 minutes max.
Storage Condition	0°C ~ 35°C, ≤70%RH

·Recommended reflow methods: IR, vapor phase oven, hot air oven, N 2 environment for lead-free

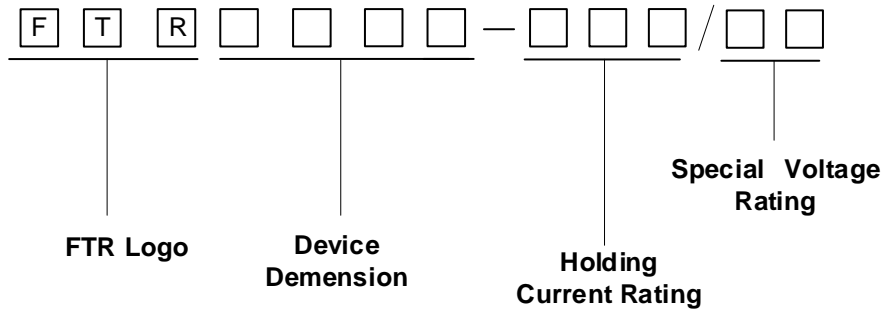
·Recommended maximum paste thickness is 0.25mm (0.010 inch)

·Device 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.

Partnumber code



Environmental Specifications

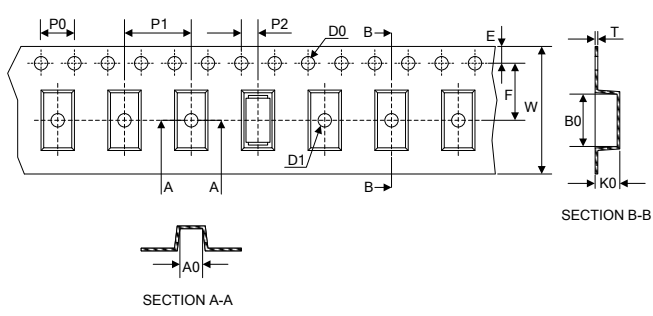
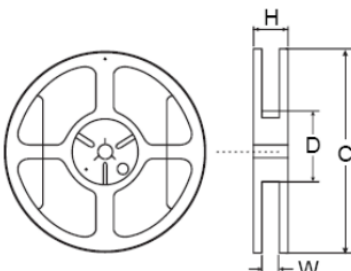
Operating / Storage temperature	-40°C to +85°C
Maximum Device Surface Temperature in Tripped State	125°C
Passive Aging	+85°C, 1000 hours ±50% typical resistance change
Humidity Aging	+85°C, 85%RH, 1000 hours ±50% typical resistance change
Thermal Shock	MIL-STD-202, Method 107G +85°C/-40°C 20 times -50% typical resistance change
Solvent Resistance	MIL-STD-202, Method 215 No change
Vibration	MIL-STD-883C, Method 2007.1, Condition A No change
Moisture Level Sensitivity	Level 1, J-STD-020C

Physical Specifications

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

Packaging

Part Number	Quantity	Part Number	Quantity	Part Number	Quantity
FTR1210-005	3000	FTR1210-075	4000	FTR1210-150	3000
FTR1210-010	3000	FTR1210-075/24	2000	FTR1210-150/12	2000
FTR1210-020	4000	FTR1210-110	4000	FTR1210-150/16	2000
FTR1210-035	4000	FTR1210-110/12	3000	FTR1210-175	3000
FTR1210-050	4000	FTR1210-110/16	3000	FTR1210-200	2000

Tape	Symbol	Dimension (mm)		
		020,035,050 075,110,050	005,010 110/12,110/16 175	075/24,150/12 150/16,200
	W	8.00±0.30	8.00±0.30	8.00±0.30
	P0	4.00±0.10	4.00±0.10	4.00±0.10
	P1	4.00±0.10	4.00±0.10	4.00±0.10
	P2	2.00±0.10	2.00±0.10	2.00±0.10
	D0	Φ1.55±0.10	Φ1.55±0.10	Φ1.55±0.10
	D1	1.00min	1.00min	1.00min
	E	1.75±0.10	1.75±0.10	1.75±0.10
	F	3.50±0.05	3.50±0.05	3.50±0.05
	A0	2.82±0.1	2.82±0.1	2.82±0.1
	B0	3.46±0.1	3.50±0.1	3.50±0.1
	K0	1.00±0.1	1.30±0.1	1.80±0.1
	T	0.25±0.1	0.20±0.1	0.25±0.1
	Reel	C	Φ178.0±1.0	
	D	Φ60.2±0.5		
	H	11.0±0.5		
	W	9.0±1.5		