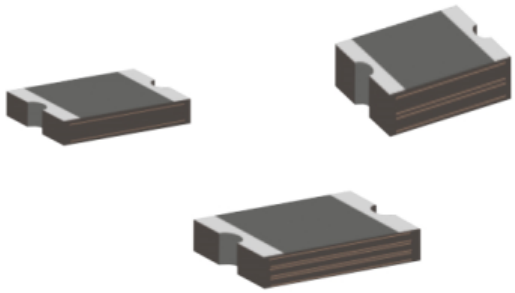
SMD0603P Series

Surface Mountable PTC Resettable Fuse

Description

The 0603 series provides miniature surface mount resettable Over-current protection with holding current from 0.03A to 0.5 A. This world s smallest PTC is suitable for ultra portable applications where space is at a premium and the device current is low.



Features

- I(hold): 0.03~0.5 A
- Very high voltage surge capabilities
- Available in lead-free version
- Fast response to fault current
- RoHS compliant, Lead- Free and Halogen-Free
- Low resistance
- Compact design saves board space
- Compatible with high temperature solders

Applications

- USB peripherals
- Disk drives
- CD-ROMs
- General electronics
- Set-top-box and HDMI
- Mobile Internet Device (MID)
- PDAs / digital cameras
- Game console port protection
- Plug and play protection for motherboards and peripherals
- Mobile phones - battery and port protection

Part Number Code

S	M	D	0	6	0	3	P	X	X	X	T	F	/	-	-

- SMD: Surface Mount Device
- 0603: Device size code
- P: Polytronics Symbol
- X X X: Current Rating
- T: Thin Version (Optional)
- F: Lead-free
- / - -: Special Voltage Rating (Optional)

Environmental Specifications

Test	Test Conditions	Accept/Reject Criteria
Resistance	In still air @ 25℃	$R_{min} \leq R \leq R_{max}$
Time to Trip	Specified current，V_{max}，25℃	T≤maximum Time to Trip
Hold Current	30min，at I_H	No trip
Trip Cycle Life	Vmax，Imax，100cycles	No arcing or burning
Trip Endurance	Vmax，1 hours	No arcing or burning

Physical Characteristics and Environmental Specifications

Terminal materials :	Tin-Plated Nickle-copper	
Soldering zone	Meets EIA specification RS 186-9E and ANSI/J-STD-002 Category 3.	
Environmental Specifications		
Test	Conditions	Resistance Change
Passive aging	85℃,1000hours	±10%
Humidity aging	85℃/85%RH.1000 hours	±5%
Thermal shock	MIL-STD-202,Method 107G +85℃/-40℃,20times	-30% typical resistance change
Solvent Resistance	MIL-STD-202,Method 215	no change
Vibration	ML-STD-883C,Test Condition A	No change

Electrical Characteristic

Part Number	V_{Max}	I_{Max}	I_{Hold}	I_{Trip}	P_D	Maximum Time-to-trip		Resistance	
	(Vdc)	(A)	(A)	(A)	Max. (W)	Current (A)	Time (Sec)	R_{Min} (Ω)	$R1_{Max}$ (Ω)
SMD0603P003TF	30.0	20	0.03	0.09	0·50	0.15	1.00	6.0	65.00
SMD0603P004TF	24.0	20	0.04	0.12	0·50	0.2	1.00	4.0	45.00
SMD0603P005TF	24·0	20	0·05	0·15	0·50	0.2	1.00	3.0	35.000
SMD0603P010TF	15·0	40	0·10	0·30	0·50	0.5	1.00	0.9	8.000
SMD0603P020TF	9·0	40	0·20	0·50	0·50	1.00	0.60	0.55	3.500
SMD0603P025TF	9.0	40	0·25	0·55	0·50	8.0	0.08	0.500	3.000
SMD0603P030TF	6.0	40	0·30	0·70	0·50	8A	0.10	0.300	2.00
SMD0603P035TF	6.0	40	0·35	0·75	0·50	8A	0.10	0.200	1.400
SMD0603P040TF	6.0	40	0·40	0·80	0·50	8A	0.10	0.20	0.900
SMD0603P050TF	6.0	40	0·50	1·00	0·50	8A	0.10	0.100	0.800

V_{max} = Maximum operating voltage vice can withstand without damage at rated current (Imax).

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

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.

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

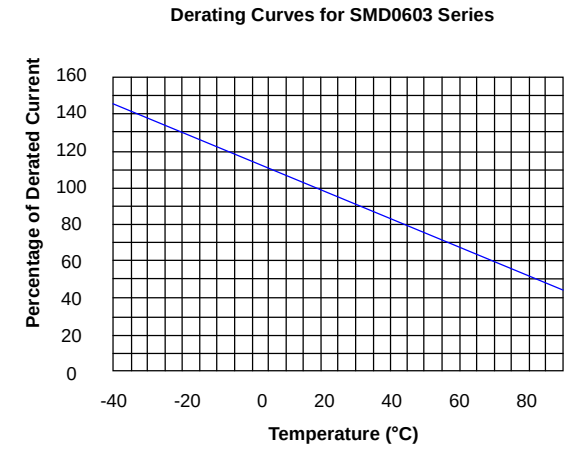
$Ri_{min/max}$ = Minimum/Maximum device resistance prior to tripping at 25°C.

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

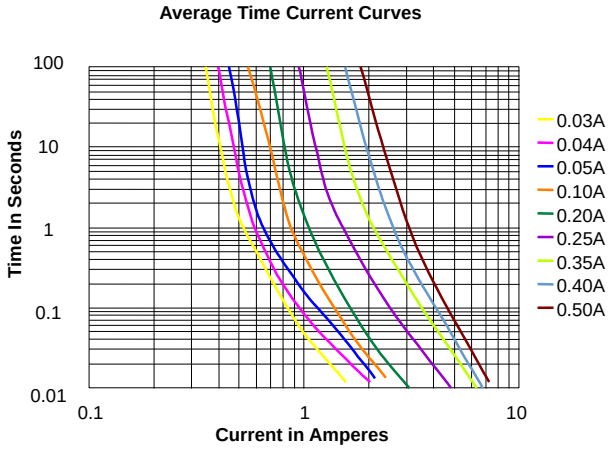
Thermal Derating Chart-IH (A)

Part Number	Maximum ambient operating temperatures (℃)								
	-40	-20	0	25	40	50	60	70	85
SMD0603P003TF	0.042	0.038	0.035	0.03	0.026	0.021	0.018	0.015	0.011
SMD0603P004TF	0.056	0.05	0.046	0.04	0.034	0.028	0.024	0.02	0.014
SMD0603P005TF	0.07	0.063	0.058	0.05	0.043	0.035	0.03	0.025	0.018
SMD0603P010TF	0.14	0.125	0.115	0.10	0.085	0.07	0.06	0.05	0.035
SMD0603P020TF	0.28	0.25	0.23	0.20	0.17	0.14	0.12	0.10	0.07
SMD0603P025TF	0.35	0.31	0.29	0.25	0.21	0.18	0.15	0.13	0.09
SMD0603P030TF	0.42	0.38	0.35	0.30	0.26	0.21	0.18	0.15	0.11
SMD0603P035TF	0.47	0.44	0.39	0.35	0.30	0.27	0.24	0.20	0.14
SMD0603P040TF	0.54	0.50	0.45	0.40	0.34	0.31	0.27	0.23	0.16
SMD0603P050TF	0.67	0.63	0.56	0.50	0.43	0.39	0.34	0.29	0.20

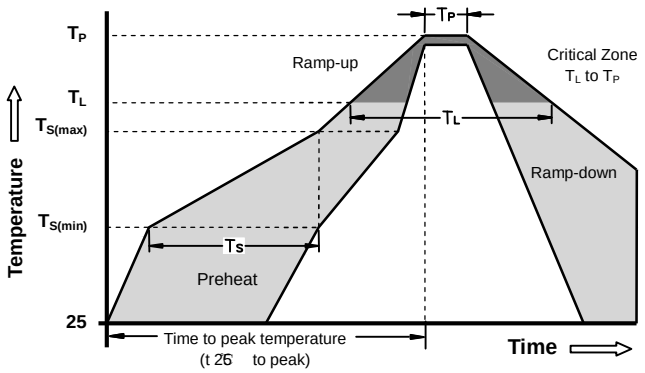
Thermal Derating Curve



Average Time-Current Curve

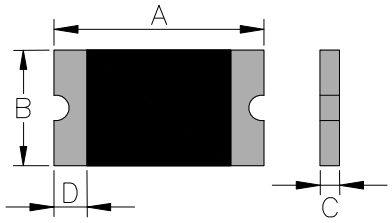
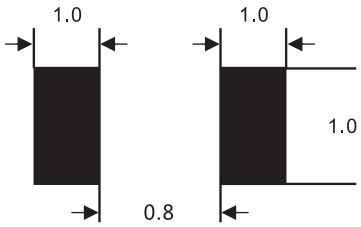


Soldering Parameters



Reflow Condition		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 Seconds
Average ramp up rate (Liquids Temp T_L) to peak		3°C/second max
$T_{S(max)}$ to TL - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_L) (Liquids)	217°C
	- Time (min to max) (t_s)	60 -150 Seconds
Peak 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
Do not exceed		260°C

Recommended pad layout (mm)

Average Time Current Curves (mm)	Recommended pad layout (mm)
	

Product Dimensions

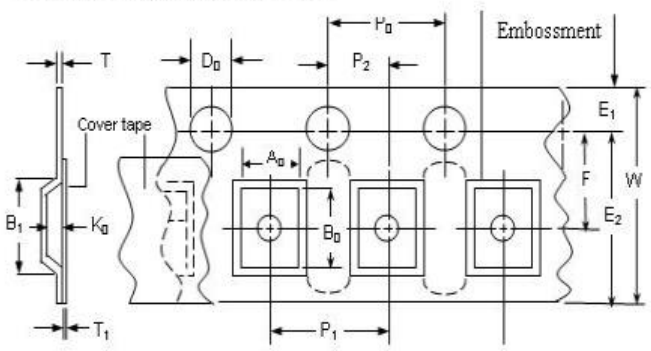
Unit ：mm

Part Number	Marking	A		B		C		D		E
		Min	Max	Min	Max	Min	Max	Min	Max	Max
SMD0603P003TF	-	1.45	1.85	0.65	1.05	0.40	0.75	0.15	0.50	0.40
SMD0603P004TF	-	1.45	1.85	0.65	1.05	0.40	0.75	0.15	0.50	0.40
SMD0603P005TF	1	1.45	1.85	0.65	1.05	0.40	0.75	0.15	0.50	0.40
SMD0603P010TF	1	1.45	1.85	0.65	1.05	0.40	0.75	0.15	0.50	0.40
SMD0603P020TF	2	1.45	1.85	0.65	1.05	0.40	0.75	0.15	0.50	0.40
SMD0603P025TF	2	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.50	0.40
SMD0603P030TF	3	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.50	0.40
SMD0603P035TF	3	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.50	0.40
SMD0603P040TF	5	1.45	1.85	0.65	1.05	0.50	1.20	0.15	0.50	0.40
SMD0603P050TF	5	1.45	1.85	0.65	1.05	0.50	1.20	0.15	0.50	0.40

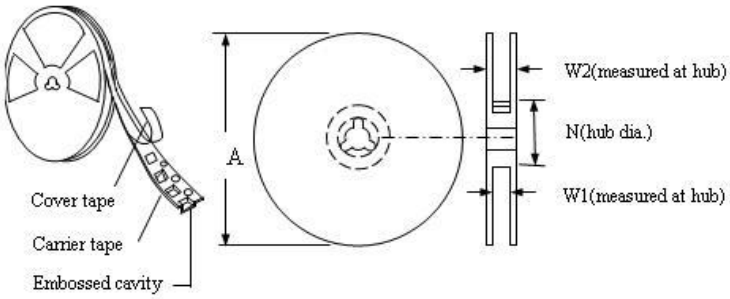
Taping and Reel Specifications

Covering Specifications EIA 481-1(Unit:mm)	
W	8.00± 0.10
P_0	4.0 ± 0.10
P_1	4.0± 0.10
P_2	2.0 ± 0.05
A_0	0.95 ± 0.10
B_0	1.85± 0.05
D_0	1.55± 0.05
F	3.50± 0.05
E_1	1.75 ± 0.10
T	0.20± 0.02
Leader min.	390
Trailer min.	160
Reel Dimensions	
A	178±1.0
N	59±1
W_1	8.5+1.0/-0.2
W_2	12.0±1

EIA Tape Component Dimentions



EIA Reel Dimentions



Packaging Quantity

Quantity	4000		5000	
Part Number	SMD0603P030TF	SMD0603P035TF	SMD0603P003TF	SMD0603P004TF
	SMD0603P040TF		SMD0603P005TF	SMD0603P010TF
			SMD0603P020TF	SMD0603P025TF
			SMD0603P050TF	