Sinochip Electronics Co.,LTD.

Engineering Product Specification

F0603 Series

Rev. #	Revision Description	Date	Author	Appr.
A	Original	3/26'07	SEA	C．X．M．
B	Add Application;Update UL No.;Correct Interrupting Rating.	8/22'08	Jesse	SEA
C	Add Halogen-free,Update Interrupting Rating from 35A to 50A.	9/25'08	Jesse	SEA
D	Update Item 2、Item 9.	11/05'08	Jesse	SEA
E	Update Cold Resistance & Electrical Characteristics	1/06'09	Jesse	Alan
F	Update Cold Resistance & Electrical Characteristics	7/15'09	Rock	Alan

Table of Contents

1. Scope

This Specification applies to F0603 series SMD fuses.

2. General

- Fast acting
- 1.6mm×0.8mm physical size
- Thick film manufacturing method,ceramic substrate, silver fusing element
- Higher temperature profiles
- Excellent environmental integrity
- RoHS compliant
- Halogen-free

3. Manufacturer and Production Facility

- Manufacturer

  Nanjing Sinochip Technology & development Co.,
  Ltd. Qingma Road 6#
  Maqun Science & Technology Park
  Nanjing City, Jiangsu Province, P. R. China
  Phone: 086-25-52153215
  Fax: 086-25-52157065

4. Agency / Certificate Information

- UL Recognition Card:

  JDYX2.E319540, JDYX8.E319540

- ISO 9001:2000, Certificate Number 10807Q10334ROS

5. Catalog Symbol

Example F0603-1.0A

F 0603-1.0A

① ② ③ ④

①. Symbol of SINOCHIP Electrical Characteristic: F = Fast acting

②. Size Number

③. Ampere Rating: 1A

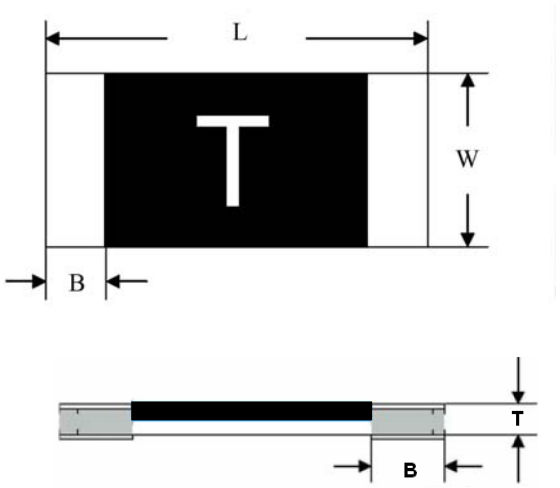
6. Ordering Information

Part Number	Marking	Current Rating (A)	Voltage Rating (V)	Interrupting Rating 32V DC	Typical Cold DCR* (Ω)	Nominal I^2T** (A^2S)
F0603 -0.5A	F	0.50	32	50A	0.940	0.0067
F0603-0.75A	G	0.75	32	50A	0.448	0.0087
F0603-1.0A	H	1.00	32	50A	0.252	0.0150
F0603-1.5A	K	1.50	32	50A	0.108	0.0365
F0603-2.0A	N	2.00	32	50A	0.058	0.0595
F0603-2.5A	O	2.50	32	50A	0.043	0.1222
F0603-3.0A	P	3.00	32	50A	0.044	0.1350
F0603-3.5A	R	3.50	32	50A	0.032	0.1891
F0603-4.0A	S	4.00	32	35A	0.019	0.3559
F0603-5.0A	T	5.00	32	35A	0.0135	0.7030
F0603-6.0A	6	6.00	32	35A	0.0115	0.8861

* Measured at≤10% rated current and 25℃.

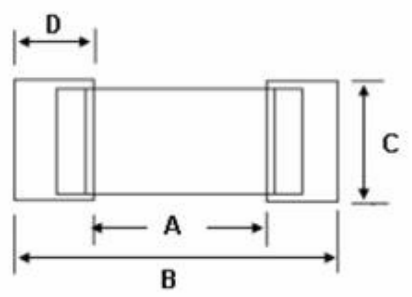
** Melting I^2T at 10 times of rated current.

7. Shape & Dimensions: (mm)



L	W	T	B
1.60±0.15	0.80±0.15	0.40±0.10	0.30±0.10

8. Recommended Land Patterns: (mm)



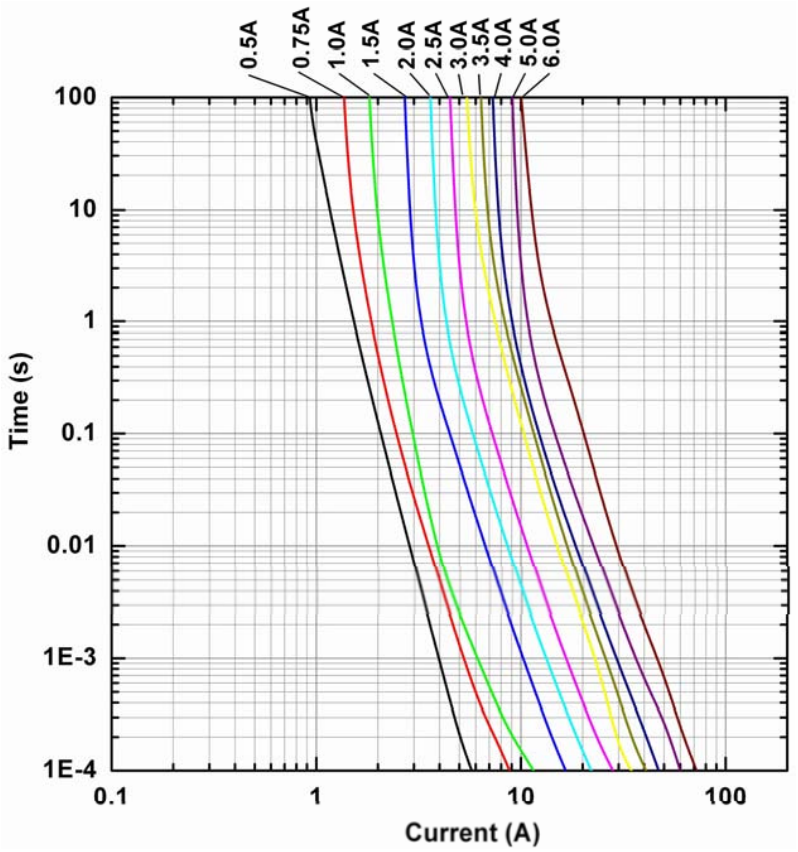
A	B	C	D
1.0±0.2	2.50±0.3	0.8±0.2	1.2±0.3

9. Materials:

	Components	Material
1	Substrate	Ceramic
2	Terminations	Silver over-plated with tin (100%)
3	Element	Silver or Silver / Palladium

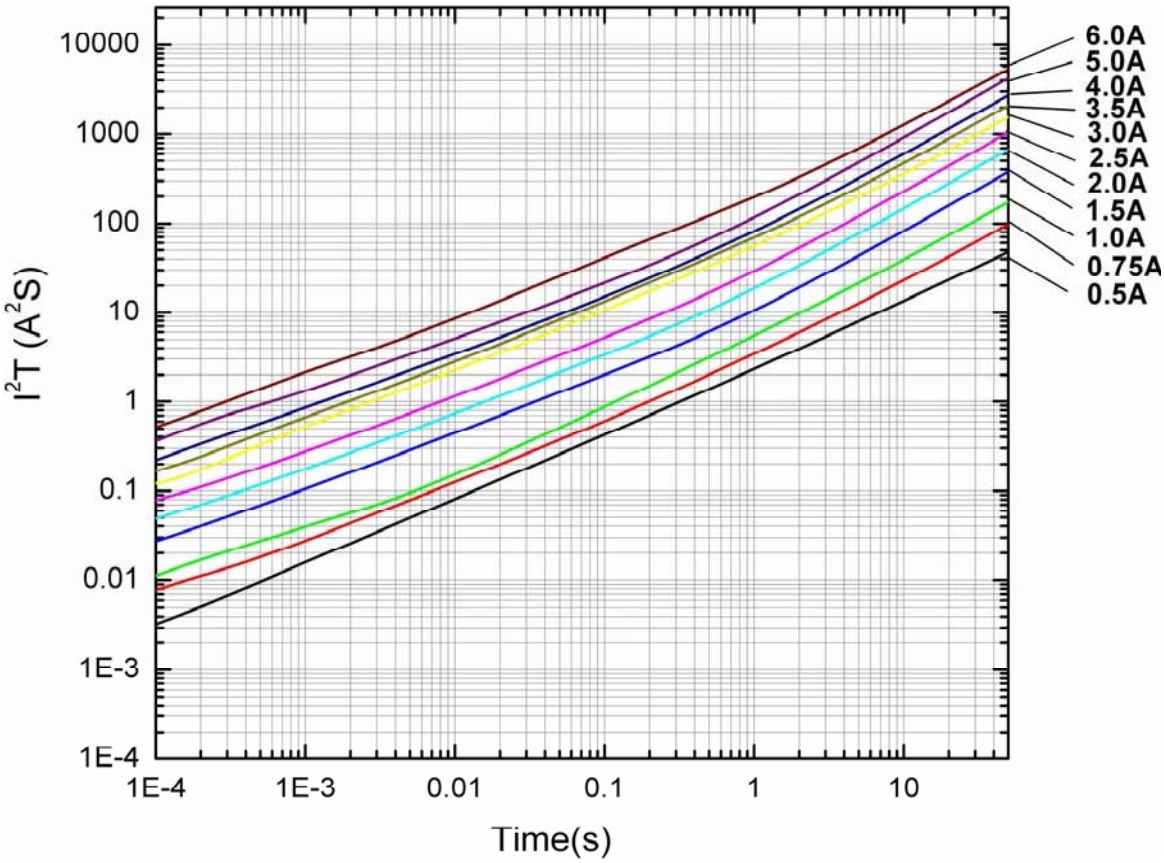
10. Time Current Curve:

Electrical Characteristics		
Ampere Rating	**% of Current Rating**	**Opening Time**
500mA-6A	100%	4 Hours Min.
500mA-750mA	200%	60 Seconds Max.
500mA-6A	250%	5 Seconds Max.



Title: Engineering Product Specification F0603 Series	Revision: F
Printed on: 7/15'09	Page 8 of 13

11. I^2T vs Time Curve:



Title: Engineering Product Specification F0603 Series	Revision: F
Printed on: 7/15'09	Page 9 of 13

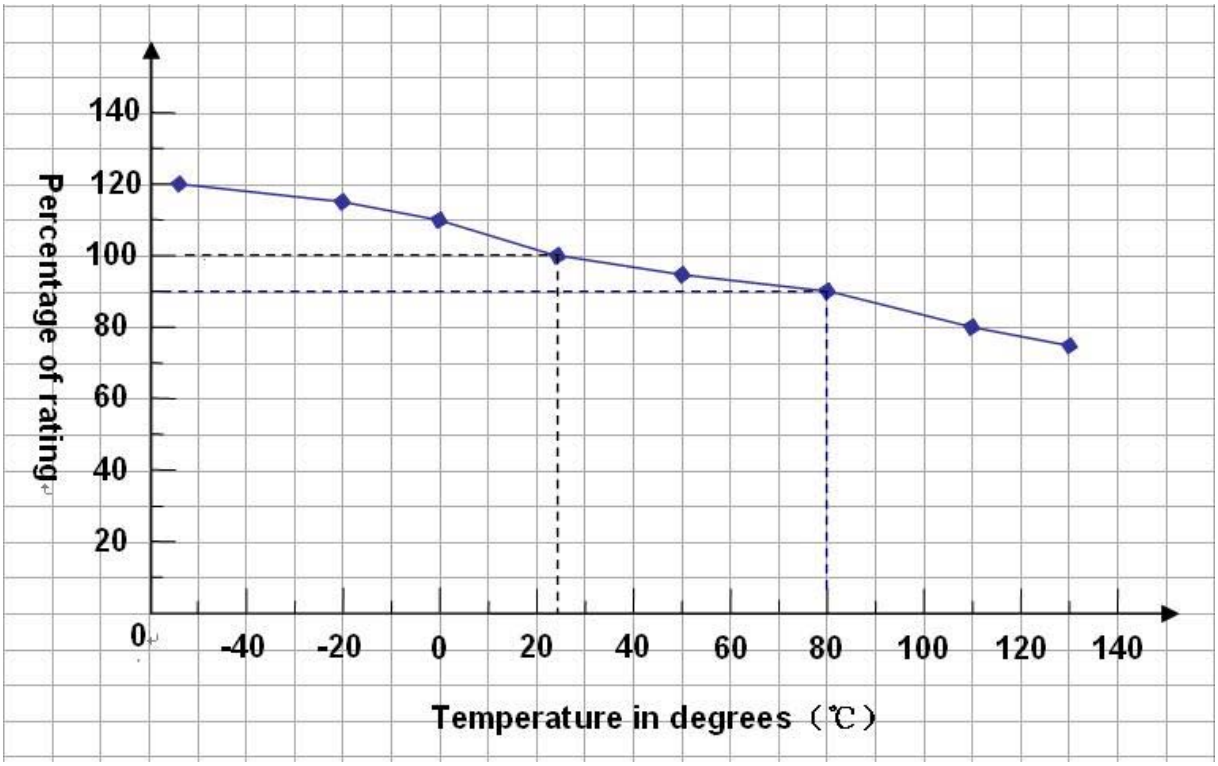
12. Temperature Derating Curve: (Ambient temperature on current-carrying capacity)

- **For Circuit,current rating shall be derated in accordannce with the figure.**
- **This current derating curve is for fusing characterisics.**

Example,

Work Temp:80℃, Temp derating factor = 90%

Melting $I^2t_{fuse} \geqslant I^2t_{pulse} / Fp / 0.9$



13. Reliability Test:

Characteristics	Test condition / Methods	Requirement	Test Reference
Carrying capacity	100% of its rated current	No Fusing，4hr min	Refer to SINOCHIP File
Fusing Time	200% of its rated current（500~750mA）	Within 60sec	Refer to SINOCHIP File
	250% of its rated current	Within 5sec	Refer to SINOCHIP File
Solderability	235°C±5 ℃, 3s±0.5s	95% coverage min	IEC60127/A.3.3; IEC60068-2-20; MIL-STD-202 Method 208H
Resistance to soldering	260°C±5℃, 10s±0.5s	△R:<10%	MIL-STD-202 Method 210
Bending test	Distance between holding points：90mm，Bending：1mm，1time，10sec	(1) No mechanical damages (2) △R: <10%	Refer to SINOCHIP File
High Temperature Operating Life	96hours, 125℃ at 60% rated current. Measure cold resistance and Time-Current characteristics.	(1)△R: <10%; (2)100% of Rating Current, Opening time >4 hours (3)200% of Rating Current, Opening time <60 seconds	MIL-STD-202 Method 108
Moisture Resistance	10 Cycles. Measure cold resistance and Time-Current characteristics.	(1)△R: <10%; (2)100% of Rating Current, Opening time >4 hours (3)200% of Rating Current, Opening time <60 seconds	MIL-STD-202 Method 106
High Temperature Exposure	1000 hrs. @ T=125℃. Unpowered. Measure cold resistance. and Time-Current characteristics.	(1)△R: <10%; (2)100% of Rating Current, Opening time >4 hours (3)200% of Rating Current, Opening time <60 seconds	MIL-STD-202 Method 108
Insulation Resistance	DC resistance	0.1MΩ min	IEC60127-4
ON /OFF Cycle Test	Surge current and 100% rated current; 50s ON; 10s OFF; 100,000 Cycles	(1)No open; (2)100% of Rating Current, Opening time >4 hours (3)200% of Rating Current, Opening time <60 seconds	Refer to SINOCHIP File

Salt spray	5% salt solution，48 hours exposure	△R: <10%	MIL-STD-202 Method 101	
Thermal Shock	10 cycles between -55°C/+125°C, 30 minutes @each extreme	No mechanical damage; △R: <10%	IEC 60068-2-14	
Interrupting Ability	Loading current 50A	without permanent arcing,ignition and bursting of fuse link	UL248-14	

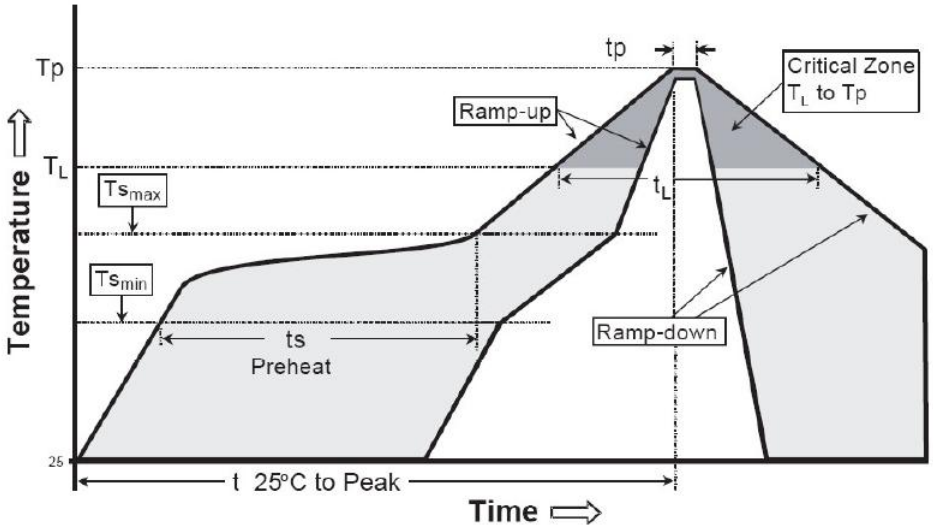
14. Recommended Solder Curve:

14.1 Infrared Reflow

14.1.1 Temperature:260℃

14.1.2 Time:30 Seconds Maximum

14.1.3 Recommend Reflow profile



Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate(Ts_{max} to Tp)	3℃/second max.
Preheat Temperature Min(Ts_{min}) Temperature Max(Ts_{max}) Time(Ts_{min} to Ts_{max})	150℃ 200℃ 60-120 seconds
Peak Temperature(Tp)	260℃
Time within 5℃ of actual Peak Temperature(Tp)	20-40 seconds
Ramp-Down Rate	6℃/second max.
Time 25℃ to Peak Temperature	8 minutes max.

14.2 Wave soldering

14.2.1 Reservoir Temperature:260℃

14.2.2 Time in Reservior:10 Seconds Maximum

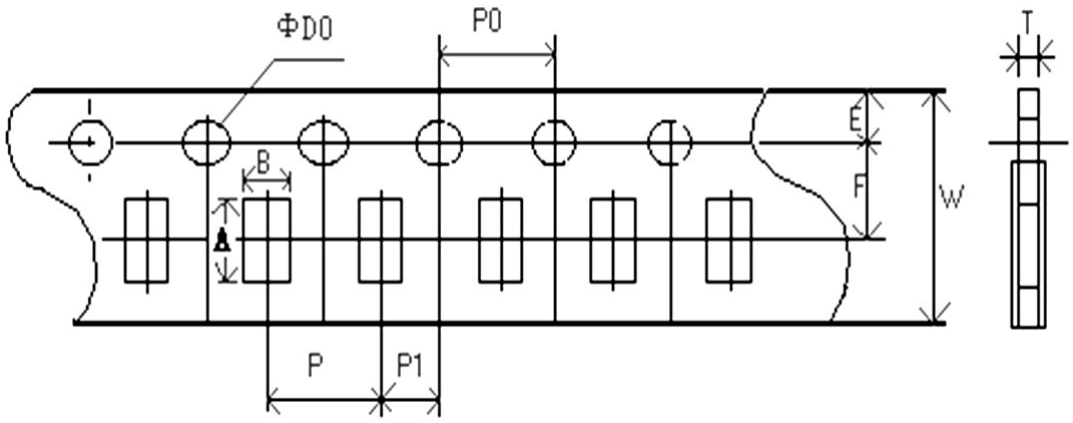
14.3 Hand Soldering

14.3.1 Temperature:380℃

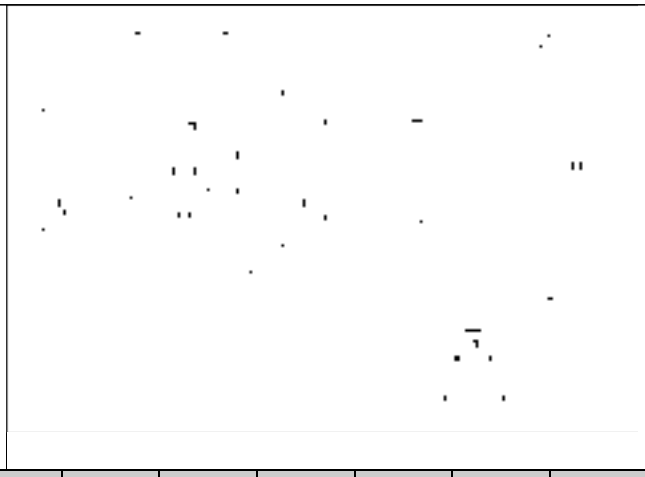
14.3.2 Time:5 Seconds Maximum

15. Packaging:

• 5,000 pieces of fuses in paper taper and reeled on a 178mm(7 inch) reel.



Type	A	B	W	F	E
F0603	1.85±0.10	1.10±0.10	8.00±0.20	3.50±0.05	1.75±0.10
Type	**P**	**P0**	**P1**	**D0**	**T**
F0603	4.00±0.10	4.00±0.10	2.00±0.05	1.50±0.10	0.60±0.10



Type	M	W	T	A	B	C	D
F0603	178 ±2.0	10.0 ±1.5	12.0 ±2.0	2.5 ±0.5	13.0 ±0.5	31.0 ±1.0	80.0 ±1.0

16. Storage:

- **The maximum ambient temperature shall not exceed 40℃.Storage temperature higher than 40℃ could result in the deformation of packaging materials.**
- **The maximum relative humidity recommended for storage is 65%.High humidity with high temperature can accelerate the oxidation of the solder plating on the termination and reduce the solderability of the components.**
- **Sealed plastic bags with desiccant shall be used to reduce the oxidation of the termination and shall only be opened prior to use. The products shall not be stored in areas where harmful gases containing sulfur or chlorine are present.**

17. Application:

- **Battery pack**
- **PC related equipment and peripherals (Hard drive,Printer,etc.)**
- **Portable devices (Mobile phone,PDA battery charger,etc.)**
- **Digital camera (Digital still camera)**
- **Game equipment**
- **LCD monitor,LCD modules**
- **Wireless basestation**

END