

## 1. 适用范围 / SCOPE

此份规格书仅涵盖0603FF系列产品。

This specification covers 0603FF series devices, which is SMD Fuse.

## 2. 产品名称及编码 / TYPE NUMBER & PART NUMBER

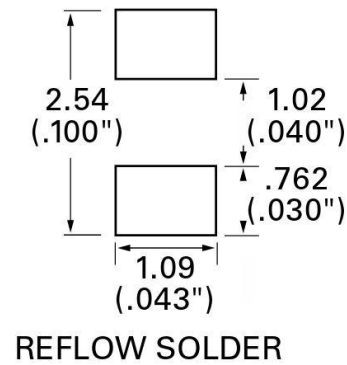
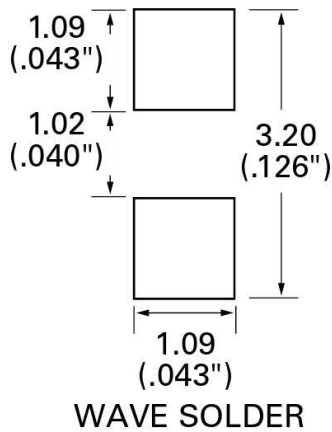
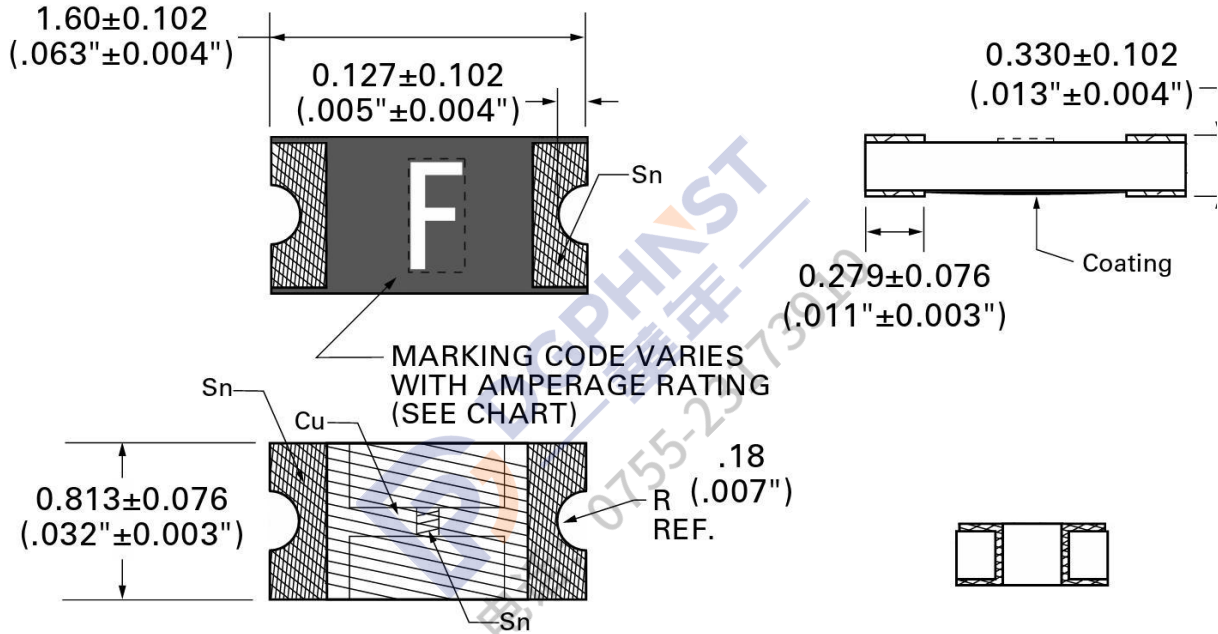
产品名称/ TYPE NUMBER

0603FF	****A	****V
1	2	3

- (1) 系列号: 0603FF (尺寸: 0.06×0.03; 熔断特性:快断 )  
Series Number: 0603FF (Size: 0.06×0.03; Melting characteristic:Fast Acting)
- (2) 额定电流: (例如:3.5A=3.5 安培)  
Rating Current : (Ex. :3.5A = 3.5 Ampere)
- (3) 额定电压: (例如:32V=32 伏特 )  
Rating Voltage : (Ex. :32V = 32 Volt)

### 3. 产品尺寸和结构 / SIZE AND STRUCTURE

3-1 尺寸 (单位: mm) / SIZE (Unit: mm)



#### 4. 基本信息/ ORDERING INFORMATION

Part NO. 料号	Rated voltage 额定电压 (DC)	Rated Current 额定电流 (A)	Breaking Capacity 分断电流	Typical Cold Resistance (mOhms) <sup>2</sup> 标准冷电阻	Typical Pre-Arcing I <sup>2</sup> T (A <sup>2</sup> Sec) 熔化热值	Marking 标记
0603FF200mA	24V 32V 48V 63V	0.20	50A	0.42	0.0028	D
0603FF375mA		0.375		0.28	0.0052	E
0603FF500mA		0.50		0.20	0.0088	F
0603FF750mA		0.75		0.15	0.018	G
0603FF1A		1.0		0.072	0.022	H
0603FF1.5A		1.50		0.047	0.053	K
0603FF2A		2.0		0.037	0.10	N
0603FF2.5A		2.5		0.029	0.17	O
0603FF3A		3.0		0.024	0.19	P
0603FF3.5A		3.5		0.019	0.25	R
0603FF4A		4.0		0.016	0.36	S
0603FF5A		5.0		0.012	1.30	T

说明/Notes :

- a. “典型电阻”是在通以小于额定电流的 10%的弱电流条件下量测的阻抗。  
Nominal Resistance measured with < 10% rated current ;
- b. “典型 I<sup>2</sup>t”是指自通电至作动时间为 8ms 的过程所对应的 I<sup>2</sup>t。  
Nominal Melting I<sup>2</sup>t measured at 8 m sec opening time ;
- c. 标准冷电阻公差范围+/-25%. Standard cold resistance tolerance range +/-25% ;

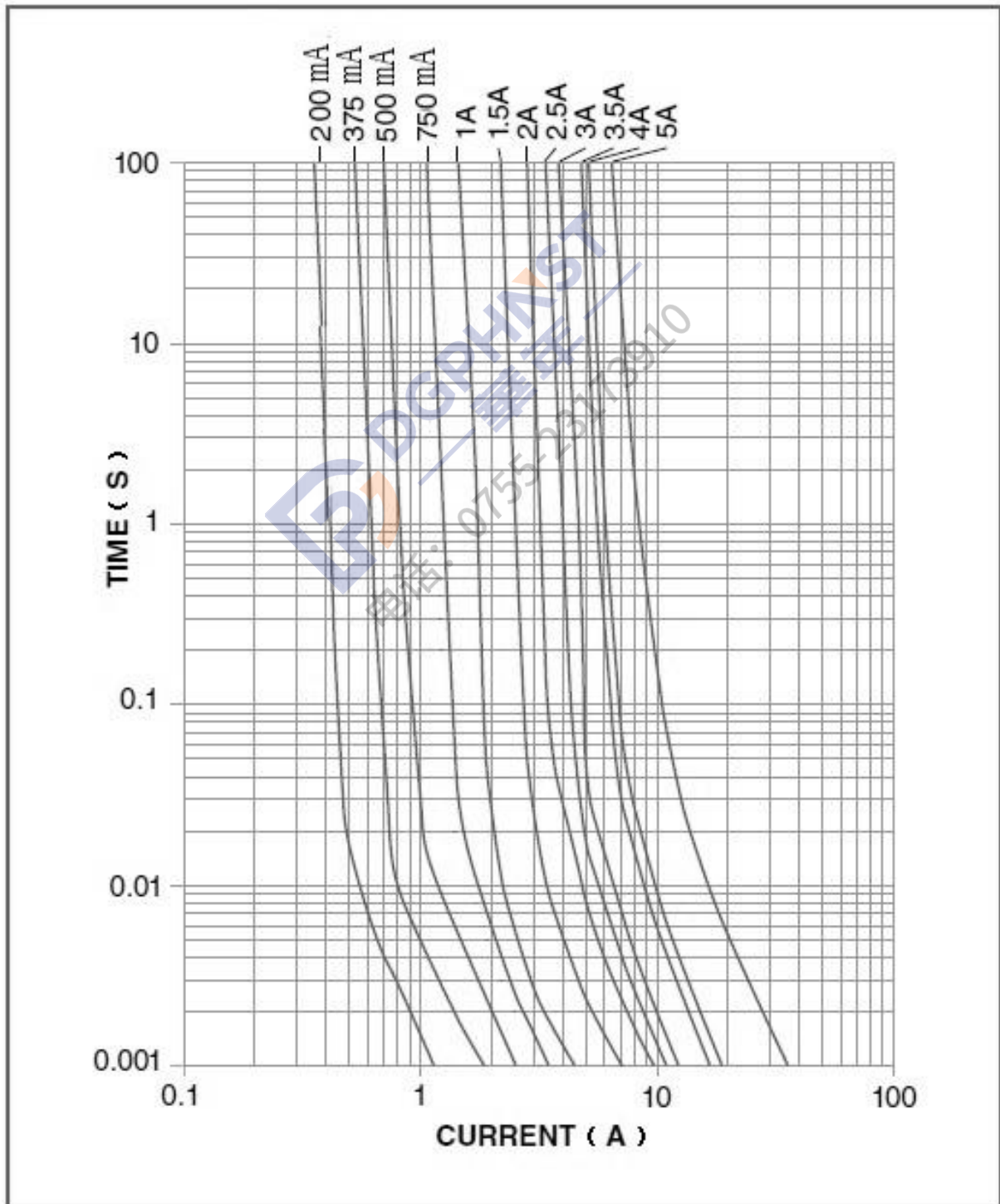
#### 5. 电气特性 / ELECTRICAL CHARACTERISTICS

5-1 时间-电流特性/ Pre-Arcing Time-Current Characteristics (limits)

RATED CURRENT	1.0 I <sub>N</sub> /倍	2.0 I <sub>N</sub> /倍	3 I <sub>N</sub> /倍
200mA to 5A	Min	Max	Max
	4 hrs	5s	0.2s

I<sub>N</sub> : 25°C下额定电流 / Rating Current at 25°C

5-2 时间-电流特性曲线 / Time-Current Curve:



## 6. 产品特性及信赖性测试规范/PRODUCT CHARACTERISTICS AND RELIABILITY TEST STANDARD

序号 NO.	项目 Item	内容 Contain	判断标准 Criteria
1	时间/电流特性 Time/current characteristics	通1.0In、2.0In、3.0In电流，测试熔断时间  I= 1.0In、2.0In、3.0In Test time	各电流条件下测试时间符合规定值 Value of time measured in different currents is within spec. UL248-1/-14
2	分断能力测试 Breaking capacity	V =63V DC ; I=50A	没有持续电弧、燃烧、爆炸现象 No a permanent arcing, ignition, bursting UL248-1/-14
3	可焊性 Solder ability	锡炉温度245℃ ± 5℃，浸入深度2.0mm ± 0.5mm，浸锡时间5±0.5s，放在20X的放大镜下检查湿润率 T=245℃±5℃，t=5s±0.5s； magnifier：20X	湿润率盖率≥95% Cover ≥95% MIL-STD-202 Method 208
4	抗焊性测试 Soldering heat resistance	锡炉温度T =250℃ ± 5℃，浸锡时间t =30 ± 5s  T=250±5℃，t=30±5s	外观无裂纹/损伤，标识清晰可辨；前后阻值偏差≤15%； No crack and damage, Marking is easily legible ΔR<15% MIL-STD-202, Method 210F, Condition K
5	冷热冲击 Thermal Shock	-65℃，停留15min，→25℃，停留5min→125℃停留15min；循环次数为100次  -65℃ 15min→25℃ 5min→+125℃15min； 100 cycles	外观无裂纹/损伤，前后阻值偏差<10% No crack and damage, ΔR<10%  MIL-STD-202, Method 213B
6	机械冲击 Mechanica Shock	峰值100 G,持续时间11ms,波形：半正弦，五次脉冲 a= 100G for 11ms, 5pulses	外观无裂纹和损伤，前后阻值偏差< ± 10%。 No crack and damage, ΔR<10% MIL-STD-202, Method 213B
7	振动测试 Vibration	承受振幅为0.03英寸(全程最大0.06英寸),频率在大约10Hz到55Hz的范围均匀地变化的简谐运动)	MIL-STD-202, Method 201A
8	高频振动测试 Vibration, High Frequency	20g's 峰值，公差值为±10%，振动频率10Hz-2000Hz，总计时间为12h	MIL-STD-202, Method 204D, Condition D
9	盐雾试验 Salt spray test	1.溶液浓度：5 ± 0.1% 2.PH值：6.5~7.2 3.试验箱温度：35 ± 2 ° C，压力桶温度：47 ± 1℃ 4.连续放置48小时	1.外观正常，无明显变色等变化 2.冷电阻值变化小于±10% 3.测试后从中抽取样品校正额定电流，运行4h不熔断。 GB/T2423.17-2008
10	弯曲试验 Bending test	1.将保险丝焊接在测试板上 2.将试验板放在弯曲夹具上，试验板 3.以1mm/s的速度将试验板弯曲1mm， 保持时间60s	1.保险丝焊盘无明显的裂缝； 3.试验前后阻值变化≤15% 3.通100%In电流，4H内不熔断 IEC 60127

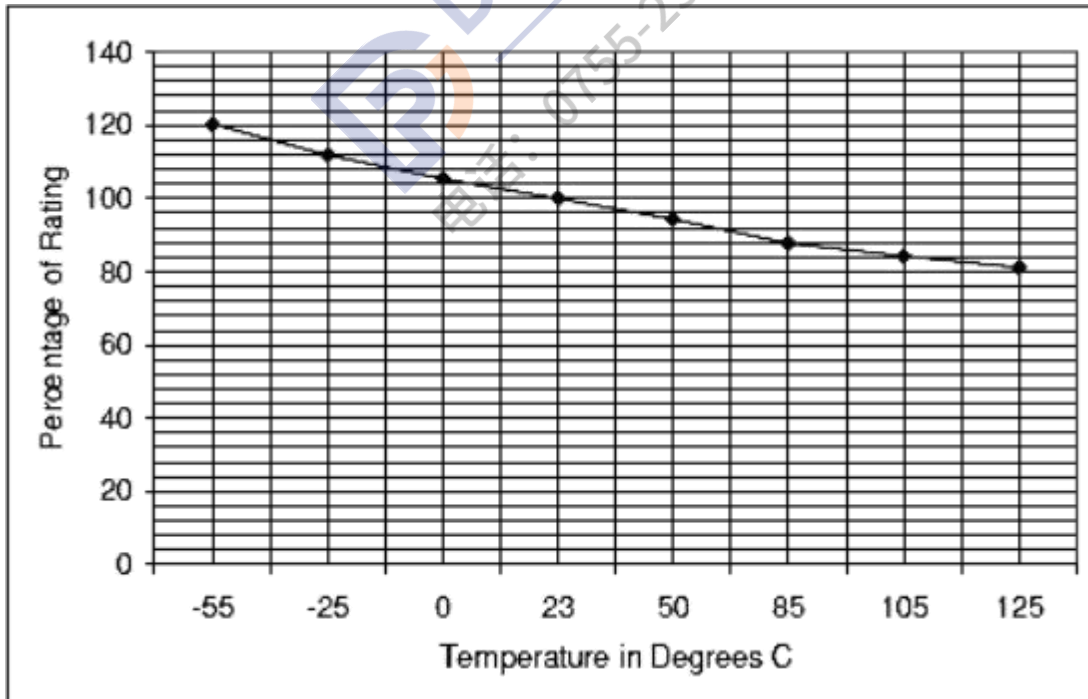
## 7. 环境特性 / ENVIRONMENTAL C

7-1 操作温度范围:  $-55^{\circ}\text{C} \sim 125^{\circ}\text{C}$  / Operating Temperature:  $-55^{\circ}\text{C} \sim 125^{\circ}\text{C}$ , 若贵司操作环境温度超出  $23 \pm 3^{\circ}\text{C}$  范围, 在选用保险丝规格时, 需考虑操作环境温度对保险丝的影响。请参照: 温度-电流曲线图。

When choosing the fuse's specification, if the operating environmental temperature beyond the scope from  $20 \sim 26^{\circ}\text{C}$ , you should consider the environmental temperature's affection to fuses.

please refer:

Temperature-Current curve:



### 7-2 存储条件 / Storage Conditions

在温度  $10^{\circ}\text{C} \sim 40^{\circ}\text{C}$ 、相对湿度  $\leq 75\%$  的密闭条件下可存放 2 年。

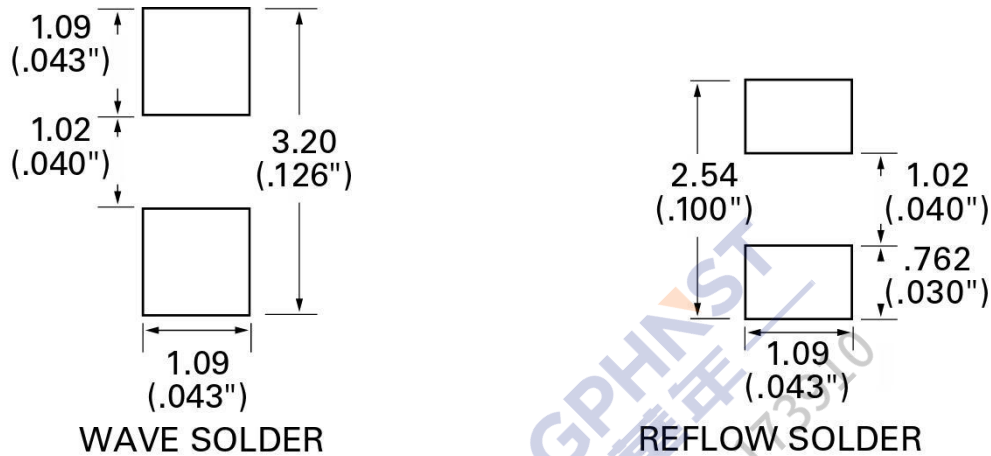
Under airtight in temperature  $10^{\circ}\text{C} \sim 40^{\circ}\text{C}$ 、relative humidity  $\leq 75\%$  can store 2 years.

在温度  $10^{\circ}\text{C} \sim 40^{\circ}\text{C}$ 、相对湿度为  $95\%$  的非露天下最多可存放 30 天。

Without dew in temperature  $10^{\circ}\text{C} \sim 40^{\circ}\text{C}$ 、relative humidity be  $95\%$  maximum value for 30days.

## 8. 焊垫尺寸及焊接条件 / SOLDER PAD SIZE AND WELDING CONDITIONS

### 8-1 焊垫尺寸建议 / Recommended Size of the Pad.



### 8-2 焊接参数建议 / Recommended Customer Soldering Parameters

温度曲线 Temperature Condition

预热段 : 145 ± 15°C, max. 120 sec

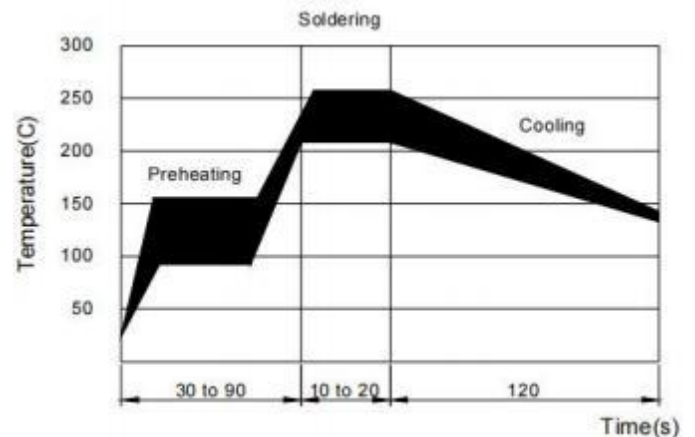
Preheating : 145 ± 15°C, max. 120 sec.

焊锡段 : min. 220°C, max. 60 sec.

Soldering: min. 220°C, max. 60 sec.

允许最高温度 : 260±5°C, max. 10sec.

Maximum temperature : 260±5°C, max. 10sec.



允许烙铁焊接条件(热风设备): 350°C, 3~5seconds

Rework Temperature (hot air equipment) : 350°C, 3~5seconds

### 8-3 焊接方法建议 / Recommended Reflow Methods

焊接热源方式可用红外线, 热蒸气, 热风

IR, vapor phase oven, hot air oven.

如果焊锡温度超过允许最高温度, 则产品本身会有功能损坏的疑虑

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

## 9. 批量生产出货测试项目 / LOT ACCEPTANCE TEST REQUIREMENTS

### 9-1 外观 / Visual

方法：利用放大镜进行检查

Procedure: Visual

标准：不能有脏污、不洁、文印错误、破损等

Acceptance Criteria: No parts are outstandingly stained.

### 9-2 尺寸 / Dimensions

方法：使用合适且经校正的标尺

Procedure: As appropriate, calipers, micrometers, optical comparator, or approved gages.

标准：尺寸均在规定标准范围内

Acceptance Criteria: No parts outside specific dimensions.

### 9-3 时间-电流特性 / Time-Current Characteristics

方法：测试电流 $I=1.0I_n$ ； $2.0I_n$ ； $3.0I_n$ ；量测出个别电流下的对应时间

Procedure： $I=1.0I_n$ ； $2.0I_n$ ； $3.0I_n$ ；and measure the value of time individually by meter at  $25^{\circ}\text{C}$

标准：对应时间值均在规定标准范围内/Acceptance Criteria: All parts must within the specific .

### 9-4 分断能力 / Breaking Capacity

方法：测试电压\电流为 $V = 63\text{VDC}$ ； $I=50\text{A}$ ，利用此条件冲击元件

Procedure:  $V = 63\text{VDC}$ ； $I=50\text{A}$

标准：元件不发生持续电弧燃烧及爆裂

Acceptance Criteria: No permanent arcing, ignition, bursting

## 10. 安全认证及编号 / STANDARDS AND APPROVALS

UL

E213695

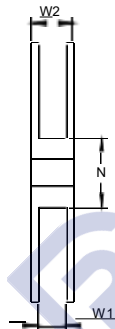
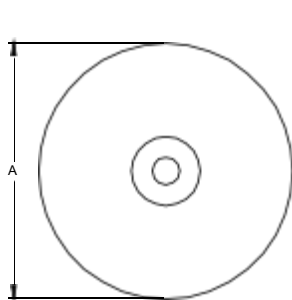


## 11. 包装讯息 / PACKING INFORMATION

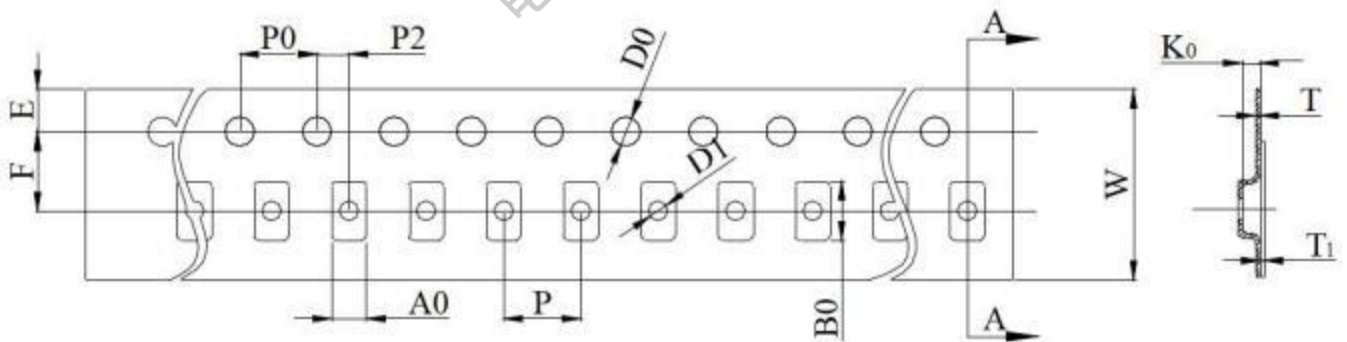
### 11-1 包装数量 / QUANTITY

编码 Part Number	数量 (pcs) Quantity(pcs)
<b>0603FF *A*V</b>	<b>5,000</b>

### 11-2 卷轮规格 / Reel & Tape specifications



<b>A ± 5</b>	<b>N ± 2</b>	<b>W1 +1/-0</b>	<b>W2 Max.</b>
<b>178</b>	<b>60</b>	<b>8.4</b>	<b>12.4</b>

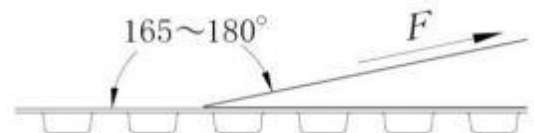


<b>W</b>	<b>8.00 ± 0.30</b>	<b>D0</b>	<b>1.50 ± 0.10</b>
<b>P0</b>	<b>4.00 ± 0.10</b>	<b>F</b>	<b>3.50 ± 0.10</b>
<b>P</b>	<b>4.00 ± 0.10</b>	<b>E</b>	<b>1.75 ± 0.10</b>
<b>P2</b>	<b>2.00 ± 0.10</b>	<b>T</b>	<b>0.80 ± 0.05</b>
<b>A0</b>	<b>1.2 ± 0.15</b>	<b>T1</b>	<b>Max. 0.1</b>
<b>B0</b>	<b>1.95 ± 0.15</b>	<b>K0</b>	<b>Max. 0.1</b>

### 11-3 密封胶膜剥离强度要求 / Peeling Strength of Seal Tape

F = 剥离强度 : 0.3 – 1.0N ( 30 - 100gf )

F = Peeling Strength: 0.3 – 1.0N (30 - 100gf )



## 12. 其他 / OTHERS

12-1 如果在使用中有超出本规格书的要求，必须经由双方协商确认。

In the event that an impropriety is found beyond this specification ,it shall be fixed by mutual agreement between the parties.

12-2 如果本规格书有不适当的情况，必须通过双方协商并由本公司修改。

In the event that an impropriety is found in this specification , LANBAO ELECTRICAL APPLIANCES CO. LTD. shall amend it by mutual agreement between the parties.

DGPHASE  
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版次	制作	确认	审核
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## JDYX2.E213695 - Fuses, Supplemental - Component

## Fuses, Supplemental - Component

ZHONG SHAN LANBAO ELECTRICAL APPLIANCES CO LTD

E213695

West Xing Pu Rd

Huang Pu

Zhongshan, Guangdong 528429 China

Cat. No.	Size mm(in)	Amps (A)	Volts (V)	Interrupting Rating (A)
<b>Supplemental fuses</b>				
<b>2C</b>	5 x 20 (0.20 x 0.79)	0.1-2.5	250Vac	100
		5-12.5	250Vac	100
<b>2F</b>	5.2 x 20 (0.20 x 0.79)	2.5-6.3	250Vac	100
		0.1-2	250Vac	35
<b>2T</b>	5.2 x 20 (0.20 x 0.79)	0.1-0.4	250Vac	35
		0.5-1.0	250Vac	35
		1.1-5.0	250Vac	100
		6.0-15	250Vac	100
<b>3F</b>	6.3 x 32 (0.25 x 1.26)	0.1-10	250Vac	100
		12-15	250Vac	100
<b>3T</b>	6.3 x 32 (0.25 x 1.26)	0.1-10	350Vac	100
		10.1-20	350Vac	100
<b>RFI-20</b>	5.2 x 20 (0.20 x 0.79)	0.1-2.0	250Vac	35
		2.5-6.3	250Vac	100
<b>RFI-30</b>	6.3 x 32 (0.25 x 1.26)	0.1-10	250Vac	100
		12-15	250Vac	100
<b>RTC-20</b>	5 x 20 (0.20 x 0.79)	0.1-2.5	250Vac	100
		5-12.5	250Vac	100

<b>RTI-20</b>	5.2 x 20 (0.20 x 0.79)	0.1-0.4	250Vac	35
		0.5-1.0	250Vac	35
		1.1-5.0	250Vac	100
		6.0-15	250Vac	100
<b>RTI-30</b>	6.3 x 32 (0.25 x 1.26)	0.1-10	250Vac	100
		10.1-20	250Vac	100
<b>Supplemental fuses: pigtail leads</b>				
<b>2P</b>	5.2 x 20 (0.20 x 0.79)	2.5-6.3	250Vac	100
		0.1-2	250Vac	35
<b>RFP-20</b>	5.2 x 20 (0.20 x 0.79)	0.1-2.0	250Vac	35
		2.5-6.3	250Vac	100
<b>Supplemental fuses: filled-tube, cartridge enclosed</b>				
<b>LB630</b>	6.4 x 31.8 (0.25 x 1.25)	0.1-30	750Vac	500
		0.1-30	750Vdc	500
		0.1-30	500Vac	500
		0.1-30	500Vdc	500
		0.1-30	250Vac	500
		0.1-30	250Vdc	500
<b>Supplemental fuses: pigtail leads, filled-tube, cartridge enclosed</b>				
<b>LB630(P)</b>	6.8 x 32.5 (0.27 x 1.28)	0.1-30	750Vac	500
		0.1-30	750Vdc	500
		0.1-30	500Vac	500
		0.1-30	500Vdc	500
		0.1-30	250Vac	500
		0.1-30	250Vdc	500
<b>Supplemental micro fuses: pigtail leads, surface mount</b>				
<b>TB, TR</b>	8.5 x 4 x 5 (0.33 x 0.16 x 0.20)	0.05-10	400Vac	100
		0.05-10	300Vac	100
		0.05-10	250Vac	100

		0.05-10	125Vac	100
		0.05-10	125Vdc	100
<b>Supplemental micro fuses: surface mount</b>				
<b>0603FF, 0603HI or 0603TD</b>	1.6 x 0.8 x 0.5 (0.06 x 0.03 x 0.02)	0.25-8	24Vdc	50
		0.25-8	32Vdc	50
		0.25-8	48Vdc	50
		0.25-8	63Vdc	50
<b>1206FF, 1206HI, 1206HV or 1206TD</b>	3.2 x 1.6 x 0.5 (0.13 x 0.06 x 0.02)	0.25-10	125Vac	50
		0.25-10	63Vdc	50
		0.25-10	72Vdc	50
		0.25-10	125Vdc	50
		0.25-30	48Vdc	200
		0.25-50	24Vdc	200
		0.25-50	32Vdc	200
		0.25-50	36Vdc	200

Marking: Company name or trademark  and model designation.

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