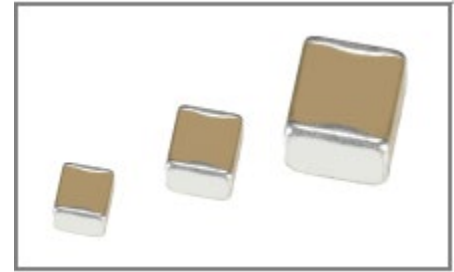


## ■ 安全规格认证多层片式陶瓷电容器 Safety Recognized of ceramic chip capacitors

### ◆ 特征 Feature

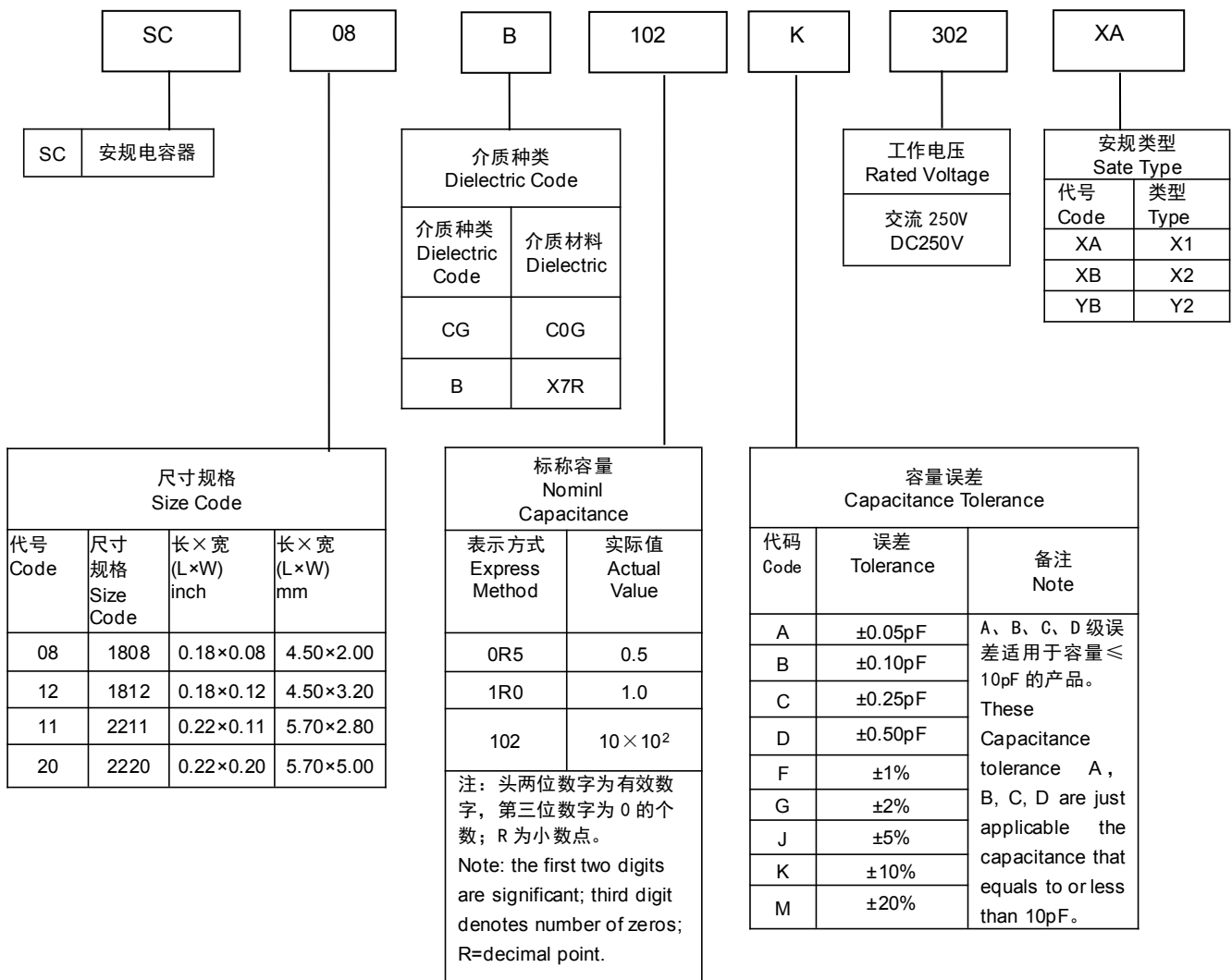
- \* 新型独石结构，体积小，电容量高，能在高压下工作  
A New monolithic structure capacitor for small, high-capacitance capability of operating at high-voltage levels.
- \* 符合 60384-14 标准。  
Available for equipment base on 60384-14 standard
- \* 仅用于回流焊接  
Only for reflow soldering
- \* 它们实用于薄型设备。  
Fit for use on thin type equipment.



### ◆ 应用 Application

- \* 适合于无变压器的 DAA 调制调解器线路滤波器及耦合用  
Ideal for use on line filters and couplings for DAA modems without transformers.
- \* 适合信息设备线路滤波器用。  
Ideal for use on line filters for information equipment.

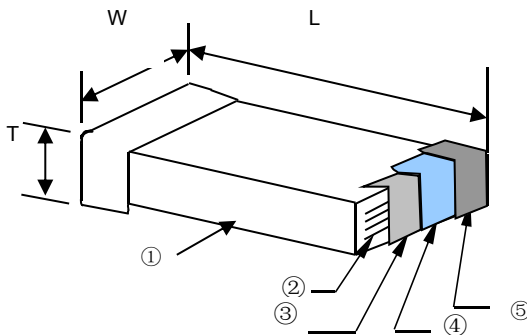
### ◆ 型号表示法 How To Order



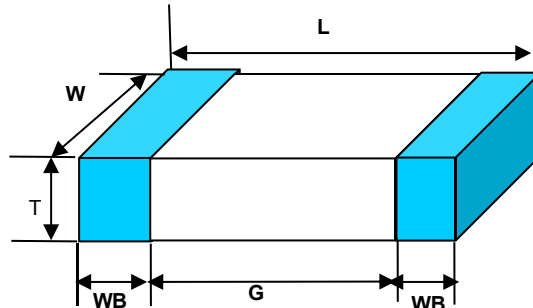
**◆ 产品应用电压**
**Product application voltage**

代号 Code	使用时的峰值脉冲电压 (kV) Peak pulse voltage in use (kV)	耐久性试验前施加的峰值脉冲电压 (kV) Peak pulse voltage applied before durability test (kV)
XA	$2.5\text{kV} < U \leq 4.0\text{kV}$	$C_R \leq 1.0\mu\text{F}, 4$ $C_R > 1.0\mu\text{F}, 4/\sqrt{C_R}$
XB	$\leq 2.5\text{kV}$	$C_R \leq 1.0\mu\text{F}, 2.5$ $C_R > 1.0\mu\text{F}, 2.5/\sqrt{C_R}$

代号 Code	额定电压 (V) Rated Voltage (V)	耐久性试验前施加的峰值脉冲电压 (kV) Peak pulse voltage applied before durability test (kV)
YB	$150\text{V} \leq U \leq 250\text{V}$	5.0

**◆ 产品结构**
**Product Structure**


序号 NO	名称 Name
①	陶瓷介质 Ceramic dielectric
②	内电极 Inner electrode
③	外电极 Substrate electrode
④	镍层 Nickel Layer
⑤	锡层 Tin Layer

**◆ 产品尺寸**
**Product Dimensions**


型号 Type		尺寸 Dimensions (mm)				
英制表示 British expression	公制表示 Metric expression	L	W	T	WB	G
1808	4520	$4.50 \pm 0.40$	$2.00 \pm 0.20$	$\leq 2.50$	$\leq 0.7$	$\geq 4.0$
1812	4532	$4.50 \pm 0.40$	$3.20 \pm 0.30$	$\leq 3.50$	$\leq 0.7$	$\geq 4.0$
2211	5728	$5.70 \pm 0.40$	$2.80 \pm 0.30$	$\leq 3.50$	$\leq 1.0$	$\geq 4.0$
2220	5750	$5.70 \pm 0.40$	$5.00 \pm 0.40$	$\leq 3.50$	$\leq 1.0$	$\geq 4.0$

备注：可根据客户的特殊要求设计符合客户需求的产品。

Note: We can design according to customer special requirements.

**◆温度系数/特性**
**Temperature Coefficient /Characteristics**


介质种类 Dielectric	参考温度点 Reference Temperature Point	标称温度系数 Temperature Coefficient	工作温度范围 Operation Temperature Range
COG	20°C	0±30 ppm/°C	-55°C~125°C
X7R	20°C	±15%	-55°C~125°C


备注：I类电容器标称温度系数和允许偏差是采用温度在20°C和85°C之间的电容量变化来确定的，而II类电容器标称温度系数是按照工作范围之间的电容量相对20°C的电容量变化来确定的。

Note: Nominal temperature coefficient and allowed tolerance of class I are decided by the changing of the capacitance between 20°C and 85°C. Nominal temperature coefficient of class II are decided by the temperature of 20°C.

**◆容量范围 Capacitance Range**



项目 Item	XA							
	COG				X7R			
材料 Dielectric								
代号 Code	08	12	11	20	08	12	11	20
尺寸 Dimensions	1808	1812	2211	2220	1808	1812	2211	2220
电容量 Capacitance								
2pF								
5pF								
6.8pF								
8.2pF								
10pF								
15pF								
22pF								
33pF								
47pF								
56pF								
68pF								
82pF								
100pF								
120pF								
150pF								
180pF								
220pF								
270pF								
330pF								
470pF								
560pF								
820pF								
1.0nF								
1.5nF								
2.2nF								
3.3nF								
4.7nF								

备注：1、 正常生产 2、可根据客户的特殊要求设计符合客户需求的产品



Note: 1、 Normal production 2、We can design according to the customer requirements.

项目 Item	XB			
材料 Dielectric	X7R			
代号 Code	08	12	11	20
尺寸 Dimensions	1808	1812	2211	2220
电容量 Capacitance				
1.0 nF				
1.5 nF				
2.2 nF				
3.3 nF				
4.7 nF				
5.6 nF				
6.8 nF				
10nF				
15nF				
22nF				
33nF				
47nF				

项目 Item	YB							
材料 Dielectric	COG				X7R			
代号 Code	08	12	11	20	08	12	11	20
尺寸 Dimensions	1808	1812	2211	2220	1808	1812	2211	2220
电容量 Capacitance								
2PF								
5PF								
6.8PF								
8.2PF								
10PF								
15PF								
22PF								
33PF								
47PF								
56PF								
68PF								
82PF								
100PF								
120PF								
150PF								
180PF								

备注：1、  正常生产      2、可根据客户的特殊要求设计符合客户需求的产品  
 Note: 1、  Normal production      2、We can design according to the customer requirements.

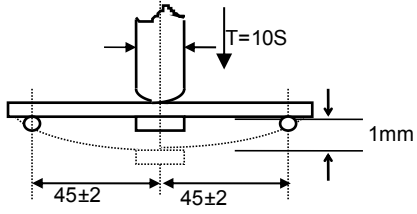
项目 Item	YB							
材料 Dielectric	COG				X7R			
代号 Code	08	12	11	20	08	12	11	20
尺寸 Dimensions	1808	1812	2211	2220	1808	1812	2211	2220
电容量 Capacitance								
220PF								
270PF								
330PF								
470PF								
560PF								
820PF								
1.0nF								
1.5nF								
2.2nF								
3.3nF								
4.7nF								

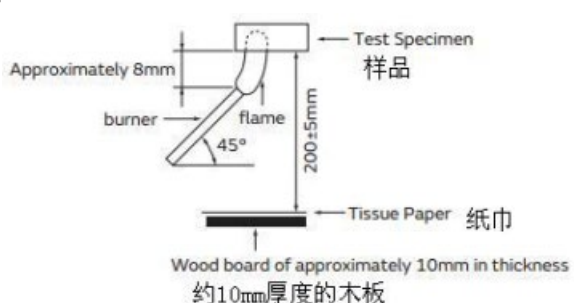
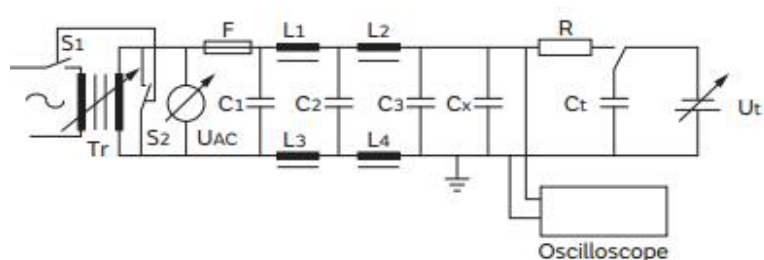
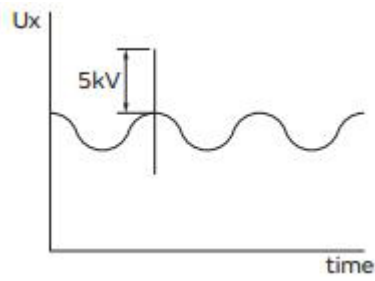
备注：1、  正常生产      2、可根据客户的特殊要求设计符合客户需求的产品  
 Note: 1、  Normal production      2、We can design according to the customer requirements.

### ◆可靠性测试 Reliability Test

项目 Item	技术规格 Technical Specification		测试方法 Test Method and Remarks			
容量 Capacitance	I类 Class I	应符合指定的误差级别 Should be within the specified tolerance.	标称容量 Capacitance	测试频率 Measuring Frequency	测试电压 Measuring Voltage	
			≤1000pF	1MHz±10%	1.0±0.2Vrms	
			> 1000 pF	1KHz±10%		
	II类 Class II	应符合指定的误差级别 Should be within the specified tolerance.	测试温度：25℃±3℃ 测试频率：1KHz±10% 测试电压：1.0±0.2Vrms Test Temperature: 25℃±3℃ Test Frequency: 1KHz±10% Test Voltage: 1.0±0.2Vrms			
损耗角正切 (DF, tanδ) Dissipation Factor	I类 Class I	DF		标称容量 Capacitance	测试频率 Measuring Frequency	测试电压 Measuring Voltage
		≤0.56%		Cr < 5 pF	1MHz±10%	1.0±0.2Vrms
		≤ 1.5[(150/Cr)+7]×10 <sup>-4</sup>		5pF≤Cr < 50 pF	1MHz±10%	
		≤0.15%		50pF≤Cr≤1000 pF	1MHz±10%	
	≤0.15%		> 1000 pF	1KHz±10%		
	II类 Class II	X7R	≤5%	测试频率：1KHz±10% 测试电压：1.0±0.2Vrms Test Frequency: 1KHz ±10% Test Voltage: 1.0± 0.2Vrms		

项目 Item	技术规格 Technical Specification		测试方法 Test Method and Remarks							
绝缘电阻 (IR) Insulation Resistance	I类 Class I	C≤10 nF , Ri ≥50000MΩ C> 10 nF , Ri•CR≥500S	测试电压: DC500±50V 测试时间: 60±5 s 测试湿度: ≤75% 测试温度: 25℃±3℃ 测试充放电电流: ≤50mA Measuring Voltage: DC500±50V Duration: 60±5s Test Humidity: ≤75% Test Temperature: 25℃±3℃ Test Current: ≤50mA							
	II类 Class II	X7R C≤25 nF, Ri≥10000MΩ C> 25 nF, Ri•CR> 100S								
介质耐电强度 (DWW) Dielectric Withstanding Voltage	无缺陷或异常 No defects or abnormalities		在端子间施加表中的电压 60±1S 时不应观察到任何故障, 并且充电/放电电流不超过 50mA No failure should be observed when voltage in the table is applied between the terminations for 60 sec. provided the charge/discharge current is less than 50mA. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>测量电压 Test Voltage</th> </tr> </thead> <tbody> <tr> <td>XA、B</td> <td>DC1075V</td> </tr> <tr> <td>YB、C</td> <td>AC1500V</td> </tr> </tbody> </table>		测量电压 Test Voltage	XA、B	DC1075V	YB、C	AC1500V	
	测量电压 Test Voltage									
XA、B	DC1075V									
YB、C	AC1500V									
可焊性 Solderability	上锡率应大于 95% 外观: 无可见损伤。 At least 95% of the terminal electrode is covered by new solder. Visual Appearance: No visible damage.		将电容在 80~120℃的温度下预热 10~30 秒。 Preheating conditions: 80 to 120℃; 10~30s.							
			<table border="1" style="width: 100%;"> <tr> <td>有铅焊料: (Sn/Pb: 63/37)</td> <td>无铅焊料:</td> </tr> <tr> <td>浸锡温度: 235±5℃</td> <td>浸锡温度: 245±5℃</td> </tr> <tr> <td>浸锡时间: 2±0.5s</td> <td>浸锡时间: 2±0.5s</td> </tr> <tr> <td>Solder Temperature: 235±5℃</td> <td>Solder Temperature: 245±5℃</td> </tr> <tr> <td>Duration: 2±0.5s</td> <td>Duration: 2±0.5</td> </tr> </table>	有铅焊料: (Sn/Pb: 63/37)	无铅焊料:	浸锡温度: 235±5℃	浸锡温度: 245±5℃	浸锡时间: 2±0.5s	浸锡时间: 2±0.5s	Solder Temperature: 235±5℃
有铅焊料: (Sn/Pb: 63/37)	无铅焊料:									
浸锡温度: 235±5℃	浸锡温度: 245±5℃									
浸锡时间: 2±0.5s	浸锡时间: 2±0.5s									
Solder Temperature: 235±5℃	Solder Temperature: 245±5℃									
Duration: 2±0.5s	Duration: 2±0.5									
耐焊接热 Resistance to Soldering Heat	项目 Item	COG	X7R							
	ΔC/C	≤±2.5%或±0.25PF, 取较大值 ≤±2.5% or ±0.25PF, whichever is larger	-5~+10%							
	DF	同初始标准 Same to initial value.								
	IR	同初始标准 Same to initial value.								
	外观: 无可见损伤 上锡率: ≥95% Appearance: No visible damage. At least 95% of the terminal electrode is covered by new solder.									
将电容在 100~200℃的温度下预热 10±2 分钟。 Preheating conditions: 100 to 200℃; 10±2min. 浸锡温度: 265±5℃ 浸锡时间: 10±1s 然后取出溶剂清洗干净, 在 10 倍以上的显微镜底下观察。 Clean the capacitor with solvent and examine it with a 10X(min.) microscope. 放置时间: 24±2 小时 放置条件: 室温 Recovery Time: 24±2h Recovery condition: Room temperature										
端头结合强度 Termination Adhesion	外观无可见损伤 No visible damage.		施加的力: 5N      时间: 10±1S Applied Force: 5N      Duration: 10±1S							

项目 Item	技术规格 Technical Specification		测试方法 Test Method and Remarks																					
抗弯曲强度 Resistance to Flexure of Substrate (Bending Strength)	<table border="1"> <tr> <td></td> <td>COG</td> <td>X7R</td> </tr> <tr> <td><math>\Delta C/C</math>:</td> <td><math>\leq 3\%</math> 或 <math>\pm 2pF</math></td> <td><math>\leq 12.5\%</math></td> </tr> </table>			COG	X7R	$\Delta C/C$ :	$\leq 3\%$ 或 $\pm 2pF$	$\leq 12.5\%$	试验基板: $Al_2O_3$ 或 PCB      弯曲深度: 1mm 施压速度: 1mm/sec.              单位: mm 应在弯曲状态下进行测量。  Test Board: $Al_2O_3$ or PCB      Warp: 1mm Speed: 1mm/sec.                  Unit: mm The measurement should be made with the board in the bending position.															
		COG	X7R																					
$\Delta C/C$ :	$\leq 3\%$ 或 $\pm 2pF$	$\leq 12.5\%$																						
外观: 无可见损伤。 Appearance: No visible damage.																								
温度循环 Temperature Cycle	<table border="1"> <tr> <td>项目 Item</td> <td>COG</td> <td>X7R</td> </tr> <tr> <td><math>\Delta C/C</math></td> <td><math>\leq \pm 1\%</math> 或 <math>\pm 1pF</math>, 取较大值 <math>\leq \pm 1\%</math> or <math>\pm 1pF</math>, whichever is larger</td> <td>-10% ~ +10%</td> </tr> </table>		项目 Item	COG	X7R	$\Delta C/C$	$\leq \pm 1\%$ 或 $\pm 1pF$ , 取较大值 $\leq \pm 1\%$ or $\pm 1pF$ , whichever is larger	-10% ~ +10%	预处理 <sup>**</sup> (2类): 上限类别温度, 1小时 恢复: 24±1h Preheating conditions: up-category temperature, 1h Recovery time: 24±1h 初始测量 Initial Measurement 循环次数: 5次, 一个循环分以下4步: Cycling Times: 5 times, 1 cycle, 4 steps: <table border="1"> <thead> <tr> <th>阶段 Step</th> <th>温度 (Temperature)</th> <th>时间(Time)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>下限温度(Low- category temp.): NPO/X7R: -55℃</td> <td>30min</td> </tr> <tr> <td>2</td> <td>常温 (Normal temp.): +20℃</td> <td>2~3min</td> </tr> <tr> <td>3</td> <td>上限温度 (Up- category temp.): NPO/X7R: +125℃</td> <td>30min</td> </tr> <tr> <td>4</td> <td>常温 (Normal temp.): +20℃</td> <td>2~3min</td> </tr> </tbody> </table> 试验后放置 (恢复) 时间: 24±2h Recovery time after test: 24±2h	阶段 Step	温度 (Temperature)	时间(Time)	1	下限温度(Low- category temp.): NPO/X7R: -55℃	30min	2	常温 (Normal temp.): +20℃	2~3min	3	上限温度 (Up- category temp.): NPO/X7R: +125℃	30min	4	常温 (Normal temp.): +20℃	2~3min
	项目 Item	COG	X7R																					
$\Delta C/C$	$\leq \pm 1\%$ 或 $\pm 1pF$ , 取较大值 $\leq \pm 1\%$ or $\pm 1pF$ , whichever is larger	-10% ~ +10%																						
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3	上限温度 (Up- category temp.): NPO/X7R: +125℃	30min																						
4	常温 (Normal temp.): +20℃	2~3min																						
耐湿负荷 Humidity load	<table border="1"> <tr> <td rowspan="2"><math>\Delta C/C</math></td> <td>COG</td> <td><math>\leq \pm 7.5\%</math> 或 <math>\pm 0.75pF</math>, 取两者之中较大者 <math>\leq \pm 7.5\%</math> or <math>\pm 0.75pF</math>, whichever is larger.</td> </tr> <tr> <td>X7R</td> <td>-12.5% ~ +12.5%</td> </tr> <tr> <td>DF</td> <td colspan="2"><math>\leq 2</math> 倍初始标准 Not more than twice of initial value.</td> </tr> <tr> <td rowspan="2">IR</td> <td>COG</td> <td><math>R_i \geq 5000M\Omega</math> 或 <math>R_i \cdot C_R \geq 50S</math> 取两者之中较小者。 <math>R_i \geq 5000M\Omega</math> 或 <math>R_i \cdot C_R \geq 50S</math> whichever is smaller.</td> </tr> <tr> <td>X7R</td> <td><math>R_i \geq 1000M\Omega</math> 或 <math>R_i \cdot C_R \geq 10S</math> 取两者之中较小者。 <math>R_i \geq 1000M\Omega</math> 或 <math>R_i \cdot C_R \geq 10S</math> whichever is smaller.</td> </tr> </table>		$\Delta C/C$	COG	$\leq \pm 7.5\%$ 或 $\pm 0.75pF$ , 取两者之中较大者 $\leq \pm 7.5\%$ or $\pm 0.75pF$ , whichever is larger.	X7R	-12.5% ~ +12.5%	DF	$\leq 2$ 倍初始标准 Not more than twice of initial value.		IR	COG	$R_i \geq 5000M\Omega$ 或 $R_i \cdot C_R \geq 50S$ 取两者之中较小者。 $R_i \geq 5000M\Omega$ 或 $R_i \cdot C_R \geq 50S$ whichever is smaller.	X7R	$R_i \geq 1000M\Omega$ 或 $R_i \cdot C_R \geq 10S$ 取两者之中较小者。 $R_i \geq 1000M\Omega$ 或 $R_i \cdot C_R \geq 10S$ whichever is smaller.	温度: 40±2℃ 湿度: 90~95%RH 电压: 额定电压 时间: 500小时 放置条件: 室温 放置时间: 24小时(I类); 48小时(II类) Temperature: 40±2℃ Humidity: 90~95%RH Voltage: Rated Voltage Duration: 500h Recovery conditions: Room temperature Recovery Time: 24h (Class1) or 48h (Class2)								
	$\Delta C/C$	COG		$\leq \pm 7.5\%$ 或 $\pm 0.75pF$ , 取两者之中较大者 $\leq \pm 7.5\%$ or $\pm 0.75pF$ , whichever is larger.																				
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	X7R	$R_i \geq 1000M\Omega$ 或 $R_i \cdot C_R \geq 10S$ 取两者之中较小者。 $R_i \geq 1000M\Omega$ 或 $R_i \cdot C_R \geq 10S$ whichever is smaller.																						
外观: 无损伤 Appearance: No visible damage.																								
稳态湿热 Damp heat, steady state	<table border="1"> <tr> <td rowspan="2"><math>\Delta C/C</math></td> <td>COG</td> <td><math>\leq \pm 2\%</math> 或 <math>\pm 0.2pF</math>, 取两者之中较大者 <math>\leq \pm 2\%</math> or <math>\pm 0.2pF</math>, whichever is larger.</td> </tr> <tr> <td>X7R</td> <td>-10% ~ +10%</td> </tr> <tr> <td>DF</td> <td colspan="2"><math>\leq 2</math> 倍初始标准 Not more than twice of initial value.</td> </tr> <tr> <td rowspan="2">IR</td> <td>COG</td> <td><math>R_i \geq 5000M\Omega</math> 或 <math>R_i \cdot C_R \geq 50S</math> 取两者之中较小者。 <math>R_i \geq 5000M\Omega</math> 或 <math>R_i \cdot C_R \geq 50S</math> whichever is smaller.</td> </tr> <tr> <td>X7R</td> <td><math>R_i \geq 1000M\Omega</math> 或 <math>R_i \cdot C_R \geq 10S</math> 取两者之中较小者。 <math>R_i \geq 1000M\Omega</math> 或 <math>R_i \cdot C_R \geq 10S</math> whichever is smaller.</td> </tr> </table>		$\Delta C/C$	COG	$\leq \pm 2\%$ 或 $\pm 0.2pF$ , 取两者之中较大者 $\leq \pm 2\%$ or $\pm 0.2pF$ , whichever is larger.	X7R	-10% ~ +10%	DF	$\leq 2$ 倍初始标准 Not more than twice of initial value.		IR	COG	$R_i \geq 5000M\Omega$ 或 $R_i \cdot C_R \geq 50S$ 取两者之中较小者。 $R_i \geq 5000M\Omega$ 或 $R_i \cdot C_R \geq 50S$ whichever is smaller.	X7R	$R_i \geq 1000M\Omega$ 或 $R_i \cdot C_R \geq 10S$ 取两者之中较小者。 $R_i \geq 1000M\Omega$ 或 $R_i \cdot C_R \geq 10S$ whichever is smaller.	温度: 40±2℃ 湿度: 90~95%RH 时间: 500小时 放置条件: 室温 放置时间: 24小时(I类); 48小时(II类) Temperature: 40±2℃ Humidity: 90~95%RH Duration: 500h Recovery conditions: Room temperature Recovery Time: 24h (Class1) or 48h (Class2)								
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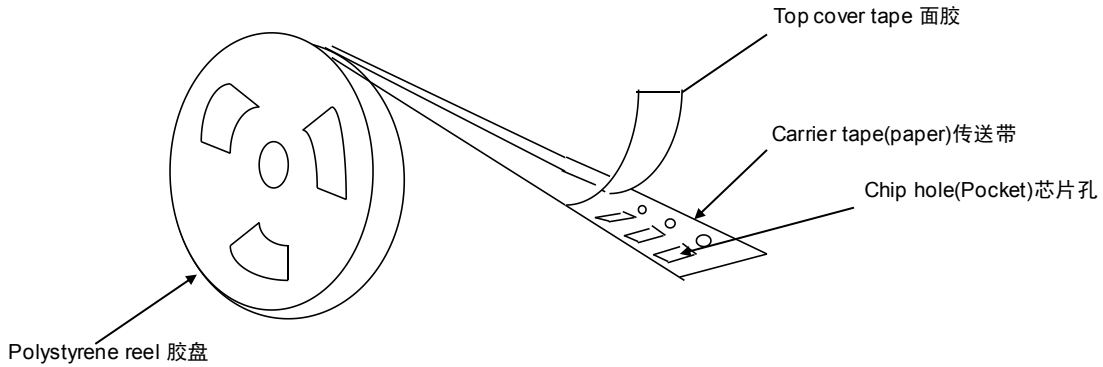
项目 Item	技术规格 Technical Specification	测试方法 Test Method and Remarks																						
振动 Vibration	无可见损伤 No visible damage	电容器件安装到 PCB 板上，试验频率 10~55Hz，振动幅度 1.5mm，在 3 个垂直方向上各振动 2 小时，共 6 小时 The capacitive device is installed on the PCB board, the test frequency is 10~ 55Hz, the vibration amplitude is 1.5mm, and the vibration is 2 hours in each of the 3 vertical directions, for a total of 6 hours																						
阻燃性测试 Passive Flammability	纸巾不被烧起来 The tissue paper shall not ignite.	试验电容器保持在火焰中最有利于燃烧的位置，如附图 每个样品只能暴露在火焰中一次。 火焰作用时间：30S The capacitor under test shall be held in the flame in the position which the tissue paper shall not ignite. best promotes burning. Each specimen shall only be exposed once to the flame. Time of exposure to flame : 30 s 																						
自燃性测试 Active Flammability	纯棉纱不会燃烧 Cotton yarn will not bum	在产品外部包裹至少一层但不多于两层的纯棉纱，样品经受储能电容器 20 次的放电试验，连续放电之间每次间隔时间应为 5s，最后一次放电，交流电应保持 2 分钟。  <table border="1" data-bbox="582 1400 997 2038"> <thead> <tr> <th>代号 Code</th> <th>参数 Parameter</th> </tr> </thead> <tbody> <tr> <td>C1,C2</td> <td>1uF±10%</td> </tr> <tr> <td>C3</td> <td>0.033uF±5% 10kV</td> </tr> <tr> <td>L1,L2, L3,L4</td> <td>1.5mH±20% 16A</td> </tr> <tr> <td>Ct</td> <td>3uF±5% 10Kv</td> </tr> <tr> <td>R</td> <td>100Ω±2%</td> </tr> <tr> <td>Cx</td> <td>样品电容 (Sample capacitance)</td> </tr> <tr> <td>UAC</td> <td>UR±5%</td> </tr> <tr> <td>F</td> <td>16A 保险丝 (16A Fuse)</td> </tr> <tr> <td>UR</td> <td>额定电压 (Rated voltage)</td> </tr> <tr> <td>Ut</td> <td>施加在储能钽电容器上的电压 (Voltage Applied to Tantalum Capacitors for Energy Storage)</td> </tr> </tbody> </table> 	代号 Code	参数 Parameter	C1,C2	1uF±10%	C3	0.033uF±5% 10kV	L1,L2, L3,L4	1.5mH±20% 16A	Ct	3uF±5% 10Kv	R	100Ω±2%	Cx	样品电容 (Sample capacitance)	UAC	UR±5%	F	16A 保险丝 (16A Fuse)	UR	额定电压 (Rated voltage)	Ut	施加在储能钽电容器上的电压 (Voltage Applied to Tantalum Capacitors for Energy Storage)
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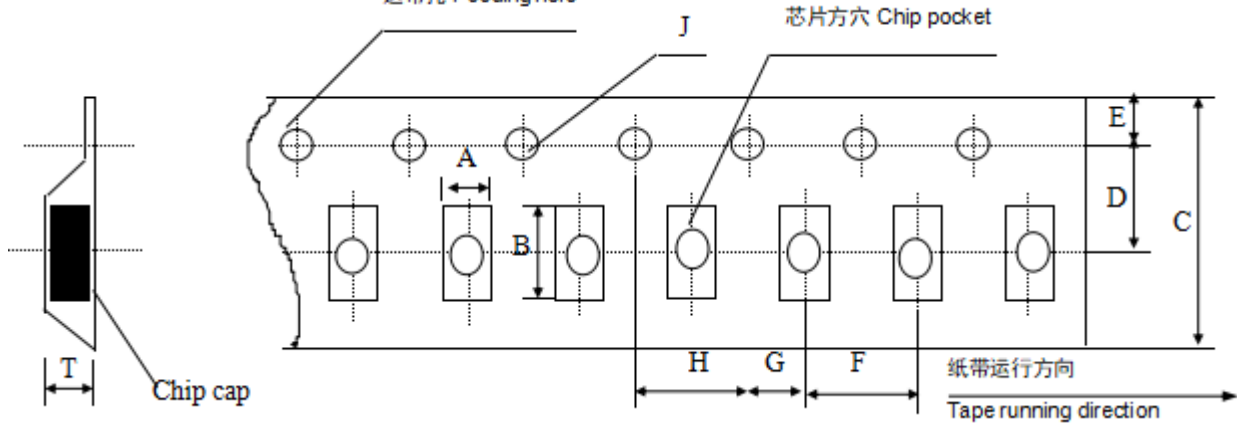
项目 Item	技术规格 Technical Specification		测试方法 Test Method and Remarks												
充放电 Charge and discharge	$\Delta C$ /C	COG	$\leq \pm 2\%$ 或 $\pm 0.2\text{pF}$ , 取两者之中较大者 $\leq \pm 2\%$ or $\pm 0.2\text{pF}$ , whichever is larger.												
		X7R	-10% ~ +10%												
	DF	同初始标准 Same to initial value.													
	IR	COG	$R_i \geq 2500\text{M}\Omega$ 或 $R_i \cdot C_r \geq 25\text{S}$ 取两者之中较小者。 $R_i \geq 2500\text{M}\Omega$ 或 $R_i \cdot C_r \geq 25\text{S}$ whichever is smaller.												
		X7R	$R_i \geq 1000\text{M}\Omega$ 或 $R_i \cdot C_r \geq 25\text{S}$ 取两者之中较小者。 $R_i \geq 1000\text{M}\Omega$ 或 $R_i \cdot C_r \geq 25\text{S}$ whichever is smaller.												
外观：无缺陷或异常 Appearance: No defects or abnormalities.			<p>如下图所示安放被测器件 C, 承受 10000 次充放电循环：            充电电压：额定电压            充放电电流：<math>\leq 1\text{A}</math></p> <p>As shown in the following figure, the device under test C is placed and subjected to 10000 charge and discharge cycles.            Charge voltage: Ur            Charge and discharge current: <math>\leq 1\text{A}</math></p>  <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>代号 Code</th> <th>参数 Parameter</th> </tr> </thead> <tbody> <tr> <td>C</td> <td>样品电容 (Sample capacitance)</td> </tr> <tr> <td>R1</td> <td>放电限流电阻 Current-limiting resistor (discharge)</td> </tr> <tr> <td>R2</td> <td>充电限流电阻 Current-limiting resistor (charge)</td> </tr> <tr> <td>U</td> <td>充电电压 Charge voltage</td> </tr> <tr> <td>S</td> <td>开关器件 Switching device</td> </tr> </tbody> </table>	代号 Code	参数 Parameter	C	样品电容 (Sample capacitance)	R1	放电限流电阻 Current-limiting resistor (discharge)	R2	充电限流电阻 Current-limiting resistor (charge)	U	充电电压 Charge voltage	S	开关器件 Switching device
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脉冲电压 Impulse voltage	无永久性击穿或飞弧。 No permanent breakdown or flashover.		<p>每个电容器应承受 24 次相同极性的脉冲, 脉冲间隔时间不应小于 10S, 脉冲电压峰值如下表：</p> <p>Each capacitor shall withstand 24 pulses of the same polarity, the pulse interval time shall not be less than 10S, and the peak value of pulse voltage like the follow table:</p> <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Code</th> <th>使用时的峰值脉冲电压 (kV) Peak pulse voltage in use (kV)</th> </tr> </thead> <tbody> <tr> <td>XA</td> <td>4.0</td> </tr> <tr> <td>XB</td> <td>2.5</td> </tr> <tr> <td>YB</td> <td>5</td> </tr> </tbody> </table>	Code	使用时的峰值脉冲电压 (kV) Peak pulse voltage in use (kV)	XA	4.0	XB	2.5	YB	5				
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XA	4.0														
XB	2.5														
YB	5														
耐久性 Endurance	$\Delta C$ /C	$\leq \pm 2\%$ 或 $\pm 1\text{pF}$ , 取两者之中较大者 $\leq \pm 2\%$ or $\pm 1\text{pF}$ , whichever is larger.	<p>脉冲电压试验完成后的一周内进行。            温度：<math>125^\circ\text{C}</math> (NPO X7R)            时间：1000 小时            充电电流：不应超过 50mA            施加电压：XA/XB: 1.25 额定电压                              YB: 1.7 额定电压</p> <p>电容器串联一个 <math>47\Omega \pm 5\%</math> 电阻器；每小时一次将电压升高至 1000V, 持续时间 0.1s。            放置条件：室温            放置时间：24 小时 (I 类), 或 48 小时 (II 类),            This test shall be conducted within one week after the completion of impulse voltage test.            Temperature: <math>125^\circ\text{C}</math> (NPO X7R)            Duration: 1000h            Charge/ Discharge Current: 50mA max.            Applied Voltage: XA/XB: 1.25 Rated Voltage                              YB: 1.7 Rated Voltage            The capacitor is connected in series with a <math>47\Omega \pm 5\%</math> resistor. Raise the voltage to 1000V once an hour for 0.1sec.            Recovery Conditions: Room Temperature            Recovery Time: 24h (Class 1), or 48h (Class2)</p>												
	DF	$\leq 2$ 倍初始标准 Not more than twice of initial value.													
	IR	COG	$R_i \geq 4000\text{M}\Omega$ 或 $R_i \cdot C_r \geq 40\text{S}$ 取两者之中较小者。 $R_i \geq 4000\text{M}\Omega$ 或 $R_i \cdot C_r \geq 40\text{S}$ whichever is smaller.												
		X7R	$R_i \geq 2000\text{M}\Omega$ 或 $R_i \cdot C_r \geq 50\text{S}$ 取两者之中较小者。 $R_i \geq 2000\text{M}\Omega$ 或 $R_i \cdot C_r \geq 50\text{S}$ whichever is smaller.												
	外观：无损伤 Appearance: No visible damage.														

**◆包装 Package**

\* 塑胶卷盘结构 Embossed Taping



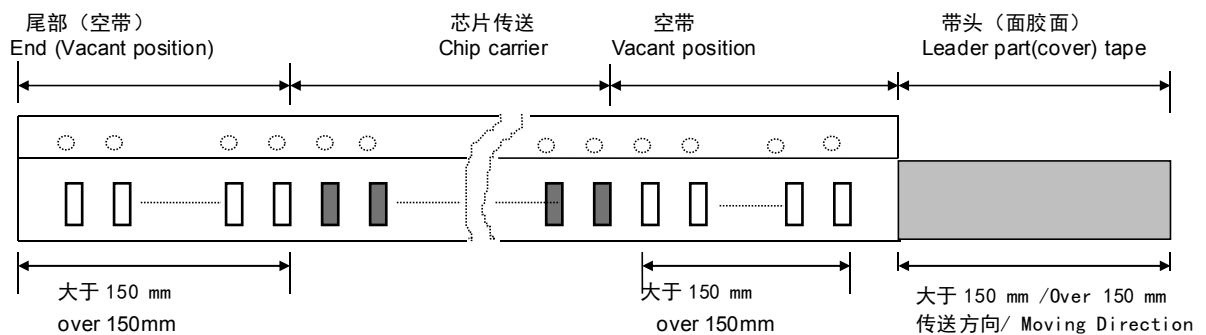
\* 塑胶带尺寸结构(适合 'SC08~SC20' 型产品)  
Dimensions of embossed taping for 0805~1812 type  
送带孔 Feeding hole



代号 Code 规格 Tape size	A	B	C	D*	E	F	G*	H	J	T
SC08(1808)	2.20 ± 0.10	4.95 ± 0.10	12.00 ± 0.10	5.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	1.50 -0/+0.10	3.0 Max
SC12(1812)	3.66 ± 0.10	4.95 ± 0.10	12.00 ± 0.10	5.50 ± 0.05	1.75 ± 0.10	8.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	1.55 -0/+0.10	4.0 Max
SC11(2211) SC20(2220)	6.2 ±0.1	6.7 ±0.1	12.00 ± 0.10	5.50 ± 0.05	1.75 ± 0.10	8.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	1.55 -0/+0.10	2.4 ± 0.10

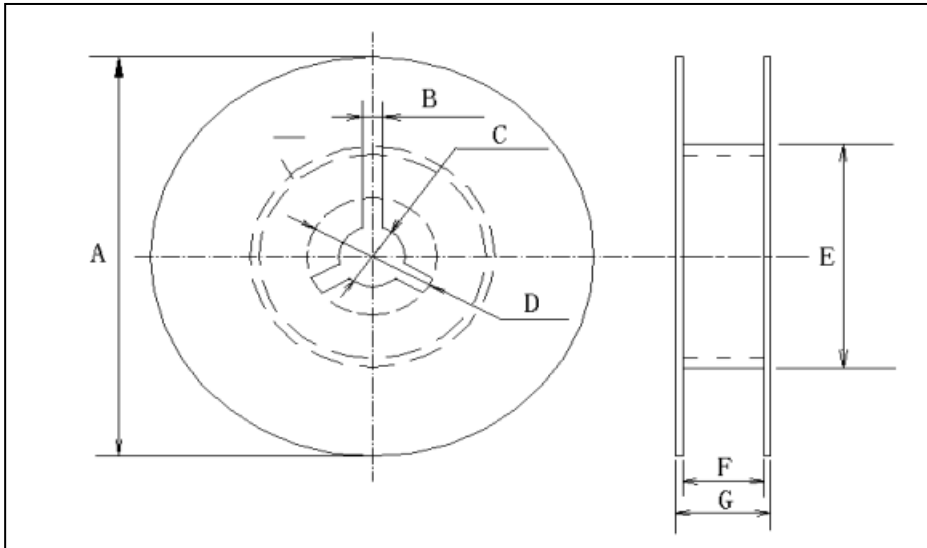
备注: \*表示此处对尺寸的要求非常精确。  
Note: The place with "\*" means where needs exactly dimensions.

\* 传送带的前后结构  
Structure of leader part and end part of the carrier paper



**\* 卷盘尺寸**

Reel Dimensions (unit: mm)



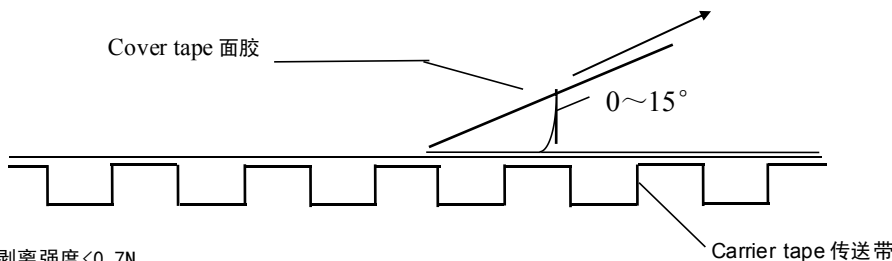
卷盘型号	A	B	C	D	E	F	G
7'REEL	$\phi 178 \pm 2.0$	3.0	$\phi 13 \pm 0.5$	$\phi 21 \pm 0.8$	$\phi 50$ 或更大 $\phi 50$ or more	$10.0 \pm 1.5$	12max
13'REEL	$\phi 330 \pm 2.0$	3.0	$\phi 13 \pm 0.5$	$\phi 21 \pm 0.8$	$\phi 50$ 或更大 $\phi 50$ or more	$10.0 \pm 1.5$	12max

**\* 关于卷带的说明：面胶剥离强度**

Taping specification: top tape peeling strength

塑料胶盘 Embossed Taping

Cover tape peeling direction 面胶剥离方向


 标准:  $0.1N < \text{剥离强度} < 0.7N$ 

 Standard:  $0.1N < \text{peeling strength} < 0.7N$ 
**\* 塑料盒散包装**

Bulk Case Package

单位 (unit) :mm

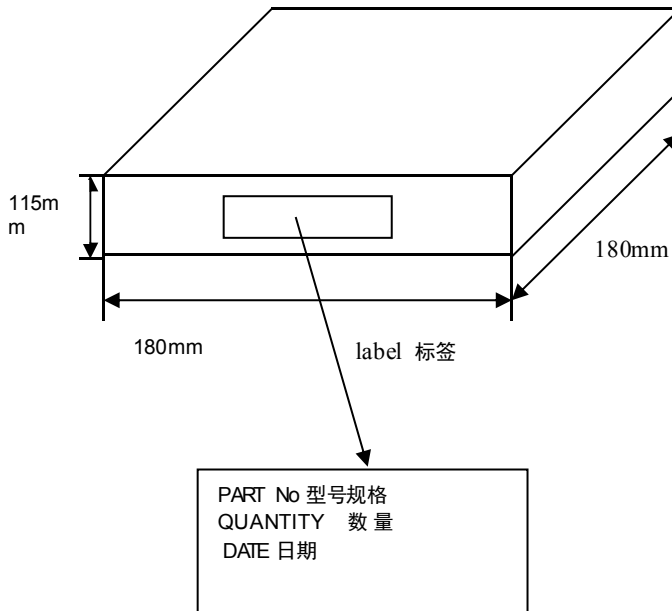
Symbol	A	B	T	C	D	E
Dimension	$6.80 \pm 0.10$	$8.80 \pm 1.00$	$12.00 \pm 0.10$	$15.00 + 0.10 / - 0$	$2.00 + 0 / - 0.10$	$4.70 \pm 0.10$
Symbol	F	W	G	H	L	I
Dimension	$31.50 + 0.20 / - 0$	$36.00 + 0 / - 0.20$	$19.00 \pm 0.35$	$7.00 \pm 0.35$	$110.00 \pm 0.70$	$5.00 \pm 0.35$

**\* 包装数量 Packing Quantity**

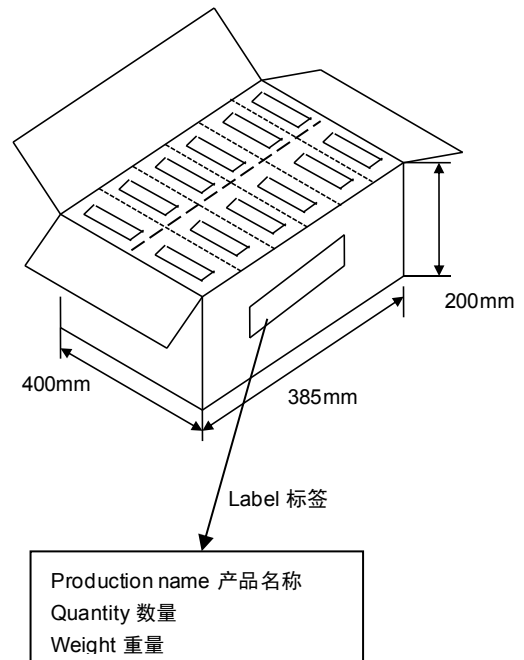
尺寸 (SIZE)	包装形式和数量 (Package Style & Quantity) unit: pcs			
	纸带卷盘 (PT)	胶带卷盘 (ET)	塑料盒散装 (BC)	一般散装 (BP)
SC08 (1808)	-----	2000	-----	2000
SC12 (1812)	-----	T $\leq$ 1.85mm 1000 T $>$ 1.85mm 500	-----	2000
SC11 (2211) SC20 (2220)	-----	500	-----	500

**\* 外包装**
**Outer packing**

小包装 The first package  
 Quantity: 10 reels  
 数量: 10 卷



大包装 The second package  
 Quantity: 6 cases  
 数量: 6 盒


**◆ 储存方法**
**Storage Methods**

- \* 确保芯片可焊性良好的贮存期限为 12 个月 (在包装好已交付的情况下)。  
 The guaranteed period for solderability is 12 months (Under deliver package condition).
- \* 储存条件/Storage conditions:  
 储存温度/Temperature 5~40℃                      储存相对湿度/Relative Humidity 20~70%

**◆ 使用前的注意事项**
**Precautions For Use**

多层片式瓷介电容器 (MLCC) 在短路或开路的电路中都有可能失效, 在超出本承诺书或相关说明书中所述使用频率的恶劣工作环境, 或外界机械力超压作用下, 电容芯片都有可能着火、燃烧甚至爆炸, 所以在使用的时候, 首先应考虑按本承诺书的有关说明来进行, 如有不明之处, 请联系我们技术部、品管部或生产部。

The Multi-layer Ceramic Capacitors (MLCC) may fail in a short circuit moderm in an open circuit mode when subjected to severe conditions of electrical environment and / or mechanical stress beyond the specified "rating" and specified "conditions" in the specification, which will result in burn out, flaming or glowing in the worst case. Following "precautions for "safety" and Application Notes shall be taken in your major consideration. If you have a question about the precautions for handling, please contact our engineering section or factory.

**\* 焊接的条件与相关图表**
**Soldering Profile**

为避免因温度的突然变化而引起的芯片开裂或局部爆炸的现象发生, 请按有关温度曲线图表来进行。(请参考附页中的图表)

To avoid the crack problem by sudden temperature change, follow the temperature profile in the adjacent graph (refer to the graph in the enclosure page).

**\* 手工焊接**
**Manual Soldering**

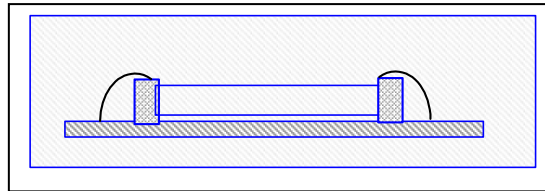
手工焊接很容易因为芯片局部受热不均而引起瓷体微裂或局部爆炸的现象, 在焊接时, 如果操作者不小心, 会使烙铁头直接同电容芯片的瓷体部分接触, 这样很容易使电容芯片因热冲击而受损或出现其他意外. 因此, 使用电烙铁手工焊接时应仔细操作, 并对电烙铁的尖端的选择和尖端温度控制应多加小心.

Manual soldering can pose a great risk of creating thermal cracks in capacitors. The hot soldering iron tip comes into direct contact with the end terminations, and operator's careless may cause the tip of the soldering iron to come into direct contact with the ceramic body of the capacitor. Therefore the soldering iron must be handled carefully, and pay much attention to the selection of the soldering iron tip and temperature contact of the tip.

\* 适量的焊料

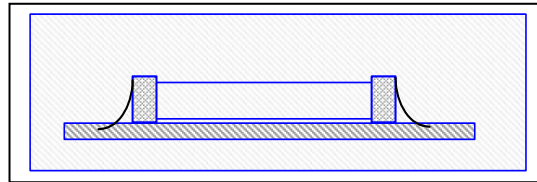
Optimum Solder Amount for Reflow Soldering

焊料过多  
Too much solder



这样会因端头压力过大而  
可能引起芯片受损  
Cracks tend to occur due to large stress.

焊料太少  
Not enough solder



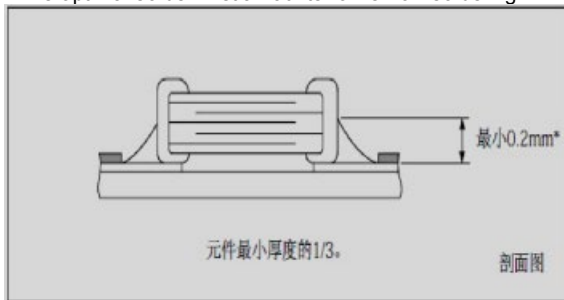
固定力量不足,可能会引起  
电容芯片与线路接触不良  
Weak holding force may cause  
bad connection  
between the capacitor and PCB.

\* 推荐焊料用量

Recommended Soldering amounts

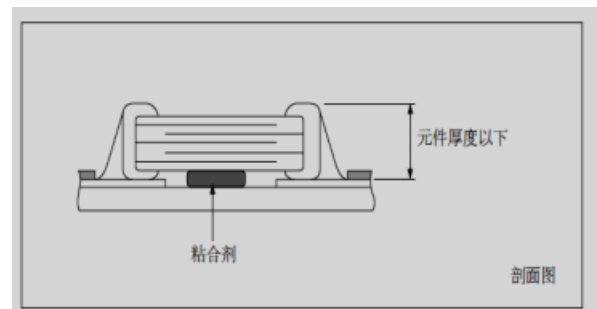
回流焊接的最佳焊料用量

The optimal solder fillet amounts for re-flow soldering



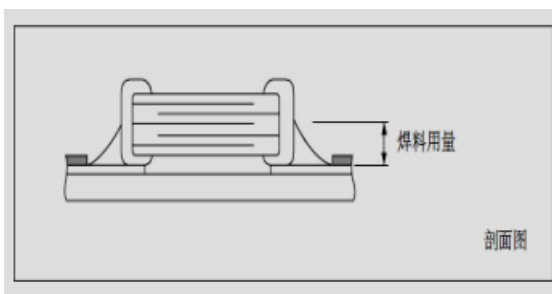
波峰焊接的最佳焊料用量

The optimal solder fillet amounts for wave soldering



使用烙铁返修时的最佳焊料量

The optimal solder fillet amounts for reworking by using soldering iron



\* 推荐焊接方式

Recommended Soldering Method

规格尺寸 Size	温度特性 Temperature Characteristics	额定电压 Rated Voltage	容量范围 Capacitance	焊接方式 Soldering Method
SC08 (1808)	NPO/X7R	/	/	R
SC12 (1812)	NPO/X7R	/	/	R
SC11 (2211)	NPO/X7R	/	/	R
SC20 (2220)	NPO/X7R	/	/	R

焊接方式 Soldering method: R—回流焊 Reflow Solering  
W—波峰焊 Wave Soldering

**◆ 推荐焊接温度曲线图**
**The temperature profile for soldering**
**\* 回流焊接 (Re-flow soldering)**

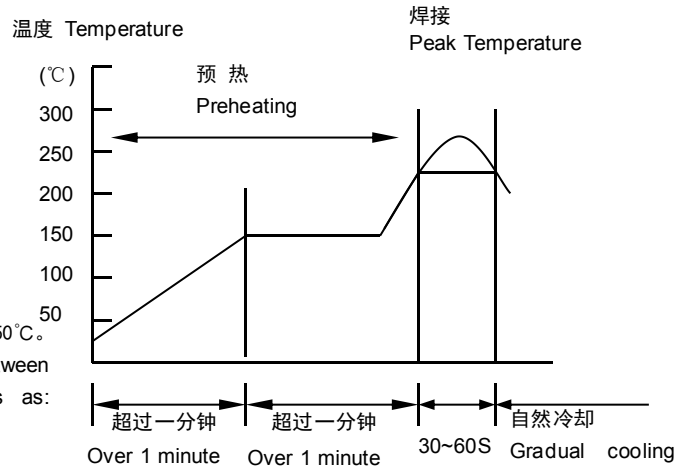
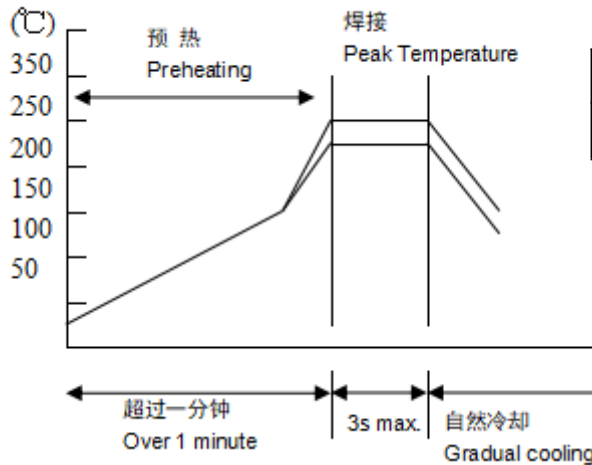
	Pb-Sn 焊接 Pb-Sn soldering	无铅焊接 Lead-free soldering
尖峰温度 Peak temperature	230℃~250℃	240℃~260℃

在预热时,请将焊接温度与芯片表面温度之间的温差维持在  $T \leq 150^\circ\text{C}$ 。

While in preheating, please keep the temperature difference between soldering temperature and surface temperature of chips as:  $T \leq 150^\circ\text{C}$ .

**\* 波峰焊接 (Wave soldering)**

温度 Temperature



	Pb-Sn 焊接 Pb-Sn soldering	无铅焊接 Lead-free soldering
尖峰温度 Peak temperature	230℃~260℃	240℃~270℃

在预热时, 请将焊接温度与芯片表面温度之间的温差维持在  $T \leq 150^\circ\text{C}$ 。

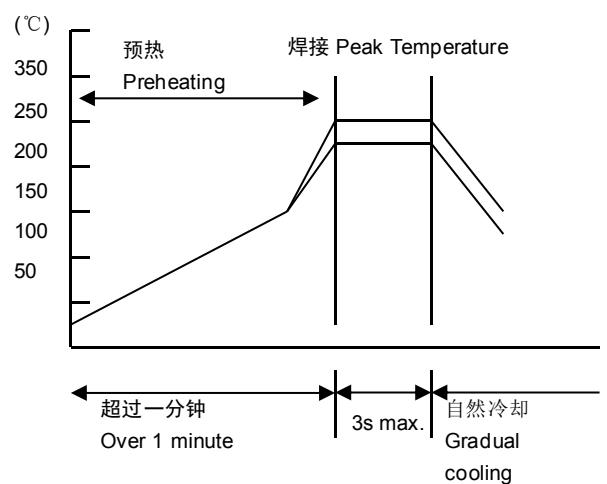
While in preheating, please keep the temperature difference between soldering temperature and surface temperature of chips as:  $T \leq 150^\circ\text{C}$ .

**\* 手工焊接**

Hand soldering

项目 (Item)	建议 (Suggestions)
预热 Preheating	$\Delta \leq 130^\circ\text{C}$
烙铁头温度 Temperature of soldering iron head	最高 $350^\circ\text{C}$ Highest temperature: $350^\circ\text{C}$
烙铁功率 Power of soldering iron	最大 20W 20W at the highest
烙铁头直径 Diameter of soldering iron head	建议 1mm 1mm recommended
焊接时间 Soldering time	最长 3s 3s at the longest
锡膏量 Solder paste amount	$\leq 1/2$ 芯片厚度 $\leq 1/2$ chip thickness
限制条件 Restricted conditions	请勿使用烙铁头直接接触陶瓷元件 Please avoid the direct contact between soldering iron head and ceramic components

温度 Temperature



\*以最新版本的内容为准

