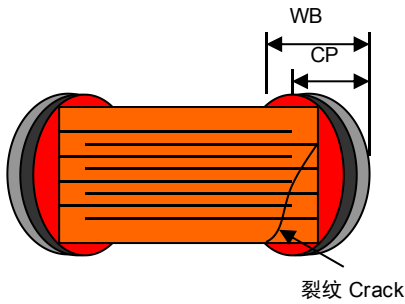


■ 开路设计片式陶瓷电容器
Open-Mode Design MLCC

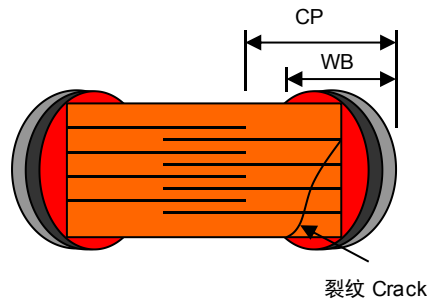
◆ 特征
Feature

- * 叠层独石结构，具有高可靠性
There is high reliability on monolithic structure of laminated layers.
- * 具有优良的焊接与耐焊性能，适用于回流焊接与波峰焊接
And its character of excellent soldering ability and soldering resistance ability is suitable for reflow soldering and peak soldering.
- * 具有较高的容量且容量性能稳定
It includes high and stable capacitance.
- * 电路在电容器出现断裂失效时开放，可以对电路进行保护。
Open circuit during capacitor cracking can protect the circuit.
- * 此类型电容器的采用特殊的电极结构设计，如下图 2 和图 3 的内部结构。
This type of capacitor adopts special inner electrode designs as picture2 and picture3 below
- * 执行标准：GB/T 21041-2007 GB/T 21042-2007
Executive Standard: GB/T 21041-2007 GB/T 21042-2007



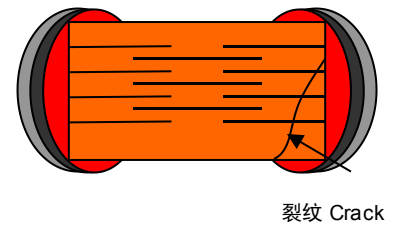
正常设计 (CP<WB), 开裂时电路泄漏电流
Normal design (CP<WB), Circuit leakage current during cracking

图 1



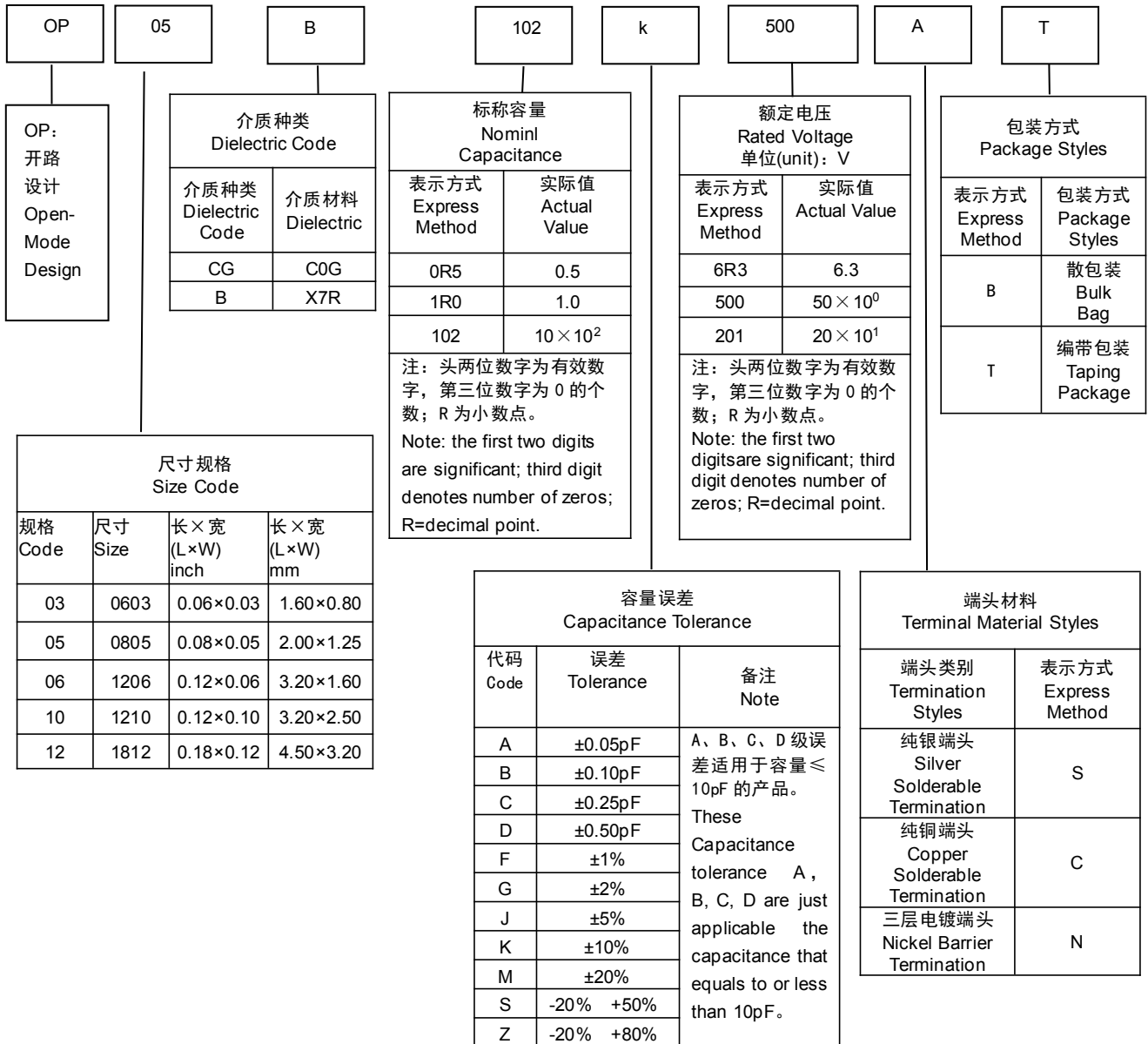
开路设计(CP>WB), 开裂时电路开放
Open-mode design (CP>WB), the circuit is open when cracked

图 2



悬浮设计, 开裂时电路开放
Suspension design, the circuit is open when cracked

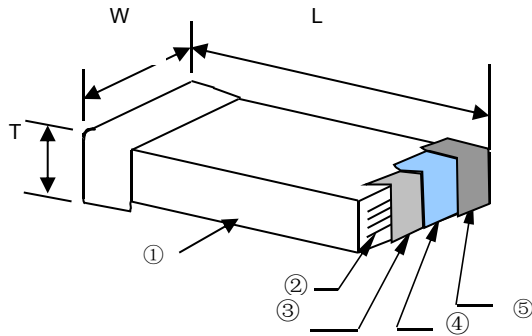
图 3

◆型号表示法
How To Order

◆ 温度系数/特性
Temperature Coefficient /Characteristics

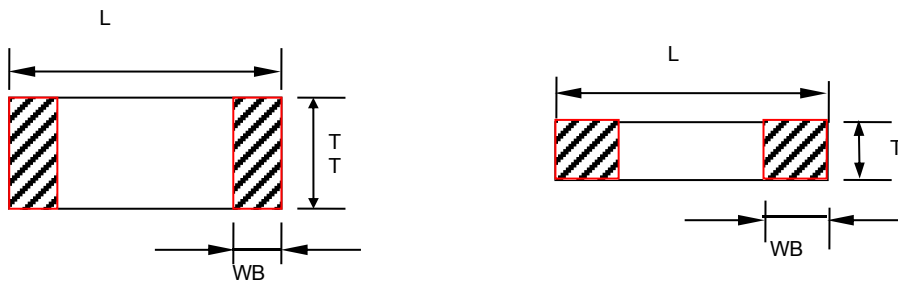
介质种类 Dielectric	参考温度点 Reference Temperature Point	标称温度系数 Temperature Coefficient	工作温度范围 Operation Temperature Range
COG	20°C	0±30 ppm/°C	-55°C ~ 125°C
X7R	20°C	±15%	-55°C ~ 125°C

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.

◆ 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)			
规格 Code	英制表示 British expression	公制表示 Metric expression	L	W	T	WB
03	0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.35±0.20
05	0805	2012	2.00±0.20	1.25±0.20	≤0.55 0.80±0.20 1.25±0.20	0.50±0.20
06	1206	3216	3.20±0.30	1.60±0.30	0.80±0.20 1.25±0.20 1.60±0.30	0.60±0.30
10	1210	3225	3.20±0.30	2.50±0.30	≤2.80	0.60±0.30
12	1812	4532	4.50±0.40	3.20±0.30	≤3.50	0.60±0.30

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

◆ 容量范围及其电压
Capacitance Range and Operating Voltage

规格 Code	尺寸 Size	额定电压 Rated Voltage	C0G(pF)	X7R(pF)
03	0603	4V	---	150~470,000
		6.3V	---	150~470,000
		10V	---	150~100,000
		16V	---	150~100,000
		25V	---	150~100,000
		50V	0.1~1,000	150~100,000
		100V	0.1~1,000	150~15,000
		200V	0.1~220	150~4,700
		250V	0.1~220	150~4,700

◆ 容量范围及其电压
Capacitance Range and Operating Voltage

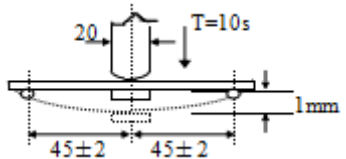
规格 Code	尺寸 Size	额定电压 Rated Voltage	C0G(pF)	X7R(pF)
05	0805	4V	---	150~1,000,000
		6.3V	---	150~1,000,000
		10V	---	150~470,000
		16V	---	150~220,000
		25V	---	150~100,000
		50V	0.3~2,200	150~100,000
		100V	0.3~2,200	150~47,000
		200V	0.3~1,000	150~22,000
		250V	0.3~1,000	150~22,000
		500V	0.3~470	150~10,000
		1000V	0.3~100	---
06	1206	4V	---	200~22,00,000
		6.3V	---	200~2,200,000
		10V	---	200~2,200,000
		16V	---	200~1,000,000
		25V	---	200~1,000,000
		50V	0.3~3,300	200~1,000,000
		100V	0.3~3,300	200~10,000
		200V	0.3~2,200	200~47,000
		250V	0.3~2,200	200~47,000
		500V	0.3~1,000	200~22,000
		630V	0.3~1,000	200~22,000
		1000V	0.3~680	200~10,000
		2000V	0.3~220	200~3,300
10	1210	4V	---	220~4,700,000
		6.3V	---	220~4,700,000
		10V	---	220~4,700,000
		16V	---	220~4,700,000
		25V	---	220~2,200,000
		50V	10~3,900	220~2,200,000
		100V	10~3,900	220~1,000,000
		200V	10~3,300	220~47,000
		250V	10~3,300	220~47,000
		500V	10~1,800	220~27,000
		630V	10~1,800	220~27,000
		1000V	10~1,000	220~22,000
		2000V	10~330	220~10,000
12	1812	50V	10~10,000	---
		100V	10~10,000	470~1,000,000
		200V	10~5,600	470~470,000
		250V	10~5,600	470~470,000
		500V	---	470~100,000
		630V	---	470~100,000
		1000V	---	470~56,000
		2000V	---	470~12,000
		3000V	---	470~10,000
		4000V	---	470~3,300
5000V	---	470~1,000		

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 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	C0G	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%			
X7R	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			
绝缘电阻 (IR) Insulation Resistance	C0G	C≤10 nF, Ri≥5000MΩ C> 10 nF, Ri•Cr≥500S	测试电压: 额定电压 (最高 500V) 测试时间: 60±5 秒 测试湿度: ≤75% 测试温度: 25℃±3℃ 测试充放电电流: ≤50mA Measuring Voltage: Rated Voltage (Max 500V)		
	X7R	C≤25 nF, Ri≥10000MΩ C> 25 nF, Ri•Cr> 100S	Duration: 60±5s Test Humidity: ≤75% Test Temperature: 25℃±3℃ Test Current: ≤50mA		
损耗角正切 (DF, tanδ) Dissipation Factor	C0G	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
		$1.5[(150/Cr)+7] \times 10^{-4}$	5pF≤Cr<50 pF	1MHZ±10%	
		≤0.15%	50pF≤Cr≤1000 pF	1MHZ±10%	
	≤0.15%	> 1000 pF	1KHZ±10%		
	X7R	<50V	≤9%	测试频率: 1KHZ±10% 测试电压: 1.0±0.2Vrms Test Frequency: 1KHZ±10% Test Voltage: 1.0±0.2Vrms	
≥50V		≤2.5%			
介质耐电强度 (DWV) Dielectric Withstanding Voltage	不应有介质被击穿或损伤 No breakdown or damage.	Ur<100V	测量电压: I类: 300% Ur II类: 250% Ur 时间: 1~5 秒 充/放电电流: 不应超过 50mA Measuring Voltage: I class:300% Ur II class :250% Ur Duration: 1~5s Charge/ Discharge Current: 50mA max.		
		100V≤Ur<500V	施加额定电压的 200%, 5 秒, 最大电流不超过 50mA Force 200%Rated voltage for 5 second. Max..current should not exceed 50 mA.		
		500V≤Ur≤1000V	施加额定电压的 150%, 5 秒, 最大电流不超过 50mA Force 150%Rated voltage for 5 second. Max..current should not exceed 50 mA.		
		1000V<Ur≤2000V	施加额定电压的 120%, 5 秒, 最大电流不超过 50mA Force 120%Rated voltage for 5 seconds. Max..current should not exceed 50 mA.		
		2000V<Ur≤5000V	施加额定电压的 120%, 5 秒, 最大电流不超过 10mA Force 120%Rated voltage for 5 seconds. Max..current should not exceed 10 mA.		

项目 Item	技术规格 Technical Specification	测试方法 Test Method and Remarks																										
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°C 的温度下预热 10~30 秒。 Preheating conditions: 80 to 120°C; 10~30s. 有铅焊料：(Sn/Pb: 63/37) 无铅焊料： 浸锡温度：235±5°C 浸锡温度：245±5°C 浸锡时间：2±0.5s 浸锡时间：2±0.5s Solder Temperature: 235±5°C Solder Temperature: 245±5°C Duration: 2±0.5s Duration: 2±0.5s																										
耐焊接热 Resistance to Soldering Heat	<table border="1"> <tr> <td rowspan="2">ΔC/C</td> <td>COG</td> <td>≤±0.5%或±0.5PF, 取较大值 ≤±0.5% or ±0.5PF, whichever is larger</td> </tr> <tr> <td>X7R</td> <td>-5~+10%</td> </tr> <tr> <td>DF</td> <td colspan="2">同初始标准 Same to initial value.</td> </tr> <tr> <td>IR</td> <td colspan="2">同初始标准 Same to initial value.</td> </tr> </table> <p>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.</p>	ΔC/C	COG	≤±0.5%或±0.5PF, 取较大值 ≤±0.5% or ±0.5PF, whichever is larger	X7R	-5~+10%	DF	同初始标准 Same to initial value.		IR	同初始标准 Same to initial value.		将电容在 100~200°C 的温度下预热 10±2 分钟。 浸锡温度：265±5°C 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。 放置时间：24±2 小时 放置条件：室温 Preheating conditions: 100 to 200°C; 10±2min. Solder Temperature: 265±5°C Duration: 10±1s Clean the capacitor with solvent and examine it with a 10X(min.) microscope. Recovery Time: 24±2h Recovery condition: Room temperature															
ΔC/C	COG		≤±0.5%或±0.5PF, 取较大值 ≤±0.5% or ±0.5PF, whichever is larger																									
	X7R	-5~+10%																										
DF	同初始标准 Same to initial value.																											
IR	同初始标准 Same to initial value.																											
抗弯曲强度 Resistance to Flexure of Substrate (Bending Strength)	外观：无可见损伤。 Appearance: No visible damage.	<p>试验基板：Al₂O₃ 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。</p> <p>Test Board: Al₂O₃ or PCB Warp: 1mm Speed: 1mm/sec. Unit: mm The measurement should be made with the board in the bending position.</p> 																										
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																										
温度循环 Temperature Cycle	<table border="1"> <tr> <td rowspan="2">ΔC/C</td> <td>COG</td> <td>≤±1%或±1PF, 取较大值 ≤±1% or ±1pF, whichever is larger</td> </tr> <tr> <td>X7R</td> <td>-10%~+10%</td> </tr> <tr> <td>DF</td> <td colspan="2">同初始标准 Same to initial value.</td> </tr> <tr> <td>IR</td> <td colspan="2">同初始标准 Same to initial value.</td> </tr> </table> <p>外观：无可见损伤 Appearance: No visible damage</p>	ΔC/C	COG	≤±1%或±1PF, 取较大值 ≤±1% or ±1pF, whichever is larger	X7R	-10%~+10%	DF	同初始标准 Same to initial value.		IR	同初始标准 Same to initial value.		<p>预处理* (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:</p> <table border="1"> <thead> <tr> <th>阶段 Step</th> <th>温度 (Temperature) (°C)</th> <th>时间 (Time)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>下限温度 (Low- category temp.): -55</td> <td>30min</td> </tr> <tr> <td>2</td> <td>常温 (Normal temp.): +20°C</td> <td>2~3min</td> </tr> <tr> <td>3</td> <td>上限温度 (Up- category temp.): +125</td> <td>30min</td> </tr> <tr> <td>4</td> <td>常温 (Normal temp.): +20°C</td> <td>2~3min</td> </tr> </tbody> </table> <p>试验后放置 (恢复) 时间：24±2h Recovery time after test: 24±2h</p>	阶段 Step	温度 (Temperature) (°C)	时间 (Time)	1	下限温度 (Low- category temp.): -55	30min	2	常温 (Normal temp.): +20°C	2~3min	3	上限温度 (Up- category temp.): +125	30min	4	常温 (Normal temp.): +20°C	2~3min
ΔC/C	COG		≤±1%或±1PF, 取较大值 ≤±1% or ±1pF, whichever is larger																									
	X7R	-10%~+10%																										
DF	同初始标准 Same to initial value.																											
IR	同初始标准 Same to initial value.																											
阶段 Step	温度 (Temperature) (°C)	时间 (Time)																										
1	下限温度 (Low- category temp.): -55	30min																										
2	常温 (Normal temp.): +20°C	2~3min																										
3	上限温度 (Up- category temp.): +125	30min																										
4	常温 (Normal temp.): +20°C	2~3min																										

项目 Item	技术规格 Technical Specification			测试方法 Test Method and Remarks
耐湿负荷 Humidity load	ΔC/C	C0G	±7.5%或±0.75pF,取两者之中较大者 ±7.5% or ±0.75pF, whichever is larger.	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)
		X7R	≤±12.5%	
	DF	≤2 倍初始标准 Not more than twice of initial value.		
	IR	C0G	Ri≥2500MΩ或 Ri·CR≥25S 取两者之中较小者。 Ri≥2500MΩ or Ri·CR≥25S whichever is smaller.	
		X7R	Ri≥1000MΩ或 Ri·CR≥10S 取两者之中较小者。 Ri≥1000MΩ or Ri·CR≥10S whichever is smaller.	
外观: 无损伤 Appearance: No visible damage.				
寿命试验 Life Test	ΔC/C	C0G	±7.5%或±0.75pF,取两者之中较大者 ±7.5% or ±0.75pF, whichever is larger.	低压产品 (<100V) 电压: 2 倍额定工作电压 时间: 1000 小时 温度: 125℃ 充电电流: 不应超过 50mA 放置条件: 室温 放置时间: 24 小时 (I 类), 或 48 小时 (II 类), Low-Voltage (< 100V) Applied Voltage: 2*Ur Duration: 1000h Temperature: 125℃ Charge/ Discharge Current: 50mA max. Recovery Conditions: Room Temperature Recovery Time: 24h (Class 1), or 48h (Class2)
		X7R	≤±20%	
	DF	≤2 倍初始标准 Not more than twice of initial value.		
	IR	C0G	Ri≥4000MΩ或 Ri·CR≥40S 取两者之中较小者。 Ri≥4000MΩ or Ri·CR≥40S whichever is smaller.	
		X7R	Ri≥2000MΩ或 Ri·CR≥50S 取两者之中较小者。 Ri≥2000MΩ or Ri·CR≥50S whichever is smaller.	
外观: 无损伤 Appearance: No visible damage.				
中高压 寿命试验 Middle &high voltage Life Test	ΔC/C	C0G	±7.5%或±0.75pF,取两者之中较大者 ±7.5% or ±0.75pF, whichever is larger.	中高压产品: 100V≤额定电压≤200V: 1.5 倍工作电压 200V<额定电压≤500V: 1.3 倍工作电压 500V<额定电压: 1.2 倍工作电压 时间: 1000 小时 充电电流: 不应超过 50mA 温度: 125℃ (NPO X7R、X7S); 85℃ (X5R、Y5V) 105℃ (X6S) 放置条件: 室温 放置时间: 24 小时 (I 类), 或 48小时 (II类), Applied Voltage: 100V≤Rated Voltage≤200V: 1.5 Multiple 200V<Rated Voltage≤500V: 1.3 Multiple 500V<Rated Voltage: 1.2 Multiple Duration: 1000h Charge/ Discharge Current: 50mA max. Temperature: 125℃ (NPO X7R、X7S); 85℃ (X5R、Y5V) 105℃ (X6S) Recovery Conditions: Room Temperature Recovery Time: 24h (Class 1), or 48h (Class2)
		X7R	≤±20%	
	DF	≤2 倍初始标准 Not more than twice of initial value.		
	IR	C0G	Ri≥4000MΩ或 Ri·CR≥40S 取两者之中较小者。 Ri≥4000MΩ or Ri·CR≥40S whichever is smaller.	
		X7R	Ri≥2000MΩ或 Ri·CR≥50S 取两者之中较小者。 Ri≥2000MΩ or Ri·CR≥50S whichever is smaller.	
外观: 无损伤 Appearance: No visible damage.				

注解:

专门预处理* (仅对 2 类电容器):

将电容器放在上限类别温度或按详细规范中可能规定的更高温度下经 1h 后, 接着在试验的标准大气条件下恢复 24±1h。

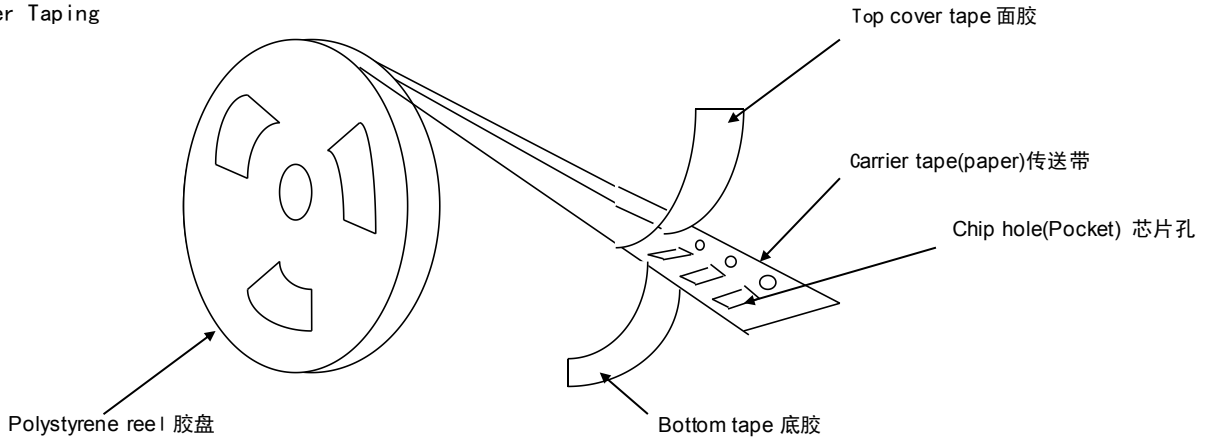
Note:

Pretreatment (only for class2 capacitor)

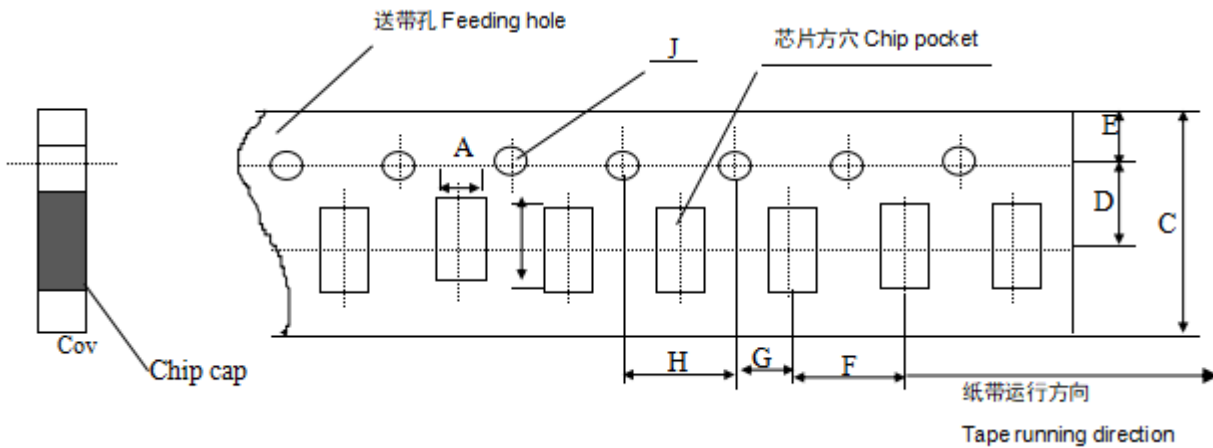
Pretreatment (only for class2 capacitor) is a method to treat the capacitor before measurement. First, place the capacitor in the up-category temperature or other specified higher temperature environment for 1hour. Then recovery the capacitor at standard pressure conditions for 24±1hours.

◆ **包装**
Package

* 纸带卷盘结构
Paper Taping



* 适合 'OP03, OP05, OP06' 常规尺寸产品的纸带尺寸
Dimensions of paper taping for OP03, OP05, OP06 types.



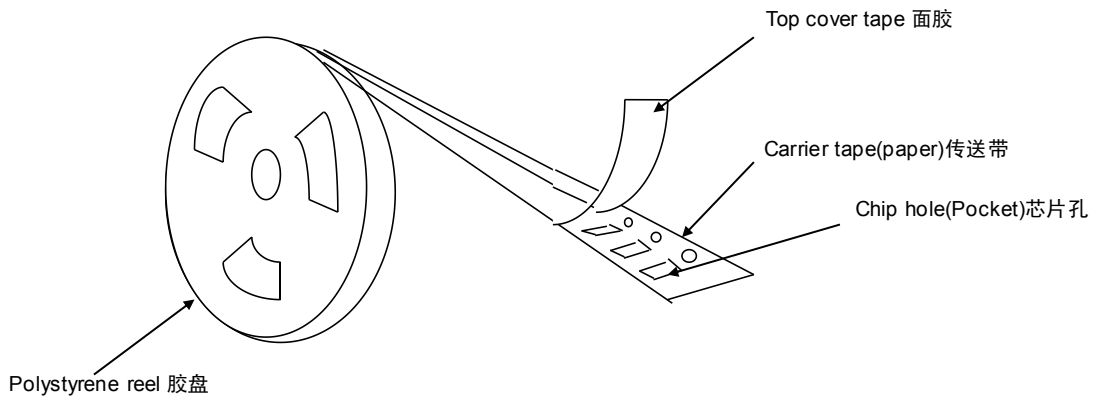
Unit: mm

代号Code 纸带规格 paper size	A	B	C	D*	E	F	G*	H	J	T
OP03	1.10 ±0.10	1.90 ±0.10	8.00 ±0.10	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50 -0/+0.10	1.10 Max
OP05	1.45 ±0.15	2.30 ±0.15	8.0 ±0.15	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50 -0/+0.10	1.10 Max
OP06	1.80 ±0.20	3.40 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50 -0/+0.10	1.10 Max

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

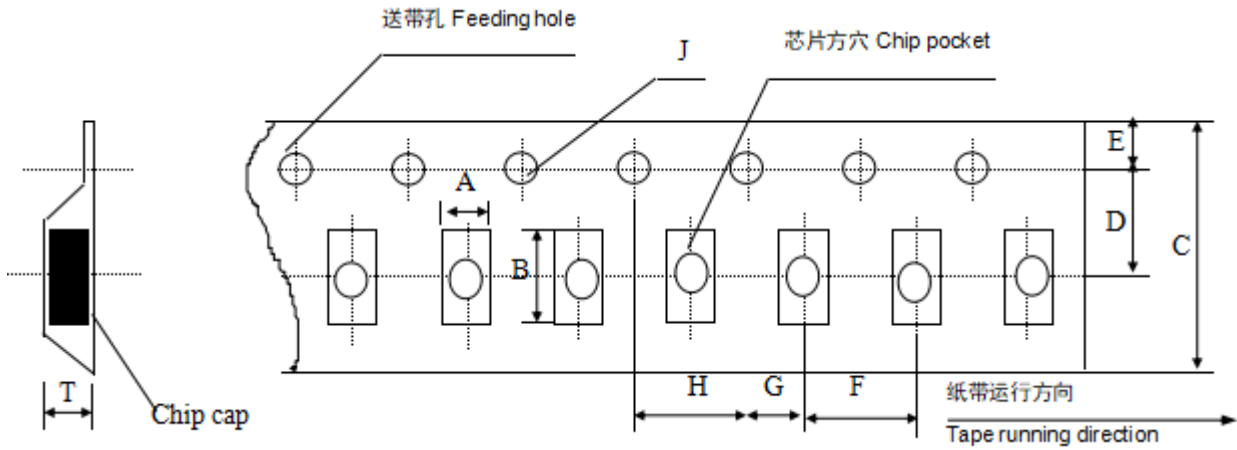
* 塑胶卷盘结构

Embossed taping



* 塑胶带尺寸结构(适合‘0805~1812’型产品)

Dimensions of embossed taping for 0805~1812 type



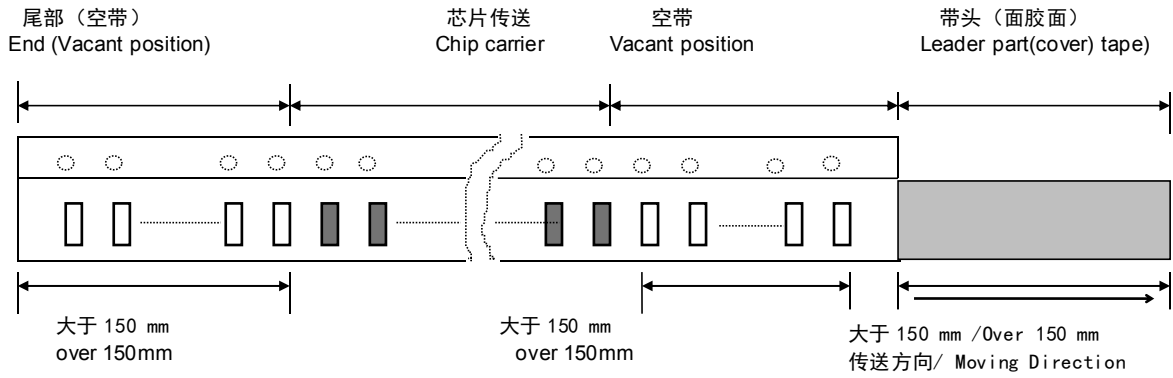
代号 Code 规格 Tape size	A	B	C	D*	E	F	G*	H	J	T
OP05	1.55 ± 0.20	2.35 ± 0.20	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	4.00 ± 0.10	1.50 -0/+0.10	1.50 Max
OP06	1.95 ± 0.20	3.60 ± 0.20	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	4.00 ± 0.1	1.50 -0/+0.10	1.85 Max
OP10	2.70 ± 0.10	3.42 ± 0.10	8.00 ± 0.10	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	1.55 -0/+0.10	3.2 Max
OP12	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

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.

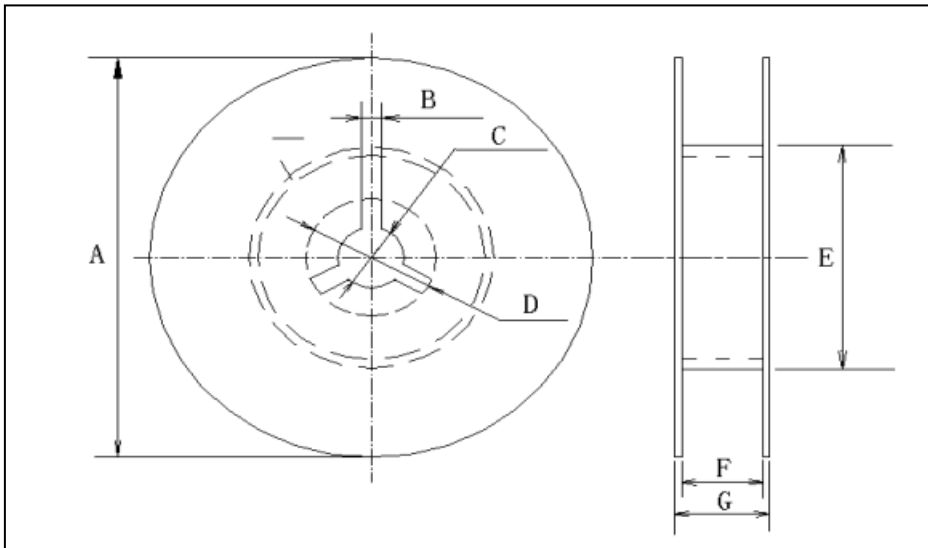
* 传送带的前后结构

Structure of leader part and end part of the carrier paper



* 卷盘尺寸

Reel dimensions (unit: mm)

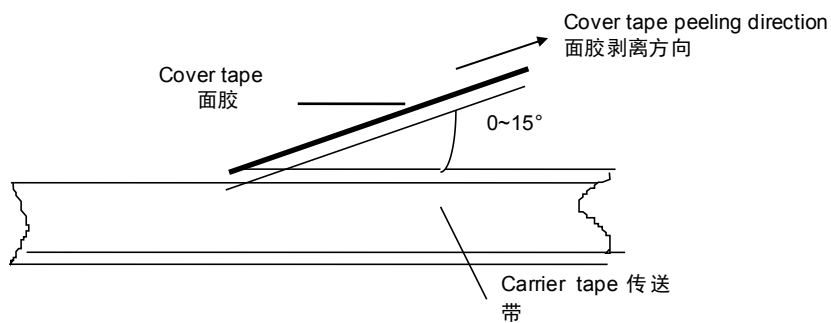


卷盘型号	A	B	C	D	E	F	G
7'REEL	$\phi 178 \pm 2.0$	3.0	$\phi 13 \pm 0.5$	$\phi 21 \pm 0.8$	$\phi 50$ 或更大 $\phi 50$ or more	10.0 ± 1.5	12max
13'REEL	$\phi 330 \pm 2.0$	3.0	$\phi 13 \pm 0.5$	$\phi 21 \pm 0.8$	$\phi 50$ 或更大 $\phi 50$ or more	10.0 ± 1.5	12max

* 关于卷带的说明: 面胶剥离强度

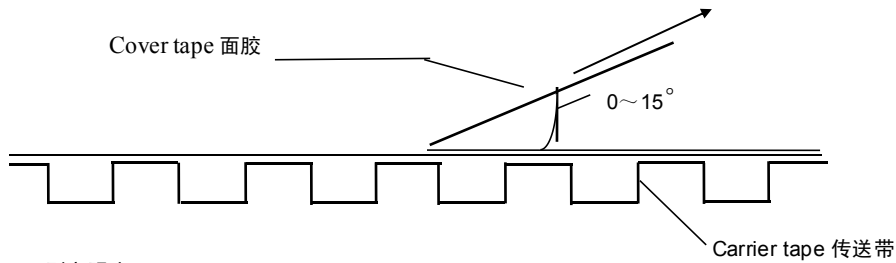
Taping specification: top tape peeling strength

* 纸带 Paper Taping



*** 塑料胶盘 Embossed Taping**

Cover tape peeling direction 面胶剥离方向



标准：0.1N<剥离强度<0.7N

Standard: 0.1N < peeling strength < 0.7N

在剥离时，纸带不能有纸碎，也不能粘在底、面胶上。

No paper dirty remains on the scotch when peeling, and sticks to top and bottom tape.

*** 塑料盒散包装**

Bulk Case Package

单位 (unit) :mm

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

*** 包装数量**

Packing Quantity

尺寸规格 Type	包装形式和数量 (Package Style & Quantity) unit: pcs				
	塑料压纹带卷盘 (EPT)	纸带卷盘 (PT)	胶带卷盘 (ET)	塑料盒散装 (BC)	一般散装 (BP)
OP03	----	4000	----	15000	5000
OP05	----	4000	3000	10000	5000
OP06	----	4000	T≤1.35mm 3000 T>1.35mm 2000	5000	5000
OP10	----	-----	T≤1.80mm 2000 T>1.80mm 1000	-----	2000
OP12	----	-----	T≤1.85mm 1000 T>1.85mm 500	-----	2000

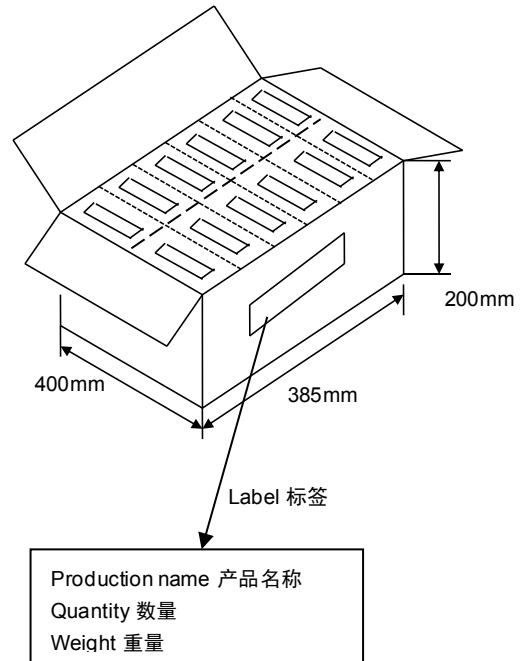
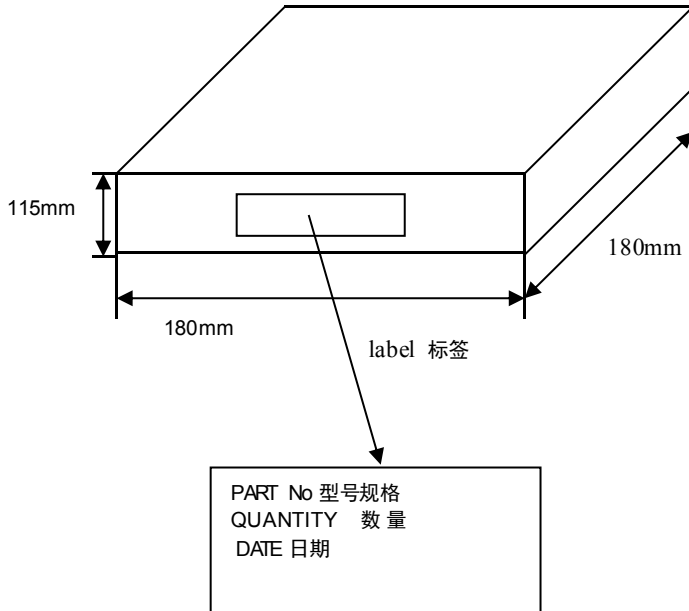
注意：包装的形式和数量可根据客户的要求来定。

Note: We can choose packing style and quantity can be according to the customer's requirement.

*** 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 mode 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

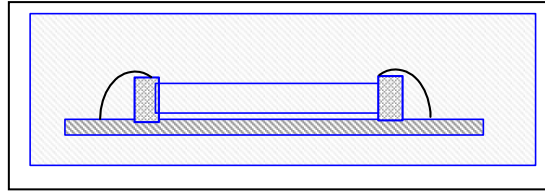
手工焊接很容易因为芯片局部受热不均而引起瓷体微裂或局部爆炸的现象, 在焊接时, 如果操作者不小心, 会使烙铁头直接同电容芯片的瓷体部分接触, 这样很容易使电容芯片因热冲击而受损或出现其他意外, 因此, 使用电烙铁手工焊接时应仔细操作, 并对电烙铁的尖端的选择和尖端温度控制应多加小心。

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**

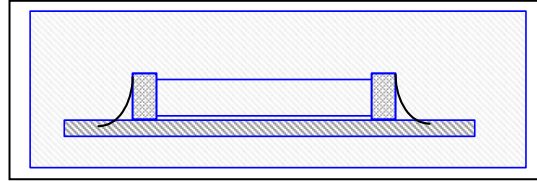
Optimum Solder Amount for Reflow Soldering

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



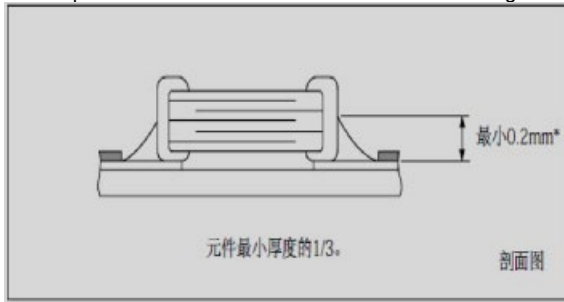
固定力量不足,可能会引起
电容芯片与线路接触不良
Weak holding force may cause
bad connection
between the capacitor and PCB.

*** 推荐焊料用量**

Recommended Soldering amounts

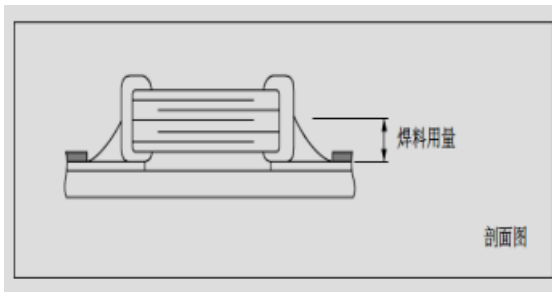
回流焊接的最佳焊料用量

The optimal solder fillet amounts for re-flow soldering



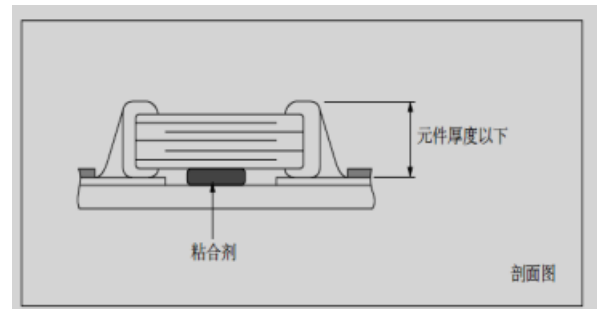
使用烙铁返修时的最佳焊料量

The optimal solder fillet amounts for reworking by using soldering iron



波峰焊接的最佳焊料用量

The optimal solder fillet amounts for wave soldering



*** 推荐焊接方式**

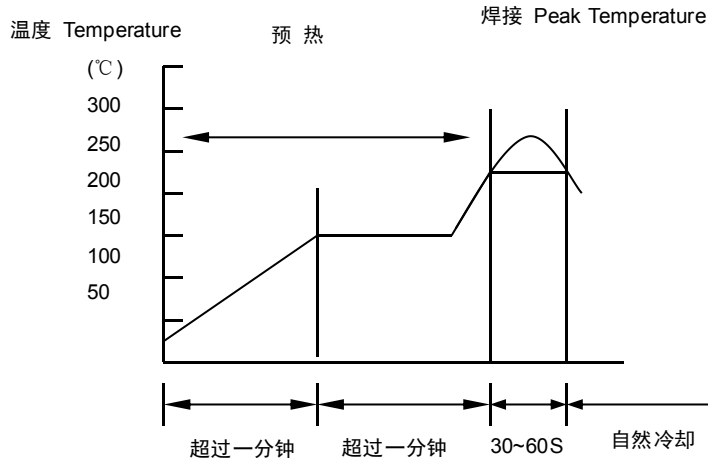
Recommended Soldering Method

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
OP03	C0G/X7R	/	$C \geq 1\mu\text{f}$	R
		/	$C < 1\mu\text{f}$	R/W
OP05	C0G/X7R	/	$C \geq 4.7\mu\text{f}$	R
		/	$C < 4.7\mu\text{f}$	R/W
OP06	C0G/X7R	/	$C \geq 10\mu\text{f}$	R
		/	$C < 10\mu\text{f}$	R/W
$\geq \text{OP10}$	C0G/X7R	/	/	R

焊接方式 Soldering method: R—回流焊 Reflow Soldering 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)



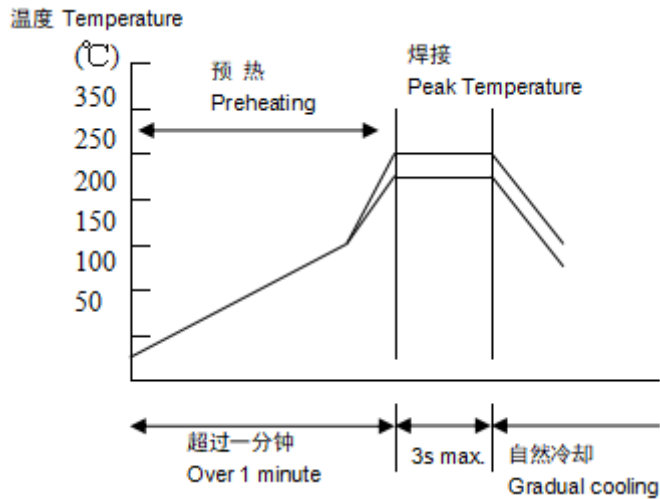
	Pb-Sn 焊接 Pb-Sn soldering	无铅焊接 Lead-free soldering
尖峰温度 Peak temperature	230°C~250°C	240°C~260°C

 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)



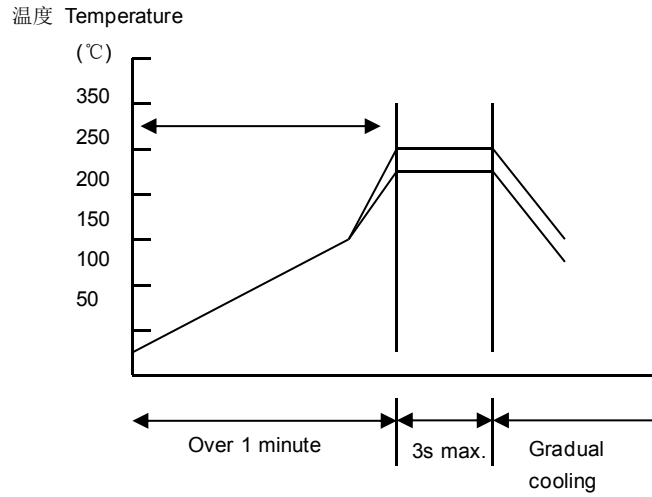
	Pb-Sn 焊接 Pb-Sn soldering	无铅焊接 Lead-free soldering
尖峰温度 Peak temperature	230°C~260°C	240°C~270°C

 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


条件 Conditions:

预热 Preheating	烙铁头温度 Temperature of soldering iron head	烙铁功率 Power of soldering iron	烙铁头直径 Diameter of soldering iron head	焊接时间 Soldering time	锡膏量 Solder paste amount	限制条件 Restricted conditions
$\Delta \leq 130^\circ\text{C}$	最高 350°C Highest temperature: 350°C	最大 20W 20W at the highest	建议 1mm 1mm recommended	最长 3s 3s at the longest	$\leq 1/2$ 芯片厚度 $\leq 1/2$ chip thickness	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

*以最新版本的内容为准