

序号 No	目 录 TABLE OF CONTENTS
1	特征 Feature
2	应用范围 Application
3	型号表示法 Ordering Code
4	产品外形尺寸 Product shape and size
5	温度系数/特性 Temperature Coefficient /Characteristics
6	容量范围及其电压 Capacitance Range and Voltage
7	可靠性测试方法 Reliability Test Methods
8	包装 Package
9	储存方法 Storage Methods
10	使用前的注意事项 Precautions Before Use
11	推荐焊接温度曲线图 The temperature profile for soldering
12	修订履历 Revision History

■ 片式排容

Multi-layer Ceramic Capacitor Array

◆ 特征

Feature

- * 叠层独石结构，具有高可靠性能

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.

- * 节约空间：可以节省高达 50% 的 PCB 空间位置，提高装配密度

Space saving: CA can save 50% space of the PC board and improve the assembling density.

- * 更高的体积比容：安装一块 CA 等于安装 4 块 0603 片容，减少安装次数，提高安装效率

Provide more capacitance per volumetric area: Efficiently use the side margins and thickness. Promoting mounting efficiency. One chip of CA equals to four chips of 0603 type capacitor. So it can reduce times of picking and placing.

- * 降低成本：减少放置的次数；缩短生产时间；减少设备管理费用；减少 PCB 费用

Cost saving: Reduce times for picking and placing, reduce manufacturing time, reduce the cost for manage the equipments and reduce the cost of PCB.

- * 安装简易：可进行 SMT 编带包装，由贴片机高速贴片

Easy to picking and placing: SMT package, easy to mounting.

- * 提高线路板工作效率：可以减少印刷的线路。提高线路板的运转速度，提高工作效率

Improve the working efficiency of the printed board: Reduce the amount of printed circuits and promote the working speed of the printed circuit.

- * 执行标准：GB/T 21041-2007 GB/T 21042-2007

Executive Standard: GB/T 21041-2007 GB/T 21042-2007

◆ 应用范围

Application

- * 适用于对元器件空间要求严格的 PCB，如手提电脑、PDA、无绳电话

Applied in PCB which require strictly about space speed, such as notebook computer, PDA and portable telephone, etc.

- * 特别适用于输入、输出接口电路

CA is best suitable to use in I/O interface circuit.



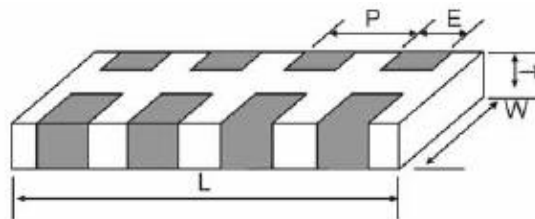
◆型号表示法

How To Order

6124	B	102	K	500	N	T																																										
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误差 Tolerance	±0.05pF	±0.10pF	±0.25pF	±0.50pF	±1%	±2%	±5%	±10%	±20%																																							

◆外形及尺寸

Product shape and size



型号 Type	尺寸 (mm)					尺寸代码 Size code
	L	W	T	P	E	
6124	1.60 ± 0.20	3.20 ± 0.20	0.80 ± 0.10	0.80 ± 0.20	0.40 ± 0.10	ZA

◆ 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
C0G	25°C	0±30 ppm/°C	-55°C~125°C
X7R	25°C	±15%	-55°C~125°C

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

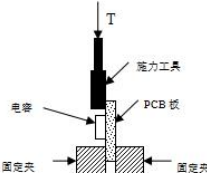
尺寸 Dimension	6124							
材料 Dielectric	C0G				X7R			
额定电压 Rated Voltage	16V	25V	50V	100V	16V	25V	50V	100V
电容量 Capacitance								
0.5PF	ZA	ZA	ZA					
5 PF	ZA	ZA	ZA					
10 PF	ZA	ZA	ZA					
15 PF	ZA	ZA	ZA					
20 PF	ZA	ZA	ZA					
22 PF	ZA	ZA	ZA					
33 PF	ZA	ZA	ZA					
47 PF	ZA	ZA	ZA					
100 PF	ZA	ZA	ZA	ZA	ZA	ZA	ZA	
150 PF	ZA	ZA	ZA		ZA	ZA	ZA	
220 PF	ZA	ZA	ZA		ZA	ZA	ZA	
330 PF	ZA	ZA	ZA		ZA	ZA	ZA	
470 PF	ZA	ZA	ZA		ZA	ZA	ZA	
1000 PF	ZA	ZA	ZA		ZA	ZA	ZA	
2.2 nF					ZA	ZA	ZA	
3.3nF					ZA	ZA	ZA	
4.7nF					ZA	ZA	ZA	
6.8nF					ZA	ZA	ZA	
10 nF					ZA	ZA	ZA	ZA
22 nF					ZA	ZA	ZA	
33 nF					ZA	ZA	ZA	
47 nF					ZA	ZA	ZA	
68 nF					ZA	ZA	ZA	
100 nF					ZA	ZA	ZA	
220 nF								

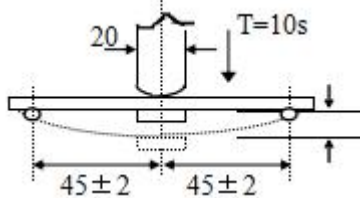
◆ 可靠性测试方法

Reliability Test Methods

二类介质规格测容量前需去老化处理：测试温度：25℃±3℃，测试湿度：<70%RH. 电容器 150℃热处理 1h±10min，放置 24±2h 后测量。

The second type of medium specification needs to be aged before measuring the capacity: test temperature: 25℃±3℃, test humidity: <70%RH. The capacitors were heat treated at 150℃ for 1 hour ±10minutes and measured after 24±2 hours of placement.

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			
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： 额定电压 测试时间： 60±5 秒 测试湿度： ≤75%			
	II 类 Class II	C≤25 nF, Ri≥10000MΩ C> 25 nF, Ri•CR≥100S				测试温度： 25℃±3℃ 测试充放电电流： ≤50mA Measuring Voltage: Rated Voltage Duration: 60±5s Test Humidity: ≤75% Test Temperature: 25℃±3℃ Test Current: ≤50mA			
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	
						≤1/（400+20C）	C<30 pF	1MHz±10%	1.0±0.2Vrms
						≤0.1%	C≥30pF		
	II 类 Class II	X7R	≥50V ≤250×10 ⁻⁴	25V ≤350×10 ⁻⁴	16V ≤500×10 ⁻⁴	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			
介电耐电强度 (DWV) Dielectric Withstanding Voltage	不应有介质被击穿或损伤 No breakdown or damage.					测量电压： I 类： 300%额定电压 II 类： 250%额定电压 时间： 1~5 秒 充/放电电流： 不应超过 50mA Measuring Voltage: Class I :300% Rated Voltage Class II :250% Rated Voltage Duration: 1~5s Charge/ Discharge Current: 50mA max.			
端头结合强度 Termination Adhesion	外观无可见损伤 No visible damage.					如图所示：慢慢施加一个 5N 的力(T)到电容侧面瓷体上,并保持 10+1 秒。 As shown in the picture , Slowly apply a T force to the porcelain body on the side of the capacitor and hold for 10+1 seconds. 			
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.			
						无铅焊料： 浸锡温度： 245±5℃ 浸锡时间： 2±0.5s Lead-free soldering Solder Temperature: 245±5℃ Duration: 2±0.5s			

项目 Item	技术规格 Technical Specification			测试方法 Test Method and Remarks																				
耐焊接热 Resistance to Soldering Heat	项目 Item	I类 Class I	II类 Class II	将电容在 100~200℃的温度下预热 60~120 秒。 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。 试验后放置时间: 24±2h 放置条件: 室温 Preheating conditions: 100 to 200℃; 60~120s. Solder Temperature: 265±5℃ 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	≤±2.5%或±0.25pF, 取较大值 ≤±2.5% or ±0.25PF, whichever is larger	±15%																					
	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.																							
抗弯曲强度 Resistance to Flexure of Substrate (Bending Strength)	外观: 无可见损伤。 Appearance: No visible damage. ΔC/C: I 类: ≤±5%或±0.5pF, 取两者中最大者 II 类: ≤±10% Class I : ≤±5% or ±0.5pF,whichever is larger. Class II : ≤±10%  弯曲深度 Test Board:PCB Warp: 1mm Speed: 1mm/sec. The measurement should be made with the board in the bending position.																							
温度循环 Temperature Cycle	<table><tr><td>项目 Item</td><td>I类 Class I</td><td>II类 Class II</td></tr><tr><td>ΔC/C</td><td>≤±1%或±1PF, 取较大值 ≤±1% or ±1pF, whichever is larger</td><td>-15% ~+15%</td></tr></table> 无可见损伤 No visible damage.	项目 Item	I类 Class I	II类 Class II	ΔC/C	≤±1%或±1PF, 取较大值 ≤±1% or ±1pF, whichever is larger	-15% ~+15%	外观 <table><tr><td>阶段 Step</td><td>温度 (Temperature) (℃)</td><td>时间 (Time)</td></tr><tr><td>1</td><td>下限温度(Low- category temp.): C0G/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.): C0G/X7R: +125</td><td>30min</td></tr><tr><td>4</td><td>常温 (Normal temp.): +20</td><td>2~3min</td></tr></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.): C0G/X7R:-55	30min	2	常温 (Normal temp.): +20	2~3min	3	上限温度 (Up- category temp.): C0G/X7R: +125	30min	4	常温 (Normal temp.): +20	2~3min
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阶段 Step	温度 (Temperature) (℃)	时间 (Time)																						
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3	上限温度 (Up- category temp.): C0G/X7R: +125	30min																						
4	常温 (Normal temp.): +20	2~3min																						
耐湿负荷 Humidity load	<table><tr><td>ΔC/C</td><td colspan="2">I 类: ±7.5%或±0.75pF,取两者之中较大者 II 类: X7R: ≤±12.5% Class I : ±7.5% or ±0.75pF, whichever is larger. Class II : ≤±12.5%</td></tr><tr><td>DF</td><td colspan="2">≤2 倍初始标准 Not more than twice of initial value.</td></tr><tr><td rowspan="2">IR</td><td>Class I</td><td>Ri≥5000MΩ或 Ri•CR≥50S 取两者之中较小者。 Ri≥5000MΩ或 Ri•CR≥50S whichever is smaller.</td></tr><tr><td>Class II</td><td>Ri≥1000MΩ或 Ri•CR≥10S 取两者之中较小者。 Ri≥1000MΩ或 Ri•CR≥10S whichever is smaller.</td></tr><tr><td colspan="3">外观: 无损伤 Appearance: No visible damage.</td></tr></table>	ΔC/C	I 类: ±7.5%或±0.75pF,取两者之中较大者 II 类: X7R: ≤±12.5% Class I : ±7.5% or ±0.75pF, whichever is larger. Class II : ≤±12.5%		DF	≤2 倍初始标准 Not more than twice of initial value.		IR	Class I	Ri≥5000MΩ或 Ri•CR≥50S 取两者之中较小者。 Ri≥5000MΩ或 Ri•CR≥50S whichever is smaller.	Class II	Ri≥1000MΩ或 Ri•CR≥10S 取两者之中较小者。 Ri≥1000MΩ或 Ri•CR≥10S whichever is smaller.	外观: 无损伤 Appearance: No visible damage.			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±2h 小时 Temperature: 40±2℃ Humidity: 90~95%RH Voltage: Rated Voltage Duration: 500h Recovery conditions: Room temperature Recovery Time::24h±2h								
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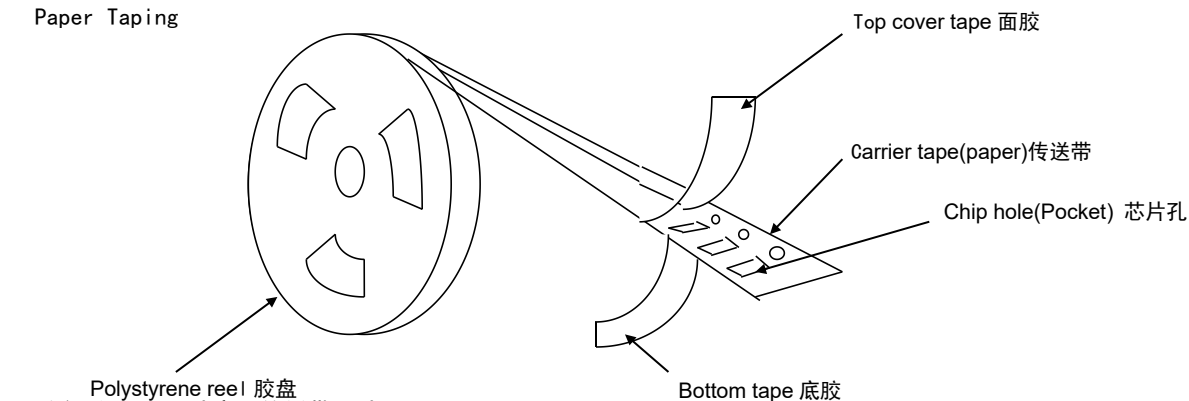
项目 Item	技术规格 Technical Specification			测试方法 Test Method and Remarks
寿命试验 Life Test	ΔC /C	I 类 Class I	≤±3%或±0.3pF, 取两者之中较大者 ≤±3%或±0.3pF, whichever is larger.	电压: 2 倍额定工作电压 时间: 1000 小时 温度: 125℃ (C0G、X7R) 充电电流: 不应超过 50mA 放置条件: 室温 放置时间: 24±2h 小时; Applied Voltage: 2*Ur, except the table 1 Duration: 1000h. Temperature: 125℃(C0G、X7R) Charge/ Discharge Current: 50mA max. Recovery Conditions: Room Temperature Recovery Time: :24h±2h
		II 类 Class II	-20% ~ +20%	
	DF	≤2 倍初始标准 Not more than twice of initial value.		
	IR	I 类 Class I	Ri≥4000MΩ或 Ri•CR≥40S 取两者之中较小者 Ri≥4000MΩ or Ri•CR≥40S whichever is smaller.	
		II 类 Class II	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.			

◆ 包装

Package

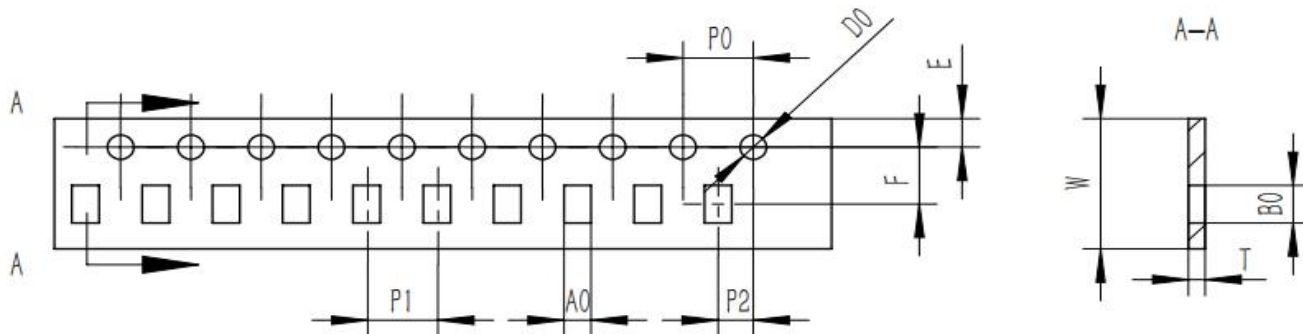
* 纸带卷盘结构

Paper Taping



* 适合 '6124 尺寸产品的纸带尺寸

Dimensions of paper taping for 6124 types



代号Code 纸带规格 paper size	A0	B0	W	F	E	P1	P2	P0	D0	T
6124	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	1.55 -0/+0.05	1.10 Max

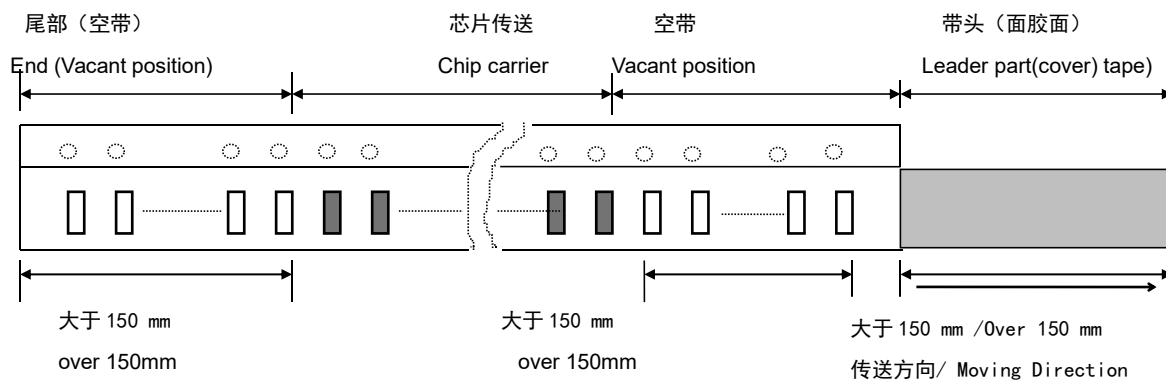
注意: *表示此处对尺寸的要求非常精确。

Note: The place with "*" means where needs exactly dimensions.

Unit: mm

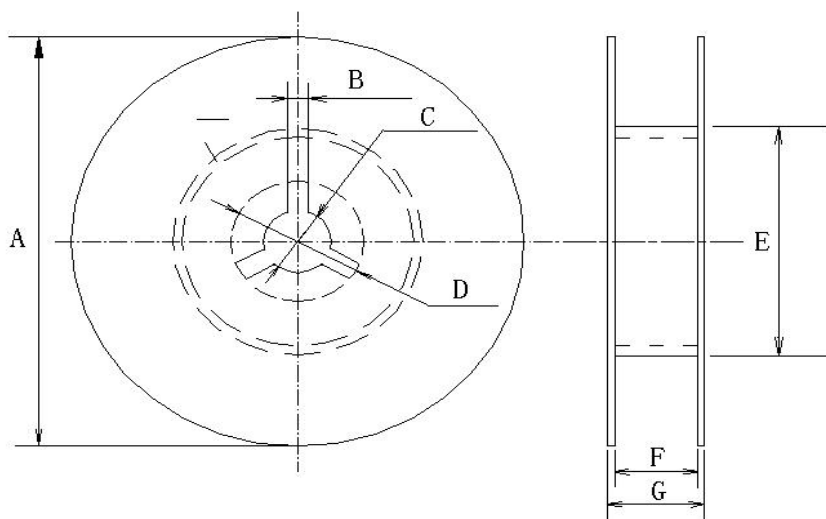
* 传送带的前后结构

Structure of leader part and end part of the carrier paper



* 卷盘尺寸

Reel dimensions (unit: mm)

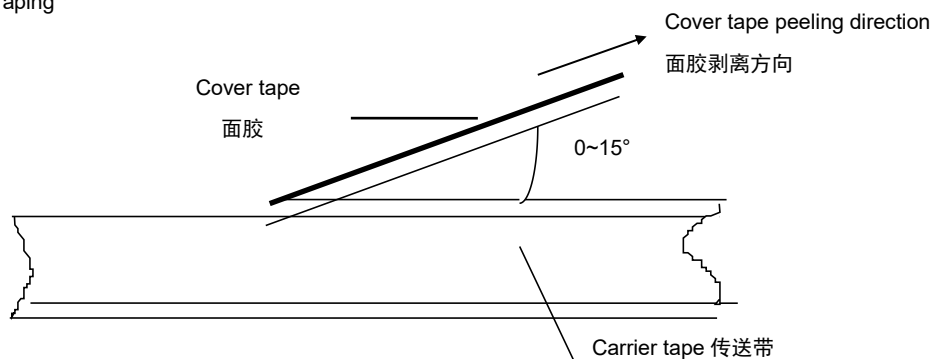


卷盘型号 Reel Code	A	B	C	D	E	F	G
7'REEL	$\phi 178 \pm 2.0$	3.0	$\phi 13 \pm 0.5$	$\phi 21 \pm 0.8$	$\phi 50$ 或更大 $\phi 50$ or more	10.0 ± 1.5	12max

* 关于卷带的说明：面胶剥离强度

Taping specification: top tape peeling strength

* 纸带 Paper Taping



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.

* 包装数量

Packing Quantity

尺寸代码 SizeCode	厚度 Thickness	纸带卷盘 (PT)	胶带卷盘 (ET)
6124	0.80±0.10	4000	-----

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.

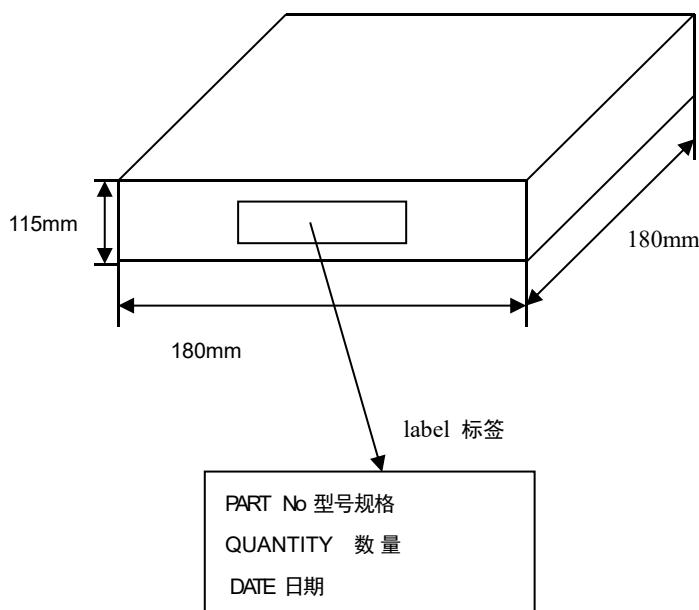
* 外包装

Outer packing

小包装 The first package

Quantity: 10 reels

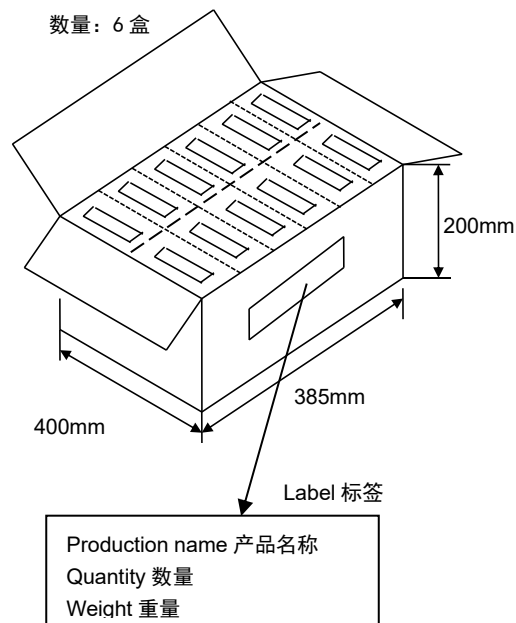
数量: 10 卷



大包装 The second package

Quantity: 6 cases

数量: 6 盒



◆ 储存注意事项

*MLCC 的储存条件: 相对湿度为 20~70%, 储存温度为 5~40℃, 建议温度低于 30℃。

*MLCC 的性能可能会受到储存条件的影响, 交货后请立即使用。高温高湿条件、长期储存可能会导致包装材料变质、产品端头电极氧化。如自交付后已超过六个月, 使用前检查包装、外观等。如果交付后超过一年, 在使用前要检查可焊性。

* 不要将电容器存放在含有腐蚀性气体 (例如硫化氢、二氧化硫、氯气、氨气等) 的环境中。

* 不要在阳光直射下或高湿度条件下储存电容器。

◆ Storage Precautions

* Storage Conditions for MLCC: Relative humidity: 20~70%, storage temperature: 5~40℃, recommended temperature is below 30℃.

* The performance of MLCCs may be affected by storage conditions. Please use immediately after delivery. High temperature and high humidity conditions, or long-term storage, may lead to packaging material deterioration and oxidation

of the product's end electrodes. If it has been over six months since delivery, check the packaging and appearance before use. If it has been over a year, check the solderability before use.

* Do not store capacitors in environments containing corrosive gases (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia, etc.).

* Do not store capacitors under direct sunlight or in high humidity conditions.

◆使用前注意事项

*安装前的信息

- 1、不要重复使用从设备上拆下的电容器。
- 2、确认额定容量、额定电压等电气特性。
- 3、确认施加电压下的电容特性。
- 4、确认使用下的机械应力。
- 5、确认长期存放的电容器的可焊性。
- 6、在测量电容之前，对长期存放的电容器进行热处理。

◆ Precautions Before Use

Pre-installation Information

- 1、Do not reuse capacitors removed from equipment.
- 2、Confirm electrical characteristics such as rated capacitance and rated Voltage.
- 3、Confirm the capacitor characteristics under applied Voltage.
- 4、Confirm the mechanical stress under use conditions.
- 5、Confirm the solderability of capacitors stored for long periods.
- 6、Perform heat treatment on capacitors that have been stored for a long time before measuring capacitance.

◆应用限制 Application Restrictions

- 1、我们的产品旨在用于一般消费电子设备(例如家用电器、办公设备、信息和通信设备，AV 设备、OA 设备、包括但不限于手机和 PC 等)，产品的设计基于正常操作和使用条件下的通用应用和标准用途。
- 2、不推荐用于下列高可靠性应用场景，包括但不限于：航天设备、医疗设备、航空设备、原子能设备、灾难预防设备、犯罪预防设备、电加热设备、燃烧设备、公共信息网络设备、数据处理设备、军事设备、发电控制设备、安全设备、车载设备、交通信号设备、运输设备和海底设备。
- 3、除非您事先获得风华的书面同意，否则风华不对您或第三方因将我们的产品用于第 2 点设备而产生的任何损害承担任何责任。

1、Our products are intended for use in general consumer electronic devices (such as household appliances, office equipment, information and communication devices, AV equipment, OA equipment, including but not limited to mobile phones and PCs), based on general applications and standard uses under normal operating and usage conditions.

2、Our products are not recommended for the following high-reliability application scenarios, including but not limited to: aerospace equipment, medical devices, aviation equipment, atomic energy equipment, disaster prevention equipment, crime prevention equipment, electric heating equipment, combustion equipment, public information network devices, data processing equipment, military equipment, power generation control equipment, safety equipment, vehicle-mounted devices, traffic signal equipment, transportation equipment, and underwater equipment.

3、Unless you have prior written consent from Fenghua, Fenghua is not liable for any damages caused to you or third parties by using our products in the devices mentioned in point 2.

* 焊接的条件与相关图表

Soldering Condition and 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.

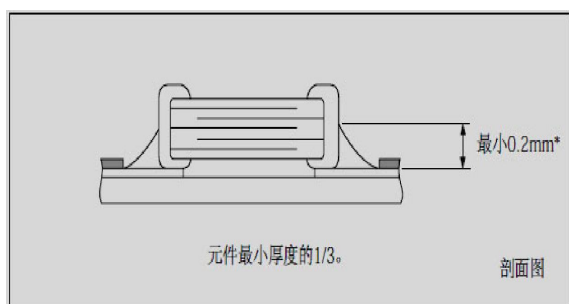
Manual soldering can pose a great risk of creating thermal cracks in capacitors. The hot soldering iron tip comes into direct contact with the end terminations, and operator's careless may cause the tip of the soldering iron to come into direct contact with the ceramic body of the capacitor. Therefore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

* 推荐焊料用量

Recommended Soldering amounts

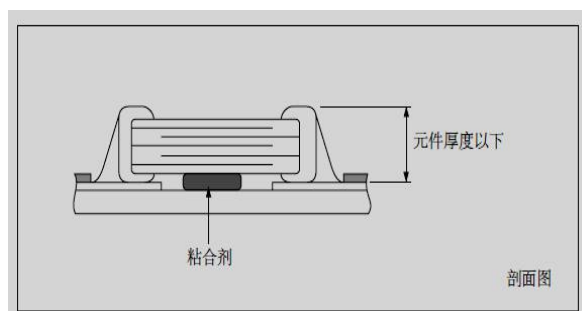
回流焊接的最佳焊料用量

The optimal solder fillet amounts for re-flow soldering



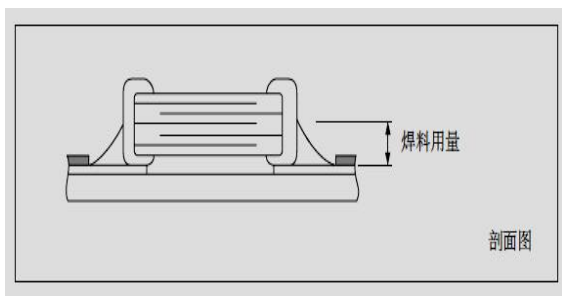
波峰焊接的最佳焊料用量

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

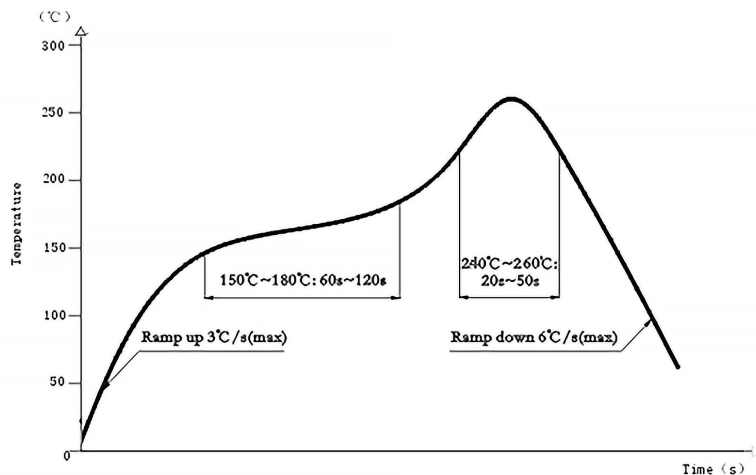
规格尺寸 Size	温度特性 Temperature Characteristics	容量范围 Capacitance	焊接方式 Soldering Method
6124	C0G	/	R
	X7R	/	R

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)



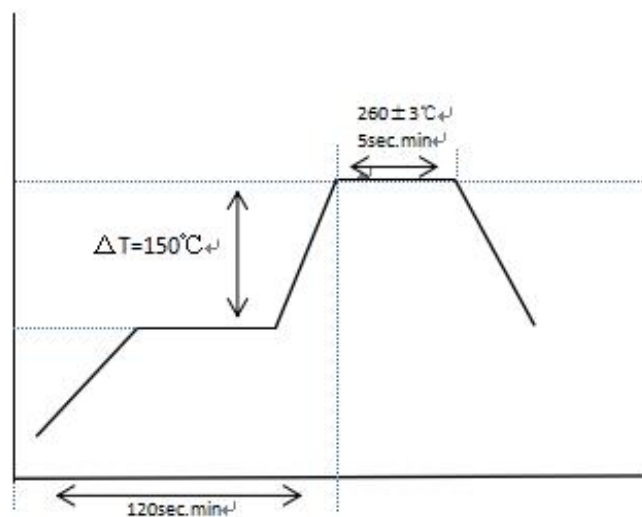
回流焊要求：器件回流焊要求满足 J-STD-020 无铅回流焊。

Reflow soldering requirements: The device reflow soldering requirements meet the J-STD-020 lead-free reflow soldering.

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)



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: $T \leq 150^{\circ}\text{C}$.

* 备注：产品规格书仅供设计选型参考用，不作为交货依据。

Note: The product specification is for design and selection reference only and shall not serve as a basis for delivery.

2. In the product specification, deliverable high-Voltage models with the same specifications, capacity, and temperature characteristics can fully cover the low-Voltage models. For products with the same specifications, capacity, and Voltage, X7R temperature characteristic products can cover X7S, X7T, X6S, and X5R (e.g., 6124B/104K500NT can cover 6124BS104K500NT, 6124BT104K500NT, 6124DS104K500NT, 6124X/104K500NT). Therefore, detailed model specifications will not be listed separately in the specification.