

承认书

APPROVAL SHEET

产品名称： 多层片式陶瓷电容器

PART NAME: MULTILAYER CERAMIC CAPACITORS

系 列： 高强度系列（25V~2000V）

SERIES： High-Strength series（25V~2000V）

尺寸规格： 0603~ 1206

Size: 0603~ 1206

供 应 商（SUPPLIER）： 利和兴电子元件(江门)有限公司

发布日期（ISSUED DATE）：

批 准（APPROVED BY）：

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一、MLCC 简介

片式多层陶瓷电容器 (MLCC) 是适合于表面贴装技术 (SMT) 的小尺寸、高比容、高精度陶瓷介质电容器, 可贴装于印刷线路板 (PCB)、混合集成电路 (HIC) 基片, 有效地缩小电子信息终端产品 (尤其是便携式产品) 的体积和重量, 提高产品可靠性。顺应了 IT 产业小型化、轻量化、高性能、多功能的发展方向, 陶瓷电容器适合厂家高密度、高效表面贴装。

General Introduction

Multi-layer ceramic chip capacitor is a kind of ceramic dielectric capacitor with small size, high capacitance per volume, high accuracy, suited surface mounted technology (SMT). It is widely used in electronic circuitry, mounted printed circuit board, and hybrid IC. These different functions require specific capacitor properties.

二、MLCC 介质种类

产品采用的介质材料可以分为两大类:

I类陶瓷介质电容器, 称为高频电容器, 包括通用型高频 COG、COH 电容器和温度补偿型高频 HG、LG、PH、RH、SH、TH、UJ、SL 电容器。高频电容器具有极高的稳定性, 其中 COG、COH 电容器电性能几乎不随时间、交流信号、外加直流偏压的变化而改变, 同时具有极低介质损耗, 即高 Q 值。适用于低损耗、温度补偿型电路中。

II类陶瓷介质陶瓷电容器, 包括 X5R、X6S、X7R、X7S、X7T 介质材料的电容器为II类电容器, 具有较高的介电常数, 容量比I类电容器高, 具有较稳定的温度特性, 更宽的容量范围, 一般电路中, 如隔直、耦合、旁路、鉴频等电路中。

MLCC Dielectric Types

The dielectric materials used in the products can be divided into two broad categories:

Class I dielectric ceramic capacitors, called high-frequency capacitors, including Standard high-frequency COG, COH capacitors and temperature-compensated high-frequency HG, LG, PH, RH, SH, TH, UJ, SL capacitors. High-frequency capacitors have a very high stability, where COG, COH capacitor electrical performance almost does not change over time, AC signal, plus DC bias, while having very low dielectric loss, that is, high Q value. Suitable for low-loss, temperature-compensated circuits.

Class II dielectric ceramic capacitors, including X5R, X6S, X7R, X7S, X7T dielectric material, Class II dielectric capacitors, with a higher dielectric constant, higher capacitance than Class I capacitors, with stable temperature characteristics, with a wider range of capacitance, In general circuit, such as DC blocking, coupling, bypass, frequency discriminator and other circuits.

三、MLCC 产品尺寸与结构
Product Size and Structure

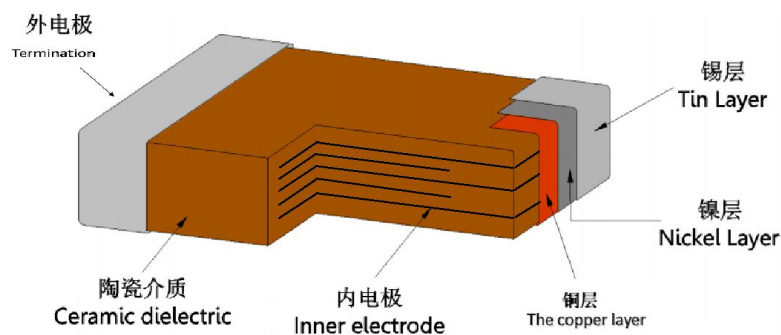
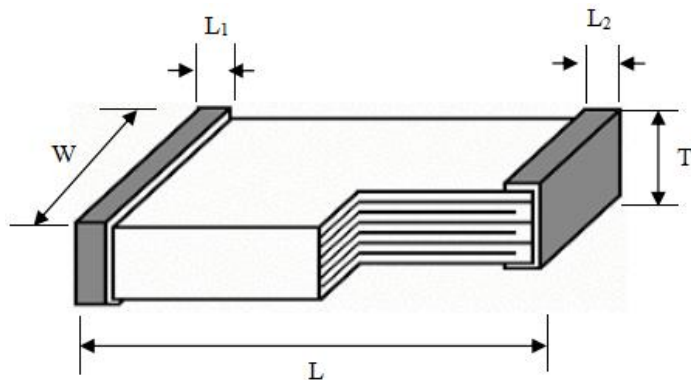


图 1 片式多层陶瓷电容器外形与内部结构
Figure 1 Dimension and Cross-section of MLCC



型号 Type		尺寸 Dimensions (mm)				
英制表示 British	公制表示 Metric	L	W	L ₁ /L ₂	T	厚度代码 Thickness Code
0603	1608	1.60±0.20	0.80±0.20	0.30±0.20	0.80±0.20	H
0805	2012	2.00±0.20	1.25±0.20	0.50±0.20	0.80±0.20 1.25±0.20	H L
1206	3216	3.20±0.30	1.60±0.30	0.60±0.30	1.25±0.20	L

四、产品规格表示方法

Part Number Structure

LCG	0805	X7R	104	K	500	N	T	H
①	②	③	④	⑤	⑥	⑦	⑧	⑨

① 产品系列 Series

代码 Code	表示名称 Name
L	利和兴 Lihexing
C	电容器 Capacitor
G	高强度系列 High-Strength series

② 尺寸规格 Size Specification(mm)

英制表示 BRITISH	长×宽 (L×W) INCH	长×宽 (L×W) MM
0201	0.02×0.01	0.60×0.30
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25
1206	0.12×0.06	3.20×1.60
1210	0.12×0.10	3.20×2.50
1808	0.18×0.08	4.50×2.00
1812	0.18×0.12	4.50×3.20
2220	0.22×0.20	5.70×5.00

③ 介质种类 Dielectric Type

II类陶瓷介质 Class II Ceramic Dielectrics
X7R

④ 静电容量 Capacitance

代码 Code	表示值 Indicated value	静电容量 Capacitance	说明 Explanation
0R5	0.5	0.5pF	静电容量由3位字符表示。单位为皮法(pF)。第1位和第2位数字为有效数字,第3位数字表示有效数字后的0的个数。有小数点时以大写字母"R"表示。此时,所有数字均为有效数字。如果包含有任何不是"R"的字母,则表明该特指的品名是一个非标准的部件。 Nominal capacitance is represented by 3 digits, with the unit of picofarad (pF). The first and second digits are significant digits, and the third digit identifies the multiplier. When there is a decimal point, it is represented by a capital letter "R". At this time, all numbers are valid numbers. If it contains any letter other than "R", it indicates that the specified product name is a non-standard part.
1R0	1.0	1.0pF	
100	10	10pF	
102	10×10^2	1000pF	
104	10×10^4	100000pF	
...	...	...	

⑤ 静容量公差 Capacitance Tolerance

代码 Code	静容量公差 Capacitance Tolerance
K	±10%
M	±20%

⑥ 额定电压 Rated Voltage

代码 Code	表示值 Indicated value	额定电压 Rated Voltage	说明 Explanation
6R3	6.3	DC6.3V	额定电压前面两位数字代表电压数字, 第三位数字表示 0 的个数; R 代表小数点。 The first and second digits are significant digits of the rated voltage, and the third digit identifies the multiplier; R represents the decimal point.
100	10×10^0	DC10V	
500	50×10^0	DC50V	
201	20×10^1	DC200V	
251	25×10^1	DC250V	
631	63×10^1	DC630V	
102	10×10^2	DC1000V	

⑦ 端电极类型 Termination Type

代码 Code	端电极材料 Terminal electrode material
N	Cu/Ni/Sn

⑧ 包装形式 Packaging Type

代码 Code	包装方式 Packaging Type
T	纸带 Paper tape
S	塑胶带 Embossed tape
B	散包装 Bulk packaging

⑨ 厚度代码 Thickness Code

代码 Code	厚度尺寸 Thickness Dimension
A	0.1mm
B	0.2mm
C	0.3mm
D	0.4mm
E	0.5mm
F	0.6mm
G	0.7mm
H	0.8mm
J	1.0mm
L	1.2mm
M	1.4mm
P	1.6mm
S	1.8mm
U	2.0mm
V	2.5mm

W	3.0mm
X	3.7mm

五、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
X7R	20°C	±15%	-55°C ~ 125°C

六、产品范围、尺寸、厚度

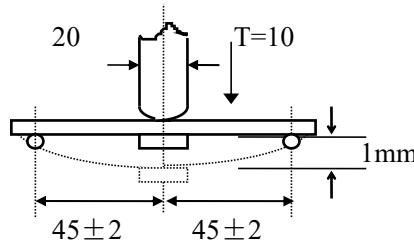
Product Range、Size & Thickness

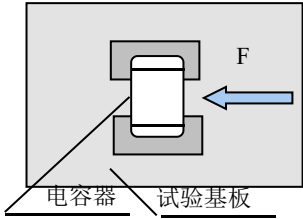
尺寸代码 Size Code	电压 Voltage	称电容量范围 Nominal Capacitance Range	厚度代码 Thickness Code
		X7R	
0603	25V	—	H
	50V	221-104	H
	100V	221-183	H
	200V	221-682	H
	250V	221-682	H
0805	25V	221-334	H
	25V	394-105	L
	50V	221-274	H
	50V	334	L
	100V	221-473	H
	100V	563-104	L
	200V	221-183	H
	200V	223-473	L
	250V	221-183	H
	250V	223-333	L
	500V	221-272	H
	500V	332-103	L
1206	25V	221-474	H
	50V	221-474	H
	100V	221-563	H
	100V	683-474	L
	200V	221-273	H
	200V	333-104	L
	250V	221-273	H
	250V	333-104	L
	500V	221-272	H
	500V	332-223	L
	630V	221-272	H
	630V	332-103	L
	1000V	221-103	L
	2000V	221-102	L

七、可靠性测试方法

Reliability Test Methods

项目 Item	技术要求 Technical Requirements				测试方法 Test Method and Remarks											
容量 Capacitance	应符合指定的误差级别 K: ±10%、M: ±20% Should be within the specified tolerance				X7R: <table><tr><td>标称容量 Capacitance</td><td>测试频率 Measuring Frequency</td><td>测试电压 Measuring Voltage</td></tr><tr><td>≤10μF</td><td>1KHz ±10%</td><td>1.0±0.2Vrms</td></tr><tr><td>>10μF</td><td>120+/-24Hz</td><td>0.5±0.1Vrms</td></tr></table>			标称容量 Capacitance	测试频率 Measuring Frequency	测试电压 Measuring Voltage	≤10μF	1KHz ±10%	1.0±0.2Vrms	>10μF	120+/-24Hz	0.5±0.1Vrms
标称容量 Capacitance	测试频率 Measuring Frequency	测试电压 Measuring Voltage														
≤10μF	1KHz ±10%	1.0±0.2Vrms														
>10μF	120+/-24Hz	0.5±0.1Vrms														
损耗角正切 (DF, tan δ) Dissipation Factor	规格 Size	额定电压 Rated Voltage	容量范围 Capacitance Range	DF												
	0603	≤25V	≤0.47μF	≤7%												
			>0.47μF	≤10%												
		>25V	≤0.22μF	≤5%												
			>0.22μF	≤10%												
	0805	/	≤1μF	≤5%												
			>1μF	≤10%												
	1206	≤25V	≤2.2μF	≤5%												
			>2.2μF	≤10%												
		>25V	≤1μF	≤5%												
			>1μF	≤10%												
绝缘电阻(IR) Insulation Resistance	X7R: C≤25 nF, Ri≥10000MΩ; C>25 nF, Ri•CR≥100s				测试电压: UR≤500V, 额定电压; UR>500V, 500V 测试时间: 60±5 秒 测试湿度: ≤75% 测试温度: 25°C±3°C 测试充放电电流: ≤50mA Measuring Voltage: UR≤500V, Rated Voltage; UR>500V, 500V; Duration: 60±5s Test Humidity: ≤75% Test Temperature: 25°C±3°C Test Current: ≤50mA											
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				测量电压: Measuring Voltage:											
					特性 Characteristics	额定电压 Rated Voltage	测试电压 Measuring Voltage									
								X7R	UR≤50V	2.5* UR						
									100V≤UR<500V	2.0* UR						
									500V≤UR<2KV	1.5* UR						
	UR≥2KV	1.2* UR														
时间: 1~5 秒, 充/放电电流: 不应超过 50mA Duration: 1~5s Charge/ Discharge Current: 50mA max.																

项目 Item	技术要求 Technical Requirements	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℃ 的温度下预热 10~30 秒。 Preheating Conditions:80 to 120℃； 10~30s。 无铅焊料： (Lead Free) 浸锡温度： 245±5℃ 浸锡时间： 2±0.5s Solder Temperature: 245±5℃ Duration: 2±0.5s								
耐焊接热 Resistance to Soldering Heat	<table><tr><td>项目 Item</td><td>X7R</td></tr><tr><td>△C/C</td><td>≤±15%</td></tr><tr><td>Q 或 DF</td><td>同初始标准 Same to initial value。</td></tr><tr><td>IR (25℃)</td><td>同初始标准 Same to initial value。</td></tr></table> 外观： 无可见损伤 Appearance： No visible damage	项目 Item	X7R	△C/C	≤±15%	Q 或 DF	同初始标准 Same to initial value。	IR (25℃)	同初始标准 Same to initial value。	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。 放置时间： 24±2 小时，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
项目 Item	X7R									
△C/C	≤±15%									
Q 或 DF	同初始标准 Same to initial value。									
IR (25℃)	同初始标准 Same to initial value。									
抗弯曲强度 Bending Strength	外观： 无可见损伤 Appearance： No visible damage △C/C≤ ±10%	试验基板： PCB； 弯曲深度： 1mm 施压速度： 1mm/sec； 保持时间： 5±1s 应在弯曲状态下进行测量。  Test Board: PCB Warp: 1mm Speed: 1mm/sec. Hold time: 5±1 sec The measurement should be made with the board in the bending position.								

项目 Item	技术要求 Technical Requirements	测试方法 Test Method and Remarks									
端头结合强度 Termination Adhesion	外观：无可见损伤 Appearance: No visible damage	将产品焊在试验板上，施加推力 F Solder the product onto the test board and apply a thrust force F. <table><tr><td>规 格 Specific ation</td><td>施加力 F Apply force F</td><td>时间 Time (S)</td></tr><tr><td>≤0402</td><td>2N</td><td>60±1</td></tr><tr><td>≥0603</td><td>5N</td><td>60±1</td></tr></table>  电容器 试验基板	规 格 Specific ation	施加力 F Apply force F	时间 Time (S)	≤0402	2N	60±1	≥0603	5N	60±1
规 格 Specific ation	施加力 F Apply force F	时间 Time (S)									
≤0402	2N	60±1									
≥0603	5N	60±1									
温度循环 Temperature Cycle	外观：无可见损伤 Appearance: No visible damage △C/C≤ ±15%	循环次数：5 次，一个循环分以下 4 步： 阶段 1：下限温度-55℃；时间 30 分钟； 阶段 2：常温 20℃；时间 1 分钟； 阶段 3：上限温度；时间 30 分钟； 阶段 4：常温 20℃；时间 1 分钟。 Cycling Times: 5times. A cycle is divided into the following 4 steps: Step1: Lower limit temperature :-55℃； 30 minutes; Step2: Normal temperature :20℃； 1 minutes; Step3: Upper limit temperature； 30 minutes; Step4: Normal temperature :20℃； 1 minute.									
潮湿负荷 Humidity load	<table><tr><td>项目 Item</td><td>X7R</td></tr><tr><td>△C/C</td><td>≤±12.5%</td></tr><tr><td>Q 或 DF</td><td>≤2 倍初始标准 Not more than twice of initial value</td></tr><tr><td>IR (25℃)</td><td>Ri≥1000MΩ或 Ri•C≥10S 取两者之中较小者。 whichever is smaller.</td></tr></table> 外观：无可见损伤 Appearance: No visible damage	项目 Item	X7R	△C/C	≤±12.5%	Q 或 DF	≤2 倍初始标准 Not more than twice of initial value	IR (25℃)	Ri≥1000MΩ或 Ri•C≥10S 取两者之中较小者。 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±2 小时。 Temperature: 40±2℃ Humidity: 90~95%RH Voltage: Rated Voltage Duration: 500h Recovery Conditions: Room temperature Recovery Time: 24±2h .	
项目 Item	X7R										
△C/C	≤±12.5%										
Q 或 DF	≤2 倍初始标准 Not more than twice of initial value										
IR (25℃)	Ri≥1000MΩ或 Ri•C≥10S 取两者之中较小者。 whichever is smaller.										

项目 Item	技术要求 Technical Requirements	测试方法 Test Method and Remarks
寿命试验 Life Test	项目 Item	X7R
	$\Delta C/C$	$\leq \pm 20\%$
	Q 或 DF	≤ 2 倍初始标准 Not more than twice of initial value
	IR (25°C)	$R_i \geq 2000 M\Omega$ 或 $R_i \cdot C \geq 50 S$ 取两者之中较小者。 whichever is smaller.
	外观: 无可见损伤 Appearance: No visible damage	
		时间: 1000h 温度: 上限温度 充电电流: 不超过 50mA 电压: $U_R \leq 200V$: $1.5U_R$ $200V < U_R \leq 500V$: $1.3U_R$ $500V < U_R$: $1.2U_R$ Duration: 1000h Temperature: Up- category temp Charge/ Discharge Current: 50mA max Voltage: $U_R \leq 200V$: $1.5U_R$ $200V < U_R \leq 500V$: $1.3U_R$ $500V < U_R$: $1.2U_R$

*预处理 (仅针对II类电容器): 在 $140^\circ C \sim 150^\circ C$ 下预热 $1h \pm 10min$ 后, 在室温下放置 $24 \pm 2h$ 。

实验结束后处理 (仅针对II类电容器): 在 $140^\circ C \sim 150^\circ C$ 下预热 $1h \pm 10min$ 后, 在室温下放置 $24 \pm 2h$ 。

*Pre-conditioning (for Class II capacitors only): Preheat at $140^\circ C$ to $150^\circ C$ for 1 hour ± 10 minutes, then store at room temperature for 24 ± 2 hours.

Post-test treatment (for Class II capacitors only): Preheat at $140^\circ C$ to $150^\circ C$ for 1 hour ± 10 minutes, then store at room temperature for 24 ± 2 hours

八、包装
Package

① 产品厚度和包装数量 Thickness and Packing Amount

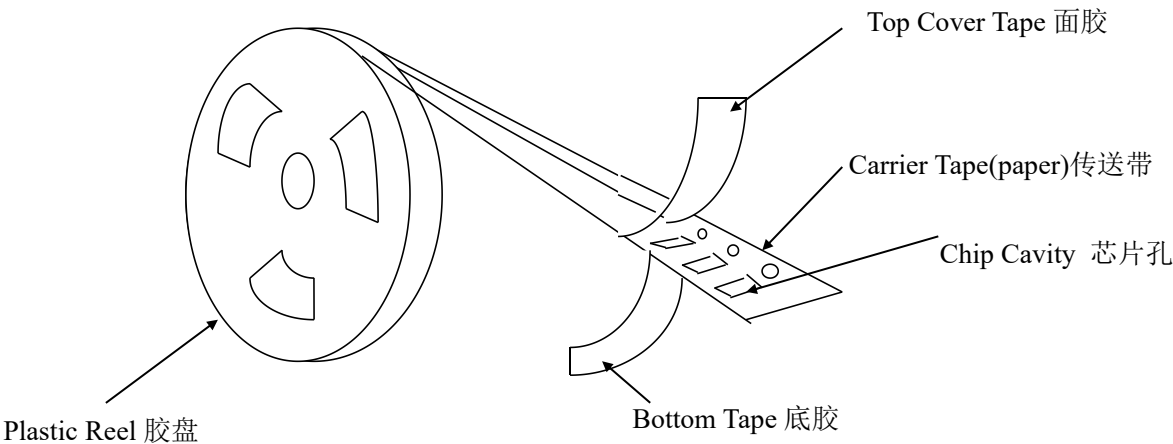
尺寸 Size	厚度代码 Thickness Code	纸带 7"Reel Paper Tape	胶带 7"Reel Embossed Tape
		Standard Qty(pcs)	Standard Qty(pcs)
0201	C	15000	-----
0402	E	10000	-----
0603	H	4000	-----
0805	G/H	4000	-----
	L	-----	3000
1206	G/H	4000	-----
	J/L	-----	3000
	P	-----	2000
1210	L/P	-----	2000
	U/V	-----	1000
1808/1812	L/P/U	-----	1000
	V/W	-----	500
2220	P/U/V	-----	500

② 带式圆盘包装 Tape and Reel Package

带式圆盘包装在高速 SMT 生产中广泛应用.典型的直径为 180mm(7 英寸)的圆盘可以包装 1500-15000 粒电容, 直径为 330mm(13 英寸)的圆盘可以包装 10000-50000 粒电容.带式圆盘包装包括纸带包装、胶带包装两种方式。

Tape and reel packaging is currently the most popular system for high-speed SMT production, A typical 180mm(7inch)diameter reel contains 1500 to 15,000 capacitors,330mm(13inch)diameter reel contains 10,000 to 50,000 capacitors, Tape and reel packaging comprises paper tapes and embossed tapes.

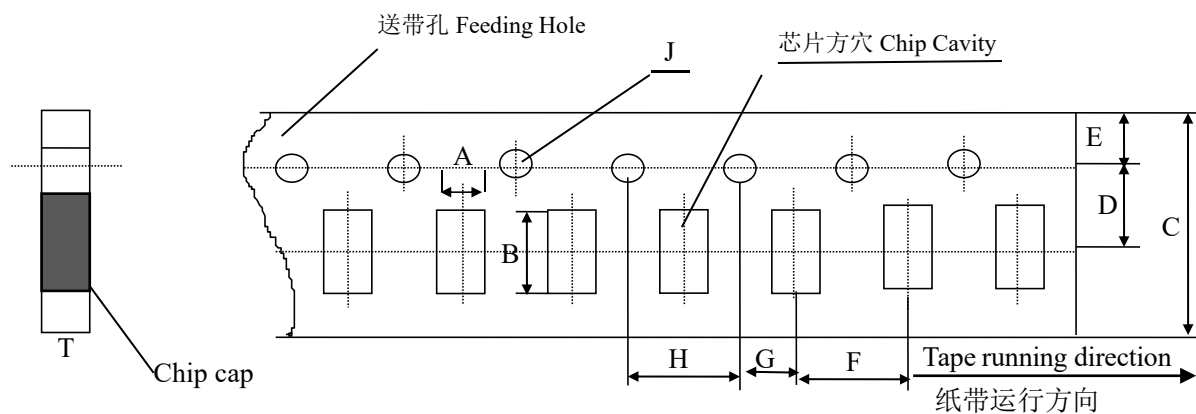
③ 纸带卷盘结构 Paper Taping



④ 纸带标准 Paper Tape Specifications

适合 0805 产品的纸带尺寸

Dimensions of paper taping for 0805 types.

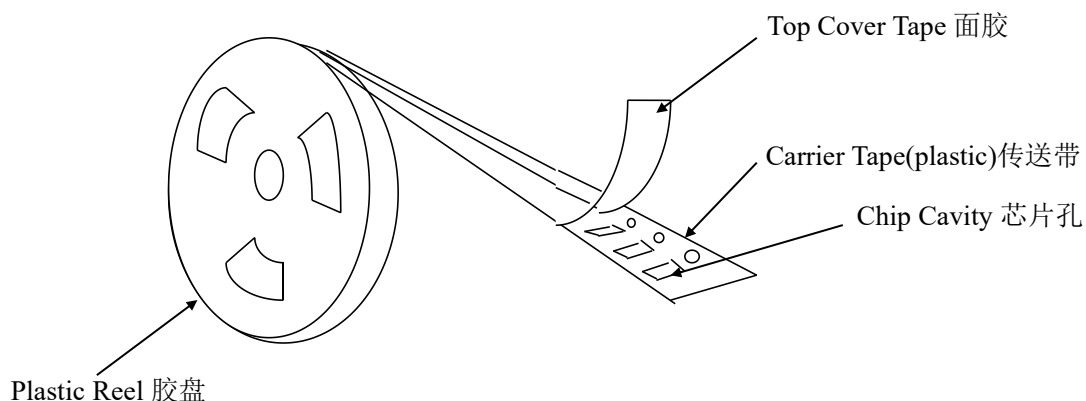


代码 Code 纸带规格 Paper size	A	B	C	D*	E	F	G*	H	J	T
0201	0.37 ±0.10	0.67 ±0.10	8.00 ±0.10	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	2.00 ±0.05	4.00 ±0.10	1.50 -0/+0.10	0.80 Below
0402	0.65 ±0.10	1.15 ±0.10	8.00 ±0.10	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	2.00 ±0.05	4.00 ±0.10	1.50 -0/+0.10	0.80 Below
0603	1.10 ±0.10	1.90 ±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
0805	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
1206	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。

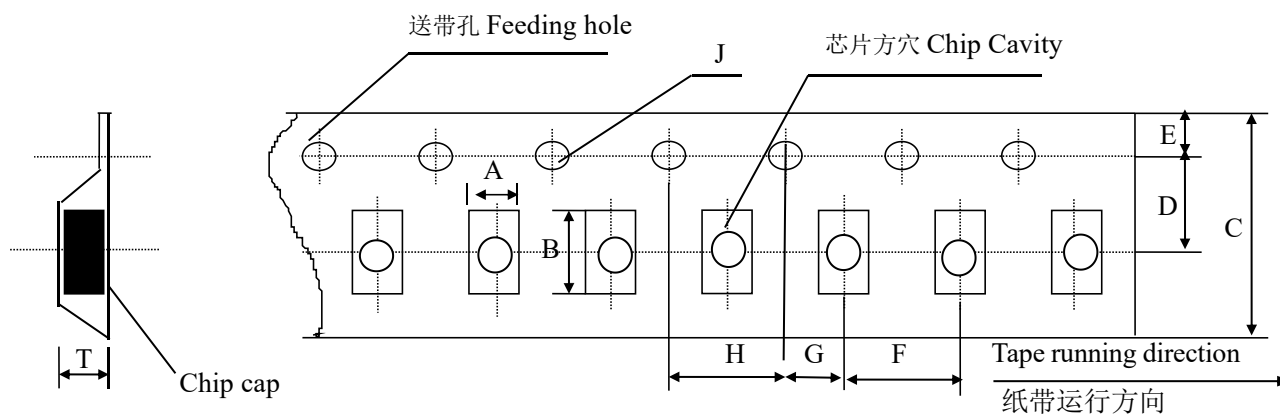
Note: The place with "*" means where needs exactly dimensions

⑤ 塑胶卷盘结构 Embossed Taping



※ 塑胶带尺寸结构(适合 0805、1206、1210 型产品)

Dimensions of embossed taping for 0805, 1206, 1210type

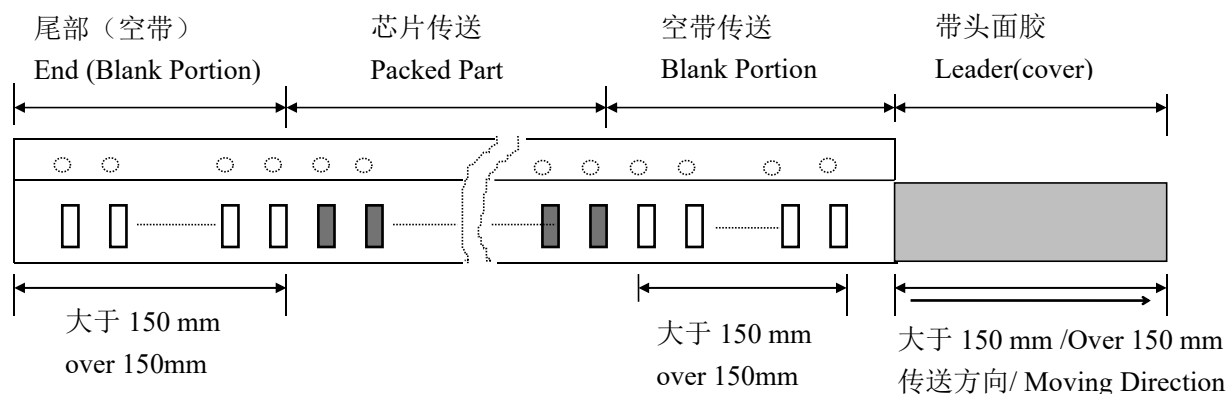


代码 Code 规格 Tape size	A	B	C	D*	E	F	G*	H	J	T
0805	1.55 ±0.20	2.35 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50 -0/+0.10	1.50 Max
1206	1.95 ±0.20	3.60 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.1	1.50 -0/+0.10	1.85 Max
1210	2.70 ±0.10	3.42 ±0.10	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	3.20 Max
1808	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	3.20 Max
1812	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	3.00 Max

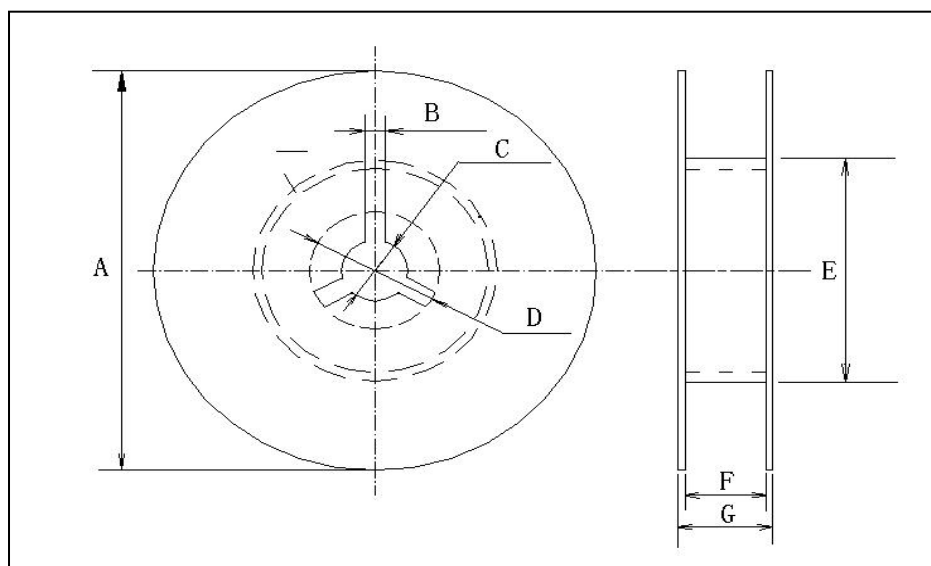
备注: *表示此处对尺寸的要求非常精确。

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

⑥ 传送带的前后结构 Front end and Back end Structure of Carrier Tape



a 卷盘尺寸 Reel Dimensions(unit: mm)



b 尺寸代码 (Size Code)

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

⑦ 纸带性能 Performance of Taping

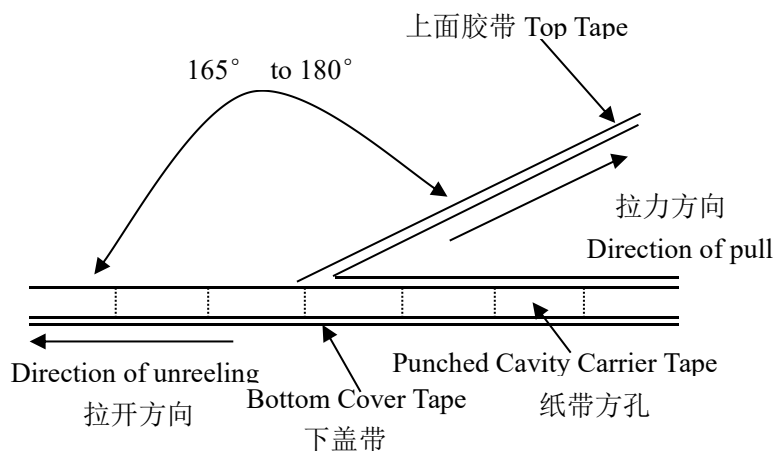


图 a

⑧ 纸带和上盖带的剥离性能 Peeling Force of Carrier Tape and Top Cover Tape

- (a) 纸带在伸直状态下应该能经受 1.02kg 的压力。

The paper tape shall be able to with stand a pressure of 1.02kg in the straight state

- (b) 上盖带应该能经受 1.02kg 的拉力。

The top cover tape should with stand 1.02kg of pull force

- (c) 上盖带剥离强度 Peeling Force of Top Cover Tape

除非有特殊规定，上盖带以 300mm/min 的速度，165~180°的角度（图 a）剥离纸带时，剥离力度应该在 10~60g 之间。

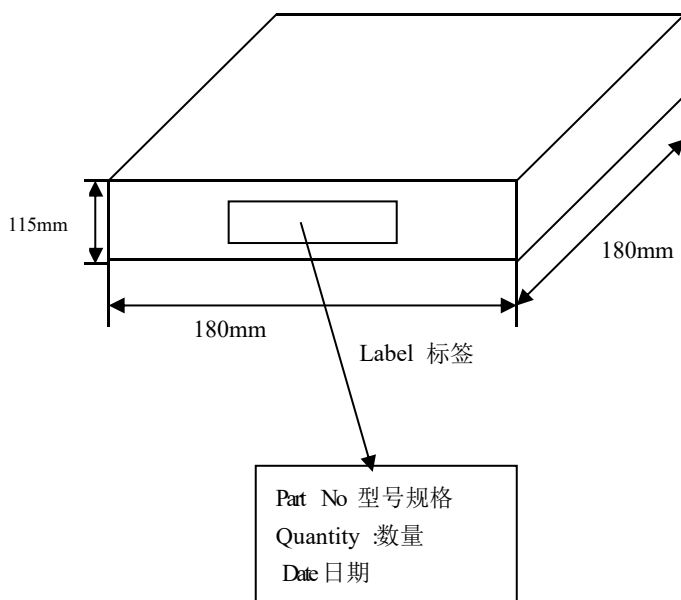
Unless otherwise specified, the peeling force of top cover tape shall be 10g to 60g when the top cover tape is pulled at a speed of 300mm/min with the angle between the taped during peeling and the direction of unreeling maintained at 165 to 180°as shown in figure (Figure a).

⑨ 外箱包装 Outer packing

小包装 The inner package

Quantity: 10 reels

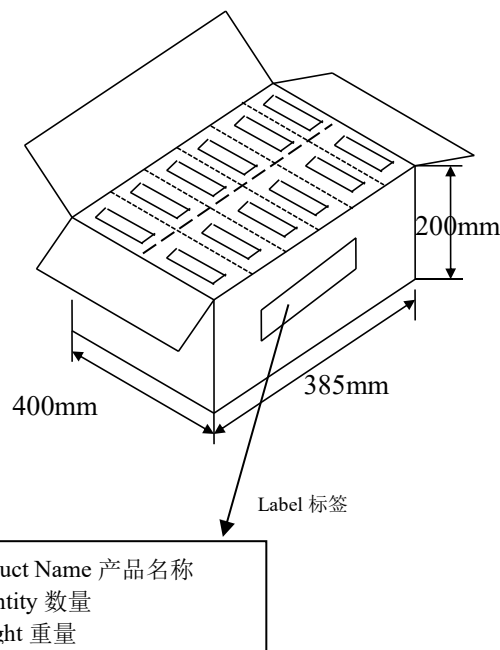
数量: 10 卷



大包装 The outer package

Quantity: 6 inner boxes

数量: 6 盒



九、储存方法

Storage Methods

确保芯片可焊性良好的贮存期限为 6 个月(在包装好已交付的情况下)。

The guaranteed period for solderability is 6 months (Under deliver package condition).

储存条件/Storage Conditions:

储存温度/Storage Temperature: 5~40℃, 储存相对湿度/Relative Humidity: 20~70%

十、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, 在超出本承认书或相关说明书中所述使用的恶劣工作环境, 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, 首先应考虑按本承认书的有关说明来进行, 如有不明之处, 请联系厂家咨询。

The Multi-layer Ceramic Capacitors (MLCC) may fail in a short circuit or 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 explosion in the worst case. Following “precautions for “safety” and Application Notes shall be taken in your major consideration.

① 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开裂的现象发生, 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 related

graph (refer to the graph in the enclosure page).

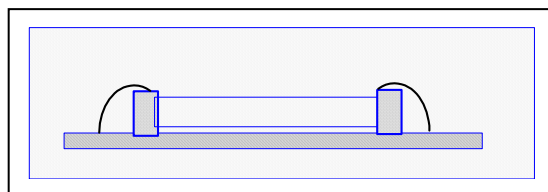
② 手工焊接 Manual Soldering

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开裂的现象,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 welding is easy to cause microcrack or partial cracking because of uneven heating of chip. 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.

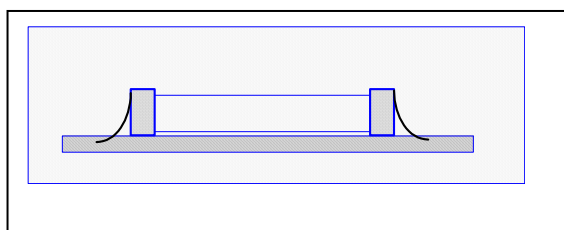
③ 适量的焊料 Optimum Solder Amount for Reflow Soldering

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

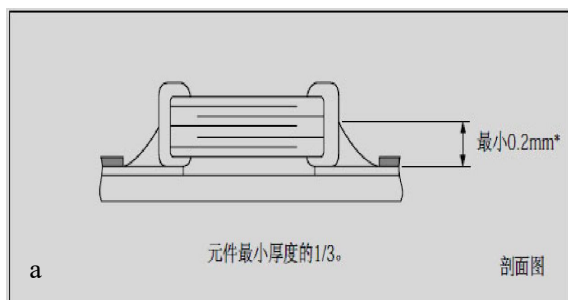


固定力量不足,可能会引起电容芯片与线路接触不良
Weak holding force may cause bad connection between the capacitor and PCB

④ 推荐焊料用量 Recommended Soldering amounts

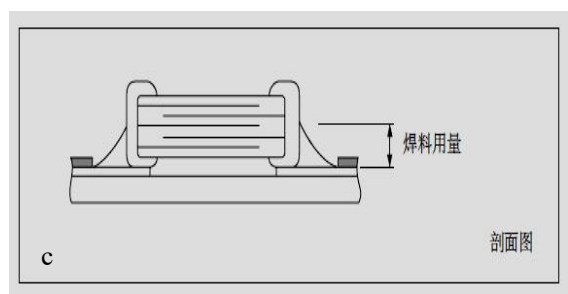
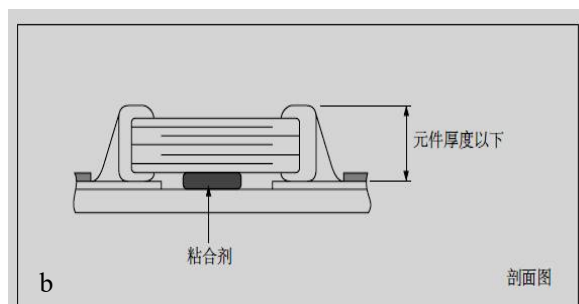
a.回流焊接的最佳焊料用量

The optimal solder amounts for re-flow soldering



b.波峰焊接的最佳焊料用量

The optimal solder amounts for wave soldering



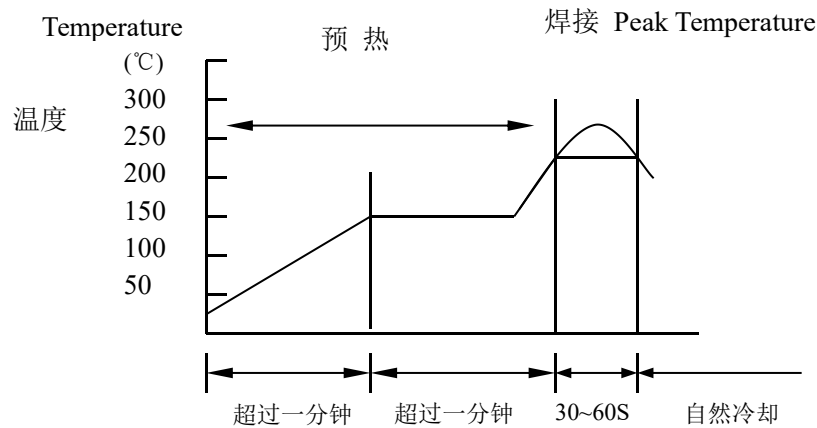
c.使用烙铁返修时的最佳焊料量

The optimal solder amounts for reworking by using soldering iron

十一、推荐焊接温度曲线图

The temperature profile for soldering

(a) 回流焊接（Re-flow soldering）

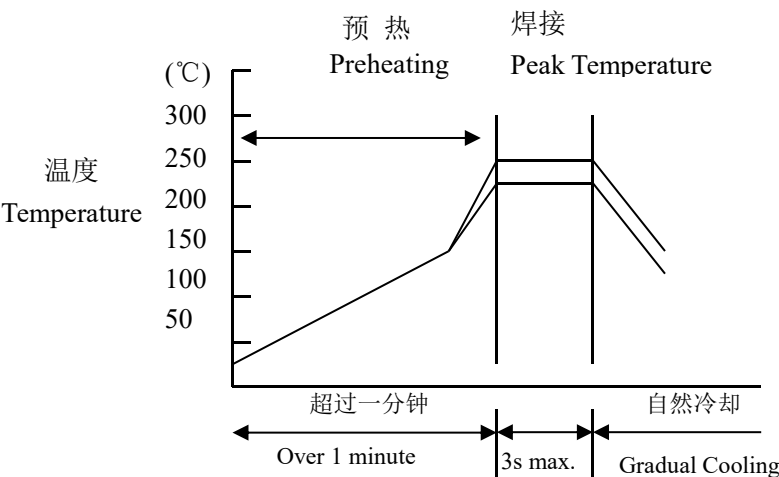


/	Pb-Sn 焊接 Pb-Sn soldering	无铅焊接 Lead-free soldering
尖峰温度 Peak temperature	230℃～250℃	240℃～260℃

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

(b) 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℃～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: $T \leq 150^{\circ}\text{C}$.