

一、概述

● 电容器及介质种类：

高频类：此类介质材料的电容器为 类电容器，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。其中 COG、COH 电容器电性能最稳定，几乎不随温度、电压和时间的变化而变化，适用于低损耗，稳定性要求高的高频电路，HG、LG、PH、RH、SH、TH、UJ、SL 电容器容量随温度变化而相应变化，适用于低损耗、温度补偿型电路中。

X7R、X5R、X7S、X6S：此类介质材料的电容器为 类电容器，具有较高的介电常数，容量比 类电容器高，具有较稳定的温度特性，适用于容量范围广，稳定性要求不高的电路中，如隔直、耦合、旁路、鉴频等电路中。

Y5V：此类介质材料的电容器为 类电容器，是所有电容器中介电常数最大的电容器，但其容量稳定性较差，对温度、电压等条件较敏感，适用于要求大容量，温度变化不大的电路中。

Z5U：此类介质材料的电容器为 类电容器，其温度特性介于 X7R 和 Y5V 之间，容量稳定性较差，对温度、电压等条件较敏感，适用于要求大容量，使用温度范围接近于室温的旁路，耦合等，低直流偏压的电路中。

SUMMARY

● Types of Dielectric Material and Capacitor

HIGH FREQUENCY TYPE: The capacitor of this kind dielectric material is considered as Class capacitor, including high frequency COG、COH capacitor and temperature compensating capacitor such as HG, LG, PH, RH,SH, TH, UJ, SL. The electrical properties of COG、COH capacitor are the most stable one and change invariably with temperature, voltage and time. They are suited for applications where low-losses and high-stability are required, HG ,LG ,PH ,RH ,SH ,TH ,UJ ,SL capacitor's capacitance changes with temperature.They are suited for applications where low-losses and temperature compensating circuits.

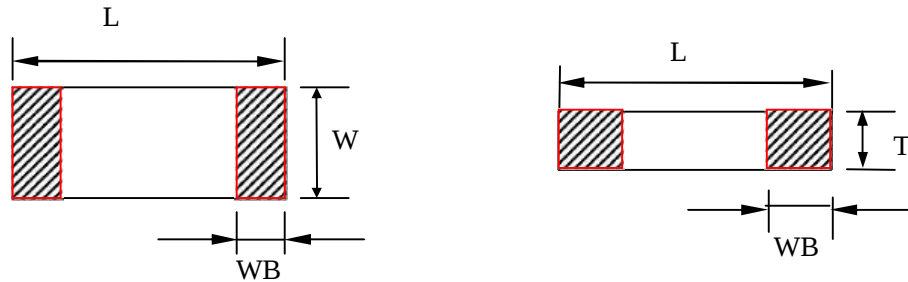
X7R、X5R、X7S、X6S :X7R、X5R、 X7S、X6S material is a kind of material has high dielectric constant. The capacitor made of this kind material is considered as Class capacitor whose capacitance is higher than that of class . These capacitors are classified as having a semi-stable temperature characteristic and used over a wide temperature range, such in these kinds of circuits, DC-blocking, decoupling, bypassing, frequency discriminating etc.

Y5V：The capacitor made of this kind of material is the highest dielectric constant of all ceramic capacitors. They are used over a moderate temperature range in application where high capacitance is required because of its unstable temperature coefficient, but where moderate losses and capacitance changes can be tolerated. Its capacitance and dissipation factors are sensible to measuring conditions, such as temperature and voltage, etc.

Z5U :The capacitor made of this kind of material is considered as Class capacitor, whose temperature characteristic is between that of X7R and Y5V. The capacitance of this kind of capacitor is unstable and sensible to temperature and voltage. Ideally suited for bypassing and decoupling application circuits operating with low DC bias in the environment approaches to room temperature.

二、尺寸及结构 DIMENSIONS AND STRUCTURE

尺寸 DIMENSIONS

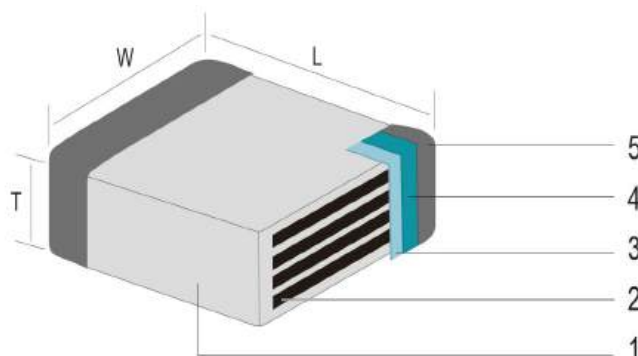


型号 Type		尺寸 Dimensions (mm)			
英制表示 British expression	公制表示 Metric expression	L	W	T	WB
0201	0603	0.6 ± 0.03	0.3 ± 0.03	0.3 ± 0.03	0.15 ± 0.10
0402	1005	1.00 ± 0.05	0.50 ± 0.05	0.50 ± 0.05	0.25 ± 0.10
0603	1608	1.60 ± 0.10	0.80 ± 0.10	0.80 ± 0.10	0.30 ± 0.10
0805	2012	2.00 ± 0.20	1.25 ± 0.20	≤ 0.55 0.80 ± 0.20 1.00 ± 0.20 1.25 ± 0.20	0.50 ± 0.20
1206	3216	3.20 ± 0.30	1.60 ± 0.30	0.80 ± 0.20 1.00 ± 0.20 1.25 ± 0.20 1.60 ± 0.30	0.60 ± 0.30
1210	3225	3.20 ± 0.30	2.50 ± 0.30	≤ 2.80	0.60 ± 0.30
1808	4520	4.50 ± 0.40	2.00 ± 0.20	≤ 2.20	0.60 ± 0.30
1812	4532	4.50 ± 0.40	3.20 ± 0.30	≤ 3.50	0.60 ± 0.30
2220	5750	5.70 ± 0.40	5.00 ± 0.40	≤ 3.50	0.60 ± 0.30
2225	5763	5.70 ± 0.50	6.30 ± 0.50	≤ 6.20	0.60 ± 0.30
3012	7632	7.60 ± 0.50	3.20 ± 0.30	≤ 8.10	0.60 ± 0.30
3035	7690	7.60 ± 0.50	9.00 ± 0.50	≤ 8.10	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

结构 STRUCTURE



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

三、型号规格表示方法 HOW TO ORDER

CC 0805 CG 101 J 500 N A T

说明 NOTES :

尺寸 DIMENSIONS

尺寸规格 Size Code	0201	0402	0603	0805	1206	1210	1808	1812	2220	2225	3035
长×宽 (L×W) inch	0.02×0.01	0.04×0.02	0.06×0.03	0.08×0.05	0.12×0.06	0.12×0.10	0.18×0.08	0.18×0.12	0.22×0.20	0.22×0.25	0.30×0.35
长×宽 (L×W) mm	0.60×0.30	1.00×0.50	1.60×0.80	2.00×1.25	3.20×1.60	3.20×2.50	4.50×2.00	4.50×3.20	5.70×5.00	5.70×6.30	7.60×9.00

介质种类 DIELECTRIC STYLE

介质种类 (Dielectric Code)	C	CH	HG	LG	PH	RH	SH	TH	UJ	SL	A	B	BS	DS	E	F
介质材料 (Dielectric)	CO G	CO H	HG	LG	PH	RH	SH	TH	UJ	SL	X5 R	X7 R	X7 S	X6 S	Z5 U	Y5 V

标称容量 NOMINAL CAPACITANCE

单位(unit) : pF

表示方式 (Express Method)	实际值 (Actual Value)	注：头两位数字为有效数字，第三位数字为 0 的个数；R 为小数点。 Note: the first two digits are significant; third digit denotes number of zeros; R=decimal point.
0R5	0.5	
1R0	1.0	
102	10×10^2	
224	22×10^4	
...	...	

容量误差 CAPACITANCE TOLERANCE

代码 (Code)	A	B	C	D	F	G	J	K	M	S	Z
误差 (Tolerance)	± 0.05pF	± 0.10pF	± 0.25pF	± 0.5pF	± 1.0%	± 2.0%	± 5.0%	±10%	±20%	+50% -20%	+80% -20%

备注：A、B、C、D 级误差适用于容量 ≤ 10pF 的产品。

Note :These capacitance tolerance A ,B, C, D are just applicable the capacitance that equals to or less than 10pF.

额定电压 RATED VOLTAGE

单位(unit) : V

表示方式 (Express Method)	实际值 (Actual Value)	注 :头两位数字为有效数字 ,第三位数字为 0 的个数 ; R 为小数点。 Note: the first two digits are significant; third digit denotes number of zeros; R=decimal point.
6R3	6.3	
500	50×10^0	
201	20×10^1	
102	10×10^2	
...	...	

端头材料 TERMINAL MATERIAL STYLES

端头类别 (Termination Styles)	表示方式 (Express Method)
纯银端头 (Silver Solderable Termination)	S
纯铜端头 (Copper Solderable Termination)	C
三层电镀端头 (Nickel Barrier Termination)	N

厚度 Thickness

厚度 Thickness	5= 0.50mm	A = 0.65mm	F=1.25mm	I= 2.00mm
3= 0.30mm	8= 0.80mm	C = 0.85mm	H=1.60mm	J= 2.50mm

包装方式 PACKAGE STYLES

B	T
散包装 (Bulk Bag)	编带包装 (Taping Package)

四、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/	-55 ~ 125
COH	20°C	0±60 ppm/	-55 ~ 125
HG	20°C	-33±30 ppm/	-25 ~ 85
LG	20°C	-75±30 ppm/	-25 ~ 85
PH	20°C	-150± 60 ppm/	-25 ~ 85
RH	20°C	-220± 60 ppm/	-25 ~ 85
SH	20°C	-330± 60 ppm/	-25 ~ 85
TH	20°C	-470± 60 ppm/	-25 ~ 85
UJ	20°C	-750± 120 ppm/	-25 ~ 85
SL	20°C	-1000 ~ +140 ppm/	-25 ~ 85
X7R	20°C	±15%	-55 ~ 125
X5R	20°C	±15%	-55 ~ 85
X7S	20°C	±22%	-55 ~ 125
X6S	20°C	±22%	-55 ~ 105
Z5U	20°C	-56% ~ +22%	10 ~ 85
Y5V	20°C	-80% ~ +30%	-25 ~ 85

备注： 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 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 20C 的电容量变化来确定的。

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

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

尺寸规格 Size Code	额定电压 Rated Voltage	容量范围 Capacitance	
		COG(NPO)(PF)	Y5V (Z5U)(PF)
0201	4V	——	——
	6.3V	——	10,000 ~ 100,000
	10V	——	——
	16V	——	10,000
	25V	——	——
	50V	0.5 ~ 100	——
0402	4V	——	——
	6.3V	——	1,000 ~ 1,000,000
	10V	——	1,000 ~ 1,000,000
	16V	——	1,000 ~ 220,000
	25V	——	1,000 ~ 220,000
	50V	0.1 ~ 1,000	1,000 ~ 100,000
0603	4V	——	——
	6.3V	——	1,000 ~ 10,000,000
	10V	——	1,000 ~ 10,000,000
	16V	——	1,000 ~ 2,200,000
	25V	——	1,000 ~ 2,200,000
	50V	0.1 ~ 6,800	1,000 ~ 1,000,000
0805	4V	——	——
	6.3V	——	1,000 ~ 22,000,000
	10V	——	1,000 ~ 22,000,000
	16V	——	1,000 ~ 22,000,000
	25V	——	1,000 ~ 10,000,000
	50V	0.3 ~ 22,000	1,000 ~ 4,700,000

尺寸规格 Size Code	额定电压 Rated Voltage	容量范围 Capacitance			
		X7R (PF)	X7S(PF)	X5R(uF)	X6S(uF)
0201	4V	——	——	0.015 uF ~ 1uF	——
	6.3V	——	——	0.015 uF ~ 1uF	——
	10V	100 ~ 10,000	——	0.015 uF ~ 0.1 uF	——
	16V	100 ~ 10,000	——	——	——
	25V	100 ~ 10,000	——	——	——
	50V	——	——	——	——
0402	4V	——	——	0.1uF~10uF	0.1~2.2 uF
	6.3V	100 ~ 470,000	100,000 ~ 470,000	0.1uF~4.7uF	0.1~2.2 uF
	10V	100 ~ 470,000	100,000 ~ 470,000	0.1uF~4.7uF	0.1~1 uF
	16V	100 ~ 220,000	47,000 ~ 220,000	0.1uF~2.2 uF	——
	25V	100 ~ 100,000	22,000 ~ 100,000	0.1uF~2.2 uF	——
	50V	100 ~ 100,000	4,700 ~ 100,000	0.047uF~0.1 uF	——
0603	4V	——	——	0.47uF ~ 22uF	0.1~10 uF
	6.3V	150 ~ 2,200,000	470,000 ~ 2,200,000	0.47uF ~ 22uF	0.1~10 uF
	10V	150 ~ 2,200,000	470,000 ~ 2,200,000	0.47uF ~ 10uF	0.1~10 uF
	16V	150 ~ 1,000,000	470,000 ~ 1,000,000	0.47uF ~ 10uF	0.1~4.7 uF
	25V	150 ~ 1,000,000	470,000 ~ 1,000,000	0.47uF ~ 10uF	0.1~4.7 uF
	50V	150 ~ 470,000	——	0.47uF ~ 1uF	——
0805	4V	——	——	1uF ~ 47uF	0.1~47 uF
	6.3V	150 ~ 10,000,000	1,000,000 ~ 10,000,000	1uF ~ 47uF	0.1~22 uF
	10V	150 ~ 10,000,000	1,000,000 ~ 10,000,000	1uF ~ 22uF	0.1~10 uF
	16V	150 ~ 4,700,000	1,000,000 ~ 4,700,000	1uF ~ 22uF	0.1~10 uF
	25V	150 ~ 4,700,000	1,000,000 ~ 4,700,000	1uF ~ 10uF	0.1~10 uF
	50V	150 ~ 1,000,000	——	——	——

尺寸规格 Size Code	额定电压 Rated Voltage	容量范围 Capacitance			
		X7R (PF)	X7S (PF)	X5R(uF)	X6S(uF)
1206	4V	——	——	2.2uF ~100uF	——
	6.3V	200 ~ 22,000,000	2,200,000 ~ 22,000,000	2.2uF ~ 100uF	0.1~100 uF
	10V	200 ~ 22,000,000	2,200,000 ~ 22,000,000	2.2uF ~ 47uF	0.1~22 uF
	16V	200 ~ 10,000,000	2,200,000 ~ 10,000,000	2.2uF ~ 22uF	0.1~22 uF
	25V	200 ~ 10,000,000	1,500,000 ~ 10,000,000	2.2uF ~ 22uF	0.1~10 uF
	50V	200 ~ 4,700,000	1,000,000 ~ 4,700,000	2.2uF ~ 10uF	——
1210	6.3V	220 ~ 47,000,000	——	47uF ~ 100uF	0.1~100 uF
	10V	220 ~ 47,000,000	——	4.7uF ~ 100uF	0.1~47 uF
	16V	220 ~ 22,000,000	3,300,000 ~ 22,000,000	4.7uF ~ 47uF	0.1~22 uF
	25V	220 ~ 22,000,000	2,200,000 ~ 22,000,000	4.7uF ~ 22uF	0.1~22 uF
	50V	220 ~ 10,000,000	1,000,000 ~ 10,000,000	——	——
1808	6.3V	220 ~ 4,700,000	——	4.7uF ~ 100uF	——
	10V	220 ~ 4,700,000	——	4.7uF ~ 47uF	——
	16V	220 ~ 4,700,000	——	4.7uF ~ 22uF	——
	25V	220 ~ 4,700,000	——	4.7uF ~ 10uF	——
	50V	220 ~ 4,700,000	——	——	——
1812	6.3V	——	——	10uF ~ 100uF	——
	10V	——	——	10uF ~ 47uF	——
	16V	470 ~ 6,800,000	——	4.7uF ~ 22uF	——
	25V	470 ~ 6,800,000	——	4.7uF ~ 10uF	——
	50V	470 ~ 4,700,000	——	——	——

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 customer special requirements .

六、高 Q 值 COG 电容器 Hi-Q COG MLCC

应用:

适合于射频 RF 电路及要求 Hi-Q、低 ESR、高频率响应的微波电路中。

● CQ、CG 电容器说明：

下述 Q 值标准是相对通用客户而制定的，对要求更高 Q 值产品的客户，可专门设计和生产。

使用频率在 1MHz~2.4GHz 之间，对要求更高频率产品的客户，可根据客户的要求另外专门设计。

CQ 比 CG 相对可应用频率略高,请客户依需选定。

Application:

Hi-Q COG capacitors are ideally suited for RF and microwave application requiring high Q, low ESR, and high resonant frequency.

● Note for CQ and CG:

The following Q value is just confirmed by general customer. If there is a higher requirement for Q value requirements, we can design and produce according to the special requirements.

For the customer whose requirements for frequency is between 1MHz and 2.4GHz or higher frequency, we can design it according to their requirements.

The frequency of CQ is a little higher than that of CG. Please choose them according to your requirements.

CQ 电容器的容量值及其 Q 值 CQ Capacitance value and Q value

容量 Capacitance (pF)	300MHz 时的Q 值 Q value at 300MHz		容量 Capacitance (pF)	300MHz 时的Q 值 Q value at 300MHz		容量 Capacitance (pF)	300MHz 时的Q 值 Q value at 300MHz	
	0805	0603		0805	0603		0805	0603
4.7	≥ 1000	≥ 800	12	≥ 400	≥ 320	30	≥ 150	≥ 120
5.2	≥ 900	≥ 720	13	≥ 375	≥ 300	33	≥ 140	≥ 112
5.6	≥ 850	≥ 680	14	≥ 350	≥ 280	36	≥ 130	≥ 104
6.2	≥ 800	≥ 640	15	≥ 325	≥ 260	39	≥ 120	≥ 96
6.8	≥ 700	≥ 560	16	≥ 300	≥ 240	43	≥ 110	≥ 88
7.5	≥ 650	≥ 520	18	≥ 250	≥ 200	47	≥ 100	≥ 80
8.2	≥ 575	≥ 460	20	≥ 225	≥ 180	56	≥ 80	≥ 80
9.1	≥ 525	≥ 420	22	≥ 215	≥ 172	62	≥ 80	≥ 80
10	≥ 500	≥ 400	24	≥ 200	≥ 160	68	≥ 80	≥ 80
11	≥ 450	≥ 360	27	≥ 175	≥ 140	82	≥ 80	≥ 80

七、中高压电容器 HIGH VOLTAGE MLCC

中高压多层片状陶瓷电容器是在多层片状陶瓷电容器的工艺技术、设备基础上，通过采用特殊工艺制作的一种具有良好高压可靠性的产品，该产品适合于表面贴装，适合于多种直流高压线路，可以有效的改善电子线路的性能。

● 应用范围

模拟或数字调制解调器。
 局域网/广域网接口界面。
 日光灯启动辉器照明电路。
 倍压电器。
 直流变送器。
 背光源驱动电路。

Middle & high voltage MLCC is a kind of special design 、special technology MLCC that bases on the technology of general MLCC. This kind of MLCC has stable high voltage reliability and suitable to SMT. Middle & high MLCC is widely applicable for many direct high voltage circuits in which it can improve the performance of the circuit.

● APPLICATIONS

Analog & Digital Modems
 LAN/WAN Interface
 Lighting Ballast Circuits
 Voltage Multipliers
 DC-DC Converters
 Back-lighting Inverters

容量范围及其电压

单位/unit: pF

尺寸规格 Size Code	工作电压 Rated Voltage	容量范围 Capacitance		
		NPO	X7R	Y5V
0603	100V	0.5 ~ 1,000	150 ~ 100,000	2,200 ~ 100,000
	200V	0.5 ~ 470	150 ~ 10,000	——
	250V	0.5 ~ 470	150 ~ 10,000	——
0805	100V	0.5 ~ 3,300	150 ~ 100,000	10,000 ~ 100,000
	200V	0.1 ~ 1,500	150 ~ 22,000	10,000 ~ 47,000
	250V	0.1 ~ 1,500	150 ~ 22,000	10,000 ~ 47,000
	500V	0.1 ~ 470	150 ~ 10,000	——
	630V	0.1 ~ 470	150 ~ 10,000	——
	1000V	0.1 ~ 100	——	——
1206	100V	0.5 ~ 3,300	150 ~ 1,000,000	15,000 ~ 470,000
	200V	0.1 ~ 2,700	150 ~ 220,000	10,000 ~ 220,000
	250V	0.1 ~ 2,700	150 ~ 220,000	10,000 ~ 220,000
	500V	0.1 ~ 1,500	150 ~ 33,000	——
	630V	0.1 ~ 1,500	150 ~ 33,000	——
	1000V	0.1 ~ 1,000	150 ~ 10,000	——
	2000V	0.1 ~ 270	150 ~ 2,700	——

容量范围及其电压

单位/unit: pF

尺寸规格 Size Code	工作电压 Rated Voltage	容量范围 Capacitance		
		NPO	X7R	Y5V
1210	100V	1.0 ~ 6,800	150 ~ 2,200,000	15,000 ~ 1,000,000
	200V	1.0 ~ 3,300	150 ~ 220,000	15,000 ~ 470,000
	250V	1.0 ~ 3,300	150 ~ 220,000	15,000 ~ 470,000
	500V	1.0 ~ 2,200	150 ~ 68,000	——
	630V	1.0 ~ 2,200	150 ~ 68,000	——
	1000V	1.0 ~ 1,000	150 ~ 22,000	——
	2000V	1.0 ~ 470	150 ~ 10,000	——
	3000V	——	150 ~ 680	——
	4000V	——	150 ~ 680	——
1808	100V	2.0 ~ 4,700	220 ~ 2,200,000	150,000 ~ 1,000,000
	200V	2.0 ~ 3,900	220 ~ 220,000	10,000 ~ 390,000
	250V	2.0 ~ 3,900	220 ~ 220,000	10,000 ~ 390,000
	500V	2.0 ~ 2,700	220 ~ 68,000	——
	630V	2.0 ~ 2,700	220 ~ 68,000	——
	1000V	2.0 ~ 1,000	150 ~ 22,000	——
	2000V	2.0 ~ 470	150 ~ 10,000	——
	3000V	2.0 ~ 330	150 ~ 4,700	——
	4000V	2.0 ~ 33	150 ~ 2,200	——
	5000V	2.0 ~ 33	——	——
1812	100V	3.0 ~ 10,000	270 ~ 1,000,000	150,000 ~ 2,200,000
	200V	3.0 ~ 6,800	270 ~ 560,000	100,000 ~ 470,000
	250V	3.0 ~ 6,800	270 ~ 560,000	100,000 ~ 470,000
	500V	3.0 ~ 4,700	270 ~ 150,000	——
	630V	3.0 ~ 4,700	270 ~ 150,000	——
	1000V	3.0 ~ 1,200	270 ~ 56,000	——
	2000V	3.0 ~ 1,000	270 ~ 12,000	——
	3000V	3.0 ~ 560	270 ~ 4,700	——
	4000V	3.0 ~ 220	270 ~ 3,300	——
	5000V	3.0 ~ 68	——	——
1825	100V	3.0 ~ 22,000	12,000 ~ 1,200,000	150,000 ~ 2,200,000
	200V	3.0 ~ 8,200	12,000 ~ 1,000,000	100,000 ~ 470,000
	250V	3.0 ~ 8,200	12,000 ~ 1,000,000	100,000 ~ 470,000
	500V	3.0 ~ 5,600	1,000 ~ 470,000	——
	630V	3.0 ~ 5,600	1,000 ~ 470,000	——
	1000V	3.0 ~ 1,800	1,000 ~ 100,000	——
	2000V	3.0 ~ 1,000	1,000 ~ 22,000	——
	3000V	3.0 ~ 680	1,000 ~ 10,000	——
	4000V	3.0 ~ 470	1,000 ~ 6,800	——
	5000V	3.0 ~ 82	——	——

尺寸规格	工作电压	容量范围 Capacitance		
Size Code	Rated Voltage	NPO	X7R	Y5V
2220	100V	5.0 ~ 27,000	22,000 ~ 1,200,000	150,000 ~ 1,500,000
	200V	5.0 ~ 12,000	22,000 ~ 1,000,000	100,000 ~ 1,000,000
	250V	5.0 ~ 12,000	22,000 ~ 1,000,000	100,000 ~ 1,000,000
	500V	5.0 ~ 6,800	1,500 ~ 470,000	——
	630V	5.0 ~ 6,800	1,500 ~ 470,000	——
	1000V	5.0 ~ 3,900	1,500 ~ 100,000	——
	2000V	5.0 ~ 1,000	1,500 ~ 33,000	——
	3000V	5.0 ~ 680	1,500 ~ 10,000	——
	4000V	5.0 ~ 560	1,500 ~ 6,800	——
	5000V	5.0 ~ 120	——	——
2225	100V	5.0 ~ 27,000	2,200 ~ 2,200,000	250,000 ~ 3,300,000
	200V	5.0 ~ 12,000	2,200 ~ 2,200,000	220,000 ~ 2,200,000
	250V	5.0 ~ 12,000	2,200 ~ 2,200,000	220,000 ~ 2,200,000
	500V	5.0 ~ 6,800	2,200 ~ 470,000	——
	630V	5.0 ~ 6,800	2,200 ~ 470,000	——
	1000V	5.0 ~ 3,900	2,200 ~ 100,000	——
	2000V	5.0 ~ 1,000	2,200 ~ 47,000	——
	3000V	5.0 ~ 680	2,200 ~ 15,000	——
	4000V	5.0 ~ 560	2,200 ~ 6,800	——
	5000V	5.0 ~ 120	——	——
3012	100V	5.0 ~ 27,000	150 ~ 3,300,000	15,000 ~ 1,500,000
	200V	5.0 ~ 12,000	150 ~ 2,200,000	15,000 ~ 1,000,000
	250V	5.0 ~ 12,000	150 ~ 1,200,000	——
	500V	5.0 ~ 6,800	150 ~ 220,000	——
	630V	5.0 ~ 6,800	150 ~ 150,000	——
	1000V	5.0 ~ 3,900	150 ~ 47,000	——
	2000V	5.0 ~ 1,000	150 ~ 33,000	——
	3000V	5.0 ~ 1,000	150~10,000	——
	4000V	5.0 ~ 1,000	150~8,200	——
3035	100V	5.0 ~ 27,000	47,000 ~ 4,700,000	10,000 ~ 2,200,000
	200V	5.0 ~ 12,000	47,000 ~ 2,200,000	10,000 ~ 2,200,000
	250V	5.0 ~ 12,000	47,000 ~ 2,200,000	10,000 ~ 2,200,000
	500V	5.0 ~ 6,800	5,600 ~ 1,000,000	——
	630V	5.0 ~ 6,800	5,600 ~ 470,000	——
	1000V	5.0 ~ 3,900	5,600 ~ 56,000	——
	2000V	5.0 ~ 1,000	5,600 ~ 47,000	——

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 customer special requirements.

中高压电容器介质耐电强度的测试方法：

Measurement method of dielectric withstanding voltage for high voltage MLCC

额定电压范围 Rated voltage range	耐电性能的测试方法 Measuring Method
$100V \leq V_r < 500V$	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.
$500V \leq V_r \leq 1000V$	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.
$1000V < V_r \leq 2000V$	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.
$2000V < V_r \leq 5000V$	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.

八、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	类 Class	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%	
	类 Class	应符合指定的误差级别 Should be within the specified tolerance.	测试温度： 25 ± 3 Test Temperature: 25 ± 3 C ≤ 10μF：测试频率: 1KHZ ± 10% 测试电压: 1.0 ± 0.2Vrms Test Frequency: 1KHZ ± 10% Test Voltage: 1.0 ± 0.2Vrms C > 10μF X7R、X5R、X7S、X6S、Y5V： 测试频率: 120 ± 24 HZ 测试电压: 0.5 ± 0.1Vrms Test Frequency: 120 ± 24 HZ Test Voltage: 0.5 ± 0.1Vrms Z5U：测试频率: 1 ± 0.1KHZ 测试电压: 0.5 ± 0.05Vrms Test Frequency: 1 ± 0.1KHZ Test Voltage: 0.5 ± 0.05Vrms		
损耗角正切 (DF, tan δ) Dissipation Factor	类 Class	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 ⁻⁴	5pF ≤ Cr < 50 pF	1MHZ ± 10%	
		≤ 0.15%	50pF ≤ Cr ≤ 1000 pF	1MHZ ± 10%	
		≤ 0.15%	> 1000 pF	1KHZ ± 10%	



CHANGTAIFENG

MLCC多层片式陶瓷电容器规格说明书

CC-Multilayer ceramic capacitor Product Specifications

项目 Item	技术规格 Technical Specification							测 试 方 法 Test Method and Remarks
损耗角正切(DF, tan δ) Dissipation Factor	类 Class	X7R/ X5R	≥ 50V	25V	16V	10V	6.3V	C ≤ 10μF 测试频率: 1KHZ ± 10% 测试电压: 1.0 ± 0.2Vrms Test Frequency: 1KHZ ± 10% Test Voltage: 1.0 ± 0.2Vrms C > 10μF X7R、X5R、X7S、X6S、Y5V 测试频率: 120 ± 24 HZ 测试电压:0.5 ± 0.1Vrms Test Frequency: 120 ± 24HZ Test Voltage: 0.5 ± 0.1Vrms Z5U:测试频率:1 ± 0.1KHZ 测试电压:0.5 ± 0.05Vrms Test Frequency: 1 ± 0.1KHZ Test Voltage: 0.5 ± 0.05Vrms
		X7S/ X6S (≥ 0402)	≤ 2.5%	≤3.5% (C < 0.47μF) ≤10.0% (C ≥ 0.47μF)	≤3.5% (C < 0.47μF) ≤10.0% (C ≥ 0.47μF)	≤5.0% (C < 0.15μF) ≤10.0% (C ≥ 0.15μF)	≤5.0% (C < 0.15μF) ≤10.0% (C ≥ 0.15μF)	
		X7R/ X5R	≥ 50V	25V	16V	10V	6.3V	
		X7S/ X6S (< 0402)	≤ 3.5%	≤5.0%	≤5.0% (C < 0.047μF) ≤10% (C > 0.047μF)	≤7.5% (C < 0.047μF) ≤10% (C > 0.047μF)	≤7.5% (C < 0.047μF) ≤10% (C > 0.047μF)	
		Y5V Z5U	≥ 25V		16V	10V	6.3V	
			≤7.0% (C <1.0μF) ≤9.0% (C ≥1.0μF)		≤15%	≤15%	≤15%	
绝缘电阻 (IR) Insulation Resistance	类 Class	C ≤ 10 nF, Ri ≥ 50000MΩ C > 10 nF, Ri C _R ≥ 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） Duration: 60 ± 5s Test Humidity: ≤ 75% Test Temprature: 25 ± 5 Test Current: ≤ 50mA
	类 Class	X7R/ X5R/ X7S/ X6S	C ≤ 25 nF, Ri ≥ 10000MΩ C > 25 nF, Ri C _R > 100S					
		Y5V Z5U	C ≤ 25 nF, Ri ≥ 4000MΩ C > 25 nF, Ri C _R > 100S					
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： 类:300%额定电压 类:250%额定电压 时间：1 ~ 5 秒 充/放电电流：不应超过 50mA (这部分说明不包括中高压 MLCC) Measuring Voltage: Class :300% Rated voltage Class :250% Rated voltage Duration: 1 ~ 5s Charge/ Discharge Current: 50mA max. (This method excludes high-voltage MLCC)

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 的温度下预热 10~30 秒。 Preheating conditions:80 to 120 ；10~30s.
					有铅焊料:(Sn/Pb：63/37) 浸锡温度:235±5 浸锡时间:2±0.5s Solder Temperature:235±5 Duration:2±0.5s
耐焊耐热 Resistance to Soldering Heat	项目 Item	NPO 至 SL NPO to SL	X7R/X5R/ X7S/X6S	Y5V、 Z5U	将电容在 100~200 的温度下预热 10±2 分钟。 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 ；10±2min. 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	≤ ± 0.5% 或 ± 0.5PF，取较大值 ≤ ± 0.5% or ± 0.5PF， whichever is larger	-5~+10%	-10~+2 0%	
	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	≤ ± 10%			

项目 Item	技术规格 Technical Specification		测试方法 Test Method and Remarks															
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	Δ C/C: 类：≤ ± 1%或 ± 1pF , 取两者中最大者 类： B,X,BS,DS: ≤ ± 10% E,F: ≤ ± 20% Class : ≤ ± 1% or ± 1pF, whichever is larger. Class : B,X,BS,DS: ≤ ± 10% E,F: ≤ ± 20%		预处理 (2类): 上限类别温度, 1小时 恢复：24 ± 1h 初始测量 循环次数：5 次，一个循环分以下 4 步：															
			<table><tr><td>阶段</td><td>温度 ()</td><td>时间(分钟)</td></tr><tr><td>第 1 步</td><td>下限温度(NPO/X7R/X7S/X6S/X5R:-55 Y5V:-25 Z5U:+10)</td><td>30</td></tr><tr><td>第 2 步</td><td>常温 (+20)</td><td>2 ~ 3</td></tr><tr><td>第 3 步</td><td>上限温度(NPO/X7R/X7S: Y5V/Z5U/X5R:+85 X6S:+105)</td><td>30</td></tr><tr><td>第 4 步</td><td>常温 (+20)</td><td>2 ~ 3</td></tr></table>	阶段	温度 ()	时间(分钟)	第 1 步	下限温度(NPO/X7R/X7S/X6S/X5R:-55 Y5V:-25 Z5U:+10)	30	第 2 步	常温 (+20)	2 ~ 3	第 3 步	上限温度(NPO/X7R/X7S: Y5V/Z5U/X5R:+85 X6S:+105)	30	第 4 步	常温 (+20)	2 ~ 3
			阶段	温度 ()	时间(分钟)													
			第 1 步	下限温度(NPO/X7R/X7S/X6S/X5R:-55 Y5V:-25 Z5U:+10)	30													
			第 2 步	常温 (+20)	2 ~ 3													
第 3 步	上限温度(NPO/X7R/X7S: Y5V/Z5U/X5R:+85 X6S:+105)	30																
第 4 步	常温 (+20)	2 ~ 3																
试验后放置 (恢复) 时间：24 ± 2h Preheating conditions: up-category temperature, 1h Recovery time: 24 ± 1h																		
Initial Measurement Cycling Times: 5 times, 1 cycle, 4 steps:																		
<table><tr><td>Step</td><td>Temperature ()</td><td>Time (min.)</td></tr><tr><td>1</td><td>Low-category temp. (NPO/X7R/X7S/X6S/X5R:-55 Y5V:-25 Z5U:+10)</td><td>30</td></tr><tr><td>2</td><td>Normal temp. (+20)</td><td>2 ~ 3</td></tr><tr><td>3</td><td>Up-category temp. (NPO/X7R/X7S: Y5V/Z5U/X5R:+85 X6S:+105)</td><td>30</td></tr><tr><td>4</td><td>Normal temp. (+20)</td><td>2 ~ 3</td></tr></table>	Step	Temperature ()	Time (min.)	1	Low-category temp. (NPO/X7R/X7S/X6S/X5R:-55 Y5V:-25 Z5U:+10)	30	2	Normal temp. (+20)	2 ~ 3	3	Up-category temp. (NPO/X7R/X7S: Y5V/Z5U/X5R:+85 X6S:+105)	30	4	Normal temp. (+20)	2 ~ 3			
Step	Temperature ()	Time (min.)																
1	Low-category temp. (NPO/X7R/X7S/X6S/X5R:-55 Y5V:-25 Z5U:+10)	30																
2	Normal temp. (+20)	2 ~ 3																
3	Up-category temp. (NPO/X7R/X7S: Y5V/Z5U/X5R:+85 X6S:+105)	30																
4	Normal temp. (+20)	2 ~ 3																
Recovery time after test: 24 ± 2h																		
潮湿试验 Moisture Resistance	Δ C/C	类: ≤ ± 2%或 ± 1pF, 取两者之中较大者 类: B,X,BS,DS: ≤ ± 10% E,F: ≤ ± 30% Class : ≤ ± 2% or ± 1pF, whichever is larger. Class : B,X,BS,DS: ≤ ± 10% E,F: ≤ ± 30%	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(类) ; 48 小时(类) Temperature：40 ± 2 Humidity：90~95%RH Duration：500h Recovery conditions：Room temperature Recovery Time：24h (Class1) or 48h (Class2)															
	DF	≤ 2 倍初始标准 Not more than twice of initial value.																
	IR	类：Ri ≥ 2500MΩ 或 Ri C_R ≥ 25S 取两者之中较小者. Class : Ri ≥ 2500MΩ 或 Ri C_R ≥ 25S whichever is smaller.																
		类：Ri ≥ 1000MΩ 或 Ri C_R ≥ 25S 取两者之中较小者. Class : Ri ≥ 1000MΩ 或 Ri C_R ≥ 25S whichever is smaller.																
	外观：无损伤 Appearance: No visible damage.																	

项目 Item	技术规格 Technical Specification		测试方法 Test Method and Remarks
寿命试验 Life Test	Δ C/C	类： $\leq \pm 2\%$ 或 $\pm 1\text{pF}$ 取两者之中较大者 类：B,X,BS,DS: $\leq \pm 20\%$ E,F: $\leq \pm 30\%$ Class : $\leq \pm 2\%$ or $\pm 1\text{pF}$, whichever is larger. Class : B,X,BS,DS: $\leq \pm 20\%$ E,F: $\leq \pm 30\%$	低压产品（ $\leq 100\text{V}$ ） 电压： 1.5 倍额定工作电压 时间： 1000 小时 温度： 125 （NPO、X7R、X7S） 85 （X5R、Y5V） 105 （X6S） 充电电流：不应超过 50mA 放置条件：室温 放置时间： 24 小时（类），或 48 小时（类）， Low-Voltage（ $\leq 100\text{V}$ ） Applied Voltage: $1.5 \times \text{Rated Voltage}$ Duration: 1000h Temperature： 125 （NPO、X7R、X7S） 85 （X5R、Y5V） 105 （X6S） Charge/ Discharge Current: 50mA max. Recovery Conditions: Room Temperature Recovery Time: 24h (Class 1), or 48h (Class2)
	DF	≤ 2 倍初始标准 Not more than twice of initial value.	
	IR	类： $R_i \geq 4000\text{M}\Omega$ 或 $R_i \quad C_R \geq 40\text{S}$ 取两者之中较小者. Class : $R_i \geq 4000\text{M}\Omega$ 或 $R_i \quad C_R \geq 40\text{S}$ whichever is smaller.	
		类： $R_i \geq 2000\text{M}\Omega$ 或 $R_i \quad C_R \geq 50\text{S}$ 取两者之中较小者. Class : $R_i \geq 2000\text{M}\Omega$ 或 $R_i \quad C_R \geq 50\text{S}$ whichever is smaller.	
	外观：无损伤 Visual Appearance: No visible damage.		
中高压产品 寿命试验 Middle & high voltage Life Test	Δ C/C	类： $\leq \pm 2\%$ 或 $\pm 1\text{pF}$ 取两者之中较大者 类：B,X,BS,DS: $\leq \pm 20\%$ E,F: $\leq \pm 30\%$ Class : $\leq \pm 2\%$ or $\pm 1\text{pF}$, whichever is larger. Class : B,X,BS,DS: $\leq \pm 20\%$ E,F: $\leq \pm 30\%$	中高压产品： $100\text{V} \leq \text{额定电压} < 500\text{V}$ ： 2 倍工作电压 $500\text{V} \leq \text{额定电压} \leq 1000\text{V}$ ： 1.5 倍工作电压 额定电压 $> 1000\text{V}$ ： 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（类），或 48 小时（类）， Applied Voltage: $100\text{V} \leq \text{Rated Voltage} < 500\text{V}$ ： 2 Multiple $500\text{V} \leq \text{Rated Voltage} \leq 1000\text{V}$ ： 1.5 Multiple $> 1000\text{V}$ 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)
	DF	≤ 2 倍初始标准 Not more than twice of initial value.	
	IR	类： $R_i \geq 4000\text{M}\Omega$ 或 $R_i \quad C_R \geq 40\text{S}$ 取两者之中较小者. Class : $R_i \geq 4000\text{M}\Omega$ 或 $R_i \quad C_R \geq 40\text{S}$ whichever is smaller.	
		类： $R_i \geq 2000\text{M}\Omega$ 或 $R_i \quad C_R \geq 50\text{S}$ 取两者之中较小者. Class : $R_i \geq 2000\text{M}\Omega$ 或 $R_i \quad C_R \geq 50\text{S}$ whichever is smaller.	
	外观：无损伤 Visual Appearance: No visible damage.		

注解：

专门预处理（仅对 2 类电容器）：

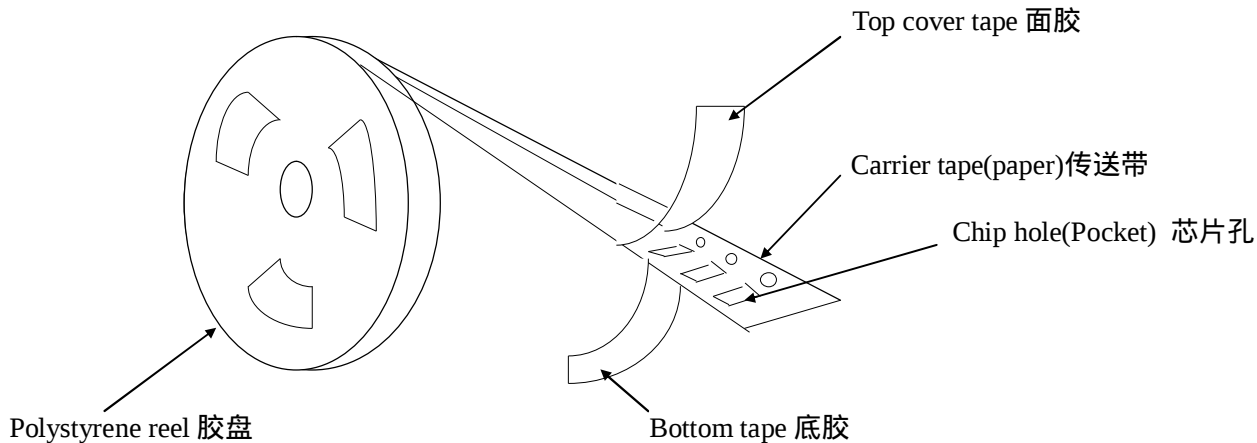
将电容器放在上限类别温度或按详细规范中可能规定的更高温度下经 1h 后，接着在试验的标准大气条件下恢复 $24 \pm 1\text{h}$ 。

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 $24 \pm 1\text{hours}$.

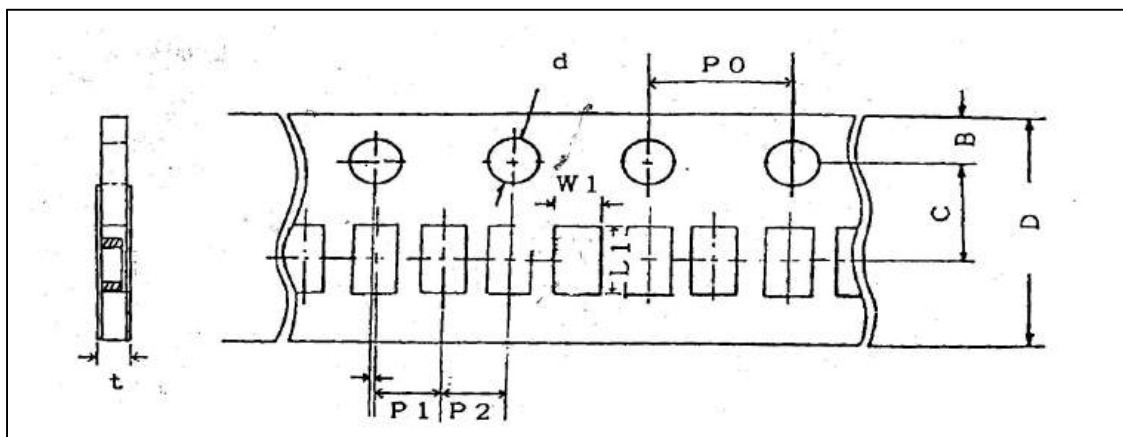
九、包装 PACKAGE

纸带卷盘结构 PAPER TAPING



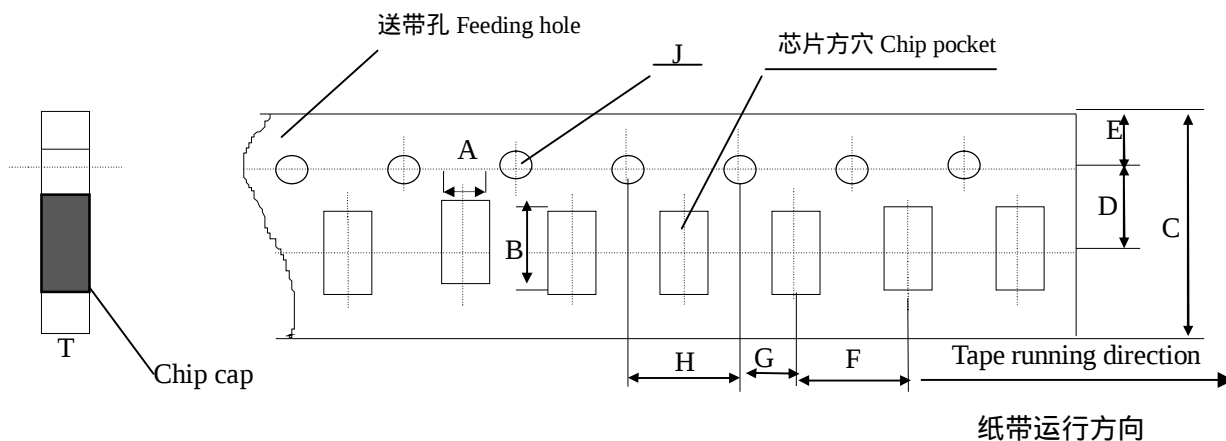
0201、0402 纸带编带尺寸大小

Dimensions of paper taping for 0402 type



代号 Code	W1	L1	D	C	B	P1	P2	P0	d	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

适合 ' 0603 , 0805 , 1206 ' 常规尺寸产品的纸带尺寸
Dimensions of paper taping for 0603 , 0805 , 1206 types.



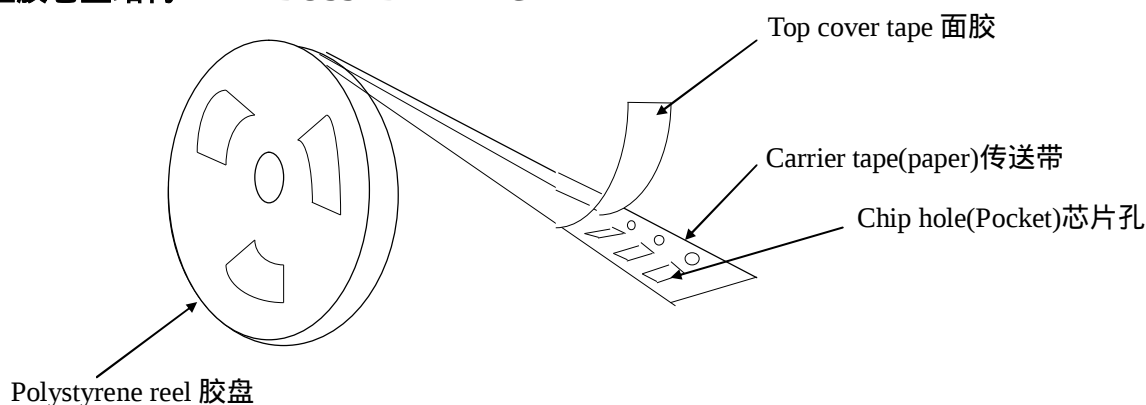
Unit : mm

代号 Code 纸带规格 paper size	A	B	C	D*	E	F	G*	H	J	T
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.

● 塑胶卷盘结构 EMBOSSED TAPING



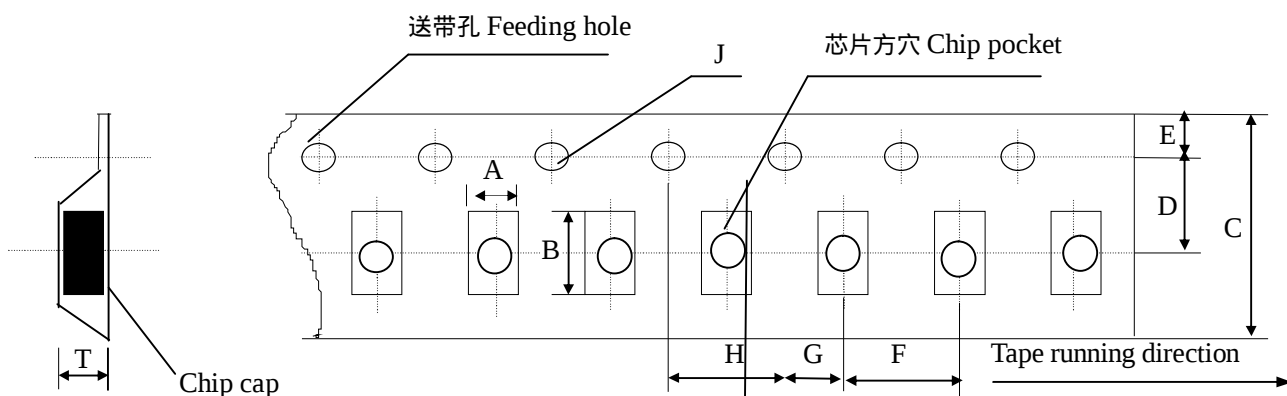
塑胶带尺寸结构(适合 ‘ 0805~1812 ’ 型产品)

Dimensions of embossed taping for 0805~1812 type



MLCC多层片式陶瓷电容器规格说明书

CC-Multilayer ceramic capacitor Product Specifications

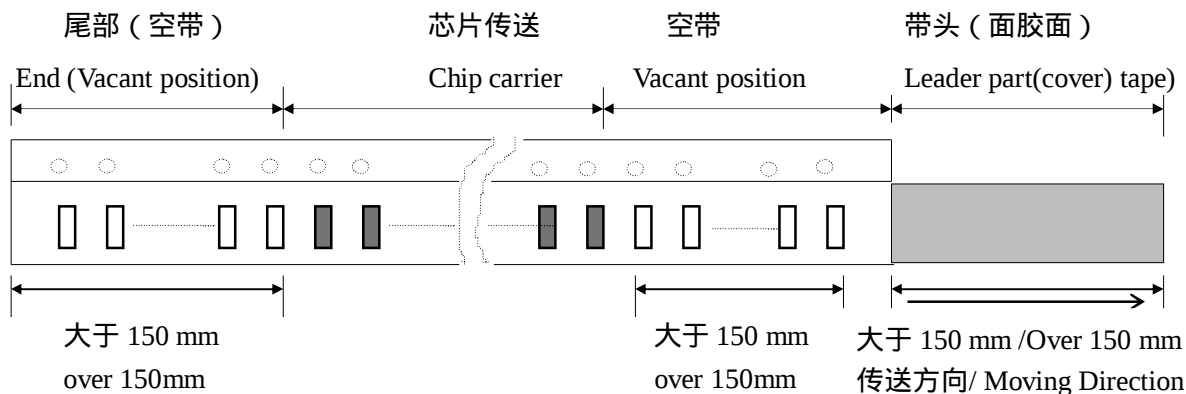


塑胶带传送方向										
代号 Code 规格 Tape size	A	B	C	D*	E	F	G*	H	J	T
0805	1.55	2.35	8.00	3.50	1.75	4.00	2.00	4.00	1.50	1.50
	± 0.20	± 0.20	± 0.20	± 0.05	± 0.10	± 0.10	± 0.10	± 0.10	-0/+0.10	Max
1206	1.95	3.60	8.00	3.50	1.75	4.00	2.00	4.00	1.50	1.85
	± 0.20	± 0.20	± 0.20	± 0.05	± 0.10	± 0.10	± 0.10	± 0.1	-0/+0.10	Max
1210	2.70	3.42	8.00	3.50	1.75	4.00	2.00	4.00	1.55	3.2
	± 0.10	± 0.10	± 0.10	± 0.05	± 0.10	± 0.10	± 0.05	± 0.10	-0/+0.10	Max
1808	2.20	4.95	12.00	5.50	1.75	4.00	2.00	4.00	1.50	3.0
	± 0.10	± 0.10	± 0.10	± 0.05	± 0.10	± 0.10	± 0.05	± 0.10	-0/+0.10	Max
1812	3.66	4.95	12.00	5.50	1.75	8.00	2.00	4.00	1.55	4.0
	± 0.10	± 0.10	± 0.10	± 0.05	± 0.10	± 0.10	± 0.05	± 0.10	-0/+0.10	Max

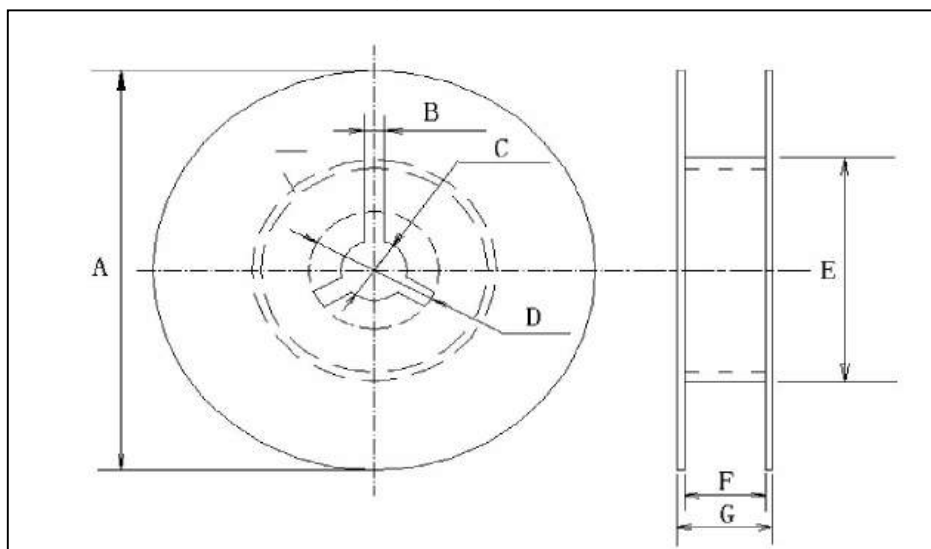
备注：*表示此处对尺寸的要求非常精确。

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)



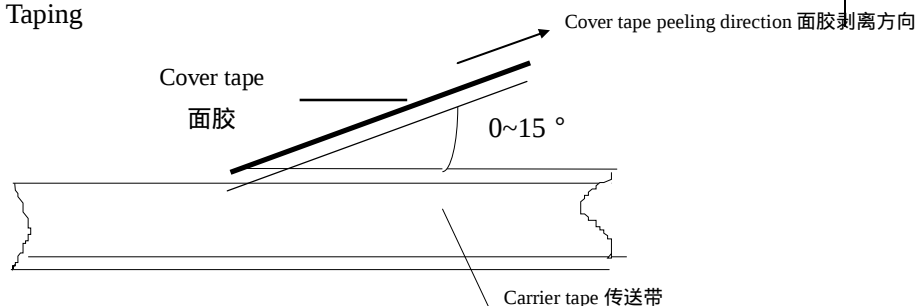
尺寸代码 (CODE)

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

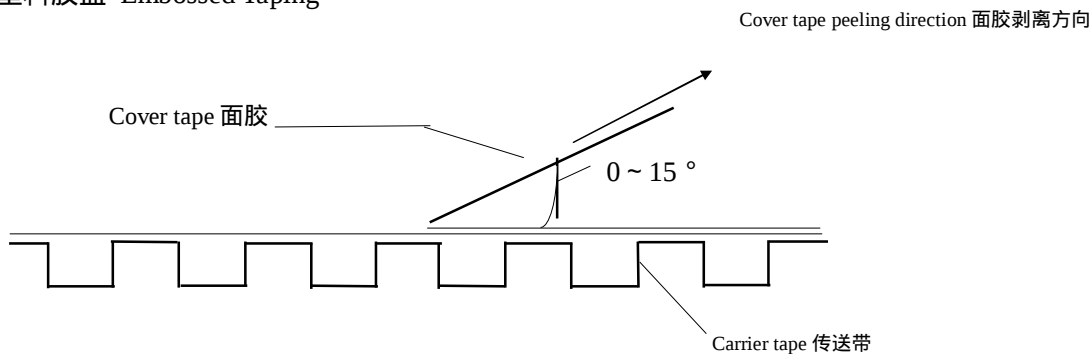
关于卷带的说明 Taping specification

面胶剥离强度 Top tape peeling strength

(a) 纸带 Paper Taping



(b) 塑料胶盘 Embossed 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.

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 (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)
0201	15000	-----	20000	5000
0402	10000	-----	20000	5000
0603	4000	-----	15000	5000
0805	4000	3000	10000	5000
1206	4000	T ≤ 1.35mm 3000 T > 1.35mm 2000	5000	5000
1210	-----	T ≤ 1.80mm 2000 T > 1.80mm 1000	-----	2000
1410	-----	2000	-----	-----
1808	-----	2000	-----	2000
1812	-----	T ≤ 1.85mm 1000 T > 1.85mm 500	-----	2000
1825、2220、 2025、2225、 3035	-----	500	-----	500

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

十 MLCC 使用注意事项 Precautions on the use of MLCC

电路板设计 PCB Design

电路板图案设计 Design of Land-patterns

下面图和表格给出了部分推荐的设计图案，可以防止安装时焊锡量过多。

同时也给出了不正确的图案。

The following diagrams and tables show some examples recommended patterns to prevent excessive solder amounts (larger fillets which above the component end terminations)

Examples of improper pattern designs are also shown.

电路板设计推荐图案尺寸：|

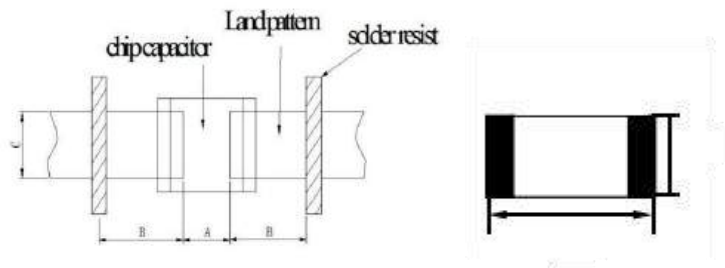
Recommended land dimensions for a typical chip capacitor land patterns for PCBs

波峰焊接时推荐设计的尺寸 (单位: mm):

Recommended land dimensions for wave-soldering (unit: mm)

回流焊接时推荐设计的尺寸 (单位: mm)

规格 SIZE		0603	0805	1206
尺寸	L	1.6	2.0	3.2
	W	0.8	1.25	1.6
A		0.8~1.0	1.0~1.4	1.8~2.5
B		0.5~0.8	0.8~1.5	0.8~1.7
C		0.6~0.8	0.9~1.2	1.2~1.6



Recommended land dimensions for reflow-soldering (unit: mm)

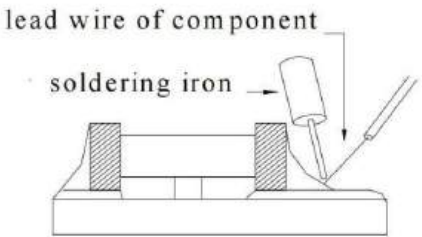
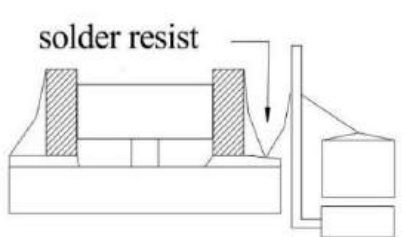
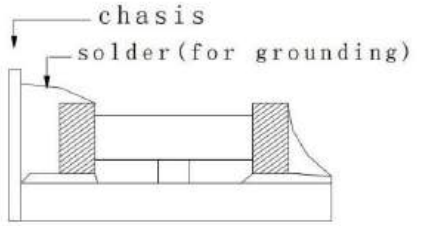
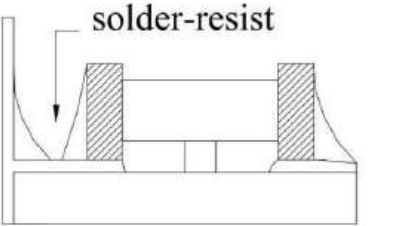
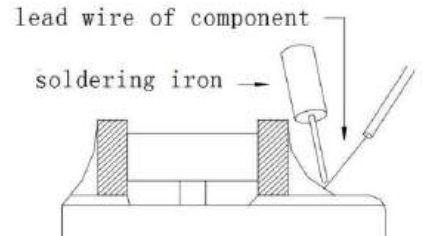
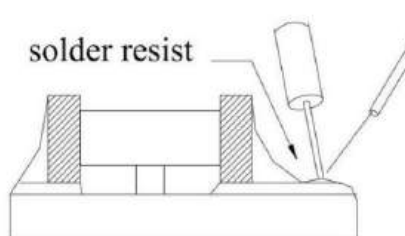
规格 SIZE		0201	0402	0603	0805	1206	1210
尺寸	L	0.6	1.0	1.6	2.00	3.2	3.2
	W	0.3	0.5	0.8	1.25	1.6	2.5
A		0.20~0.25	0.35~0.45	0.6~0.8	0.8~1.2	1.8~2.5	1.8~2.5
B		0.20~0.30	0.40~0.50	0.6~0.8	0.8~1.2	1.0~1.5	1.0~1.5
C		0.25~0.35	0.45~0.55	0.6~0.8	0.9~1.6	1.2~2.0	1.6~3.2

过量的焊锡会影响产品抵抗机械应力的能力，因此在设计图案时应引起注意。

Excess solder can affect the ability of chips to withstand mechanical stresses. Therefore, please take proper precautions when designing land-patterns.

在应用中一些焊接好与坏的情况:

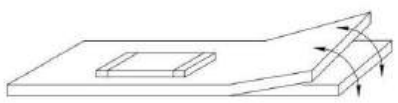
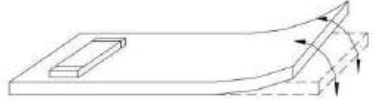
Examples of good and bad solder application

项目 Item	不推荐结构 Not recommended	推荐结构 Recommended
片状元件和带引线的元件的混合焊接 Mixed mounting of SMD and leaded component		
靠近底座的焊接 Component placement close to the chassis		
在片状元件附近带引线元件的焊接 Hand-soldering of leaded components near mounted components		

■ 图案结构 Pattern configurations

下面是电容器安装好与坏的例子。选择贴装位置，应尽可能减小电路板在弯曲时受到的机械应力。

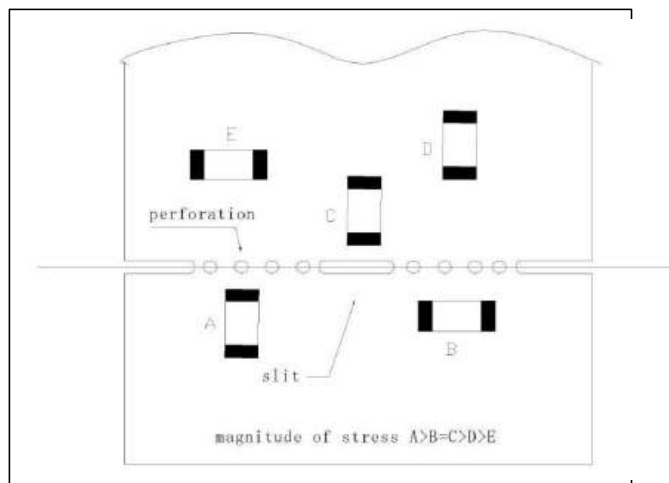
The following are examples of good and bad capacitor layout, SMD capacitors should be located to minimize any possible mechanical stresses from board warp or deflection.

	不推荐结构 Not recommended	推荐结构 Recommended
电路板弯曲 Deflection of the board		

对于电路板分拨的电容器，在分拨时受到的机械应力大小与电容器的安装有关。下面推荐了一些好的设计。

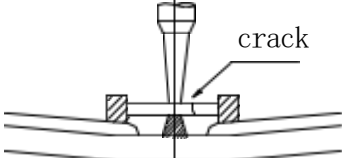
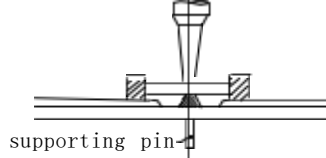
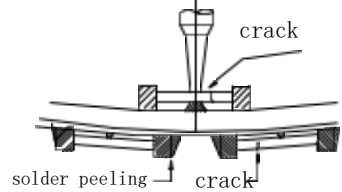
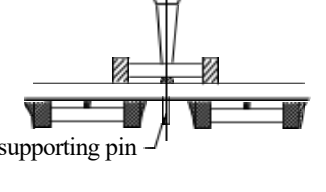
To layout the capacitors for the breakaway PC board, it should be noted that the amount of mechanical stresses given depending on capacitor layout. The example below shows recommendations for better design.

在沿着分拨线分拨电路板时，对产品施加的机械应力与使用的方法关系很大。分折电路板时片状元件受到的疲劳按照如下顺序增大：分折、剪切、V 型槽、穿孔。因此，贴装时应该考虑电路板的分拨过程。When breaking PC boards along their perforations, the amount of mechanical stress on the capacitors can vary according to the method used. The following methods are listed in order from least stressful to most stressful: push-back, silt, -grooving, and perforation. Thus, any ideal SMD capacitor layout must also consider the PCB splitting procedure.



自动贴装注意事项 Considerations for automatic placement 贴装机的调整 Adjustment of mounting machine

- ①.产品在电路板贴装时，不应该受到过大的冲击。
- ②.必须定期对吸头和定位爪进行检查、维修和更换
- ①.Excessive impact load should not be imposed on the capacitors when mounting the PC boards.
- ②.The maintenance and inspection of the mounters should be conducted periodically.

	不推荐结构 Not recommended	推荐结构 Recommended
单面贴装 Single-sided mounting		
双面贴装 Double-sided mounting		

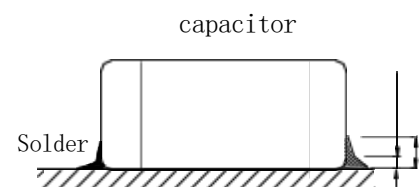
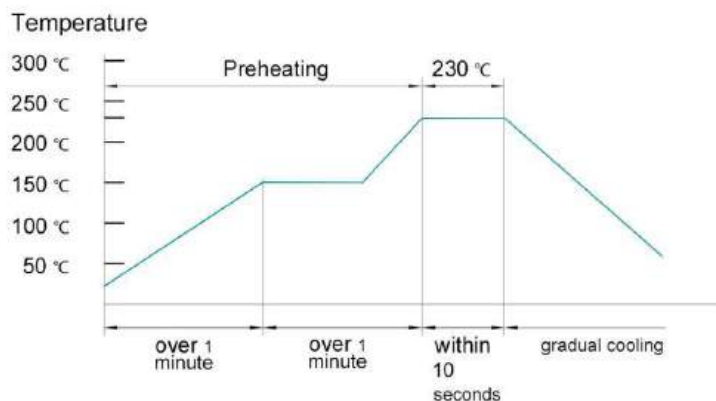
推荐焊接曲线 Recommended soldering profile

说明

- ①.产品推荐使用回流焊接工艺;
- ②.大尺寸产品适用于回流焊接工艺
- ①.flow Soldering is recommended;
- ②.flow soldering is suitable for bigger size MLCC

锡铅焊接曲线 Recommended Sn&Pb soldering profile

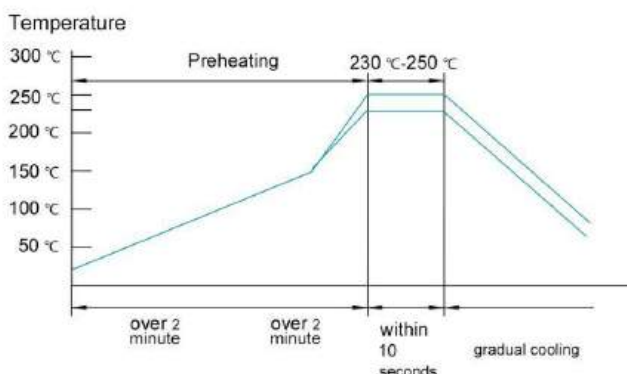
流焊 Reflow soldering



注意 Caution

- ①.理想状况的焊锡高度为电容器厚度的 1/3 ~ 1/2 , 如右图所示:
- ②.过长的焊接时间会影响端头的可焊性, 焊接时间尽可能保持与推荐时间一致。
- ①.The ideal condition is to have solder mass (fillet) controlled to 1/2 to 1/3 of the thickness of the capacitor, as shown below:
- ②.Because excessive dwell times can detrimentally affect solder ability, soldering duration should be kept as close to recommended times as possible.

波峰焊 Wave solder profile



注意 Caution

- ①.确保电容器充分预热。
 - ②.产品预热和焊接温度差不超过 100~130℃。
 - ③.焊接后尽可能慢速冷却。
- ①.Make sure the capacitors are preheated sufficiently.
 - ②.The temperature difference between the capacitor and melted solder should not be greater than 100 to 130℃.
 - ③.Cooling after soldering should be gradual as possible.

手工焊接 Hand soldering

条件:

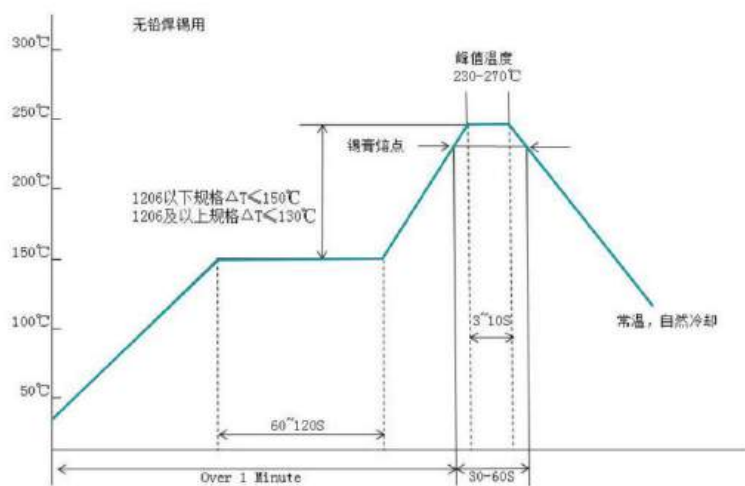
预热	烙铁头温度	烙铁功率	烙铁头直径	焊接时间	锡膏量	限制条件
$\Delta \leq 130^{\circ}\text{C}$	最高 350℃	最大 20w	建议 1mm	最长 5s	$\leq \frac{1}{2}$ 芯片厚度	请勿使用烙铁头直接接触陶瓷原件

注意 Caution

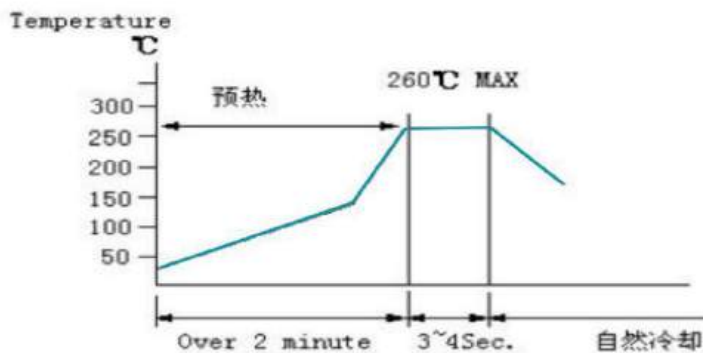
- ①.用尖端最大直径 1.0mm 功率 20W 的焊接烙铁。
 - ②.焊接烙铁不要直接接触产品。
- ①.Use a 20w soldering iron with a maximum tip diameter of 1.0mm.
 - ②.The soldering iron should not directly touch the capacitor.

■ 无铅焊接曲线 Recommended Pb-Free soldering profile

回流焊 Reflow solderin



波峰焊 Wave solder profile



分拨电路板 Handling

Breakaway PC boards (splitting along perforations)

- ①.在电容器或其它贴装后，必须注意因电路板弯曲或变形带来的应力。
- ②.分拨电路板时必须使用专用的夹具，不可以用手拨断。

- ① .When splitting the PC board after mounting capacitors and other components, care is required so as not to give any stresses of deflection or twisting to the board.
- ②.Board separation should not be done manually, but by using the appropriate devices.

十一 保存 Storage

- ①.在下列环境中保存产品：温度 5~40℃；湿度 ≤70% RH
- ②.产品自生产之日保存期为一年，产品使用之前请勿拆开编带。
- ③.编带拆开后，产品应在三个月内使用。
- ④.高介电常数电容器 (X7R,X5R,Y5V、X7T、X6S) 的容值随时间会逐渐减小，所以在电路设计时应充分考虑这一现象。容值减小的电容器在 150℃热处理 1 小时后容值会恢复到初始值。
- ①. Keep the storage environment conditions as following: Temperature: 5~40℃； Humidity: ≤70% RH
- ②. Don't open the tape until the parts are to be used, and store them within one year since the date printed on the reel.
- ③. Use the chips within 3 months after the tape is opened.
- ④ . The capacitance value of high dielectric constant capacitors (X7R,X5R,Y5V、X7T、X6S) will gradually decrease with the passage of time, so this should be taken into consideration in the circuit design. If such a capacitance reduction occurs, a heat treatment of 150℃ for 1 hour will return the capacitance to its initial level.