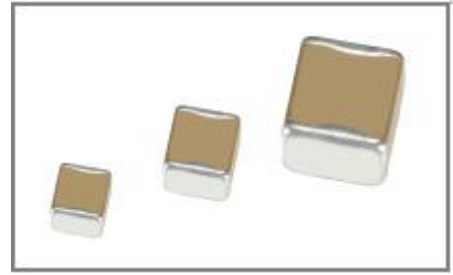


■中高压系列片式陶瓷电容器

High Voltage Series Of Ceramic Chip Capacitors



◆特征 Feature

- * 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，通过采用特殊设计制作出来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。
High Voltage MLCC is a kind of special design MLCC that bases on the technology of general MLCC. This kind of MLCC has stable high Voltage reliability and suitable to SMT. High Voltage MLCC is widely applicable for many direct high Voltage circuits in which it can improve the performance of the circuit.
- * 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
- * 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

- * 模拟或数字调制解调器
Analog & Digital Modems
- * 局域网/广域网接口界面
LAN/WAN Interface
- * 日光灯启动辉器照明电路
Lighting Ballast Circuits
- * 倍压电器
Voltage Multipliers
- * 直流变送器
DC-DC Converters
- * 背光源驱动电路
Back-lighting Inverters

[illegible]

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., 0402B104K101NT can cover 0402BS104K101NT, 0402BT104K101NT, 0402DS104K101NT, 0402X/104K101NT). Therefore, detailed model specifications will not be listed separately in the specification.

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2	应用范围 Application
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8	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
9	可靠性测试 Reliability Test
10	包装 Package
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12	使用前的注意事项 Precautions Before Use
13	推荐焊接温度曲线图 The temperature profile for soldering

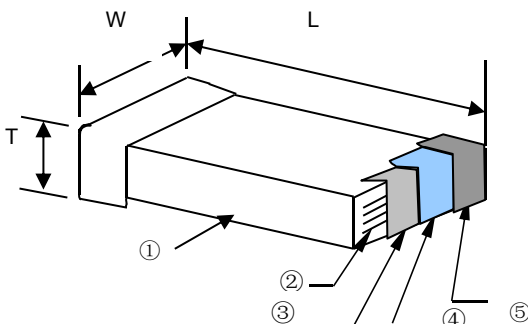
◆型号表示法

How To Order

0805	CG	102	J	201	N	T
尺寸规格 Size Code			标称容量 Nominal Capacitance		额定电压 Rated Voltage 单位(unit): V	
尺寸规格 Size Code	EIA	长×宽 (L×W) mm	表示方式 Express Method	实际值 Actual Value	表示方式 Express Method	实际值 Actual Value
0402	0402	1.00×0.50	0R5	0.5	6R3	6.3
0603	0603	1.60×0.80			500	50×10 ⁰
0805	0805	2.00×1.25			201	20×10 ¹
1206	1206	3.20×1.60	102	10×10 ²	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.	
1210	1210	3.20×2.50				
1808	1808	4.50×2.00				
1812	1812	4.50×3.20				
2211	2211	5.70×0.28				
2220	2220	5.70×5.00				
2225	2225	5.70×6.30				
介质种类 Dielectric Code			容量误差 Capacitance Tolerance			包装方式 Package Styles
介质种类 Dielectric Code	介质材料 Dielectric	代码 Code	误差 Tolerance	备注 Note		表示方式 Express Method
B	X7R	A	±0.05pF	A、B、C、D级误差适用于容量≤10pF的产品。 These Capacitance tolerance A, B, C, D are just applicable the capacitance that equals to or less than 10pF.		编带 7 寸盘包装 Braided 7 inch disc packing
CG	C0G	B	±0.10pF			
		C	±0.25pF			
		D	±0.50pF			
		F	±1%			
		G	±2%			
		J	±5%			
		K	±10%			
		M	±20%			
		A	±0.05pF			
						编带 13 寸盘包装 Braided 13 inch disc packing

◆产品结构

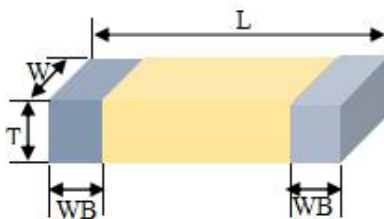
Product Structure



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)				尺寸代码 Size code
英制表示 British	公制表示 Metric	L	W	T	WB	
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.05	CA
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.35±0.20	DA
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20	0.50±0.20	EA
				1.25±0.25	0.50±0.20	EB
1206	3216	3.20±0.30	1.60±0.30	0.80±0.20	0.60±0.30	FA
				1.25±0.25		FB
				1.60±0.30		FC
1210	3225	3.20±0.30	2.50±0.30	1.25±0.25	0.60±0.30	GA
				1.60±0.30		GB
				2.00±0.30		GC
				2.50±0.30		GD
1808	4520	4.50±0.40	3.20±0.30	1.60±0.30	0.60±0.30	HA
				2.00±0.30		HB
1812	4532	4.50±0.40	3.20±0.30	1.25±0.25	0.60±0.30	IA
				1.60±0.30		IB
				2.00±0.30		IC
				2.50±0.30		ID
1825	4563	4.50±0.40	6.30±0.50	1.60±0.30	0.60±0.30	JA
				2.00±0.30		JB
				2.50±0.30		JC
2211	5728	5.70±0.40	2.80±0.40	1.60±0.30	0.60±0.30	KA
				2.00±0.30		KB
2220	5750	5.70±0.40	5.00±0.40	1.60±0.30	0.60±0.30	LA
				2.00±0.30		LB
				2.50±0.30		LC
2225	5763	5.70±0.50	6.30±0.50	1.60±0.30	0.60±0.30	MA
				2.00±0.30		MB
				2.50±0.30		MC

备注：1、产品具体厚度“T”查阅本承认书中“容量范围及其电压”。2、可根据客户的特殊要求设计符合客户需求的产品。

Note: 1、The specific thickness of the product can read "capacity range and Voltage" in this approval sheet.

2、We can design according to customer special requirements.

◆ 温度系数/特性 Temperature Coefficient /Characteristics

介质种类 Dielectric	参考温度点 Reference Temperature Point	标称温度系数 Temperature Coefficient	工作温度范围 Operation Temperature Range
C0G	25°C	0±30ppm/°C	-55°C~125°C
X7R	25°C	±15%	-55°C~125°C

◆ 容量范围及电压

Capacitance Range and Voltage

*I 类电容器具体电压对应容量及厚度情况列表

* List of specific Voltage corresponding to capacity and thickness of Class I capacitors

材料 Dielectric	C0G								
尺寸 Dimension	0402 (1.0mm*0.5mm)	0603 (1.6mm*0.8mm)			0805 (2.0mm*1.2mm)				
容量/电压 Capacity/ Voltage	100V	100V	200V	250V	100V	200V	250V	500V	1KV
0.5pF									
1pF		DA							
1.2pF		DA							
1.5pF		DA							
1.8pF		DA			EA				
2.0pF		DA			EA				
2.2pF	CA	DA			EA				
2.7pF	CA	DA		DA	EA				
3.0pF	CA	DA		DA	EA				
3.3pF	CA	DA		DA	EA				
3.6pF	CA	DA		DA	EA				
3.9pF	CA	DA		DA	EA				
4.7pF	CA	DA		DA	EA			EA	
5.0pF	CA	DA		DA	EA			EA	
5.6pF	CA	DA		DA	EA			EA	
6.8pF	CA	DA		DA	EA			EA	EA
8.0pF	CA	DA		DA	EA			EA	EA
8.2pF	CA	DA		DA	EA			EA	EA
10pF	CA	DA		DA	EA			EA	EB
12pF	CA	DA		DA	EA		EA	EA	EB
15pF	CA	DA		DA	EA		EA	EA	EB
18pF	CA	DA		DA	EA		EA	EA	EB
22pF	CA	DA		DA	EA		EA	EA	EB
27pF	CA	DA		DA	EA		EA	EA	EB
33pF	CA	DA		DA	EA		EA	EA	EB
39pF	CA	DA		DA	EA		EA	EA	EB
47pF	CA	DA		DA	EA	EA	EA	EA	EB
56pF	CA	DA	DA	DA	EA	EA	EA	EA	EB
68pF	CA	DA	DA	DA	EA	EA	EA	EA	EB
100pF	CA	DA	DA	DA	EA	EA	EA	EA	EB
120pF	CA	DA	DA	DA	EA	EA	EA	EA	EB
150pF	CA	DA	DA	DA	EA	EA	EA	EA	EB
180pF	CA	DA	DA	DA	EA	EA	EA	EB	EB
220pF	CA	DA	DA	DA	EA	EA	EA	EB	
270pF	CA	DA	DA	DA	EA	EA	EA	EB	
300pF	CA	DA	DA	DA	EA	EA	EA	EB	
330pF		DA	DA	DA	EA	EA	EA	EB	
390pF		DA	DA		EA	EA	EA	EB	
470pF		DA	DA		EA	EA	EA	EB	
560pF		DA			EA	EA	EA		
680pF		DA			EA	EA	EA		
820pF		DA			EA	EA	EA		
1nF		DA			EA	EA	EA		
1.5nF					EA		EB		
1.8nF					EA		EB		
2.2nF					EA		EB		
2.7nF					EA		EB		
3.3nF					EA		EB		
4.7nF					EA		EB		
10nF									

代码 Code	CA	DA	EA	EB
T	0.50±0.05	0.80±0.10	0.80±0.20	1.25±0.25

材料 Dielectric	C0G							
尺寸 Dimension	1206 (3.2mm*1.6mm)							
容量/电压 Capacity/ Voltage	100V	200V	250V	500V	630V	1KV	2KV	3KV
0.5pF				FB		FB		
1pF				FA		FB		
1.2pF				FA		FB		
1.5pF				FA		FB		
1.8pF				FA		FA		
2.0pF				FA		FB	FB	
2.2pF				FA		FB	FB	
2.7pF				FA		FB	FB	
3.0pF			FA	FA		FB	FB	
3.3pF			FA	FA		FB	FB	
3.6pF			FA	FA		FB	FB	
3.9pF			FA	FA		FB	FB	
4.7pF			FA	FA		FB	FB	
5.0pF			FA	FA		FB	FB	
5.6pF			FA	FA		FB	FB	
6.8pF			FA	FB		FB	FB	
8.0pF			FA	FB		FB	FB	
8.2pF			FA	FB		FB	FB	
10pF			FA	FA		FB	FB	
12pF			FA	FA/FB*		FB	FB	
15pF			FA	FB		FB	FB	
18pF			FA	FB		FB	FB	
22pF	FA	FA	FA	FB		FA*/FB	FB	
27pF	FA	FA	FA	FB		FB	FB	
33pF	FA	FA	FA	FB		FB	FB	FB
39pF	FA	FA	FA	FA		FB	FB	
47pF	FA	FA	FA	FA/FB*		FB	FB	FB
56pF	FA	FA	FA	FB		FB	FB	
68pF	FA	FA	FA	FB	FB	FB	FC	
100pF	FA	FA	FA	FB	FB	FB	FC	
120pF	FA	FA	FA	FA	FA	FB	FC	
150pF	FA	FA	FA	FA/FB*	FB	FB	FC	
180pF	FA	FA	FA	FA/FB*	FB	FB	FC	
220pF	FA	FA	FA	FA/FB*	FB	FB	FC	
270pF	FA	FA	FA	FB	FB	FB		
330pF	FA	FA	FA	FB	FB	FB		
390pF	FA	FA	FA	FB	FB	FB		
470pF	FA	FA	FA	FB	FB	FB		
560pF	FA	FA	FA	FB	FB	FC		
680pF	FA	FA	FA	FB/FC*	FB	FC		
820pF	FA	FA	FA	FC	FC	FC		
1nF	FA	FB	FB	FC	FC	FC		
1.5nF	FA			FC	FC			
1.8nF	FA				FC			
2.2nF	FA				FC			
2.7nF	FA				FC			
3.3nF	FA				FC			
4.7nF								
10nF								

代码 Code	FA	FB	FC	备注
T	0.80±0.20	1.25±0.25	1.60±0.30	加“*”为特殊品 Add “*” as special product.

材料 Dielectric	C0G										
尺寸 Dimension	1210 (3.2mm*2.5mm)						1808 (4.5mm*2.0mm)				
容量/电压 Capacity/ Voltage	100V	200V	500V	630V	1KV	2KV	500V	1KV	2KV	3KV	5KV
2.0pF							HA			HA	
2.2pF							HA			HA	
2.7pF							HA			HA	
3.0pF							HA			HA	HA
3.3pF							HA			HA	HA
3.6pF							HA			HA	HA
3.9pF							HA			HA	HA
4.7pF							HA			HA	HA
5.0pF							HA			HA	HA
5.6pF							HA			HA	HA
6.8pF							HA			HA	HA
8.0pF							HA			HA	HA
8.2pF							HA			HA	HA
10pF		GA	GA			GA	HA			HA	HA
12pF		GA	GA			GA	HA			HA	HA
15pF		GA	GA			GA	HA			HA	HA
18pF		GA	GA			GA	HA			HA	HA
22pF		GA	GA			GA	HA			HA	HA
27pF		GA	GA			GA	HA			HA	HA
33pF		GA	GA			GA	HA	HA		HA	HA
39pF		GA	GA			GA	HA	HA		HA	HA
47pF		GA	GA			GA*/GB	HA	HA		HA	HA
56pF		GA	GA			GA*/GB	HA	HA		HA	HA
68pF		GA	GA		GB	GA*/GB	HA	HA		HA	HA
82pF		GA	GA		GB	GA*/GB	HA	HA		HA	HA*/HB
100pF	GA	GA	GA	GB	GA*/GB	GB	HA	HA	HA	HA	HB
120pF	GA	GA	GA	GB	GC	GB	HA	HA	HA	HA	
150pF	GA	GA	GA	GB	GC	GB	HA	HA	HA	HA	
180pF	GA	GA	GA	GB	GC	GB	HA	HA	HA	HA	
220pF	GA	GA	GA	GB	GC	GB	HA	HA	HA	HA	
270pF	GA	GA	GA	GB	GC	GB	HA	HA	HA	HA	
300pF	GA	GA	GA	GB	GC	GB	HA	HA	HA	HA*/HB	
330pF	GA	GA	GA	GB	GC	GB*/GC	HA	HA	HA	HA	
390pF	GA	GA	GA		GC		HA	HA	HA		
470pF	GA	GA	GA		GB*/GC		HA	HA*/HB	HA*/HB		
560pF	GA	GA	GA		GB		HA	HA*/HB	HA*/HB		
680pF	GA	GA	GA		GB		HA	HA*/HB	HA*/HB		
820pF	GA	GA	GA		GB*/GC		HA	HA*/HB	HA*/HB		
1nF	GA	GA	GB		GB*/GC		HA	HB	HB		
1.5nF	GA	GA	GA*/GB		GB*/GC		HA				
1.8nF	GA	GA	GB		GC		HA				
2.2nF	GA	GA	GB		GC		HA	HB			
2.7nF	GA	GA	GC				HA				
3.3nF	GA						HA				
4.7nF	GA						HB				
5.6nF	GA										
6.8nF	GA			GD	GD						
10nF				GD							
15nF				GD							
18nF				GD							
22nF				GD							

代码 Code	GA	GB	GC	GD	HA	HB	备注 Note
T	1.25±0.25	1.60±0.30	2.00±0.30	2.50±0.30	1.60±0.30	2.00±0.30	加“*”为特殊品 Add “*” as special product.

材料 Dielectric	C0G									
尺寸 Dimension	1812 (4.5mm*3.2mm)								1825 (4.5mm*6.3mm)	
容量/电压 Capacity/ Voltage	100V	200V	500V	630V	1KV	2KV	3KV	5KV	1KV	3KV
2.0pF								IB		
2.2pF								IB		
2.7pF								IB		
3.0pF								IB		
3.3pF					IB		IB	IB		
3.6pF					IB		IB	IB		
3.9pF					IB		IB	IB		
4.7pF					IB		IB	IB		
5.0pF					IB		IB	IB		
5.6pF					IB		IB	IB		
6.8pF					IB		IB	IB		
8.0pF					IB		IB	IB		
8.2pF					IB		IB	IB		
10pF					IB		IB	IB		
12pF					IB		IB	IB		
15pF					IB		IB	IB		
18pF					IB		IB	IB		
22pF			IA		IB	IB	IB	IB		
27pF			IA		IB	IB	IB			
33pF			IA		IB	IB	IB			
39pF			IA		IB	IB	IB			
47pF			IA		IB	IB	IB			
56pF	IA		IA		IB	IB	IB			
68pF	IA		IA		IB	IB	IB			
82pF	IA		IA		IB	IB	IB			
100pF	IA		IA		IB	IB	IB			
120pF	IA		IA		IB	IB	IB			
150pF	IA		IA		IB	IB	IB			
180pF	IA		IA		IB	IB	IB			
220pF	IA		IA		IB	IB	IB			JA
270pF	IA		IA		IB	IB	IB*/IC			
330pF	IA		IA		IB	IB	IB*/IC			
390pF	IA		IA		IB	IB	IC			
470pF	IA		IA		IB	IB	IC			
560pF	IA		IA		IB	IB				
680pF	IA		IA		IB	IB*/IC				
820pF	IA		IA		IB	IB*/IC				
1nF	IA		IA	IB	IB	ID				
1.5nF	IA*/IB		IB		IB					
1.8nF	IA*/IB		IB		IB*/ID					
2.2nF	IA*/IB		IB		ID					
2.7nF	IA*/IB		IB							
3.3nF	IA*/IB		IB							
3.9nF	IA*/IB		IB							
4.7nF	IA*/IB	IB	IB		ID					
5.6nF	IA*/ID									
6.8nF	IA*/ID									
10nF	IA*/ID								JB	
15nF	IA*/ID									
18nF	IA*/ID									
22nF	ID									
33nF	ID									

代码 Code	IA	IB	IC	ID	JA	JB	备注 Note
T	1.25±0.25	1.60±0.30	2.00±0.30	2.5±0.30	1.60±0.30	2.00±0.30	加“*”为特殊品 Add “*” as special product.

材料 Dielectric		C0G															
尺寸 Dimension	2211 (5.7mm*2.8mm)			2220 (5.7mm*5.0mm)						2225 (5.7mm*6.3mm)							
容量/电压 Capacity/ Voltage	250 V	3KV	5KV	250V	500 V	1KV	2KV	3KV	5KV	1KV	1.5KV	2KV	2.5KV	3KV			
3.3pF																	
3.6pF																	
3.9pF																	
4.7pF																	
5.0pF																	
5.6pF																	
6.8pF																	
8.0pF																	
8.2pF																	
10pF			KA											MA			
12pF			KA		LA									MA			
15pF			KA		LA								MA	MA			
18pF			KA		LA								MA	MA			
22pF			KA		LA								MA	MA			
27pF			KA		LA								MA	MA			
33pF			KA		LA								MA	MA			
39pF			KA		LA								MA	MA			
47pF			KA*/ KB		LA								MA	MA			
56pF					LA								MA	MA			
68pF					LA								MA	MA			
82pF					LA								MA	MA			
100pF					LA		LA	LA	LA			MA	MA	MA			
120pF					LA		LA	LA				MA/MC*	MA	MA			
150pF					LA		LA	LA				MA/MC*	MA	MA			
180pF					LA		LA	LA				MA/MC*	MA	MA			
220pF		KA			LA		LA*/LB	LA*/L		MA		MA/MC*	MA	MA			
270pF					LA		LA*/LB	LA*/L		MA		MA/MC*	MA	MA			
330pF					LA		LA*/LB	LA*/L		MA		MA/MC*		MA			
390pF					LA		LA*/LB	LA*/L		MA	MA	MA/MC*		MA			
470pF					LA		LA*/LB	LA*/L		MA	MA	MA/MC*		MA			
560pF					LA		LA*/LB	LA*/L		MA	MA	MA/MC*		MA			
680pF				LA	LA		LA*/LB	LA*/L		MA	MA	MA/MC*		MA			
820pF				LA	LA		LB	LB		MA	MA/MC*	MA/MC*		MA			
1nF	KA			LA	LA	LA	LB	LB		MA	MA	MA/MC*		MA			
1.5nF				LA	LA	LA*/L	LC	LC									
1.8nF				LA	LA	LA*/L	LC	LC									
2.2nF				LA	LA	LA*/L	LC	LC						MC			
2.7nF				LA	LA	LA*/L								MC			
3.3nF				LA	LA	LA*/L								MC			
3.9nF				LA	LA	LA*/L											
4.7nF				LA	LA	LA*/L											
5.6nF				LA		LA*/L											
6.8nF				LA		LC											
8.2nF				LA													
10nF				LA													
代码 Code	KA		KB		LA		LB		LC		MA		MB		MC		备注 Note
T	1.60±0.30		2.00±0.30		1.60±0.30		2.00±0.30		2.50±0.30		1.60±0.30		2.00±0.30		2.50±0.30		加“*”为特殊品 Add "*" as special product.

*II 类电容器具体电压对应容量及厚度情况列表

A list of the specific Voltage-specific capacitors of Class I capacitors

材料 Dielectric	X7R										
尺寸 Dimension	0402 (1.0mm*0.5mm)	0603 (1.6mm*0.8mm)			0805 (2.0mm*1.2mm)						
容量/电压 Capacity/ Voltage	100V	100V	200V	250V	100V	200V	250V	500V	630V	1000V	2000V
100pF							EA	EA			
120pF							EA	EA			
150pF		DA			EA		EA	EA			
180pF		DA			EA		EA	EA			
220pF	CA	DA	DA		EA	EA	EA	EA			
270pF	CA	DA	DA		EA	EA	EA	EA			
330pF	CA	DA	DA		EA	EA	EA	EA			
390pF	CA	DA	DA		EA	EA	EA	EA			
470pF	CA	DA	DA	DA	EA	EA	EA	EA			
560pF	CA	DA	DA	DA	EA	EA	EA	EA			
680pF	CA	DA	DA	DA	EA	EA	EA	EA			
1nF	CA	DA	DA	DA	EA	EA	EA	EA/EB*	EA	EA	EB
1.5nF	CA	DA	DA	DA	EA	EA	EA	EA/EB*	EA	EA/EB*	
1.8nF	CA	DA	DA	DA	EA	EA	EA	EA/EB*	EA	EA/EB*	
2.2nF	CA	DA	DA	DA	EA	EA	EA	EA/EB*	EA	EB	
2.7nF	CA	DA	DA	DA	EA	EA	EA	EA/EB*	EA/EB*		
3.3nF	CA	DA	DA	DA	EA	EA	EA	EB	EA/EB*		
4.7nF	CA	DA	DA	DA	EA	EA	EA	EA	EA/EB*		
5.6nF	CA	DA	DA	DA	EA	EA	EA	EA	EA/EB*		
10nF	CA	DA	DA	DA	EA	EA/EB*	EA/EB*	EB			
15nF		DA			EA	EA/EB*	EA/EB*				
18nF		DA			EA	EA/EB*	EA/EB*				
22nF		DA			EA	EA/EB*	EA/EB*				
33nF		DA			EB	EB	EB				
39nF		DA			EB						
47nF		DA			EA*/EB						
56nF		DA			EA*/EB						
68nF		DA			EA*/EB						
82nF		DA			EA*/EB						
100nF		DA			EB						
220nF					EB						
330nF					EB						
470nF					EB						
680nF											
1μF											
2.2μF											
3.3μF											
4.7μF											
6.8μF											
10μF											

代码 Code	CA	DA	EA	EB	备注 Note
T	0.50±0.05	0.80±0.10	0.80±0.20	1.25±0.25	加 “*” 为特殊品 Add “*” as special product.

材料 Dielectric	X7R							
尺寸 Dimension	1206 (3.2mm*1.6mm)							
容量/电压 Capacity/ Voltage	100V	200V	250V	500V	630V	1000V	2000V	2500V
100pF	FA	FA		FA		FB	FB	
120pF	FA	FA		FA		FB	FB	
150pF	FA	FA		FA		FA*/FB	FB	
180pF	FA	FA		FA		FB	FB	
220pF	FA	FA		FA		FA*/FB	FB	
270pF	FA	FA		FA		FB	FB	
330pF	FA	FA		FA		FA*/FB	FB	
390pF	FA	FA		FA		FB	FB	
470pF	FA	FA	FA	FA	FA	FA*/FB	FB	
560pF	FA	FA	FA	FA	FA	FB	FB	
680pF	FA	FA	FA	FA	FA	FA*/FB	FB	
1nF	FA	FA	FA	FA	FA	FA*/FB	FB	FB
1.5nF	FA	FA	FA	FA	FA	FB	FB	
1.8nF	FA	FA	FA	FA	FA	FB	FB	
2.2nF	FA	FA	FA	FA	FA	FB	FB/FC*	
2.7nF	FA	FA	FA	FB	FA	FB	FB	
3.3nF	FA	FA	FA	FB	FA	FB	FB	
4.7nF	FA	FA	FA	FB	FB	FB	FB/FC*	
5.6nF	FA	FA	FA	FB	FB	FB	FB/FC*	
6.8nF	FA	FA	FA	FB	FB	FC	FC	
10nF	FA	FA	FA	FB	FB	FB		
15nF	FA	FA	FA	FB	FB			
18nF	FA	FA	FA	FB	FB			
22nF	FA	FA	FA/FB*	FB	FB			
33nF	FA	FB	FB	FB	FB/FC*			
47nF	FA	FB	FB	FB	FC			
56nF	FA	FB	FB					
68nF	FA	FB	FB					
100nF	FB	FB/FC*	FB					
220nF	FB	FC	FC					
330nF	FB							
470nF	FC							
680nF	FB*/FC							
1μF	FC							
2.2μF								
3.3μF								
4.7μF								
6.8μF								
10μF								

代码 Code	FA	FB	FC	备注 Note
T	0.80±0.20	1.25±0.25	1.60±0.30	加“*”为特殊品 Add “*” as special product.

材料 Dielectric	X7R													
尺寸 Dimension	1210 (3.2mm*2.5mm)							1808 (4.5mm*2.0mm)						
容量/电压 Capacity/ Voltage	100V	200V	250V	500V	630V	1KV	2KV	250V	500V	1KV	2KV	3KV	4KV	5KV
100pF											HA	HA		
120pF											HA	HA		
150pF											HA	HA		HA
180pF											HA	HA		HA
220pF						GA	GA			HA	HA	HA		HA
270pF						GA	GB			HA	HA	HA		HA
330pF						GA	GB			HA	HA	HA		HA
390pF						GA	GB			HA	HA	HA		HA
470pF						GA	GB	HB		HA	HA	HA		HA
560pF						GA	GB	HB		HA	HA	HA		HA
680pF					GA	GA	GB	HB		HA	HA	HA		HA
1nF			GA		GA	GA	GB	HB		HA	HA/H B*	HA/H B*	HA/H B*	HA/H B*
1.5nF			GA		GA	GA	GB	HB		HA	HA	HB		
1.8nF			GA		GA	GA	GB	HB		HA	HA	HB		
2.2nF			GA		GA	GA	GB	HB		HA	HA/H B*	HA/H B*		
2.7nF			GA		GA	GA	GB	HB		HA	HB	HB		
3.3nF			GA	GA	GA	GA	GA	HB		HA	HA/H B*	HA/H B*		
4.7nF	GA		GA	GA	GA/ GB*	GA/ GB*	GB	HB		HA	HA	HA		
5.6nF	GA		GA	GA	GA	GA	GB			HA	HA			
6.8nF	GA		GA	GA	GA	GA*/ GB	GB			HA	HA			
8.2nF	GA		GA	GA	GA	GA*/ GB	GB			HA	HA			
10nF	GA		GA	GA	GA	GA*/ GB	GB			HA	HA			
15nF	GA		GA	GA	GA	GB				HA				
18nF	GA		GA	GA	GA	GB				HA				
22nF	GA		GA	GA	GA	GB				HA				
33nF	GA		GA	GA/ GB*	GA/ GB*/ GC*									
47nF	GA	GA	GA	GA/ GB*	GA/ GB*/ GC*/ GD*				HA					
56nF	GA		GA	GB	GB									
68nF	GA/G B*		GA	GB	GB									
82nF	GA		GA	GB	GB									
100nF	GA		GA	GB/ GC*	GB/ GC*									
220nF	GB		GA/ GC*/ GD*											
330nF	GB		GC											
470nF	GB													
680nF	GB													
820nF	GB													
1μF	GB													
2.2μF	GB/G C*/G D*													
3.3μF														
4.7μF														
6.8μF														

代码 Code	GA	GB	GC	GD	HA	HB	备注 Note
T	1.25±0.25	1.60±0.30	2.00±0.30	2.50±0.30	1.60±0.30	2.00±0.30	加“*”为特殊品 Add “*” as special product.

材料 Dielectric	X7R									
尺寸 Dimension	1812 (4.5mm*3.2mm)									
容量/电压 Capacity/ Voltage	100V	200V	250V	500V	630V	1KV	2KV	3KV	4KV	5KV
100pF										
120pF										
150pF								IB	IB	
180pF								IB	IB	
220pF							IB	IB	IB	
270pF							IB	IB	IB	
330pF						IB	IB	IB	IB	
390pF						IB	IB	IB	IB	
470pF						IB	IB	IB	IB	
560pF						IB	IB	IB	IB	
680pF			IB			IB	IB	IB	IB	
820pF			IB			IB	IB	IB	IB	
1nF		IB	IB			IB	IB	IB	IB	
1.5nF		IB	IB			IB	IB	IB	IB	
1.8nF		IB	IB			IB	IB	IB	IB	
2.2nF		IB	IB			IB	IB	IB/IC*	IB	IB/IC*
2.7nF		IB	IB			IB	IB	IB	IB	
3.3nF		IB	IB			IB	IB	IB	IB	
4.7nF		IB	IB			IB	IB	IB		
5.6nF		IB	IB			IB	IB	IB/ID*		
6.8nF		IB	IB			IB	IB	IB/ID*		
8.2nF		IB	IB			IB	IB	IB/ID*		
10nF		IB	IB	IB		IB	IB	ID		
12nF		IB	IB	IB		IB	IB			
15nF		IB	IB	IB		IB	IB			
18nF		IB	IB	IB		IB	ID			
22nF		IB	IB	IB	IB	IB				
33nF		IB	IB	IA	IB	IB				
47nF	IB	IB	IB	IB	IB	IB				
56nF	IB	IB	IB	IB	IB	ID				
68nF	IB	IB	IB	IB	IB					
82nF	IB	IB	IB	IB	IB					
100nF	IB	IB	IA*/IB	IB	IB/ID*					
120nF	IB	IB	IA	IB	IC					
150nF	IB	IB	IC	IC	IC					
180nF	IB	IB	IB	IC	IC/ID*					
220nF	IB	IB	IB/IC*	IC/ID*	IC/ID*					
330nF	IB	IC	IB*/IC							
470nF	IB	IC	ID							
560nF	IB	IC	IC							
680nF	IC	IC	IC							
820nF	IC	IC	IC							
1μF	IC	IC	IC							
2.2μF	IC/ID*									
3.3μF										
4.7μF										
6.8μF										
10μF										

代码 Code	IB	IC	ID	备注 Note
T	1.60±0.30	2.00±0.30	2.50±0.30	加“*”为特殊品 Add "*" as special product.

材料 Dielectric	X7R								
尺寸 Dimension	1825 (4.5mm*6.3mm)							2211 (5.7mm*2.8mm)	
容量/电压 Capacity/ Voltage	200V	250V	500V	630V	1000V	2000V	3000V	3000V	5000V
100pF									
120pF									
150pF									JA
180pF									JA
220pF									JA
270pF									JA
330pF									JA
390pF									JA
470pF									JA
560pF									JA
680pF									JA
820pF									JA
1nF						JA			JA
1.2nF						JA			JA
1.5nF						JA			JA
1.8nF						JA			JA
2.2nF						JA		JA	JA
2.7nF						JA			
3.3nF						JA			
3.9nF						JA			
4.7nF						JA	JA/JB*		
5.6nF						JA			
6.8nF						JA			
8.2nF						JA			
10nF						JA			
12nF						JA			
15nF						JA			
18nF						JA			
22nF						JA			
33nF									
47nF									
56nF									
68nF									
82nF									
100nF	JA		JA	JA					
120nF			JA	JA					
150nF			JA	JA					
220nF			JA						
270nF									
330nF									
470nF									
560nF									
680nF									
8520nF									
1μF		JB/JC*							
1.2μF									
1.5μF									
1.8μF									
2.2μF									
2.7μF									
3.3μF									
4.7μF									
6.8μF									
10μF									

代码 Code	JA	JB	JC	备注 Note
T	1.60±0.30	2.00±0.30	2.50±0.30	加“*”为特殊品 Add “*” as special product.

材料 Dielectric	X7R										
尺寸 Dimension	2220 (5.7mm*5.0mm)										
容量/电压 Capacity/ Voltage	100V	200V	250V	500V	630V	1000V	2000V	2500V	3000V	4000V	5000V
100pF											
120pF											
150pF											
180pF											
220pF											
270pF											
330pF				LA							
390pF				LA							
470pF				LA							
560pF				LA							
680pF				LA							
820pF				LA							
1nF				LA			LA		LA	LA	LA
1.5nF				LA			LA		LA	LA	LB
1.8nF				LA			LA		LA	LA	LA
2.2nF			LA	LA			LA		LA/LB*	LA	LB
2.7nF			LA	LA			LA		LA	LA	LB
3.3nF			LA	LA			LA		LA	LA	LB
3.9nF			LA	LA			LA		LA	LA	LB
4.7nF			LA	LA		LA	LA/LB*		LA/LB*	LA	LB
5.6nF			LA	LA		LA	LA		LA	LA	
6.8nF			LA	LA		LA	LA		LA	LA	
8.2nF			LA	LA		LA	LA		LA	LA/LB*	
10nF			LA	LA		LA	LA	LA	LA		
12nF			LA	LA		LA	LA				
15nF			LA	LA		LA	LA				
18nF			LA	LA		LA	LA				
22nF			LA	LA		LA	LA				
33nF			LA	LA		LA	LA				
47nF	LA	LA	LA	LA		LA	LA/LB*				
56nF	LA	LA	LA	LA		LA/LB*					
68nF	LA	LA	LA	LA		LA/LB*					
82nF	LA	LA	LA	LA		LA/LB*					
100nF	LA	LA	LA	LA	LA	LB					
120nF	LA	LA	LA	LA	LA	LB					
150nF	LA	LA	LA	LA	LA	LB					
220nF	LA	LA	LA	LA	LA*/LC	LB					
330nF	LA	LA	LA	LA*/LB	LA*/LB/ LC*						
470nF	LA	LA	LA	LA*/LB	LA*/LB						
680nF	LA	LA	LA								
820nF	LA		LA								
1μF	LA		LA								
1.2μF	LA		LA								
1.5μF	LA		LA								
1.8μF	LA		LA								
2.2μF	LA*/LB B		LA*/LB								
3.3μF	LB										
4.7μF	LB										
6.8μF											
10μF											

代码 Code	LA	LB	LC	备注 Note
T	1.60±0.30	2.00±0.30	2.50±0.30	加“*”为特殊品 Add “*” as special product.

材料 Dielectric	X7R										
尺寸 Dimension	2225 (5.7mm*6.3mm)										
容量/电压 Capacity/ Voltage	100V	200V	250V	500V	630V	1000V	1500V	2000V	3000V	4000V	5000V
100pF											
120pF											
150pF									MA		
180pF									MA		
220pF						MA			MA		
270pF						MA			MA		
330pF						MA			MA		
390pF						MA			MA		
470pF						MA			MA		
560pF						MA			MA		
680pF						MA			MA		
820pF						MA			MA		
1nF			MA			MA			MA		
1.2nF			MA			MA			MA		
1.5nF			MA			MA			MA		MA
1.8nF			MA			MA			MA		
2.2nF			MA			MA		MA	MA	MA	
2.7nF			MA			MA		MA	MA		
3.3nF			MA	MA		MA		MA	MA		
3.9nF			MA	MA		MA		MA	MA		
4.7nF			MA	MA		MA		MA	MA		
5.6nF			MA	MA		MA		MA	MA		
6.8nF			MA	MA		MA		MA	MA		
8.2nF			MA	MA		MA		MA	MA		
10nF			MA	MA		MA		MA	MA		
12nF			MA	MA		MA		MA	MA		
15nF			MA	MA		MA		MA	MA		
18nF			MA	MA		MA		MA			
22nF			MA	MA		MA		MA			
33nF			MA	MA		MA		MA/MB*			
47nF			MA	MA		MA		MA			
56nF			MA	MA		MA		MA/MB*			
68nF			MA	MA		MA		MA/MB*			
82nF			MA	MA		MA		MA/MB*			
100nF	MA		MA	MA		MA*/MB					
120nF	MA		MA	MA		MB					
150nF	MA		MA	MA							
220nF	MA		MA	MA							
330nF	MA		MA	MA							
470nF	MA	MA	MA	MA	MA						
680nF	MA		MA	MB	MA						
820nF	MA		MA		MA						
1μF	MA		MA*/MB		MC						
1.2μF	MA		MA*/MB								
1.5μF	MA		MA*/MB								
1.8μF	MA		MA*/MB								
2.2μF	MB		MB								
3.3μF											
4.7μF											
6.8μF											
10μF											

代码 Code	MA	MB	MC	备注 Note
T	1.60±0.30	2.00±0.30	2.50±0.30	加“*”为特殊品 Add "*" as special product.

◆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
$V_r=100V$	施加额定电压的 250%, 5 秒, 最大电流不超过 50mA Force 250%Rated Voltage for 5 second. Charge / Discharge current limit: 50mA max
$100V \leq V_r < 500V$	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. Charge / Discharge current limit: 50mA max
$500V \leq V_r \leq 1000V$	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. Charge / Discharge current limit: 50mA max
$1000V < V_r \leq 2000V$	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. Charge / Discharge current limit: 50mA max
$2000V < V_r \leq 5000V$	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.

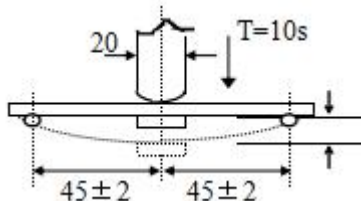
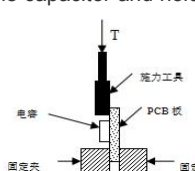
◆ 可靠性测试

Reliability Test

二类介质规格测量前需去老化处理: 测试温度: $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$, 测试湿度: $<70\%\text{RH}$. 电容器在 150°C 热处理 1 小时, 放置 48h 后进行测量。

.The second type of medium specification needs to be aged before measuring the capacity: test temperature: $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$, test humidity: $<70\%\text{RH}$. The capacitors were heat treated at 150°C for 1 hour and measured after 48 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		
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% （C>1000 pF, 1KHz±10%）	1.0±0.2Vrms
		≤0.1%	C≥30pF		
	II类 Class II	≤250×10 ⁻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		
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（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 temperature: 25℃±3℃ Test Current: ≤50mA		
	II类 Class II	C≤25nF, Ri≥10000MΩ C>25nF, Ri•CR>100S			

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% At least 95% of the terminal electrode is covered by new solder. 外观: 无可见损伤. 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																					
耐焊接热 Resistance to Soldering Heat	<table><tr><th>项目 Item</th><th>I 类 Class I</th><th>II 类 Class II</th></tr><tr><td>ΔC/C</td><td>≤±2.5%或±0.25pF, 取较大值 ≤±2.5%或±0.25pF, whichever is larger</td><td>±15%</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><tr><td colspan="3">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.</td></tr></table>	项目 Item	I 类 Class I	II 类 Class II	ΔC/C	≤±2.5%或±0.25pF, 取较大值 ≤±2.5%或±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.			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	I 类 Class I	II 类 Class II																				
	ΔC/C	≤±2.5%或±0.25pF, 取较大值 ≤±2.5%或±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%	试验基板: PCB 弯曲深度: 1mm 施压速度: 1mm/sec. 应在弯曲状态下进行测量. Test Board: PCB Speed: 1mm/sec. Unit: mm The measurement should be made with the board in the bending position. 																					
温度循环 Temperature Cycle	<table><tr><th>项目 Item</th><th>COG</th><th>X7R</th></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> 外观无可见损伤 No visible damage.	项目 Item	COG	X7R	ΔC/C	≤±1%或±1pF, 取较大值 ≤±1% or ±1pF, whichever is larger	-15% ~+15%	Recovery time: 24±1h 初始测量 Initial Measurement 循环次数: 5 次, 一个循环分以下 4 步: Cycling Times: 5 times, 1 cycle, 4 steps: <table><tr><th>阶段 Step</th><th>温度 (Temperature)</th><th>时间 (Time)</th></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
	项目 Item	COG	X7R																				
ΔC/C	≤±1%或±1pF, 取较大值 ≤±1% or ±1pF, whichever is larger	-15% ~+15%																					
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																					
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 T 的力到电容侧面瓷体上, 并保持 60+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 60+1 seconds. <table><tr><th>规格</th><th>施加力 T</th></tr><tr><td>≤0402</td><td>2N</td></tr><tr><td>≥0603</td><td>5N</td></tr></table> 	规格	施加力 T	≤0402	2N	≥0603	5N															
		规格	施加力 T																				
≤0402	2N																						
≥0603	5N																						

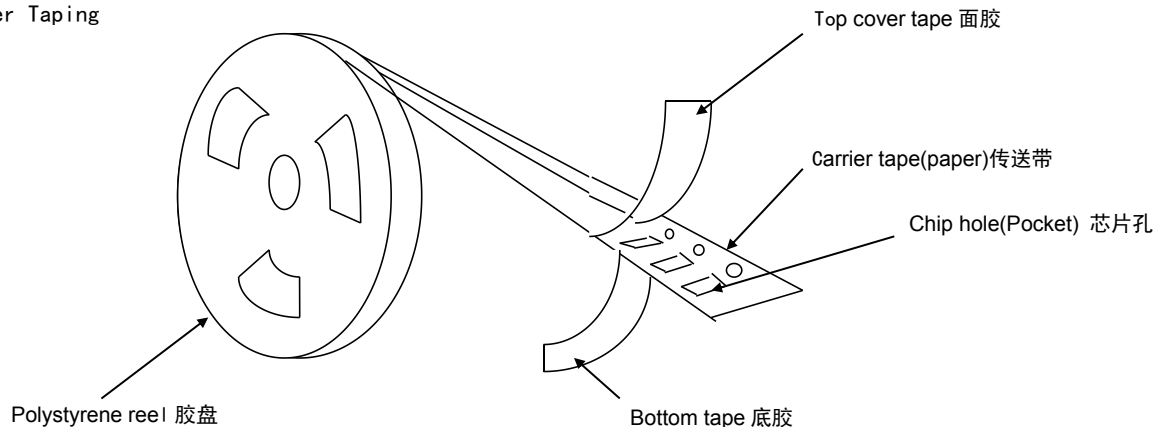
项目 Item	技术规格 Technical Specification			测试方法 Test Method and Remarks
耐湿负荷 Humidity load	$\Delta C/C$	I 类 Class I	$\pm 7.5\%$ 或 $\pm 0.75pF$, 取两者之中较大者 $\pm 7.5\%$ or $\pm 0.75pF$, whichever is larger.	温度: $40\pm 2^{\circ}C$ 湿度: 90~95%RH 电压: 额定电压 时间: 500 小时 放置时间: $24\pm 2h$ 小时; II 类: $0201\geq 47nF$ 、 $0402\geq 33nF$ 、 $0603\geq 1\mu F$ 、 $0805\geq 4.7\mu F$ 、 $1206\geq 10\mu F$ 产品试验后需在 $150^{\circ}C$ 温度下保持 1h , 再放置 $24\pm 2h$ 后测试电性能. Temperature: $40\pm 2^{\circ}C$ Humidity: 90~95%RH Voltage: Rated Voltage Duration: 500h Recovery Time: $24h\pm 2h$ Class 2: $0201\geq 47nF$ 、 $0402\geq 33nF$ 、 $0603\geq 1\mu F$ 、 $0805\geq 4.7\mu F$ 、 $1206\geq 10\mu F$ product need to keep in $150^{\circ}C$ 、1h after the test, and measurement to be made after being kept at room temperature for $24\pm 2h$.
		II 类 Class II	-12.5% ~ +12.5%	
	DF	≤ 2 倍初始标准 Not more than twice of initial value.		
	IR	I 类 Class I	$Ri\geq 5000M\Omega$ 或 $Ri\cdot Cr\geq 50S$ 取两者之中较小者. $Ri\geq 5000M\Omega$ 或 $Ri\cdot Cr\geq 50S$ whichever is smaller.	
		II 类 Class II	$Ri\geq 1000M\Omega$ 或 $Ri\cdot Cr\geq 10S$ 取两者之中较小者. $Ri\geq 1000M\Omega$ 或 $Ri\cdot Cr\geq 10S$ whichever is smaller.	
外观: 无损伤 Appearance: No visible damage.				
寿命试验 Life Test	$\Delta C/C$	I 类 Class I	$\leq \pm 3\%$ 或 $\pm 0.3pF$, 取两者之中较大者 $\leq \pm 3\%$ 或 $\pm 0.3pF$, whichever is larger.	电压: $100V\leq$ 额定电压 $\leq 200V$: 1.5 倍工作电压 $200V<$ 额定电压 $\leq 500V$: 1.3 倍工作电压 $500V<$ 额定电压: 1.2 倍工作电压 时间: 1000 小时 温度: $125^{\circ}C$ 充电电流: 不应超过 50mA 放置时间: $24\pm 2h$ 小时; II 类: $0201\geq 47nF$ 、 $0402\geq 33nF$ 、 $0603\geq 1\mu F$ 、 $0805\geq 4.7\mu F$ 、 $1206\geq 10\mu F$ 产品试验后需在 $150^{\circ}C$ 温度下保持 1h , 再放置 $24\pm 2h$ 后测试电性能. Applied Voltage: $100V\leq$ Rated Voltages $\leq 200V$: 1.5 Multiple $200V<$ Rated Voltage $\leq 500V$: 1.3 Multiple $500V<$ Rated Voltage: 1.2 Multiple Duration: 1000h Temperature: $125^{\circ}C$ (C0G、X7R) Charge/Discharge Current: 50mA max. Recovery Time: $24h\pm 2h$ Class 2: $0201\geq 47nF$ 、 $0402\geq 33nF$ 、 $0603\geq 1\mu F$ 、 $0805\geq 4.7\mu F$ 、 $1206\geq 10\mu F$ product need to keep in $150^{\circ}C$ 、1h after the test, and measurement to be made after being kept at room temperature for $24\pm 2h$.
		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	$Ri\geq 4000M\Omega$ 或 $Ri\cdot Cr\geq 40S$ 取两者之中较小者 $Ri\geq 4000M\Omega$ 或 $Ri\cdot Cr\geq 40S$ whichever is smaller.	
		II 类 Class II	$Ri\geq 2000M\Omega$ 或 $Ri\cdot Cr\geq 50S$ 取两者之中较小者. $Ri\geq 2000M\Omega$ 或 $Ri\cdot Cr\geq 50S$ whichever is smaller.	
外观: 无损伤 Appearance: No visible damage.				

◆ 包装

Package

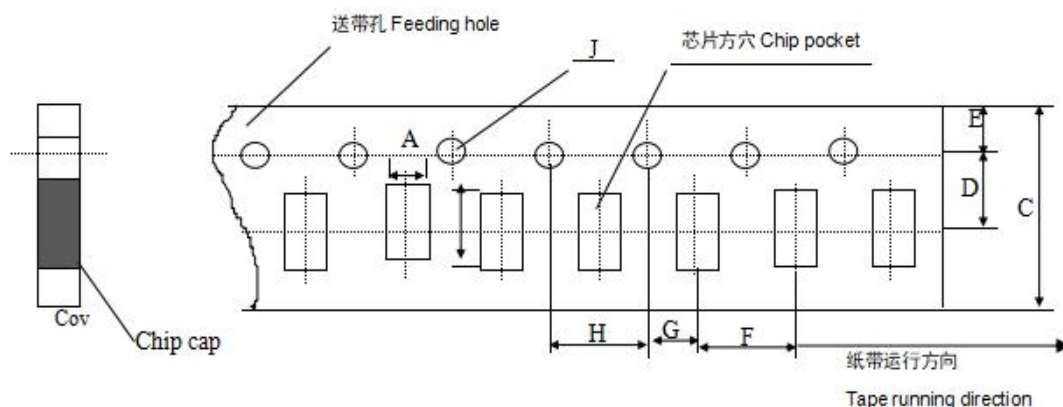
* 纸带卷盘结构

Paper Taping



* 适合 '0402, 0603, 0805, 1206' 常规尺寸产品的纸带尺寸

Dimensions of paper taping for 0603, 0805, 1206 types.



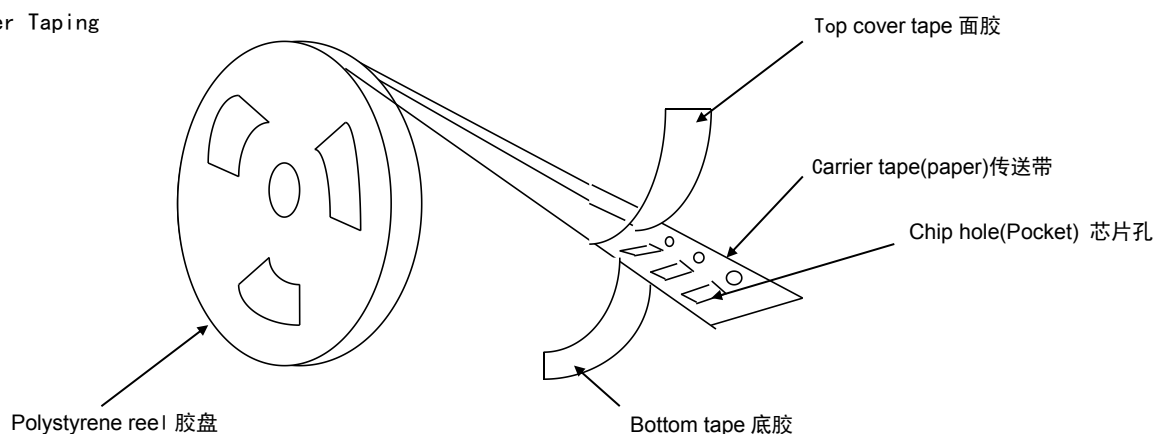
代号Code 纸带规格	A	B	C	D*	E	F	G*	H	J	T
0402	0.59±0.03	1.12±0.03	8.0±0.10	3.5±0.05	1.75±0.10	2.0±0.05	2±0.05	4.0±0.10	1.55±0.05	0.60±0.03
0603	0.95±0.05	1.90±0.05	8.0±0.10	3.5±0.05	1.75±0.10	4.0±0.05	2±0.05	4.0±0.10	1.55±0.05	0.95±0.03
0805	1.55±0.05	2.30±0.05	8.0±0.10	3.5±0.05	1.75±0.10	4.0±0.05	2±0.05	4.0±0.10	1.55±0.05	0.95±0.03
1206	1.85±0.05	3.45±0.05	8.0±0.10	3.5±0.05	1.75±0.10	4.0±0.05	2±0.05	4.0±0.10	1.55±0.05	0.95±0.03

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.

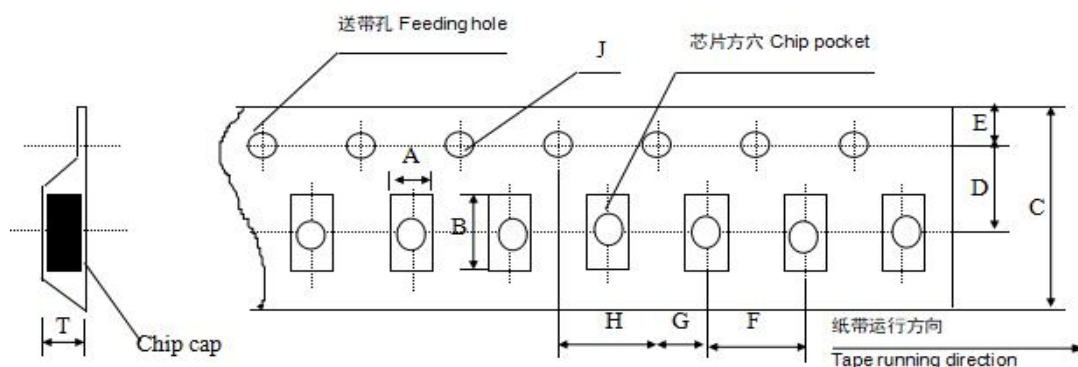
* 塑胶卷盘结构 Embossed taping

Paper Taping



* 塑胶带尺寸结构(适合'0805~1812' 型产品)

Dimensions of embossed taping for 0805~2225 type



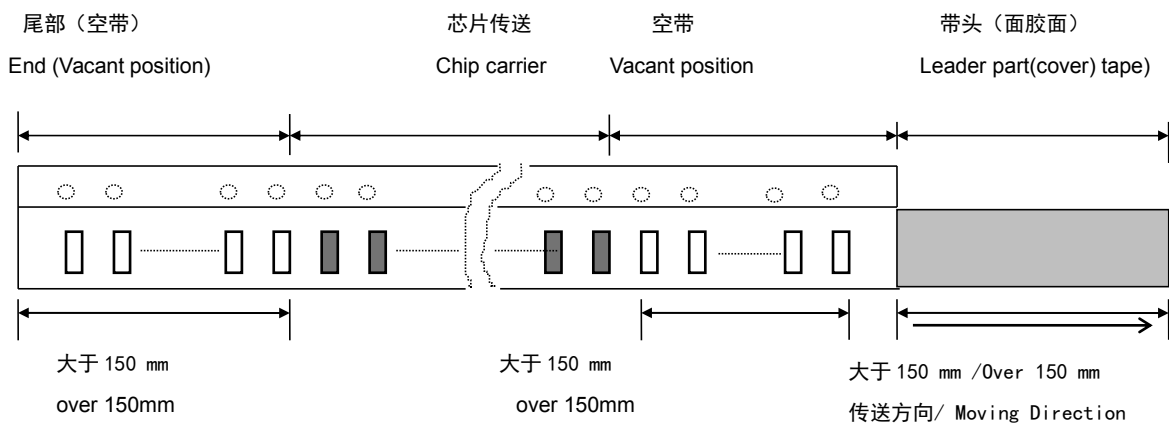
备注：*表示此处对尺寸的要求非常精确。

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

代号 Code 规格 Tape size	A	B	C	D*	E	F	G*	H	J	T
0805	1.40 + 0.10-0.05	2.25 ± 0.10	8.00 + 0.10-0.03	3.5±0.05	1.75 ± 0.10	4.0±0.1	2±0.05	4.0±0.10	1.55±0.05	1.35 + 0.1-0.03
1206	1.85 ± 0.10	3.50 ± 0.10	8.00 + 0.10-0.03	3.5±0.05	1.75 ± 0.10	4.0±0.1	2±0.05	4.0±0.10	1.55±0.05	1.35 + 0.1-0.03
1206	1.88 ± 0.10	3.53 ± 0.10	8.00 + 0.10-0.03	3.5±0.05	1.75 ± 0.10	4.0±0.1	2±0.05	4.0±0.10	1.55±0.05	1.80 + 0.1-0.03
1210	2.76 ± 0.10	3.42 ± 0.10	8.00 + 0.10-0.03	3.5±0.05	1.75 ± 0.10	4.0±0.1	2±0.05	4.0±0.10	1.55±0.05	1.55 + 0.1-0.03
1808	2.20 + 0.10-0.03	4.95±0.10	12.00 + 0.10-0.03	5.5±0.05	1.75 ± 0.10	8.0±0.1	2±0.05	4.0±0.1	1.55±0.05	1.80 + 0.1-0.03
1812	3.66 ± 0.10	4.95±0.10	12.00 + 0.10-0.03	5.5±0.05	1.75 ± 0.10	8.0±0.1	2±0.05	4.0±0.1	1.55±0.05	1.85±0.1
2220	5.70 ± 0.10	6.20 ± 0.10	12.00 + 0.10-0.03	5.5±0.05	1.75 ± 0.10	8.0±0.1	2±0.05	4.0±0.1	1.55±0.05	2.0 + 0.15-0.03
2225	6.20 + 0.10-0.03	6.70 + 0.10-0.03	12.00 + 0.10-0.03	5.5±0.05	1.75 ± 0.10	8.0±0.1	2±0.05	4.0±0.1	1.55±0.05	2.4 + 0.10-0.03

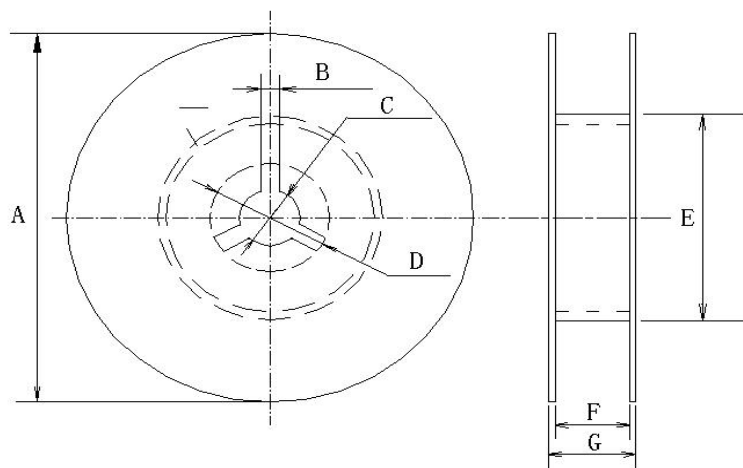
* 传送带的前后结构

Structure of leader part and end part of the carrier paper



* 卷盘尺寸

Reel dimensions (unit: mm)

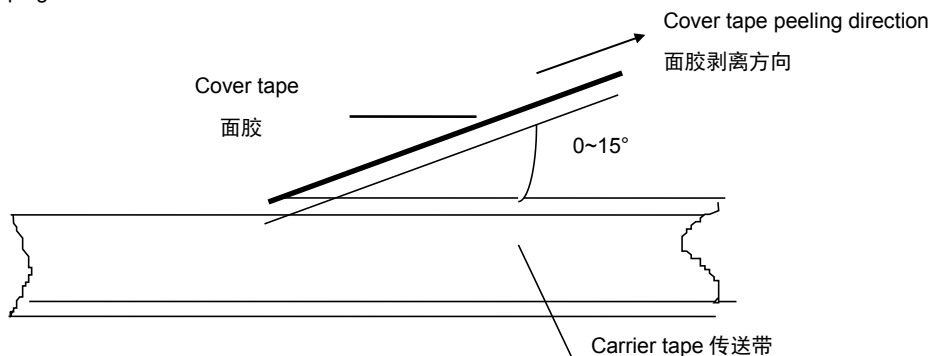


卷盘型号 Reel Code	A	B	C	D	E	F	G
7'REEL	$\phi 178 \pm 2.0$	3.0	$\phi 13 \pm 0.5$	$\phi 21 \pm 0.8$	$\phi 50$ 或更大 $\phi 50$ or more	10.0 ± 1.5	12max
13'REEL	$\phi 330 \pm 2.0$	3.0	$\phi 13 \pm 0.5$	$\phi 21 \pm 0.8$	92-100	10.0 ± 1.5	12max

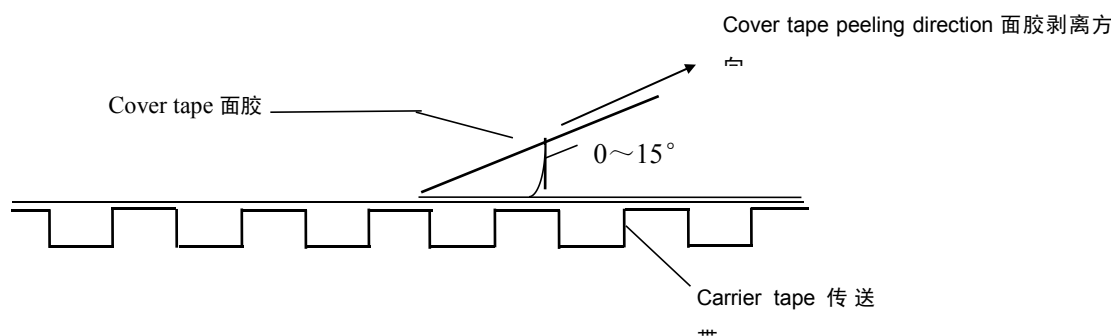
* 关于卷带的说明：面胶剥离强度

Taping specification: top tape peeling strength

* 纸带 Paper Taping



塑料胶盘 Embossed Taping



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 (T) Thickness	7 寸纸带卷盘 (PT)	7 寸胶带卷盘 (ET)	13 寸纸带卷盘 (PT)	13 寸胶带卷盘 (ET)
0402	0.50 ± 0.05	10000	—	50000	—
0603	0.80 ± 0.10	4000	—	15000	—
0805	0.80 ± 0.20	4000	—	15000	—
	1.25 ± 0.25	—	$T \leq 1.35\text{mm}$ 3000 $T > 1.35\text{mm}$ 2000	—	10000
1206	0.80 ± 0.20	4000	—	15000	—
	1.25 ± 0.25	—	$T \leq 1.35\text{mm}$ 3000 $T > 1.35\text{mm}$ 2000	—	10000
	1.60 ± 0.30	—	2000	—	8000

1210	1.25±0.25	---	2000	---	8000
	1.60±0.30	---	2000	---	8000
	2.00±0.30	---	1000	---	8000
	2.50±0.30	---	1000	---	8000
1808	1.60±0.30	---	2000	---	8000
	2.00±0.30	---	2000	---	8000
1812	1.25±0.25	---	1000	---	3000
	1.60±0.30	---	T≤1.85mm 1000 T>1.85mm 500	---	3000
	2.00±0.30	---	500	---	3000
1825	1.60±0.30	---	500	---	---
	2.00±0.30	---	500	---	---
	2.50±0.30	---	500	---	---
2211	1.60±0.30	---	500	---	---
	2.00±0.30	---	500	---	---
2220	1.60±0.30	---	500	---	---
	2.00±0.30	---	500	---	---
	2.50±0.30	---	500	---	---
2225	1.60±0.30	---	500	---	---
	2.00±0.30	---	500	---	---
	2.50±0.30	---	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.

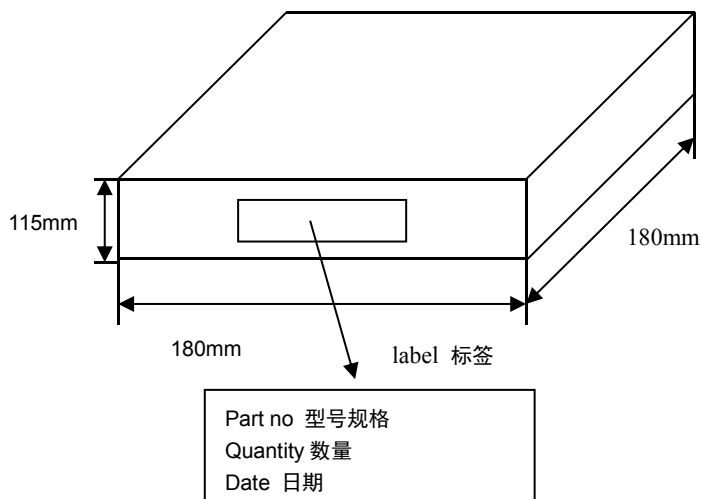
* 外包装

Outer packing

小包装 The first package

Quantity: 10 reels

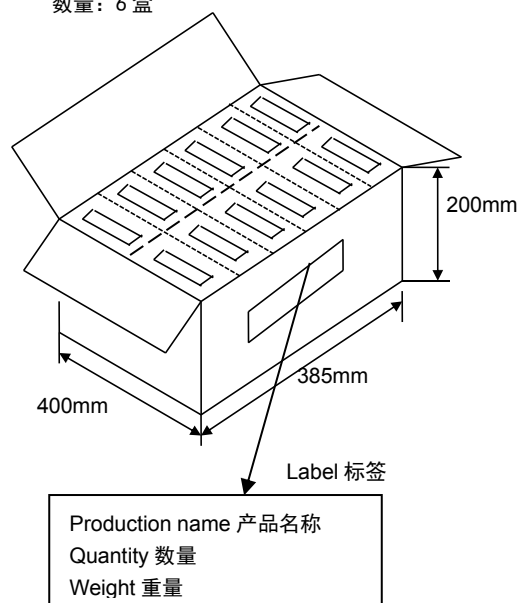
数量：10 卷



大包装 The second package

Quantity: 6 cases

数量：6 盒



◆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。

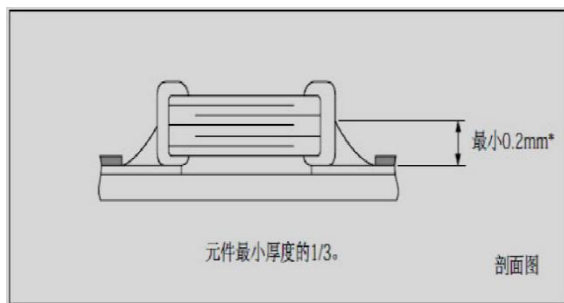
Manual soldering can pose a great risk of creating thermal cracks in capacitors. The hot soldering iron tip comes into direct contact with the end terminations, and operator's careless may cause the tip of the soldering iron to come into direct contact with the ceramic body of the capacitor. Therefore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

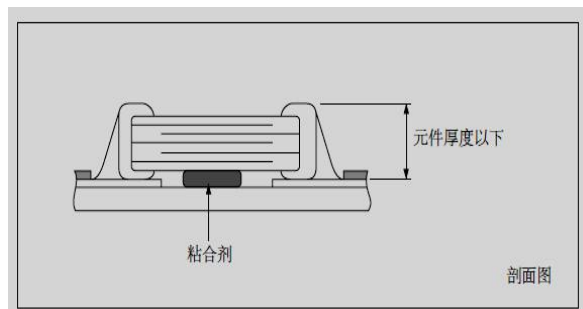
回流焊接的最佳焊料用量

The optimal solder fillet amounts for re-flow soldering



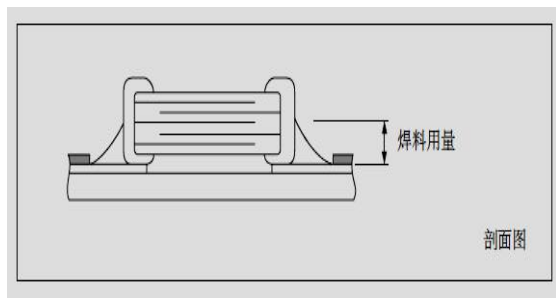
波峰焊接的最佳焊料用量

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

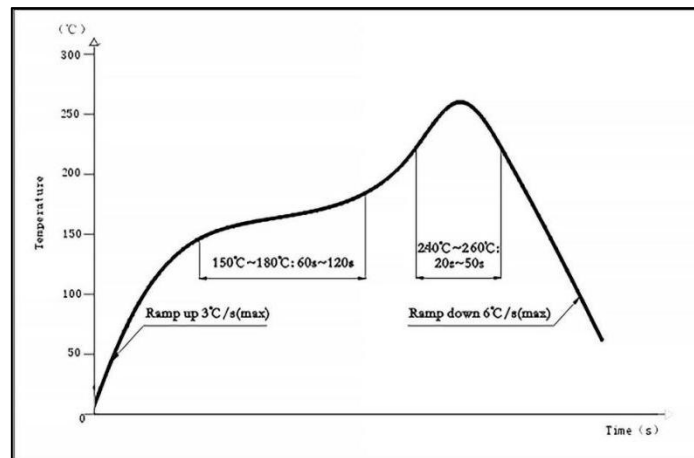
规格尺寸 Size	温度特性 Temperature Characteristics	容量范围 Capacitance	焊接方式 Soldering Method
0402	X7R	/	R
0603	C0G	/	R/W
	X7R	$C \geq 1\mu f$	R
		$C < 1\mu f$	R/W
0805	C0G	/	R/W
	X7R	$C \geq 4.7\mu f$	R
		$C < 4.7\mu f$	R/W
1206	C0G	/	R/W
	X7R	$C \geq 10\mu f$	R
		$C < 10\mu f$	R/W
≥ 1210	C0G	/	R
	X7R	/	R

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

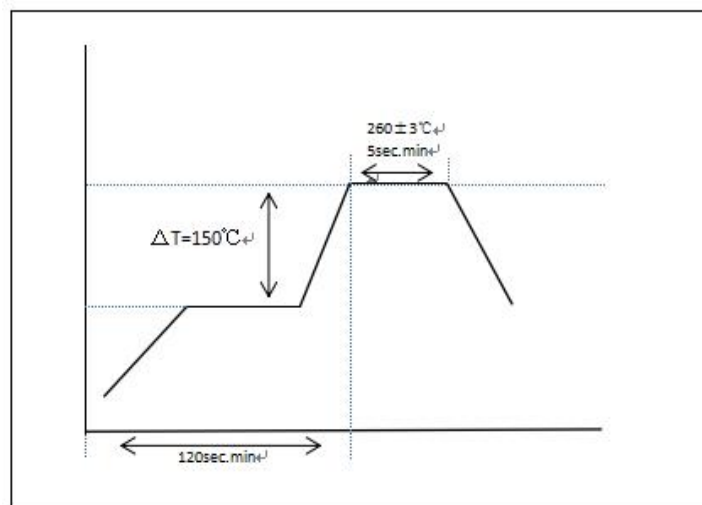
* 回流焊接 (Re-flow soldering)



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)

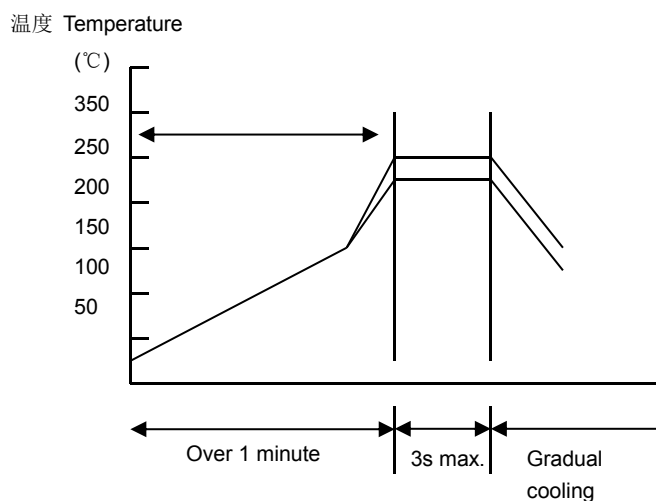


在预热时, 请将焊接温度与芯片表面温度之间的温差维持在 $T \leq 150^{\circ}\text{C}$ 。

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

* 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

* 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.