

■修订履历 Revision History

[illegible]

注：1.上述所提供之内容为产品规格说明。在产品未变更时，风华保有修改此内容不另行通知之所有权利，任何产品变更将会以 P C N 通知客户。

1.The content provided above is the produce specification, if the product is not changed, FENGHUA reserves all the right to modify this content without prior notice. any product change will be notified to the customer by PCN.

2.产品规格书中,同规格同容量同温度特性可交付的高电压型号规格,可以完全覆盖低压;同规格同容量同电压产品,温度特性 X7R 产品可覆盖 X7S,X7T,X6S,X5R (如 0402B104K250AT 可以覆盖 0402BS104K250AT,0402BT104K250AT, 0402DS104K250AT, 0402X104K250AT) 规格书中就不再列出详细型号规格。

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., 0402B104K250AT can cover 0402BS104K250AT, 0402BT104K250AT, 0402DS104K250AT, 0402X104K250AT). Therefore, detailed model specifications will not be listed separately in the specification.

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

■ 柔性端头多层片式陶瓷电容器
MLCC with Flexiterm

◆ 特征
Feature

- * 叠层独石结构，具有高可靠性
There is high reliability on monolithic structure of laminated layers.
- * 具有优良的焊接与耐焊性能，适用于回流焊接与波峰焊接
And its character of excellent soldering ability and soldering resistance ability is suitable for reflow soldering and peak soldering.
- * 具有较高的容量且容量性能稳定
It includes high and stable capacitance.
- * 具有高强度的抗弯曲性能，下弯可达到 3mm
High mechanical performance able to withstand, 3mm bend test.
- * 采用柔性端头体系。
Flexible termination system.
- * 可减少线路板因弯曲导致的失效故障。
Reduction in circuit board flex failures.

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

- * 应用于高弯曲的线路板。
High Flexure Stress Circuit Boards.
- * 应用于温度变化的线路。
Variable Temperature Applications.



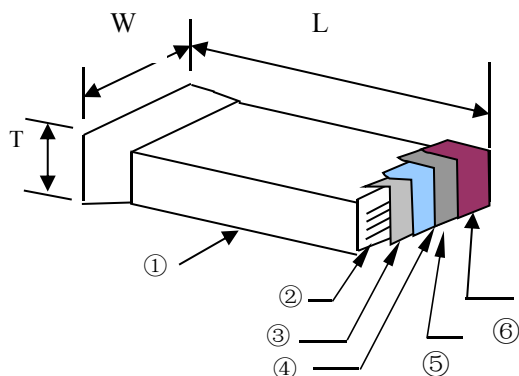
◆型号表示法

How To Order

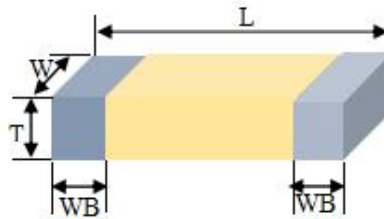
0805			B		102		K		500		A		T	
尺寸规格 Size Code			标称容量 Nominal Capacitance		额定电压 Rated Voltage 单位(unit): V		包装方式 Package Styles							
尺寸规格 Size Code	EIA	长×宽 (L×W) mm	表示方式 Express Method	实际值 Actual Value	表示方式 Express Method	实际值 Actual Value	表示方式 Express Method	包装方式 Package Styles						
0402	0402	1.00×0.50	0R5	0.5	6R3	6.3	T	编带 7 寸 盘包装 Braided 7 inch disc packing						
0603	0603	1.60×0.80												
0805	0805	2.00×1.25												
1206	1206	3.20×1.60	1R0	1.0	500	50×10 ⁰	D	编带 13 寸 盘包装 Braided 13 inch disc packing						
1210	1210	3.20×2.50	102	10×10 ²	201	20×10 ¹								
1808	1808	4.50×2.00	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.											
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		端头材料 Terminal Material Styles									
介质种类 Dielectric Code		介质材料 Dielectric	代码 Code	误差 Tolerance			端头类别 Termination Styles		表示方式 Express Method					
B		X7R	J	±5%			柔性端头多层片式 陶瓷电容器 MLCC with Flexiterm Solderable Termination		A					
CG		C0G	K	±10%										
			M	±20%										

◆产品结构

Product Structure



序号 NO	名称 Name	序号 NO	名称 Name
①	陶瓷介质 Ceramic dielectric	④	导电性树脂 Conductive Resin
②	内电极 Inner electrode	⑤	镍层 Nickel Layer
③	外电极 Substrate electrode	⑥	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±0.25	0.80±0.20	0.50±0.20	EA
		2.00±0.20	1.25±0.25	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
				2.50±0.30		GD
1808	4520	4.50±0.40	2.00±0.20	1.25±0.25	0.60±0.30	HA
				1.60±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
				2.5±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
2211	5728	5.70±0.40	2.80±0.40	1.60±0.30	0.60±0.30	KA
2220	5750	5.70±0.40	5.00±0.40	1.60±0.30	0.60±0.30	LA
				2.00±0.30		LB
2225	5763	5.70±0.50	6.30±0.50	1.60±0.30	0.60±0.30	MA
				2.00±0.30		MB
				3.00±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

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

* 常规电压 (Ur≤50V) 产品

Conventional Voltage (Ur≤50V) products

材料 Dielectric	X7R											
尺寸 Dimension	0402 (1.0mm*0.5mm)				0603 (1.6mm*0.8mm)				0805 (2.0mm*1.25mm)			
电压 Voltage	≤10V	16V	25V	50V	≤10V	16V	25V	50V	≤10V	16V	25V	50V
330pF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
470pF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
560pF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
680pF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
820pF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
1nF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
1.2nF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
1.5nF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
1.8nF	CA	CA	CA	CA	DA	DA	DA	EA	EA	EA	DA	DA
2.2nF	CA	CA	CA	CA	DA	DA	DA	EA	EA	EA	DA	DA
4.7nF	CA	CA	CA	CA	DA	DA	DA	EA	EA	EA	DA	DA
5.6nF	CA	CA	CA	CA	DA	DA	DA	EA	EA	EA	DA	DA
6.8nF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
10nF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
15nF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
18nF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
22nF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
33nF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
47nF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
56nF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
68nF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
100nF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
120nF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
150nF	CA	CA	CA	CA	DA	DA	DA	DA	EA	EA	EA	EA
180nF	CA	CA			DA	DA	DA	DA	EA	EA	EA	EA
220nF	CA	CA			DA	DA	DA	DA	EA	EA	EA	EA
330nF	CA	CA			DA	DA	DA	DA	EA	EA	EA	EA
390nF	CA	CA			DA	DA	DA	DA	EA	EA	EA	EA
470nF	CA	CA			DA	DA	DA	DA	EA	EA	EA	EA
560nF	CA				DA	DA	DA	DA	EA	EA	EA	EA
680nF	CA				DA	DA	DA	DA	EA	EA	EA	EA
820nF	CA				DA	DA	DA	DA	EA	EA	EA	EA
1μF	CA				DA	DA	DA	DA	EA	EB	EB	EB
1.2μF					DA	DA	DA	DA	EB	EB	EB	EB
1.5μF					DA	DA	DA	DA	EB	EB	EB	EB
1.8μF					DA	DA	DA	DA	EB	EB	EB	EB
2.2μF					DA	DA	DA		EB	EB	EB	EB
3.3μF					DA				EB	EB	EB	
4.7μF					DA				EB	EB	EB	
5.6μF												
6.8μF												
8.2μF												
10μF												

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	X7R														
尺寸 Dimension	1206 (3.2mm*1.6mm)				1210 (3.2mm*2.5mm)				1808 (4.5mm*2.0mm)				1812 (4.5mm*3.2mm)		
电压 Voltage	≤10V	16V	25V	50V	≤10V	16V	25V	50V	≤10V	16V	25V	50V	16V	25V	50V
330pF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
470pF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
560pF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
680pF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
20pF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
1nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
1.2nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
1.5nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
1.8nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
2.2nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
3.3nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
3.9nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
4.7nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
5.6nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
6.8nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
8.2nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
10nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
12nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
15nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
18nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
22nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
27nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
33nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
39nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
47nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
56nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
68nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
82nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
100nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
120nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
150nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
180nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
220nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
270nF	FA	FA	FA	FA	GA	GA	GA	GA	HB	HB	HB	HB	IB	IB	IB
330nF	FB	FB	FB	FB	GB	GB	GB	GB	HB	HB	HB	HB	IB	IB	IB
470nF	FB	FB	FB	FB	GB	GB	GB	GB	HB	HB	HB	HB	IB	IB	IB
560nF	FB	FB	FB	FB	GB	GB	GB	GB	HB	HB	HB	HB	IB	IB	IB
680nF	FB	FB	FB	FB	GB	GB	GB	GB	HB	HB	HB	HB	IB	IB	IB
820nF	FB	FB	FB	FB	GB	GB	GB	GB	HB	HB	HB	HB	IB	IB	IB
1μF	FC	FC	FC	FC	GB	GB	GB	GB	HB	HB	HB	HB	IB	IB	IB
1.2μ	FB	FB	FB	FB	GB	GB	GB	GB	HB	HB	HB	HB	IB	IB	IB
1.5μ	FB	FB	FB	FB	GB	GB	GB	GB	HB	HB	HB	HB	IB	IB	IB
1.8μ	FB	FB	FB	FB	GB	GB	GB	GB	HB	HB	HB	HB	IB	IB	IB
2.2μF	FC	FC	FC	FC	GB	GB	GB	GB	HB	HB	HB		IB	IB	IB
2.7μF	FC	FC	FC	FC	GB	GB	GB	GB	HB	HB	HB		IB	IB	IB
3.3μF	FC	FC	FC	FC	GB	GB	GB	GB	HB	HB	HB		IB	IB	IB
4.7μF	FC	FC	FC	FC	GB	GB	GB	GB	HB	HB	HB		IB	IB	IB
5.6μF	FC	FC	FC	FC	GD										
6.8μF	FC	FC	FC	FC	GD										
8.2μF	FC	FC	FC	FC	GD										
10μF	FC	FC	FC	FC	GD										
12μF	FC				GD										
15μF	FC				GD										
18μF	FC				GD										
22μF	FC				GD										
27μF					GD										
33μF					GD										
39μF					GD										
47μF					GD										

代码 Code	FA	FB	FC	GA	GB	GD	HB	IB
T	0.80±0.20	1.25±0.25	1.60±0.30	1.25±0.25	1.60±0.30	2.50±0.30	1.60±0.30	1.60±0.30

材料 Dielectric 尺寸 Dimension 电压 Voltage	C0G														
	0603 (1.6mm*0.8mm)			0805 (2.0mm*1.25mm)			1206 (3.2mm*1.6mm)			1210 (3.2mm*2.5mm)			1812 (4.5mm*3.2mm)		
	≤16V	25V	50V	≤16V	25V	50V	≤16V	25V	50V	≤16V	25V	50V	≤16V	25V	50V
0.1pF	DA	DA	DA	EA	EA	EA									
0.5pF	DA	DA	DA	EA	EA	EA	FA	FA	FA						
1pF	DA	DA	DA	EA	EA	EA	FA	FA	FA						
1.5pF	DA	DA	DA	EA	EA	EA	FA	FA	FA						
1.8pF	DA	DA	DA	EA	EA	EA	FA	FA	FA						
2.0pF	DA	DA	DA	EA	EA	EA	FA	FA	FA						
2.2pF	DA	DA	DA	EA	EA	EA	FA	FA	FA						
2.7pF	DA	DA	DA	EA	EA	EA	FA	FA	FA						
3.0pF	DA	DA	DA	EA	EA	EA	FA	FA	FA						
3.3pF	DA	DA	DA	EA	EA	EA	FA	FA	FA						
4.7pF	DA	DA	DA	EA	EA	EA	FA	FA	FA						
5.6pF	DA	DA	DA	EA	EA	EA	FA	FA	FA						
6.8pF	DA	DA	DA	EA	EA	EA	FA	FA	FA						
8.2pF	DA	DA	DA	EA	EA	EA	FA	FA	FA						
10pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
12pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
15pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
18pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
22pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
27pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
33pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
39pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
47pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
56pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
68pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
100pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
120pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
150pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
180pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
220pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
270pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
330pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
390pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
470pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
560pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
680pF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
1nF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
1.5nF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
1.8nF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
2.2nF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
2.7nF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
3.3nF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
4.7nF	DA	DA	DA	EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
5.6nF				EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
6.8nF				EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
8.2nF				EA	EA	EA	FA	FA	FA	GA	GA	GA	HA	HA	HA
10nF				EA	EA	EA	FB	FB	FB	GA	GA		HA	HA	HA
12nF							FC	FC					HA	HA	HA
15nF							FC	FC					HA	HA	
18nF							FC	FC							
22nF							FC	FC							
33nF							FC	FC							

代码 Code	DA	EA	FA	FB	FC	GA	HA
T	0.80±0.10	0.80±0.20	0.80±0.20	1.25±0.25	1.60±0.30	1.25±0.25	1.25±0.25

* 中高压产品

Medium and high Voltage products

材料 Dielectric	X7R										
尺寸 Dimension	0402 (1.0mm*0.5mm)	0603 (1.6mm*0.8mm)			0805 (2.0mm*1.2mm)						
电压 Voltage	100V	100V	200V	250V	100V	200V	250V	500V	630V	1000V	2000V
100pF	CA	DA					EB	EB			
120pF	CA	DA					EB	EB			
150pF	CA	DA					EB	EB			
180pF	CA	DA					EB	EB			
220pF	CA	DA			EA		EB	EB			
270pF	CA	DA			EA		EB	EB			
330pF	CA	DA	DA		EA		EB	EB			
390pF	CA	DA	DA		EA		EB	EB			
470pF	CA	DA	DA		EA		EB	EB			
560pF	CA	DA	DA		EA		EB	EB			
680pF	CA	DA	DA		EA		EB	EB			
820pF	CA	DA	DA		EA		EB	EB			
1nF	CA	DA	DA		EA		EB	EB		EB	EB
1.2nF	CA	DA	DA		EA		EB	EB	EB	EB	
1.5nF	CA	DA	DA		EA		EB	EB	EB	EB	
1.8nF	CA	DA	DA		EA		EB	EB	EB	EB	
2.2nF	CA	DA	DA		EA		EB	EB	EB	EB	
2.7nF	CA	DA	DA		EA		EB	EB	EB		
3.3nF	CA	DA	DA	DA	EA		EB	EB	EB		
4.7nF	CA	DA	DA	DA	EA		EB	EB	EB		
5.6nF		DA	DA	DA	EA		EB	EB	EB		
6.8nF		DA	DA	DA	EA		EB	EB			
8.2nF		DA	DA	DA	EA		EB	EB			
10nF		DA	DA	DA	EA	EA	EB	EB			
12nF		DA			EA	EB	EB	EB			
15nF		DA			EA	EB	EB	EB			
18nF		DA			EA	EB	EB	EB			
22nF		DA			EA	EB	EB	EB			
33nF		DA			EB	EB	EB	EB			
47nF		DA			EB			EB			
56nF		DA			EB			EB			
68nF		DA			EB			EB			
82nF		DA			EB			EB			
100nF		DA			EB			EB			
220nF					EB						
330nF					EB						
470nF					EB						
560nF					EB						
680nF					EB						
820nF					EB						
1μF					EB						
2.2μF					EB						
3.3μF					EB						
4.7μF					EB						
6.8μF											
10μF											

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	X7R							
尺寸 Dimension	1206 (3.2mm*1.6mm)							
电压 Voltage	100V	200V	250V	500V	630V	1000V	2000V	2500V
100pF	FA	FA		FA	FB	FC	FB	
120pF	FA	FA		FA		FC	FB	
150pF	FA	FA		FA		FC	FB	
180pF	FA	FA		FA		FC	FB	
220pF	FA	FA		FA		FC	FB	
270pF	FA	FA		FA		FC	FB	
330pF	FA	FA	FA	FA		FC	FB	
390pF	FA	FA	FA	FA		FC	FB	
470pF	FA	FA	FA	FA		FC	FB	
560pF	FA	FA	FA	FA		FC	FB	
680pF	FA	FA	FA	FA		FC	FB	
820pF	FA	FA	FA	FA		FC	FB	
1nF	FA	FA	FA	FA		FC	FB	FC
1.2nF	FA	FA	FA	FA		FC	FB	
1.5nF	FA	FA	FA	FA		FC	FB	
1.8nF	FA	FA	FA	FA		FC	FB	
2.2nF	FA	FA	FA	FB		FC	FB	
2.7nF	FA	FA	FA	FB		FC	FB	
3.3nF	FA	FA	FA	FB		FC	FB	
3.9nF	FA	FA	FA	FB		FC	FB	
4.7nF	FA	FA	FA	FB	FB	FC	FB	
5.6nF	FA	FA	FA	FB	FB	FC	FB	
6.8nF	FA	FA	FA	FB	FB	FC	FC	
8.2nF	FA	FA	FA	FB	FB	FC		
10nF	FA	FA	FA	FB	FB	FC		
12nF	FA	FA	FA	FB	FB			
15nF	FA	FA	FA	FB	FB			
18nF	FA	FA	FA	FB	FB			
22nF	FA	FA	FA	FB	FB			
27nF	FA	FB	FB	FB	FB			
33nF	FA	FB	FB	FB	FC			
47nF	FA	FB	FB	FB	FC			
56nF	FA	FB	FB	FC				
68nF	FB	FB	FB	FC				
82nF	FB	FB	FB	FC				
100nF	FB	FB	FB	FC				
120nF	FB	FC	FB					
150nF	FB	FC	FB					
180nF	FB	FC	FB					
220nF	FB	FC	FC					
280nF	FB							
330nF	FB							
390nF	FC							
470nF	FC							
560nF	FC							
680nF	FC							
820nF	FC							
1μF	FC							
2.2μF								
3.3μF								
4.7μF								
6.8μF								
10μF								

代码 Code	FA	FB	FC
T	0.80±0.20	1.25±0.25	1.60±0.30

材料 Dielectric	X7R														
尺寸 Dimension	1210 (3.2mm*2.5mm)							1808 (4.2mm*5.0mm)							
电压 Voltage	100V	200V	250V	500V	630V	1KV	2KV	100V	250V	500V	1KV	2KV	3KV	4KV	5KV
100pF												HB	HB		
120pF												HB	HB		
150pF												HB	HB		HB
180pF												HB	HB		HB
220pF						GA	GA				HB	HB	HB		HB
270pF						GB	GB				HB	HB	HB		HB
330pF						GB	GB				HB	HB	HB		HB
390pF						GB	GB				HB	HB	HB		HB
470pF						GB	GB	HB			HB	HB	HB		HB
560pF						GB	GB	HB			HB	HB	HB		HB
680pF					GA	GB	GB	HB			HB	HB	HB		HB
820pF					GA	GB	GB	HB			HB	HB	HB		HB
1nF			GB		GA	GB	GB	HB	HB		HB	HB	HB	HB	HB
1.2nF			GB		GA	GB	GB	HB	HB		HB	HB	HB		
1.5nF			GB		GA	GB	GB	HB	HB		HB	HB	HB		
1.8nF			GB		GA	GB	GB	HB	HB		HB	HB	HB		
2.2nF			GB		GA	GB	GB	HB	HB		HB	HB	HB		
2.7nF			GB		GA	GB	GB	HB	HB		HB	HB	HB		
3.3nF			GB	GA	GA	GB	GA	HB	HB		HB	HB	HB		
3.9nF			GB	GA	GA	GB	GA	HB	HB		HB	HB	HB		
4.7nF	GA		GB	GA	GA	GB	GA	HB	HB		HB	HB	HB		
5.6nF	GA		GB	GA	GA	GB	GA	HB	HB		HB	HB			
6.8nF	GA		GB	GA	GA	GB	GA	HB	HB		HB	HB			
8.2nF	GA		GB	GA	GA	GB	GA	HB	HB		HB	HB			
10nF	GA		GB	GA	GA	GB	GB	HB	HB		HB	HB			
12nF	GA		GB	GA	GA	GB	GB	HB	HB		HB				
15nF	GA		GB	GA	GA	GB		HB	HB		HB				
18nF	GA		GB	GA	GA	GB		HB	HB		HB				
22nF	GA		GB	GA	GA	GB		HB	HB						
33nF	GA		GB	GB	GA			HB	HB						
39nF	GA		GB	GB	GA			HB	HB						
47nF	GA	GA	GB	GB	GB			HB	HB	HB					
56nF	GA		GB	GB	GA			HB	HB						
68nF	GA		GB	GB	GA			HB	HB						
82nF	GA		GB	GB	GA			HB	HB						
100nF	GA		GB	GB	GA			HB	HB						
120nF	GA		GD					HB	HB						
150nF	GA		GD					HB	HB						
180nF	GA		GD					HB	HB						
220nF	GB		GD					HB	HB						
330nF	GB		GD					HB	HB						
390nF	GB							HB	HB						
470nF	GB							HB	HB						
560nF	GB														
680nF	GB														
820nF	GB														
1μF	GB														
2.2μF	GC														
3.3μF															
4.7μF															
6.8μF															
10μF															

代码 Code	GA	GB	GD	HB
T	1.25±0.25	1.60±0.30	2.50±0.30	1.60±0.30

材料 Dielectric	X7R									
尺寸 Dimension	1812 (4.5mm*3.2mm)									
电压 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	IB	
1nF		IB	IB			IB	IB	IB	IB	
1.2nF		IB	IB			IB	IB	IB	IB	
1.5nF		IB	IB			IB	IB	IB	IB	
1.8nF		IB	IB	IB		IB	IB	IB	IB	
2.2nF		IB	IB	IB		IB	IB	IB	IB	IC
2.7nF		IB	IB	IB		IB	IB	IB	IB	
3.3nF		IB	IB	IB		IB	IB	IB	IB	
3.9nF		IB	IB	IB		IB	IB	IB		
4.7nF		IB	IB	IB		IB	IB	IB		
5.6nF		IB	IB	IB		IB	IB	IC		
6.8nF		IB	IB	IB		IB	IB	IC		
8.2nF		IB	IB	IB		IB	IB	IC		
10nF	IA	IB	IB	IB		IB	IB	ID		
12nF	IA	IB	IB	IB		IB	IB			
15nF	IA	IB	IB	IB		IB	IC			
18nF	IA	IB	IB	IB		IB	IC			
22nF	IA	IB	IB	IB	IB	IB				
33nF	IA	IB	IB	IA	IB	IB				
39nF	IA	IB	IB	IB	IB	IB				
47nF	IA	IB	IB	IB	IB	IB				
56nF	IA	IB	IB	IB	IB	IC				
68nF	IA	IB	IB	IB	IB					
82nF	IA	IB	IB	IB	IB					
100nF	IA	IB	IB	IB	IC					
120nF	IA	IB	IC	IB						
150nF	IA	IB	IB	IB						
180nF	IA	IB	IB	IB						
220nF	IA	IB	IC	IC						
270nF	IA	IB	IC							
330nF	IA	IC	IC							
390nF	IA	IC	IC							
470nF	IA	IC	ID							
560nF	IA	IC	IC							
680nF	IC	IC	IC							
820nF	IC	IC	IC							
1μF	IC	IC	IC							
1.2μF	ID									
1.5μF	ID									
1.8μF	ID									
2.2μF	ID									
3.3μF										
4.7μF										
5.6μF										
6.8μF										
10μF										

代码 Code	IA	IB	IC	ID
T	1.25±0.25	1.60±0.30	2.00±0.30	2.50±0.30

材料 Dielectric	X7R								
尺寸 Dimension	1825 (4.5mm*6.3mm)						2211 (5.7mm*2.8mm)		
电压 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
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		
5.6nF						JA	JB		
6.8nF						JA	JB		
8.2nF						JA	JB		
10nF					JA	JA	JB		
12nF					JA	JA			
15nF					JA	JA			
18nF					JA	JA			
22nF					JA	JA			
33nF			JA		JA				
39nF			JA		JA				
47nF			JA		JA				
56nF			JA		JA				
68nF			JA		JA				
82nF			JA		JA				
100nF	JA		JA		JB				
120nF			JA						
150nF			JA	JA					
220nF			JA						
330nF									
470nF									
680nF									
820nF									
1μF									
2.2μF									
3.3μF									
4.7μF									
6.8μF									
10μF		JB							

代码 Code	JA	JB
T	1.60±0.30	2.00±0.30

材料 Dielectric	X7R										
尺寸 Dimension	2220 (5.7mm*6.3mm)										
电压 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
1.2nF				LA			LA		LA	LA	LA
1.5nF				LA			LA		LA	LA	LA
1.8nF				LA			LA		LA	LA	LA
2.2nF			LA	LA			LA		LA	LA	LA
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		LA	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	
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				
56nF		LA	LA	LA		LB					
68nF		LA	LA	LA		LB					
82nF		LA	LA	LA		LB					
100nF		LA	LA	LA		LB					
120nF		LA	LA	LA		LB					
150nF		LA	LA	LA	LA	LB					
220nF		LA	LA	LA	LA	LB					
330nF		LA	LA	LA	LA						
470nF	LA	LA	LA	LA	LA						
680nF	LA	LA	LA								
820nF	LA	LA	LA								
1μF	LA		LA								
2.2μF	LA		LB								
3.3μF	LB										
4.7μF											
6.8μF											
10μF											

代码 Code	LA	LB
T	1.60±0.30	2.00±0.30

材料 Dielectric	X7R									
尺寸 Dimension	2225 (5.7mm*5.0mm)									
电压 Voltage	100V	200V	250V	500V	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	MA		
22nF			MA	MA	MA		MA	MA		
33nF			MA	MA	MA		MB			
47nF			MA	MA	MA		MA			
56nF			MA	MA	MA		MB			
68nF			MA	MA	MA		MB			
82nF			MA	MA	MA		MB			
100nF	MA		MA	MA	MA	MB	MB			
120nF	MA		MA	MA	MC					
150nF	MA		MA	MA						
220nF	MA		MA	MA						
330nF	MA		MA	MA						
470nF	MA	MA	MA	MA						
680nF			MA	MB						
680nF			MA	MB						
1μF			MB	MC						
2.2μF			MB							
3.3μF										
4.7μF										
6.8μF										
10μF										

代码 Code	MA	MB	MC
T	1.60±0.30	2.00±0.30	3.00±0.30

◆ 可靠性测试方法

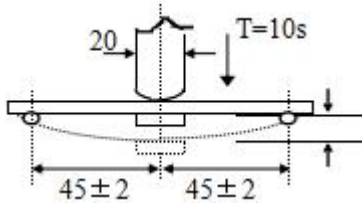
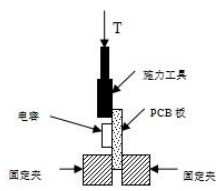
Reliability Test Methods

二类介质规格测量前需去老化处理：测试温度：25℃±3℃，测试湿度：<70%RH. 电容器在150℃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℃±3℃, test humidity: <70%RH. The capacitors were heat treated at 150℃ 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℃ 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 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						
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≤25 nF, Ri≥10000MΩ C>25 nF, Ri•CR>100S							
损耗角正切 (DF, tanδ) Dissipation Factor	电压 Voltage	DF(×10 ⁻⁴)	0402	0603	0805	1206 及以上 and above			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 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
	50V	≤250	≤10nF	<100nF	——	≤680nF			
		≤350	≤47nF	<470nF	≤1uF	≤2.2uF			
		≤500	≤0.1μF	——	——	——			
		≤750	——	——	≤2.2uF	≤4.7uF			
		≤1000	——	≤1μF	≤1μF	≤10μF			
	25V	≤250	≤10nF	<100nF	——	≤680nF			
		≤350	≤47nF	<470nF	≤1uF	——			
		≤500	0.22μF	——	——	——			
		≤750	——	——	≤2.2μF	≤10μF			
		≤1000	——	≤2.2μF	≤4.7μF	——			
	16V	≤250	≤10nF	<100nF	——	≤680nF			
		≤350	≤47nF	<470nF	≤1uF	——			
		≤500	≤220nF	——	——	——			
		≤750	——	——	≤4.7μF	≤10μF			
		≤1000	≤470nF	≤2.2μF	≤4.7μF	——			
	10V	≤250	≤10nF	<100nF	——	≤680nF			
		≤350	≤47nF	<470nF	≤1uF	——			
		≤500	≤220nF	——	——	——			
		≤750	——	——	≤2.2μF	≤10μF			
		≤1000	≤1μF	≤2.2μF	≤4.7μF	≤47μF			
	≤6.3V	≤250	≤10nF	<100nF	——	≤680nF			
		≤350	47nF	<470nF	≤1uF	——			
		≤500	≤220nF	——	——	——			
		≤750	——	——	≤2.2uF	≤10μF			
		≤1000	≤1μF	≤4.7μF	≤10μF	——			

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
 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

项目 Item	技术规格 Technical Specification			测试方法 Test Method and Remarks															
耐焊接热 Resistance to Soldering Heat	项目 Item	I类 Class I	II类 Class II	将电容在 100~200℃ 的温度下预热 60~120 秒。 浸锡温度: 265±5℃ 浸锡时间: 10±1s 然后取出溶剂清洗干净, 在 10 倍以上的显微镜底下观察。 试验后放置时间: 24±2h。 放置条件: 室温 Preheating conditions: 100 to 200℃; 60~120s. Solder Temperature: 265±5℃ Duration: 10±1s Clean the capacitor with solvent and examine it with a 10X(min.) microscope. Recovery Time: 24±2h. Recovery condition: Room temperature															
	ΔC/C	≤±2.5%或±0.25pF, 取较大值 ≤ ± 2.5% or ± 0.25PF, whichever is larger	±15%																
	DF	同初始标准 Same to initial value.																	
	IR	同初始标准 Same to initial value.																	
	外观: 无可见损伤 上锡率: ≥95% Appearance: No visible damage. At least 95% of the terminal electrode is covered by new solder.																		
抗弯曲强度 Resistance to Flexure of Substrate (Bending Strength)	外观: 无可见损伤。 Appearance: No visible damage. ΔC/C: I 类: ≤±5%或±0.5pF, 取两者中最大者 II 类: ≤±10% Class I: ≤±5% or ±0.5pF, whichever is larger. Class II: ≤±10%			试验基板: PCB 弯曲深度: 3mm 施压速度: 1mm/sec. 单位: mm 应在弯曲状态下进行测量。 Test Board: PCB Warp: 3mm Speed: 1mm/sec. Unit: mm The measurement should be made with the board in the bending position. 															
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 Specification</th><th>施加力 T Apply Force T</th></tr><tr><td>≤0402</td><td>2N</td></tr><tr><td>≥0603</td><td>5N</td></tr></table> 	规格 Specification	施加力 T Apply Force T	≤0402	2N	≥0603	5N									
规格 Specification	施加力 T Apply Force T																		
≤0402	2N																		
≥0603	5N																		
温度循环 Temperature Cycle	项目 Item	I类 Class I	II类 Class II	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.): -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.): +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.): -55	30min	2	常温 (Normal temp.): +20℃	2~3min	3	上限温度 (Up- category temp.): +125	30min	4	常温 (Normal temp.): +20℃	2~3min
阶段 Step	温度 (Temperature) (℃)	时间 (Time)																	
1	下限温度 (Low- category temp.): -55	30min																	
2	常温 (Normal temp.): +20℃	2~3min																	
3	上限温度 (Up- category temp.): +125	30min																	
4	常温 (Normal temp.): +20℃	2~3min																	
可焊性 Solderability	上锡率应大于 95%外观: 无可见损伤。 At least 95% of the terminal electrode is covered by new solder. Visual Appearance: No visible damage.			将电容在 80~120℃ 的温度下预热 10~30 秒。 Preheating conditions: 80 to 120℃; 10~30s. 无铅焊料: 浸锡温度: 245±5℃ 浸锡时间: 2±0.5s Lead-free soldering Solder Temperature: 235±5℃ Duration: 2±0.5s															

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: $\pm 7.5\%$ 或 $\pm 0.75pF$,取两者之中较大者 II 类: $\leq \pm 12.5\%$ Class I : $\pm 7.5\%$ or $\pm 0.75pF$, whichever is larger. Class II : $\leq \pm 12.5\%$		温度: $40\pm 2^{\circ}C$ 湿度: 90~95%RH 电压: 额定电压 时间: 500 小时 放置条件: 室温 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 conditions: Room temperature 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 $24\pm 2h$.																	
	DF	≤ 2 倍初始标准 Not more than twice of initial value.																			
	IR	Class I	$Ri\geq 5000M\Omega$ 或 $Ri\cdot C_R\geq 50S$ 取两者之中较小者. $Ri\geq 5000M\Omega$ or $Ri\cdot C_R\geq 50S$ whichever is smaller.																		
		Class II	$Ri\geq 1000M\Omega$ 或 $Ri\cdot C_R\geq 10S$ 取两者之中较小者. $Ri\geq 1000M\Omega$ or $Ri\cdot C_R\geq 10S$ whichever is smaller.																		
	外观: 无损伤 Appearance: No visible damage.																				
寿命试验 Life Test	$\Delta C/C$	Class I	$\leq \pm 3\%$ 或 $\pm 0.3pF$, 取两者之中较大者 $\leq \pm 3\%$ or $\pm 0.3pF$, whichever is larger.	温度: $125^{\circ}C$ (C0G、X7R) 充电电流: 不应超过 50mA. 时间: 1000 小时 电压: 低压产品 ($<100V$) 2 倍额定工作电压, 除表 1 外 $100V\leq$ 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 放置条件: 室温 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: $125^{\circ}C$ (C0G、X7R) Charge/Discharge Current:50mA max. Time:1000h. Applied Voltage:1.Low Voltage products ($< 100V$) 2 times rated operating Voltage, except Table 1. 2. Medium and high pressure products: $100V\leq$ Rated Voltage $\leq 200V$: 1.5 Multiple $200V<$ Rated Voltage $\leq 500V$: 1.3 Multiple $500V<$ Rated Voltage: 1.2 Multiple Recovery Conditions: Room Temperature 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 $24\pm 2h$.																	
		Class II	-20% ~ +20%																		
	DF	≤ 2 倍初始标准 Not more than twice of initial value.																			
	IR	Class I	$Ri\geq 4000M\Omega$ 或 $Ri\cdot C_R\geq 40S$ 取两者之中较小者 $Ri\geq 4000M\Omega$ or $Ri\cdot C_R\geq 40S$ whichever is smaller.																		
		Class II	$Ri\geq 2000M\Omega$ 或 $Ri\cdot C_R\geq 50S$ 取两者之中较小者. $Ri\geq 2000M\Omega$ or $Ri\cdot C_R\geq 50S$ whichever is smaller.																		
	外观: 无损伤 Appearance: No visible damage.																				
	<table><tr><th>容量 Capacitance</th><th>试验电压 Voltage</th></tr><tr><td>$100nF\leq 0201<220nF$</td><td rowspan="6">1.5Ur</td></tr><tr><td>$47nF\leq 0402<2.2\mu F$</td></tr><tr><td>$220nF\leq 0603<4.7\mu F$</td></tr><tr><td>$0.47\mu F\leq 0805<10\mu F$</td></tr><tr><td>$1\mu F\leq 1206<22\mu F$</td></tr><tr><td>$1\mu F\leq 1210<22\mu F$</td></tr><tr><td>$0201\geq 220nF$</td><td rowspan="6">1.0Ur</td></tr><tr><td>$0402\geq 2.2\mu F$</td></tr><tr><td>$0603\geq 4.7\mu F$</td></tr><tr><td>$0805\geq 10\mu F$</td></tr><tr><td>$1206\geq 22\mu F$</td></tr><tr><td>$1210\geq 22\mu F$</td></tr></table>				容量 Capacitance	试验电压 Voltage	$100nF\leq 0201<220nF$	1.5Ur	$47nF\leq 0402<2.2\mu F$	$220nF\leq 0603<4.7\mu F$	$0.47\mu F\leq 0805<10\mu F$	$1\mu F\leq 1206<22\mu F$	$1\mu F\leq 1210<22\mu F$	$0201\geq 220nF$	1.0Ur	$0402\geq 2.2\mu F$	$0603\geq 4.7\mu F$	$0805\geq 10\mu F$	$1206\geq 22\mu F$	$1210\geq 22\mu F$	
	容量 Capacitance	试验电压 Voltage																			
	$100nF\leq 0201<220nF$	1.5Ur																			
	$47nF\leq 0402<2.2\mu F$																				
$220nF\leq 0603<4.7\mu F$																					
$0.47\mu F\leq 0805<10\mu F$																					
$1\mu F\leq 1206<22\mu F$																					
$1\mu F\leq 1210<22\mu F$																					
$0201\geq 220nF$	1.0Ur																				
$0402\geq 2.2\mu F$																					
$0603\geq 4.7\mu F$																					
$0805\geq 10\mu F$																					
$1206\geq 22\mu F$																					
$1210\geq 22\mu F$																					

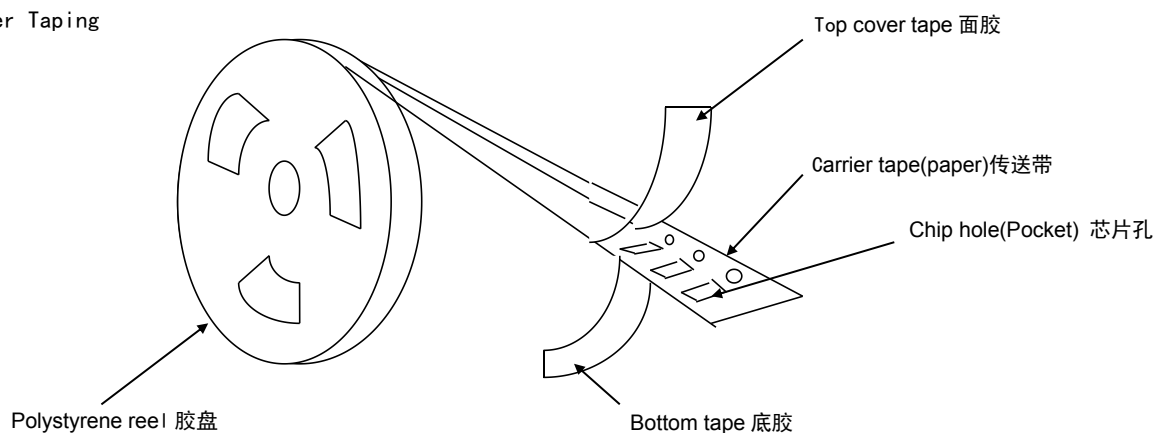
项目 Item	技术规格 Technical Specification	测试方法 Test Method and Remarks	
介质耐电强度 (DWV) Dielectric Withstanding Voltage	不应有介质被击穿或损伤 No breakdown or damage.	Ur < 100V	测量电压: I类: 300% Ur II类: 250% Ur 时间: 1~5 秒 充/放电电流: 不应超过 50mA。 Measuring Voltage: I class: 300% Ur II class: 250% Ur Duration: 1~5s Charge/ Discharge Current: 50mA max.
		100V ≤ Ur < 500V	施加额定电压的 200%, 5 秒, 最大电流不超过 50mA Force 200% Rated Voltage for 5 second. Charge / Discharge current limit: 50mA max
		500V ≤ Ur ≤ 1000V	施加额定电压的 150%, 5 秒, 最大电流不超过 50mA Force 150% Rated Voltage for 5 second. Charge / Discharge current limit: 50mA max
		1000V < Ur ≤ 2000V	施加额定电压的 120%, 5 秒, 最大电流不超过 50mA Force 120% Rated Voltage for 5 seconds. Charge / Discharge current limit: 50mA max
		2000V < Ur ≤ 5000V	施加额定电压的 120%, 5 秒, 最大电流不超过 10mA Force 120% Rated Voltage for 5 seconds. Max. current should not exceed 10 mA.

◆ 包装

Package

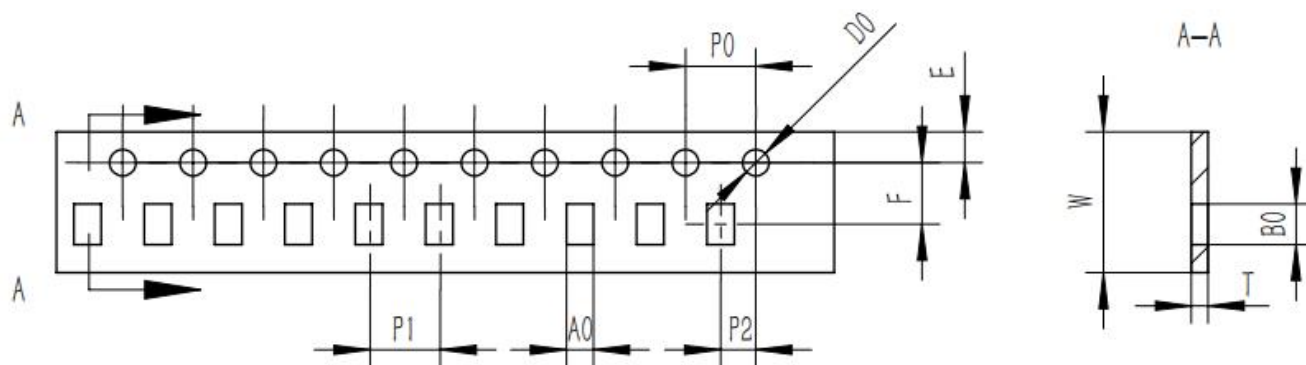
* 纸带卷盘结构

Paper Taping



* 0402 纸带编带尺寸大小

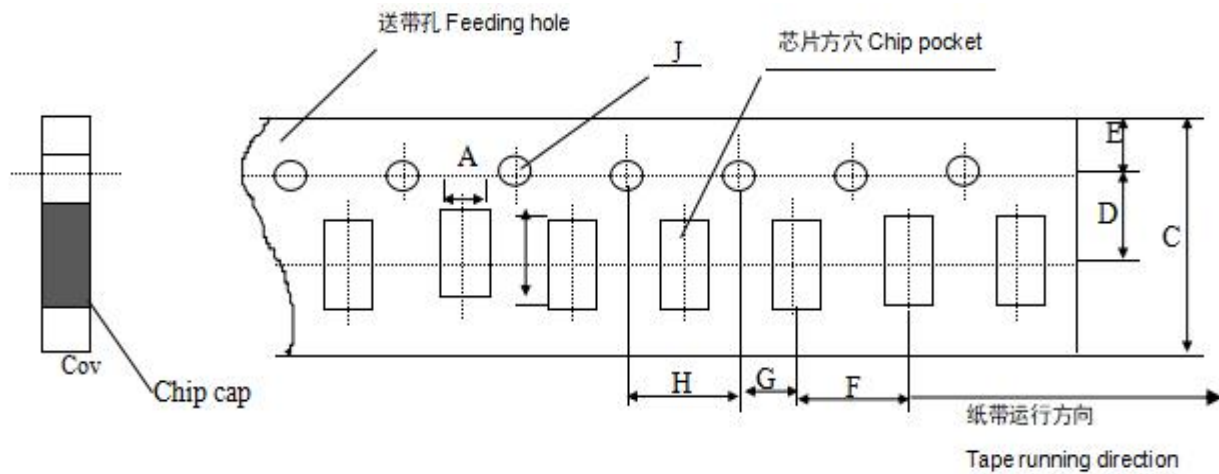
Dimensions of paper taping for 0402 type



代号 Code	A0	B0	W	F	E	P1	P2	P0	D0	T
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	1.55 -0/+0.05	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.

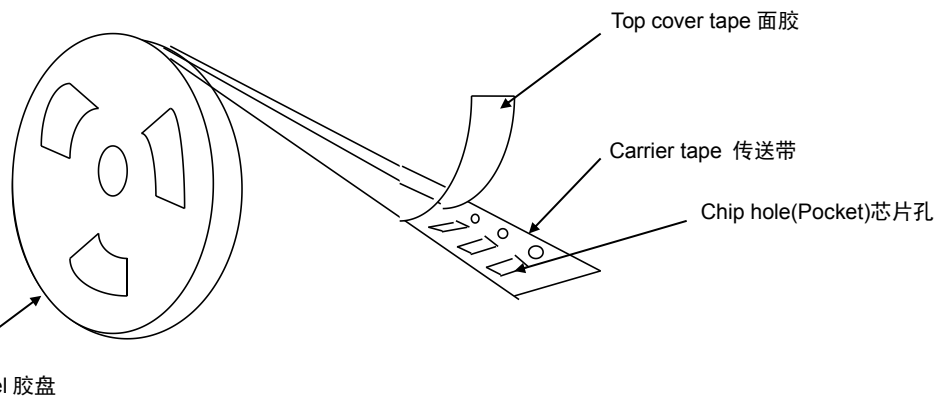


注意: *表示此处对尺寸的要求非常精确。

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

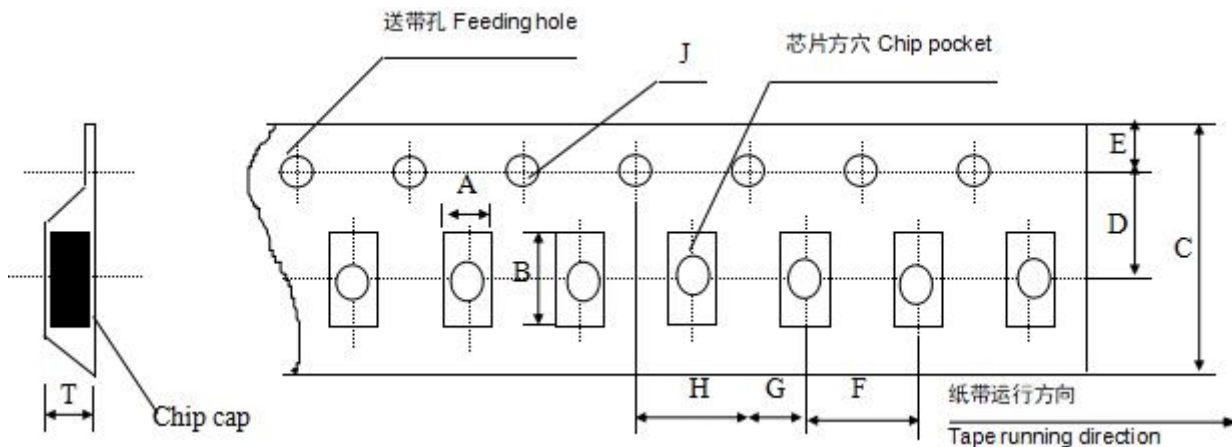
* 塑胶卷盘结构

Embossed taping



* 塑胶带尺寸结构(适合'0805~2225' 型产品)

Dimensions of embossed taping for 0805~2225 type



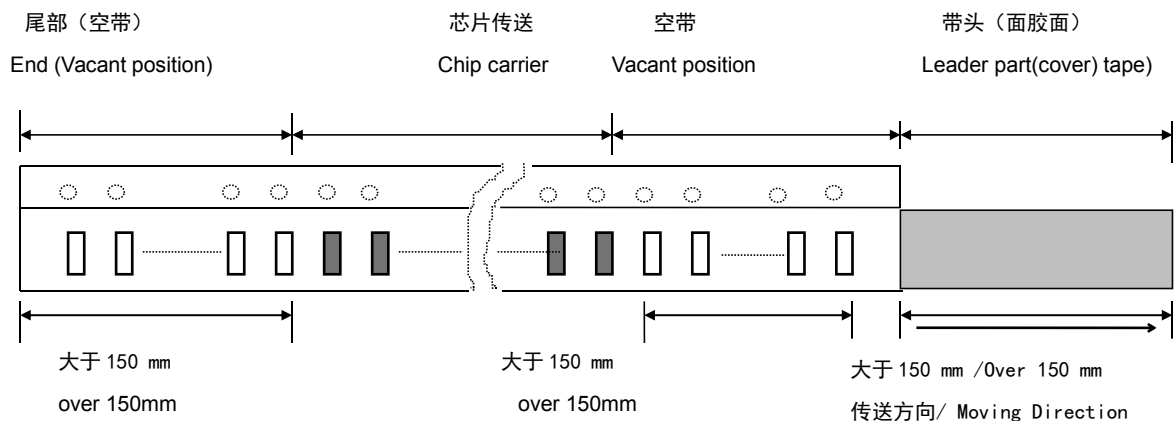
代号 Code 规格 Tape size	A	B	C	D*	E	F	G*	H	J	T
0805	1.55 ± 0.20	2.35 ± 0.20	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	4.00 ± 0.10	1.55 -0/+0.05	1.50 Max
1206	1.95 ± 0.20	3.60 ± 0.20	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	4.00 ± 0.1	1.55 -0/+0.05	1.85 Max
1210	2.70 ± 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/+0.05	3.2 Max
1808	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	1.55 -0/+0.05	3.0 Max
1812	3.66 ± 0.10	4.95 ± 0.10	12.00 ± 0.10	5.50 ± 0.05	1.75 ± 0.10	8.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	1.55 -0/+0.05	4.0 Max
2211/ 2220/2225	6.2 ±0.1	6.7 ±0.1	12.00 ± 0.10	5.50 ± 0.05	1.75 ± 0.10	8.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	1.55 -0/+0.05	2.4 ± 0.10

备注：*表示此处对尺寸的要求非常精确。

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

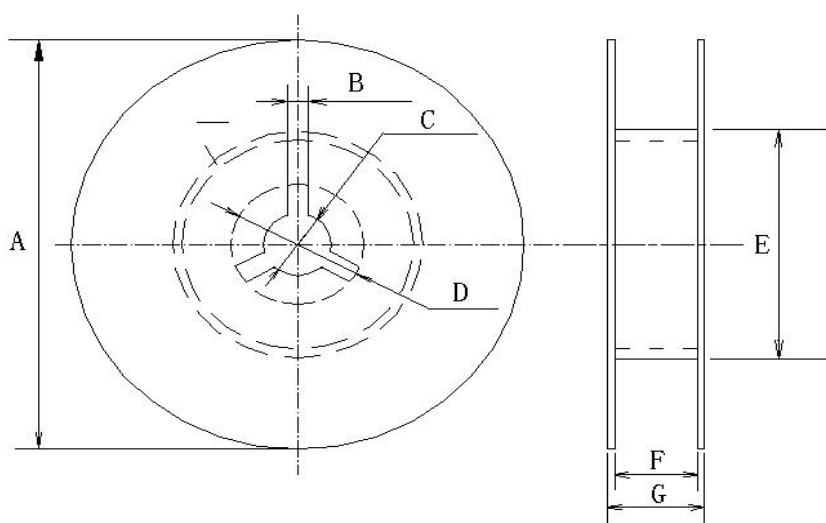
* 传送带的前后结构

Structure of leader part and end part of the carrier paper



* 卷盘尺寸

Reel dimensions (unit: mm)

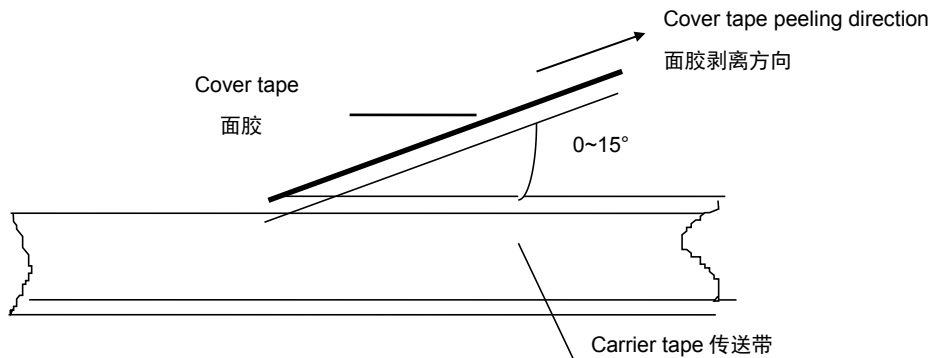


卷盘型号 Reel Code	A	B	C	D	E	F	G
7'REEL	φ178±2.0	3.0	φ13±0.5	φ21±0.8	φ50 或更大 φ50 or more	10.0±1.5	12max

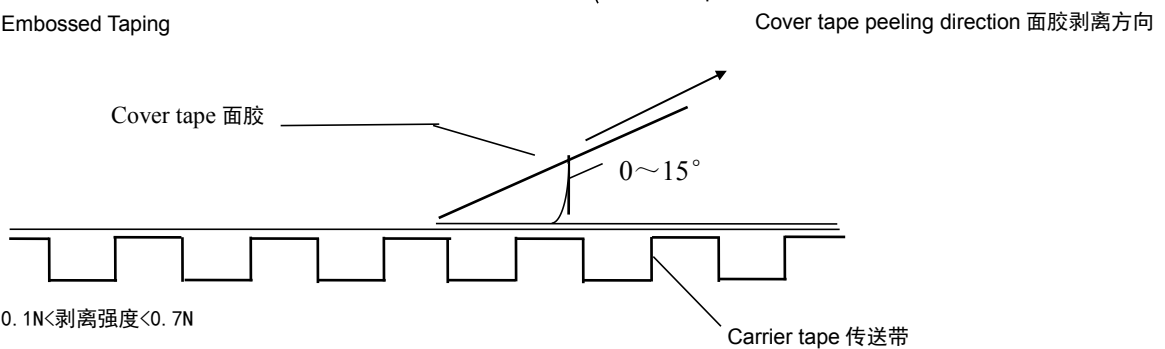
* 关于卷带的说明：面胶剥离强度

Taping specification: top tape peeling strength

* 纸带 Paper Taping



* 塑料胶盘 Embossed Taping



标准: $0.1N < \text{剥离强度} < 0.7N$

Standard: $0.1N < \text{peeling strength} < 0.7N$

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	—
	0.50±0.15	10000	—	50000	—
	0.50±0.20	10000	—	50000	—
0603	0.80±0.10	4000	—	15000	—
	0.80±0.20	4000	—	15000	—
0805	0.80±0.20	4000	—	15000	—
	1.25±0.25	—	T≤1.35mm 3000 T>1.35mm 2000	—	10000
1206	0.80±0.20	4000	—	15000	—
	1.25±0.25	—	T≤1.35mm 3000 T>1.35mm 2000	—	10000
	1.60±0.30	—	2000	—	8000
1210	1.25±0.25	—	2000	—	8000
	1.60±0.30	—	2000	—	8000
	2.50±0.30	—	1000	—	8000
1808	1.60±0.30	—	2000	—	8000
	2.00±0.30	—	2000	—	8000
1812	1.60±0.30	—	—	—	3000
	2.00±0.30	—	—	—	3000
2211	1.60±0.30	—	500	—	—
2222	ALL	—	500	—	—
2225	ALL	—	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.

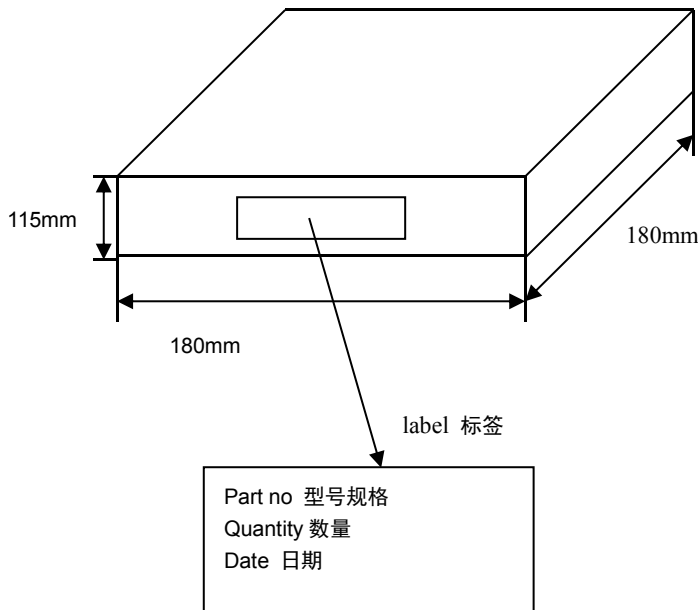
* 外包装

Outer packing

小包装 The first package

Quantity: 10 reels

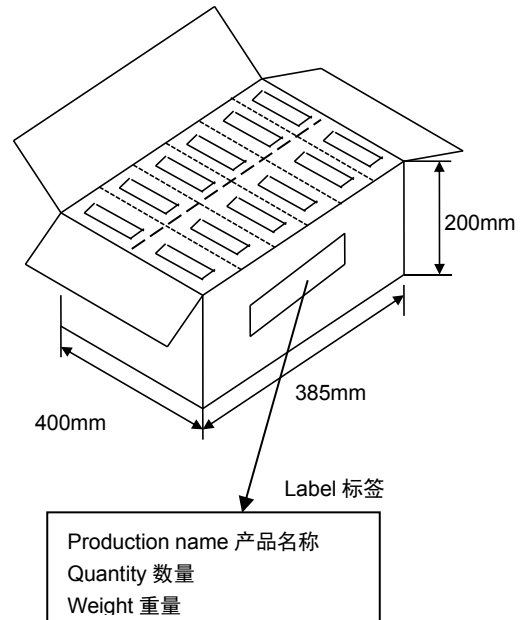
数量: 10 卷



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.

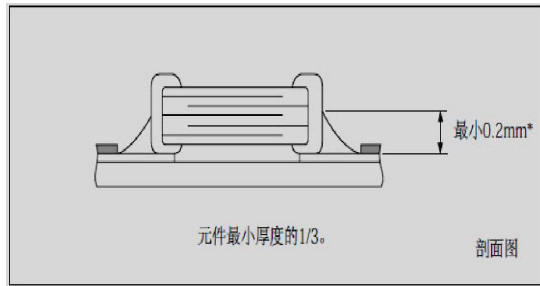
Manual soldering can pose a great risk of creating thermal cracks in capacitors. The hot soldering iron tip comes into direct contact with the end terminations, and operator's careless may cause the tip of the soldering iron to come into direct contact with the ceramic body of the capacitor. Therefore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

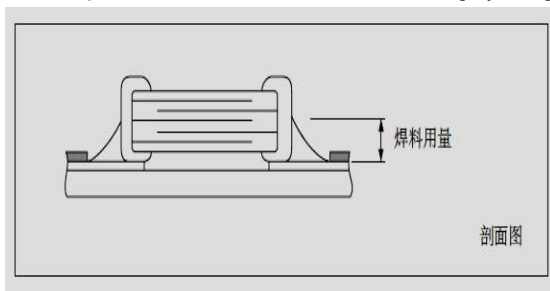
回流焊接的最佳焊料用量

The optimal solder fillet amounts for re-flow soldering



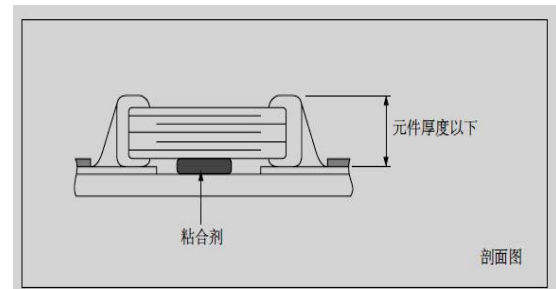
使用烙铁返修时的最佳焊料量

The optimal solder fillet amounts for reworking by using soldering iron



波峰焊接的最佳焊料用量

The optimal solder fillet amounts for wave soldering



* 推荐焊接方式

Recommended Soldering Method

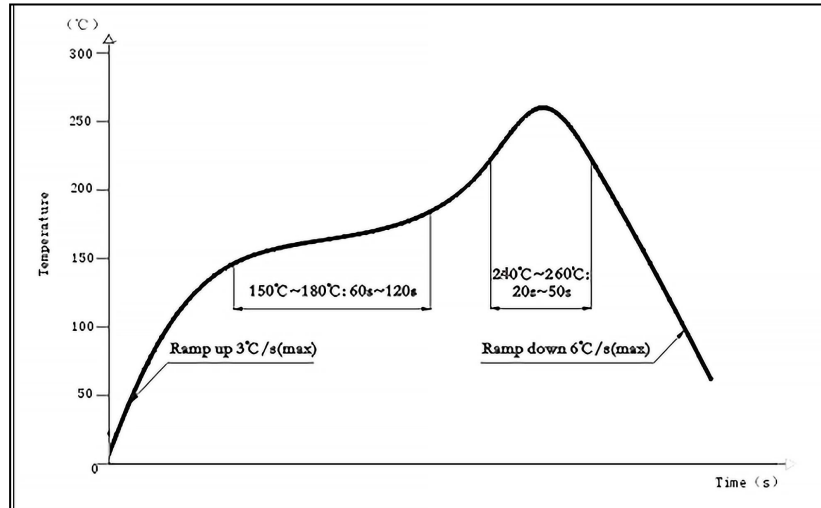
规格尺寸 Size	温度特性 Temperature Characteristics	容量范围 Capacitance	焊接方式 Soldering Method
0402	X7R	/	R
0603	C0G	/	R/W
	X7R	C \geq 1uf	R
		C<1uf	R/W
0805	C0G	/	R/W
	X7R	C \geq 4.7uf	R
		C<4.7uf	R/W
1206	C0G	/	R/W
	X7R	C \geq 10uf	R
		C<10uf	R/W
\geq 1210	C0G	/	R
	X7R	/	R

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

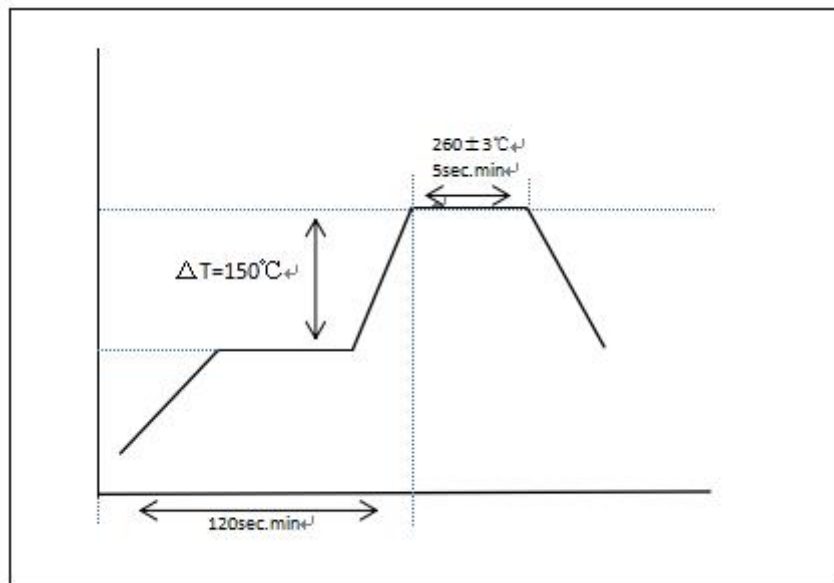
* 回流焊接 (Re-flow soldering)



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)

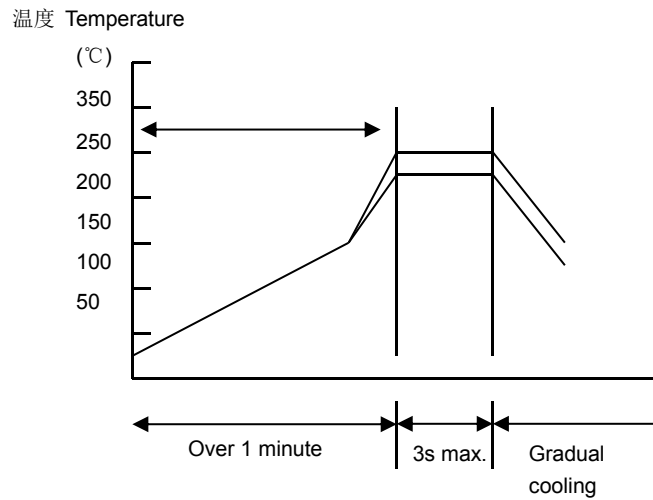


在预热时, 请将焊接温度与芯片表面温度之间的温差维持在 $T \leq 150^{\circ}\text{C}$ 。

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.