

编号: GH-ZD4132C

版本号: 1



广东风华高新科技股份有限公司
GUANGDONG FENGHUA ADVANCED TECHNOLOGY HOLDING CO., LTD.

承 认 书

APPROVAL SHEET

客户名称

CUSTOMER : _____

产品名称

片 式 排 容

PART NAME: _____ **MLCC Arrays**

规格

SPECIFICATION: _____ **0603×4 TYPE**

版本

VERSION: _____

日期

DATE OF ISSUE: _____

制 造 MANUFACTURER			客 户 CUSTOMER		
拟制 DESIGN	审核 CHECK	批准 APPROVAL	检验 INSPECTOR	审核 CHECK	批准 APPROVAL



片式排容系列 (C-ARRAY SERIES)

一、优点 FEATURE

※节约空间: 可以节省高达 50% 的 PCB 空间位置, 提高装配密度

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

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

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

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

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

※安装简易: 可进行 SMT 编带包装, 由贴片机高速贴片

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

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

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

※执行标准: GH/T 21041-2007 GH/T 21042-2007

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

二、用途 APPLICATIONS

※适用于对元器件空间要求严格的 PCB, 如手提电脑、PDA、无绳电话

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

※特别适用于输入、输出接口电路

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

三、型号规格表示方法及温度特性

HOW TO ORDER & Temperature Coefficient /Characteristics

6124 B 103 K 500 N T
① ② ③ ④ ⑤ ⑥ ⑦

① 产品尺寸及产品类型:

PRODUCT SIZE AND PRODUCT TYPE

代码 Code	长(英寸) L(inch)	宽(英寸) W(inch)	内置单元 Elements Inside
6124	0.06	0.12	4
5084	0.05	0.08	4
5082	0.05	0.08	2



② 介质种类 DIELECTRIC STYLE

介质种类(Dielectric Code)	CG	CH	B	X	E	F
介质材料 (Dielectric)	COG	COH	X7R	X5R	Z5U	Y5V

③ 标称容量 NOMINAL CAPACITANCE

单位(unit): pF

表示方式 (Express Method)	实际值 (Actual Value)	
0R5	0.5	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.
1R0	1.0	
102	10×10^2	
...	...	

④ 容量误差 CAPACITANCE TOLERANCE

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

备注：A、B、C、D级误差适用于容量≤10pF的产品。

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

⑤ 额定电压 RATED VOLTAGE

单位(unit): V

表示方式 (Express Method)	实际值 (Actual Value)	
6R3	6.3	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.
500	50×10^0	
201	20×10^1	
102	10×10^2	
...	...	

⑥ 端头材料 TERMINAL MATERIAL STYLES

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



⑦ 包装方式 PACKAGE STYLES

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

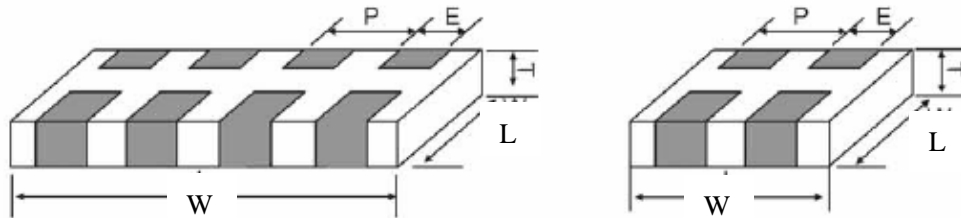
温度系数/特性 Temperature Coefficient /Characteristics

介质种类 Dielectric	参考温度点 Reference Temperature Point	标称温度系数 Temperature Coefficient	工作温度范围 Operation Temperature Range
COG	20°C	0±30 ppm/°C	-55°C~125°C
X7R	20°C	±15%	-55°C~125°C
X5R	20°C	±15%	-55°C~85°C
Z5U	20°C	-56%~+22%	10°C~85°C
Y5V	20°C	-80%~+30%	-25°C~85°C

备注：I类电容器标称温度系数和允许偏差是采用温度在20°C和85°C之间的电容量变化来确定的。

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

四、外形尺寸



规格型号	尺寸 (mm)				
	L	W	T	P	E
5082	1.25±0.20	2.00±0.20	0.80±0.10	1.00±0.10	0.50±0.05
			1.00±0.10		
5084	1.25±0.20	2.00±0.20	0.80±0.10	0.50±0.05	0.25±0.05
			1.00±0.10		
6124	1.60±0.20	3.20±0.20	0.80±0.10	0.80±0.20	0.40±0.10
			1.00±0.10		



五、电容量范围

项目	6124										
材料	COG				X7R				Y5V		
工作电压	16V	25V	50V	100V	16V	25V	50V	100V	16V	25V	50V
电容量											
0.5PF	Yellow	Green	Yellow								
5 PF	Yellow	Green	Yellow								
10 PF	Yellow	Green	Yellow								
15 PF	Yellow	Green	Yellow								
20 PF	Yellow	Green	Yellow								
22 PF	Yellow	Green	Yellow								
33 PF	Yellow	Green	Yellow								
47 PF	Yellow	Green	Yellow								
100 PF	Yellow	Green	Yellow	Green	Yellow	Green	Yellow				
150 PF	Yellow	Green	Yellow		Yellow	Green	Yellow				
220 PF	Yellow	Green	Yellow		Yellow	Green	Yellow				
330 PF	Yellow	Green	Yellow		Yellow	Green	Yellow				
470 PF	Yellow	Green	Yellow		Yellow	Green	Yellow		Yellow	Green	Yellow
1000 PF	Yellow	Green	Yellow		Yellow	Green	Yellow		Yellow	Green	Yellow
2.2nF					Yellow	Green	Yellow		Yellow	Green	Yellow
3.3nF					Yellow	Green	Yellow		Yellow	Green	Yellow
4.7nF					Yellow	Green	Yellow		Yellow	Green	Yellow
6.8nF					Yellow	Green	Yellow		Yellow	Green	Yellow
10 nF					Yellow	Green	Yellow	Green	Yellow	Green	Yellow
22 nF					Yellow	Green	Yellow		Yellow	Green	Yellow
33 nF					Yellow	Green	Yellow		Yellow	Green	Yellow
47 nF					Yellow	Green	Yellow		Yellow	Green	Yellow
68 nF					Yellow	Green	Yellow		Yellow	Green	Yellow
100 nF					Yellow	Green	Yellow		Yellow	Green	Yellow
220nF											



五、电容量范围

项目	5084								
	COG			X7R			Y5V		
工作电压	16V	25V	50V	16V	25V	50V	16V	25V	50V
电容量									
0.5PF	Yellow	Green	Yellow						
5 PF	Yellow	Green	Yellow						
10 PF	Yellow	Green	Yellow						
15 PF	Yellow	Green	Yellow						
20 PF	Yellow	Green	Yellow						
22 PF	Yellow	Green	Yellow						
33 PF	Yellow	Green	Yellow						
47 PF	Yellow	Green	Yellow						
100 PF	Yellow	Green	Yellow	Green	Yellow	Green			
150 PF				Green	Yellow	Green			
220 PF				Green	Yellow	Green			
330 PF				Green	Yellow	Green			
470 PF				Green	Yellow	Green			
1000 PF				Green	Yellow	Green	Yellow	Green	Yellow
2.2nF				Green	Yellow	Green	Yellow	Green	Yellow
3.3nF				Green	Yellow	Green	Yellow	Green	Yellow
4.7nF				Green	Yellow	Green	Yellow	Green	Yellow
6.8nF							Yellow	Green	Yellow
10 nF							Yellow	Green	Yellow
22 nF							Yellow	Green	Yellow
33 nF									
47 nF									
68 nF									
100 nF									
220nF									



五、电容量范围

项目	5082								
材料	COG			X7R			Y5V		
工作电压	16V	25V	50V	16V	25V	50V	16V	25V	50V
电容量									
0.5PF	Yellow	Green	Yellow						
5 PF	Yellow	Green	Yellow						
10 PF	Yellow	Green	Yellow						
15 PF	Yellow	Green	Yellow						
20 PF	Yellow	Green	Yellow						
22 PF	Yellow	Green	Yellow						
33 PF	Yellow	Green	Yellow						
47 PF	Yellow	Green	Yellow						
100 PF	Yellow	Green	Yellow	Green	Yellow	Green			
150 PF	Yellow	Green	Yellow	Green	Yellow	Green			
220 PF	Yellow	Green	Yellow	Green	Yellow	Green			
330 PF				Green	Yellow	Green			
470 PF				Green	Yellow	Green			
1000 PF				Green	Yellow	Green	Yellow	Green	Yellow
2.2nF				Green	Yellow	Green	Yellow	Green	Yellow
3.3nF				Green	Yellow	Green	Yellow	Green	Yellow
4.7nF				Green	Yellow	Green	Yellow	Green	Yellow
6.8nF				Green	Yellow	Green	Yellow	Green	Yellow
10 nF				Green	Yellow	Green	Yellow	Green	Yellow
22 nF				Green	Yellow	Green	Yellow	Green	Yellow
33 nF							Yellow	Green	Yellow
47 nF							Yellow	Green	Yellow
68 nF									
100 nF									
220nF									



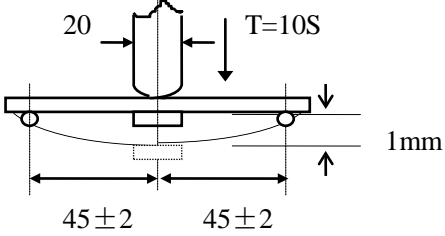
六、可靠性测试 Reliability Test

项目 Item	技术规格 Technical Specification		测试方法 Test Method and Remarks		
容量 Capacitance	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 X7R、Y5V 测试频率: 120±24 Hz 测试电压: 0.5±0.1Vrms Test Frequency: 120±24 Hz Test Voltage: 0.5±0.1Vrms		
损耗角正切 (DF, tan δ) Dissipation Factor	I类 Class I	DF	标称容量 Capacitance	测试频率 Measuring Frequency	测试电压 Measuring Voltage
		≤0.56%	Cr<5 pF	1MHz±10%	1.0±0.2Vrms
		$1.5[(150/Cr)+7] \times 10^{-4}$	5pF≤Cr<50 pF	1MHz±10%	
		≤0.15%	50pF≤Cr≤1000 pF	1MHz±10%	
≤0.15%	>1000 pF	1KHz±10%			



项目 Item	技术规格 Technical Specification				测试方法 Test Method and Remarks				
损耗角正切 (DF, tan δ) Dissipation Factor	II类 Class II	X7R	≥50V	25V	16V	10V	6.3V	C ≤ 10μF 测试频率: 1KHz ± 10% 测试电压: 1.0 ± 0.2Vrms Test Frequency: 1KHz ± 10% Test Voltage: 1.0 ± 0.2Vrms C > 10μF X7R、Y5V 测试频率: 120 ± 24 Hz 测试电压: 0.5 ± 0.1Vrms Test Frequency: 120 ± 24Hz Test Voltage: 0.5 ± 0.1Vrms	
			≤2.5%	≤3.5%	≤5.0%	≤5.0%	≤7.5% (C < 3.3μF) ≤10.0% (C ≥ 3.3μF)		
	Y5V	≥25V		16V	10V	6.3V			
		≤7.0% (C < 1.0μF) ≤9.0% (C ≥ 1.0μF)	≤15%	≤15%	≤15%				
绝缘电阻 (IR) Insulation Resistance	I类 Class I	C ≤ 10 nF, Ri ≥ 50000M Ω C > 10 nF, Ri • CR ≥ 500S				测试电压: 额定电压 测试时间: 60 ± 5 秒 测试湿度: ≤75%			
	II类 Class II	X7R	C ≤ 25 nF, Ri ≥ 10000M Ω C > 25 nF, Ri • CR > 100S				测试温度: 25°C ± 3°C 测试充放电电流: ≤50mA Measuring Voltage: Rated Voltage Duration: 60 ± 5s		
			Y5V	C ≤ 25 nF, Ri ≥ 4000M Ω C > 25 nF, Ri • CR > 100S				Test Humidity: ≤75% Test Temperature: 25°C ± 3°C Test Current: ≤50mA	
介质耐电强度(DWV) Dielectric Withstanding Voltage	不应有介质被击穿或损伤 No breakdown or damage.				测量电压: I类: 300% 额定电压 II类: 250% 额定电压 时间: 1~5 秒 充/放电电流: 不应超过 50mA (这部分说明不包括中高压 MLCC) Measuring Voltage: Class I : 300% Rated voltage Class II : 250% Rated voltage Duration: 1~5s Charge/ Discharge Current: 50mA max. (This method excludes high-voltage MLCC)				



项目 Item	技术规格 Technical Specification			测试方法 Test Method and Remarks	
可焊性 Solderability	上锡率应大于 95% 外观: 无可见损伤。 At least 95% of the terminal electrode is covered by new solder. Visual Appearance: No visible damage.			将电容在 80~120°C 的温度下预热 10~30 秒。 Preheating conditions: 80 to 120°C; 10~30s.	
	有铅焊料: (SnPb: 63/37) 浸锡温度: 235 ± 5°C 浸锡时间: 2 ± 0.5s Solder Temperature: 235 ± 5°C Duration: 2 ± 0.5s		无铅焊料: 浸锡温度: 245 ± 5°C 浸锡时间: 2 ± 0.5s Solder Temperature: 245 ± 5°C Duration: 2 ± 0.5s		
耐焊接热 Resistance to Soldering Heat	项目 Item	NPO 至 SL NPO to SL	X7R	Y5V	将电容在 100~200°C 的温度下预热 10 ± 2 分钟。 浸锡温度: 265 ± 5°C 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°C; 10 ± 2min. Solder Temperature: 265 ± 5°C Duration: 10 ± 1s Clean the capacitor with solvent and examine it with a 10X(min.) microscope. Recovery Time: 24 ± 2h Recovery condition: Room temperature
	ΔCC	≤ ± 0.5%	-5~+10%	-10~+20%	
	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.			试验基板: Al ₂ O ₃ 或 PCB 弯曲深度: 1mm 施压速度: 1mm/sec. 单位: mm 应在弯曲状态下进行测量。 	
	ΔC/C	≤ ± 10%			
端头结合强度 Termination Adhesion	外观无可见损伤 No visible damage.			施加的力: 5N 时间: 10 ± 1S Applied Force: 5N Duration: 10 ± 1S	



项目 Item	技术规格 Technical Specification		测试方法 Test Method and Remarks																
温度循环 Temperature Cycle	$\Delta C/C$: I类: $\leq \pm 1\%$ 或 $\pm 1pF$, 取两者中最大者 II类: B: $\leq \pm 10\%$ F: $\leq \pm 20\%$ Class I: $\leq \pm 1\%$ or $\pm 1pF$, whichever is larger. Class II: B: $\leq \pm 10\%$ F: $\leq \pm 20\%$		预处理* (2类): 上限类别温度, 1小时 恢复: $24 \pm 1h$ 初始测量 循环次数: 5次,一个循环分以下4步: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>阶段</th> <th>温度 (°C)</th> <th>时间 (分钟)</th> </tr> </thead> <tbody> <tr> <td>第1步</td> <td>下限温度 (NPO/X7R/X5R: -55 Y5V:-25 Z5U:+10)</td> <td>30</td> </tr> <tr> <td>第2步</td> <td>常温 (+20)</td> <td>2~3</td> </tr> <tr> <td>第3步</td> <td>上限温度 (NPO/X7R/X5R:+125 Y5V/Z5U: +85)</td> <td>30</td> </tr> <tr> <td>第4步</td> <td>常温 (+20)</td> <td>2~3</td> </tr> </tbody> </table>		阶段	温度 (°C)	时间 (分钟)	第1步	下限温度 (NPO/X7R/X5R: -55 Y5V:-25 Z5U:+10)	30	第2步	常温 (+20)	2~3	第3步	上限温度 (NPO/X7R/X5R:+125 Y5V/Z5U: +85)	30	第4步	常温 (+20)	2~3
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第4步	常温 (+20)	2~3																	
			试验后放置(恢复)时间: $24 \pm 2h$ Preheating conditions: up-category temperature, 1h Recovery time: $24 \pm 1h$ Initial Measurement Cycling Times: 5 times, 1 cycle, 4 steps: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Time(min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Low- category temp. (NPO/X7R/X5R: -55 Y5V:-25 Z5U:+10)</td> <td>30</td> </tr> <tr> <td>2</td> <td>Normal temp. (+20)</td> <td>2~3</td> </tr> <tr> <td>3</td> <td>Up- category temp. (NPO/X7R/X5R:+125 Y5V/Z5U: +85)</td> <td>30</td> </tr> <tr> <td>4</td> <td>Normal temp. (+20)</td> <td>2~3</td> </tr> </tbody> </table> Recovery time after test: $24 \pm 2h$		Step	Temperature (°C)	Time(min.)	1	Low- category temp. (NPO/X7R/X5R: -55 Y5V:-25 Z5U:+10)	30	2	Normal temp. (+20)	2~3	3	Up- category temp. (NPO/X7R/X5R:+125 Y5V/Z5U: +85)	30	4	Normal temp. (+20)	2~3
Step	Temperature (°C)	Time(min.)																	
1	Low- category temp. (NPO/X7R/X5R: -55 Y5V:-25 Z5U:+10)	30																	
2	Normal temp. (+20)	2~3																	
3	Up- category temp. (NPO/X7R/X5R:+125 Y5V/Z5U: +85)	30																	
4	Normal temp. (+20)	2~3																	
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: B: $\leq \pm 12.5\%$ F: $\leq \pm 30\%$ Class I: $\pm 7.5\%$ or $\pm 0.75pF$, whichever is larger. Class II: B: $\leq \pm 12.5\%$ F: $\leq \pm 30\%$	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小时(I类); 48小时 (II类)																
	DF	≤ 2 倍初始标准 Not more than twice of initial value.	温度: $40 \pm 2^\circ C$ Humidity: 90~95%RH Voltage: Rated Voltage Duration: 500h Recovery conditions: Room temperature Recovery Time: 24h (Class1) or 48h (Class2)																
	IR	Class I	$R_i \geq 5000M\Omega$ 或 $R_i \cdot C_R \geq 50S$ 取两者之中较小者; $R_i \geq 5000M\Omega$ 或 $R_i \cdot C_R \geq 50S$ whichever is smaller.																
		X7R	$R_i \geq 1000M\Omega$ 或 $R_i \cdot C_R \geq 10S$ 取两者之中较小者; $R_i \geq 1000M\Omega$ 或 $R_i \cdot C_R \geq 10S$ whichever is smaller.																
		Y5V	$R_i \geq 400M\Omega$ 或 $R_i \cdot C_R \geq 10S$ 取两者之中较小者; $R_i \geq 400M\Omega$ 或 $R_i \cdot C_R \geq 10S$ whichever is smaller.																
外观: 无损伤 Appearance: No visible damage.																			



项目 Item	技术规格 Technical Specification		测试方法 Test Method and Remarks
寿命试验 Life Test	$\Delta C/C$	I类: $\leq \pm 2\%$ 或 $\pm 1\text{pF}$ 取两者之中较大者 II类: B: $\leq \pm 20\%$ F: $\leq \pm 30\%$ Class I : $\leq \pm 2\%$ or $\pm 1\text{pF}$, whichever is larger. Class II : B: $\leq \pm 20\%$ F: $\leq \pm 30\%$	电压: 2 倍额定工作电压 时间: 1000 小时 温度: 125°C (NPO、X7R) 85°C (Y5V) 充电电流: 不应超过 50mA 放置条件: 室温 放置时间: 24 小时 (I类), 或 48 小时 (II类), Applied Voltage: $2 \times \text{Rated Voltage}$ Duration: 1000h Temperature: 125°C (NPO、X7R) 85°C (Y5V) Charge/ Discharge Current: 50mA max. Recovery Conditions: Room Temperature Recovery Time: 24h (Class 1), or 48h (Class2)
	DF	≤ 2 倍初始标准 Not more than twice of initial value.	
	IR	I类: $R_i \geq 4000\text{M}\Omega$ 或 $R_i \cdot C_R \geq 40\text{S}$ 取两者之中较小者. Class I : $R_i \geq 4000\text{M}\Omega$ 或 $R_i \cdot C_R \geq 40\text{S}$ whichever is smaller.	
		II类: $R_i \geq 2000\text{M}\Omega$ 或 $R_i \cdot C_R \geq 50\text{S}$ 取两者之中较小者. Class II : $R_i \geq 2000\text{M}\Omega$ 或 $R_i \cdot C_R \geq 50\text{S}$ whichever is smaller.	
外观: 无损伤 Visual Appearance: No visible damage.			

注解:

专门预处理* (仅对 2 类电容器):

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

Note: Pretreatment (only for class2 capacitor)

Pretreatment (only for class2 capacitor) is a method to treat the capacitor before measurement. First, place the capacitor in the up-category temperature or other specified higher temperature environment for 1hour. Then recovery the capacitor at standard pressure conditions for $24 \pm 1\text{hours}$ 。

※以最新版本的内容为准