

东莞市诚韬电子有限公司
DONG GUAN CHENG TAO ELECTRONIC CO.,LTD
TEL:0769-85328315 FAX:0769-85532615

承 认 书

客 户:

CUSTOMER

品 名: 贴片固态

DESCRIPTION

規 格: HV 系列

料 號:

PART NO.

適用機種:

FOR MODEL NO.

承制方確認

擬 制	審 核	批 准
蔡 雯 莉	曾 可 可	刘 欣 晨

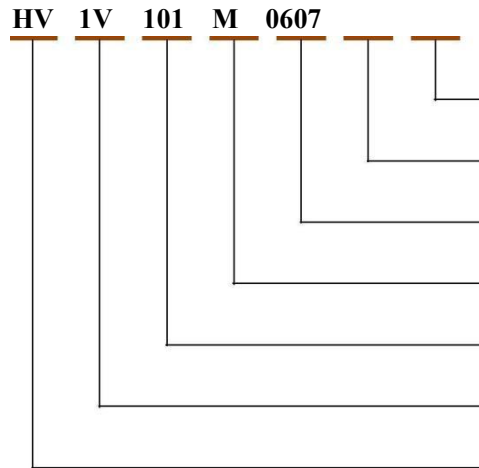
使用方確認

開發/工程 審 核	IQC 審核	批 准

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1> 物料编码 Huasheng material code



尺寸编码 Size code(1.5)

电容公差编码 Capacitance tolerance Code (1.4)

电容量编码 Capacitance Code(1.3)

电压编码 Voltage Code(1.2)

系列编码 Category Code(1.1)

1.1 系列编码 Series Code

编码 Code	HV
系列编码 Series Code	HV

1.2 电压编码 Voltage Code

编码 Code	0E	0G	0J	1A	1C	1E	1V	1H	1J	1K	2A
电压编码 VoltageCode(W.V)	2.5	4	6.3	10	16	25	35	50	63	80	100

1.3 电容量编码 Capacitance Code

编码 Code	470	101	221	331	471	561	681	821	102
电容量 Capacitance (uF)	47	100	220	330	470	560	680	820	1000

1.4 电容公差编码 Capacitance tolerance coding

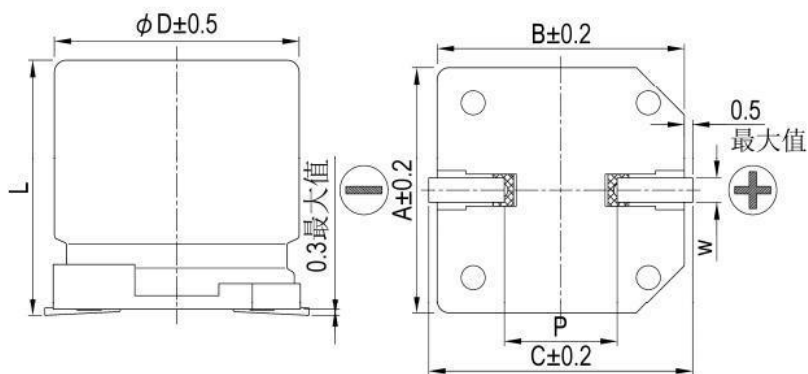
“M” 代表-20%~+20% “ M” stands for -20%~+20%

1.5 尺寸编码 Size code

编码 Code	0505	0605	0607	0810	1010
直径 D (Φ)	5	6.3	6.3	8	10
高度 H (mm)	5.8	5.8	7.7	10.5	10.5

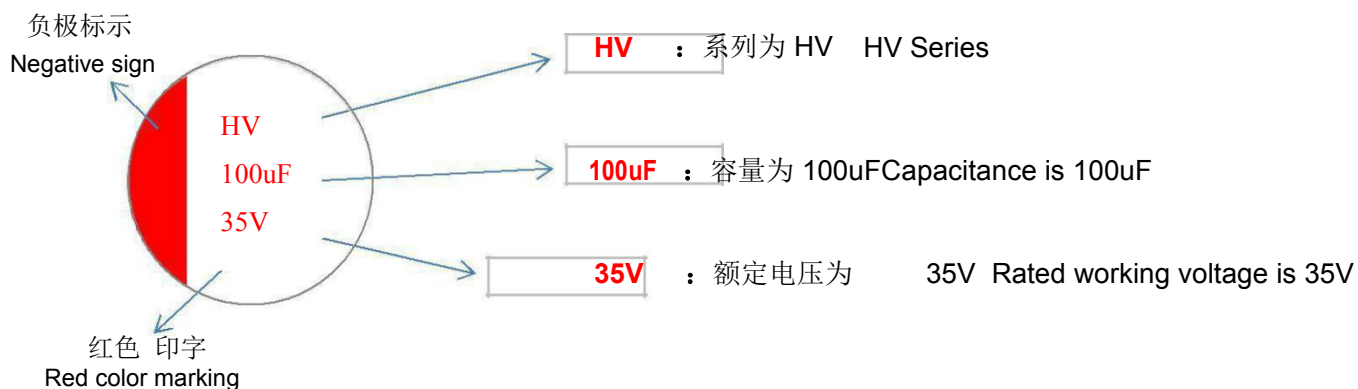
贴片式导电高分子固态电容器
Chip conductive polymer solid state capacitor

2> 产品尺寸图 Product size drawing

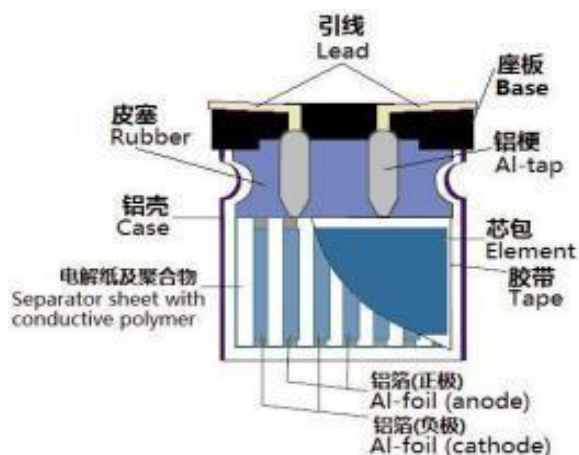


尺寸编码 Size Code	ΦD	L	P	W	A	B	C
0505	5.0	5.8±0.3	1.5	0.5~0.8	5.3	5.3	5.7
0605	6.3	5.8±0.3	2.2	0.5~0.8	6.6	6.6	7.2
0607	6.3	7.7±0.3	2.2	0.5~0.8	6.6	6.6	7.2
0810	8.0	10.5±0.5	3.1	0.8~1.1	8.3	8.3	9.0
1010	10	10.5±0.5	4.5	0.8~1.1	10.3	10.3	11.0

3> 印字标识 Print identification



4> 产品结构图 Product Structure Diagram



No.	成分 Compositions	
1	芯包 Element	正极箔 Anode foil
2		负极箔 Cathode foil
3		电解纸 Separator
4		胶带 Tape
5		聚合物 Polymer
6	皮塞 Rubber	
7	铝梗 Al-tap	
8	引线 Lead wires	
9	铝壳 Case	
10	座板 Base	

5> 产品特性 Characteristics

1.标准测试条件

Standard test conditions

除非另有规定，所有测试环境应当在以下条件下进行：

Unless otherwise specified, all tests shall be performed at following conditions:

环境温度： **15-35** °C

Ambient temperature: 15-35 °C

相对湿度： **45-75%** RH

Relative humidity: 45-75% RH

气压： **86-106** Kpa

Air pressure 86-106 Kpa

测试疑虑时，在以下条件下确认测量结果：

Any testing doubt, confirm the measurement results under the following conditions:

环境温度： **20±2** °C

Ambient temperature: 20±2 °C

相对湿度： **60-70%** RH

Relative humidity: 60-70% RH

气压： **86-106** Kpa

Air pressure 86-106 Kpa

贴片式导电高分子固态电容器
Chip conductive polymer solid state capacitor

HV 系列 HV series

·105℃、2,000 小时寿命保证 105℃, 2,000 hours life guarantee

·极低等效串联电阻 (ESR) Very low equivalent Series Resistance (ESR)

符合 RoHS 和 REACH 指令 Comply with the RoHS and REACH directives

◆特性参数表 Characteristic parameter list



WV	Cap (μ F)	尺寸 Φ DxL (mm)	损失角正切值 ($\tan\delta$) (20℃, 120Hz)	漏电流 (μ A) (max)	等效串联电阻 (ESR) (m Ω max./20℃, 100kHz)	额定纹波电流 (mA _{rms} /105℃, 100kHz)	料号
2.5V	330	6.3*5.8	0.10	500	28	2400	HV0E331M0605
	330	6.3*7.7	0.10	500	25	2550	HV0E331M0607
	390	6.3*7.7	0.10	500	25	2650	HV0E391M0607
	470	6.3*7.7	0.10	500	22	2750	HV0E471M0607
	560	6.3*5.8	0.10	500	25	2600	HV0E561M0605
6.3	100	6.3X5.8	0.12	500	38	1300	HV0J101M0605
	220	5X5.8	0.12	500	42	1450	HV0J221M0505
		6.3X5.8	0.12	500	38	1600	HV0J221M0605
	330	6.3X5.8	0.12	500	28	1900	HV0J331M0605
	470	6.3X7.7	0.12	592	25	2750	HV0J471M0605
	560	6.3X7.7	0.12	705	25	3100	HV0J561M0607
	680	6.3X7.7	0.12	857	25	3500	HV0J681M0607
	820	6.3X7.7	0.12	1033	22	3750	HV0J821M0607
		8X10.5			20	4100	HV0J821M0810
	1000	8X10.5	0.12	1260	20	4350	HV0J102M0810
		10X10.5			20	4500	HV0J102M1010
	1500	8X10.5	0.12	1890	20	4550	HV0J152M0810
	2200	10X10.5	0.12	2772	20	4800	HV0J222M1010
10V	100	6.3X5.8	0.12	500	48	1250	HV1A101M0605
	220	6.3X5.8	0.12	500	38	1650	HV1A221M0605
		6.3X7.7			35	2150	HV1A221M0607
	330	6.3X7.7	0.12	660	32	2350	HV1A331M0607
		8X10.5			28	2950	HV1A331M0810
	470	6.3X7.7	0.12	940	32	2600	HV1A471M0607
		8X10.5			28	3100	HV1A471M0810
	560	8X10.5	0.12	1120	28	3350	HV1A561M0810
	680	8X10.5	0.12	1360	28	3450	HV1A681M0810
	820	8X10.5	0.12	1640	28	3600	HV1A821M0810
	1000	8X10.5	0.12	2000	25	3950	HV1A102M0810
	1500	10X10.5	0.12	3000	25	4100	HV1A152M1010

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WV	Cap (μ F)	尺寸 Φ DxL (mm)	损失角正切值 (tan δ) (20℃, 120Hz)	漏电流 (μ A) (max)	等效串联电阻 (ESR) (m Ω max./20℃, 100kHz)	额定纹波电流 (mA rms/105℃, 100kHz)	料号
16V	10	6.3X5.8	0.12	500	75	650	HV1C100M0605
	47	5X5.8	0.12	500	65	650	HV1C470M0505
		6.3X5.8	0.12	500	58	950	HV1C470M0605
	100	5X5.8	0.12	500	68	780	HV1C101M0505
		6.3X5.8	0.12	500	55	1150	HV1C101M0605
	150	6.3X5.8	0.12	500	48	1500	HV1C151M0605
		6.3X7.7	0.12	500	38	2100	HV1C151M0607
	220	6.3X7.7	0.12	704	35	2450	HV1C221M0607
	270	6.3X7.7	0.12	864	35	2500	HV1C271M0607
		8X10.5			32	2720	HV1C271M0810
	330	6.3X7.7	0.12	1056	35	2550	HV1C331M0607
		8X10.5			32	2800	HV1C331M0810
		10X10.5			30	3350	HV1C331M1010
	470	6.3X7.7	0.12	1504	28	2650	HV1C471M0607
		8X10.5			28	2900	HV1C471M0810
		10X10.5			25	3500	HV1C471M1010
	560	8X10.5	0.12	1792	28	3050	HV1C561M0810
		10X10.5			25	3750	HV1C561M1010
	680	8X10.5	0.12	2176	28	3200	HV1C681M0810
		10X10.5			25	3850	HV1C681M1010
	820	8X10.5	0.12	2624	28	3350	HV1C821M0810
		10X10.5			25	4100	HV1C821M1010
	1000	10X10.5	0.12	3200	25	4350	HV1C102M1010
25V	10	6.3X5.8	0.12	500	78	550	HV1E100M0605
	22	5X5.8	0.12	500	65	650	HV1E220M0505
	47	6.3X5.8	0.12	500	58	850	HV1E470M0605
	68	5X5.8	0.12	500	78	680	HV1E680M0505
	100	6.3X5.8	0.12	500	48	950	HV1E101M0605
		6.3X7.7			45	1650	HV1E101M0607
	220	6.3X7.7	0.12	1100	35	1950	HV1E221M0607
		8X10.5			32	2500	HV1E221M0810
	330	8X10.5	0.12	1650	32	2650	HV1E331M0810
	470	8X10.5	0.12	2350	30	2800	HV1E471M0810
		10X10.5			28	3150	HV1E471M1010
	560	8X10.5	0.12	2800	28	3050	HV1E561M0810
	680	8X10.5	0.12	3400	28	3200	HV1E681M0810
		10X10.5			25	3350	HV1E681M1010
	820	10X10.5	0.12	4100	25	3650	HV1E821M1010
	1000	10X10.5	0.12	5000	25	3800	HV1E102M1010

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Chip conductive polymer solid state capacitor

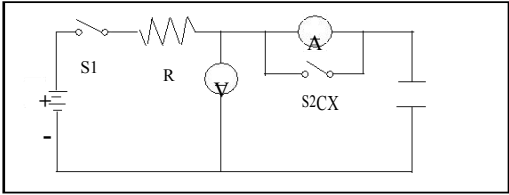
WV	Cap (μ F)	尺寸 Φ DxL(mm)	损失角正切值 ($\tan\delta$) (20℃, 120Hz)	漏电流 (μ A) (max)	等效串联电阻 (ESR) (m Ω max./20℃, 100kHz)	额定纹波电流 (mA _{rms} /105℃, 100kHz)	料号
35V	10	5X5.8	0.12	500	92	360	HV1V100M0505
		6.3X5.8	0.12	500	78	480	HV1V100M0605
	22	5X5.8	0.12	500	85	410	HV1V220M0505
		6.3X5.8	0.12	500	58	550	HV1V220M0605
	47	6.3X5.8	0.12	500	58	750	HV1V470M0605
		6.3X7.7			52	1150	HV1V470M0607
	68	6.3X7.7	0.12	500	48	1300	HV1V680M0607
	100	6.3X7.7	0.12	700	48	1500	HV1V101M0607
		8X10.5			38	1950	HV1V101M0810
	150	8X10.5	0.12	1050	38	2100	HV1V151M0810
	220	8X10.5	0.12	1540	38	2300	HV1V221M0810
	270	10X10.5	0.12	1890	35	2600	HV1V271M1010
	330	8X10.5	0.12	2310	35	2450	HV1V331M0810
		10X10.5			32	2700	HV1V331M1010
	470	8X10.5	0.12	3290	35	2650	HV1V471M0810
		10X10.5			28	2950	HV1V471M1010
	560	10X10.5	0.12	3920	28	3350	HV1V561M1010
50V	2.2	5X5.8	0.12	500	85	290	HV1H2R2M0505
	10	5X5.8	0.12	500	98	310	HV1H100M0505
		6.3X5.8	0.12	500	78	350	HV1H100M0605
	22	6.3X5.8	0.12	500	58	460	HV1H220M0605
	33	6.3X7.7	0.12	500	48	850	HV1H330M0607
	47	6.3X7.7	0.12	500	45	950	HV1H470M0607
		8X10.5			38	1450	HV1H470M0810
	100	8X10.5	0.12	1000	38	1650	HV1H101M0810
		10X10.5			35	1800	HV1H101M1010
	150	8X10.5	0.12	1500	35	1900	HV1H151M0810
		10X10.5			30	2150	HV1H151M1010
	220	10X10.5	0.12	2200	28	2350	HV1H221M1010
63V	8.2	5X5.8	0.12	500	68	310	HV1J8R2M0505
	10	6.3X5.8	0.12	500	68	310	HV1J100M0605
	22	6.3X7.7	0.12	500	58	420	HV1J220M0607
	47	8X10.5	0.12	592	48	1100	HV1J470M0810
	56	8X10.5	0.12	705	45	1250	HV1J560M0810
	100	8X10.5	0.12	1260	38	1500	HV1J101M0810
		10X10.5			32	1600	HV1J101M1010
	150	10X10.5	0.12	1890	28	1950	HV1J151M1010
	220	10X10.5	0.12	2772	35	2350	HV1J221M1010
80V	10	6.3X7.7	0.12	500	68	290	HV1K100M0607
	22	6.3X7.7	0.12	500	58	680	HV1K220M0607

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Chip conductive polymer solid state capacitor

WV	Cap (μ F)	尺寸 Φ DxL(mm)	损失角正切值 ($\tan\delta$) (20℃, 120Hz)	漏电流 (μ A) (max)	等效串联电阻 (ESR) (m Ω max./20℃, 100kHz)	额定纹波电流 (mA _{rms} /105℃, 100kHz)	料号
80	47	8X10.5	0.12	752	58	980	HV1K470M0810
		10X10.5			55	1250	HV1K470M1010
	100	10X10.5	0.12	1600	48	1500	HV1K101M1010
100	4.7	5X5.8	0.12	500	98	118	HV2A4R7M0505
	10	6.3X5.8	0.12	500	82	225	HV2A100M0605
	22	6.3X7.7	0.12	500	48	320	HV2A220M0607
		8X10.5			45	660	HV2A220M0810
	33	10X10.5	0.12	660	48	850	HV2A330M1010
	47	10X10.5	0.12	940	45	1050	HV2A470M1010

贴片式导电高分子固态电容器
Chip conductive polymer solid state capacitor

3.特性参数说明 Description

NO.	特性 Characteristics	单位 unit	说明 Description				
1	容量 capacitance	uF	产品标称容量, 测试频率: 120HZ , 在规定容量公差内 Product nominal capacity, test frequency: 120HZ, within the specified capacity tolerance				
2	电压 working voltage	v	产品额定电压 Rated working voltage				
3	损失角 Dissipation Factor	%	也称损耗, 测试频率: 120HZ Also calls dissipation, test frequency: 120HZ				
4	阻抗 ESR Impedance	mΩ	等效串联电阻, 测试频率 100KHZ Equivalent series resistance, test frequency 100KHZ				
5	纹波电流 RC Ripple Current	mA rms	最大许可纹波电流为 100KHZ 下最大 A.C 电流 The maximum allowable ripple current is 100KHZ, the largest A.C current				
			DC 电压和峰值 AC 电压总和不可超出额定电压, 不可反向充电 The DC voltage plus the peak AC voltage must not exceed the rated voltage, and non-reverse charging				
			频率 HZ Frequency	120≤f<1k	1K≤f<10K	10K≤f<100K	100K≤f<500K
			系数 coefficient	0.05	0.3	0.7	1
6	漏电流 LC Leak Current	uA	施加额定工作电压 2 分钟后读数, 小于或等于规格值 (at 20℃) I≤0. 2CV 或 500 μ A (取大值) Less than or equal to the specified value. After 2 minutes application of rated Voltage at 20℃				
							
7	外形尺寸 Φ DXL Dimensions	mm	产品外径、高度 Diameter、Height				

贴片式导电高分子固态电容器
Chip conductive polymer solid state capacitor

6> 高温负荷寿命试验 High temperature load life test

电容器在额定最高温度下施加额定电压，持续储存至规定寿命时间后，符合以下要求：

The capacitor applies the rated voltage at the rated maximum temperature and is continuously stored to the specified life time, meeting the following requirements:

项目 item	要求 requirements
寿命时间 life time	2000 ±48 小时 hours
容量变化 change of capacitance	在容量初始值±20%内 Within ±20% of the initial value
损失角 dissipation factor	不超过规定值的 1.5 倍 Not to exceed 150% of the value specified
ESR	不超过规定值的 1.5 倍 Not to exceed 150% of the value specified
LC	不超过规定值 Not to exceed the value specified

7> 浪涌电压试验 Surge voltage test

在任何情况下，浪涌直流电压是电容器所应承受的最大电压，这包括瞬变和峰值纹波最高的线路电压。

The surge DC rating is the maximum voltage to which the capacitor should be subjected under any conditions. This includes transients and peak ripple at the highest line voltage.

额定电压 (V) rated working voltage	额定温度 (°C) upper temperature	浪涌电压 (V) surge voltage
2.5	105	2.9
6.3	105	7.2
10	105	11.5
16	105	18.4
25	105	28.8
35	105	40.3
50	105	57.5
63	105	72.5
100	105	115.0

浪涌电压=1.15*额定电压

在常温条件下，电容串联 **1000Ω**电阻后，应用浪涌直流电压进行测试。

充电 **30±5** 秒，放电 **5±0.5** 分钟，充电放电过程重复 **1000** 次，符合以下要求：

At room temperature, after the capacitor is connected to 1000Ω resistor, the surge DC voltage is used for testing. Charge 30±5 seconds, discharge 5±0.5 minutes, the charging and discharge process is repeated 1000 times, meeting the following requirements:

项目 item	要求 requirements
容量变化 change of capacitance	在容量初始值±20%内 Within ±20% of the initial value
损失角 dissipation factor	不超过规定值的 1.5 倍 Not to exceed 150% of the value specified
ESR	不超过规定值的 1.5 倍 Not to exceed 150% of the value specified
LC	不超过规定值 Not to exceed the value specified

贴片式导电高分子固态电容器
Chip conductive polymer solid state capacitor

8> 稳态湿热试验 Damp heat(steady state) test

于环境温度 $60\pm 2^{\circ}\text{C}$, 湿度 **90-95% RH** 条件下, 储存 **1000 $\pm$ 48** 小时, 符合以下要求:

The following requirements shall be satisfied after the capacitors are stored at $60\pm 2^{\circ}\text{C}$, 90 to 95%RH for 1000 $\pm$ 48 hours

项目 item	要求 requirements
容量变化 change of capacitance	在容量初始值 $\pm 20\%$ 内 Within $\pm 20\%$ of the initial value
损失角 dissipation factor	不超过规定值的 1.5 倍 Not to exceed 150% of the value specified
ESR	不超过规定值的 1.5 倍 Not to exceed 150% of the value specified
LC	不超过规定值 Not to exceed the value specified

9> 温度特性试验 characteristics at High and low Temperature

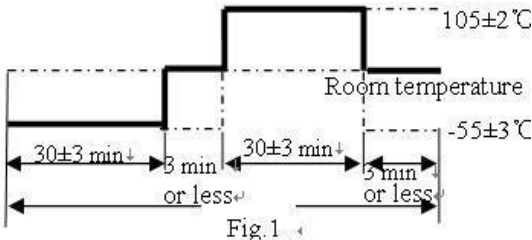
于以下环境步骤按规定时间储存, 符合以下要求:

The following requirements shall be satisfied after the capacitors are stored at following conditions and specified time

步骤 Step	温度 Temperature	存储时间 Storage Time	测试项目 Test item	要求 requirements
1	$20^{\circ}\text{C} \pm 2^{\circ}\text{C}$	30minutes	电容量 Capacitance 损耗角正切 Tangent of loss angle ESR	不超过规定值 Not to exceed the value specified
2	$-55^{\circ}\text{C} \pm 3^{\circ}\text{C}$	2 hours	ESR	$Z(-55^{\circ}\text{C}) / Z(20^{\circ}\text{C}) \leq 2.5$
3	$105^{\circ}\text{C} \pm 3^{\circ}\text{C}$	2 hours	LC	$LC(105^{\circ}\text{C}) / LC(\text{SPEC}) \leq 12.5$ LC (SPEC) : 初始规定值 LC (SPEC) : indicates the initial specified value
			ESR	$Z(+105^{\circ}\text{C}) / Z(20^{\circ}\text{C}) \leq 1.25$

10> 快速变温试验 Rapid change of temperature

要求 requirement	
容量变化在初始值 $\pm 20\%$ 内 Within $\pm 20\%$ of the initial value	
损失角不超过规定值 Dissipation factor: not to exceed the value specified	
ESR 不超过规定值 ESR: not to exceed the value specified	
LC 不超过规定值 LC: not to exceed the value specified	



使用电压: 无负荷 Applied voltage : without load
循环次数: 5 次 Cycle number : 5 Cycles
测试图: Fig. 1 Test diagram: Fig. 1

Fig. 1

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11> 振动试验 Vibration test

振动频率: 10-55HZ (间隔 1 分钟 / 10HZ-->55HZ-->10HZ)

Vibration frequency: 10-55HZ (Spaced one minute apart/ 10HZ-->55HZ-->10HZ) **振幅:** 0.75mm (总偏移 1.5mm)

Amplitude: 0.75mm (total migration 1.5mm)

方向: X、Y、Z (3 向)

Direction: X、Y、Z axis(three directions)

持续时间: 2 小时/向

Duration: 2 hours/direction

安装图示如下:

Installation diagram as below:



30 分钟内, 容量值相比初始值不应有明显变化

Within 30 minutes, capacitance has no significant change comparison with initial value

项目 item	要求 requirement
容量变化 change of capacitance	在容量初始值±5%内 Within ±5% of the initial value
外观 appearance	端子无断裂、松动 pins have no broken and loose

12> 可焊性试验 Solderability test

焊料: 约 25%松香/乙醇溶液, 焊料 Sn-Ag-Cu

Solder: about 25% rosin/ethanol solution, solder Sn - Ag - Cu

温度: 245±5℃

Temperature: 245±5℃

时间: 2±0.5 秒

Time: 2±0.5 seconds

试验后端子浸渍位置至少 95%面积包盖了新锡。

After testing, more than 95% of the terminal surface shall be covered with new solder

13> 焊锡耐热试验

Solder Heat Resistance Test

1. 焊锡槽法 Tin groove method:

温度: 260±5℃ **时间:** 10±1 秒

Temperature: 260±5℃ Time: 10±1 seconds

2. 烙铁焊接方法 Soldering iron welding method:

温度: 400±10℃ **时间:** 3+1/-0 秒

Temperature: 400±10℃ Time: 3+1/-0 seconds

以上两种方法, 在电容器热量趋于稳定后, 符合以下要求:

For above two methods, after the capacitor heat is stabilized, the following requirements should be met

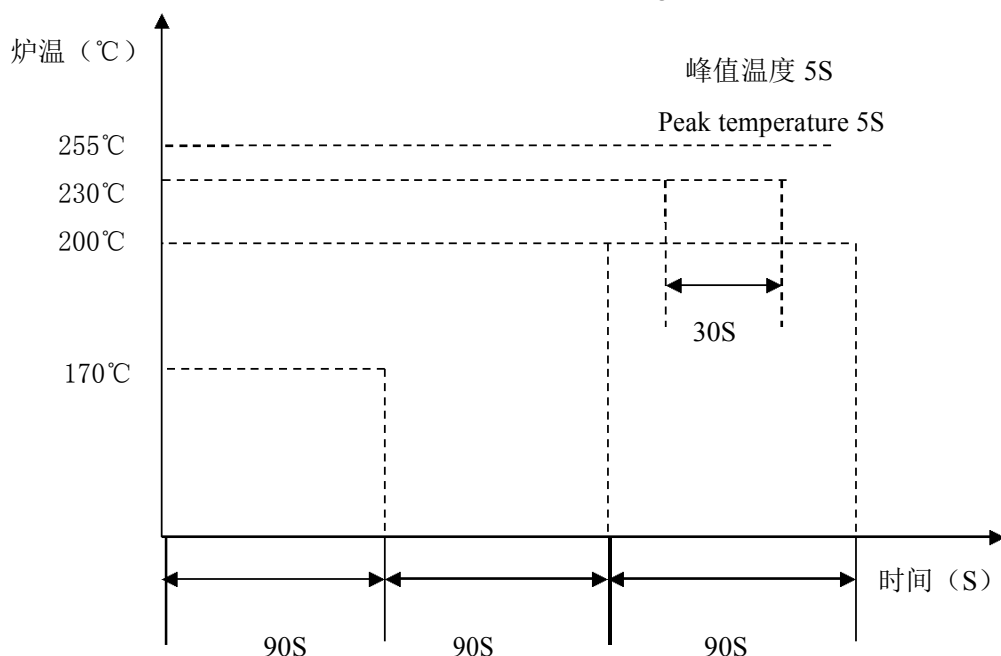
贴片式导电高分子固态电容器
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项目 item	要求 requirement
容量变化 change of capacitance	在容量初始值±5%内 Within ±5% of the initial value
损失角 dissipation factor	不超过规定值 Not to exceed the value specified
ESR	不超过规定值 Not to exceed the value specified
LC	不超过规定值 Not to exceed the value specified

14> 回流焊条件 Reflow soldering condition

无铅回流焊温度与时间曲线

Temperature and time curve of lead-free reflow welding



阶段 stage	条 件 piece		
	最高温度 maximum temperature	时间 time	温度范围 temperature range
预热 preheat	170°C	≤90sec	≤170°C
预热 preheat	200°C	≤90sec	170°C—200°C
回流焊 reflow soldering	255°C	≤30sec	230°C—255°C

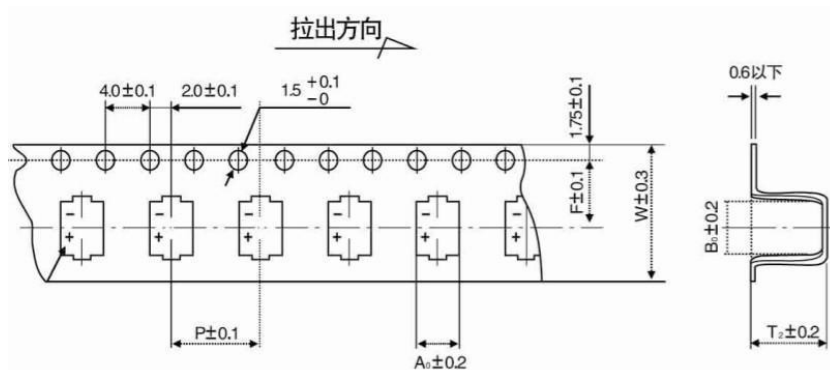
注：出现超过条件超过允许的情况，请联系我们；If conditions are exceeded, please contact us；避免二次回流焊，如不可避免，请确认电容器温度已冷却至 5°C-35°C；

Avoid secondary reflow welding, if unavoidable, please confirm that the capacitor temperature has been cooled to 5°C-35°C；

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Chip conductive polymer solid state capacitor

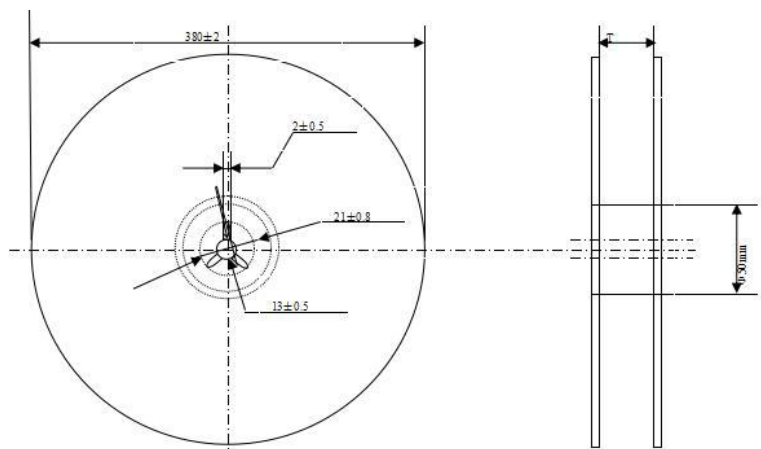
15> 包装规范 package specification

载带尺寸 (mm) Belt size (mm)



尺寸 Size	W (MM)	P (MM)	F (MM)	A0 (MM)	B0 (MM)	T2 (MM)	S	形状 Applicable
Φ5*5.8	12	12	5.5	5.7	5.7	5.8	--	
Φ6.3*5.8	16	12	7.5	7.0	7.0	5.8	--	
Φ6.3*7.7	16	12	7.5	7.0	7.0	8.3	--	
Φ8*10.5	24	16	11.5	8.7	8.7	11.0	--	
Φ10*10.5	24	16	11.5	10.7	10.7	11.0	--	

编带包装盘 (mm) Braid packing tray (mm)



ΦD	5	6.3	8、10
T	14	18	26

尺寸 size	数量/每盘 Quantity/per plate	数量/每箱 Quantity/per box
5*5.8	1000pcs	10Kpcs
6.3	1000pcs	10Kpcs
8、10	500pcs	5Kpcs

一、 16>铝电解电容器的使用注意事项 Guidelines For Using Aluminum Electrolytic Capacitor

为使您获得电解电容器的最佳性能和延长电解电容器的使用寿命，在使用电解电容器前，请务必阅读本注意
事项。

Upon using Aluminum Electrolytic Capacitors, please proper handing and observing to
following important

points will insure optimum capacitor performance and long life.

1. 直流电解电容器是有极性的 DC electrolytic capacitors are polarized.

确定极性，极性标志在电容器的基体上。避免因极性反可能引起电路短路或电容器损坏，当极性不固定或不确定的，使用双极性电容器。注意直流电解电容器不能使用于交流。

Make sure of the polarity. The polarity is marked on the body of the capacitor .Application of the reversed voltage cause a short circuit or damage to the capacitor. Use bipolar capacitors when the polarity is not determined or unknown. Note that DC electrolytic capacitors can not be used for AC application.

2. 使用电压不要大于额定电压 Do not apply voltage greater than rated voltage.

使用电压大于额定电压，漏电流会增大，可能损坏电容器。建议工作电压为额定电压的百分之七十~八十，电容器在建议的工作电压下使用可延长电容器的寿命。

If a voltage exceeding the rated voltage is applied, the leakage current will increase, which damage the capacitor. Recommended working voltage is 70 to 80 percent of tatted voltage.

Using capacitors at recommended working voltage prolongs capacitor life.

3. 不要使过量的纹波电流通过电容器 Do not allow excessive ripple current through the capacitor.

流过电容器的纹波电流超过许可值，将会引起电容器发热，电容量减少，损害电容器。通过电容器的纹波电流不要大于允许值。

The flow of ripple current over permissible ripple current will cause heat of the capacitor, which may decrease the capacitance and damage the capacitor. Ripple current on the capacitor must be at or bellow allowable level.

4. 快速的充放电电路中，使用专门设计的电容器 ‘

Use specially designed capacitors for the circuits where charge and discharge are frequency repeated.

在经受快速的周期性充放电电路中，电容器可能受损害，它的寿命因容量下降、温升等原因而缩短，在这种电路中，一定要使用专门设计的电容器。

In the circuit subjected to rapid charge cycles, capacitors may be damaged, its life may be shortened by capacitance decrease, heat rise, ect. Be sure and use special capacitors in these applications.

5. 工作温度范围 Operating temperature range.

电容器的特性随工作温度而变化，在温度较高的情况下，容量、漏电流增大，损耗减少；在低温情况下，容量和漏电流下降，损耗增大。电容器在较低的温度下使用会确保延长寿命。

The characteristics of capacitors change with the operating temperature. The capacitance and leakage current increase and $\tan \delta$ decrease at higher temperatures. The capacitance and leakage current decrease and $\tan \delta$ increase at lower temperature. Usage at lower temperature will ensure longer life.

6. 核对工作频率 Check operating frequency.

电解电容器的容量通常是在 100Hz 或 120Hz 下测得的。然而要记住容量随频率的升高而下降， $\tan \delta$ 随频率的升高而增大，并使周围温度升高。

The capacitance of electrolytic capacitors is usually measured at 100Hz or 120Hz. However, remember that capacitance decrease and $\tan \delta$ increase as the applied frequency becomes higher whereas the ambient temperature becomes higher.

7. 长时间存放的电容器，在使用前加额定直流电压处理

Apply rated DC voltage treatment to the capacitors which have been stored for a long time . 长时间的存放，实际对电容器的容量和 $\tan \delta$ 没有多大的影响，然而往往会使漏电流增大，耐压降低。长时间存放后的电容器处理，首先逐渐施加直流电压至额定电压，然后再使用。

Long periods of storage have virtually no effect on a capacitor's capacitance and $\tan \delta$. Such periods tend however, to increase leakage current and decrease withstand voltage. After removing capacitors from long-duration storage, first apply a gradually increasing DC voltage to rated voltage and then use them.

8. 电容器外壳与阴极端是不绝缘的 The capacitor case is not insulated from the cathode terminal.

电容器外壳与阴极端是通过电解液连接的，如果电容器的外壳必须与线路绝缘，则电容器的安装位置处，一定要采取绝缘措施。

The capacitor's case and cathode terminal connect through the electrolyte. If the case is to be completely insulated, that insulation must be at the capacitor's mounting point.

9. 电容器的端子或引线上不要施加过大的力

Do not apply excessive force to the terminals and leads.

过大的力施加到端子和引线上，可能引起引线的断裂或端子分裂，转而会引起内部连接的破坏。

The excessive strong force applied to the terminals and lead wires may cause leads to break or terminals to separate and, in turn, cause the internal contact to fail.