

HS 系列 HS series

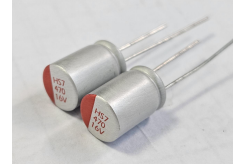
•105℃、2000 小时寿命保证 105℃, 2000 hours life guarantee

•极低等效串联电阻(ESR)并可承受大纹波电流

Very low equivalent series resistance (ESR) and can withstand large ripple currents

•符合 ROHS 和 REACH 指令 Comply with the ROHS and REACH directives

◆标准品一览表 List of standards



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) ($m\Omega$ max./20℃, 100kHz)	额定纹波电流 (mA _{rms} /105℃, 100kHz)	产品代码
2.5V	470	6.3X7	0.08	500	18	2690	HS0E477M0607PC
	560	6.3X7	0.08	500	18	2690	HS0E567M0607PC
		6.3X8	0.08	500	16	4100	HS0E567M0608PC
	680	6.3X8	0.08	500	16	4100	HS0E687M0608PC
		6.3X9	0.08	500	14	4500	HS0E687M0609PC
	820	6.3X8	0.08	500	16	4100	HS0E827M0608PC
		6.3X9			14	4500	HS0E827M0609PC
	1000	6.3X9	0.08	500	14	4500	HS0E108M0609PC
		8X8			14	4500	HS0E108M0808PC
	1500	8X8	0.08	750	14	4500	HS0E158M0808PC
		8X11.5			14	4750	HS0E158M0811PC
	2200	8X11.5	0.08	1100	14	4900	HS0E228M0811PC
		10X12			14	4900	HS0E228M1012PC
	3300	10X12	0.08	1650	14	4900	HS0E338M1012PC
4700	10X13.5	0.08	2350	14	4900	HS0E478M1013PC	
5600	10X16	0.08	2800	14	4900	HS0E568M1016PC	
6800	10X16	0.08	3400	14	4900	HS0E688M1016PC	
6.3V	100	5X5.5	0.08	500	28	1350	HS0J107M0505PC
		5X7			25	1650	HS0J107M0507PC
	180	5X7	0.08	500	21	2350	HS0J187M0507PC
	220	5X7	0.08	500	18	2690	HS0J227M0507PC
		6.3*5.5			25	2690	HS0J227M0605PC
	270	5X7	0.08	500	21	2690	HS0J277M0507PC
		6.3*5.5			22	2690	HS0J277M0605PC
	330	5X8	0.08	500	16	2690	HS0J337M0508PC
		6.3X5.5			22	2690	HS0J337M0605PC
	390	5X9	0.08	500	16	2690	HS0J397M0509PC

WV	Cap (μ F)	尺寸 Φ DxL(mm)	损失角正切值($\tan\delta$) (20°C, 120Hz)	漏电流 (μ A) (max)	等效串联电阻 (ESR) (m Ω max./20°C, 100kHz)	额定纹波电流 (mA _{RMS} /125°C, 100kHz)	产品代码
6.3V	470	5X9	0.08	592	16	2690	HS0J477M0509PC
		6.3X7		500	16	4100	HS0J477M0607PC
	500	5.5X7	0.08	630	16	3650	HS0J507M5507PC
	560	5X11.5	0.08	706	16	3500	HS0J567M0511PC
		5.5X9			16	4100	HS0J567M5509PC
		6.3X7			16	3950	HS0J567M0607PC
		6.3X8			16	4100	HS0J567M0608PC
	680	5.5X9	0.08	857	14	4150	HS0J687M5509PC
		6.3X8			16	4500	HS0J687M0608PC
		8X8			14	4500	HS0J687M0808PC
	820	5.5X11.5	0.10	1033	16	4250	HS0J827M5511PC
		6.3X8			16	4300	HS0J827M0608PC
		6.3X9			16	4500	HS0J827M0609PC
		8X8			14	4500	HS0J827M0808PC
	1000	6.3X10.5	0.10	1260	14	4500	HS0J108M0610PC
		6.3X11.5		752	14	4350	HS0J108M0611PC
		8X8	0.10		14	4500	HS0J108M0808PC
		8X11.5		1600	14	4700	HS0J108M0811PC
	1500	6.3X11.5	0.10	1890	14	4650	HS0J158M0611PC
		8X11.5	0.12	500	14	4800	HS0J158M0811PC
10X12		500		14	4900	HS0J158M1012PC	
1800	8X16	0.10	2268	14	4900	HS0J188M0816PC	
2200	8X16	0.10	2772	14	4900	HS0J228M0816PC	
	10X12			14	4900	HS0J228M1012PC	
3300	8X16	0.10	4158	14	5100	HS0J338M0816PC	
	10X12	0.12	2000	14	5100	HS0J338M1012PC	
4700	10X16	0.10	3760	14	5350	HS0J478M1016PC	
5600	10X16	0.10	4480	14	5500	HS0J568M1016PC	

WV	Cap (μF)	尺寸 $\Phi D \times L$ (mm)	损失角正切值 ($\tan\delta$) (20°C, 120Hz)	漏电流 (μA) (max)	等效串联电阻 (ESR) ($m\Omega$ max./20°C, 100kHz)	额定纹波电流 (mA rms/105°C, 100kHz)	产品代码
7.5V	220	6.3X5.5	0.08	500	28	2690	HS0Q227M0605PC
	330	5X11.5	0.08	500	18	3100	HS0Q337M0511PC
	470	6.3X7	0.08	705	16	3350	HS0Q477M0607PC
	500	5X11.5	0.08	750	14	3500	HS0Q507M0511PC
		5.5X9			14	3500	HS0Q507M5509PC
	560	6.3X8	0.08	840	14	3800	HS0Q567M0608PC
		8X8			14	4100	HS0Q567M0808PC
	680	6.3X9	0.10	1020	14	4350	HS0Q687M0609PC
		8X8			14	4350	HS0Q687M0808PC
	820	6.3X11.5	0.10	1230	14	4500	HS0Q827M0611PC
		8X8			14	4500	HS0Q827M0808PC
	1000	6.3X11.5	0.10	1500	14	4500	HS0Q108M0611PC
		8X11.5			14	4650	HS0Q108M0811PC
	1500	6.3X15	0.10	2250	14	4750	HS0Q158M0615PC
		8X11.5			14	4900	HS0Q158M0811PC
	2200	8X16	0.10	3300	14	5100	HS0Q228M0816PC
10X12		14			5100	HS0Q228M1013PC	
3300	10X13.5	0.10	4950	14	5250	HS0Q338M1013PC	
	10X16			14	5400	HS0Q338M1016PC	
4700	10X16	0.10	7050	14	5500	HS0Q478M1016PC	
10V	100	5X7	0.08	500	28	2350	HS1A107M0507PC
		6.3X5.5			38	2250	HS1A107M0605PC
	220	5X8	0.08	500	16	2690	HS1A227M0508PC
		6.3X7			16	2950	HS1A227M0607PC
		6.3X8			16	3100	HS1A227M0608PC
	330	6.3X8	0.08	660	16	3300	HS1A337M0608PC
	470	5X11.5	0.08	940	16	3400	HS1A477M0511PC
		6.3X8			14	3500	HS1A477M0608PC
		8X8			14	3650	HS1A477M0808PC
	560	6.3X9	0.08	1120	14	3700	HS1A567M0609PC
		8X8			14	4100	HS1A567M0808PC
	680	6.3X11.5	0.10	1360	14	4200	HS1A687M0611PC
		8X11.5			14	4500	HS1A687M0811PC
	820	6.3X11.5	0.10	1640	14	4650	HS1A827M0611PC
		8X11.5			14	4700	HS1A827M0811PC
	1000	8X11.5	0.10	2000	14	4850	HS1A108M0811PC
1500	10X12	0.10	3000	14	4900	HS1A158M1012PC	
2200	10X12	0.10	4400	10	5300	HS1A228M1012PC	
3300	10X16	0.10	6600	10	5650	HS1A338M1016PC	

WV	Cap (μ F)	尺寸 Φ DxL (mm)	损失角正切值 ($\tan\delta$) (20°C, 120Hz)	漏电流 (μ A) (max)	等效串联电阻 (ESR) (m Ω max./20°C, 100kHz)	额定纹波电流 (mA _{rms} /105°C, 100kHz)	产品代码
12V	330	5X9	0.10	792	18	2900	HS1B337M0509PC
	330	5.5X9	0.10	792	16	3500	HS1B337M5509PC
	470	6.3X8	0.10	1128	16	3650	HS1B477M0608PC
	560	6.3X11.5	0.10	1344	14	3800	HS1B567M0611PC
	680	6.3X11.5	0.10	1632	14	3900	HS1B687M0611PC
	820	8X11.5	0.10	1968	14	4000	HS1B827M0811PC
	1000	8X11.5	0.10	2400	14	4200	HS1B108M0811PC
	1500	8X16	0.10	3600	12	4500	HS1B158M0816PC
	2200	10X13.5	0.10	5280	12	4900	HS1B228M1013PC
	3300	10X16	0.10	7920	12	5400	HS1B338M1016PC
16V	22	5X7	0.12	500	45	650	HS1C226M0507PC
	47	5X7	0.12	500	48	950	HS1C476M0507PC
		6.3X5.5	0.12	500	38	980	HS1C476M0605PC
	100	5X7	0.12	500	25	2250	HS1C107M0507PC
		6.3X5.5			38	1950	HS1C107M0605PC
		6.3X7			22	2350	HS1C107M0607PC
		6.3X8			22	2600	HS1C107M0608PC
	180	5X8	0.12	576	20	2690	HS1C187M0508PC
		6.3X7			20	2800	HS1C187M0607PC
	220	5X9	0.12	704	20	2850	HS1C227M0509PC
		6.3X7			18	2900	HS1C227M0607PC
		6.3X8			16	3000	HS1C227M0608PC
	270	5X11.5	0.12	864	16	3100	HS1C277M0511PC
		6.3X8			16	3200	HS1C227M0608PC
	330	5X11.5	0.12	1056	18	3200	HS1C337M0511PC
		5.5X11.5			16	3100	HS1C337M5511PC
		6.3X7			18	3100	HS1C337M0607PC
		6.3X9			16	3300	HS1C337M0609PC
		8X8			14	3700	HS1C337M0808PC
	470	5.5X11.5	0.12	1504	16	3500	HS1C477M5511PC
		6.3X9			16	3500	HS1C477M0609PC
		6.3X10.5			16	3500	HS1C477M0610PC
		8X8			14	3800	HS1C477M0808PC
		8X11.5			14	4100	HS1C477M0811PC
		10X12			14	4500	HS1C477M1012PC
	560	5.5X11.5	0.12	1792	16	3600	HS1C567M5511PC
		6.3X11.5			14	3800	HS1C567M0611PC
		8X8			14	3950	HS1C567M0808PC
		8X11.5			14	4200	HS1C567M0811PC
		10X12			12	4600	HS1C567M1012PC

WV	Cap (μ F)	尺寸 Φ DxL(mm)	损失角正切值($\tan\delta$) (20°C, 120Hz)	漏电流 (μ A) (max)	等效串联电阻 (ESR) (m Ω max./20°C, 100kHz)	额定纹波电流 (mA _{RMS} /105°C, 100kHz)	产品代码
16V	680	6.3X11.5	0.12	2176	16	4150	HS1C687M0611PC
		6.3X15			14	4500	HS1C687M0615PC
		8X11.5			12	4500	HS1C687M0811PC
		10X12			12	4900	HS1C687M1012PC
	820	6.3X11.5	0.12	2624	14	4500	HS1C827M0611PC
		6.3X15			14	4700	HS1C827M0615PC
		8X11.5			12	4750	HS1C827M0811PC
		10X12			12	4900	HS1C827M1012PC
	1000	8X11.5	0.12	3200	14	4800	HS1C108M0811PC
		8X13.5			14	4900	HS1C108M0813PC
		8X16			12	5100	HS1C108M0816PC
		10X12			12	5100	HS1C108M1012PC
	1200	8X16	0.12	3840	12	5250	HS1C128M0816PC
		10X12			12	5250	HS1C128M1012PC
	1500	8X16	0.12	4800	12	5300	HS1C158M0816PC
		10X12			12	5300	HS1C158M1012PC
10X16		12			5500	HS1C158M1016PC	
2200	10X16	0.12	7040	12	5800	HS1C228M1016PC	
3300	10X16	0.12	10560	18	6100	HS1C338M1016PC	
20V	100	5X7	0.12	500	38	2450	HS1D107M0507PC
	220	6.3X8	0.12	880	25	2800	HS1D227M0608PC
	330	6.3X9	0.12	1320	25	3100	HS1D337M0609PC
	470	6.3X11.5	0.12	1880	25	3250	HS1D477M0611PC
	560	6.3X15	0.12	2240	22	3500	HS1D567M0615PC
		8X11.5			20	3500	HS1D567M0811PC
	680	6.3X15	0.12	2720	22	3650	HS1D687M0615PC
		8X11.5			20	3650	HS1D687M0811PC
	820	8X13.5	0.12	3280	20	3900	HS1D827M0813PC
		10X12			20	3900	HS1D827M1012PC
	1000	8X16	0.12	4000	20	4200	HS1D108M0816PC
		10X12			20	4200	HS1D108M1012PC
	1500	10X13.5	0.12	6000	20	4500	HS1D158M1013PC
		10X16			20	4700	HS1D158M1016PC
2200	10X16	0.12	8800	20	4900	HS1D228M1016PC	
25V	10	5X8	0.12	500	85	1950	HS1E106M0508PC
	22	5X7	0.12	500	68	2000	HS1E226M0507PC
	33	6.3X5.5	0.12	500	58	2100	HS1E336M0605PC
	47	5X8	0.12	500	45	2250	HS1E476M0508PC
		6.3X5.5			48	2200	HS1E476M0605PC
6.3X7		45			2350	HS1E476M0607PC	

WV	Cap (μ F)	尺寸 Φ DxL(mm)	损失角正切值($\tan\delta$) (20°C, 120Hz)	漏电流 (μ A) (max)	等效串联电阻 (ESR) (m Ω max./20°C, 100kHz)	额定纹波电流 (mA _{rms} /105°C, 100kHz)	产品代码
25V	56	5X8	0.12	500	45	2350	HS1E566M0508PC
	82	6.3X7	0.12	500	45	2550	HS1E826M0607PC
	100	5X7	0.12	500	48	2150	HS1E107M0507PC
		5X8			38	2450	HS1E107M0508PC
		5X11.5			38	2900	HS1E107M0511PC
		6.3X5.5			48	2450	HS1E107M0605PC
		6.3X7			45	2750	HS1E107M0607PC
		6.3X8			32	2900	HS1E107M0608PC
		8X8			20	3500	HS1E107M0808PC
		8X11.5			20	3750	HS1E107M0811PC
		120			5X9	0.12	600
	6.3X8		32	3050	HS1E127M0608PC		
	150	5X9	0.12	780	35	2950	HS1E157M0509PC
		5.5X9			35	3250	HS1E157M5509PC
		6.3X7			32	3200	HS1E157M0607PC
	180	5X9	0.12	900	35	3100	HS1E187M0509PC
		6.3X7			32	3300	HS1E187M0607PC
		8X8			20	3900	HS1E187M0808PC
	220	5X11.5	0.12	1100	35	3100	HS1E227M0511PC
		5.5X9			35	3200	HS1E227M5509PC
		5.5X11.5			35	3550	HS1E227M5511PC
		6.3X7			35	3350	HS1E227M0607PC
		6.3X8			35	3500	HS1E227M0608PC
		6.3X9			32	3700	HS1E227M0609PC
		8X10.5			20	4100	HS1E227M0810PC
		8X11.5			20	4300	HS1E227M0811PC
	270	5X11.5	0.12	1350	35	3250	HS1E277M0511PC
		5.5X9			35	3250	HS1E277M5509PC
		6.3X9			32	3800	HS1E227M0609PC
	330	5X15	0.12	1650	35	3350	HS1E337M0515PC
		5.5X11.5			35	3650	HS1E337M5511PC
		6.3X9			35	3750	HS1E337M0609PC
6.3X11.5		35			3800	HS1E337M0611PC	
8X8		28			4250	HS1E337M0808PC	

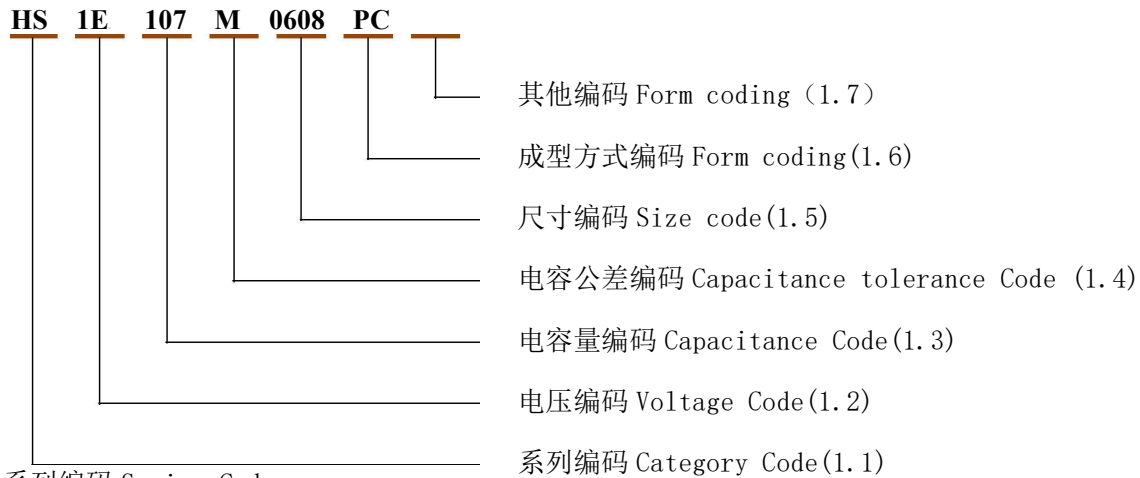
WV	Cap (μ F)	尺寸 Φ DxL(mm)	损失角正切值($\tan\delta$) (20°C, 120Hz)	漏电流 (μ A) (max)	等效串联电阻 (ESR) ($m\Omega$ max./20°C, 100kHz)	额定纹波电流 (mA _{rms} /105°C, 100kHz)	产品代码
25V	330	8X11.5	0.12	1650	28	4500	HS1E337M0811PC
		10X12			20	4900	HS1E337M1012PC
	470	5.5X15	0.12	2350	35	3750	HS1E477M5515PC
		6.3X11.5			35	3900	HS1E477M0611PC
		6.3X15			35	4100	HS1E477M0615PC
		8X8			28	4250	HS1E477M0808PC
		8X11.5			28	4750	HS1E477M0811PC
		8X16			20	4900	HS1E477M0816PC
		10X12			20	4900	HS1E477M1012PC
		560			5.5X15	0.12	2800
	6.3X15		35	4300	HS1E567M0615PC		
	8X11.5		28	5100	HS1E567M0811PC		
	680	6.3X15	0.12	3400	35	4500	HS1E687M0615PC
		8X11.5			28	5100	HS1E687M0811PC
		8X16			20	5250	HS1E687M0816PC
		10X12			20	5250	HS1E687M1012PC
	820	6.3X15	0.12	4100	35	4700	HS1E827M0615PC
		8X13.5			28	5400	HS1E827M0813PC
		8X16			20	5500	HS1E827M0816PC
		10X12			20	5500	HS1E827M1012PC
	1000	8X16	0.12	5000	20	5650	HS1E108M0816PC
		10X12			20	5650	HS1E108M1012PC
		10X16			20	5700	HS1E108M1016PC
	1200	10X16	0.12	6000	20	5800	HS1E128M1016PC
1500	10X16	0.12	7500	20	5900	HS1E158M1016PC	
2200	10X16	0.12	11000	20	6100	HS1E228M1016PC	

◆纹波电流频率系数 Ripple current frequency coefficient

频率 Frequency	120Hz \cong f < 1 kHz	1 KHz \cong f < 10 kHz	10 KHz \cong f < 100 kHz	100 KHz \cong f < 500 kHz
系数 Coefficient	0.05	0.3	0.7	1.00

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6>	产品特性 Characteristics
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8>	浪涌电压试验 Surge voltage test
9>	稳态湿热试验 Damp heat (steady state)
10>	温度特性试验 Characteristics at high and low temperature
11>	快速变温试验 Rapid change of temperature
12>	端子强度试验 Lead strength test
13>	振动试验 Vibration test
14>	可焊性试验 Weldability test
15>	焊锡耐热试验 Solder Heat Resistance Test
16>	包装数量 Packing quantity
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1> 物料编码 material code



1.1 系列编码 Series Code

编码 Code	HS
系列编码 Series Code	HS

1.2 电压编码 Voltage Code

编码 Code	0E	0J	0Q	1A	1C	1B	1E
电压编码 VoltageCode(W.V)	2.5	6.3	7.5	10	16	20	25

1.3 电容公差编码 Capacitance tolerance coding

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

1.4 电容量编码 Capacitance Code

编码 Code	476	107	227	337	477	567	687	827	108
电容量 Capacitance (uF)	47	100	220	330	470	560	680	820	1000

1.5 尺寸编码 Size code

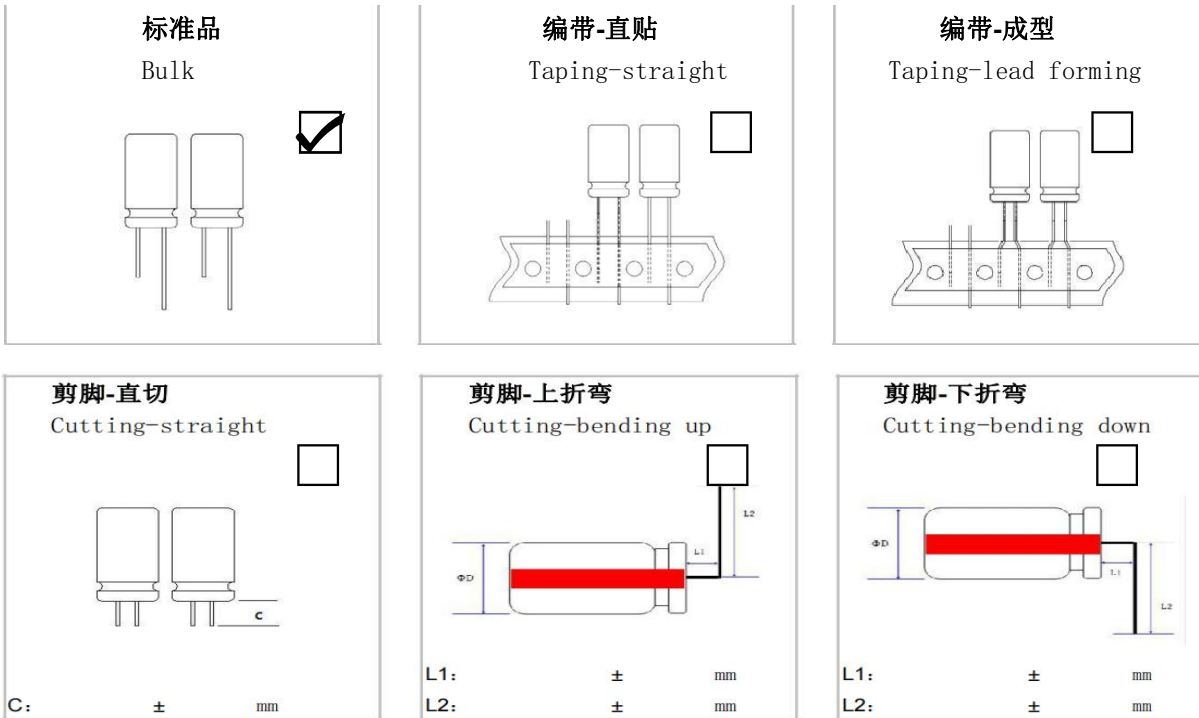
编码 Code	0507	0508	0608	0609	0610	0808	0811	1010	1012
直径 D (Φ)	5	5	6.3	6.3	6.3	8	8	10	10
高度 H (mm)	7	8	8	9	10.5	8	11.5	10	12

1.6 成型方式编码 Form coding

编码 Code	PC	PJ	PB	PZ
其他 Other	平豆散装 Platform rubber& In bulk	平豆剪脚 Platform rubber &Lead Cut3.5±0.3mm	平豆编带 Platform rubber& Taping Pitch=2.5mm	座板 Right lying Bending 2.2±0.5mm

1.7 其他编码 Form coding

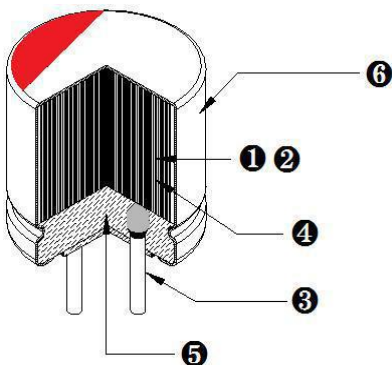
2> 电容引脚加工方式 Capacitor Lead Processing



3> 印字 Markin

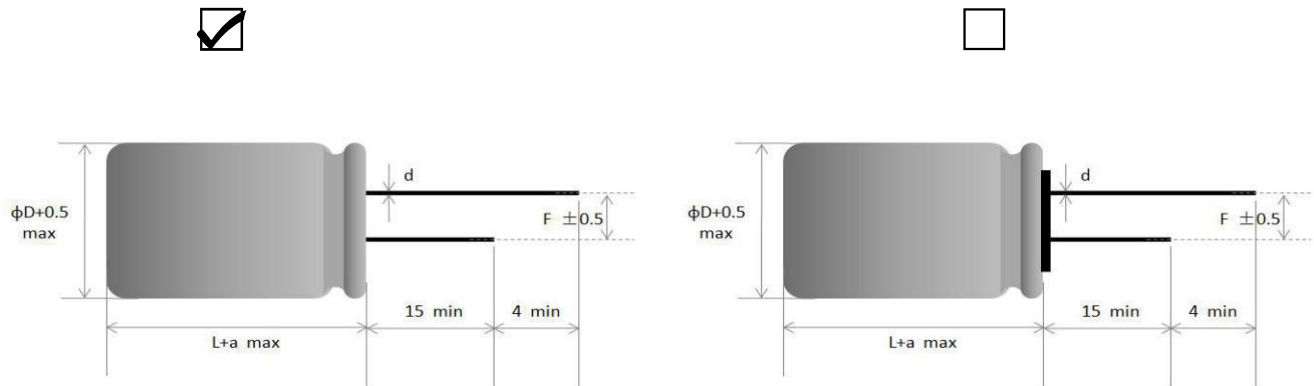


4> 产品结构图 Product Structure Diagram



- ① 阳极箔：高纯铝化成箔
Anode foil: high pure aluminum formation foil
- ② 阴极箔：高纯铝碳箔
Cathode foil: high pure aluminum carbon foil
- ③ 导针：高纯铝，引线为镀锡铜包钢线
leader pin: high pure aluminum, lead is tin copper clad steel wire
- ④ 电解纸：马尼拉麻
Electrolytic paper: Manila hemp
- ⑤ 胶盖：橡胶
Sealing: rubber
- ⑥ 铝壳：高纯铝，涂层铝壳
Aluminum can: high purity aluminum, coated aluminum can

5> 产品尺寸 Product Size



6> 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

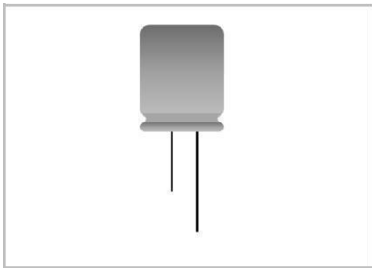
气压： 86-106 Kpa

Air pressure 86-106 Kpa

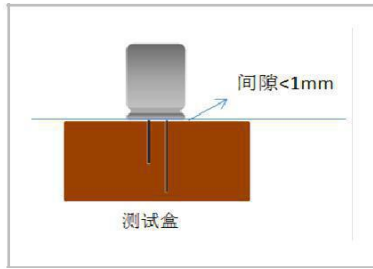
3.特性参数说明 Description

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										
			<table border="1"> <thead> <tr> <th>频率 HZ Frequency</th> <th>120≤f<1k</th> <th>1K≤f<10K</th> <th>10K≤f<100K</th> <th>100K≤f<500K</th> </tr> </thead> <tbody> <tr> <td>系数 coefficient</td> <td>0.05</td> <td>0.3</td> <td>0.7</td> <td>1</td> </tr> </tbody> </table>	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
			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	泄漏电流，产品施加额定电压，充电 2 分钟后测试漏电流值 Leakage current, after charging for 2 minutes, test the leakage current value of product 										
7	外形尺寸 Φ DXL Dimensions	mm	产品外径、高度 Diameter、Height										

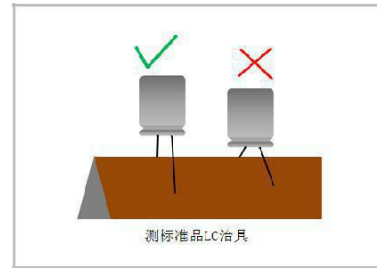
4.特性测试注意事项 Precautions before testing characteristics



测试前保持引脚垂直平行不能扭动、拉扯电容引脚
Keep the pin perpendicular and parallel before testing. Do not twist or pull the capacitor pin



测试容量/损失角/ESR 值时，测试点需在引线根部
When testing the capacity/loss Angle /ESR value, the test point must be at the root of the lead



测试 LC 时，需保持引脚平行不能让电容引脚呈八字形分开
When testing LC, keep pins parallel, and can not separate two pins as “八”shape

7> 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

8> 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

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

于环境温度 60±2℃，湿度 90-95% RH 条件下，储存 1000±48 小时，符合以下要求：

The following requirements shall be satisfied after the capacitors are stored at 60±2℃,90 to 95%RH for 1000±48 hours

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

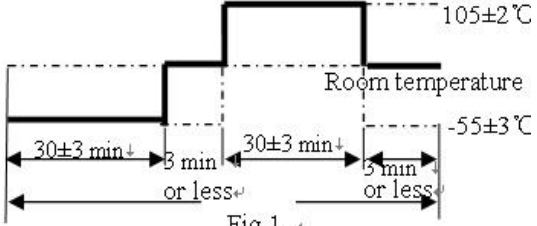
10> 温度特性试验 characteristics at High and low Temperature

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℃±2℃	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℃±3℃	2 hours	ESR	$Z(-55℃)/Z(20℃) \leq 2.5$
3	105℃±3℃	2 hours	LC	$LC(105℃)/LC(SPEC) \leq 12.5$ LC(SPEC):初始规定值 LC(SPEC): indicates the initial specified value
			ESR	$Z(+105℃)/Z(20℃) \leq 1.25$

11> 快速变温试验 Rapid change of temperature

 <p>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</p>	要求 requirement
	容量变化在初始值±20%内 Within ±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

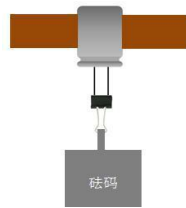
12> 端子强度试验 Lead strength test

1. 引张强度 Tensile Strength

电容器引脚向下，固定电容器本体，在引脚上静态负重至规定时间，符合以下要求：

Fixing capacitor body and pins down, static load on the pins to the specified time, meets the following requirements

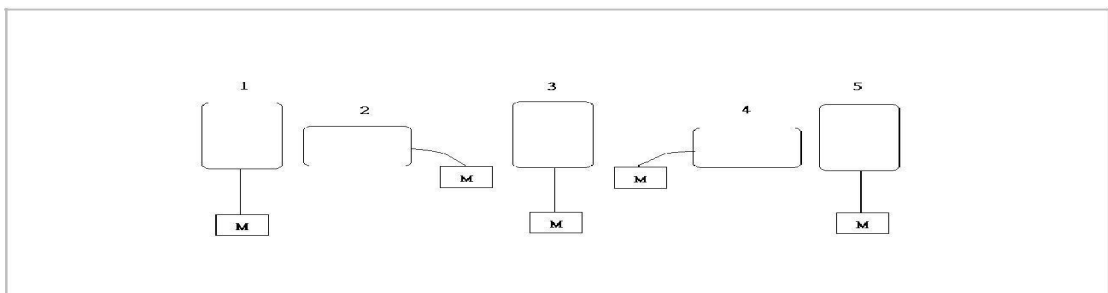
电容器引线直径 mm diameter of pin	负重 (N) weight	负重时间 (秒) load time	要求 requirement
d≤0.5	5	10±1	端子无断裂、松动 pins have no broken and loose
0.5<d≤0.8	10	10±1	端子无断裂、松动 pins have no broken and loose
0.8<d≤1.2	25	10±1	端子无断裂、松动 pins have no broken and loose



2. 折曲强度 Bending strength

电容器引脚向下，固定电容器本体，在引脚上负重，按图示折弯，试验两回。

Fixing capacitor body and pins down, load on the pins and bending for 2 times according to following diagram, then meets requirements as below:



电容器引线直径 mm diameter of pin	负重 (N) weight	回数 cycle	要求 requirement
d≤0.5	2.5	2	端子无断裂、松动 pins have no broken and loose
0.5<d≤0.8	5	2	端子无断裂、松动 pins have no broken and loose
0.8<d≤1.2	10	2	端子无断裂、松动 pins have no broken and loose

13> 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)

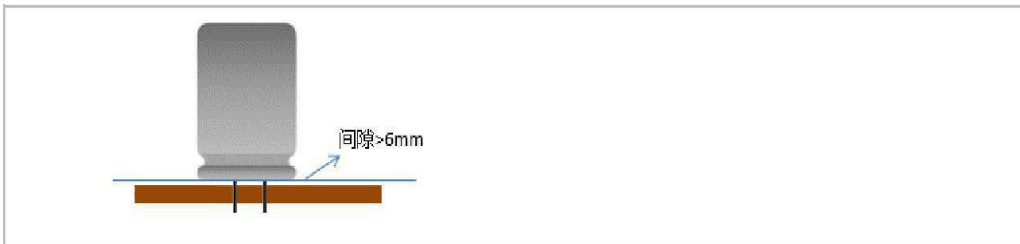
Direction: X、Y、Z axis(three directions)

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

14> 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

15> 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

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

16> 包装数量 Packing quantity

包装标签标示 Packing Label Marked

(下面的项目应该标志在标签上 the following items shall be marked on the label) (盒内或包内 Inside box or bag)

1) 系列 series 2) 料号 P/N 3) 额定电容 Rated capacitance 4) 额定电压 Rated Voltage

5) 数量 quantity 6) 尺寸 size

7) 批号 LOT Number :

1 - 2 3 4 5 6 7 8 9

成品 Product 年 year 月 month 号码 number

分类	标准品			剪脚品		
	袋	内盒	外箱	袋	内盒	外箱
尺寸 D*L(mm)	(pcs)	267x260x135 (mm)	546x279x160 (mm)	(pcs)	267x260x135 (mm)	546x279x160 (mm)
φ 5	1000	10000	20000	1000	12000	24000
φ 6	1000	10000	20000	1000	12000	24000
φ 8	500	5000	10000	1000	6000	12000
φ 10	500	5000	10000	500	6000	12000

17>使用安装注意事项 Precautions for use and installation

固体铝电解电容器具有不同于一般电解液作为阴极的铝电解电容器，为使导电性高分子铝电解电容器在电路中发挥其优越的性能，在使用中请特别注意以下内容。

Solid aluminum electrolytic capacitors are different from the general electrolyte as the cathode of aluminum electrolytic capacitors. In order to make conductive polymer aluminum electrolytic capacitors play their superior performance in the circuit, please pay special attention to the following contents in use.

<p>1. 极性</p> <p>导电性高分子型固体铝电解电容器的引出端子有正负极之分。</p> <p>在电路中使用切勿将正负极接反，否则将导致电容器漏电流增加并将严重影响电容器的使用寿命。</p>	<p>1. Polarity</p> <p>The solid aluminum electrolytic capacitor with positive and negative electrodes.</p> <p>Do not reverse the polarity when using. If happened, increased leakage current or a decreased life span may result.</p>
<p>2. 不推荐使用的电路</p> <p>导电性高分子型固体铝电解电容器在电路使用中由于焊接等原因会导致漏电流增大，因此不推荐应用于以下电路。</p> <p>a) 高阻抗电路 b) 耦合电路 c) 时间常数电路 d) 受漏电流影响较大的电路</p>	<p>2. Prohibited circuits</p> <p>Conductive polymer solid aluminum electrolytic capacitors in the circuit use due to welding and other reasons will lead to increased leakage current, so it is not recommended for use in the following circuits.</p> <p>a) High impedance circuits b) Coupling circuits c) Time constant circuits d) A circuit heavily affected by leakage current</p>
<p>3. 禁止在过电压状态下使用</p> <p>导电性高分子型固体铝电解电容器必须在低于额定工作电压下使用。</p> <p>瞬间的超过额定电压的过电压可能会导致电容器的短路。</p>	<p>3. Compliance with rated performance</p> <p>The aluminum solid capacitor with conductive polymer must be used under the rated voltage.</p> <p>Over-voltage exceeding the rated voltage should not be applied since it may cause a short circuit.</p>
<p>4. 电容器焊接时的注意事项</p> <p>电容器的焊接条件请在本公司所规定的范围内进行。</p> <p>强烈的焊接条件，可能会造成电容器电气性能的劣化甚至外观不良，严重时更会导致电容器漏电流的急剧增加和容量急剧下降。</p>	<p>4. Considerations when soldering</p> <p>The soldering conditions are to be within the range prescribed in specifications.</p> <p>If the specifications are not followed, there is a possibility of the cosmetic deflection, the intensive increase of leakage current, and the capacitance reduction.</p>
<p>5. 线路板焊接时的注意事项</p> <p>导电性高分子型固体铝电解电容器的封口皮塞具有较好的密封效果，由于封口的原因皮塞可能会有一定程度的鼓起，电路设计时请考虑本公司规格书的L尺寸和引线的位置公差范围。</p>	<p>5. Things to be noted before mounting</p> <p>The aluminum solid capacitors with conductive polymer is sealed well, because of sealing the rubble may protrude, please conform to the dimensional tolerance stipulated in the specifications.</p>

1. 电路设计的注意事项	1. Considerations when circuit design
(a) 额定电性能的使用确认	(a) Service confirmation of rated electrical properties
在电路设计前, 请先确认电容器的使用及安 装环境, 请在本公司的技术手册或者规格书的规 定条件范围内正确使用。	Before the circuit design, please confirm the use and installation environment of the capacitor, and please use it correctly within the range of conditions specified in the company's technical manual or specifications.
(b) 使用温度和纹波电流	(b) Use temperature and ripple current
使用温度请设定在规格书规定的范围之内。 使用电容器过程中切勿施加超过额定纹波电流的电 流。如有此现象的发生将会导致电容器内部急 剧发热而严重缩短电容器的使用寿命。	The operating temperature should be set within the range specified in the specification. Do not apply more current than the rated ripple current when using the capacitor. If this phenomenon occurs, it will lead to acute heating inside the capacitor and seriously shorten the service life of the capacitor.
(c) 漏电流	(c) leakage current
对于高温无负荷、高温高湿无负荷及温度急 剧变化等试验也会导致漏电流的增大。 这种情况下, 在最高使用温度范围内施加额 定使用电压, 漏电流会有一定程度的降低。	Heat pressure from soldering and mechanical stress from transportation may cause the leakage current to become large. In such a case, leakage current will gradually decreased by applying voltage less than or to the rated voltage at a temperature within the upper category temperature.
(d) 电路设计时的施加电压	(d) The applied voltage at the time of circuit design
可以施加 100%的额定电压。请在直流电压 与纹波电压的最大值不超过额定电压的范围内使用。 直流电压偏低时, 纹波电压的负的最大值 不能超过额定电压的10%的反向电压。在切断电 源等造成的过渡现象中产生的反电压, 应在额定电压的 20% 以内使用。	100% of the rated voltage can be applied. Please use in the range where the maximum DC voltage and ripple voltage do not exceed the rated voltage. When the DC voltage is low, the maximum negative ripple voltage cannot exceed 10% of the rated voltage reverse voltage. The reverse voltage generated in the transition phenomenon caused by cutting off the power source should be used within 20% of the rated voltage.
(e) 电容器的绝缘性	(e) Insulation of capacitors
电容器的表面喷塑涂层不保证完全绝缘。使 用电容器时请将外壳、负极引线、正极引线 与周 围组 件之间的线路完全分开。	The sprayed coating on the surface of the capacitor does not guarantee complete insulation. When using the capacitor, completely separate the circuit between the housing, negative leads, positive leads and the perimeter assembly.
(f) 工作环境限制	(f) Working environment limitation
电容器在下列环境中禁止使用: (1)在有水、卤水、油的地方 (2)充满有害气体的地方, 如硫化氢、亚硫酸、氯 气、氨气等 (3)容易受臭氧氧化、紫外线及放射线辐射的地方	Capacitors are prohibited in the following environments: (1) where there is water, brine, oil (2) where there are harmful gases, such as hydrogen sulfide, sulfite, chlorine, ammonia, etc. (3) Areas susceptible to ozone oxidation, ultraviolet radiation and radiation
(g) 其它	(g) others
设计电路前请先确认以下内容: 电容器的电性能会受到温度和频率的影响, 在设计 前请先确认波动量。	Please confirm the following before designing the circuit: The electrical performance of the capacitor will be affected by temperature and frequency, please confirm the fluctuation before designing.

2. 安装注意事项	2. Installation precautions
(a) 安装前的注意事项	(a) Precautions before installation
<p>使用过的电容器不能再使用。</p> <p>长期保存的电容器其漏电流会有不同程度的升高，此情况下请通过 1kΩ 的电阻进行施加额定电压处理。处理方法：在 60~70℃ 温度下施加额定电压 1h。</p>	<p>Used capacitors cannot be used again. The leakage current of the capacitor stored for a long time will increase to varying degrees, in this case, please apply the rated voltage treatment through the resistance of 1kΩ. Treatment method: Apply the rated voltage for 1h at a temperature of 60 ~ 70℃.</p>
(b) 安装时的注意事项	(b) Precautions during installation
<p>安装时注意电容器的标称容量和额定电压，并确认极性。</p> <p>安装过程中切勿将电容器掉落地面，此电容器不能再使用，安装过程中防止电容器变形。</p> <p>安装前请确认电容器的引线间距是否与线路板孔间隔吻合。</p>	<p>Pay attention to the nominal capacity and rated voltage of the capacitor when installing, and confirm the polarity. Do not drop the capacitor to the ground during installation. The capacitor cannot be used again. Prevent deformation of the capacitor during installation. Before installation, ensure that the lead spacing of the capacitor is consistent with the hole spacing of the circuit board.</p>
(c) 电烙铁焊接	(c) Soldering with electric iron
<p>焊接温度、时间等请保持在本公司规格书规定的范围内。</p> <p>焊接时不要给电容器施加过度的应力，通电的电烙铁不要触及电容器本身。</p> <p>焊接后电容器的漏电流因焊接预热条件、焊接温度、时间、线路板的材质及材质不同而发生很大的变化，几十甚至几百微安，但是在施加额定电压后处于稳定状态时电容器由于自愈能力而会使其漏电流逐渐减小。</p>	<p>Welding temperature, time, etc. should be kept within the range specified in the company's specifications. Do not apply excessive stress to the capacitor when welding, and do not touch the capacitor itself with the energized electric soldering iron. After welding, the leakage current of the capacitor changes greatly due to the welding preheating conditions, welding temperature, time, the material and material of the circuit board, tens or even hundreds of microamps, but when the rated electrical voltage is applied in a stable state, the capacitor will gradually reduce its leakage current due to its self-healing ability.</p>
(d) 焊接后注意事项	(d) Precautions after welding
<p>电容器焊接在线路板后，请不要施加外力。禁止将电容器倾斜、弯折、扭曲。</p>	<p>After the capacitor is welded to the circuit board, do not apply external force. Do not tilt, bend or twist the capacitor.</p>
3. 电容器在设备中安装时的注意事项	3. Precautions with completed board
<p>(1) 安装过程中切勿直接接触电容器的引线端子。</p> <p>(2) 禁止将电容器的正负极之间用导线短路，不要将导电性的酸性或碱性溶液洒落在电容器表面。</p> <p>(3) 安装前确认电容器在设备中的安装环境。</p> <p>(4) 设备的试验温度要在电容器的额定范围内使用。</p>	<p>(1) Do not directly touch the lead terminal of the capacitor during installation.</p> <p>(2) It is forbidden to use a wire short circuit between the positive and negative electrodes of the capacitor, and do not sprinkle the conductive acid or alkaline solution on the surface of the capacitor.</p> <p>(3) Confirm the installation environment of the capacitor in the equipment before installation.</p> <p>(4) The test temperature of the equipment should be made within the rated range of the capacitor</p>

<p>4. 意外情况的处理</p> <p>导电性高分子型固体铝电解电容器组成材料包括电解质、电解纸、皮塞和套管属于可燃性物质，电容器短路后电流值急剧增加，导致引线端子和电容器内部短路部分会产生电火花，情况严重时会引起皮塞和套管燃烧，所以在电路设计中应对电容器的安装方法和安装位置谨慎对待。</p>	<p>4. Handling of unexpected situations</p> <p>The conductive polymer solid aluminum electrolytic capacitor consists of electrolytes, electrolytic paper, plugs and bushings, which are inflammable substances. After the capacitor is short-circuited, the current value increases sharply, resulting in electrical sparks generated by the lead terminals and the internal short-circuited part of the capacitor. In serious cases, the plugs and bushings will burn. Therefore, in the circuit design, the installation method and installation position of the capacitor should be carefully treated</p>
<p>5. 电容器的保管条件</p> <p>(1) 导电性高分子型固体铝电解电容器的保存要避免高温、高湿的环境，并避免阳光直射。常温常湿(一般情况温度为 35℃ 以下，湿度保持在 75%RH 以下)</p> <p>(2) 为保持电容器具有良好的可焊性，应在产品出厂状态下(塑料袋包装)保管。为防止吸潮而导致焊接性劣化，产品出厂时密封在专用的包装袋内。</p> <p>(3) 为保持良好的焊接性，引线式产品保管期限为(购入后)一年，SMD 型的保管期限为(购入后)一年，SMD 型产品打开包装后，需在 4 周内使用完。</p> <p>(4) 使用时，应在即刻安装前开封，开封后尽量全部用完。出现剩余时，散装产品重新放入原包装袋内，并用胶带封好开口部分。</p> <p>(5) 不要将电容器直接保管在有水、卤素及有油等有机物的环境中。</p> <p>(6) 不要将电容器保存在充满有害气体的环境中，如硫化氢、亚硫酸、氯气、氨气等。</p> <p>(7) 不要将电容器保存在易受臭氧氧化、紫外线及放射线辐射的环境中。</p>	<p>5. Storage conditions of capacitors</p> <p>(1) The storage of conductive polymer solid aluminum electrolytic capacitors should avoid high temperature and high humidity environment, and avoid direct sunlight. Normal temperature and humidity (generally, the temperature is below 35 ° C, and the humidity is kept below 75%RH)</p> <p>(2) In order to maintain the good weldability of the capacitor, it should be kept in the factory state of the product (plastic bag packaging). In order to prevent weldability deterioration caused by moisture absorption, the product is sealed in a special packaging bag when leaving the factory.</p> <p>(3) In order to maintain good weldability, the storage period of lead type products is one year (after purchase), and the storage period of SMD type products is one year (after purchase), and SMD type products should be used within 4 weeks after opening the packaging.</p> <p>(4) When used, it should be opened before immediate installation, and used up as much as possible after opening. When there is surplus, the bulk product is put back into the original packaging bag, and the open part is sealed with tape.</p> <p>(5) Do not store capacitors directly in an environment with organic matter such as water, halogen and oil.</p> <p>(6) Do not store the capacitor in an environment full of harmful gases, such as hydrogen sulfide, sulfite, chlorine, ammonia, etc.</p> <p>(7) Do not store the capacitor in an environment susceptible to ozone oxidation, ultraviolet and radioactive radiation.</p>

18>环保 Environmental protection

本公司每年一次，将电容主要材料及电容成品送第三方权威检测机构检测。

Once a year, the company will send the main materials and finished capacitors to third-party authoritative testing institutions for testing.

检测时，根据当年欧盟最新要求检测 **ROHS**、**SVHC** 管理物质。

At the time of testing, ROHS and SVHC management substances were tested according to the latest requirements of the European Union that year.

检测报告，本公司会在检测完成后上发给客户。

The test report will be sent to the customer after the test is completed

为倡导环保，节能减排，本公司一律提供 **pdf** 电子档承认书给客户。

In order to advocate environmental protection, energy saving and emission reduction, the company will provide pdf electronic documents to customers.

有特殊要求，请再联络本公司业务人员，谢谢！

For special requirements, please contact our business personnel. Thanks!