




# 承 認 書

## SPECIFICATION

客 戶: (Customer)	华秋
品 名: (Product Name)	铝电解电容器
规 格: (Specifications)	RT1 35V2200 $\mu$ F D16*25MM
日 期: (Date)	2024 年 4 月 29 日

供應商簽署欄 Supplier confirmation		
PREPARED BY	CHECKED BY	APPROVED BY
		

客戶確認簽署欄 Customer confirmation

珠海華冠電容器股份有限公司

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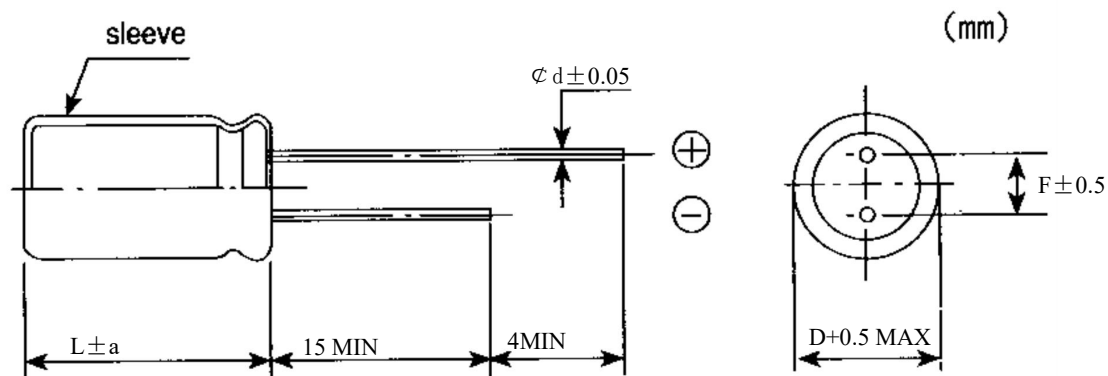


## 华冠电容规格承认书目录

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1、 Standard Rating 基本参数



No.	Customer Part No.	LEAGUER Part No.	Capacitance (μF)	Tolerance on Rated Capacitance (%)	Rated Voltage (Vdc)	Surge Voltage (Vdc)	Operating Temp. Range (°C)	tanδ (120Hz) (Max)	Leakage Current (μA)(2min.)	Max Ripple Current (mA) at 105°C 120Hz	Endurance at 105°C (Hours)	Dimensions (mm)				
												φD	L	α	d	F
1		RT11V222M1625B1	2200	±20	35	40.3	-40~+105	0.16	770	1370	2000	16	25	2.0	0.8	7.5

## 2、SCOPE 概述

本承认书规定了 RT1 系列径向引线引出铝电解电容器的技术规范，本技术规范条文解释权归本公司所有。

This specification covers "RT1 series" miniature single-ended aluminum electrolytic capacitors, Leaguer reserves the right of final interpretation for this technical specification.

## 3、APPLICABLE SPECIFICATION 参考标准

本承认书参考 JIS-C-5101-1 和 JIS-C-5101-4 制定。

This approval sheet consulted the institute of JIS-C-5101-1 and JIS-C-5101-4.

## 4、OPERATING TEMPERATURE RANGE 工作温度范围

工作温度范围是电容器在施加额定工作电压条件下，可以长期可靠工作的环境温度范围。

-40℃~+105℃ (6.3V.DC~400V.DC)

-25℃~+105℃ (450V.DC~500V.DC)

Operating temperature range is the range of ambient temperature at which the capacitor can be operated continuously at rated voltage.

-40℃~+105℃ (6.3V.DC~400V.DC)

-25℃~+105℃ (450V.DC~500V.DC)

## 5、CONDITION OF TEST 测试环境

如果没有其他规定，标准的测试、检验环境条件如下所示：

环境温度：15℃~35℃

相对湿度：45%~75%

大气压力：86kpa~106kpa

如果对测试结果有异议，可以在以下条件测试：

环境温度：20±1℃

相对湿度：60%~67%

大气压力：86kpa~106kpa

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests are as follows

Ambient temperature : 15℃ to 35℃

Relative humidity : 45% to 75%

Air pressure : 86kpa to 106kpa

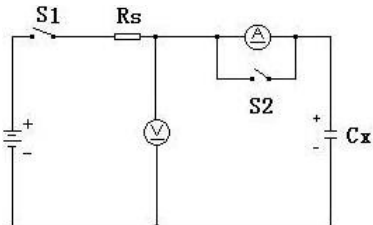
If there may be doubt on the results, measurements shall be made within the following limits

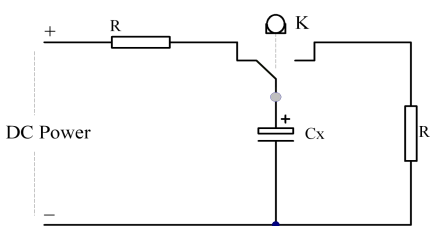
Ambient temperature : 20±1℃

Relative humidity : 60% to 67%

Air pressure : 86kpa to 106kpa

## 6、Electrical Requirements 电性能要求

序号 No.	项目 Item	测试方法 Test method	性能 Performance																
6.1	额定工作电压 Rated voltage		6.3V.DC~450V.DC																
6.2	电容量 Capacitance	测试频率: 120Hz(±20%) 测试电路: 串联等效 测试电压: 0.5Vrms 以下 Measuring frequency: 120Hz±20% Measuring circuit : Series equivalent circuit Measuring voltage : 0.5Vrms or less	容量范围: 1 μ F ~33000 μ F 容量偏差: -20%~+20% Range of Capacitance: 1 μ F ~33000 μ F Capacitance tolerance: -20%~+20%																
6.3	损失角正切值 Dissipation factor	测试条件与 6.2 电容量测试相同 Testing conditions are the same as 6.2 for capacitance																	
		W.V	6.3	10	16	25	35	50	63	100	160~250	350~450							
		Tg δ	0.28	0.24	0.20	0.16	0.16	0.12	0.10	0.08	0.20	0.25							
0.02 is added to every 1000μF increase over 1000μF																			
6.4	漏电流 Leakage current	在电容器两端施加额定工作电压, 并串联 1000±100 Ω 电阻, 在施加规定时间电压后, 测量漏电流。 测试电路如下图: The rated voltage shall be applied across the capacitor and its protective resistor shall be 1000 ± 100 Ω . The leakage current shall then be measured after an electrification period of schedule time. Measurement circuit  Rs: Protective resistor(1000±100 Ω) DC ammeter DC voltmeter S <sub>1</sub> : Switch S <sub>2</sub> : Protective switch for an ammeter	6.3V~100V: I ≤ 0.01CV or 3 μ A Whichever is greater (after 2 min)  160V~450V : (CV ≤ 1000) I ≤ 0.1CV+40 μ A (after 1 min) I ≤ 0.03CV+15 μ A (after 5 min)  160V~450V : (CV > 1000) I ≤ 0.04CV+100 μ A (after 1 min) I ≤ 0.02CV+25 μ A (after 5 min)  I: 漏电流 (μ A) C: 容量 (μ F) V: 额定工作电压 (V) I: Leakage current(μ A) C: Capacitance(μ F) V: Rated voltage (V)																
6.5	低温特性 Low Temperature Characteristics (at 120Hz)	W.V.	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450			
		Z-25°C/ Z+20°C	5	4	3	2	2	2	2	2	2	3	3	4	6	6	7		
		Z-40°C/ Z+20°C	10	8	6	4	3	3	3	3	3	4	4	8	8	10	-		
6.6	<b>MULTIPLIER FOR RIPPLE CURRENT</b>																		
	Frequency (HZ )		60(50)				120				500				1k		10k ≤		
	Coefficient	0.47~1 μ F		0.50				1.00				1.20				1.30		1.50	
		2.2~4.7 μ F		0.65				1.00				1.20				1.30		1.50	
		10~47 μ F		0.80				1.00				1.20				1.30		1.50	
		100~1000 μ F		0.80				1.00				1.10				1.15		1.20	
2200~33000 μ F		0.80				1.00				1.05				1.10		1.15			

序号 No.	项目 Item	测试方法 Test method			性能 Performance														
6.7	Characteristics at High and Low Temperature 高低温特性	<table border="1"> <thead> <tr> <th>Step</th> <th>Test Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20±2°C</td> <td>-</td> </tr> <tr> <td>2</td> <td>-40±3°C</td> <td>2 hours</td> </tr> <tr> <td>3</td> <td>20±2°C</td> <td>15min</td> </tr> <tr> <td>4</td> <td>105±2°C</td> <td>2 hours</td> </tr> </tbody> </table>	Step	Test Temperature	Time	1	20±2°C	-	2	-40±3°C	2 hours	3	20±2°C	15min	4	105±2°C	2 hours	阶段 1: 测量容量和阻抗 ( z  20°C 120Hz±20%) 阶段 2: 电容器恒温贮存 2 小时, 在热平衡状态测阻抗 ( z  -40°C 120Hz±20%) 阶段 4: 电容器恒温贮存 2 小时, 在热平衡状态测漏电流 Step 1: Capacitance and impedance shall be measured. ( z  20°C 120Hz±20%) Step 2: After the capacitor being stored for 2 hours, impedance shall be measured at thermal stability. ( z  -40°C 120Hz±20%) Step 4: After the capacitor being stored for 105°C 2 hours, leakage current shall be measured. The measurement shall be made at thermal stability	阶段 2 阻抗比: 相对于阶段 1 比值小于 6.5 中的值 Step2 Impedance ratio: relative to Step2, the ratio is less than the value in 6.5 阶段 4 漏电流: 小于或等于规定值的 8 倍 Step4 Leakage Current : Less than 800% of the specified value
Step	Test Temperature	Time																	
1	20±2°C	-																	
2	-40±3°C	2 hours																	
3	20±2°C	15min																	
4	105±2°C	2 hours																	
6.8	耐浪涌电压 Surge Test	对电容器施加浪涌电压, 每充电 30s, 放电 5min30sec, 连续循环 1000 次后测量。 测试温度: 15~35°C。 After surge voltage(the value of item 3 of P4) applied at a cycling rate of 30 seconds charge and 5.5 minutes discharge 1000 successive test cycle. Test temperature:15~35°C.			漏电流: ≤第 2 页规定值 Leakage Current : Less than the specified value of page 2 容量变化: 与初始测量值比变化率 ±15%范围内 Capacitance Change : Within ±15% of the initial measured value 损耗角正切值: 规定值的 130%. Tangent of Loss Angle : Less than 130% of specified value														
		Test circuit 																	
		Note: This requirement is applicable only to instantaneous over voltage which may be applied to terminals of capacitor, therefore, not applicable to such over voltages as often applied.																	
6.9	可焊性 Solderability	温度: 235±2°C 浸入时间: 2±0.5sec 浸入深度: 浸入引线约 0.5~1mm 助焊剂: 约 25%的松香溶于酒精 Temperature : 235±2°C Immersing Time: 2±0.5sec Immersing Depth : Dip the terminal for Approx. 0.5~1mm thick Flux: Approx. 25% rosin in Ethanol			引线端子表面 90%以上的面积附着新焊料。 More than 90% of the terminal surface shall be covered with new solder.														

序号 No.	项目 Item	测试方法 Test method	性能 Performance																								
6.10	振动 Vibration	频率：10 到 55 Hz，每分钟互换 振幅：0.75mm 在互相垂直的 3 个方向上，每个方向振动 2 小时，共 6 小时。 Frequency: 10~55Hz reciprocation for 1 min Total amplitudes: 0.75mm Direction and during of vibration: 3 orthogonal directions, Mutually each for 2hrs total 6hrs	容量：在测试的 30 分钟内，电容量测试值无明显变化 外观：无可见损伤 容量变化：容量变化率在±10%范围内 Capacitance : Within 30 minutes of the test, the capacitance test value has no obvious change Appearance: No significant change can be observe Capacitance change : Within ±10% of initial measured value																								
6.11	耐焊接热 Resistance to soldering heat	焊槽法：Solder bath method: 焊锡温度：260±5℃ Solder bath temperature : 260±5℃ 浸入时间：10±1 秒 Immersion time : 10±1sec. 电路板 : 1.6mm Printed wiring board: 1.6mm	外观：无可见损伤 容量变化：容量变化率在±10%范围内 Appearance: No significant change can be observe Capacitance change : Within ±10% of initial measured value																								
6.12	端子强度 Terminal strength	端子抗拉强度： 沿电容器端子引线方向施加拉力(如下表)，10±1 秒。 <table border="1" data-bbox="411 947 997 1014"> <tr> <td>引线直径Φ</td> <td>0.45</td> <td>0.5</td> <td>0.6</td> <td>0.8</td> <td>1.0</td> </tr> <tr> <td>拉力 N</td> <td colspan="2">5</td> <td colspan="2">10</td> <td>20</td> </tr> </table> 端子抗弯强度： 在电容器引线施加固定重力（如下表），然后，将电容体弯折 90° 后回到原位，再向相反方向弯折 90° 后回到原位。 上述过程在 5 秒内完成。 <table border="1" data-bbox="411 1200 997 1267"> <tr> <td>引线直径Φ</td> <td>0.45</td> <td>0.5</td> <td>0.6</td> <td>0.8</td> <td>1.0</td> </tr> <tr> <td>拉力 N</td> <td colspan="2">2.5</td> <td colspan="2">5</td> <td>10</td> </tr> </table> Tensile strength of terminal: A static load (stated in the table above) shall be applied to the terminal in the axial direction and acting in a direction away from the body for 10±1 sec.. Bending strength of terminal: Hang the specified dead weight (stated in the table above), then bend the body through 90°, return to the original position. Next bend it in opposite direction through 90° with the same speed, again return to the original position. Complete this operation in about 5 sec.	引线直径Φ	0.45	0.5	0.6	0.8	1.0	拉力 N	5		10		20	引线直径Φ	0.45	0.5	0.6	0.8	1.0	拉力 N	2.5		5		10	测量电容器应无接触不良、开路或短路，无可见机械损伤 When the capacitor is measured, there shall be no intermittent contacts, or open or short-circuiting. There shall be no visible mechanical damage.
引线直径Φ	0.45	0.5	0.6	0.8	1.0																						
拉力 N	5		10		20																						
引线直径Φ	0.45	0.5	0.6	0.8	1.0																						
拉力 N	2.5		5		10																						
6.13	稳态湿热 Resistance to damp heat (steady state)	电容器放置在温度 60℃、湿度 90~95% 的环境下 500±6 小时，然后放置在标准环境中恢复 1-2 小时 Capacitors shall be exposed for 500±6hrs in an atmosphere of 90~95% R.H. at 60℃. And then the capacitor shall be subjected to standard atmospheric conditions for 1-2 hours, after which measurements shall be made.	容量变化：与初始测量值比变化率在±20%范围内。 损耗角正切值：≤规定值的 1.5 倍 漏电流：≤规定值 外观：无可见损伤 Capacitance Change: Within ±20% of the initial measured value Tangent of Loss Angle : Less than 150% of the specified value Leakage Current : Less than the specified value Appearance : No significant change can be observed.																								



序号 No.	项目 Item	测试方法 Test method	性能 Performance
6.14	高温负荷寿命 High Temperature Unload Life Test	温度: 105±2℃ 试验持续时间: 2000 小时。 施加电压: 额定电压 试验完成后, 电容器在测量前应在室温中恢复 16 小时。 Test Duration: 2000hours. Applied Voltage: Rated Voltage After subjected to the test, the capacitors shall be left at the room temperature for 16 hours prior to the measurement.	容量变化:与初始测量值比变化率在 ±25%范围内。 损耗角正切值 : ≤规定值的 2 倍 漏电流 : ≤规定值 外观:无可见损伤 Capacitance Change: Within±25% of the initial measured value Tangent of Loss Angle : Less than 200% of the specified value Leakage Current : Less than the specified value Appearance: No significant change can be observed.
6.15	高温储存 High Temperature Unload Life Test	温度: 105±2℃ 试验持续时间: 1000 小时 试验完成后, 电容器在测量前应在室温中恢复 16 小时。 Test Temperature: 105±2℃ Test Duration: 1000 hours After subjected to the test, the capacitors shall be left at the room temperature for 16 hours prior to the measurement.	容量变化:与初始测量值比变化率在 ±20%范围内。 损耗角正切值 : ≤规定值的 2 倍 漏电流 : ≤规定值的 2 倍 外观:无可见损伤 Capacitance Change: Within ±20% of the initial measured value Tangent of Loss Angle : Less than 200% of the specified value Leakage Current : Less than 200% of the specified value Appearance: No significant change can be observed.
6.16	防爆试验 Safety vent	以下试验只适用于铝壳直径 ≥ Φ8 产品。 The following tests only apply to those products with vent products at diameter ≥ Φ8 with vent. 在电容器两极施加反向工作电压, 其中通过的电流为 1 A, 在测试时防爆装置应能在 30 分钟内动作。 D. C. Application test The capacitor shall be subjected to a reverse D.C. voltage equal to the rated D.C.voltage. The current flowing through the capacitor shall be 1A. If the vent does work with the voltage applied for 30 minutes, the test is considered to be passed.	上述过程中应无引线、铝箔等散射, 无火花产生。 The safety vent is actuated under the test conditions, thereby preventing terminals, metal pieces, etc, of the capacitor from scattering due to burst, the case from separating from the seal packing, or the capacitor from producing flame.
6.17	自然放置下的储存规定 Storage requirements in natural state	1、环境温度: -10~35℃, 环境湿度: <75%RH; 2、产品储存期限为 12 个月; 3、产品储存期限>12 个月时, 需送回工序重新老化; 4、存放时间超过 3 年的电解电容器应立即报废, 不可再使用; 1、Ambient temperature: -10~35℃, Ambient humidity: <75%RH; 2、Storage time: 12 months 3、Storage time >12 months, need ageing again; 4、Storage time > three years, need to be discarded;	

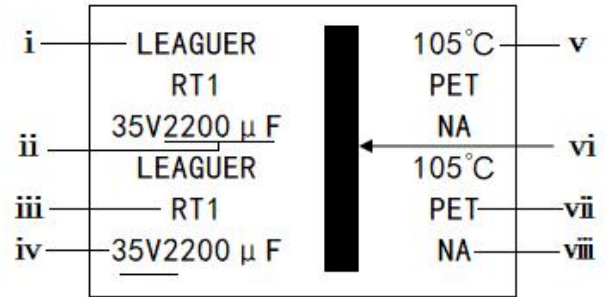
## 7、Marking 标示

a) Following items shall be marked on the sleeving;

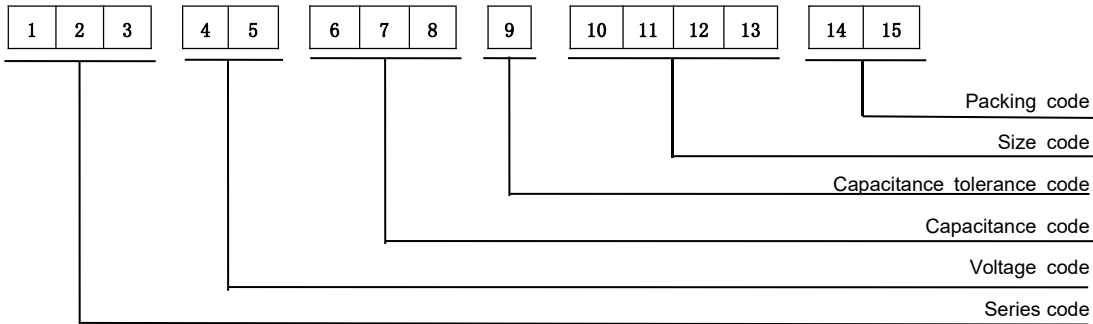
Sleeve color: Black; Marking color: White.

电容器的套管上印刷以下内容;套管颜色: 黑色; 标记颜色: 白色。

- |       |                   |          |
|-------|-------------------|----------|
| i.    | LEAGUER           | 商标       |
| ii.   | Capacitance       | 额定容量     |
| iii.  | Series            | 系列代码     |
| iv.   | Rated Voltage     | 额定电压     |
| v.    | 105°C             | 产品使用上限温度 |
| vi.   | Negative Polarity | 负极标示     |
| vii.  | PET               | 套管材质标识   |
| viii. | Code              | 制造代码     |



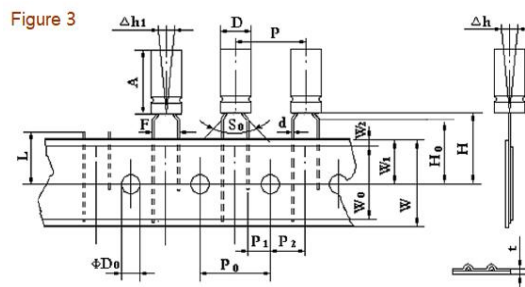
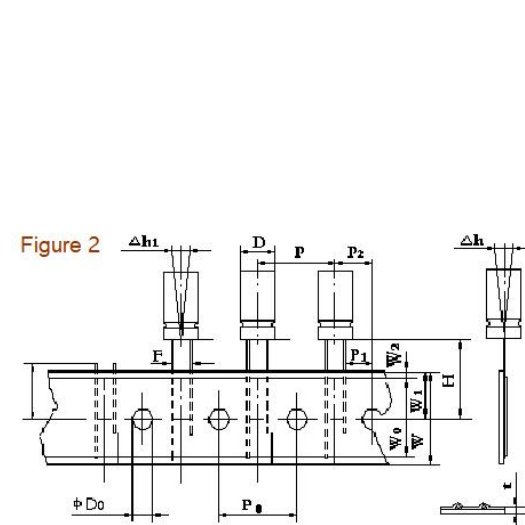
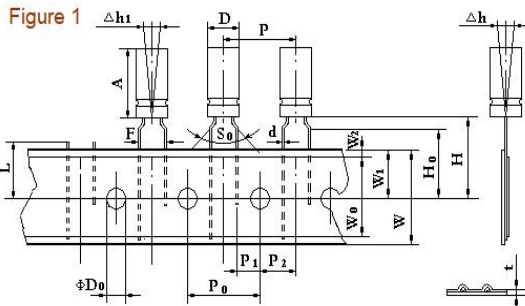
### 8、PART NO SYSTEM 物料编码



1 2 3	4 5	6 7 8	9	10 11 12 13	14 15					
Series code	Voltage (V)	Code	Capacitance (μF)	Code	Capacitance tolerance	Code	Size	Code	Packing	Code
RTZ	2.5	0E	0.1	0R1	±5%	J	4×5	0405	Bulk packing	B1
RT1	4	0G	0.22	R22	±10%	K	5×5	0505		
RTE	6.3	0J	0.33	R33	±15%	Y	6.3×5	0605	Lead Cut	C1
RLL	10	1A	0.47	R47	±20%	M	4×7	0407		
MT1	16	1C	0.68	R68	-10~-30%	Q	5×7	0507	Lead Forming & cut	CB
ST1	25	1E	1.0	010	Others	T	6.3×7	0607		
STL	35	1V	2.2	2R2		Kink & Cutting	CK	8×7	0807	
RLG	50	1H	3.3	3R3				5×11	0511	
RZL	63	1J	4.7	4R7		Forming lead to right side	CN	6.3×11	0611	
RKZ	80	1K	6.8	6R8				8×12	0812	
RTV	100	2A	10	100		Forming lead to left side	CM	8×14	0814	
RTK	160	2C	22	220				8×16	0816	
RTG	180	2J	33	330		Taping F=5mm (4Φ~8Φ)	F1	10×12	1012	
REB	200	2D	47	470				10×16	1016	
REF	220	2P	68	680		Taped Straight-pack	F2	10×20	1020	
RXG	250	2E	100	101				13×20	1320	
RXZ	315	2F	220	221		Taping F=2.5mm (4Φ~5Φ)	F3	13×25	1325	
RXF	330	2U	330	331				16×25	1625	
	350	2V	470	471				16×31	1631	
	400	2G	680	681	16×36			1636		
	420	2M	1000	102	18×26	1826				
	450	2W	2200	222	18×36	1836				
	500	2H	3300	332	18×40	1840				
	550	2J	4700	472						
	600	2K	6800	682						
			10000	103						
			22000	223						
			33000	333						
			68000	683						

## 9、Lead Forming Type 加工型式

### 9.1 Taping 编带



Code F1	Case Size				Tol
	4*5 4*7	5*5 5*7 5*11	6.3*5 6.3*7 6.3*11	8*5 8*7 8*12	
Reference figure	Figure 1				--
φd	0.45	0.45 0.5 (5*11)	0.45 0.5 (6*11)	0.45 0.5(8*7) 0.5(8*12)	±0.05
p	12.7				±1.0
P <sub>0</sub>	12.7				±0.3
P <sub>1</sub>	3.85				±0.5
F	5.0				+0.6/-0.2
Δh	0				±1.0
W	18.0				±0.5
W <sub>0</sub>	12min				--
W <sub>1</sub>	9.0				±0.5
W <sub>2</sub>	2.0 max				--
H	18.5 (17.5) *				±0.5
H <sub>0</sub>	16.0				±0.5
D <sub>0</sub>	4.0				±0.3
t	0.6				±0.2
Δh1	0				±0.2

Code F2	Case Size					Tol
	4*5 4*7	5*5 5*7 5*11	6.3*5 6.3*7 6.3*11	8*5 8*7 8*12	φ10	
Reference figure	Figure 2					--
φd	0.45	0.45 0.5(5*11)	0.45 0.5(6.3*11)	0.45 0.5(8*7) 0.5(8*12)	0.60	±0.05
p	12.7					±1.0
P <sub>0</sub>	12.7					±0.3
P <sub>1</sub>	5.6	5.35	5.1	4.6	3.85	±0.5
F	1.5	2.0	2.5	3.5	5.0	+0.6/-0.2
Δh	0					±1.0
W	18.0					±0.5
W <sub>0</sub>	12min					--
W <sub>1</sub>	9.0					±0.5
W <sub>2</sub>	2.0 max					--
H	18.5 (17.5) *					±0.5
H <sub>0</sub>	--					--
D <sub>0</sub>	4.0					±0.3
t	0.6					±0.2
Δh1	0					±0.2

Code F3	Case Size			Tol
	4*5 4*7	5*5 5*7 5*11	8*5 8*7	
Reference figure	Figure 3		Figure 2	--
φd	0.45	0.45 0.5 (5*11)	0.45 0.5(8*7)	±0.05
p	12.7			±1.0
P <sub>0</sub>	12.7			±0.3
P <sub>1</sub>	5.1			±0.5
F	2.5			+0.6/-0.2
Δh	0			±1.0
W	18.0			±0.5
W <sub>0</sub>	12min			--
W <sub>1</sub>	9.0			±0.5
W <sub>2</sub>	2.0 max			--
H	18.5 (17.5) *			±0.5
H <sub>0</sub>	16.0		--	±0.5
D <sub>0</sub>	4.0			±0.3
t	0.6			±0.2
Δh1	0			±0.2

9.2 Lead Cut& Lead Forming 端子切脚或成型

Code		Case Size			Shape Figure
		D	s±0.5	h	
C	1	φ4	1.5	h±0.3	
		φ5	2.0		
		φ6.3	2.5		
		φ8	3.5		
		φ10	5.0		
		φ13	5.0		
		φ16	7.5		
φ18	7.5				
C	B	φ4	1.5	h±0.5	
		φ5	2.0		
		φ6.3	2.5		
		φ8	3.5		
C	K	φ10	5.0	h±0.5	
		φ13	5.0		
		φ16	7.5		
		φ18	7.5		
C	N	φ4	1.5	h±0.5	
		φ5	2.0		
		φ6.3	2.5		
		φ8	3.5		
C	M	φ4	1.5	h±0.5	
		φ5	2.0		
		φ6.3	2.5		
		φ8	3.5		

## 10、Packing quantity 包装数量

### 10.1 Straight capacitor 直引线型产品

Parys Diameter 壳号	Plastics bag packing quantity 塑料袋包装数量	Inside packing box packing quantity 内包装盒包装数量	Over-wrap box packing quantity 外包装箱包装数量
Φ5×11	1000	15000	30000
Φ6.3×11	1000	10000	20000
Φ8×12/8×14	500	6000	12000
Φ8×16	500	5000	10000
Φ10×12	250	4000	8000
Φ10×16	250	3000	6000
Φ10×20	200	2600	5200
Φ10×25	200	2200	4400
Φ10×30	200	2000	4000
Φ13×20	150	1500	3000
Φ13×25	100	1400	2800
Φ16×25	100	900	1800

### 10.2 Cut capacitor 切脚型产品

Parys Diameter 壳号	Plastics bag packing quantity 塑料袋包装数量	Inside packing box packing quantity 内包装盒包装数量	Over-wrap box packing quantity 外包装箱包装数量
Φ5×11	1000	20000	40000
Φ6.3×11	1000	15000	30000
Φ8×12	500	10000	20000
Φ8×14/8×16	500	6000	12000
Φ10×12	500	5000	10000
Φ10×16	250	4000	8000
Φ10×20/10×25/10×30	200	3000	6000
Φ13×20	150	1800	3600
Φ13×25	100	1500	3000
Φ16×25	100	1000	2000

### 10.3 Packahing specification 编带产品

Parys Diameter 壳号	Inside packing box packing quantity 啤盒包装数量	Over-wrap box packing quantity 外包装箱包装数量
Φ5×11/6.3×11	2000	20000
Φ8×12/8×14	1000	10000
Φ8×16	1000	8000
Φ10×12/10×16/10×20/10×25	500	4000
Φ13×20/13×25	400	3200

### Solder flow:

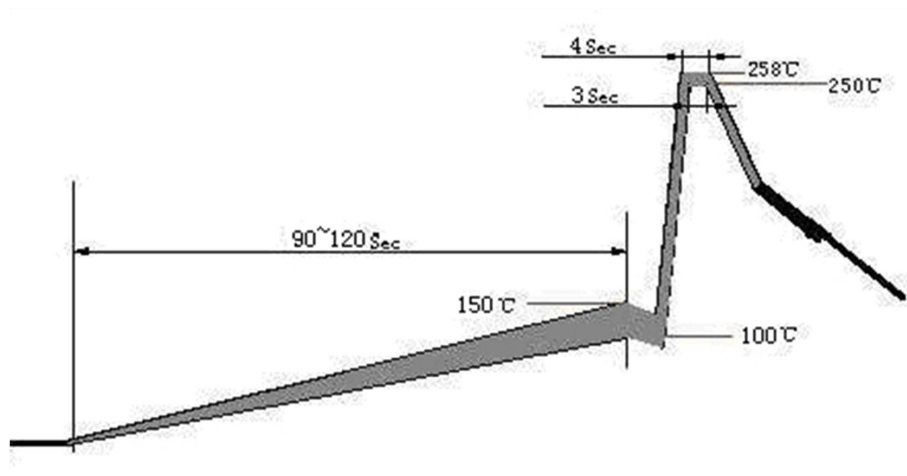
\*Do not dip capacitor's body into melted solder.

\*Flux should not be adhered to capacitor's body but only to its terminals.

\*Pre-heating: 100~150°C, 90~120 seconds .

\*Melted solder temperature: 260°C max.

\*Solder time: 3~4 S.



## 11、OTHER REMARKS 其它说明

### 11.1 铝电解电容器使用注意事项 IMPORTANT INFORMATION ON THE APPLICATION OF ALUMINUM ELECTROLYTIC CAPACITORS

#### (1) 直流铝电解电容器应按正确的极性使用 DC aluminum electrolytic capacitors are normally polarized

当直流铝电解电容器按反极性接入电路时，电容器会导致电子线路短路，由此产生的电流会引致电容器损坏。若电路中有可能在负引线施加正电压，请选无极性产品。

When reverse voltage is applied on DC aluminum electrolytic capacitor ,the circuit will be short out and the capacitor will be damaged due to abnormal current flows through the capacitor. Please use non- polar types of capacitors when the positive voltage is applied on the cathode terminal.

#### (2) 在额定工作电压以下使用 Use capacitor within rated voltage

当电容器上所施加电压高于额定工作电压时，电容器的漏电流将上升，其电气特性将在短时期内劣化直至损坏。请注意电压峰值勿超出额定工作电压。

When capacitor is used at higher voltage than the rated voltage, leakage current may increase and characteristics may be drastically deteriorated and damaged in a short period. Please take extra caution that the peak voltage should not exceed the rated voltage.

#### (3) 作快速充放电使用 Sudden charge and discharge

当常规电容器被用作快速充电用途,其使用寿命可能会因为容量下降,温度急剧上升等而缩减。

When aluminum electrolytic capacitors for general purpose-use are employed in rapid charge and discharge application, its life expectancy may be shortened resulted from capacitance decrease, heat rise, etc.

#### (4) 电容器贮存 Storage of the capacitor

##### ① 请保管在室温 5~35℃，湿度 75% 以下的环境。

we recommend the following conditions for storage: Ambient temperature: 5~35℃ ,Ambient humidity: <75%RH;

(a) 产品储存期限: ≤12 个月; Storage life: ≤ 12 months;

(b) 产品储存期限>12 个月时，需充电后再使用;

If storage life >12 months, the products need to be charged again before using;

(c) 存放时间超过 2 年的电解电容器应报废处理;

If Storage time > two years, the products need to be discarded;

#### (5) 施加纹波电流应小于额定值 Use capacitor within rated ripple current

施加纹波电流超过额定值后，会导致电容器体过热，容量下降，寿命缩短。所施加纹波电压的峰值应小于额定工作电压。

If excessive ripple current is applied on the capacitor, which will result in generating excessive heat inside, reducing capacitance and shortening life of capacitor. Therefore the peak value of the ripple voltage should be less than the rated value.

#### (6) 使用环境温度 Ambient temperature

铝电解电容器的使用寿命会受到环境温度的影响。据科学统计，使用环境温度下降 10℃ 其使用寿命增加 1 倍。

Life of aluminum electrolytic capacitor is affected by the ambient temperature. It is generally known that the life doubles for each 10℃ decrease in temperature.

#### (7) 引出线强度 Tensile strength of lead wire

当拉力施加到电容器引出线，该拉力将作用于电容器内部，这可能导致电容器内部短路，开路或漏电流上升。在电容器焊装到电路板，请勿强烈摇动电容器。

When a strong force is applied to the lead wires or terminals, stress is put on the internal connections, which may result in short circuit, open circuit or leakage current increase. Therefore it is not advisable to bend or handle a capacitor after it has been soldered to the PC board.



**(8) 焊接过程耐热性 Heat resistance at the soldering process**

铝电解电容器装至电路板进行浸焊或波峰焊时，其塑料套管可能因焊接时间过长、温度过高而发生破裂或二次收缩。

During soldering process, secondary shrinkage or sleeve crack may occur when soldering temperature is too high or soldering time is too long.

**(9) 电路板的安装孔孔距及安装位置 Hole pitch and position of PC board**

电路板安装孔的设计应与产品说明书的引线脚距相一致，如果将电容器强行插入孔距不配套的电路板，那么会有应力作用于引出线，这可能导致短路或漏电流上升。

When designig a PC board , its hole pitch should be designed to coincide with the lead pitch (lead spacing) of the capacitor specified in the catalog or specifications. When a capacitor is forcibly inserted into an unmatched hole pitch, a force will put on the leads and which could result in a short circuit or increased leakage current.

**(10) 关于焊接以后的清洗 Cleaning after soldering**

① 电容器不能用卤化有机物系列的清洗剂进行清洗。如果必须进行清洗，请使用能够保证电容器质量的清洗剂。

The aluminum electrolytic capacitors should be free of halogenated solvents during board cleaning after soldering. Use solvent proof capacitors when halogenated solvents are used.

② 对于能够保证电容器质量的清洗剂，清洗后请不要在清洗溶液或者密封容器中保管。清洗后的电容器请和电路板一起在热风下干燥 10 分钟以上，热风的温度不可高于电容器规定上限温度。

After cleaned with the solvent which can guarantee the quality of capacitors, the capacitors should not be kept in solvent environments of non-ventilated places. Let the capacitors after cleaning dry with hot blast fully above 10mins and the temperature of hot blast should not be over than specified upper limit of that of capacitors.

**(11) 关于固定剂以及镀层（涂层剂）Adhesives、fixative and coating materials(coating agent)**

① 请不要使用含有卤化有机物系列的固定剂及镀层（涂层剂）。

Do not use halogenated adhesives and coating materials to fix aluminum electrolytic capacitors.

② 请不要让固定剂及镀层（涂层剂）将电容器封口部位（端子一侧）全部封住。

Do not cover up all the sealing area of capacitors with adhesives、fixative or coating materials (coating agent), make coverage only partial.

**11.2 符合 RoHS RoHS compliance**

符合欧盟 RoHS 的最新标准，若客户有特殊要求，按照双方签订的相关协议为准。

Completely in accordance with the latest standard of RoHS or relevant agreements reached by both parts if customer has special requirements.