

产 品 承 认 书
APPROVAL SHEET

客户料号:

Part Number

客 户:

CUSTOMERS

品 名:

DESCRIPTION

铝电解电容

规 格:

SERIES

GF 2200UF16V 10X20

供应商料号

Supplier PN:

2200UF16VG200GF

日 期:

DATE

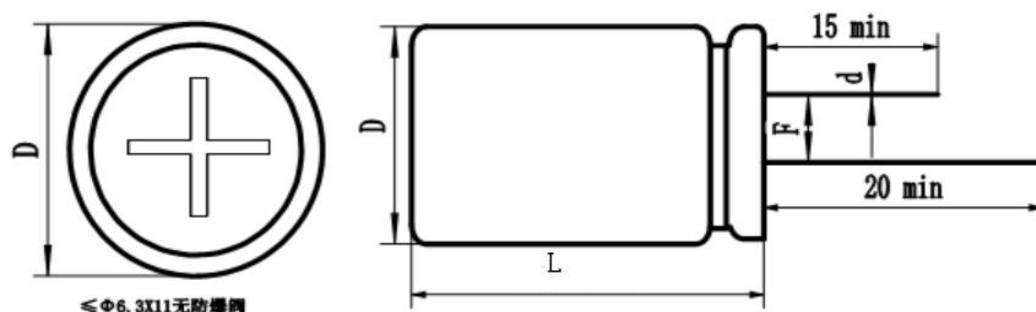
2025/3/17

发行单位 ISSUE DEPARTMENT	
	
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批准 APPROVED	胡俊波 HU JUNBO

客户承认栏 APPROVED COLUMN	
合格 ☐	
不合格 ☐	
审核 CHECKED	
批准 APPROVED	

贵司确认后，敬请回签一份（After your confirmation, please sign back）

1. 外形尺寸图 (Dimensions) : 单位: mm



ΦD	10.0	± 0.5
L	20.0	± 1.5
F	5.0	± 0.5
Φd	0.6	± 0.05

2、部品规格特性表 (电容测试条件: $25 \pm 5^\circ\text{C}$ 湿度 $65\% \pm 5\%$, 容量\损失测试频率 120HZ)

客户料号	系列	标准容量	额定电压	尺寸	容差	损失角	漏电流	阻抗	寿命	纹波电流	浪涌电压	套管	加工形式	工作温度
Part Number	Series	CAP (uF)	WV (V)	SIZE	Tolerance/120HZ	D. F/120HZ	LC (uA) 60s	100KHz (Ω)	life (Hrs)	R. C. mA100K HZ105 $^\circ\text{C}$	surge voltage	Sleeve	B	working temperature ($^\circ\text{C}$)
	GF	2200.0	16.0	10.0 X 20.0	- 20 % ~ 20 %	10.0	352.0	0.042	3000	1650.0	20.0	绿底白字PET	长脚	-40~+105
备注														

纹波电流系数 (Multiplier for ripple current) :

Freq	50Hz/60Hz	120Hz	1KHz	10KHz	50~100KHz
CAP ≤ 10	0.47	0.59	0.85	0.97	1.00
10 < CAP ≤ 100	0.52	0.65	0.89	0.97	1.00
100 < CAP ≤ 1000	0.58	0.72	0.9	0.98	1.00
CAP > 1000	0.63	0.78	0.91	0.98	1.00

纹波温度系数 Multiplier for ripple current vs temperature

Temperatrue($^\circ\text{C}$)	45	60	70	85	105
Multiplier	2.10	1.90	1.65	1.40	1.00

3. 胶管标识示意图 (Marking):

3.....

Econd

16V2200uF

Econd

.....1

.....2

GF

105℃ (M)

RoHS

2502

PET

.....4

.....5

.....6

.....7

.....8

NO. 代表内容 Item

1. 公司商标 (Logo)

2. 电容器规格（额定电压和容量）Capacitance and Rated Vlotage

3. 负极表示带 Polarity bar

4. 产品系列 (Series)

5. 工作最高温度与容量范围 (Operating Temperature Range and Capacitance Tolerance)

6. 环保标识 (RoHS)

7. 生产周期:如“ 2502 ”其中 25 代表 2025年； 02 代表 02 月份生产.

8. 胶管材质

5.1 试验项目 Test item

NO	项 目 Items	条 件 Conditions	规 格 Specifications														
1	最大允许纹波电流 Maximum permissible ripple current	Temperature:105±2℃ Voltage :DC.Voltage+peak ripple voltage≤ Rated voltage. Ripple frequency:100KHz	Refer to table														
2	浪涌 Surge	Temperature:105±2℃ Applied voltage: see specification "ON" position : 30 seconds "OFF" position :5 minutes 30 seconds. Duration : 1000 cycles	1.No electrical or mechanical damage. 2.Capacitance change within ±15%. 3.D.F.smaller than specification volue. 4.Leakage current smaller than specification value.														
3	温度循环 Temperature Cycle	<table><tr><td rowspan="5">One Cycle</td><td>Temperature(℃)</td><td>Time (minutes)</td></tr><tr><td>Rated high category temperature±3</td><td>30±3</td></tr><tr><td>25℃</td><td>3MAX</td></tr><tr><td>Rated low category temperature±3</td><td>30±3</td></tr><tr><td>25℃</td><td>3MAX</td></tr><tr><td colspan="3">Total number of cycles: 5</td></tr></table>	One Cycle	Temperature(℃)	Time (minutes)	Rated high category temperature±3	30±3	25℃	3MAX	Rated low category temperature±3	30±3	25℃	3MAX	Total number of cycles: 5			1.No appearance defect. 2.Capacitance change within ±5% 3.D.F.smaller than specification value. 4.Leakage current smaller than specification value.
One Cycle	Temperature(℃)	Time (minutes)															
	Rated high category temperature±3	30±3															
	25℃	3MAX															
	Rated low category temperature±3	30±3															
	25℃	3MAX															
Total number of cycles: 5																	
4	耐焊接热 Resistance to Soldering Heat	Warm up time :120±2 seconds to reach 120±2℃ Solder bath temperature: 260±5℃. Solder bath composition: Sn-96.5%. Ag-3.0% Cu-0.5% Immersion depth: 1.5 to 2.0mm Immersion duration: 10±1 seconds	1.No appearance defect. 2.Capacitance change within ±5% 3.D.F.smaller than specification value. 4.Leakage current smaller than specification														
5	可焊性 Solder Ability	Solder bath temperature: 235±5℃. Solder bath composition: Sn-96.5%. Ag-3.0% Cu-0.5% Immersion depth: 1.5 to 2.0mm Immersion duration: 10±1 seconds	A minimum of 95% the immersed surface is to be coated with the new solder														

5. 2试验项目 Test item

NO	项 目 Items		条 件 Conditions			规 格 Specifications						
6	低温特性（最大阻抗比） Low Temperature Charcteriestics (Max.Impedance Ratio)		working Voltage (v)		6.3	10	16	25	35	50	63	100
			Impedance Z-40℃/+20℃		8	6	4	3	3	3	3	3
7	高湿度储存 High Humidity storage		Temperature:40±2℃ Relative humidity :90 to 95% Duration : 240±8 hours			1.No electrical or mechanical damage. 2.Capacitance change within ±15%. 3.D.F.smaller than specification volue. 4.Leakage current smaller than specification volue.						
8	防爆 Vent		Conduct under normal lighting for lab work			There shall be no explosion,flash,flame,spark or fire from the capacitor during or after the test,nor shall there be expulsion of any metal from the casing						
			Capacitor diameter	Applied current(A)	Minutes							
			Less than 22.4mm	1	within 30							
More than 22.5mm	10											
9	端子强度：拉伸度/弯曲强度 Terminal strength : Tensile testintensity/winding intensity	拉伸度 Tensile testintensity	Diameter of terminnal	Tensile Strength(n)	continued time	1.No electrical or mechanical damage 2.No appearance damage						
			0.5≧d≤0.8	10	10±1sec							
			0.8<d≤1.25	20								
		弯曲强度 winding intensity	2bends（Bend 180 degrees for a round）									
			Diameter of terminnal	winding Strength(n)	Awl quality							
0.5≧d≤0.8	5		0.51kg									
0.8<d≤1.25	10	1.02kg										
10	振动 Vibration		Frequency range : 10 Hz to 55 Hz Amplitude :1.5 mm Cycle definition:10Hz to 55 Hz and back to 10Hz Cycle duration :1 minute. Duration :2 hours per direction (3directions)			1.No electrical or mechanical damage 2.No appearance damage						
11	高温负荷 Endurance		Capacitors are placed in an oven and applied voltage for 3000 hours at 105℃.After being restored to 25℃, capacitors shall meet the specifications.			1.Capacitance change within ±20% of the initial value. 2.D.F.change within ±200% of the specified value. 3.Leakage current smaller than specification value.						
12	高温储存 Shelf Life		Capacitors are placed in an oven for 1000 hours at 105℃without applying rated working voltage.After being restored to 25℃,capacitors shall meet the snecifications			1.Capacitance change within ±20% of the initial value. 2.D.F.change within ±200% of the specified value. 3.Leakage current within ±200% of the specification value.						

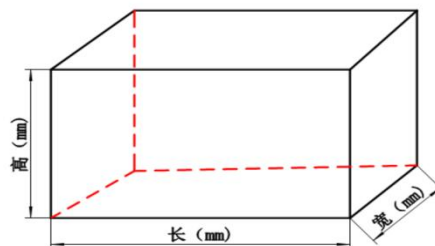
6. 包装方式 (Packing)

6.1 散料包装: 散料包装包含长脚和短脚包装, 具体如下:

电容尺寸 DXL (mm)	长脚		短脚	
	包装袋尺寸 (长x宽): 220*200mm		包装袋尺寸 (长x宽): 200*180mm	
	每袋数量 (pcs)	每箱数量 (K)	每袋数量 (pcs)	每箱数量 (K)
3X5-4X7	2000	96	2000	96
5X7	1000	40	1000	40
5X9-11	1000	40	1000	32
6. 3X7	1000	40	1000	40
6. 3X9-15	1000	32	1000	24
8X7-9	1000	40	1000	24
8X10-13	500	20	500	16
8X13.5-15	500	16	500	16
8X15.5-16.5	500	16	500	12
8X20-10X13	500	12	500	12
10X14-17	400	9.6	400	9.6
10X20-26	300	7.2	300	7.2
13X14-22	200	4.8	200	4.8
13X24-26	100	3.2	100	4
13X30-31	100	2	100	3.2
16X18-22	100	2.4	100	3.2
16X25-28	100	3.2	100	3.2
16X30-18X26	100	2.4	100	2.4
18X28-36	50	1.6	50	1.6
18X40	50	1.2	50	1.2
22X24-38	25	0.8	25	0.8



散料尺寸示意图 (上)

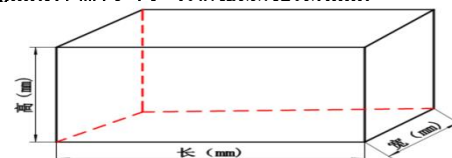


外箱尺寸示意图 (上)

散料包装外箱尺寸 (长X宽X高):
420X327X270mm

6.2 编带包装: 编带为统一包装方式: 每箱固定装10盒, 内盒尺寸345X235X55 (mm); 外盒尺寸: 490X355X295 (mm)

电容拍别	每盒数量 (pcs)	每箱盒数	每箱数量 (K)	备注
4	2500	10	25	
5	2000	10	20	
6. 3	1500	10	15	
8	1000	10	10	
10	600	10	6	每行空一
13	400	10	4	编一隔一



内盒尺寸 (长X宽X高): 345X235X55 外
盒尺寸 (长X宽X高): 490X355X295

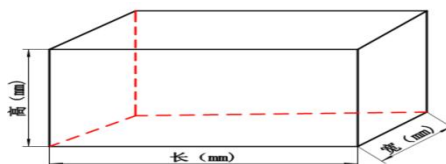
6.3 排盒包装:

1. 排盒包装标准:

拍别 (mm)	内盒选择	内盒品种	每排数量	每盒排数	每盒数量	每箱盒数	每箱数量	内盒隔板数
13Φ	内盒选择寸 依据产品尺寸而定	高盒	22	14	308	6	1848	单条/2排
		中盒				8	2464	单条/2排
		低盒				12	3696	单条/2排
16Φ	内盒选择寸 依据产品尺寸而定	高盒	18	12	216	6	1296	单条/2排
		中盒				8	1728	单条/2排
		低盒				12	2592	单条/2排
18Φ	内盒选择寸 依据产品尺寸而定	高盒	16	10	160	6	960	单条/2排
		中盒				8	1280	单条/2排
		低盒				12	1920	单条/2排
22Φ	内盒选择寸 依据产品尺寸而定	高盒	13	9	117	6	702	双条/3排
		中盒				8	936	双条/3排
		低盒				12	1404	双条/3排

2. 内盒、隔条、外箱 {长X宽X高 (mm)}

内盒型号	内盒尺寸 (mm)	隔条尺寸 (mm)	每大箱装盒数 (盒)	外箱尺寸 (mm)
高盒	305*200*65	300*62	6	420*310*215
中盒	305*200*45	300*42	8	
低盒	305*200*30	300*30	12	



7. 铝电解电容器仓储条件:

- ① 仓储温度: $\leq 35^{\circ}\text{C}$ ② 仓储湿度: $\leq 75\text{RH}\%$ ③ 电容存储有效期: 一年 (超过一年需要重新充电)