

客户 Customer: _____ 承认书编号 No: H-19-0220-001
系列 Series: HGS 提出日期 Date: 2019-02-20
规格 Spec: : 4.7μF 400V 8X12 产品料号 P/N: EHLA472M400F12BC



承认书

APPROVAL SHEET

承认 APPROVED BY:

签认后，请寄回一份，谢谢！

Please return us one copy your signed specification after you approved of it , thanks!!

核准 APPROVED BY	查核 CHECKED BY	经办 DESIGNED BY
陈芳林		陈曦

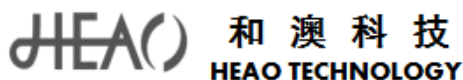
中国湖南：益阳市和澳电子科技有限公司

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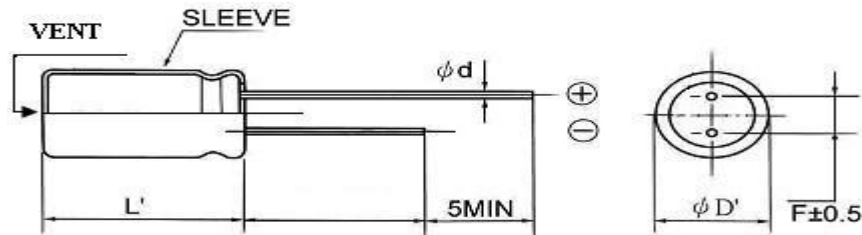
客户料号 (Customer P/N)	系列 (Series) HGS	料号 (P/N) EHGS472M400F12BC
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特性 (Characteristics)

电压 (V) Voltage	容量 (uF) Capacitor	公差 (%) Tolerance	温度 (°C) Temperature	浪涌电压 (V) Surge Voltage	漏电流 (uA) Leakage Current	损耗 (%) Dissipation Factor	等效串联电阻 ESR	纹波电流 (mA) Ripple Current	尺寸 Size DXL (mm)
400	4.7	-20~+20	-40~+105	450	8.8	12	/	110	8*12

项目 Items	特性 Characteristics																	
温度范围 Temperature range	-40℃ to +105℃																	
标称电压 Rated Voltage	400 WV.DC																	
容量公差 Capacitance Tolerance	-20%~+20% 测试环境温度、测试频率(20±5 ℃、120Hz)																	
漏电流 Leakage Current	充电时间 Time	2 分钟后 After 2 minutes					2 者之中取大值 Whichever is greater.											
	漏电流标准 LC standard	LC≤0.02CV+10uA																
LC: Leakage Current (μA) C: 容量 Capacitance (μF) V: 电压 Voltage (V) 环境温度 (20 ℃)																		
损耗角之正切值(损耗) Dissipation Factor	电压 Voltage	6.3	10	16	25	35	50	63	80	100	160	250	350	400	450	500		
	损耗 DF	0.22	0.19	0.16	0.14	0.12	0.10	0.10	0.10	0.10	0.15	0.15	0.15	0.15	0.15	0.15		
容量每增加 1000uF 损耗增加 2% Add 2% for every increase of 1000UF (25 ℃ , 120Hz)																		
低温特性 Low Temperature Characteristics	电压 Voltage	6.3	10	16	25	35	50	63	80	100	160	250	350	400	450	500		
	Z-25℃/Z20℃	7	4	3	2	2	2	2	2	3	3	3	6	6	6	6		
	Z-40℃/Z20℃	15	10	8	6	4	3	3	3	6	6	6	--	--	--	--		
Z-25℃:Z20℃: -25度与 20 度的阻抗比; Z-40℃:Z+20℃: -40度与 20 度的阻抗比 (20℃ , 120Hz)																		
可靠性 Endurance	在 105℃环境温度中施加额定电压 3000 小时后, 电容器温度恢复到 20℃测试时, 各项特性变化应满足以下要求: The following specification shall be satisfied when the capacitors are restored to 20℃ after subjected to Rate Voltage with the rated ripple current is applied for 3000 hours at 105℃																	
	容量变化 Capacitance Change	≅初始值±20%					≅±20% of the initial value											
	损耗变化 Dissipation Factor Change	≅200%标准值					≅200% of the initial specified value											
	漏电流变化 Leakage Current Change	小于标准值					Not more than the specified value											
高温储存 High temperature storage	在 105℃环境温度中不加压放置 1000 小时后, 各项特性变化应满足以下要求: The following specification shall be satisfied when the capacitors are restored to 25℃after exposing them for 1000hours at 105℃ without voltage applied . 符合上面列出的各项要求 They meet the specified value for Endurance characteristics listed above.																	

图和尺寸 Diagram and Dimension



ψ D(mm)	5	6.3	8	10	13	16	18	22
ψ d(mm)	0.5±0.05			0.6±0.05		0.8±0.05		
F(mm)	2.0	2.5	3.5	5.3	5.3	7.8	7.8	10
ψ D'(mm)	D±0.5							D±1.0
L'(mm)	L±1.0		L±1.5			L±2.0		



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电解电容器检查记录表

Inspection record of Electrolytic Capacitors

料号(P/N):	EHGS472M400F12BC	检查号码(QC No.):	20190220001
系列(Series):	HGS	客户(Buyer):	
规格(Spec.):	4.7 μ F 400WV	批量(Lot Qty):	200Pcs
批号(Lot No.):	HE190220001	尺寸(Dimension):	Φ 8X12mmL
测试环境(Test Ambient):	温度(Temp.) 20℃ 湿度(R.H.) 65%		

一. 样本数据 (Sample Data) :

项目 序号	静电容量 (Capacitance)	损失 (Dissipation Factor)	漏电流 (leakage Current)	ESR 100KHZ	成品高度 Product height
	120HZ -20%~+20%	120HZ 12 %max	1min<8.8uA	mΩ	12±1.5mm
1	4.5	3.8	2.1	/	12.6
2	4.44	3.7	2	/	12.6
3	4.42	3.8	2.4	/	12.6
4	4.49	3.6	1.7	/	12.6
5	4.3	3.6	2.1	/	12.6
6	4.56	3.7	2.4	/	12.6
7	4.44	3.6	1.9	/	12.6
8	4.44	3.6	1.9	/	12.6
9	4.56	3.66	2.2	/	12.6
10	4.55	3.6	2.1	/	12.6
Max	4.56	3.8	2.4	/	12.6
Mix	4.3	3.6	1.9	/	12.6
Ave	4.44	3.67	2.06	/	12.6

. 外观:包装/外形 (Package/Appearance)

规格 (Spec) :	500Pcs/包
检验 (Test) :	OK

三. 抽样计划 : (参照电解电容器检查缺点分类标准)

缺陷等级	(Defect Level):	n	允收 Ac	判退 Re	D
严重缺点	(Critical Defect):	全检	0	1	0
主要缺点	(Major Defect):	全检	0	1	0
次要缺点	(Minor Defect):	全检	0	1	0

判定 (Inspection Results)
OK

四. 其它 :

注明 Note	测试仪器 Test instrument:	品质部 (R & D Dept)		
	容量损耗测试仪 L.C.R. meter: CHROMA 11020 LCR METER	Approved	Checked	Inspector
	漏电流测试仪 L.C. meter:CHROMA 11200 METER 记录有效期: 2年 Record validity: 2years.	陈芳林	莫胜辉	陈曦

品质保证

Contents Of Quality Assurance

范围(Scope)	保证方式及项目 Assurance Method Contents
1、电器特性 Electrical Characteristics 1.1 静电容量 Capacitance	<ul style="list-style-type: none"> ◎依据 EIAJ 5141,5102 ◎容量公差 -20%~+20% ◎Measured in Accordance With EIAJ 5141,5102 ◎Capacitors Tolerance:-20%~+20%

<p>1.2 漏电流 Leakage Current</p>	<p>◎依据 EIAJ 5141,5102</p> <p>◎以额定直流电压充电 2 分钟后, 漏电流最大允许值, 依据本公司系列规定于各表所示之值以下</p> <p>◎Measured in Accordance With EIAJ 5141,5102</p> <p>◎After the Application of the rated D.C Voltage for 2 minutes,The Leakage Current Maximum value test in accordance with value standard aeries</p>																										
<p>1.3 损失角之正切值 Dissipation Factor</p>	<p>◎依据 EIAJ 5141,5102</p> <p>◎其 D.F 最大值, 在本公司各系列规定所示值以下, 其测量温度在+25±5℃, 测试频率在 120Hz</p> <p>◎Measured in Accordance With EIAJ 5141,5102</p> <p>◎The Dissipation Factor Maximum value at +25±5℃, Test in accordance with value Standard series</p>																										
<p>1.4 浪涌电压 Surge Voltage</p>	<p>◎依据 EIAJ 5141,5102</p> <table border="1" data-bbox="397 689 1549 887"> <tr> <td>额定电压 WV</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> <td>160</td> <td>200</td> <td>250</td> <td>300</td> <td>400</td> <td>500</td> </tr> <tr> <td>浪涌电压 SV</td> <td>21</td> <td>35</td> <td>45</td> <td>65</td> <td>75</td> <td>130</td> <td>200</td> <td>250</td> <td>300</td> <td>330</td> <td>450</td> <td>560</td> </tr> </table> <p>◎电容器接 1KΩ 电阻, 在常温下, 以每 5±0.5 分钟为一个周期, 每一周期加浪涌电压 30±5 秒, 经过 1000 周期以后测量其值, 应满足以下要求</p> <p>◎静电容量变化率: 初始值±20%以内</p> <p>◎损耗变化率: 规格值±200%以内</p> <p>◎漏电流变化率: 规格值以内</p> <p>◎Measured in Accordance With EIAJ 5141,5102</p> <p>◎The Capacitor may be subjected for short periods not exceeding approximately 30±5 seconds at infrequency intervals of not than 5 minutes,the test shall be Conducted 1000 cycles at room temperature with Voltage applied through a series Resistance of 1000Ohms without discharge. unless otherwise specified as follows</p> <p>◎Capacitor change:≤within 20% of initial value</p> <p>◎Dissipation Factor ≤200% of specified value</p> <p>◎Leakage current change:initial specified value</p>	额定电压 WV	16	25	35	50	63	100	160	200	250	300	400	500	浪涌电压 SV	21	35	45	65	75	130	200	250	300	330	450	560
额定电压 WV	16	25	35	50	63	100	160	200	250	300	400	500															
浪涌电压 SV	21	35	45	65	75	130	200	250	300	330	450	560															

<p>2、机械特性 Mechanical Characteristics</p> <p>2.1、端子强度 Terminal Strength</p> <p>2.1.1、拉力试验 Pull Test</p>	<p>◎依据 EIAJ 5141,5102</p> <p>◎将电容器本体垂直固定, 于端子部施加如下表所示之负重, 经 30±5 秒后, 端子不可有断裂或其他异常</p> <table border="1" data-bbox="397 1892 1312 2089"> <thead> <tr> <th>端子线直径(mm) Terminal diameter</th> <th>负重(Kg) Weight</th> </tr> </thead> <tbody> <tr> <td>0.5 以下(含) ≦0.5</td> <td>0.5</td> </tr> <tr> <td>0.6~0.8</td> <td>1</td> </tr> <tr> <td>0.8 以上</td> <td>2.5</td> </tr> </tbody> </table> <p>◎Measured in Accordance With EIAJ 5141,5102</p> <p>◎That with Diameter of lead wire less than 0.5mm and case size than 10mm be capable of</p>	端子线直径(mm) Terminal diameter	负重(Kg) Weight	0.5 以下(含) ≦0.5	0.5	0.6~0.8	1	0.8 以上	2.5
端子线直径(mm) Terminal diameter	负重(Kg) Weight								
0.5 以下(含) ≦0.5	0.5								
0.6~0.8	1								
0.8 以上	2.5								

	<p>withstanding a steady pull of 0.5Kg for a period of 10 seconds</p> <p>◎That with Diameter of lead wire between 0.6~0.8mm be capable of withstanding a steady pull of 1Kg for a period of 10 seconds</p> <p>◎That with Diameter of lead wire lager than 0.8mm be capable of withstanding a steady pull of 2.5Kg for a period of 10 seconds</p>								
<p>2.1.2、折弯测试</p> <p>Bending Test</p>	<p>◎将电容器本体保持垂直状态，依下表的负重加于端子线，然后将本体向水平方向倾斜 90 度再回复原位置，再朝反方向倾斜 90 度，再回复原来位置，此为一个周期。如此做 2 周期，(每周期时间为 5 秒钟).端子不可有断裂或其他异常。</p> <table border="1"> <thead> <tr> <th>端子线直径(mm) Terminal diameter</th> <th>负重(Kg) Weight</th> </tr> </thead> <tbody> <tr> <td>0.5 以下(含) ≤ 0.5</td> <td>0.25</td> </tr> <tr> <td>0.6~0.8</td> <td>0.50</td> </tr> <tr> <td>0.8 以上</td> <td>1.00</td> </tr> </tbody> </table> <p>◎That with Diameter of lead wire less than 0.5mm can be given a weight of 0.25Kg</p> <p>◎That with Diameter of lead wire between 0.6~0.8mm can be given a weight of 0.5Kg</p> <p>◎That with Diameter of lead wire lager than 0.8mm can be given a weight of 1Kg</p>	端子线直径(mm) Terminal diameter	负重(Kg) Weight	0.5 以下(含) ≤ 0.5	0.25	0.6~0.8	0.50	0.8 以上	1.00
端子线直径(mm) Terminal diameter	负重(Kg) Weight								
0.5 以下(含) ≤ 0.5	0.25								
0.6~0.8	0.50								
0.8 以上	1.00								
<p>2.2、耐焊接热性</p> <p>Solder heat Resistance</p>	<p>◎依据 EIAJ 5141,5102</p> <p>◎将电容器端子 CP 线浸入温度为 $350\pm 10^{\circ}\text{C}$ 的锡熔液里，30 ± 1 秒后取出，于常温下放置 1-2 小时后，测量其值，应满足以下要求：</p> <p>◎静电容量变化率：初始值$\pm 20\%$以内</p> <p>◎损耗变化率：规格值以内</p> <p>◎漏电流变化率：规格值以内</p> <p>◎外观：无明显异常</p> <p>◎Measured in Accordance With EIAJ 5141,5102</p> <p>◎The section from the base to 4mm of the capacitor terminal must be immersed in $350\pm 10^{\circ}\text{C}$,Liquid tin 30 ± 1 seconds,the after removing The following specifications Shall be satisfied,When the capacitor terminal is restored to 20°C,With 1-2 hours</p> <p>◎Capacitor change:\leqwithin 20% of initial value</p> <p>◎Dissipation Factor :initial of specified value</p> <p>◎Leakage current change:initial specified value</p> <p>◎Appearance is good</p>								



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Aluminum electrolytic capacitors

<p>2.3、焊锡附着性</p> <p>Solder ability Test</p>	<p>◎依据 EIAJ 5141,5102</p> <p>◎将电容器端子 CP 线浸入温度为 $230\pm 5^{\circ}\text{C}$ 的锡熔液里，锡熔液离本体 $4\pm 1\text{mm}$ 处，经 2 秒后，其浸入部份，至少有 3/4 部有新锡附着。</p> <p>◎Measured in Accordance With EIAJ 5141,5102</p> <p>◎The section from the base to 4mm of the capacitor terminal must be immersed in $230\pm 5^{\circ}\text{C}$,Liquid tin 2 seconds,then after removing. The liquid tin must be at here to No less than 3/4 this section.</p>
<p>3、耐温性</p> <p>Temperature</p>	<p>◎依据 EIAJ 5141,5102</p> <p>◎将电容器置于低温箱中，温度达到-25°C和-40°C后测量其阻抗值，并将其值与$+20^{\circ}\text{C}$时的</p>

resistance characteristics 3.1、低温特性 Low Temperature characteristics	阻抗值对比, 应满足如下要求:															
	电压 Voltage	6.3	10	16	25	35	50	63	80	100	160	250	350	400	450	500
	Z-25°C/Z20°C	7	4	3	2	2	2	2	2	3	3	3	6	6	6	6
	Z-40°C/Z20°C	15	10	8	6	4	3	3	3	6	6	6	--	--	--	--
3.2、高温特性 High Temperature characteristics	◎ Measured in Accordance With EIAJ 5141,5102 ◎ capacitor at -25°C or -40°C.120Hz shall not be less than 80% of the value at 20°C ◎ Impedance ratio at 120Hz the following specifications shall be satisfied.															
	◎ 依据 EIAJ 5141,5102 ◎ 将电容器存放在各系列额定温度 85°C 和 105°C±3°C 空气循环式恒温箱中, 测定其参数应满足以下要求: ◎ 静电容量变化率: 初始值±10%以内 ◎ 损耗变化率: 规格值以内 ◎ 漏电流变化率: 规格值以内 ◎ 外观: 无明显异常 ◎ Measured in Accordance With EIAJ 5141,5102 ◎ capacitor at -85°C or -105°C.120Hz the following specifications shall be satisfied ◎ Capacitor change:≤within 10% of initial value ◎ Dissipation Factor :initial specified value ◎ Leakage current change:initial specified value ◎ Appearance is good															
3.3、耐湿特性 Humidity resistance characteristics	◎ 依据 EIAJ 5141,5102 ◎ 将电容器存放在温度为 40±2°C、相对湿度为 90-95%RH 循环式恒温箱中, 放置 120±6 小时测定其参数应满足以下要求: ◎ 静电容量变化率: 初始值±10%以内 ◎ 损耗变化率: 规格值以内 ◎ 漏电流变化率: 规格值以内 ◎ 外观: 无明显异常 ◎ Measured in Accordance With EIAJ 5141,5102 ◎ The testing oven used in this test .shall be capable of painting the temperature															

3.3、耐湿特性 Humidity resistance characteristics	At 40±2°C and relative humidity 90 to 95% for 120±6 Hours.the following specifications shall be satisfied ◎ Capacitor change:≤within 10% of initial value ◎ Dissipation Factor :initial specified value ◎ Leakage current change:initial specified value ◎ Appearance is good
3.4、高温负荷寿命 High temperature	◎ 依据 EIAJ 5141,5102 ◎ 将电容器加 1KΩ 电阻保护, 然后加额定电压, 置于标称温度 85°C 或 105°C, 循环式恒温

<p>Load life</p>	<p>箱中，3000 小时后取出测试其参数应满足以下要求：</p> <ul style="list-style-type: none"> ◎静电容量变化率：初始值±20%以内 ◎损耗变化率：规格值以内 ◎漏电流变化率：规格值以内 ◎外观：无明显异常 ◎Measured in Accordance With EIAJ 5141,5102 ◎DC Voltage shall be applied through 3000Ohms series resistor in such a manner as To develop rated Voltage across the capacitors are restored to 25 °C after the rated Voltage applied at 85 °C or 105 °C±2°C ◎Capacitor change:≤within 20% of initial value ◎Dissipation Factor :initial specified value ◎Leakage current change:initial specified value ◎Appearance is good
<p>3.5、高温无负荷寿命</p> <p>High temperature Unload life</p>	<ul style="list-style-type: none"> ◎依据 EIAJ 5141,5102 ◎将电容器放置于额定 85°C或 105°C的循环式恒温箱中（不加电压），放置 1000±12 小时后取出，待产品回复常温，测量其参数应满足以下要求： ◎静电容量变化率：初始值±20%以内 ◎损耗变化率：规格值以内 ◎漏电流变化率：规格值 200%以内 ◎外观：无明显异常 ◎Measured in Accordance With EIAJ 5141,5102 ◎The following specification shall be satisfied. When the capacitors are restored to 20°C.after exposing then at 85°C or 105°C for 1000±12 Hours without voltage applied ◎Capacitor change:≤within 20% of initial value ◎Dissipation Factor :initial specified value ◎Leakage current change:initial of 200% specified value ◎Appearance is good