

HF 系列

特长 / 用途

- 105℃、5,000 小时寿命保证
- 极低等效串联电阻(ESR)并可承受大纹波电流
- 符合 ROHT 和 REACH 指令

◆规格表

项 目	性 能							
工作温度范围	-55~+105℃							
额定静电容量容许误差值	±20% (20℃、120Hz)							
漏电流 (LC)	≤标准品一览表的值 (20℃、2 分值) <span style="float:right">注: 计算方法 <math>LC \leq 0.2CV</math> 或 <math>300\mu A</math>, 取较大者</span>							
损失角正切值 (tanδ)	参阅标准品一览表 (20℃、120Hz)							
等效串联电阻 (ESR)	参阅标准品一览表 (20℃、100KHz)							
耐久性	在 105℃ 环境中, 连续加载额定电压 50,00 小时后、待温度恢复到 20℃ 进行测量时, 应满足以下要求。							
	外观	无明显变化						
	静电容量变化率	≤初始值的± 20%						
	损失角正切值	≤初始规格值的 150%						
	等效串联电阻(ESR)	≤初始规格值的 150%						
	漏电流	≤初始规格值						
耐湿负荷特性	在 60℃90~95%RH 环境中, 连续加载额定电压 2,000 小时后, 待温度恢复到 20℃ 进行测量时, 应满足以下要求。							
	外观	无明显变化						
	静电容量变化率	≤初始值的± 20%						
	损失角正切值	≤初始规格值						
	等效串联电阻 RI(ESR)	≤初始规格值的 150%						
	漏电流	≤初始规格值						
浪涌电压特性	在 105℃ 环境中, 按照充电 30 秒、放电 5 分 30 秒连续加载浪涌电压 1,000 次 ( $R_c=1k\Omega$ ) 后, 待温度恢复到 20℃ 进行测量时, 应满足以下要求。							
	额定电压 (RV)	2.5	6.3	10	16	25	35	50
	浪涌电压 (SV)	2.9	7.2	11.5	18.4	28.8	40.3	57.5
	外观	无明显变化						
	静电容量变化率	≤初始值的± 20%						
	损失角正切值	≤初始规格值						
	等效串联电阻 RI(ESR)	≤初始规格值的 150%						
	漏电流	≤初始规格值						

◆尺寸图 [mm]



Π	5.0	5.5	6.3	8.0	10.0
P	2.0	2.5	2.5	3.5	5.0
Φd	0.5	0.5	0.5/0.6	0.6	0.6
ΦD	ΦD+0.5max				
L	L+1.0max				

单位: mm

HT 系列

◆标准品一览表

WV	Cap ( $\mu$ F)	尺寸 $\Phi$ DxL (mm)	损失角正切值 ( $\tan\delta$ ) (20 $^{\circ}$ C, 120Hz)	漏电流 ( $\mu$ A) (max)	等效串联电阻 (ESR) (m $\Omega$ max./20 $^{\circ}$ C, 100kHz)	额定纹波电流 (mArms/105 $^{\circ}$ C, 100kHz)	产品代码
2.5V	470	6.3X8	0.08	300	12	1450	HF0E477M0607PC
	560	6.3X8	0.08	300	12	1550	HF0E567M0607PC
	680	6.3X8	0.08	340	12	1650	HF0E687M0608PC
		6.3X9	0.08	340	10	1700	HF0E687M0609PC
	820	6.3X8	0.08	410	12	1750	HF0E827M0608PC
		6.3X9	0.08	410	10	1800	HF0E827M0609PC
	1000	6.3X9	0.08	500	10	1950	HF0E108M0609PC
		8X8	0.08	500	12	2000	HF0E108M0808PC
	1500	8X11.5	0.08	750	10	2150	HF0E158M0811PC
	2200	8X16	0.08	1100	10	2350	HF0E228M0816PC
		10X12	0.08	1100	10	2400	HF0E228M1012PC
	3300	10X12	0.08	1650	10	2600	HF0E338M1012PC
4700	10X16	0.08	2350	10	2900	HF0E478M1016PC	
6.3V	220	5X8	0.08	300	16	1650	HF0J227M0508PC
		6.3X8	0.08	300	16	1950	HF0J227M0608PC
	330	6.3X8	0.08	415	16	2150	HF0J337M0509PC
	470	6.3X7	0.08	592	16	1800	HF0J477M0608PC
		6.3X9	0.08		14	2250	HF0J477M0608PC
		8X8	0.08		12	2400	HF0J477M0808PC
	560	6.3X8	0.08	705	16	2300	HF0J567M0608PC
		6.3X9	0.08		14	2450	HF0J567M0609PC
		8X8	0.08		14	2550	HF0J567M0808PC
	680	6.3X10.5	0.08	856	14	2550	HF0J687M0610PC
	820	6.3X9	0.10	1033	16	2500	HF0J827M0611PC
		6.3X11.5	0.10		12	2650	HF0J827M0611PC
		8X8	0.08		14	2600	HF0J827M0808PC
	1000	8X11.5	0.08	1260	12	2800	HF0J108M0811PC
	1500	10X12	0.10	1890	12	2950	HF0J158M0615PC
	2200	8X16	0.10	2772	12	3150	HF0J228M0816PC
		10X12	0.10		12	3200	HF0J228M1012PC
	3300	10X13.5	0.10	4158	12	3350	HF0J338M1013PC
		10X16	0.10		12	3500	HF0J338M1016PC

WV	Cap ( $\mu$ F)	尺寸 $\Phi$ DxL (mm)	损失角正切值 ( $\tan\delta$ ) (20 $^{\circ}$ C, 120Hz)	漏电流 ( $\mu$ A) (max)	等效串联电阻 (ESR) (m $\Omega$ max./20 $^{\circ}$ C, 100kHz)	额定纹波电流 (mArms/105 $^{\circ}$ C, 100kHz)	产品代码
10V	100	5X7	0.10	300	28	1250	HF1A107M0507PC
	220	5X9	0.10	440	22	1350	HF1A227M0509PC
	330	6.3X8	0.10	660	18	1500	HF1A337M0608PC
	470	6.3X10.5	0.10	940	16	1700	HF1A477M0610PC
	560	6.3X11.5	0.10	1120	16	1650	HF1A567M0611PC
	680	8X11.5	0.10	1360	16	1750	HF1A687M0811PC
	820	8X11.5	0.10	1640	16	1850	HF1A827M0811PC
	1000	10X12	0.10	2000	16	2050	HF1A108M1012PC
	1500	8X16	0.10	3000	14	2250	HF1A158M0816PC
	2200	10X16	0.10	4400	14	2450	HF1A228M1013PC
16V	100	6.3X5.5	0.12	320	28	1250	HF1C107M0605PC
		6.3X8	0.12		22	1450	HF1C107M0608PC
	220	6.3X7	0.12	704	25	1650	HF1C227M0607PC
		8X8	0.12		25	1800	HF1C227M0808PC
	270	6.3X7	0.12	864	22	1750	HF1C277M0511PC
	330	6.3X9	0.12	1056	22	1850	HF1C337M0515PC
	470	6.3X10.5	0.12	1504	18	2000	HF1C477M0610PC
		6.3X11.5	0.12		18	2050	HF1C477M0611PC
		8X11.5	0.12		12	2450	HF1C477M0811PC
	560	5.5X11.5	0.12	1792	16	2250	HF1C567M5511PC
	680	6.3X11.5	0.12	2176	16	2350	HF1C687M0611PC
		6.3X15	0.12		14	2400	HF1C687M0615PC
		8X11.5	0.12		14	2550	HF1C687M0811PC
		10X12	0.12		14	2600	HF1C687M1012PC
	820	8X13.5	0.12	2624	14	2750	HF1C827M0813PC
	1000	8X16	0.12	3200	12	2950	HF1C108M0816PC
1200	8X16	0.12	3840	12	3050	HF1C128M0816PC	
1500	10X16	0.12	4800	12	3250	HF1C158M1016PC	
2200	10X16	0.12	7040	12	3500	HF1C228M1016PC	
25V	10	5X8	0.12	300	68	850	HF1E106M0508PC
	47	5X8	0.12	300	65	1650	HF1E476M0508PC
	100	6.3X8	0.12	500	48	2150	HF1E107M0608PC
	220	6.3X8	0.12	1100	38	2450	HF1E227M0608PC
	270	6.3X9	0.12	1350	28	2700	HF1E277M0609PC
	330	6.3X10.5	0.12	1650	25	2850	HF1E337M0610PC
	470	8X11.5	0.12	2350	22	3100	HF1E477M0811PC
		10X12	0.12		20	3350	HF1E477M1012PC
	560	6.3X15	0.12	2800	20	3150	HF1E567M0615PC
	680	8X16	0.12	3400	20	3650	HF1E687M0816PC
	820	8X16	0.12	4100	20	3750	HF1E827M0816PC
1000	10X16	0.12	5000	20	4100	HF1E108M1016PC	

WV	Cap ( $\mu$ F)	尺寸 $\Phi$ DxL (mm)	损失角正切值 ( $\tan\delta$ ) (20°C, 120Hz)	漏电流 ( $\mu$ A) (max)	等效串联电阻 (ESR) (m $\Omega$ max./20°C, 100kHz)	额定纹波电流 (mA <sub>rms</sub> /105°C, 100kHz)	产品代码
35V	10	5X8	0.12	300	68	850	HF1V106M0508PC
	22	5X7	0.12	300	58	1050	HF1V226M0507PC
	68	6.3X8	0.12	476	48	1250	HF1V686M0608PC
	100	5.5X9	0.12	700	38	1850	HF1V107M5509PC
		6.3X7	0.12		48	1650	HF1V107M0607PC
		8X8	0.12		38	2100	HF1V107M0808PC
	120	10X12	0.12	840	38	2400	HF1V127M1012PC
	220	6.3X11.5	0.12	1540	38	2650	HF1V227M0611PC
		8X11.5	0.12		38	2800	HF1V227M0811PC
	330	8X13.5	0.12	2310	32	2850	HF1V337M0813PC
	470	8X16	0.12	3290	28	2950	HF1V477M0816PC
	560	10X13.5	0.12	3920	28	3100	HF1V567M1013PC
	680	10X16	0.12	4760	25	3450	HF1V687M1016PC
820	10X16	0.12	5740	25	3700	HF1V827M1016PC	
50V	10	5X8	0.12	300	68	700	HF1H106M0508PC
	22	5X8	0.12	300	65	850	HF1H226M0508PC
	68	8X8	0.12	680	48	1350	HF1H686M0808PC
	100	8X9.5	0.12	1000	45	1950	HF1H107M0809PC
		8X11.5	0.12		38	2200	HF1H107M0811PC
	220	8X16	0.12	2200	35	2450	HF1H227M0811PC
	330	10X16	0.12	3300	32	2700	HF1H337M1016PC
	470	10X16	0.12	3290	28	2150	HF1H477M1016PC

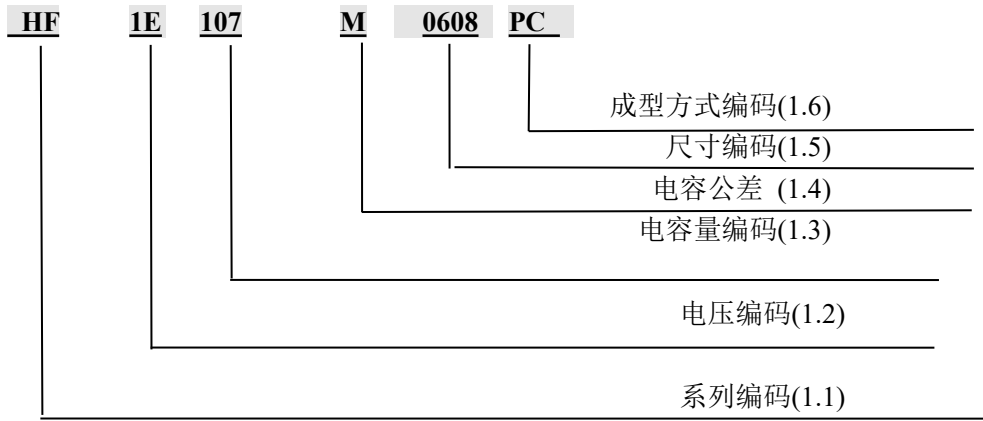
◆ 高低温阻抗

阻抗比	性能
$Z(-55^\circ\text{C}) / Z(+20^\circ\text{C})$	0.75 to 1.25
$Z(105^\circ\text{C}) / Z(+20^\circ\text{C})$	0.75 to 1.25

◆ 纹波电流频率系数

频率 Frequency	120Hz $\cong$ f < 1 kHz	1 KHz $\cong$ f < 10 kHz	10 KHz $\cong$ f < 100 kHz	100 KHz $\cong$ f < 300 kHz
系数 Coefficient	0.05	0.3	0.7	1.00

◆物料编码



1.1 系列编码

编码 Code	HF
系列编码 Series Code	HF

1.2 电压编码

编码 Code	0E	0G	0J	0C	0Q	1A	1B	1L	1C	1D	1E	1V	1H	1J	1K	2A
电压编码 VoltageCode(W.V)	2.5	4	6.3	6.8	7.5	10	12	14	16	20	25	35	50	63	80	100

1.3 电容公差

“M”代表-20%~+20%

1.4 容量编码

编码 Code	476	107	157	337	477	567	687	827	108
容量 Capacitance (uF)	47	100	150	330	470	560	680	820	1000

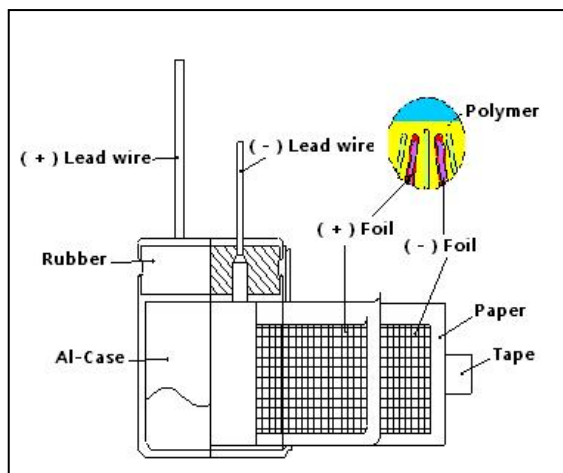
1.5 尺寸编码

编码 Code	0509	0607	0608	0609	0611	0808	0811	1010	1012
直径 D (Φ)	5	6.3	6.3	6.3	6.3	8	8	10	10
高度 H (mm)	9	7	8	9	11.5	8	11.5	10	12

1.6 成型方式编码

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=2.0mm	座板 Right lying Bending2.0±0.5mm

◆结构



导线:固体镀锡铜包钢线

Lead wires : Solid tinned copper weld steel wire

导线端子: 高纯铝 Al-boss : High pure aluminum

电解纸: 马尼拉麻 Paper : Manila hemp

铝箔 (正极): 高纯铝 Al-foil (Anode) : High pure minum

铝箔 (负极): 碳箔、高纯铝

Al-foil (Cathode) : Carbon foil、High purity aluminum

铝壳: 高纯铝 (尼龙碾压) Al-case : Aluminum (nylon unate)

胶粒: 聚酯 Tape : Polyester

导线和圆柱端子通过焊接连接在一起

The lead wire and the Al-boss are welded together.

导线扁平端子与铝箔通过按压连接在一起

The Al-tab and the Al-foil are stitched to join together.

卷绕的素子外部以阴极箔包裹

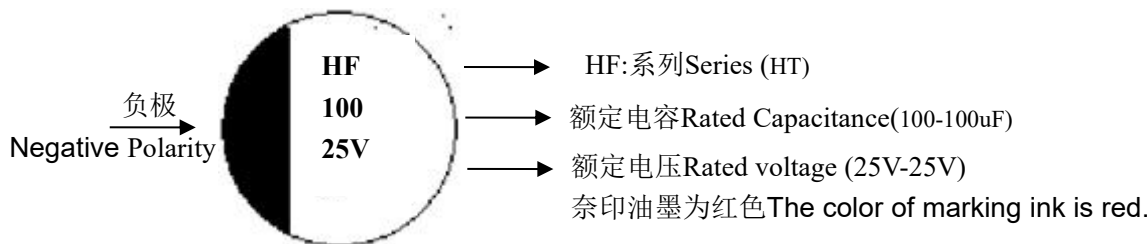
The outer most Al-foil spiral of the element is cathode.

导电高分子用作电解质

Conductive polymer is used as the electrolyte.

◆奈印

除非另有说明, 奈印应该清晰地印在电容上



◆包装

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 (pcs)	内盒 267x260x135 (mm)	外箱 546x279x160 (mm)	袋 (pcs)	内盒 267x260x135 (mm)	外箱 546x279x160 (mm)
尺寸 D*L(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

**◆操作注意事项Operating Precautions****8.1 极性Polarity**

CAP是具有正负极的固态铝电解电容，使用中不可反接，若接反，则电容会因为漏电流不断增大或短路而造成寿命缩短。

CAP is a solid aluminum electrolytic capacitor with positive and negative electrodes. Do not reverse the polarity when using. If it is used with the polarities reversed, its life may shorten because of increasing leakage current or short circuit.

**8.2禁止电路 Prohibited circuits**

因为焊接及其它动作可造成电容的漏电流增加，CAP不可使用在下列电路中：

Since problems can be expected due to leakage current increasing during soldering and other processes, CAP cannot be used in the following circuits

1)高阻抗电路1) High impedance circuits;

2)耦合电路2) Coupling circuits;

3)时限恒量电路3) Time constant circuits;

4)为提高耐电压而串联两个或多个电容于电路中

4) Connection of two or more capacitors in series for higher withstanding voltage;

5)电路因漏电流过大而有坏的影响5) Circuits to get bad influence by big leakage current

\* 除漏电流的波动上升外，电容的使用条件如在承认书中规定的高温和低温，温湿和耐受性条件都会影响电容量。若电容作为时限恒量电容使用，因其对电容量的变动的敏感性，电容量的改变会造成影响。不要将其作为时限恒量电容使用，同时若因电压原因要串联多个CAP电容，请联系东莞荣誉电子有限责任公司。

\* In addition to the leakage current fluctuation above, the operational conditions such as characteristics at high and low temperature, damp heat and endurance stipulated in the specifications will affect the capacitance. The fluctuation of the capacitance may cause problem if it is used as a time constant capacitor, which is extremely sensitive to the fluctuation of the capacitance. Do not use it as a time constant capacitor. Additionally please contact DONGGUAN HONOR Electronics Co., Ltd. for usage of two or more CAP in series for voltage proof.

**8.3 电压Over voltage**

电压若超过额定电压，即便只是一瞬间也可能造成短路

Over voltage exceeding the rated voltage may not be applied even for an instant as it may cause a short circuit.

**8.4突然充放电Sudden charge and discharge**

突然的充放电是不可取的（为了维持高的可靠性）。为防止突然的充放电造成电容短路或漏电流增大，电路中应加上一个保护电路用以分流过大的电流。若瞬间电流超过10A或超过10倍允许纹波电流，要使用保护电路。在测试漏电流时请加上一个1kΩ的电阻用以充放电。

Sudden charge and discharge restricted (for maintenance of high-proof reliability). A protection circuit is recommended for when a sudden charge or discharge causes excessive rush current because this is a main cause of short circuits and large leakage current. Use protection circuits if the rush current exceeds 10A. The rush current exceeds 10×the maximum allowable ripple current of CAP. Be sure to insert a protection resistor of about 1kΩ for charge and discharge when measuring the leakage current.

**8.5焊接注意事项Considerations when soldering**

焊接条件要在承认书的规定范围内。若没有遵守承认书的条件，则电容漏电流可能急剧增加，容量衰减。

The soldering conditions are to be within the range prescribed in specifications. If the specifications are not followed, there is a possibility of the cosmetic deflection, the intensive increase of leakage current, and the capacitance reduction.

使用需知 Things to be noted before mounting



- (a) 已安装过的或加过电压的CAP请勿再使用。经历了周期性电性能测试的CAP不可再用。  
 (a) Do not reuse CAP that have been assembled in a set and energized. Excluding CAP that have been removed for measuring electrical characteristics during a periodic inspection, CAP cannot be reused.  
 (b) CAP贮藏一年时间后，漏电流可能会增大，使用前，请在105℃，额定电压及接有1 kΩ电阻的条件下充电2小时。  
 (b) Leakage current may increase when CAP are stored for one year. In this case, apply rated voltage for 2 hour at 105℃ with load of 1 kΩ resistor.

(c) Reflow soldering 流体焊接

Do not apply radial lead type capacitors to reflow soldering. 不可用于SMD系列

(d) Handling after soldering 焊接后处理

在这之后，不要倾斜，弯曲或扭曲CAP Do not tilt, bend or twist the CAP after it  
 不可通过抓捏CAP来移动印刷电路板 Do not move the PCB with catching CAP itself.  
 堆叠印刷电路板时确保CAP没有碰触到其它电路板或部件  
 When stacking PCB make sure that the CAP does not touch other PCB or components.  
 不可将CAP与其它物品堆放 Do not dump the CAP with objects.

8.6 使用CAP于工业设备 Use of CAP for industrial equipments

为确保CAP在工业设备上的可靠性，设计必须与之相符。

To ensure reliability when the CAP is used in industrial equipments, design must allow for its

8.7 使用CAP于生命保障系统 Use of CAP for human life equipments

若使用于与人类生命有关的设备上（如空间设备、航空设备、原子设备等），请与东莞荣誉电子有限责任公司详细咨询，不要使用没有东莞荣誉电子有限责任公司承认文件的CAP。

In case of using in equipments regarding human life (e.g. Space equipment, aeronautic equipment and atomic equipment etc.), be sure to talk over the matter with DONGGUAN HONOR Electronics Co., Ltd. Don't use without recognition document of DONGGUAN HONOR Electronics Co., Ltd.

8.8 贮存 Storage

1) 请将CAP贮存于温度在-40 to 85℃之间，相对湿度在75%以下的没有阳光直射的环境中，如果可能可贮存于包裹中。(如果在35到85℃，他应该少于三个月)

Store CAP with the temperature range between -40 to 85℃ (If between 35 to 85℃, it should be less than three months), and the relative humidity of 75% without direct sunshine and store CAP in the package states if possible.

2) CAP请在使用前再打开包装袋并且快速用完。

CAP are recommended that you shall open the bag just before use and CAP shall be used up.

3) 不要在有水、盐水、油及凝结状况的地方贮存CAP

Never store CAP in which it is directly exposed to water, brine, oil or in condensation status.

4) 禁止在含有毒气体的区域放置CAP（如：硫化氢、亚硫酸、亚硝酸、氯气、氨水等）

Never store CAP in any area filled with poisonous gases (including hydrogen sulfide, sulfurous acid, nitrous acid, chlorine and ammonia).

5) 禁止在有紫外线或放射性辐射的区域放置CAP。

Never store CAP in any area to which ultraviolet and/or radial rays are radiated.

※ (导针式 Radial lead type)

开启前：出货后一年内 Before unseal : within 1 year after delivery

封口后：打开后7天内 After seal : within 7 days from opening

8.9 清洗 Cleaning

关于HCFC，可用高浓酒精，石油，匝烯，水和表面活性剂以及别的溶剂（单独或混合使用）浸泡，用超声波，煮沸，蒸发等方法按制作者的建议清洗。更多详情请联系。



system with surface active agent and other solvents the washing way (separateness or combinations) by soak, ultrasonic wave, boil, vapor etc. is confirmed under the maker's recommendation. Please contact us if you require further details.

#### 8.10为CAP设计电路的说明Notes on circuit designs for CAP

##### 8.10.1 执行Performance

在承认书中指定的额定性能范围内使用CAP。

Use CAP within the rating and performance ranges defined in this specifications.

##### 8.10.2使用温度和纹波电流Operating temperature and ripple current

如果CAP的使用温度超过了上限温度（105℃）或是有超载纹波电流通过，则有较大可能使寿命缩短，或漏电流增大，造成CAP失效。

If CAP is used at a temperature higher than the upper category temperature(105℃), or excess ripple current flows through CAP, there are high possibilities of life cycle reduction or leakage current increasing to cause CAP defective.

##### 8.10.3漏电流Leakage current

漏电流会因焊接条件而有些微的上升，加载直流电压可使电容自我修复，漏电流逐渐减小。

The leakage current of CAP may increase slightly by soldering conditions. The application of DC voltage enables the capacitors to be repaired by itself and this leads the leakage current to be smaller gradually.

##### 8.10.4使用电压Applied voltage

为了保证CAP的可靠性，加载到CAP上的电压最好小于其额定电压的80%。直流加交流电压的峰值应小于额定电压。

For the reliability of CAP, it is recommended that the voltage applied to CAP should be less than 80% of the rated voltage. Peak value of the the dc and ac voltage should not exceed its rated voltage.

##### 8.10.5失效模式Failure mode

CAP含有导电聚合物，其寿命的终止大部分是由于偶然失效模式，主要是短路。如果短路，CAP将会因持续电流流过而过热，然后铝壳会因内部压力的增加而脱离电容。

CAP contains a conductive polymer. The life ends mostly due to random failure mode, mainly short circuit. In case of short circuit, CAP can be overheated by continuous current flow, then case of CAP would be removed by internal pressure increasing.

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