

Aluminum Electrolytic Capacitors

VES Series Chip Type Aluminum Electrolytic Capacitors

ALLCONNE



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
K	M	1	0	6	M	0	1	6	V	D	0	5	L	1	1	H	B

No 1、2 CODE----Series type

Series type	CD81	CD294	CD11X	CD263H	CD288H	CD71	CDV
code	KM	HP	SX	RM	LF	NB	SM

No 3、4、5 CODE -----Electrostatic capacity

Electrostatic capacity (uF)	0.22	2.2	22	220	2200	22000	220000
code	223	224	225	226	227	228	229

No 6 CODE -----Electrostatic capacity tolerance

J: -5~+5%	B: -5~+10%	K: 10~+20%
M: -20~+20%	L: -15~+15%	R: -0~+20R%

No7、8、9、10 CODE -----Rated voltage

Rated voltage	6.3V	10V	16V	25V	35V	50V	63V	100V	160V	250V	350V
Code	6R3V	010V	016V	025V	035V	050V	063V	100V	160V	250V	350V

No11、12、13 CODE-----Product diameter

Diameter	5mm	6mm	8mm	10mm	13mm	16mm	18mm	19mm	22mm
Code	D05	D06	D08	D10	D13	D16	D18	D19	D22

No14、15、16 CODE-----Product height

Contour height	5mm	7mm	9mm	10mm	11mm	12mm	13mm	15mm	17mm	20mm	22mm
Code	L05	L07	L09	L10	L11	L12	L13	L15	L17	L20	L22

No17、18 CODE-----Case color

Case color	Black background White character	Black background Blue letter	Coffee background White character	Black background Gold character	Purple background White character	Green background White character	Green background Gold character	Yellow background Black character
Code	H B	H L	K B	H J	Z B	L B	L J	H H

1. 概述 SCOPE

本承认书规定了 CD81-105 度系列产品径向引出铝电解电容器的技术规范。

This specification covers "CD81" radial type aluminum electrolytic capacitors.

2. 参考标准 APPLICABLE SPECIFICATION

本规格书参考 GB/T2693 和 GB/T18504 制定。

This approval sheet consulted the institute of GB/T2693 and GB/T18504.

3. 工作温度范围 OPERATING TEMPERATURE RANGE

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

-40~105℃ (6.3~100v) -25~105℃ (160~450v)

Operating temperature range is the range of ambient temperature at which the capacitor can Operated continuously at rated voltage

-40~105℃ (6.3~100v) -25~105℃ (160~450v)

4. 测试环境 ATMOSPHERIC CONDITION OF MEASUREMENTS

如果没有其他规定，标准的测试、检测环境条件下如下所示：

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，可在以下条件测试：

环境温度：20±2℃

相对湿度：60~70%

大气压力：86Kpa~106kpa

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

Ambient temperature: 15 to 35℃

Relative humidity: 45to 75%

Air pressure: 86kpa to 106kpa

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

Ambient temperature: 20±2℃

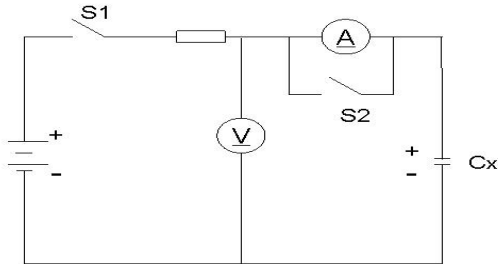
Relative humidity: 60to 70%

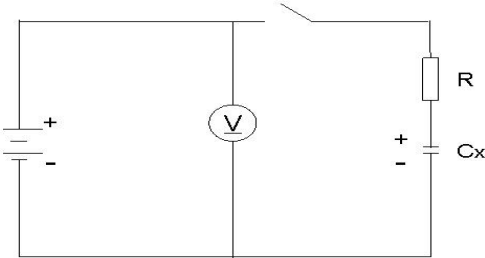
Air pressure: 86kpa to 106kpa

5. 产品特性 PRODUCT CHARACTERISTICS

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5.1 电气特性 ELECTRICAL CHARACTERISTICS

序号 NO	项 目 Item	测试方法 Test method	特 性 Performance
5.1.1	额定工作电压 Rated voltage		DC: 6.3~450V
5.1.2	电容量 Capacitance	测试频率: 120Hz $\pm$ 20% 测试电路: 串联等效 测试信号电平: 1V Measuring frequency:120Hz $\pm$ 20% Measuring circuit: Series equivalent circuit Measuring voltage: 0.5Vrms or +1.5to2.0VDC	0.1~15000 μ F 容量偏差: CD110: -20~ +20% Capacitance tolerance: CD110: -20~ +20%
5.1.3	损失角正切值 Dissipation Factor	测试条件与 5.1.2 电容量测试相同 Testing condition are the same as 5.1.2 for capacitance	见表 1 table-1
5.1.4	漏电流 Leakage current	在电容器两端施加额定工作电压, 并串联 1000 $\pm$ 100 Ω 电阻, 在施加电压 2 或者 1 分钟后, 测量漏电流。 The rated voltage shall be applied Across the capacitor and its protective resistor which shall be 1000 $\pm$ 100 Ω . The leakage current shall then be measured after an electrification period of 2 or 1 min... Measurement circuit  S: protective resistor(1000$\pm$100Ω) DC ampmetr DC voltmeter S₁:Switch S₂:Protective switch for an ampmeter	电压 (6.3~100V) 充电 2 分钟后 Ic $\leq$ 0.01CV 或 3 μ A (取大者) Ic: 漏电流 (μ A) C: 容量 (μ F) V: 额定工作电压 (V) Voltage(6.3~100V) After 2 minutes Ic $\leq$ 0.01CV or 3 μ A Whichever is greater Ic: Leakage current (μ A) C: Capacitance (μ F) V: Rated voltage (V) 电压 (160~450V) 充电 1 分钟后 Ic $\leq$ 0.03CV 或 10 μ A (取大者) Ic: 漏电流 (μ A) C: 容量 (μ F) V: 额定工作电压 (V) Voltage(160~450V) After 1 minutes Ic $\leq$ 0.03CV or 10 μ A Whichever is greater Ic: Leakage current (μ A) C: Capacitance (μ F) V: Rated voltage (V)

5.1.5	温度特性 Temperature Characteristic	<table><tr><td>阶段</td><td>温度</td><td>时间</td></tr><tr><td>1</td><td>20±2℃</td><td>--</td></tr><tr><td>2</td><td>-25±0.3℃</td><td>2H</td></tr><tr><td>3</td><td>-40±0.3℃</td><td>2H</td></tr></table> 阶段 1: 测量容量和阻抗 (Z20℃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-25℃120HZ±20%) 阶段 3: 电容器恒温贮存 2 小时, 在热平衡状态测阻抗 (Z-40℃120HZ±20%) Step 1: Capacitance and impedance shall be measured. (Z20℃120Hz±20%) Step 2: After the capacitor being stored for 2 hours, impedance shall be made at thermal stability. (Z-25℃120HZ±20%) Step 3: After the capacitor being stored for 2 hours, impedance shall be made at thermal stability. (Z-40℃120HZ±20%)	阶段	温度	时间	1	20±2℃	--	2	-25±0.3℃	2H	3	-40±0.3℃	2H	阶段 2: 阻抗值与阶段 1 阻抗值相比, 不大于表 1 要求。 阶段 3: 阻抗值与阶段 1 阻抗值相比, 不大于表 1 要求。 Step 2: Impedance ratio shall be not more value given table-1. Step 3: Impedance ratio shall be not more value given table-1.
阶段	温度	时间													
1	20±2℃	--													
2	-25±0.3℃	2H													
3	-40±0.3℃	2H													
5.1.6	耐浪涌电压 Surge Test	施加浪涌电压, 充电 30±5 秒, 放电 5.5±0.5分钟, 作一个周期, 共进行 1000 次。 测试温度 15~35℃ 然后在标准大气条件下放置达到热稳定, 测试各种参数。 Application of DC surge stated, 1000 times of charging for 30±5sec.,with a period of 5.5±0.5min... Test temperature : 15~35℃ And the capacitor shall be stored under standard atmospheric conditions to obtain thermal stability,after which measurements shall made.	容量: 不低于试验前的 80%; 损耗角正切值: ≤200% 表 1 中规定值; 漏电流: 符合 5.1.4 要求。 Capacitance: Not less than 80% of the value before test. Dissipation factor: Not more 200% of the specified value in Table-1. Leakage current: To satisfy No. 5.1.4												
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.															

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5.2 机械特性 MECHANICAL PERFORMANCE

序号 NO	项 目 Item	测试方法 Test method	特 性 Performance																				
5.2.1	端子强度 TERMINAL STRENGTH	端子抗拉强度： 沿电容器端子引线方向施加*1N10 秒钟 *1 <table><tr><td>引线直径 Φ</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>5.0</td><td colspan="2">10</td><td>20</td></tr></table> 端子抗歪强度： 在电容器引线施加固定*2N，然后，将电容器歪折 90° 后回到原位，再向相反方向歪折 90° 后回到原位。 上述过程在 5 秒内完成。 *2 <table><tr><td>引线直径 Φ</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>2.5</td><td colspan="2">5</td><td>10</td></tr></table> Tensile strength of termination: A static load of *1N shall be applied to the terminal in the axial direction and acting in a direction away from the body for 10 sec… Bending strength of termination: Hang the specified dead weight of *2N, then bent the body through 90°,return to the original position. Next bent it in opposite direction through90° with the same speed,again return to the original position. Carry out this operation in about 5 sec…	引线直径 Φ	0.5	0.6	0.8	1.0	拉力 N	5.0	10		20	引线直径 Φ	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 capacitance is measured,there shall be no intermittent contacts,oropen or short-circuiting. There shall be no such mechanical damage.
引线直径 Φ	0.5	0.6	0.8	1.0																			
拉力 N	5.0	10		20																			
引线直径 Φ	0.5	0.6	0.8	1.0																			
拉力 N	2.5	5		10																			
5.2.2	振动试验 Resistance to Vvibration	依据 IEC60068-2-6 试验,在三个互相垂直的方向分别施加 2 小时振动，共 6 小时。 To comply with IEC60068-2-6 Direction and duration of vibration: 3 orthogonal directions mutually each for 2h,Total 6h.	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 capacitance is measured there shall be no intermittent contacts,or open or short circuiting, There shall be no such mechanical damage.																				

5.2.3	可焊性 Solder ability	依据 IEC60068-2-2 进行试验 焊锡温度: $250 \pm 5^{\circ}\text{C}$ 浸入时间: 2 ± 0.5 秒 To comply with IEC60068-2-2 Temperature or solder: $250 \pm 5^{\circ}\text{C}$ Dipping time: $2 \pm 0.5\text{sec.}$ This specification shall be met after the capacitors are stored under standard atmospheric conditions for 6 months.	浸入焊锡的银线表面积约 90%以上应附着新锡。 At least 90% of circumferential surface of the dipping portion of termination of termination shall be covered with new solder.
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5.3 特性测试 CHARACTERISTICS EXPERIMENT

序号 NO	项 目 Item	试验方法 Experiment method	特 性 Peculiarity
5.3.1	耐焊接热 Resistance to soldering heat	焊槽法: 焊锡温度: $260 \pm 5^{\circ}\text{C}$ 浸入时间: 10 ± 1 秒 电路板 : 1.6mm Solder bath method Solder temperature: $260 \pm 5^{\circ}\text{C}$ Immersion time : $10 \pm 1\text{sec.}$ Printed wiring board:1.6mm	容量变化: 在初始值$\pm 10\%$; 损耗角正切值: 满足表 1 要求; 漏电流: 满足 5.1.4 要求; 外观: 无异状。 Variation of capacitance: With$\pm 10\%$ of the value before test. Dissipation factor: Not more than 200% of the specified value in able 1. Leakage current: To satisfy No. 5. 1. 4 Appearance : No remarkable abnormality.
5.3.2	稳态湿热 Resistance to damp heat (steady state)	依据 IEC60068-2-3 进行试验 试验温度: $40 \pm 2^{\circ}\text{C}$ 试验时间: $240 \pm 8\text{h}$ 相对湿度: 90~95% 试验后, 电容器在标准大气条件下 1~2 小时然后测试参数 To comply with IEC60068-2-3 Test temperature : $40 \pm 2^{\circ}\text{C}$ Test time : $240 \pm 8\text{h}$ Relative humidity: 90~95% After completion of test,the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours,after which measurements shall be made.	容量变化: 在初始值$\pm 15\%$; 损耗角正切值: 满足表 1 中规定 漏电流: 满足 5.1.4 要求; 外 观: 无异状。 Variation of capacitance: With$\pm 15\%$ of the value before test. Dissipation factor: To satisfy Table 1. Leakage current: To satisfy No.5.1.4 Appearance : No remarkable abnormality.

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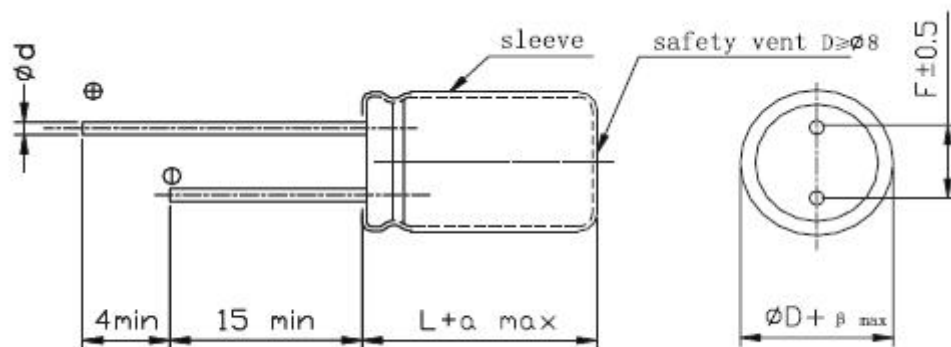
5.3.3	高温负荷试验 LIFE TEST	试验温度: $105 \pm 2^{\circ}\text{C}$, 施加额定电压和额定纹波电流 Application of the rated voltage and the rated ripple current, Test temperature: $105 \pm 2^{\circ}\text{C}$ 试验时间: 2000_{-0}^{+72}h Test time: 2000_{-0}^{+72}h	容量变化: 在初始值$\pm 20\%$ 损耗角正切值: 不超过表1所列的 200% 漏电流: 满足 5.1.4 要求 外观: 无异状 Variation of capacitance: With $\pm 20\%$ of the value before test. Dissipation factor: To satisfy Table 1. Leakage current: To satisfy No. 5.1.4 Appearance : No remarkable abnormality.
5.3.4	高温贮存试验 SHELF LIFE TEST	在 $105 \pm 2^{\circ}\text{C}$ 环境下无负荷贮存 1000_{-0}^{+8}h, 至少恢复16小时。 The capacitors are then stored with no voltage applied at a temperature of $105 \pm 2^{\circ}\text{C}$ for 1000_{-0}^{+8}h and then resumed 16 hours.	容量变化: 在初始值$\pm 20\%$ 损耗角正切值: 不超过表1所列的 200% 漏电流: 满足 5.1.4 要求 外观: 无异状 Variation of capacitance: With $\pm 10\%$ of the value before test. Dissipation factor: Not more than 200% of the specified value in able 1. Leakage current: To satisfy No.5.1.4 Appearance : No remarkable abnormality.
5.3.5	防爆试验 SAFETY VENT	在电容器上两极施加反向工作电压, 其中通过的电流应不大于 1A, 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 limited to 1A.	上述过程中应无引线、铝箔、电解液液体喷溅散落, 而且爆炸时无火花产生。 The vent device 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.

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表 1 (TABLE 1)

额定工作电压 Rated voltage(V)	浪涌电压 Surge Test	损耗角正切值 Dissipation factor	阻抗比	
			$ Z -25^{\circ}\text{C}/ Z 20^{\circ}\text{C}$	$ Z -40^{\circ}\text{C}/ Z 20^{\circ}\text{C}$
6.3	9	0.24	5	12
10	14	0.22	4	10
16	22	0.20	3	8
25	32	0.15	2	5
35	47	0.12	2	4
50	68	0.10	2	3
63	86	0.09	2	3
100	140	0.08	2	3
160	220	0.20	3	5
200	280	0.20	3	6
250	320	0.20	4	8
400	560	0.25	8	12
450	620	0.25	10	15

6、外形图及尺寸表 Case size table



D	5	6.3	8	10	12	12.5	16	18	22
F	2	2.5	3.5	5			7.5		10.0
d	0.5		0.5/0.6	0.6			0.8		1.0

a MAX	(L<20) 1.5
	(L>20) 2.0

β MAX	(D<20) 0.5
	(D>20) 1.0

7、外形尺寸和额定电压、标称电容量对应表

CAP (μF)	WV(V)	6.3V	10V	16V	25V	35V	50V	63V
		Size 尺寸	Size 尺寸	Size 尺寸	Size 尺寸	Size 尺寸	Size 尺寸	Size 尺寸
0.1							5×11	5×11
0.22							5×11	5×11
0.33							5×11	5×11
0.47							5×11	5×11
1.0							5×11	5×11
2.2							5×11	5×11
3.3							5×11	5×11
4.7					5×11	5×11	5×11	5×11
10				5×11	5×11	5×11	5×11	5×11
22		5×11	5×11	5×11	5×11	5×11	5×11	6.3×12
33		5×11	5×11	5×11	5×11	5×11	5*11/6.3×12	6.3×12
47		5×11	5×11	5×11	5×11	5×11	6.3×12	8×12
100		5×11	5×11	5×11	6.3×11	6.3×12	6.3*12/8×12	8*12/10×13
220		5×11	6.3×12	6.3×12	6.3*12/8×12	8*12	8*16/10×15	10×16
330		6.3×12	6.3×12	6.3*12/8×12	8×12	8*14/10*13	10×17	10×20
470		6.3×12	6.3×12	6.3*12/8×12	8×12	10*13/10×15	10×20	13×20
1000		8×12	8×12	10*13/10×15	10×17	10×20/13*21	13×21	16×26
2200		10×17	10×17	10×20	10*25/13×21	13*25/16×25	16*26/16×32	18×30
3300		10×20	10×20	13×21	13×25/16*25	16×25	18×36	22×40
4700		13×21	13×25	13*25	16×26	16×32	22×36	
6800		13×25	16×26	16×36	18×30	22×36		
10000		16×26	16×36	18×36	22×36	22×40		
15000		16×36	18×36	22×36	22×40			

WV(v) CAP (μF)	100V	160	200	250	350	400	450
	Size 尺寸	Size 尺寸	Size 尺寸	Size 尺寸	Size 尺寸	Size 尺寸	Size 尺寸
0.1	5×11	5×11	5×11	5×11	5×11	5×11	5×11
0.22	5×11	5×11	5×11	5×11	5×11	5×11	5×11
0.33	5×11	5×11	5×11	5×11	5×11	5×11	5×11
0.47	5×11	6.3×12	6.3×12	5×11	6.3×12	8×12	8×12
1.0	5×11	6.3×12	6.3×12	5×11	8×12	6.3*128×12	8×12
2.2	5×11	6.3×12	6.3×12	6.3×12	8×12	6.3*12/8×12	8×12
3.3	5×11	8×12	8×12	8×12	10×13	8*12	10*13
4.7	5×11	6.3*12/8×12	8×12	10×13	10×13	8*12/10×13	10*16
10	6.3×12	8*12	10×13	10×16	10×16	10*13/10×16	10*17/10*20
22	6.3*12/8×12	10×13	10×20	10×20	13×20	13×20	13*26
33	8*12	10×20	13×20	13×25	16×22	13*21/16×22	16*26
47	8*14/10×15	10×20	13×25	16×26	16×26	16×26	18*27
68	10×13	13×25	16×25	16×30	18×26	18×26	18*30
100	10*17/10*20	13×25	16×30	18×36	18×32	18×32	22*36
220	13×22	16×36	18×36	22×41	22×40	22×40	
330	13×25	22×30	22×40				
470	16×26	22×40					
1000	18×41						
2200	22×45						
3300							
4700							
6800							
10000							
15000							

8. 标记 MARKING

8.1 在电容器上应注明如下内容：

- (1) 生产厂商商标

本公司标示商标如下：

“LSECON”

- (2) 工作电压

- (3) 型号规格

- (4) 负极标志

- (5) 额定温度

The following items shall be marked indelibly on the capacitor.

- (1) Manufacture' s name or trade mark.

“LSECON”

- (2) Rated voltage

- (3) Type and specification

- (4) Polarity of the terminals

- (5) Rated temperature

8.2 标记颜色

套管颜色：

黑色

标记颜色：“白色”

Sleeve color:

BLACK

Marking color:White

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9. 其它说明

9.1 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 electrolytic capacitors are 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极电压，请选无极性产品。

When reverse voltage is applied on DC electrolytic capacitor, the capacitor will become short circuited please use non polarized capacitors in the circuit are damage due to abnormal current flows through the capacitors since the circuit where the positive voltage may be applied cathode terminal.

(2) .在额定工作电压以下作用 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 increases, characteristics drastically deteriorate and damage in a short period may occur as a result. Please take extra caution that the peak voltage should not exceed the rated voltage.

(3) .作快速充放电使用 Charge and discharge application.

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，温度急剧上升而缩减

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

(4) .电容器储存 Store the capacitor.

当铝电解电容器作了长期储存之后，其漏电流通常升高，贮存温度愈高，漏电流上升愈快。因此应注意储存环境的选择，在电容器上施加电压后，漏电流值将不断下降，在铝电解电容器的漏电流值上升对电路有不良影响的，请在使用前充电处理。

Increased leakage current is common in aluminum capacitors which have been stored for long period of time. The Higher the storage temperature, the higher the leakage current increase, therefore please take precautions concerning the storage location. The leakage current decrease gradually as voltage is applied to the capacitor. In cases where increased leakage current causes problems in the circuit, apply voltage (aging) before using.

(5) .施加纹波电流应小于额定值 Ripple current applied to capacitor should not exceed the rated value.

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。

Excessive heat will reduce capacitance and result in shortened life of capacitor if ripple currents exceeding the specified rated value are applied. The peak value of the ripple voltage should be less than the rated voltage.

(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 the aluminum electrolytic capacitor is affected by the ambient temperature. It is generally stated, that life doubles for each 10℃ decrease in temperature.

(7) .引出线强度 Lead stress

当拉力施加到电容器引出线，该拉力将作用于电容器内部，这将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. This may result in short circuit, open circuit or increased leakage current, It is not advisable to bend or handle a capacitor after it has been soldered to the PC board.

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(8) .焊接过程难热性 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。

In the dip soldering process of PC board with aluminum electrolytic capacitors mounted, secondary shrinkage or crack of PVC sleeve may be observed when solder temperature is too high or dipping 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，这将导致短路或漏电流上升。

A PC board must be designed so its hole pitch coincides with the lead pitch (lead spacing) of the capacitor specified by the catalog or specifications. When a capacitor is forcibly inserted into an unmatched whole pitch, a stress is put on the leads this could result in a short circuit or increased leakage current

9.2 本产品无铅，无污染 This product is lead free and environmental friendly

本产品（包括所有构件）完全符合欧盟 RoHS 要求，即 6 种有害物质的最大含量均不超过如下要求：

This product is according to the standard of ROHS, it means the max capacitance of six harmful material not over the following request:

Cd（镉）-100PPM Pb（铅）-1000PPM Hg（汞）-1000PPM Cr⁺（6 价铬）-1000PPM
PBBs（多溴联苯）-1000PPM PBDEs（多溴联苯醚）-1000PPM

10.样品电性能数据见测试报告

Issued-date:2023-06-10	Name	Approval Sheet-CD81
File No		CD81
STANDARD MANUAL		

一、适用范围 Adapt range

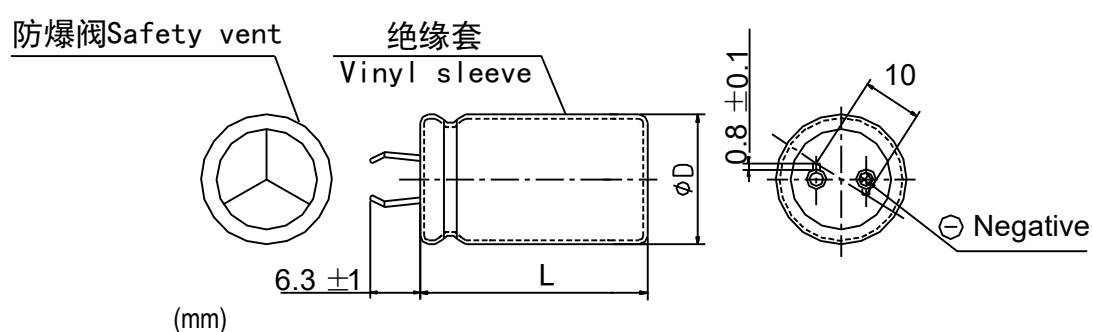
本产品规格书适用于 CD294 铝电解电容器产品。

The products specification is adapted to CD294 Aluminum Electrolytic Capacitors

二、技术性能 Specifications

项目 Item	特性 Performance characteristics				
使用温度范围(°C) Operation temperature range	- 25 ~ +105				
额定电压(V) Rated voltage	50				
标称容量(μF) Nominal capacitance	4700				
标称容量允许偏差(%) Capacitance tolerance	±20				
漏电流(μA) Leakage current	$I \leq 2350$				
损耗角正切值(tgδ) Dissipation factor (20°C, 100Hz)	<table border="1"> <tr> <td>$U_R(V)$</td><td>50</td></tr> <tr> <td>$\text{tg } \delta(\text{MAX})$</td><td>0.20</td></tr> </table>	$U_R(V)$	50	$\text{tg } \delta(\text{MAX})$	0.20
$U_R(V)$	50				
$\text{tg } \delta(\text{MAX})$	0.20				
温度特性 Temperature characteristics (Impedance ratio at 100Hz)	<table border="1"> <tr> <td>$U_R(V)$</td><td>50</td></tr> <tr> <td>$Z_{-25^\circ\text{C}}/Z_{+20^\circ\text{C}}$</td><td>$\leq 3$</td></tr> </table>	$U_R(V)$	50	$Z_{-25^\circ\text{C}}/Z_{+20^\circ\text{C}}$	≤ 3
$U_R(V)$	50				
$Z_{-25^\circ\text{C}}/Z_{+20^\circ\text{C}}$	≤ 3				
耐久性 Load life	+105°C, 2000 小时 2000 hours at +105°C				
高温贮存 Shelf life	+105°C, 1000 小时 1000 hours at +105°C				

三、外形图及尺寸表 Case size table



$D^{+1.0}_0$	22
$L^{+2.0}_0$	40

四、试验方法及要求 Tests

项目 Item	试验条件 Test Conditions	性能要求 Requirements	
浪涌电压 Surge Voltage	温度+15~+35℃, 施加规定的浪涌电压, 充电 30 秒, 放电 5 分 30 秒, 共循环 1000 次。 At +15~+35℃, applying the Us 1000 cycles of 30s on and 330s off.	无可见损伤 No visible damage	
		$\Delta C/C$	$\leq \pm 15\%$
		tg δ	$\leq$ 初始规定值 Initial specified value
		I	$\leq$ 初始规定值 Initial specified value
耐久性 Load Life	+105℃, 额定电压施加额定纹流电流 3000 小时,恢复 16 小时后: After applying rated voltage with the rated ripple current for 3000 hours at +105℃ and then resumed 16 hours:	$\Delta C/C$	$\leq \pm 20\%$
		tg δ	$\leq 200\%$ 初始规定值 Initial specified value
		I	$\leq$ 初始规定值 Initial specified value
高温贮存 Shelf Life	+105℃, 1000 小时后, 施加额定电压 30 分钟, 于 24 至 48 小时时间测试。 +105℃, 1000 hours. No voltage applied. After test: U _R to be applied for 30 minutes, 24 to 48 hours before measurement:	$\Delta C/C$	$\leq \pm 20\%$
		tg δ	$\leq 200\%$ 初始规定值 Initial specified value
		I	$\leq$ 初始规定值 Initial specified value
引出端强度 Tension Strength	IEC 68-2 试验 Ua: 拉力 10N, 10 秒 IEC 68-2 Test Ua: Loading force 10N for 10s	无可见损伤且标志清晰 No visible damage marking legible.	
可焊性 Solder ability	IEC 68-2-20 试验 Ta 方法 1: 焊料槽温度为 235 ±5℃, 浸渍深度离本体 1.5±0.5mm, 浸渍持续时间为 2±0.5 秒。 IEC 68-2-20 Test Ta means1: Tank temperature: 235±5℃, Impregnating depth:off substance 1.5 ±0.5mm , Impregnating time:2±0.5s.	引出端的良好镀层, 焊料自由流动, 引出端湿润。 Tin and wet coat the lead wire.	
耐焊接热 Resistance to soldering heat	IEC 68-2-20 试验 Tb 方法 1A: 焊料槽温度为 260±5℃, 浸渍深度离本体 1.5±0.5mm, 浸渍持续时间为 10±1 秒。 IEC 68-2-20 Test Tb means 1A: Tank temperature: 260±5℃, Impregnating depth: off substance1.5 ±0.5mm, Impregnating time: 10±1s.	无可见损伤, 标志清晰, 电容量变化率 $\leq \pm 5\%$ 。 No visible damage, marking legible, $\Delta C/C \leq \pm 5\%$.	
稳态湿热 Stable Humidity (steady state)	IEC 68-2 试验 Ca: +40℃, 湿度 90~95%, 不施加电压 21 天。 IEC 68-2 Test Ca: 21days at +40℃, RH 90% to 95%, no voltage applied.	无可见损伤和电解液漏出, 且标志清晰。 No visible damage, no leakage of electrolyte, no marking legible.	
		$\Delta C/C$	($\leq 100V$): $\leq \pm 15\%$; ($> 100V$): $\leq \pm 10\%$
		tg δ	$\leq 120\%$ 初始规定值 Initial specified value
耐振性 Resistance to vibration	IEC 68-2 试验 Fc: 频率范围 10~55Hz, 振幅为 0.75mm, 持续时间为 3×2 小时。 IEC 68-2 Test Fc: Frequency: 10~55Hz , Amplitude: 0.75mm, 3 direction, 2 hours per direction.	I	$\leq$ 初始规定值 Initial specified value
		无可见损伤和电解液漏出, 且标志清晰, 电容量变化率 $\leq \pm 5\%$ 。 No visible damage, no leakage of electrolyte, no marking legible, $\Delta C/C \leq \pm 5\%$.	

五、铝电解电容器的使用注意事项 Guidelines For Using Aluminum Electrolytic Capacitor

为使您获得电解电容器的最佳性能和延长电解电容器的使用寿命，在使用电解电容器前，请务必阅读本注意事项。

Upon using Aluminum Electrolytic Capacitors, please proper handling and observing to following important points will insure optimum capacitor performance and long life.

1.直流电解电容器是有极性的 DC electrolytic capacitors are polarized.

确定极性，极性标志在电容器的基体上。以免因极性反可能引起电路短路或电容器损坏，当极性不固定或不确定的，使用双极性电容器。注意直流电解电容器不能使用于交流。

Make sure of the polarity .The polarity is marked on the body of the capacitor. Application of the reversed voltage may cause a short circuit or damage to the capacitor. Use bipolar capacitors when the polarity is not determined or unknown. Note that DC electrolytic capacitors can not be used for AC application.

2.双极性电容器 Bipolar capacitors

只适用于脉动电路和极性反转电路中，不适用于纯交流和高纹波电路中。

They are used only in pulse circuits as well as polarity reverse circuits but not applicable in pure AC or high ripple current.

3.使用电压不要大于额定电压 DO not apply voltage greater than rated voltage .

使用电压大于额定电压，漏电流会增大，可能损坏电容器。建议工作电压为额定电压的百分之七十~八十，电容器在建议的工作电压下使用可延长电容器的寿命。

If a voltage exceeding the rated voltage is applied, the leakage current will increase, which damage the capacitor. Recommended working voltage is 70 to 80 percent of rated voltage. Using capacitors at recommended working voltage prolong capacitor life.

4.不要使过量的纹波电流通过电容器 Do not allow excessive ripple current through the capacitor.

流过电容器的纹波电流超过许可值，将会引起电容器发热，电容量减少，损害电容器。通过电容器的纹波电流不要大于允许值，一般不超过额定值的 80%。

The flow of ripple current over permissible ripple current will cause heat of the capacitor, which may decrease the capacitance and damage the capacitor. Ripple current on the capacitor must be at or bellow allowable level, generally not more than 80% of the rated current.

5.快速的充放电电路中，使用专门设计的电容器 Use specially designed capacitors for the circuits where charge and discharge are frequency repeated.

在经受快速的周期性充放电电路中，电容器可能受损害，它的寿命因容量下降、温升等原因而缩短，在这种电路中，一定要使用专门设计的电容器。

In the circuit subjected to rapid charge and discharge cycles, capacitors may be damaged, its life may be shortened by capacitance decrease, heat rise, etc. Be sure and use special capacitors in these applications.

6.工作温度范围 Operating temperature range.

电容器的特性随工作温度而变化，在温度较高的情况下，容量、漏电流增大， $\text{tg}\delta$ 减少；在低温情况下，容量和漏电流下降， $\text{tg}\delta$ 增大。电容器在较低的温度下使用会确保延长寿命。

The characteristics of capacitors change with the operating temperature. The capacitance and leakage current increase and $\text{tg}\delta$ decrease at higher temperatures. The capacitance and leakage current decrease and $\text{tg}\delta$ increase at lower temperature. Usage at lower temperature will ensure longer life.

7.使用温度与寿命的关系 Relationship between temperature and life.

电容器的寿命与其使用的温度有关，一般来说，使用温度降低 10°C ，其寿命是额定温度下的 2 倍，计算公式如下：

Life of capacitors has relationship with its used temperature .Generally, if the used temperature is reduced 10°C , life is prolonged twice at rated temperature. Here is calculating format:

$$L_2 = L_1 \times 2^{\frac{T_1 - T_2}{10}}$$

L_1 —额定温度下的寿命

L_2 —实际温度下的寿命

Life at rated temperature	Life at actual temperature
T ₁ —额定使用温度	T ₂ —实际使用温度
Rated used temperature	Actual used temperature

8.核对工作频率 Check operating frequency.

电解电容器的电容量通常是在 100Hz 或 120Hz 下测得的。然而要记住容量随频率的升高而下降， $\text{tg}\delta$ 随频率的升高而增大，并使周围温度升高。

The capacitance of electrolytic capacitors is usually measured at 100Hz or 120Hz. However, remember that capacitance decrease and $\text{tg}\delta$ increase as the applied frequency becomes higher whereas the ambient temperature becomes higher.

9.长时间存放的电容器，在使用前加额定直流电压处理 Apply rated DC voltage treatment to the capacitors which have been stored for a long time.

长时间的存放，实际对电容器的容量和 $\text{tg}\delta$ 没有多大的影响，然而往往会使漏电流增大，耐压降低。

长时间存放后的电容器处理，首先逐渐施加直流电压至额定电压，然后再使用。

Long periods of storage have virtually no effect on a capacitor's capacitance and $\text{tg}\delta$. Such periods tend; however, to increase leakage current and decrease withstand voltage.

After removing capacitors from long-duration storage, First apply a gradually increasing DC voltage to rated voltage and then use them.

10.电容器外壳与阴极端是不绝缘的 The capacitor case is not insulated from the cathode terminal.

电容器的外壳与阴极端是通过电解液连接的，如果电容器的外壳必须与线路绝缘，则电容器的安装位置处，一定要采取绝缘措施。

The capacitor's case and cathode terminal connect through the electrolyte. If the case is to be completely insulated, that insulation must be at the capacitor's mounting point.

11.电容器的端子或引线不要施加过大的力 Do not apply excessive force to the terminals and leads.

过大的力施加到端子或引线上，可能引起引线的断裂或端子分裂，转而引起内部连接的破坏。

The excessive strong force applied to the terminals and lead wires may cause leads to break or terminals to separate and, in turn, cause the internal contact to fail.

12.浸焊料后，线路板的清洗 Cleaning of the circuit board after solder dipping.

清洗线路板以去除焊剂或其它附着物。为了保护塑料套管，印刷标志以及封口材料不被破坏，电容器不能用卤化物或类似溶剂作为电容器清洗用，如三氯乙烯，二甲苯或酮类等。建议使用的清洗溶剂为：甲醇，异丙醇，乙醇，异丁醇，石油醚，丙醇和一般的洗涤剂。

Cleaning circuit boards to remove flux or other extraneous matter. To ensure protection for sleeve, marking and sealing materials on capacitor body, capacitor should never be washed or cleaned by halogen agents or solvents such as trichlorethylene, xylene or acetone etc. Recommended cleaning solvents. Methanol, isopropanol ethanol, isobutanol, petroleum ether, propane and/or commercial detergents.

13.焊接时注意温度和持续的时间 Be cautious of the temperature and duration when soldering.

烙铁应与电容器的塑料绝缘套管保持一定的距离。当电容器浸于焊料槽时，建议温度在 260°C 以内，时间不要超过 10 秒钟，以避免电容器元件受损。

Soldering irons should be kept away from the vinyl-insulated sleeves of capacitor. When the capacitor dipped in solder bath, recommendable within 260°C and 10 seconds to avoid damage of capacitor unit.

14.印刷线路板上孔的布局 Hole positions on the circuit board.

设计印刷线路板时，安装孔距应等于引线间距，当孔距大于或小于引线间距时，安装电容器时，将有应力作用到引线上，可能引起短路，电路损坏，漏电流增大。

另外，焊料可能通过所打的孔及后加工零件的引线孔溅落到塑料套管上，造成损伤，所以要认真考虑孔的布局。

When designing a circuit board, space the position holes equally to the space between lead wires. When the spacing is

either greater than or less than the capacitor's leads, mounting the capacitor will apply to the leads, causing short circuits, broken circuits, and increased current.

Otherwise, through-holes on the circuit board as well as lead holes of post-process parts can result in solder splashing onto the vinyl sleeve, causing damage. Consider hole positions carefully.

一、适用范围 Adapt range

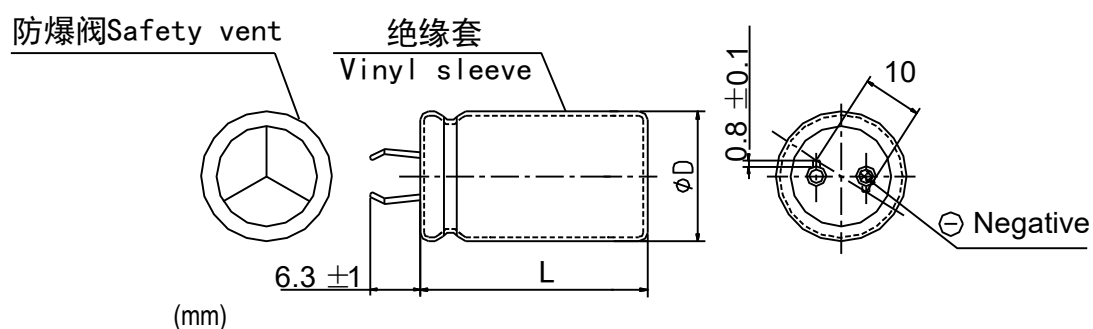
本产品规格书适用于 CD294 铝电解电容器产品。

The products specification is adapted to CD294 Aluminum Electrolytic Capacitors

二、技术性能 Specifications

项目 Item	特性 Performance characteristics				
使用温度范围(°C) Operation temperature range	- 25 ~ +105				
额定电压(V) Rated voltage	63				
标称容量(μF) Nominal capacitance	4700				
标称容量允许偏差(%) Capacitance tolerance	±20				
漏电流(μA) Leakage current	$I \leq 2961$				
损耗角正切值(tgδ) Dissipation factor (20°C, 100Hz)	<table border="1"> <tr> <td>$U_R(V)$</td><td>63</td></tr> <tr> <td>$\text{tg } \delta(\text{MAX})$</td><td>0.20</td></tr> </table>	$U_R(V)$	63	$\text{tg } \delta(\text{MAX})$	0.20
$U_R(V)$	63				
$\text{tg } \delta(\text{MAX})$	0.20				
温度特性 Temperature characteristics (Impedance ratio at 100Hz)	<table border="1"> <tr> <td>$U_R(V)$</td><td>63</td></tr> <tr> <td>$Z_{-25^\circ\text{C}}/Z_{+20^\circ\text{C}}$</td><td>$\leq 3$</td></tr> </table>	$U_R(V)$	63	$Z_{-25^\circ\text{C}}/Z_{+20^\circ\text{C}}$	≤ 3
$U_R(V)$	63				
$Z_{-25^\circ\text{C}}/Z_{+20^\circ\text{C}}$	≤ 3				
耐久性 Load life	+105°C, 2000 小时 2000 hours at +105°C				
高温贮存 Shelf life	+105°C, 1000 小时 1000 hours at +105°C				

三、外形图及尺寸表 Case size table



$D_{+1.0}^{+1.0}$	25
$L_{+2.0}^{+2.0}$	40

四、试验方法及要求 Tests

项目 Item	试验条件 Test Conditions	性能要求 Requirements	
浪涌电压 Surge Voltage	温度+15~+35℃, 施加规定的浪涌电压, 充电 30 秒, 放电 5 分 30 秒, 共循环 1000 次。 At +15~+35℃, applying the Us 1000 cycles of 30s on and 330s off.	无可见损伤 No visible damage	
		$\Delta C/C$	$\leq \pm 15\%$
		tg δ	$\leq$ 初始规定值 Initial specified value
		I	$\leq$ 初始规定值 Initial specified value
耐久性 Load Life	+105℃, 额定电压施加额定纹流电流 3000 小时,恢复 16 小时后: After applying rated voltage with the rated ripple current for 3000 hours at +105℃ and then resumed 16 hours:	$\Delta C/C$	$\leq \pm 20\%$
		tg δ	$\leq 200\%$ 初始规定值 Initial specified value
		I	$\leq$ 初始规定值 Initial specified value
高温贮存 Shelf Life	+105℃, 1000 小时后, 施加额定电压 30 分钟, 于 24 至 48 小时时间测试。 +105℃, 1000 hours. No voltage applied. After test: U_R to be applied for 30 minutes, 24 to 48 hours before measurement:	$\Delta C/C$	$\leq \pm 20\%$
		tg δ	$\leq 200\%$ 初始规定值 Initial specified value
		I	$\leq$ 初始规定值 Initial specified value
引出端强度 Tension Strength	IEC 68-2 试验 Ua: 拉力 10N, 10 秒 IEC 68-2 Test Ua: Loading force 10N for 10s	无可见损伤且标志清晰 No visible damage marking legible.	
可焊性 Solder ability	IEC 68-2-20 试验 Ta 方法 1: 焊料槽温度为 235 $\pm 5^\circ\text{C}$, 浸渍深度离本体 1.5 $\pm 0.5\text{mm}$, 浸渍持续时间为 2 ± 0.5 秒。 IEC 68-2-20 Test Ta means1: Tank temperature: 235 $\pm 5^\circ\text{C}$, Impregnating depth: off substance 1.5 $\pm 0.5\text{mm}$, Impregnating time: 2 $\pm 0.5\text{s}$.	引出端的良好镀层, 焊料自由流动, 引出端湿润。 Tin and wet coat the lead wire.	
耐焊接热 Resistance to soldering heat	IEC 68-2-20 试验 Tb 方法 1A: 焊料槽温度为 260 $\pm 5^\circ\text{C}$, 浸渍深度离本体 1.5 $\pm 0.5\text{mm}$, 浸渍持续时间为 10 ± 1 秒。 IEC 68-2-20 Test Tb means 1A: Tank temperature: 260 $\pm 5^\circ\text{C}$, Impregnating depth: off substance 1.5 $\pm 0.5\text{mm}$, Impregnating time: 10 $\pm 1\text{s}$.	无可见损伤, 标志清晰, 电容量变化率 $\leq \pm 5\%$ 。 No visible damage, marking legible, $\Delta C/C \leq \pm 5\%$.	
稳态湿热 Stable Humidity (steady state)	IEC 68-2 试验 Ca: +40℃, 湿度 90~95%, 不施加电压 21 天。 IEC 68-2 Test Ca: 21days at +40℃, RH 90% to 95%, no voltage applied.	无可见损伤和电解液漏出, 且标志清晰。 No visible damage, no leakage of electrolyte, no marking legible.	
		$\Delta C/C$	($\leq 100\text{V}$): $\leq \pm 15\%$; ($> 100\text{V}$): $\leq \pm 10\%$
		tg δ	$\leq 120\%$ 初始规定值 Initial specified value
耐振性 Resistance to vibration	IEC 68-2 试验 Fc: 频率范围 10~55Hz, 振幅为 0.75mm, 持续时间为 3 $\times 2$ 小时。 IEC 68-2 Test Fc: Frequency: 10~55Hz, Amplitude: 0.75mm, 3 direction, 2 hours per direction.	I	$\leq$ 初始规定值 Initial specified value
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五、铝电解电容器的使用注意事项 Guidelines For Using Aluminum Electrolytic Capacitor

为使您获得电解电容器的最佳性能和延长电解电容器的使用寿命，在使用电解电容器前，请务必阅读本注意事项。

Upon using Aluminum Electrolytic Capacitors, please proper handling and observing to following important points will insure optimum capacitor performance and long life.

1.直流电解电容器是有极性的 DC electrolytic capacitors are polarized.

确定极性，极性标志在电容器的基体上。以免因极性反可能引起电路短路或电容器损坏，当极性不固定或不确定的，使用双极性电容器。注意直流电解电容器不能使用于交流。

Make sure of the polarity .The polarity is marked on the body of the capacitor. Application of the reversed voltage may cause a short circuit or damage to the capacitor. Use bipolar capacitors when the polarity is not determined or unknown. Note that DC electrolytic capacitors can not be used for AC application.

2.双极性电容器 Bipolar capacitors

只适用于脉动电路和极性反转电路中，不适用于纯交流和高纹波电路中。

They are used only in pulse circuits as well as polarity reverse circuits but not applicable in pure AC or high ripple current.

3.使用电压不要大于额定电压 DO not apply voltage greater than rated voltage .

使用电压大于额定电压，漏电流会增大，可能损坏电容器。建议工作电压为额定电压的百分之七十~八十，电容器在建议的工作电压下使用可延长电容器的寿命。

If a voltage exceeding the rated voltage is applied, the leakage current will increase, which damage the capacitor. Recommended working voltage is 70 to 80 percent of rated voltage. Using capacitors at recommended working voltage prolong capacitor life.

4.不要使过量的纹波电流通过电容器 Do not allow excessive ripple current through the capacitor.

流过电容器的纹波电流超过许可值，将会引起电容器发热，电容量减少，损害电容器。通过电容器的纹波电流不要大于允许值，一般不超过额定值的 80%。

The flow of ripple current over permissible ripple current will cause heat of the capacitor, which may decrease the capacitance and damage the capacitor. Ripple current on the capacitor must be at or bellow allowable level, generally not more than 80% of the rated current.

5.快速的充放电电路中，使用专门设计的电容器 Use specially designed capacitors for the circuits where charge and discharge are frequency repeated.

在经受快速的周期性充放电电路中，电容器可能受损害，它的寿命因容量下降、温升等原因而缩短，在这种电路中，一定要使用专门设计的电容器。

In the circuit subjected to rapid charge and discharge cycles, capacitors may be damaged, its life may be shortened by capacitance decrease, heat rise, etc. Be sure and use special capacitors in these applications.

6.工作温度范围 Operating temperature range.

电容器的特性随工作温度而变化，在温度较高的情况下，容量、漏电流增大， $\text{tg}\delta$ 减少；在低温情况下，容量和漏电流下降， $\text{tg}\delta$ 增大。电容器在较低的温度下使用会确保延长寿命。

The characteristics of capacitors change with the operating temperature. The capacitance and leakage current increase and $\text{tg}\delta$ decrease at higher temperatures. The capacitance and leakage current decrease and $\text{tg}\delta$ increase at lower temperature. Usage at lower temperature will ensure longer life.

7.使用温度与寿命的关系 Relationship between temperature and life.

电容器的寿命与其使用的温度有关，一般来说，使用温度降低 10°C ，其寿命是额定温度下的 2 倍，计算公式如下：

Life of capacitors has relationship with its used temperature .Generally, if the used temperature is reduced 10°C , life is prolonged twice at rated temperature. Here is calculating format:

$$L_2 = L_1 \times 2^{\frac{T_1 - T_2}{10}}$$

L_1 —额定温度下的寿命

L_2 —实际温度下的寿命

Life at rated temperature	Life at actual temperature
T ₁ —额定使用温度	T ₂ —实际使用温度
Rated used temperature	Actual used temperature

8.核对工作频率 Check operating frequency.

电解电容器的电容量通常是在 100Hz 或 120Hz 下测得的。然而要记住容量随频率的升高而下降， $\text{tg}\delta$ 随频率的升高而增大，并使周围温度升高。

The capacitance of electrolytic capacitors is usually measured at 100Hz or 120Hz. However, remember that capacitance decrease and $\text{tg}\delta$ increase as the applied frequency becomes higher whereas the ambient temperature becomes higher.

9.长时间存放的电容器，在使用前加额定直流电压处理 Apply rated DC voltage treatment to the capacitors which have been stored for a long time.

长时间的存放，实际对电容器的容量和 $\text{tg}\delta$ 没有多大的影响，然而往往会使漏电流增大，耐压降低。

长时间存放后的电容器处理，首先逐渐施加直流电压至额定电压，然后再使用。

Long periods of storage have virtually no effect on a capacitor's capacitance and $\text{tg}\delta$. Such periods tend; however, to increase leakage current and decrease withstand voltage.

After removing capacitors from long-duration storage, First apply a gradually increasing DC voltage to rated voltage and then use them.

10.电容器外壳与阴极端是不绝缘的 The capacitor case is not insulated from the cathode terminal.

电容器的外壳与阴极端是通过电解液连接的，如果电容器的外壳必须与线路绝缘，则电容器的安装位置处，一定要采取绝缘措施。

The capacitor's case and cathode terminal connect through the electrolyte. If the case is to be completely insulated, that insulation must be at the capacitor's mounting point.

11.电容器的端子或引线不要施加过大的力 Do not apply excessive force to the terminals and leads.

过大的力施加到端子或引线上，可能引起引线的断裂或端子分裂，转而引起内部连接的破坏。

The excessive strong force applied to the terminals and lead wires may cause leads to break or terminals to separate and, in turn, cause the internal contact to fail.

12.浸焊料后，线路板的清洗 Cleaning of the circuit board after solder dipping.

清洗线路板以去除焊剂或其它附着物。为了保护塑料套管，印刷标志以及封口材料不被破坏，电容器不能用卤化物或类似溶剂作为电容器清洗用，如三氯乙烯，二甲苯或酮类等。建议使用的清洗溶剂为：甲醇，异丙醇，乙醇，异丁醇，石油醚，丙醇和一般的洗涤剂。

Cleaning circuit boards to remove flux or other extraneous matter. To ensure protection for sleeve, marking and sealing materials on capacitor body, capacitor should never be washed or cleaned by halogen agents or solvents such as trichlorethylene, xylene or acetone etc. Recommended cleaning solvents. Methanol, isopropanol ethanol, isobutanol, petroleum ether, propane and/or commercial detergents.

13.焊接时注意温度和持续的时间 Be cautious of the temperature and duration when soldering.

烙铁应与电容器的塑料绝缘套管保持一定的距离。当电容器浸于焊料槽时，建议温度在 260°C 以内，时间不要超过 10 秒钟，以避免电容器元件受损。

Soldering irons should be kept away from the vinyl-insulated sleeves of capacitor. When the capacitor dipped in solder bath, recommendable within 260°C and 10 seconds to avoid damage of capacitor unit.

14.印刷线路板上孔的布局 Hole positions on the circuit board.

设计印刷线路板时，安装孔距应等于引线间距，当孔距大于或小于引线间距时，安装电容器时，将有应力作用到引线上，可能引起短路，电路损坏，漏电流增大。

另外，焊料可能通过所打的孔及后加工零件的引线孔溅落到塑料套管上，造成损伤，所以要认真考虑孔的布局。

When designing a circuit board, space the position holes equally to the space between lead wires. When the spacing is

either greater than or less than the capacitor's leads, mounting the capacitor will apply to the leads, causing short circuits, broken circuits, and increased current.

Otherwise, through-holes on the circuit board as well as lead holes of post-process parts can result in solder splashing onto the vinyl sleeve, causing damage. Consider hole positions carefully.

一、适用范围 Adapt range

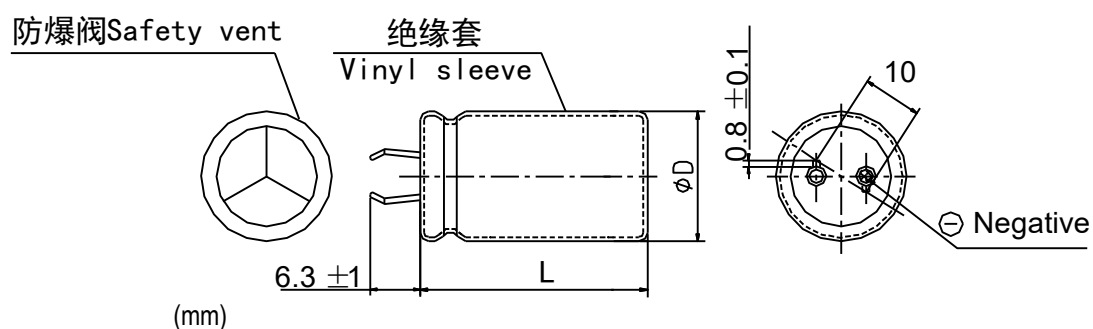
本产品规格书适用于 CD294 铝电解电容器产品。

The products specification is adapted to CD294 Aluminum Electrolytic Capacitors

二、技术性能 Specifications

项目 Item	特性 Performance characteristics				
使用温度范围(°C) Operation temperature range	- 25 ~ +105				
额定电压(V) Rated voltage	100				
标称容量(μF) Nominal capacitance	6800				
标称容量允许偏差(%) Capacitance tolerance	±20				
漏电流(μA) Leakage current	$I \leq 6800$				
损耗角正切值(tgδ) Dissipation factor (20°C, 100Hz)	<table border="1"> <tr> <td>$U_R(V)$</td><td>100</td></tr> <tr> <td>$\text{tg } \delta(\text{MAX})$</td><td>0.20</td></tr> </table>	$U_R(V)$	100	$\text{tg } \delta(\text{MAX})$	0.20
$U_R(V)$	100				
$\text{tg } \delta(\text{MAX})$	0.20				
温度特性 Temperature characteristics (Impedance ratio at 100Hz)	<table border="1"> <tr> <td>$U_R(V)$</td><td>100</td></tr> <tr> <td>$Z_{-25^\circ\text{C}}/Z_{+20^\circ\text{C}}$</td><td>$\leq 4$</td></tr> </table>	$U_R(V)$	100	$Z_{-25^\circ\text{C}}/Z_{+20^\circ\text{C}}$	≤ 4
$U_R(V)$	100				
$Z_{-25^\circ\text{C}}/Z_{+20^\circ\text{C}}$	≤ 4				
耐久性 Load life	+105°C, 2000 小时 2000 hours at +105°C				
高温贮存 Shelf life	+105°C, 1000 小时 1000 hours at +105°C				

三、外形图及尺寸表 Case size table



$D_0^{+1.0}_0$	30
$L_0^{+2.0}_0$	50

四、试验方法及要求 Tests

项目 Item	试验条件 Test Conditions	性能要求 Requirements	
浪涌电压 Surge Voltage	温度+15~+35℃, 施加规定的浪涌电压, 充电 30 秒, 放电 5 分 30 秒, 共循环 1000 次。 At +15~+35℃, applying the Us 1000 cycles of 30s on and 330s off.	无可见损伤 No visible damage	
		$\Delta C/C$	$\leq \pm 15\%$
		tg δ	$\leq$ 初始规定值 Initial specified value
		I	$\leq$ 初始规定值 Initial specified value
耐久性 Load Life	+105℃, 额定电压施加额定纹流电流 3000 小时,恢复 16 小时后: After applying rated voltage with the rated ripple current for 3000 hours at +105℃ and then resumed 16 hours:	$\Delta C/C$	$\leq \pm 20\%$
		tg δ	$\leq 200\%$ 初始规定值 Initial specified value
		I	$\leq$ 初始规定值 Initial specified value
高温贮存 Shelf Life	+105℃, 1000 小时后, 施加额定电压 30 分钟, 于 24 至 48 小时时间测试。 +105℃, 1000 hours. No voltage applied. After test: U_R to be applied for 30 minutes, 24 to 48 hours before measurement:	$\Delta C/C$	$\leq \pm 20\%$
		tg δ	$\leq 200\%$ 初始规定值 Initial specified value
		I	$\leq$ 初始规定值 Initial specified value
引出端强度 Tension Strength	IEC 68-2 试验 Ua: 拉力 10N, 10 秒 IEC 68-2 Test Ua: Loading force 10N for 10s	无可见损伤且标志清晰 No visible damage marking legible.	
可焊性 Solder ability	IEC 68-2-20 试验 Ta 方法 1: 焊料槽温度为 235 $\pm 5^\circ\text{C}$, 浸渍深度离本体 1.5 $\pm 0.5\text{mm}$, 浸渍持续时间为 2 ± 0.5 秒。 IEC 68-2-20 Test Ta means1: Tank temperature: 235 $\pm 5^\circ\text{C}$, Impregnating depth: off substance 1.5 $\pm 0.5\text{mm}$, Impregnating time: 2 $\pm 0.5\text{s}$.	引出端的良好镀层, 焊料自由流动, 引出端湿润。 Tin and wet coat the lead wire.	
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稳态湿热 Stable Humidity (steady state)	IEC 68-2 试验 Ca: +40℃, 湿度 90~95%, 不施加电压 21 天。 IEC 68-2 Test Ca: 21days at +40℃, RH 90% to 95%, no voltage applied.	无可见损伤和电解液漏出, 且标志清晰。 No visible damage, no leakage of electrolyte, no marking legible.	
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$$L_2 = L_1 \times 2^{\frac{T_1 - T_2}{10}}$$

L_1 —额定温度下的寿命

L_2 —实际温度下的寿命

Life at rated temperature	Life at actual temperature
T ₁ —额定使用温度	T ₂ —实际使用温度
Rated used temperature	Actual used temperature

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Soldering irons should be kept away from the vinyl-insulated sleeves of capacitor. When the capacitor dipped in solder bath, recommendable within 260°C and 10 seconds to avoid damage of capacitor unit.

14.印刷线路板上孔的布局 Hole positions on the circuit board.

设计印刷线路板时，安装孔距应等于引线间距，当孔距大于或小于引线间距时，安装电容器时，将有应力作用到引线上，可能引起短路，电路损坏，漏电流增大。

另外，焊料可能通过所打的孔及后加工零件的引线孔溅落到塑料套管上，造成损伤，所以要认真考虑孔的布局。

When designing a circuit board, space the position holes equally to the space between lead wires. When the spacing is

either greater than or less than the capacitor's leads, mounting the capacitor will apply to the leads, causing short circuits, broken circuits, and increased current.

Otherwise, through-holes on the circuit board as well as lead holes of post-process parts can result in solder splashing onto the vinyl sleeve, causing damage. Consider hole positions carefully.

VES 型片式铝电解电容

VES Series Chip Type Aluminum Electrolytic Capacitors

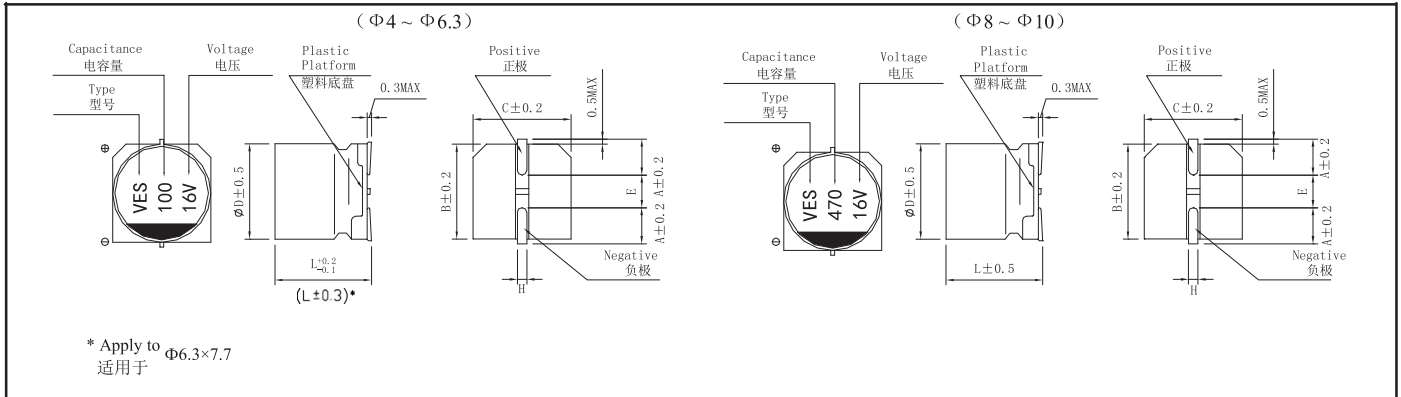
特点 Features

- 85℃标准品。
- 适用于回流焊。Reflow soldering is available.
- 适用于高密度表面贴装。Suitable for high density SMT.
- 符合ROHS指令标准。Comply with ROHS directive standards.

主要技术性能 Specifications

项目 Items	特性 Characteristics									
工作温度范围 Operating Temperature Range	-40℃ ~ 85℃									
额定电压范围 Rated Voltage Range	6.3V ~ 100V									
标称容量范围 Nominal Capacitance Range	0.1 ~ 1500 μ F									
标称容量允许偏差 Nominal Capacitance Tolerance	± 20% (20℃, 120Hz)									
漏电流 Leakage Current	I≤0.01CRVR or 3(μ A), 取较大者 (2 分钟) CR: 标称容量 (μ F) UR: 额定电压 (V) I≤0.01CRVR or 3(μ A) Whichever is greater(at 20℃, After 2 minutes) CR: Nominal Capacitance (μ F) UR: Rated voltages (V)									
损耗角正切 (tg δ) Dissipation Factor (Max) 20℃, 120Hz	UR (V)	6.3	10	16	25	35	50	63	100	
	tg δ	0.28	0.24	0.20	0.16	0.14	0.12	0.12	0.10	
耐久性 Load Life	+85℃施加额定电压 2000 小时后, 电容器应满足以下要求: After 2000 hours' application of rated voltage at 85℃, the capacitor shall meet the following requirement:									
	电容量变化率 Capacitance Change			± 20%初始值以内 Within ± 20% of the initial value						
	损耗角正切 Dissipation Factor			≤ 200%初始规定值 Not more than 200% of the initial specified value						
	漏电流 Leakage Current			≤ 初始规定值 Not more than the initial specified value						
高温贮存 Shelf Life	+85℃贮存 1000 小时后, 电容器应满足以上耐久性要求 After storage for 1000 hours at +85℃, the capacitors shall meet the requirement of load life above									
低温特性 Low Temperature Stability 阻抗比 Impedance Ratio (120Hz)	UR (V)		6.3	10	16	25	35	50	63	100
	Z(-25℃)/Z(+20℃)	< Φ8	4	3	2	2	2	2	2	2
		≥ Φ8	5	4	3	2	2	2	2	2
	Z(-40℃)/Z(+20℃)	< Φ8	8	8	4	4	4	3	3	3
		≥ Φ8	10	8	6	4	4	3	3	3
耐焊接热 Resistance to Soldering Heat	在 250℃的条件下, 电容器在热板上保持 30 秒, 然后从热板上取出电容器, 让其在室温下恢复, 电容器应满足以下要求: The capacitors shall be kept on the hot plate maintained at 250℃ for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the following requirement.									
	电容量变化率 Capacitance Change			± 10%初始值以内 Within ± 10% of the initial value						
	损耗角正切 Dissipation Factor			≤ 初始规定值 Not more than the initial specified value						
	漏电流 Leakage Current			≤ 初始规定值 Not more than the initial specified value						

外形图及尺寸表 Case Size Table



	(mm)						
	4 x 5.4	5 x 5.4	6.3 x 5.4	6.3 x 7.7	8 x 6.5	8 x 0.5	10 x 10.5
A	1.8	2.1	2.4	2.4	2.9	2.9	3.2
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3
C	4.3	5.3	6.6	6.6	8.3	8.3	10.3
E	1.0	1.3	2.2	2.2	2.3	3.1	4.5
L	5.4	5.4	5.4	7.7	6.5	10.5	10.5
H	0.5 ~ 0.8					0.8 ~ 1.1	

■ 标称电容量、额定电压、额定纹波电流与外形尺寸对应表

μF	6.3		10		16		25		35		50		63		100	
	DxL mm	I~mA	DxL mm	I~mA	DxL mm	I~mA	DxL mm	I~mA	DxL mm	I~mA	DxL mm	I~mA	DxL mm	I~mA	DxL mm	I~mA
0.1											4x5.4	3.2				
0.22											4x5.4	4.7				
0.33											4x5.4	5.7				
0.47											4x5.4	6.8				
1.0											4x5.4	10				
2.2											4x5.4	15				
3.3											4x5.4	18				
4.7							4x5.4	22	4x5.4	20	4x5.4	24			6.3x7.7	40
											4x5.4	25				
10					4x5.4	26	4x5.4	24	4x5.4	24	5x5.4	41				
							5x5.4	32	5x5.4	34	6.3x5.4	43	6.3x7.7	50	8x10.5	77
22	4x5.4	31	4x5.4	30	4x5.4	30	5x5.4	38	5x5.4	39	6.3x5.4	71	6.3x7.7	96	8x10.5	100
			5x5.4	39	5x5.4	44	6.3x5.4	55	6.3x5.4	59						
33	4x5.4	31	4x5.4	34	5x5.4	44	5x5.4	46			6.3x7.7	94	8x10.5	117	10x10.5	130
	5x5.4	44	5x5.4	48	6.3x5.4	63	6.3x5.4	67	6.3x5.4	65						
47	4x5.4	40	5x5.4	47	5x5.4	52	6.3x5.4	70	6.3x7.7	94	6.3x7.7	105	10x10.5	140		
	5x5.4	52	6.3x5.4	67	6.3x5.4	75					8x10.5	140				
100	5x5.4	47	5x5.4	54	6.3x5.4	103	6.3x7.7	143	6.3x7.7	132	8x10.5	200				
	6.3x5.4	89	6.3x5.4	98					8x10.5	175	10x10.5	250				
220	6.3x5.4	91	6.3x7.7	173	6.3x7.7	162	8x10.5	230	8x10.5	200	10x10.5	320				
			8x6.5	250	8x10.5	280	10x10.5	310	10x10.5	310						
330	6.3x7.7	188	8x10.5	390	8x10.5	320	8x10.5	270	10x10.5	360						
							10x10.5	340								
470	8x10.5	380	8x10.5	390	8x10.5	350	10x10.5	380								
					10x10.5	420										
1000	8x10.5	370	10x10.5	580												
	10x10.5	700														
1500	10x10.5	750														

I~ = Rated ripple current (mA) (85°C, 120Hz) I~ = 额定纹波电流 (mA) (85°C, 120Hz)

VET 型片式铝电解电容

VET Series Chip Type Aluminum Electrolytic Capacitors

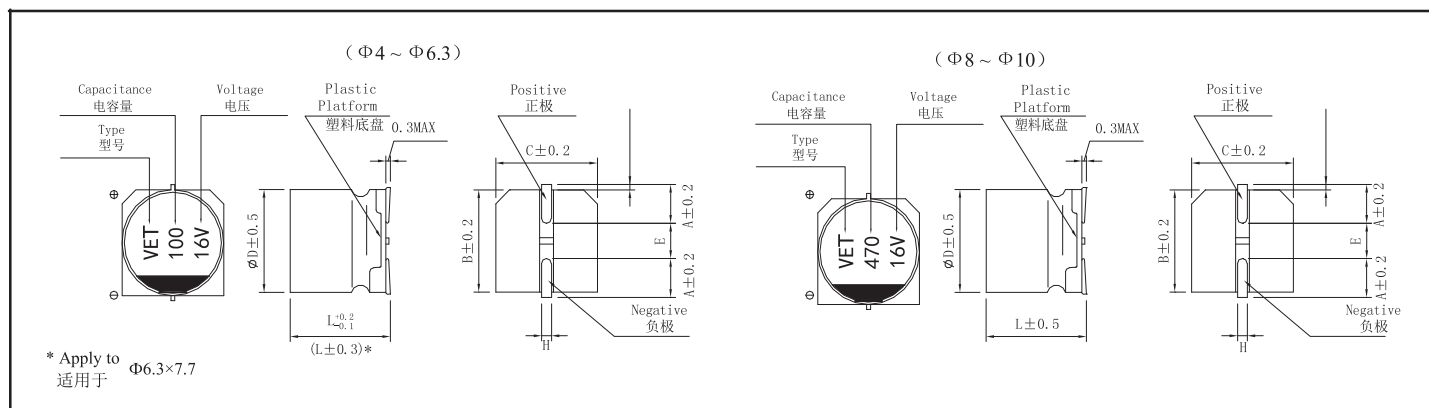
特点 Features

- 105℃标准品。
- 适用于回流焊。Reflow soldering is available.
- 适用于高密度表面贴装。Suitable for high density SMT.
- 符合ROHS指令标准。Comply with ROHS directive standards.

主要技术性能 Specifications

项目 Items	特性 Characteristics							
工作温度范围 Operating Temperature Range	-40℃ ~ +105℃							
额定电压范围 Rated Voltage Range	6.3V ~ 50V							
标称电容范围 Nominal Capacitance Range	0.1 ~ 1500 μ F							
标称电容允许偏差 Nominal Capacitance Tolerance	± 20% (20℃, 120Hz)							
漏电流 Leakage Current	I≤0.01CRVR or 3(μ A), 取较大者 (2 分钟) CR: 标称电容 (μ F) UR: 额定电压 (V) I≤0.01CRVR or 3(μ A) Whichever is greater(at 20℃, After 2 minutes) CR: Nominal Capacitance (μ F) UR: Rated voltages (V)							
损耗角正切 (tg δ) Dissipation Factor (Max) 20℃, 120Hz	UR (V)	4	6.3	10	16	25	35	50
	tg δ	0.35	0.28	0.24	0.20	0.16	0.14	0.12
耐久性 Load Life	+105℃施加额定电压 1000 小时后, 电容器应满足以下要求: After 1000 hours' application of rated voltage at 105℃, the capacitor shall meet the following requirement:							
	电容量变化率 Capacitance Change	± 20%初始值以内 Within ± 20% of the initial value						
	损耗角正切 Dissipation Factor	≤ 200%初始规定值 Not more than 200% of the initial specified value						
	漏电流 Leakage Current	≤ 初始规定值 Not more than the initial specified value						
高温贮存 Shelf Life	+105℃贮存 1000 小时后, 电容器应满足以上耐久性要求 After storage for 1000 hours at +105℃, the capacitors shall meet the requirement of load life above							
低温特性 Low Temperature Stability 阻抗比 Impedance Ratio (120Hz)	UR (V)	4	6.3	10	16	25	35	50
	Z(-25℃)/Z(+20℃)	7	4	3	2	2	2	2
	Z(-40℃)/Z(+20℃)	15	8	6	4	4	3	3
耐焊接热 Resistance to Soldering Heat	在 250℃的条件下, 电容器在热板上保持 30 秒, 然后从热板上取出电容器, 让其在室温下恢复, 电容器应满足以下要求: The capacitors shall be kept on the hot plate maintained at 250℃ for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the following requirement.							
	电容量变化率 Capacitance Change	± 10%初始值以内 Within ± 10% of the initial value						
	损耗角正切 Dissipation Factor	≤ 初始规定值 Not more than the initial specified value						
	漏电流 Leakage Current	≤ 初始规定值 Not more than the initial specified value						

外形图及尺寸表 Case Size Table



(mm)

	4 × 5.4	5 × 5.4	6.3 × 5.4	6.3 × 7.7	8 × 6.5	8 × 10.5	10 × 10.5
A	1.8	2.1	2.4	2.4	2.9	2.9	3.2
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3
C	4.3	5.3	6.6	6.6	8.3	8.3	10.3
E	1.0	1.3	2.2	2.2	2.3	3.1	4.5
L	5.4	5.4	5.4	7.7	6.5	10.5	10.5
H	0.5 ~ 0.8					0.8 ~ 1.1	

■ 标称电容量、额定电压、额定纹波电流与外形尺寸对应表

Nominal capacitance, rated voltage, rated ripple current and case size table

V μF	6.3		10		16		25		35		50	
	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA
0.1											4×5.4	2.3
0.22											4×5.4	3.4
0.33											4×5.4	4.1
0.47											4×5.4	5
1.0											4×5.4	10
2.2											4×5.4	16
3.3									4×5.4	13	4×5.4	16
4.7							4×5.4	22	4×5.4	22	5×5.4	23
10					4×5.4	28	5×5.4	28	5×5.4	30	6.3×5.4	32
22	4×5.4	29	5×5.4	30	5×5.4	39	6.3×5.4	55	6.3×5.4	60	6.3×7.7	51
33	5×5.4	34	5×5.4	34	5×5.4	35	6.3×5.4	65	8×6.5	84	6.3×7.7	70
47	5×5.4	46	6.3×5.4	48	6.3×5.4	70	6.3×5.4	70	6.3×7.7	80	6.3×7.7	80
100	6.3×5.4	71	6.3×5.4	69	6.3×5.4	70	6.3×7.7	100	8×10.5	296	8×10.5	230
220	6.3×7.7	120	6.3×7.7	120	6.3×7.7	120	8×10.5	320	10×10.5	435	10×10.5	375
330	8×10.5	290	8×10.5	305	8×10.5	425	10×10.5	450	10×10.5	450		
470	8×10.5	330	8×10.5	340	8×10.5	340	10×10.5	490				
1000	8×10.5	340	10×10.5	410	10×10.5	450						
1500	10×10.5	475										

— I~ = Rated ripple current (mA) (105°C, 120Hz) I~ = 额定纹波电流 (mA) (105°C, 120Hz)

■ 额定纹波电流的频率系数

Frequency coefficient of ripple current

Frequency 频率	50Hz	120Hz	300Hz	1KHz	10K~100Hz
Coefficient 系数	0.70	1.00	1.17	1.36	1.50

VEG 型片式铝电解电容

VEG Series Chip Type Aluminum Electrolytic Capacitors

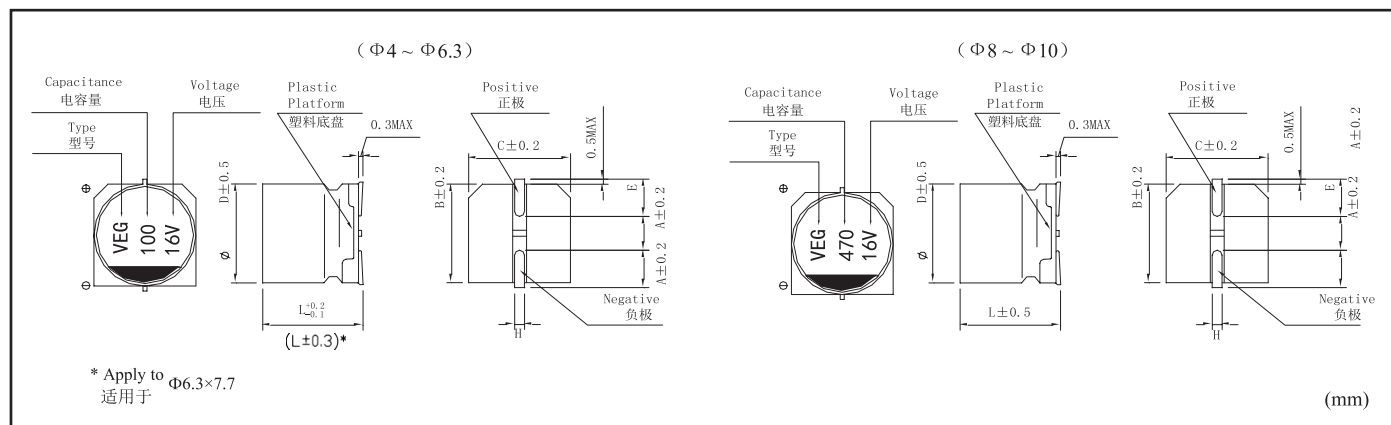
特点 Features

- 宽温长寿命。Wide temperature, long life.
- 适用于回流焊。Reflow soldering is available.
- 适用于高密度表面贴装。Suitable for high density SMT.
- 符合ROHS 指令标准。Comply with ROHS directive standards.

主要技术性能 Specifications

项目 Items	特性 Characteristics												
工作温度范围 Operating Temperature Range	-55℃ ~+105℃(6.3-100V), -40℃ ~+105℃(160-400V)												
额定电压范围 Rated Voltage Range	6.3V ~ 400V												
标称电容范围 Nominal Capacitance Range	1 ~ 1000μF												
标称电容允许偏差 Nominal Capacitance Tolerance	± 20% (20℃, 120Hz)												
漏电流 Leakage Current	6.3V ~ 100V						160V ~ 400V						
	I≤0.01CRVR or 3(μ A), 取较大者 (2 分钟) CR: 标称电容 (μ F) UR 额定电压 (V) I≤0.01CRVR or 3(μ A) Whichever is greater(at 20℃, after 2 minutes)						I≤0.04 CRVR +100(μ A) (20℃, 1 分钟) CR: 标称电容 (μ F) UR 额定电压 (V) I≤0.04CRVR +100(μ A) Whichever is greater(at 20℃, after 1 minutes)						
损耗角正切 (tg δ) Dissipation Factor (Max) 20℃, 120Hz	UR (V)	6.3	10	16	25	35	50	63	80	100	120 ~ 250	350 ~ 400	
	tg δ	0.32	0.24	0.20	0.16	0.13	0.12	0.12	0.11	0.10	0.15	0.20	
耐久性 Load Life	+105℃施加额定电压 2000 小时后, 电容器应满足以下要求: After 2000 hours' application of rated voltage at 105℃, the capacitor shall meet the following requirement:												
	电容量变化率 Capacitance Change			± 30%初始值以内(160-400V 为 ± 20%) Within ± 30% of the initial value (± 20% of 160-400V)									
	损耗角正切 Dissipation Factor			≤ 300%初始规定值(160-400V 为 ≤200%) Not more than 300% of the initial specified value(≤200% of 160-400V)									
	漏电流 Leakage Current			≤ 初始规定值 Not more than the initial specified value									
高温贮存 Shelf Life	+105℃贮存 1000 小时后, 电容器应满足以上耐久性要求 After storage for 1000 hours at +105℃, the capacitors shall meet the requirement of load life above												
低温特性 Low Temperature Stability 阻抗比 Impedance Ratio (120Hz)	UR (V)	6.3	10	16	25	35	50	63	80	100	160~250	350~400	
	Z(-25℃)/Z(+20℃)	4	4	3	3	3	2	3	4	4	-	-	
	Z(-40℃)/Z(+20℃)	-	-	-	-	-	-	-	-	-	6	10	
耐焊接热 Resistance to Soldering Heat	在 250℃的条件下, 电容器在热板上保持 30 秒, 然后从热板上取出电容器, 让其在室温下恢复, 电容器应满足以下要求: The capacitors shall be kept on the hot plate maintained at 250℃ for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the following requirement.												
	电容量变化率 Capacitance Change			± 10%初始值以内 Within ± 10% of the initial value									
	损耗角正切 Dissipation Factor			≤ 初始规定值 Not more than the initial specified value									
	漏电流 Leakage Current			≤ 初始规定值 Not more than the initial specified value									

外形图及尺寸表 Case Size Table



	4 x 5.4	5 x 5.4	6.3 x 5.4	6.3 x 7.7	8 x 6.5	8 x 10.5	10 x 10.5	8 x 12.5	10 x 12.5
A	1.8	2.1	2.4	2.4	2.9	2.9	3.2	2.9	3.2
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3	8.3	10.3
C	4.3	5.3	6	6.6	8.3	8.3	10.3	8.3	10.3
E	1.0	1.3	2.2	2.2	2.3	3.1	4.5	3.1	4.5
L	5.4	5.4	5.4	7.7	6.5	10.5	10.5	12.5	12.5
H	0.5 ~ 0.8					0.8 ~ 1.1			

注：160-400 产品 L 值公差为 ±1mm

■ 额定纹波电流的频率系数

Frequency coefficient of ripple current

Frequency 频率	50Hz	120Hz	300Hz	1KHz	≥ 10KHz
Coefficient 系数	0.70	1.00	1.17	1.36	1.50

■ 额定纹波电流的频率系数
Frequency coefficient of ripple current

电压 WV(Vdc)	容量 Ca(μ A)	产品尺寸	波纹电流	电压 WV(Vdc)	容量 Ca(μ A)	产品尺寸	波纹电流
6.3	22	4*5.4	22	16	10	4*5.4	18
	33	4*5.4	26		22	5*5.4	30
	47	5*5.4	36		33	5*5.4	32
	100	5*5.4	38		47	6.3*5.4	50
	220	6.3*5.4	86		100	6.3*5.4	60
	330	6.3*7.7	105		220	6.3*7.7	100
	470	8*10.5	340		330	8*10.5	290
	680	8*10.5	350		470	8*10.5	320
	1000	10*10.5	495		680	10*10.5	470
	1500	10*12.5	560		1000	10*12.5	510
	2200	10*12.5	580		1200	10*12.5	520
10	10	4*5.4	20	25	10	5*5.4	21
	22	5*5.4	27		22	5*5.4	23
	33	5*5.4	35		47	6.3*5.4	38
	47	5*5.4	34		100	6.3*7.7	66
	100	6.3*5.4	60		220	8*10.5	240
	220	6.3*7.7	105		330	10*10.5	410
	330	8*10.5	290		470	10*10.5	450
	470	8*10.5	320		560	10*12.5	500
	680	10*10.5	395		680	10*12.5	510
	1000	10*10.5	450				
	1500	10*12.5	520				
35	4.7	4*5.4	16	50	1	4*5.4	6.3
	10	5*5.4	27		2.2	4*5.4	11
	22	6.3*5.4	44		3.3	4*5.4	14
	33	6.3*5.4	48		4.7	5*5.4	19
	47	6.3*7.7	80		10	6.3*5.4	36
	100	8*10.5	230		22	6.3*5.4	32
	220	10*10.5	260		33	6.3*7.7	60
	330	10*10.5	450		47	8*10.5	210
	470	10*12.5	500		100	8*10.5	230
	560	10*12.5	510		200	10*10.5	375
63	10	6.3*5.4	26	80	22	8*10.5	100
	22	6.3*7.7	48		33	10*10.5	100
	33	8*10.5	140		47	10*10.5	150
	47	8*10.5	170		100	10*12.5	180
	10	10*10.5	310				
	150	10*12.5	330				
100	10	6.3*7.7	24	200	10	8*10.5	57
	22	8*10.5	100		15	8*12.5	65
	33	10*10.5	150		22	10*12.5	80
	47	10*12.5	180		10	10*10.5	75
	56	10*12.5	180		15	10*12.5	81
					22	10*12.5	83
250	3.3	8*10.5	36	400	2.2	8*10.5	29
	4.7	8*10.5	42		3.3	8*10.5	30
	6.8	8*10.5	64		4.7	8*12.5	40
	8.2	10*10.5	70		5.6	10*12.5	51
	10	10*10.5	72		6.8	10*12.5	52
					8.2	10*12.5	55
					10	10*12.5	60

VEJ 型片式铝电解电容

VEJ Series Chip Type Aluminum Electrolytic Capacitors

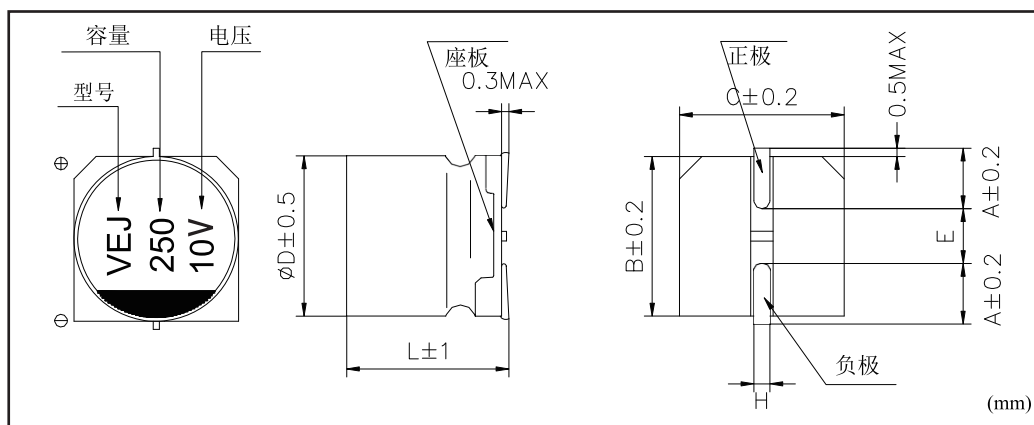
特点 Features

- 中高压宽温长寿命品。High voltage and long life and wide working temperature.
- 适用于回流焊。Reflow soldering is available.
- 适用于高密度表面贴装。Suitable for high density SMT.
- 符合ROHS 指令标准。Comply with ROHS directive standards.

主要技术性能 Specifications

项目 Items	特性 Characteristics		
工作温度范围 Operating Temperature Range	-40℃ ~ +105℃		
额定电压范围 Rated Voltage Range	160V ~ 400V		
标称容量范围 Nominal Capacitance Range	1 ~ 22μF		
标称容量允许偏差 Nominal Capacitance Tolerance	± 20% (20℃, 120Hz)		
漏电流 Leakage Current	160V ~ 400V		
	I = 0.04 CRVR +100 (μ A) max.(1 min)		
损耗角正切 (tg δ) Dissipation Factor (Max) 20℃, 120Hz	UR (V)	160 ~ 250	350 ~ 400
	tg δ	0.15	0.20
耐久性 Load Life	+105℃施加额定电压 1000 小时后, 电容器应满足以下要求: After 1000 hours' application of rated voltage at 105℃, the capacitor shall meet the following requirement:		
	电容量变化率 Capacitance Change	± 20%初始值以内 Within ± 20% of the initial value	
	损耗角正切 Dissipation Factor	≤ 200%初始规定值 Not more than 200% of the initial specified value	
	漏电流 Leakage Current	≤ 初始规定值 Not more than the initial specified value	
高温贮存 Shelf Life	+105℃贮存 1000 小时后, 电容器应满足以上耐久性要求 After storage for 1000 hours at +105℃, the capacitors shall meet the requirement of load life above		
低温特性 Low Temperature Stability 阻抗比 Impedance Ratio (120Hz)	UR (V)	160 ~ 250	350 ~ 400
	Z(-25℃)/Z(+20℃)	3	6
	Z(-40℃)/Z(+20℃)	6	10
耐焊接热 Resistance to Soldering Heat	在 250℃的条件下, 电容器在热板上保持 30 秒, 然后从热板上取出电容器, 让其在室温下恢复, 电容器应满足以下要求: The capacitors shall be kept on the hot plate maintained at 250℃ for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the following requirement.		
	电容量变化率 Capacitance Change	± 10%初始值以内 Within ± 10% of the initial value	
	损耗角正切 Dissipation Factor	≤ 初始规定值 Not more than the initial specified value	
	漏电流 Leakage Current	≤ 初始规定值 Not more than the initial specified value	

外形图及尺寸表 Case Size Table



	$\phi 8 \times 10.5$	$\phi 8 \times 12.5$	$\phi 10 \times 10.5$	$\phi 10 \times 12.5$
A	2.9	2.9	3.2	3.2
B	8.3	8.3	10.3	10.3
C	8.3	8.3	10.3	10.3
E	3.1	3.1	4.5	4.5
L	10.5	12.5	10.5	12.5
H	0.8 ~ 1.1			

■ 标称电容量、额定电压、额定纹波电流与外形尺寸对应表

Nominal capacitance, rated

	电压 WV (Vdc) 160		电压 WV (Vdc) 200		电压 WV (Vdc) 250		电压 WV (Vdc) 350		电压 WV (Vdc) 400	
容量 Ca (μA)	产品尺寸	纹波电流	产品尺寸	纹波电流	产品尺寸	纹波电流	产品尺寸	纹波电流	产品尺寸	纹波电流
1									8*10.5	42
2.2							8*10.5	44	8*12.5	40
3.3			8*10.5	55	8*10.5	34	8*12.5	43	10*10.5	58
4.7	8*10.5	68	8*10.5	53	8*10.5	34	10*10.5	60	10*10.5	56
5.6	8*10.5	67	8*10.5	51	8*10.5	36	10*10.5	58	10*12.5	72
6.8	8*10.5	65	8*10.5	49	8*12.5	38	10*10.5	56	10*12.5	70
8.2	8*10.5	64	8*12.5	43	10*10.5	50	10*12.5	73	10*12.5	68
10	8*12.5	59	10*10.5	53	10*12.5	72	10*12.5	71	10*12.5	65
15	10*12.5	79	10*12.5	75						
22	10*12.5	72								

■ 额定纹波电流补偿系数

Rated ripple current compensation coefficient

Frequency 频率	50Hz	120Hz	300Hz	1KHz	$\geq 10\text{KHz}$
Coefficient 系数	0.80	1.00	1.25	1.40	1.60

VEL 型片式铝电解电容

VEL Series Chip Type Aluminum Electrolytic Capacitors

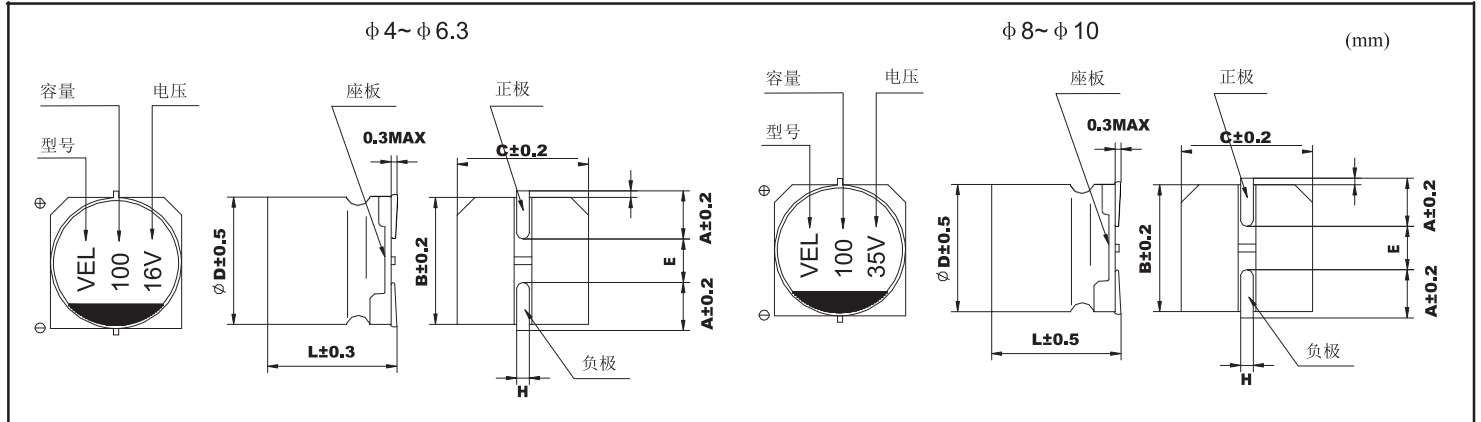
特点 Features

- 高温长寿命品。High temperature and long life.
- 适用于回流焊。Reflow soldering is available.
- 适用于高密度表面贴装。Suitable for high density SMT.
- 符合ROHS 指令标准。Comply with ROHS directive standards.

主要技术性能 Specifications

项目 Items	特性 Characteristics						
工作温度范围 Operating Temperature Range	-40℃ ~+105℃						
额定电压范围 Rated Voltage Range	6.3V ~ 50V						
标称电容量范围 Nominal Capacitance Range	1 ~ 1000μF						
标称电容量允许偏差 Nominal Capacitance Tolerance	±20% (20℃, 120Hz)						
漏电流 Leakage Current	I≤0.01CRVR or 3(μ A), 取较大者 (2 分钟) CR: 标称电容量 (μ F) UR: 额定电压 (V) I≤0.01CRVR or 3(μ A) Whichever is greater(at 20℃, after 2 minutes) CR: Nominal Capacitance (μ F) UR: Rated voltages (V)						
损耗角正切 (tg δ) Dissipation Factor (Max) 20℃, 120Hz	UR (V)	6.3	10	16	25	35	50
	tg δ	0.32	0.24	0.20	0.16	0.13	0.12
耐久性 Load Life	+105℃施加额定电压 5000 小时后 (ΦD=4, 5 和 6.3 为 3000 小时) , 电容器应满足以下要求: After 5000 hours (3000 hours for ΦD = 4, 5 and 6.3) . application of rated voltage at 105℃, the capacitor shall meet the following requirement:						
	电容量变化率 Capacitance Change		±30%初始值以内 Within ±30% of the initial value				
	损耗角正切 Dissipation Factor		≤ 300%初始规定值 Not more than 300% of the initial specified value				
	漏电流 Leakage Current		≤ 初始规定值 Not more than the initial specified value				
高温贮存 Shelf Life	+105℃ 贮存 1000 小时后, 加额定工作电压 30 分钟, 电容器应满足以上耐久性要求 After storage for 1000 hours at +105℃, UR to be applied for 30 minutes ,the capacitors shall meet the requirement of load life above						
低温特性 Low Temperature Stability 阻抗比 Impedance Ratio (120Hz)	UR (V)	6.3	10	16	25	35	50
	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2
	Z(-40℃)/Z(+20℃)	10	7	5	3	3	3
耐焊接热 Resistance to Soldering Heat	在 250℃的条件下, 电容器在热板上保持 30 秒, 然后从热板上取出电容器, 让其在室温下恢复, 电容器应满足以下要求: The capacitors shall be kept on the hot plate maintained at 250℃ for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the following requirement.						
	电容量变化率 Capacitance Change		±10%初始值以内 Within ±10% of the initial value				
	损耗角正切 Dissipation Factor		≤ 初始规定值 Not more than the initial specified value				
	漏电流 Leakage Current		≤ 初始规定值 Not more than the initial specified value				

外形图及尺寸表 Case Size Table



	4 x 5.8	5x5.8	6.3x5.8	6.3x7.7	8x10.5	10x10.5
A	1.8	2.1	2.4	2.4	2.9	3.2
B	4.3	5.3	6.6	6.6	8.3	10.3
C	4.3	5.3	6.6	6.6	8.3	10.3
E	1.0	1.3	2.2	2.2	3.1	4.5
L	5.8	5.8	5.8	7.7	10.5	10.5
H	0.5~0.8				0.8~1.1	

■ 标称电容量、额定电压、额定纹波电流与外形尺寸对应表

Nominal capacitance, rated voltage, rated ripple current and case size table

V μF	6.3		10		16		25		35		50	
	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA
0.1												
0.22												
0.33												
0.47												
1.0											4x5.8	8
2.2											4x5.8	12
3.3											4x5.8	17
4.7									4x5.8	20	5x5.8	21
10					4x5.8	20	5x5.8	30	5x5.8	30	6.3x5.8	35
22			5x5.8	30	5x5.8	35	6.3x5.8	45	6.3x5.8	50	6.3x7.7	52
33	5x5.8	40	5x5.8	40	6.3x5.8	50	6.3x5.8	50	6.3x7.7	62	8x10.5	80
47	5x5.8	45	6.3x5.8	55	6.3x5.8	60	6.3x7.7	65	8x10.5	100	8x10.5	95
100	6.3x5.8	70	6.3x5.8	75	6.3x7.7	90	8x10.5	140	10x10.5	260	10x10.5	99
220	6.3x7.7	105	8x10.5	170	10x10.5	230	10x10.5	230	10x10.5	230		
330	8x10.5	245	10x10.5	245	10x10.5	240	10x10.5	250				
470	10x10.5	350	10x10.5	350	10x10.5	360						
1000	10x10.5	350	10x10.5									

I~ = Rated ripple current (mA) (105°C, 120Hz) I~ = 额定纹波电流 (mA) (105°C, 120Hz)

■ 额定纹波电流的频率系数

Frequency coefficient of ripple current

Frequency 频率	50Hz	120Hz	300Hz	1KHz	≥ 10KHz
Coefficient 系数	0.35	0.50	0.64	0.83	1.00

VZS 型片式铝电解电容

VZS Series Chip Type Aluminum Electrolytic Capacitors

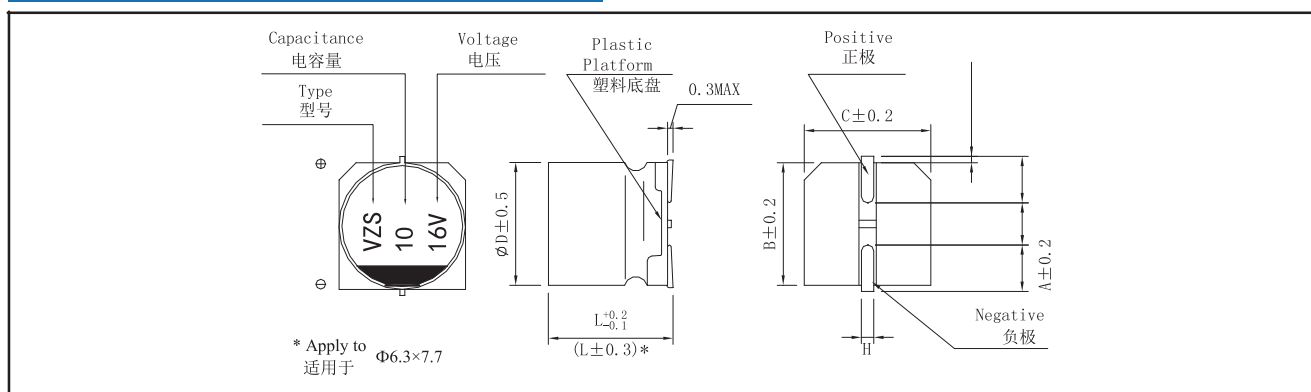
特点 Features

- 宽温低阻抗标准品。Wide temperature low impedance standard.
- 适用于回流焊。Reflow soldering is available.
- 适用于高密度表面贴装。Suitable for high density SMT.
- 符合ROHS指令标准。Comply with ROHS directive standards.

主要技术性能 Specifications

项目 Items	特性 Characteristics					
工作温度范围 Operating Temperature Range	-55℃ ~ +105℃					
额定电压范围 Rated Voltage Range	6.3V ~ 35V					
标称电容容量范围 Nominal Capacitance Range	1 ~ 220 μ F					
标称电容容量允许偏差 Nominal Capacitance Tolerance	± 20% (20℃, 120Hz)					
漏电流 Leakage Current	I≤0.01CRVR or 3(μ A), 取较大者 (2 分钟) CR: 标称电容容量 (μ F) UR: 额定电压 (V) I≤0.01CRVR or 3(μ A) Whichever is greater(at 20℃, After 2 minutes) CR: Nominal Capacitance (μ F) UR: Rated voltages (V)					
损耗角正切 (tg δ) Dissipation Factor (Max) 20℃, 120Hz	UR (V)	6.3	10	16	25	35
	tg δ	0.22	0.19	0.16	0.14	0.12
耐久性 Load Life	+105℃施加额定电压 1000小时后, 电容器应满足以下要求: After 1000hours' application of rated voltage at 105℃, the capacitor shall meet the following requirement:					
	电容量变化率 Capacitance Change	± 20%初始值以内 Within ± 20% of the initial value				
	损耗角正切 Dissipation Factor	≤ 200%初始规定值 Not more than 200% of the initial specified value				
	漏电流 Leakage Current	≤ 初始规定值 Not more than the initial specified value				
高温贮存 Shelf Life	+105℃贮存 1000 小时后, 电容器应满足以上耐久性要求 After storage for 1000 hours at +125℃, the capacitors shall meet the requirement of load life above					
低温特性 Low Temperature Stability 阻抗比 Impedance Ratio (120Hz)	UR (V)	6.3	10	16	25	35
	Z(-25℃)/Z(+20℃)	2	2	2	2	2
	Z(-40℃)/Z(+20℃)	4	4	3	3	3
耐焊接热 Resistance to Soldering Heat	在 250℃的条件下, 电容器在热板上保持 30 秒, 然后从热板上取出电容器, 让其在室温下恢复, 电容器应满足以下要求: The capacitors shall be kept on the hot plate maintained at 250℃ for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the following requirement.					
	电容量变化率 Capacitance Change	± 10%初始值以内 Within ± 10% of the initial value				
	损耗角正切 Dissipation Factor	≤ 初始规定值 Not more than the initial specified value				
	漏电流 Leakage Current	≤ 初始规定值 Not more than the initial specified value				

外形图及尺寸表 Case Size Table



	4x5.4	5x5.4	6.3x5.4	6.3x7.7
A	1.8	2.1	2.4	2.4
B	4.3	5.3	6.6	6.6
C	4.3	5.3	6.6	6.6
E	1.0	1.3	2.2	2.2
L	5.4	5.4	5.4	7.7
H	0.5 ~ 0.8			

■ 标称电容量、额定电压、额定纹波电流与外形尺寸对应表

Nominal capacitance, rated voltage, rated ripple current and case size table

V	6.3			10			16			25			35		
μF	D×L mm	Impedance Ω	I~ mA	D×L mm	Impedance Ω	I~ mA	D×L mm	Impedance Ω	I~ mA	D×L mm	Impedance Ω	I~ mA	D×L mm	Impedance Ω	I~ mA
1.0													4x5.4	5.0	50
1.5													4x5.4	5.0	50
2.2													4x5.4	5.0	50
3.3													4x5.4	5.0	50
4.7										4x5.4	5.0	50	4x5.4	5.0	50
6.8										4x5.4	5.0	50	5x5.4	2.6	80
10							4x5.4	5.0	50	5x5.4	2.6	80	5x5.4	2.6	80
15							5x5.4	2.6	80	6.3x5.4	1.3	115	6.3x5.4	1.3	115
22	4x5.4	5.0	50	5x5.4	2.6	80	5x5.4	2.6	80	6.3x5.4	1.3	115	6.3x5.4	1.3	115
33	5x5.4	2.6	80	5x5.4	2.6	80	6.3x5.4	1.3	115	6.3x5.4	1.3	115	6.3x7.7	0.8	150
47	5x5.4	2.6	80	6.3x5.4	1.3	115	6.3x5.4	1.3	115	6.3x7.7	0.8	150	6.3x7.7	0.8	150
68	6.3x5.4	1.3	115	6.3x5.4	1.3	115	6.3x7.7	0.8	150	6.3x7.7	0.8	150			
100	6.3x5.4	1.3	115	6.3x7.7	0.8	150	6.3x7.7	0.8	150						
150	6.3x7.7	0.8	150	6.3x7.7	0.8	150									
220	6.3x7.7	0.8	150												

■ 额定纹波电流的频率系数

Frequency coefficient of ripple current

I~ = Rated ripple current (mA) (105°C, 100KHz) I~ = 额定纹波电流 (mA) (105°C, 100KHz)
Low impedance (20°C 100KHz)

Frequency 频率	50Hz	120Hz	300Hz	1KHz	$\geq 10\text{KHz}$
Coefficient 系数	0.35	0.50	0.64	0.83	1.00

VZT 型片式铝电解电容

VZT Series Chip Type Aluminum Electrolytic Capacitors

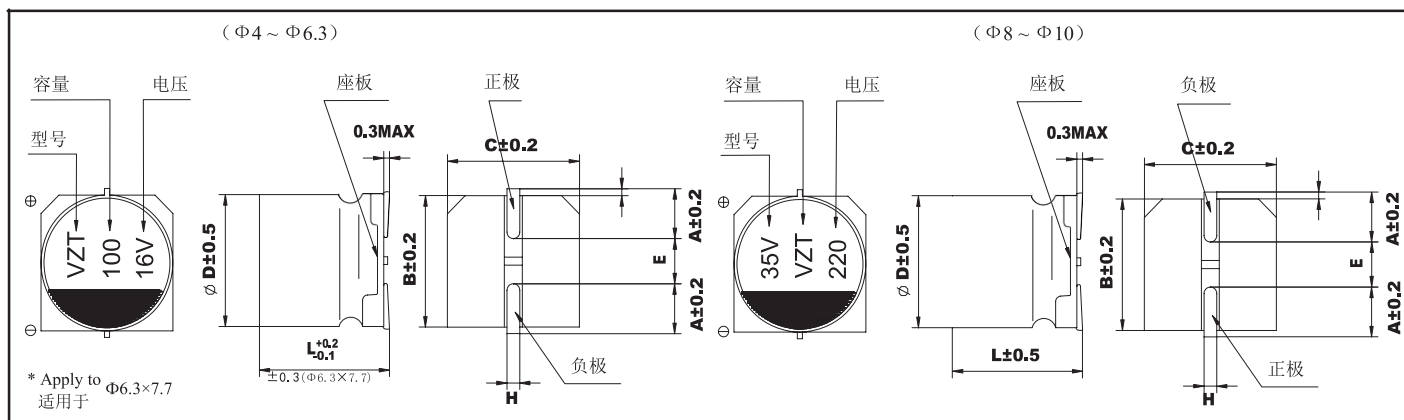
特点 Features

- 宽温低阻抗长寿命。Wide temperature of long life and low impedance.
- 适用于回流焊。Reflow soldering is available.
- 适用于高密度表面贴装。Suitable for high density SMT.
- 工作温度范围宽 ($-55^{\circ}\text{C} \sim +105^{\circ}\text{C}$) Operating over wide temperature range.
- 符合ROHS指令标准。Comply with ROHS directive standards.

主要技术性能 Specifications

项目 Items	特性 Characteristics							
工作温度范围 Operating Temperature Range	-55℃ ~ +105℃							
额定电压范围 Rated Voltage Range	6.3V ~ 35V							
标称电容范围 Nominal Capacitance Range	1 ~ 1000 μ F							
标称电容允许偏差 Nominal Capacitance Tolerance	± 20% (20℃, 120Hz)							
漏电流 Leakage Current	I≤0.01CRVR or 3(μ A), 取较大者 (2 分钟) CR: 标称电容 (μ F) UR: 额定电压 (V) I≤0.01CRVR or 3(μ A) Whichever is greater(at 20℃, After 2 minutes) CR: Nominal Capacitance (μ F) UR: Rated voltages (V)							
损耗角正切 (tg δ) Dissipation Factor (Max) 20℃, 120Hz	UR (V)	6.3	10	16	25	35		
	tg δ	0.22	0.19	0.16	0.14	0.12		
耐久性 Load Life	+105℃施加额定电压 2000小时后, 电容器应满足以下要求: After 2000hours' application of rated voltage at 105℃, the capacitor shall meet the following requirement:							
	电容量变化率 Capacitance Change		± 30%初始值以内 Within ± 30% of the initial value					
	损耗角正切 Dissipation Factor		≤ 300%初始规定值 Not more than 200% of the initial specified value					
	漏电流 Leakage Current		≤ 初始规定值 Not more than the initial specified value					
高温贮存 Shelf Life	+105℃贮存 1000 小时后, 电容器应满足以上耐久性要求 After storage for 1000 hours at +125℃, the capacitors shall meet the requirement of load life above							
低温特性 Low Temperature Stability 阻抗比 Impedance Ratio (120Hz)	UR (V)		6.3	10	16	25	35	50
	Z(-25℃)/Z(+20℃)		2	2	2	2	2	2
	Z(-40℃)/Z(+20℃)		4	4	3	3	3	3
耐焊接热 Resistance to Soldering Heat	在 250℃的条件下, 电容器在热板上保持 30 秒, 然后从热板上取出电容器, 让其在室温下恢复, 电容器应满足以下要求: The capacitors shall be kept on the hot plate maintained at 250℃ for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the following requirement.							
	电容量变化率 Capacitance Change		± 10%初始值以内 Within ± 10% of the initial value					
	损耗角正切 Dissipation Factor		≤ 初始规定值 Not more than the initial specified value					
	漏电流 Leakage Current		≤ 初始规定值 Not more than the initial specified value					

外形图及尺寸表 Case Size Table



	4 x 5.4	5 x 5.4	6.3 x 5.4	6.3 x 7.7	8 x 6.5	8 x 10.5	10 x 10.5
A	3.0	2.1	2.4	2.4	2.9	2.9	3.2
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3
C	4.3	5.3	6.6	6.6	8.3	8.3	10.3
E	1.0	1.3	2.2	2.2	2.3	3.1	4.5
L	5.4	5.4	5.4	7.7	6.5	10.5	10.5
H	0.5 ~ 0.8					0.8 ~ 1.1	

■ 标称电容量、额定电压、额定纹波电流与外形尺寸对应表

Nominal capacitance, rated voltage, rated ripple current and case size table

V	6.3			10			16			25			35			50		
μF	D×L mms	Impedance Ω	I~ mA	D×L mms	Impedance Ω	I~ mA	D×L mms	Impedance Ω	I~ mA	D×L mms	Impedance Ω	I~ mA	D×L mms	Impedance Ω	I~ mA	D×L mms	Impedance Ω	I~ mA
1.0																4x5.4	5.00	30
2.2																4x5.4	5.00	30
3.3																4x5.4	5.00	30
4.7													4x5.4	1.8	80	5x5.4	1.52	85
10										4x5.4	1.80	80	5x5.4	0.76	150	6.3x5.4	0.88	165
22				4x5.4	1.80	80	5x5.4	0.76	150	5x5.4	0.76	150	5x5.4	0.76	150	6.3x5.4	0.88	165
33	5x5.4	0.76	150	5x5.4	0.76	150	6.3x5.4	0.44	230	5x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.68	185
47	5x5.4	0.76	150	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.34	280	8x10.5	0.34	350
100	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.34	280	8x10.5	0.17	600	10x10.5	0.18	670
220	6.3x5.4	0.44	230	6.3x7.7	0.34	280	6.3x7.7	0.34	280	8x10.5	0.17	600	10x10.5	0.09	850			
330	6.3x7.7	0.34	280	8x10.5	0.17	600	8x10.5	0.17	600	10x10.5	0.09	850						
470	8x10.5	0.17	600	8x10.5	0.17	600	10x10.5	0.09	850									
1000	10x10.5	0.09	850	10x10.5	0.09	850												

I~=Rated ripple current (mA) (105℃, 100kHz) I~=额定纹波电流 (mA) (105℃, 100kHz) 20℃ 100kHz 时的电阻 (Ω) MAX

■ 额定纹波电流的频率系数

Frequency coefficient of ripple current

Frequency 频率	50Hz	120Hz	300Hz	1KHz	≥ 10KHz
Coefficient 系数	0.35	0.50	0.64	0.83	1.00

VZG 型片式铝电解电容

VZG Series Chip Type Aluminum Electrolytic Capacitors

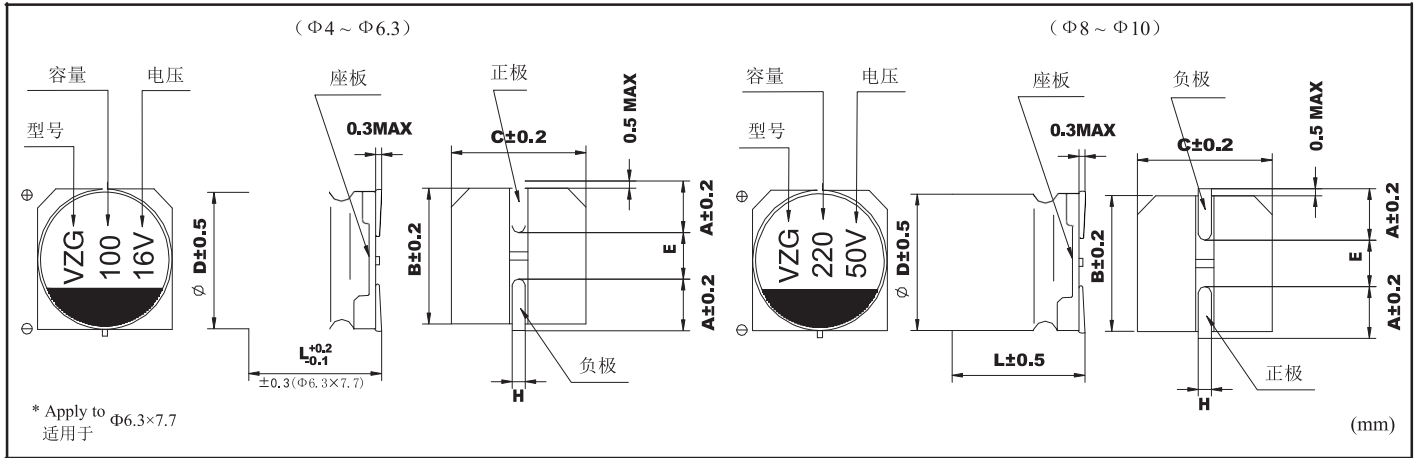
特点 Features

- 宽温低阻抗长寿命。Wide temperature of long life and low impedance.
- 适用于回流焊。Reflow soldering is available.
- 适用于高密度表面贴装。Suitable for high density SMT.
- 工作温度范围宽 ($-55^{\circ}\text{C} \sim +105^{\circ}\text{C}$) Operating over wide temperature range.
- 符合ROHS指令标准。Comply with ROHS directive standards.

主要技术性能 Specifications

项目 Items	特性 Characteristics							
工作温度范围 Operating Temperature Range	-55℃ ~ +105℃							
额定电压范围 Rated Voltage Range	6.3V ~ 35V							
标称电容范围 Nominal Capacitance Range	1 ~ 1500 μ F							
标称电容允许偏差 Nominal Capacitance Tolerance	± 20% (20℃, 120Hz)							
漏电流 Leakage Current	I≤0.01CRVR or 3(μ A), 取较大者 (2 分钟) CR: 标称电容 (μ F) UR: 额定电压 (V) I≤0.01CRVR or 3(μ A) Whichever is greater(at 20℃, After 2 minutes) CR: Nominal Capacitance (μ F) UR: Rated voltages (V)							
损耗角正切 (tg δ) Dissipation Factor (Max) 20℃, 120Hz	UR (V)	6.3	10	16	25	35	50	
	tg δ	0.26	0.20	0.16	0.14	0.12	0.12	
耐久性 Load Life	+105℃施加额定电压 2000小时后, 电容器应满足以下要求: After 2000hours' application of rated voltage at 105℃, the capacitor shall meet the following requirement:							
	电容量变化率 Capacitance Change		± 30%初始值以内 Within ± 30% of the initial value					
	损耗角正切 Dissipation Factor		≤ 300%初始规定值 Not more than 200% of the initial specified value					
	漏电流 Leakage Current		≤ 初始规定值 Not more than the initial specified value					
高温贮存 Shelf Life	+105℃贮存 1000 小时后, 电容器应满足以上耐久性要求 After storage for 1000 hours at +125℃, the capacitors shall meet the requirement of load life above							
低温特性 Low Temperature Stability 阻抗比 Impedance Ratio (120Hz)	UR (V)		6.3	10	16	25	35	50
	Z(-25℃)/Z(+20℃)		3	2	2	2	2	2
	Z(-40℃)/Z(+20℃)		5	4	4	3	3	3
耐焊接热 Resistance to Soldering Heat	在 250℃的条件下, 电容器在热板上保持 30 秒, 然后从热板上取出电容器, 让其在室温下恢复, 电容器应满足以下要求: The capacitors shall be kept on the hot plate maintained at 250℃ for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the following requirement.							
	电容量变化率 Capacitance Change		± 10%初始值以内 Within ± 10% of the initial value					
	损耗角正切 Dissipation Factor		≤ 初始规定值 Not more than the initial specified value					
	漏电流 Leakage Current		≤ 初始规定值 Not more than the initial specified value					

外形图及尺寸表 Case Size Table



	4 x 5.4	5x5.4	6.3x5.4	6.3x7.7	8x10.5	10x10.5
A	1.8	2.1	2.4	2.4	2.9	3.2
B	4.3	5.3	6.6	6.6	8.3	10.3
C	4.3	5.3	6.6	6.6	8.3	10.3
E	1.0	1.3	2.2	2.2	3.1	4.5
L	5.4	5.4	5.4	7.7	10.5	10.5
H	0.5~0.8				0.8~1.1	

■ 标称电容量、额定电压、额定纹波电流与外形尺寸对应表

Nominal capacitance, rated voltage, rated ripple current and case size table

V	6.3			10			16			25			35			50		
μF	D×L mms	Impedance Ω	I~ mA	D×L mms	Impedance Ω	I~ mA	D×L mms	Impedance Ω	I~ mA	D×L mms	Impedance Ω	I~ mA	D×L mms	Impedance Ω	I~ mA	D×L mms	Impedance Ω	I~ mA
1.0																4x5.4	5.00	30
2.2																4x5.4	5.00	30
3.3																4x5.4	5.00	30
4.7													4x5.4	1.8	80	5x5.4	1.52	85
10										4x5.4	1.80	80	5x5.4	0.76	150	6.3x5.4	0.88	165
22				4x5.4	1.80	80	5x5.4	0.76	150	5x5.4	0.76	150	5x5.4	0.76	150	6.3x5.4	0.88	165
33	5x5.4	0.76	150	5x5.4	0.76	150	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.68	185
47	5x5.4	0.76	150	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.34	280	6.3x7.7	0.68	185
100	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.34	280	8x10.5	0.17	600	8x10.5	0.34	300
220	6.3x5.4	0.44	230	6.3x7.7	0.34	280	6.3x7.7	0.34	280	8x10.5	0.17	600	8x10.5	0.17	600	10x10.5	0.18	670
330	6.3x7.7	0.34	280	8x10.5	0.17	600	8x10.5	0.17	600	8x10.5	0.17	600	10x10.5	0.09	850			
470	8x10.5	0.17	600	8x10.5	0.17	600	8x10.5	0.17	600	10x10.5	0.09	850						
1000	8x10.5	0.17	600	10x10.5	0.09	850												
1500	10x10.5	0.09	850															

■ 额定纹波电流的频率系数

I~=Rated ripple current (mA) (105℃, 100kHz) I~=额定纹波电流 (mA) (105℃, 100kHz) 20℃ 100kHz 时的电阻 (Ω) MAX

Frequency coefficient of ripple current

Frequency 频率	50Hz	120Hz	300Hz	1KHz	≥ 10KHz
Coefficient 系数	0.35	0.50	0.64	0.83	1.00

VZL 型片式铝电解电容

VZL Series Chip Type Aluminum Electrolytic Capacitors

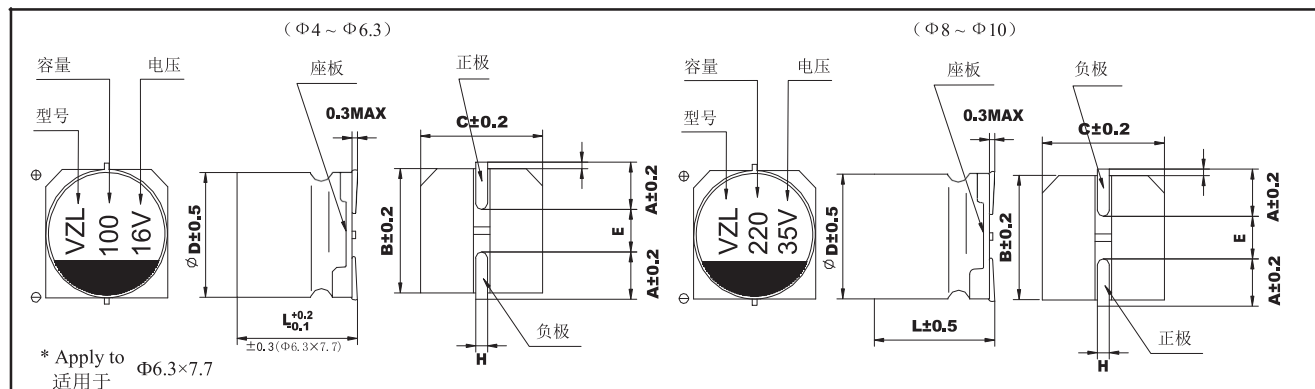
特点 Features

- 宽温低阻抗长寿命品。Wide temperature of long life and low impedance.
- 适用于回流焊。Reflow soldering is available.
- 适用于高密度表面贴装。Suitable for high density SMT.
- 工作温度范围宽 ($-55^{\circ}\text{C} \sim +105^{\circ}\text{C}$) Operating over wide temperature range.
- 符合ROHS指令标准。Comply with ROHS directive standards.

主要技术性能 Specifications

项目 Items	特性 Characteristics					
工作温度范围 Operating Temperature Range	-40℃ ~ +125℃					
额定电压范围 Rated Voltage Range	10V ~ 50V					
标称电容容量范围 Nominal Capacitance Range	-					
标称电容容量允许偏差 Nominal Capacitance Tolerance	± 20% (20℃, 120Hz)					
漏电流 Leakage Current	I ≤ 0.01CRVR or 3(μ A), 取较大者 (2 分钟) CR: 标称电容容量 (μ F) UR: 额定电压 (V) I ≤ 0.01CRVR or 3(μ A) Whichever is greater(at 20℃, After 2 minutes) CR: Nominal Capacitance (μ F) UR: Rated voltages (V)					
损耗角正切 (tg δ) Dissipation Factor (Max) 20℃, 120Hz	UR (V)	10	16	25	35	50
	tg δ	0.24	0.20	0.16	0.14	0.14
耐久性 Load Life	+125℃施加额定电压 1000-1500 小时后, 电容器应满足以下要求: After 1000-1500 hours' application of rated voltage at 125℃, the capacitor shall meet the following requirement:					
	电容量变化率 Capacitance Change	± 20%初始值以内 Within ± 20% of the initial value				
	损耗角正切 Dissipation Factor	≤ 200%初始规定值 Not more than 200% of the initial specified value				
	漏电流 Leakage Current	≤ 初始规定值 Not more than the initial specified value				
高温贮存 Shelf Life	+125℃贮存 1000 小时后, 加额定工作电压 30 分钟,电容器应满足以上耐久性要求 After storage for 1000 hours at +125℃, UR to be applied for 30 minutes, the capacitors shall meet the requirement of load life above					
低温特性 Low Temperature Stability 阻抗比 Impedance Ratio (120Hz)	UR (V)	10	16	25	35	50
	Z(-25℃)/Z(+20℃)	6	5	4	3	3
	Z(-40℃)/Z(+20℃)	12	8	6	4	4
耐焊接热 Resistance to Soldering Heat	在 250℃的条件下, 电容器在热板上保持 30 秒, 然后从热板上取出电容器, 让其在室温下恢复, 电容器应满足以下要求: The capacitors shall be kept on the hot plate maintained at 250℃ for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the following requirement.					
	电容量变化率 Capacitance Change	± 10%初始值以内 Within ± 10% of the initial value				
	损耗角正切 Dissipation Factor	≤ 初始规定值 Not more than the initial specified value				
	漏电流 Leakage Current	≤ 初始规定值 Not more than the initial specified value				

外形图及尺寸表 Case Size Table



	4x5.4	5x5.4	6.3x5.4	6.3x7.7	8x10.5	10x10.5
A	1.8	2.1	2.4	2.4	2.9	3.2
B	4.3	5.3	6.6	6.6	8.3	10.3
C	4.3	5.3	6.6	6.6	8.3	10.3
E	1.0	1.3	2.2	2.2	3.1	4.5
L	5.4	5.4	5.4	7.7	10.5	10.5
H	0.5~0.8				0.8~1.1	

■ 标称电容量、额定电压、额定纹波电流与外形尺寸对应表

Nominal capacitance, rated voltage, rated ripple current and case size table

V	6.3			10			16			25			35			50		
μF	D×L mms	Impedance Ω	I~ mA	D×L mms	Impedance Ω	I~ mA	D×L mms	Impedance Ω	I~ mA	D×L mms	Impedance Ω	I~ mA	D×L mms	Impedance Ω	I~ mA	D×L mms	Impedance Ω	I~ mA
1.0																4x5.4	5.00	30
2.2																4x5.4	5.00	30
3.3																4x5.4	5.00	30
4.7													4x5.4	1.8	80	5x5.4	1.52	85
10										4x5.4	1.80	80	5x5.4	0.76	150	6.3x5.4	0.88	165
22				4x5.4	1.80	80	5x5.4	0.76	150	5x5.4	0.76	150	5x5.4	0.76	150	6.3x5.4	0.88	165
33	5x5.4	0.76	150	5x5.4	0.76	150	6.3x5.4	0.44	230	5x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.68	185
47	5x5.4	0.76	150	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.34	280	8x10.5	0.34	350
100	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.34	280	8x10.5	0.17	600	10x10.5	0.18	670
220	6.3x5.4	0.44	230	6.3x7.7	0.34	280	6.3x7.7	0.34	280	8x10.5	0.17	600	10x10.5	0.09	850			
330	6.3x7.7	0.34	280	8x10.5	0.17	600	8x10.5	0.17	600	10x10.5	0.09	850						
470	8x10.5	0.17	600	8x10.5	0.17	600	10x10.5	0.09	850									
1000	10x10.5	0.09	850	10x10.5	0.09	850												

I~=Rated ripple current (mA) (105°C, 100kHz) I~=额定纹波电流 (mA) (105°C, 100kHz) 20°C 100kHz 时的电阻 (Ω) MAX

■ 额定纹波电流的频率系数

Frequency coefficient of ripple current

Frequency 频率	50Hz	120Hz	300Hz	1KHz	$\geq 10KHz$
Coefficient 系数	0.35	0.50	0.64	0.83	1.00

VNS 型片式铝电解电容

VNS Series Chip Type Aluminum Electrolytic Capacitors

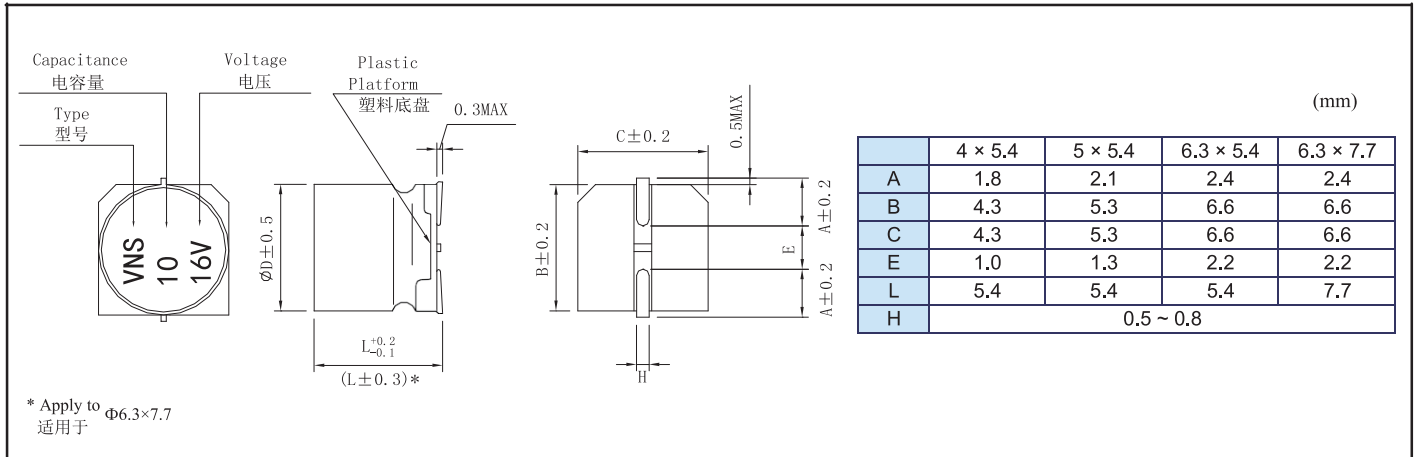
特点 Features

- 无极性产品。Bi-polar.
- 适用于回流焊。Reflow soldering is available.
- 适用于高密度表面贴装。Suitable for high density SMT.
- 符合ROHS指令标准。Comply with ROHS directive standards.

主要技术性能 Specifications

项目 Items	特性 Characteristics							
工作温度范围 Operating Temperature Range	-40℃ ~ +85℃							
额定电压范围 Rated Voltage Range	6.3V ~ 35V							
标称容量范围 Nominal Capacitance Range	0.1 ~ 100 μ F							
标称容量允许偏差 Nominal Capacitance Tolerance	± 20% (20℃, 120Hz)							
漏电流 Leakage Current	I≤0.05CRVR or 10(μ A), 取较大者 (2 分钟) CR: 标称容量 (μ F) UR: 额定电压 (V) I≤0.05CRVR or 10(μ A) Whichever is greater(at 20℃, After 2 minutes) CR: Nominal Capacitance (μ F) UR: Rated voltages (V)							
损耗角正切 (tg δ) Dissipation Factor (Max) 20℃, 120Hz	UR (V)	6.3	10	16	25	35	50	
	tg δ	0.26	0.22	0.20	0.20	0.20	0.18	
耐久性 Load Life	+85℃施加额定电压 1000 小时后, 每 250 小时换向一次, 电容器应满足以下要求: After 1000 hours' application of rated voltage at 85℃, with the polarity inverted every 250 hours, the capacitor shall meet the following requirement:							
	电容量变化率 Capacitance Change		± 20%初始值以内 Within ± 20% of the initial value					
	损耗角正切 Dissipation Factor		≤ 200%初始规定值 Not more than 200% of the initial specified value					
	漏电流 Leakage Current		≤ 初始规定值 Not more than the initial specified value					
高温贮存 Shelf Life	+105℃贮存 1000 小时后, 电容器应满足以上耐久性要求 After storage for 1000 hours at +125℃, the capacitors shall meet the requirement of load life above							
低温特性 Low Temperature Stability 阻抗比 Impedance Ratio (120Hz)	UR (V)		6.3	10	16	25	35	50
	Z(-25℃)/Z(+20℃)		4	3	2	2	2	2
	Z(-40℃)/Z(+20℃)		8	6	4	4	3	3
耐焊接热 Resistance to Soldering Heat	在 250℃的条件下, 电容器在热板上保持 30 秒, 然后从热板上取出电容器, 让其在室温下恢复, 电容器应满足以下要求: The capacitors shall be kept on the hot plate maintained at 250℃ for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the following requirement.							
	电容量变化率 Capacitance Change		± 10%初始值以内 Within ± 10% of the initial value					
	损耗角正切 Dissipation Factor		≤ 初始规定值 Not more than the initial specified value					
	漏电流 Leakage Current		≤ 初始规定值 Not more than the initial specified value					

外形图及尺寸表 Case Size Table



■ 标称电容量、额定电压、额定纹波电流与外形尺寸对应表

Nominal capacitance, rated voltage, rated ripple current and case size table

V μF	6.3		10		16		25		35		50	
	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA
0.1											4x5.4	2.3
0.22											4x5.4	3.3
0.33											4x5.4	4.1
0.47											4x5.4	4.9
1.0											4x5.4	8.4
2.2									4x5.4	10	5x5.4	13
3.3							4x5.4	13	5x5.4	17	5x5.4	17
4.7					5x5.4	13	5x5.4	20	5x5.4	21	6.3x5.4	20
10			4x5.4	18	5x5.4	20	6.3x5.4	35	6.3x5.4	35	6.3x7.7	36
22	5x5.4	28	6.3x5.4	40	6.3x5.4	35	6.3x5.4	50	6.3x7.7	54		
33	6.3x5.4	37	6.3x5.4	50	6.3x5.4	50	6.3x7.7	61				
47	6.3x5.4	45	6.3x7.7	61	6.3x7.7	61						
100	6.3x7.7	82										
220												
330												
470												
1000												

I~ = Rated ripple current (mA) (85°C, 120kHz) I~ = 额定纹波电流 (mA) (85°C, 120kHz)

■ 额定纹波电流的频率系数

Frequency coefficient of ripple current

Frequency 频率	50Hz	120Hz	300Hz	1KHz	≥ 10KHz
Coefficient 系数	0.70	1.00	1.17	1.36	1.50

VTX 型片式铝电解电容

VTX Series Chip Type Aluminum Electrolytic Capacitors

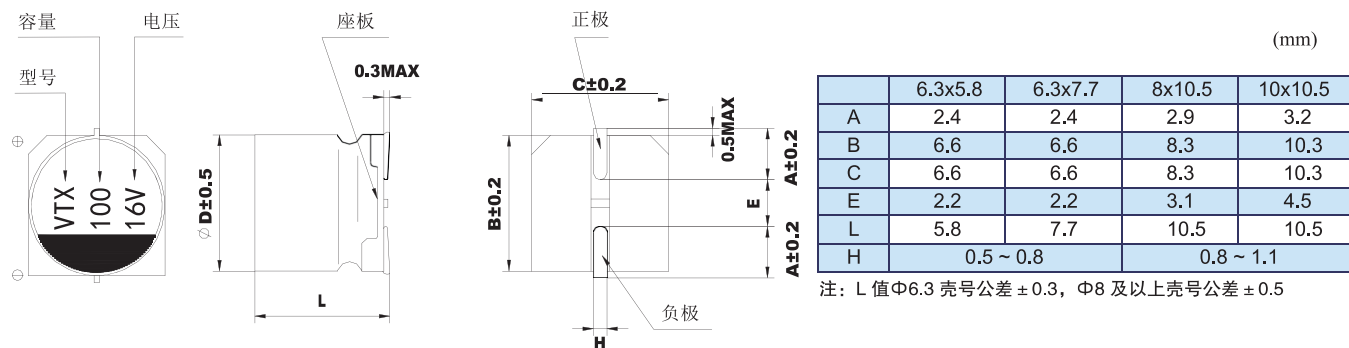
特点 Features

- 125℃高温长寿命品。125 °C high temperature and long life.
- 适用于回流焊。Reflow soldering is available.
- 适用于高密度表面贴装。Suitable for high density SMT.
- 符合ROHS指令标准。Comply with ROHS directive standards.

主要技术性能 Specifications

项目 Items	特性 Characteristics					
工作温度范围 Operating Temperature Range	-40℃ ~ +125℃					
额定电压范围 Rated Voltage Range	10V ~ 50V					
标称容量范围 Nominal Capacitance Range	-					
标称容量允许偏差 Nominal Capacitance Tolerance	± 20% (20℃, 120Hz)					
漏电流 Leakage Current	I≤0.01CRVR or 3(μ A), 取较大者 (2 分钟) CR: 标称容量 (μ F) UR: 额定电压 (V) I≤0.01CRVR or 3(μ A) Whichever is greater(at 20℃, After 2 minutes) CR: Nominal Capacitance (μ F) UR: Rated voltages (V)					
损耗角正切 (tg δ) Dissipation Factor (Max) 20℃, 120Hz	UR (V)	10	16	25	35	50
	tg δ	0.30	0.24	0.20	0.17	0.14
耐久性 Load Life	+125℃连续加 1000~1500 小时额定电压小时后, 电容器应满足以下要求: After 1000~1500hours' application of rated voltage at 105℃, the capacitor shall meet the following requirement:					
	规定时间 Specified time	Φ6.3:1000 小时 Φ8~Φ10:1500 小时				
	容量变化率 Capacitance Change	± 30%初始值 Within ± 30% of the initial value				
	损耗角正切 Dissipation Factor	≤ 300%初始规定值 Not more than 200% of the initial specified value				
	漏电流 Leakage Current	≤ 初始规定值 Not more than the initial specified value				
高温贮存 Shelf Life	+125℃贮存 1000 小时后, 加额定工作电压 30 分钟,电容器应满足以上耐久性要求 After storage for 1000 hours at +125℃, UR to be applied for 30 minutes, the capacitors shall meet the requirement of load life above					
低温特性 Low Temperature Stability 阻抗比 Impedance Ratio (120Hz)	UR (V)	10	16	25	35	50
	Z(-25℃)/Z(+20℃)	6	5	4	3	3
	Z(-40℃)/Z(+20℃)	12	8	6	4	4
耐焊接热 Resistance to Soldering Heat	在 250℃的条件下, 电容器在热板上保持 30 秒, 然后从热板上取出电容器, 让其在室温下恢复, 电容器应满足以下要求: The capacitors shall be kept on the hot plate maintained at 250℃ for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the following requirement.					
	容量变化率 Capacitance Change	± 10%初始值以内 Within ± 10% of the initial value				
	损耗角正切 Dissipation Factor	≤ 初始规定值 Not more than the initial specified value				
	漏电流 Leakage Current	≤ 初始规定值 Not more than the initial specified value				

外形图及尺寸表 Case Size Table



■ 标称电容量、额定电压、额定纹波电流与外形尺寸对应表

Nominal capacitance, rated voltage, rated ripple current and case size table

电压 WV(Vdc)	容量 Cap(μA)	产品尺寸 Size	波纹电流 mArms 120Hz/125℃	电压 WV(Vdc)	容量 Cap(μA)	产品尺寸 Size	波纹电流 mArms 120Hz/125℃
10	68	6.3*5.8	50	35	10	6.3*5.8	50
	100	6.3*7.7	75		22	6.3*5.8	50
	220	8*10.5	130		33	6.3*7.7	70
	330	8*10.5	130		47	6.3*7.7	70
	330	10*10.5	180		47	8*10.5	130
	470	10*10.5	180		100	8*10.5	130
16	33	6.3*5.8	50	50	100	10*10.5	180
	47	6.3*7.7	70		220	10*10.5	180
	100	6.3*7.7	75		10	6.3*5.8	50
	100	8*10.5	130		22	6.3*7.7	70
	220	8*10.5	130		33	6.3*7.7	70
	220	10*10.5	180		33	8*10.5	130
	330	10*10.5	180		47	8*10.5	130
25	22	6.3*5.8	50		47	10*10.5	180
	33	6.3*5.8	50		100	10*10.5	180
	47	6.3*7.7	70				
	100	8*10.5	130				
	220	8*10.5	130				
	220	10*10.5	180				
	330	10*10.5	180				

■ 纹波电流频率修正系数:

Frequency 频率	50Hz	120Hz	300Hz	1KHz	$\geq 10KHz$
Coefficient 系数	0.85	1.00	1.17	1.36	1.50

VTH 型片式铝电解电容

VTH Series Chip Type Aluminum Electrolytic Capacitors

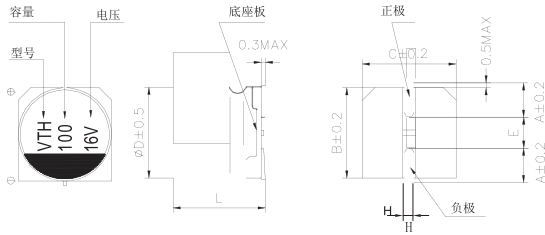
特点 Features

- 125℃高温长寿命品。 125 °C high temperature and long life.
- 适用于回流焊。 Reflow soldering is available.
- 适用于高密度表面贴装。 Suitable for high density SMT.
- 符合ROHS指令标准。 Comply with ROHS directive standards.

主要技术性能 Specifications

项目 Items	特性 Characteristics					
工作温度范围 Operating Temperature Range	-40℃ ~ +125℃					
额定电压范围 Rated Voltage Range	10V ~ 50V					
标称容量范围 Nominal Capacitance Range	-					
标称容量允许偏差 Nominal Capacitance Tolerance	± 20% (20℃, 120Hz)					
漏电流 Leakage Current	I≤0.01CRVR or 3(μ A), 取较大者 (2 分钟) CR: 标称容量 (μ F) UR: 额定电压 (V) I≤0.01CRVR or 3(μ A) Whichever is greater(at 20℃, After 2 minutes) CR: Nominal Capacitance (μ F) UR: Rated voltages (V)					
损耗角正切 (tg δ) Dissipation Factor (Max) 20℃, 120Hz	UR (V)	10	16	25	35	50
	tg δ	0.24	0.20	0.16	0.14	0.14
耐久性 Load Life	+125℃施加额定电压 1000~1500 小时后, 电容器应满足以下要求: After 1000~1500 hours' application of rated voltage at 125℃, the capacitor shall meet the following requirement:					
	电容量变化率 Capacitance Change	± 20%初始值以内 Within ± 20% of the initial value				
	损耗角正切 Dissipation Factor	≤ 200%初始规定值 Not more than 200% of the initial specified value				
	漏电流 Leakage Current	≤ 初始规定值 Not more than the initial specified value				
高温贮存 Shelf Life	+125℃贮存 1000 小时后, 加额定工作电压 30 分钟, 电容器应满足以上耐久性要求 After storage for 1000 hours at +125℃, UR to be applied for 30 minutes, the capacitors shall meet the requirement of load life above					
低温特性 Low Temperature Stability 阻抗比 Impedance Ratio (120Hz)	UR (V)	10	16	25	35	50
	Z(-25℃)/Z(+20℃)	6	5	4	3	3
	Z(-40℃)/Z(+20℃)	12	8	6	4	4
耐焊接热 Resistance to Soldering Heat	在 250℃的条件下, 电容器在热板上保持 30 秒, 然后从热板上取出电容器, 让其在室温下恢复, 电容器应满足以下要求: The capacitors shall be kept on the hot plate maintained at 250℃ for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the following requirement.					
	电容量变化率 Capacitance Change	± 10%初始值以内 Within ± 10% of the initial value				
	损耗角正切 Dissipation Factor	≤ 初始规定值 Not more than the initial specified value				
	漏电流 Leakage Current	≤ 初始规定值 Not more than the initial specified value				

外形图及尺寸表 Case Size Table



	6.3 x 5.8	6.3 x 7.7	8 x 10.5	10 x 10.5
A	2.4	2.4	2.9	3.2
B	6.6	6.6	8.3	10.3
C	6.6	6.6	8.3	10.3
E	2.2	2.2	3.1	4.5
L	5.8	7.7	10.5	10.5
H	0.5 ~ 0.8		0.8 ~ 1.1	

注：L 值Φ6.3 壳号公差 ± 0.3，Φ8 及以上壳号公差 ± 0.5

■ 标称电容量、额定电压、额定纹波电流与外形尺寸对应表

Nominal capacitance, rated voltage, rated ripple current and case size table

电压 WV	容量Cap (μA)	产品尺寸 Size	纹波电流mArms 100KHz/125℃	阻抗Ω max/100k Hz)	电压 WV	容量Cap (μA)	产品尺寸 Size	纹波电流 mArms 100KHz/125℃	阻抗Ω max/100k Hz)
10	68	6.3*5.8	110	1.2	35	10	6.3*5.8	110	1.2
	100	6.3*7.7	220	0.6		22	6.3*5.8	110	1.2
	220	8*10.5	296	0.3		33	6.3*7.7	220	0.6
	330	8*10.5	296	0.3		47	6.3*7.7	220	0.6
	330	10*10.5	440	0.2		47	8*10.5	296	0.3
	470	10*10.5	440	0.2		100	8*10.5	296	0.3
16	33	6.3*5.8	110	1.2		100	10*10.5	440	0.2
	47	6.3*7.7	220	0.6		220	10*10.5	440	0.2
	100	6.3*7.7	220	0.6	50	10	6.3*5.8	51	2.8
	100	8*10.5	296	0.3		22	6.3*7.7	83	2.0
	220	8*10.5	296	0.3		33	6.3*7.7	83	2.0
	220	10*10.5	440	0.2		33	8*10.5	160	0.7
	330	10*10.5	440	0.2		47	8*10.5	160	0.7
						47	10*10.5	247	0.5
25	22	6.3*5.8	110	1.2		100	10*10.5	247	0.5
	33	6.3*5.8	110	1.2	纹波电流频率系数				
	47	6.3*7.7	220	0.6	频率 容量	120	1K	10K	100K
	100	8*10.5	296	0.3		0.66	0.86	0.93	1.0
	220	8*10.5	296	0.3	10	0.66	0.86	0.93	1.0
	220	10*10.5	440	0.2	22-470	0.93	0.97	1.0	1.0
	330	10*10.5	440	0.2		0.93	0.97	1.0	1.0