承　　认　　书

PRODUCT SPECIFICATION

No:HR2603300041

客　户：Ropla Elektronik Sp. z o.o.	日　期：2026-3-31
CUSTOMER：	DATE：

品名：　　铝电解电容器

PATNAME：　Aluminum Electrolytic Capacitors

型号/规格：　VXB　50V390　12.5*13.5

用户承认　User
Approved　by

注：RoHS 指令(2011/65/EU)已对应完毕

对此承认书确认后，在用户承认栏注明确认印，返传一份与敝公司

常州华威电子有限公司

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拟　制 Prepared	审　核 Checked	批　准 Approved
陆顺军 研发中心	管飞 研发中心	詹光耀 研发中心

文件内容修改历史记录 RECORD OF REVISION					
生效版本 REV.NO.	变更原因 REASON	修改内容 CONTENTS	承认时间 DATE OF APPROVAL	拟制 CHECKED	备注 REMARKS
1	26 年版本	初次承认	2026-3-31	陆顺军	
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一、供样规格电性能参数一览表 Electrical performance parameters for sample specifications list：

客户物料代码 Cust Part Number	额定电压 Rated Voltage (VDC)	标称容量 Capacitance (μF)	尺寸 Dimension (D×L, mm)	损耗角正切值 (Max) tgδ	漏电流(Max) Leakage Current (μA)	纹波电流(Max) Ripple Current at 105℃, 100KHz (mA)	等效串联电阻 ESR(Max) Impedance 25℃, 100KHz (Ω)	耐久性 load life (@105°)	华威料号 Huawei Part Number
	50	390	12.5*13.5	0.12	195	650	0.12	5000	XB1H391MI135000CE0
注：此物料满足AEC-Q200 REV E认证									

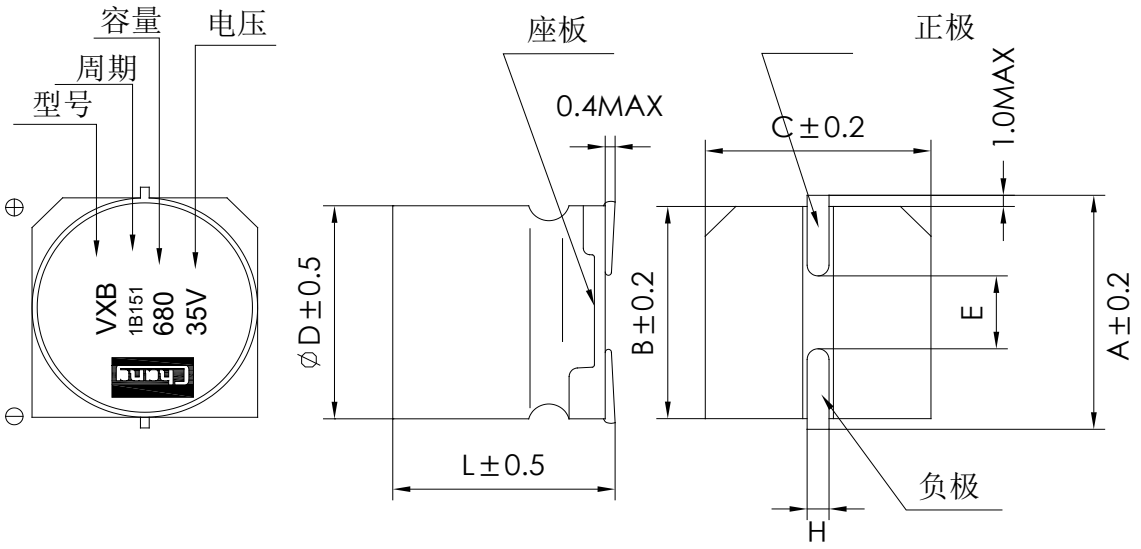
一、概述 Description

本产品规格书适用于常州华威电子有限公司 VXB 型片式铝电解电容器产品。

The product specification is adapted to series VXB V-CHIP Aluminum Electrolytic Capacitors of CHANGZHOU HUAWEI ELECTRONIC CO., LTD.

二、外形图及尺寸表 Shape dimension drawing and size table

一、 外形图 Shape dimension drawing



二、 外形尺寸表 Size table

	Φ12.5X13.5	Φ12.5X16	Φ16X16.5	Φ16X21.5	Φ18X16.5	Φ18X21.5
A	13.6	13.6	18	18	20	20
B	13	13	17	17	19	19
C	13	13	17	17	19	19
E	4.5±0.2	4.5±0.2	6.4±0.2	6.4±0.2	6.4±0.2	6.4±0.2
L	13.5	16	16.5	21.5	16.5	21.5
H	1.1 ~ 1.4					

三、技术性能 Technical performance

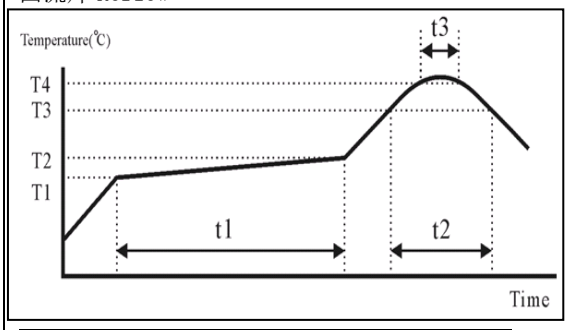
<table>
<tr><td>项目 Item</td><td>特性 Performance Characteristics</td></tr>
<tr><td>系列 (SERIES)</td><td>VXB 系列(VXB SERIES)</td></tr>
<tr><td>使用温度范围
Operating temperature</td><td>-55 ~ +105℃</td></tr>
<tr><td>额定电压范围 Rated voltage range</td><td>6.3 ~ 100V</td></tr>
<tr><td>标称电容量范围
Nominal capacitance</td><td>1~8200μF</td></tr>
<tr><td>标称电容量允许偏差
(120Hz, +20℃)
Capacitance tolerance</td><td>±20% (120Hz, +20℃)</td></tr>
<tr><td>漏电流 Leakage current</td><td>I≤0.01$C_R V_R$ or 3(μA), 取较大者（2 分钟）
C_R: 标称电容量（μF） U_R: 额定电压（V）
I≤0.01$C_R V_R$ or 3(μA) Whichever is greater(at 20℃, after 2 minutes)
C_R: Nominal Capacitance (μF) U_R: Rated voltages (V)</td></tr>
<tr><td>损耗角正切值（tgδ）
Dissipation factor
(+20℃, 120Hz)</td><td>
<table>
<tr><td>U_R(V)</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td></tr>
<tr><td>tgδ</td><td>0.26</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.12</td><td>0.10</td><td>0.08</td><td>0.07</td></tr>
</table>
</td></tr>
<tr><td>温度特性
Temperature Characteristics
(Impedance ratio at 120Hz)</td><td>
<table>
<tr><td>U_R(V)</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td></tr>
<tr><td>Z-(-25℃/Z+20℃)</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td>Z-(-55℃/Z+20℃)</td><td>8</td><td>5</td><td>4</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td></tr>
</table>
</td></tr>
<tr><td>浪涌电压
Surge voltage</td><td>
<table>
<tr><td>W.V</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td></tr>
<tr><td>S.V.</td><td>7.3</td><td>11.5</td><td>18.4</td><td>28.8</td><td>40.3</td><td>58</td><td>72.5</td><td>92</td><td>115</td></tr>
</table>
</td></tr>
<tr><td>允许最大纹波电流
Maximum permissible ripple current</td><td>在规定的某一频率下的最大交流电流，在该电流下电容器连续工作。即使在测过耐久性后，此要求仍要满足。在此，DC 电压加上最大纹波电压小于等于额定电压。
The maximum sinusoidal alternating current of a frequency specified below, at which the capacitor can be operated continuously. This requirement shall be satisfied even after the measurement electrical endurance Where(DC voltage +peak ripple voltage)≤rated voltage</td></tr>
</table>

四、试验方法及要求 Test methods and requirements

No	项目 Item	试验条件 Test Conditions	性能要求 Requirements		参考标准 Reference standard
1	高温储存 High-Temp. Exposure(storage)	电容器在最高温度（±3℃）下放置 1000+48/-0 小时 Capacitor is placed in the highest temperature（±3℃） for 1000+48/-0Hrs.	无可见损伤 No visible damage		MIL-STD-202 Method 108
			ΔC/C	±30%初始值以内 Within±30% of the initial value	
			tgδ	≤300%初始规定值 Less than 300% of specified value	
			LC	≤初始规定值 ≤Initial measured value	
2	温度循环 Temperature-Cycling	Step1:最高使用温度放置(30±3mins); Step2:最低使用温度放置(30±3mins); 转换时间：1分钟; 步骤1-2的顺序，做1000次循环 Step1: Max. rated temperature(30±3mins) Step2: Min. rated temperature(30±3mins) Max.transfer time: 1min According to the step1 to step2, and do 1000cycles	无可见损伤 No visible damage		JESD22 Method JA-104
			ΔC/C	±10%初始值以内 Within±10% of the initial value	
			tgδ	≤初始规定值 ≤Initial measured value	
			LC	≤初始规定值 ≤Initial measured value	
3	高温高湿负荷 Biased Humidity	+85℃±3℃、湿度 85%±5%RH；施加额定工作电压，放置 1000+48/-0 小时 Capacitor is placed at the temperature of 85℃±3℃, and humidity of 85%±5%RH with rated voltage for 1000+48/-0Hrs	无可见损伤 No visible damage		MIL-STD-202 Method 103
			ΔC/C	±20%初始值以内 Within±20% of the initial value	
			tgδ	≤150%初始规定值 Less than 150% of specified value	
			LC	≤初始规定值 ≤Initial measured value	
4	工作寿命 Operational Life	电容器在最高温度下，施加额定工作电压,试验 5000 小时 Capacitor is placed in the highest temperature with rated voltage for 5000 Hrs.	无可见损伤 No visible damage		MIL-STD-202 Method 108
			ΔC/C	±30%初始值以内 Within±30% of the initial value	
			tgδ	≤300%初始规定值 Less than 300% of specified value	
			LC	≤初始规定值 ≤Initial measured value	
5	机械冲击 Mechanical Shock	电容器放置在印刷电路板上并固定，条件如下: 加速度：100g; 持续时间：6ms; 方向：X-Y-Z 三轴; 次数：每个方向试验 3 次 Capacitor is placed on the PCB and fixed. Conditions as below: Accelerated speed：100g; Duration：6ms Direction： X-Y-Z three axles Frequency： Test 3 times in each direction	无可见损伤和电解液漏出，且标志清晰 No visible damage; no leakage of electrolyte; marking legible.		MIL-STD-202 Method 213
			ΔC/C	±10%初始值以内 Within±10% of the initial value	
			tgδ	≤初始规定值 ≤Initial measured value	
			LC	≤初始规定值 ≤Initial measured value	

No	项目 Item	试验条件 Test Conditions	性能要求 Requirements		参考标准 Reference standard
6	振动试验 Vibration Test	将待测试产品分别固定于夹具的“X”、“Y”、“Z”轴三个方向；一次循环每个方向振动 20 MIN，试验 3 个方向；10 ～ 2000Hz，加速度：5g；每个方向分别进行 12 次循环，“X”、“Y”、“Z”轴三个方向，每个方向振动 4H Fix the product to be tested in the "X", "Y" and "Z" axes of the fixture respectively;Each direction vibrates for 20 MIN in one cycle, and three directions are tested.10 ~ 2000Hz, acceleration: 5g;12 cycles were carried out in each direction, with "X", "Y" and "Z" axes vibrating for 4H in each direction.	不得发生导针断裂、外壳破裂、橡胶塞鼓出及其它可见外观缺陷；不得有电解液泄漏等不良。 No guide wire breakage, shell breakage, rubber plug bulging and other visible appearance defects shall occur;No bad electrolyte leakage, etc		MIL-STD-202 Method 204
			ΔC/C	±10%初始值以内 Within±10% of the initial value	
			tgδ	≤初始规定值 ≤Initial measured value	
			LC	≤初始规定值 ≤Initial measured value	
7	可焊性 Solderability	260℃±5℃，试验前须去除熔融焊料表面的浮渣和助焊剂焦渣，之后立即将产品端子浸入焊料，浸入和提出速度为 25±6mm/s，浸入深度胶粒面距离锡面 1.5mm～2mm；试验时间：5+0/-0.5S； At 260℃ ±5℃, scum and flux cinders on the surface of molten solder shall be removed before the test. After that, the product terminals shall be immersed in the solder immediately. The immersion and removal speed is 25±6mm/s, and the immersion depth of the colloidal surface shall be 1.5mm ~ 2mm from the tin surface. Test time: 5+0/-0.5S.	所有端子均须呈现连续的焊料涂层，单个端子表面关键区域沾锡率达到 95%以上 All terminals shall be continuously coated with solder, and the critical area of the surface of a single terminal shall be more than 95% tin		J-STD-002
			焊锡覆盖层应光亮均匀，端子不得有未焊针孔、脱焊或集中于某处等异常情形 The solder overlay shall be bright and uniform, and the terminals shall not have unwelded pinholes, unwelded or concentrated in one place		
8	耐溶剂试验 Resistance To Solvents	（混合）溶剂放置于 63℃～70℃恒温水浴锅中保温；将待测试产品放置于上述温度的溶剂中，含浸 3（+0.5）MIN 后取出并用湿毛刷擦拭产品本体 10 次，为一次循环； 上述过程重复 3 次 ； The solvent (mixed) was placed in a constant temperature water bath pot at 63℃ ~ 70℃ for heat preservation.Place the product to be tested in the solvent at the above temperature, soak it for 3 (+0.5) MIN, take it out and wipe the product body with a wet brush for 10 times, which is one cycle. The above process is repeated 3 times;	无可见损伤，标志清晰，无电解液泄漏。 No visible damage;marking legible,There shall be no leakage of electrolyte.		MIL-STD-202 Method 215
			产品密封性良好，无漏液漏气等不良。 Product tightness is good, no leakage of air leakage and other bad.		

No	项目 Item	试验条件 Test Conditions	性能要求 Requirements		参考标准 Reference standard
9	端子强度 Terminal Strength	产品回流焊方式安装在 PCB 板上，开启 SMD 贴片端子强度测试仪，末端弧形探头紧触焊盘上贴片产品慢慢增加推力至 1.8Kg，持续 60S 后停止 The product is mounted on PCB by reflow soldering, and the SMD patch terminal strength tester is turned on. The end arc probe touches the patch product on the pad and slowly increases the thrust to 1.8Kg, and stops after 60s.	无可见损伤 No visible damage		AEC-Q200-006
			ΔC/C	±10%初始值以内 Within±10% of the initial value	
			tgδ	≤初始规定值 ≤Initial measured value	
			LC	≤初始规定值 ≤Initial measured value	
10	浪涌电压 Surge Volage	温度 15℃~35℃；浪涌电压，充电环路电阻满足 R*C=0.1+/-0.05S；产品额定电压≥315V，浪涌电压=额定电压 X1.1 倍； 产品额定电压<315V，浪涌电压=额定电压 X1.15 倍；充电 30S，放电 330S 为一次循环，共进行 1000 次循环试验； At 15℃~35℃;Surge voltage and charging loop resistance meet R*C=0.1+/ -0.05s;Product rated voltage ≥315V, surge voltage = rated voltage X1.1 times; Rated voltage <315V, surge voltage = rated voltage X1.15 times;Charging 30S, discharge 330S for a cycle, a total of 1000 cycle tests;	无可见损伤 No visible damage		AEC-Q200-007
			ΔC/C	±20%初始值以内 Within±20% of the initial value	
			tgδ	≤初始规定值 ≤Initial measured value	
			LC	≤初始规定值 ≤Initial measured value	
11	板弯曲 Board Flex	将电容器放置在PCB板上，施加一定的外力使PCB板至少能弯曲2mm高度，持续时间：60 (+ 5) 秒 Place the capacitor on the PCB, and apply a certain external force to make the PCB bend at least 2mm high for 60 (+5) seconds.	产品不能剥离或者损坏，焊接正常 Products can not be peeled off or damaged, and welding is normal		AEC-Q200-005
			ΔC/C	±10%初始值以内 Within±10% of the initial value	
			tgδ	≤初始规定值 ≤Initial measured value	
			LC	≤初始规定值 ≤Initial measured value	
12	可燃性 flammability	将本生灯点燃并调节至产生 20mm 高的蓝色火焰，把本生灯火焰置于试样下端，点火 10s，然后移去火焰，并记下试样有焰燃烧时间。若移去火焰后 30s 内试样的火焰熄灭，必须再次将本生灯移到试样下面，重新点燃试样点火 10s，然后再次移开本生灯火焰，并记下试样的有焰燃烧和无焰燃烧的续燃时间。若试样熔滴有烟棵里，让其落入试样下 300mm 的脱脂棉上，看其是否引燃脱脂棉。 Ignite the bunsen burner and adjust it to produce a blue flame with a height of 20mm, place the bunsen burner flame at the lower end of the sample, ignite it for 10s, then remove the flame, and record the flaming combustion time of the sample. If the flame of the sample goes out within 30s after the flame is removed, the bunsen burner must be moved under the sample again, the sample should be ignited again for 10s, then the bunsen burner flame should be removed again, and the afterburning time of flaming and flameless combustion of the sample should be recorded. If the sample drops into the smoke tree, let it fall on the absorbent cotton 300mm below the sample to see if it ignites the absorbent cotton.	V-0 级：a.试片两次 10 秒燃烧试验，第一次试片被火焰点燃时间不超过 10S，第二次试片燃烧不超过 30S；b.二次燃烧试片样品若有滴落，不能点燃正下方 300mm 处的脱脂棉。 V-1 级：a.试片两次 10 秒燃烧试验，第一次试片被火焰点燃时间不超过 30S，第二次试片燃烧不超过 60S；b. 二次燃烧试片样品若有滴落，不能点燃正下方 300mm 处的脱脂棉。 Class V-0: A. two 10 second combustion tests of the test piece, the first time the test piece is ignited by the flame shall not exceed 10s, and the second time the test piece is burned shall not exceed 30s; b. If the sample of secondary combustion test piece drops, the absorbent cotton at 300mm directly below shall not be ignited. Class V-1: A. two 10 second combustion tests of the test piece, the first time the test piece is ignited by the flame shall not exceed 30s, and the second time the test piece is burned shall not exceed 60s; b. If the sample of secondary combustion test piece drops, the absorbent cotton at 300mm directly below shall not be ignited.		UL-94

<table>
<tr><th>No</th><th>项目
Item</th><th>试验条件 Test Conditions</th><th colspan="2">性能要求 Requirements</th><th>参考标准
Reference standard</th></tr>
<tr><td rowspan="5">13</td><td rowspan="5">耐焊接热
Resistance to Soldering Heat</td><td rowspan="5">回流焊 Reflow
 

<table>
<tr><td colspan="2">WV (V)</td><td>6.3~100</td></tr>
<tr><td colspan="2">Case size(Φ)</td><td>12.5~18</td></tr>
<tr><td rowspan="2">Preheat
预热</td><td>Temp(T1-T2,℃)</td><td>160~190</td></tr>
<tr><td>Time(t1)
(Max sec)</td><td>100</td></tr>
<tr><td rowspan="2">Duration
时间</td><td>Temp
(T3,℃)</td><td>220</td></tr>
<tr><td>Time(t2)
(sec)</td><td>40~70</td></tr>
<tr><td rowspan="2">Peak
最高点</td><td>Temp
(T4,℃)</td><td>260</td></tr>
<tr><td>Time
(t3,secs)</td><td>5</td></tr>
<tr><td colspan="2">Reflow cycles</td><td>2 or less</td></tr>
</table></td><td colspan="2">无可见损伤 No visible damage</td></tr>
<tr><td>ΔC/C</td><td>±10%初始值以内
Within±10% of the initial value</td></tr>
<tr><td>tgδ</td><td>≤初始规定值
≤Initial measured value</td></tr>
<tr><td>LC</td><td>≤初始规定值
≤Initial measured value</td></tr>
<tr><td></td><td colspan="2"></td><td>MIL-STD-202 Method 210</td></tr>
</table>

二、额定纹波电流补偿系数及实际使用寿命等效计算方法 Rated ripple current compensation coefficient and the actual service life equivalent calculation method

■ 频率系数 Frequency coefficient:

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

■ 温度系数 temperature coefficient：

Temperature(℃)	+45	+60	+65	+70	+75	+85	+105
Coefficient	2	2	2	2	1.7	1.7	1

■ 铝电解电容器的寿命计算方法 the actual service life equivalent calculation method：

寿命估算(Life Expectancy)：

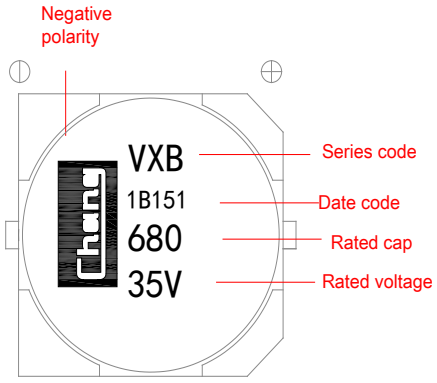
$$Lx = Lr \times 2^{\frac{To-Tx}{10}} \times 2^{\frac{\triangle To-\triangle T}{\triangle To}}$$

允许温升 Allowable temperature rise value	ΔT_0=	5	
实际使用纹波 Actual ripple current value	I_X=	100	mArms
最大纹波电流 Maximum ripple current RMS	I_0 =	240	mArms
素子发热温度 Internal heating temperature	ΔT=	0.8681	℃
制品最高使用温度 Maximum service temperature	T_0=	105	℃
最高表面温度 Maximum surface temperature	T_S =	110max	℃
实际使用的周围温度 The environment temperature	T_X =	67.1	℃
保证使用寿命 Ensure service life	Lr =	5,000	Hrs
实际使用寿命 Actual service life	L_X =	122642.65	Hrs
每天使用时间 Daily use time	hour=	24	Hrs
实际使用年数 Actual usage years	YEAR=	14.0003027	Year

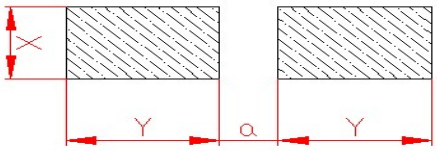
以上寿命计算方法仅为举例说明，不针对任何规格。

五、产品标志及料号编码原则 Mark and materials issue encoding principle

■ 产品标志 Mark



焊盘尺寸推荐 Recommended Land Size：mm



尺寸	X	Y	a
Φ12.5	3.2	6.0	4.0
Φ16	3.2	7.0	6.0
Φ18	3.2	8.0	6.0

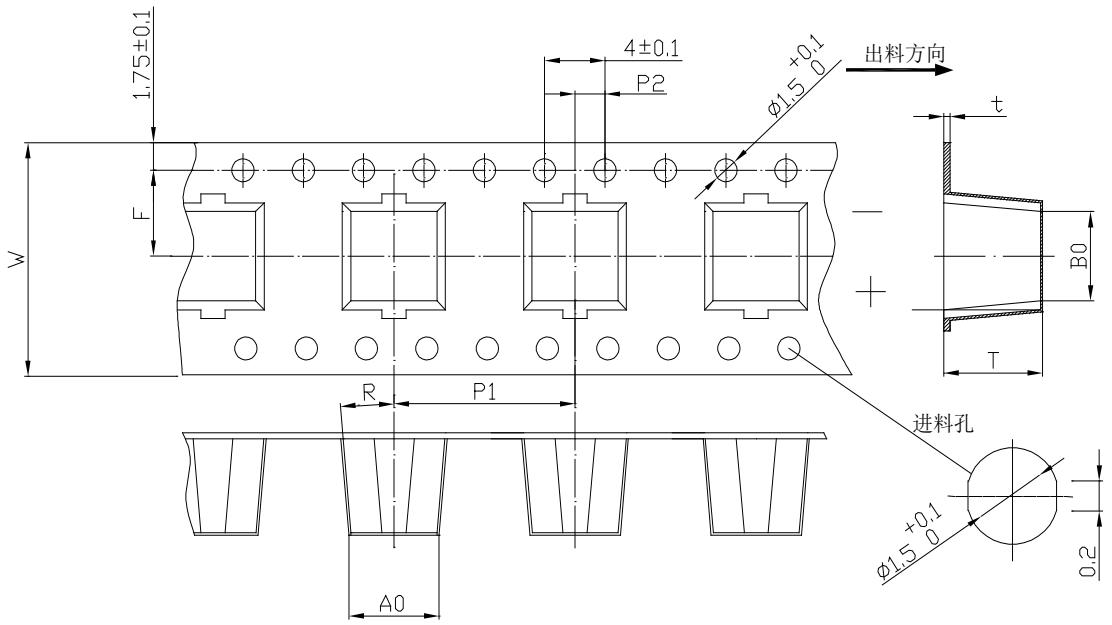
■ 产品编码原则 Materials issue encoding principle

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
系列号 Type		工作电压 Voltage(WV)		容量 Cap(μF)			容量精度 Capacity Precision	产品尺寸 Size				端子类型 Terminal Type			商标 Trademark	套管 Sleeve	等级 Level	备用码 Spare Yards	

系列号	代码	电压	代码	容量	代码	容量精度	代码	直径	代码	高度	代码	类型		代码	商标	代码	套管	代码	代码		
VXA	XA	4	0G	0.1	0R1	±5%	J	4	B	5.4	054	0	0	0	CHANG	C	PET	E	0		
VXE	XE	6	0J	0.22	R22	±10%	K	5	C	5.8	058										
VXH	XH	10	1A	0.33	R33	±15%	Y	6.3	E	7.7	077										
VXB	XB	16	1C	1	010	±20%	M	8	F	6.5	065										
VXK	XK	25	1E	2.2	2R2	-0+20%	R	10	G	10.5	105										
VXD	XD	35	1V	3.3	3R3	-5+15%	Z	12.5	I	12.5	125										
VXP	XP	50	1H	4.7	4R7	-5+20%	H	16	L	13.5	135										
VXC	XC	63	1J	10	100	-10+20%	V	18	M	16	160										
VTD	TD	100	2A	22	220	-15+20%	E	8.2	4	16.5	165										
VTK	TK	120	2N	33	330			10.2	9	21.5	215										
		160	2C	47	470			6.5	8												
		200	2D	100	101																
		250	2E	220	221																
		350	2V	330	331																
		400	2G	470	471																
		450	2W	1000	102																
				1500	152																
				2200	222																
				3300	332																

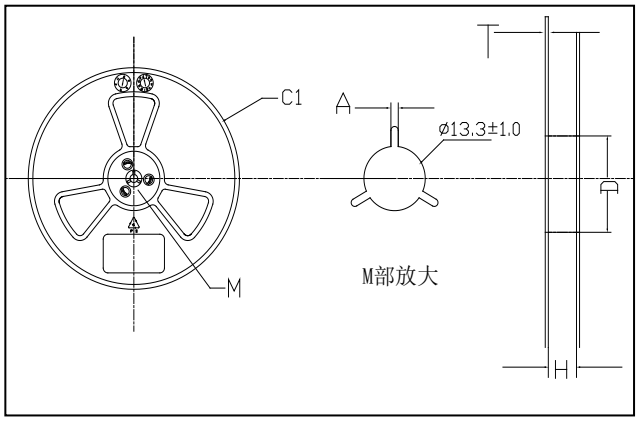
八、片式铝电解电容的编带 V- Chip Type Aluminum Electrolytic Capacitors

■ 编带 Carrier tape



适用规格	W±0.3	A0±0.1	B0±0.1	P1±0.1	P2±0.1	t±0.05	F±0.1	T±0.2
Φ12.5×13.5	32	13.4	13.4	24	2.0	0.5	14.2	14.5
Φ12.5×16	32	13.4	13.4	24	2.0	0.5	14.2	17.5
Φ16×16.5	44	17.5	17.5	28	2.0	0.5	20.2	17.5
Φ16×21.5	44	17.5	17.5	28	2.0	0.5	20.2	22.5
Φ18×16.5	44	19.5	19.5	32	2.0	0.5	20.2	17.5
Φ18×21.5	44	19.5	19.5	32	2.0	0.5	20.2	22.5

■ 编带包装盘 Reel



Package quantity 包装数量

ΦD	Quantity / Reel 数量 / 每盘
Φ12.5×13.5	250pcs
Φ12.5×16	200pcs
Φ16×16.5 Φ18×16.5	125pcs
Φ16×21.5 Φ18×21.5	75pcs

Package size 卷盘尺寸 单位：mm

ΦD	12.5	16	18
H±0.2	32.4	44.6	44.6

■ 编带包装箱

包装箱尺寸：

名称	适用规格	A±2	B ±2	C±2
包装箱(内)	Φ12.5~Φ18	387	387	240
包装箱(外)	Φ12.5~Φ18	506	405	410

包装数量 Number of packages：

壳号	盘包装数量	内箱包装数量		外箱包装数量	
单位	只/盘	盘/箱	只/箱	盘/箱	只/箱
Φ12.5X13.5	250	6	1500	12	3000
Φ12.5X16	200	6	1200	12	2400
Φ16X16.5	125	4	500	8	1000
Φ16X21.5	75	4	300	8	600
Φ18 X 16.5	125	4	500	8	1000
Φ18 X 21.5	75	4	300	8	600

九、有害物质管理目录表 List of Hazardous Substance Management Catalogues

物质名称(中文名)	物质名称 (英文名)	含量标准 (化学精密法)		含量标准(XRF)
铅以及它的化合物	Lead and its compounds	<40PPM (非金属类) <80PPM (金属类)		<90PPM (非金属类) <250PPM (金属类)
镉以及它的化合物	Cadmium and its compounds	<5PPM		<35PPM
汞及其化合物	Mercury and its compounds	禁止使用		<100PPM
六价铬以及它的化合物	Hexavalent chromium and its compounds	禁止使用		Cr<350PPM
聚溴联苯	Polybrominated biphenyls	禁止使用		
聚溴二苯醚 (包含十溴联苯醚)	Polybrominaed diphenylethers	禁止使用		
邻苯二甲酸酯	DEHP,BBP,DBP,DIBP Phthalates	总和<1000ppm 所有材料（除金属、陶瓷材料外		
溴	Bromine(Br)	700PPM	1000 PPM	<150PPM
氯（PVC 套管不适用）	Chlorine(Cl)（PVC sleeve not applicable）	700PPM		<600PPM
高度关注物质	REACH SVHC Substances of High Concern 以欧盟化学品管理局官网 https://echa.europa.eu/candidate-list-table 公布的 SVHC 授权清单为准	<1000PPM		

Note.

1. 原则上按照公司的《HW207005 环境管理物质技术标准》管理规定，但由管理总部提出按根据 Buyer 等交易商的要求制定的另行有害物质管理目录来执行的要求时，应优先按照管理总部的管理目录来记载。

2. 确认合作企业现在是否在使用这类物质，应记录使用与否。

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 handing 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 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．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 tatted voltage. Using capacitors at recommended working voltage prolongs capacitor life.

3．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。
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.

4．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 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.

5．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，损耗减少；在低温情况下，容量和漏电流下降，损耗增大。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 tanδ decrease at higher temperatures. The capacitance and leakage current decrease and tanδ at increase lower temperature. Usage at lower temperature will ensure longer life.

6．核对工作频率 Check operating frequency.
电解电容器的容量通常是在 100Hz 或 120Hz 下测得的。然而要记住容量随频率的升高而下降，tan δ 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 tanδ increase as the applied frequency becomes higher whereas the ambient temperature becomes higher.

7．为保持良好的焊接性，请将产品保管期限控制在一年以内。
To keep good solderbility, Please send the product storage period in one year of less than control.

8．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.

9．电容器的端子或引线上不要施加过大的力 Do not apply excessive force to the terminals and leads.
过大的力施加到端子和引线上， 可能引起引线的断裂或端子分裂，转而会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.