



承 认 书

PRODUCT SPECIFICATION

No:HR2403220014

客 户: Blume Elektronik Distribution GmbH

日 期: 2024-3-25

CUSTOMER:

DATE:

品名: 铝电解电容器

PATNAME: Aluminum Electrolytic Capacitors

型号/规格: VB 50V22 6.3*5.8

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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文件内容修改历史记录 RECORD OF REVISION

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[illegible]

二、概述 Description

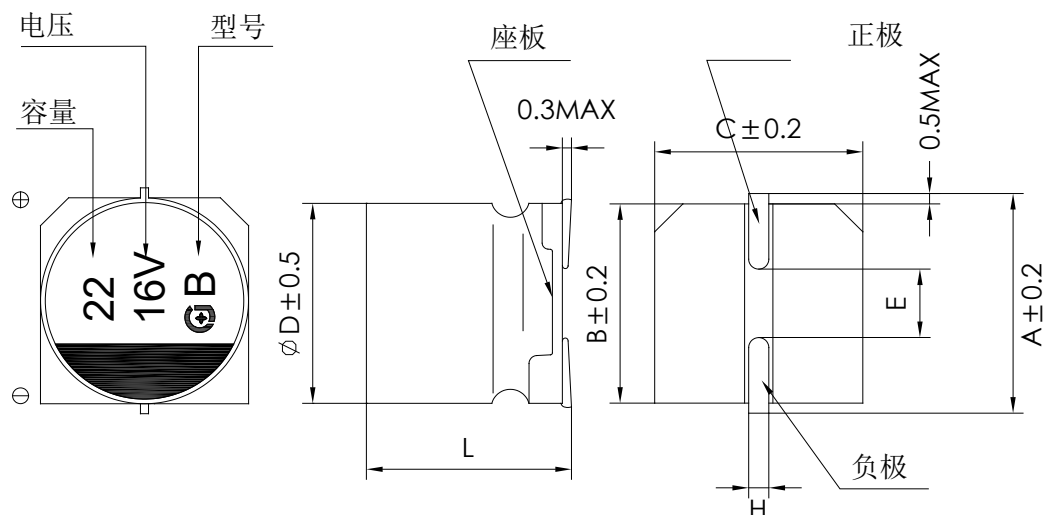
本产品规格书适用于常州华威电子有限公司 VB 型片式铝电解电容器产品。

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

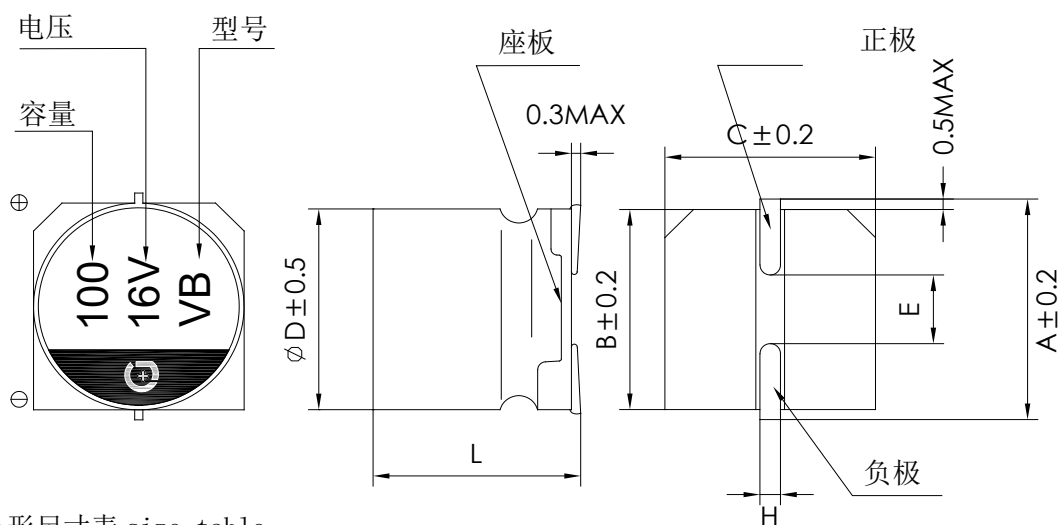
三、外形图及尺寸表 Shape dimension drawing and size table

■ 外形图 Shape dimension drawing

Φ4~Φ5



Φ6.3~Φ10



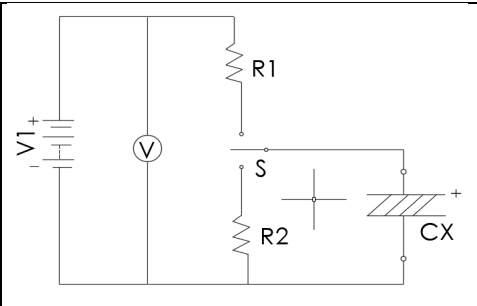
■ 外形尺寸表 size table

	Φ4X5.4	Φ5X5.4	Φ6.3X5.8	Φ6.3X7.7	Φ8X6.5	Φ8X10.5	Φ10X10.5	10X12.5
A	5.0	6.0	7.3	7.3	8.9	9.0	11.0	11.0
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3
C	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3
E	1.0	1.3	2.2	2.2	2.3	3.1	4.5	4.5
L	5.4 ^{+0.2} _{-0.1}	5.4 ^{+0.2} _{-0.1}	5.8±0.3	7.7±0.3	6.5±0.3	10.5±0.5	10.5±0.5	12.5±0.5
H	0.5 ~ 0.8					0.8 ~ 1.1		

四、技术性能 Specifications

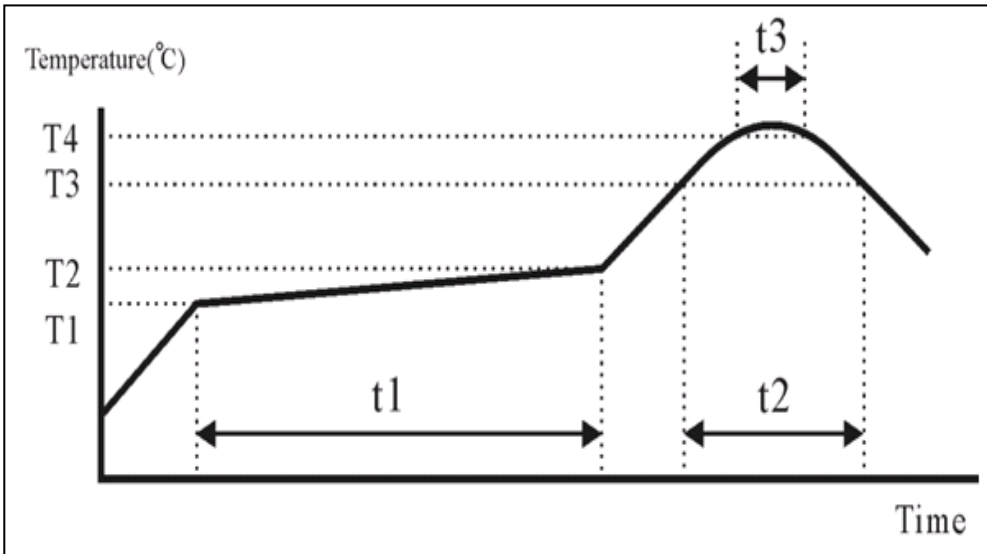
1	系列号 (SERIES)	VB 系列 (VB SERIES)																													
2	额定电压 (rated voltage)	6.3~100																													
3	工作温度范围 Operating temperature range operating	工作温度范围是指电容器在额定电压下能持续工作的所允许外部环境的温度范围 Operating temperature range is the range of ambient temperature at which the capacitor can be operated continuously at rated voltage SPEC:-55~+105℃																													
4	电容容量 capacitance	测量温度 20℃					Measuring temperature																								
		测量频率 120HZ					Measuring frequency																								
		测量电压 0.5Vrms					Measuring voltage																								
		标称电容量允许偏差: ±20% MAX					Nominal Capacitance Tolerance: ±20% MAX																								
5	损耗角正切 tangent of the loss angle	损耗角正切的测量应要和测量电容容量一样的条件下进行 Measurement should be made under the same conditions as those given for the measurement of capacitance SPEC: <table><tr><td>UR (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>tg δ</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>										UR (V)	6.3	10	16	25	35	50	63	80	100	tg δ	0.26	0.20	0.16	0.14	0.12	0.12	0.10	0.08	0.07
UR (V)	6.3	10	16	25	35	50	63	80	100																						
tg δ	0.26	0.20	0.16	0.14	0.12	0.12	0.10	0.08	0.07																						
6	漏电流 leakage current	将额定电压加在电容和 1000±100 Ω 的保护电阻上。在充电 2 分钟后, 按下列等式计算漏电流 After DC Voltage is applied to capacitors through the series protective resistor (1000±100 Ω) so that terminal voltage may reach the reacted use voltage. The leakage current when measured in 2 minutes shall not exceed the values of the following equation. 在加上额定电压一定时间后, 应满足下列要求: I≤0.01CV or 3 μA Which is greater (取较大者) (20℃, 2 分钟) SPEC: The following specifications shall be satisfied when the rated voltage is applied for the required time: I≤0.01CV or 3 μA Which is greater (20℃, 2 minutes)																													
7	允许最大纹波电流 Maximum permissible ripple current	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																													

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

1	温度特性 Characteristics of temperature	步骤 1: 测量阻抗值 Z									
		步骤 step		温度 temperature				持续时间 Duration			
		1		20±2℃							
		2		最低工作温度 minimum operating temperature				2 小时 2 hours			
		3		20±2℃				15 分钟 15 min			
		4		最高工作温度 maximum operating temperature				2 小时 2 hours			
		Step1: Capacitance, tangent of the loss angle impedance shall be measured.									
		步骤 2: 在电容器存放 2 小时后, 测量阻抗值 Z									
		Step2: After the capacitor being stored for 2hours, Capacitance, tangent of the loss angle and impedance shall be measured.									
		步骤 3: 电容器在 20±2℃下存放 15 分钟									
Step3: The capacitor being stored fro 15min at20±2℃											
步骤 4: 在电容器存放 2 小时后, 测量阻抗值 Z。											
Step4: After the capacitor being stored for 2hours, capacitance and leakage current shall be measured											
额定电压 rated voltage		6.3	10	16	25	35	50	63	80	100	
Z-(-25℃/Z+20℃)		4	3	2	2	2	2	2	2	2	
Z-(-55℃/Z+20℃)		8	5	4	3	3	3	3	3	3	
2	浪涌测试 Surge test	根据 IEC60384 - 4 No. 4. 14 方法: 在规定温度下, 循环测试 1000 次, 每次充电 30±5 秒, 在放电大约 5 分 30 秒。在标准温度条件下存放使其稳定, 然后测试。									
		According to IEC60384-4 No.4.14 methods: The capacitor shall be subjected to 1000cycles at a temperature specified below, each consisting of a charge period of 30±5sec, followed by a discharge period of approx. 5min30sec. And the capacitor shall be stored under standard conditions thermal to obtain stability after which measurements shall be made.									
		measurement circuit(测试电路图)									
							V:浪涌电压 Surge voltage		V1:直流电压 DC voltmeter		
							R1:保护电阻 (1KΩ) Protective series resistor		R2:放电电阻器 Discharge resistor		
							CX:测试电容 Test capacitor		S:开关 Switch		
		SPEC:									
		1) ΔC/C≤15%;									
		2) tg δ < 规定值;									
		3) 额定电压/浪涌电压对照表:									
RATED VOLTAGE (VDC)		6.3	10	16	25	35	50	63	80	100	
SURGE VOLTAGE (VDC)		7	11.5	18.4	28	40	58	72	92	115	

3	端子强度 Terminal strength	根据 IEC60384 - 4 No. 4.4 方法: According to IEC60384-4 No. 4.4 methods: 拉力(tensile)		
		d(mm)	[N]	Duration time
		0.3<d≤0.5	5	10±2sec(秒)
		0.5<d≤0.8	10	
		0.8<d≤1.25	20	
		2) 抗弯强度 (Bending) 端子应该在每一方向上折弯一次, 总共两次 The terminal shall be subjected to 1 bend in each direction to give a total 2 bends.		
		d(mm)	[N]	
		0.3<d≤0.5	2.5 (0.25KG)	
		0.5<d≤0.8	5.0 (0.51KG)	
		0.8<d≤1.25	10.0(1.0KG)	
端子没有破损或松动 SPEC: No breaking and loosening of terminal				
4	可焊性 Solder ability	根据 IEC60384 - 4 No. 4.6 方法: According to IEC60384-4 No. 4.6 methods: 焊料(Solder) : H60A. H60S or(或)H63A 焊接温度(Solder temperature) : 245±5℃ 浸入时间(Immersion time) : 3±0.5sec(秒) 浸入深度(Immersion depth) : 2mm 熔化: 松香在酒精的浓度是 25% Flux: 25% by weight of rosin in ethanol 从含浸处到顶部, 至少要有 3/4 的部分覆盖有新焊料 SPEC:1) 3/4 of the circumference of the surface up to the immersed shall be covered with new solder.		
5	耐焊接热 Resistance to soldering heat	根据 IEC60384 - 4 No. 4.5 方法: According to IEC60384-4 No. 4.5 methods: 焊料(Solder) : H60A. H60S or(或)H63A 焊槽温度(Solder temperature) : 260±5℃ (or 或 350±10℃ 浸入时间(Immersion time) : 10±1sec(秒) (or 或 3.5±0.5sec) 绝热屏蔽板的厚度 (Thickness of heat shunt:1.6mm) : 1.6mm SPEC: 1) 电容量变化 Change in capacitance: ±10%初始值以内 Within±10% of the initial value 2) 损耗角正切 tangent of the loss angle: 小于等于初始规定值 The initial specified value or less 3) 漏电流 leakage current: 小于等于初始规定值 The initial specified value or less		
6	标志耐溶剂性	标志应清晰可见 试剂:异丙醇 试验温度:20~25℃ 浸入时间:30±5S		
7	抗振性 Vibration	根据 IEC60384 - 4 No. 4.8 方法: 试验电容器的耐振性。在整个频率范围内, 从 10 赫兹到 55 赫兹, 然后再返回到 10 赫兹, 就这样在一分钟内往返循环。振幅为 1.5 mm。在三个垂直方向上, 每一方向要持续 2 小时, 总共 6 小时 According to IEC60384-4 No. 4.8 methods: Only endurance conditioning by sweeping shall be made. The entire frequency range, from 10 to 55Hz and return to 10Hz, shall be transverse in 1min. Amplitude(total excursion)1.5mm, This motion shall be applied for a period of 2hours in each of3 mutually perpendicular directions(a total of 6 hours) SPEC: 1) 电容量的变化(change in capacitance) : ±5%初始值以内(within ±5%of the initial value) 2) 无可见损伤(No visible damage)		

8	稳态湿热 Damp heat	根据 IEC60384 - 4 No. 4.12 方法: 电容器要在温度 $40\pm 2^{\circ}\text{C}$, 相对湿度 90%到 95%条件下存放 240 ± 8 个小时。然后在标准条件下放 1 到 2 小时后进行测量。 According to IEC60384-4 No.4.12 methods: the capacitor shall be stored at a temperature of $40\pm 2^{\circ}\text{C}$ and relative humidity of 90 to 95% for 240 ± 8 hours. And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours, after which measurements shall be made SPEC: 1) 电容量的变化 change in capacitance: $\pm 15\%$初始值以内 within $\pm 15\%$ of the initial value; 2) 损耗角正切 tangent of loss angle: 小于等于初始规定值 The initial specified value or less; 3) 漏电流 leakage current: 小于等于初始规定值 The initial specified value or less
9	高温储存 shelf life	根据 IEC60384 - 4 No. 4.17 方法: 在 $+105^{\circ}\text{C}$ 温度下不外加电压贮存, 电容器存放 1000 小时。然后在标准条件下放 1 到 2 小时后进行测量, 并且在测漏电流前, 必须满足下列条件。The According to IEC60384-4 No.4.17 methods: capacitor shall be stored at $+105^{\circ}\text{C}$ temperature specified below for 1000 hours. During which time no voltage shall be applied. And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours, after which measurements shall be made, Prior to the measurement of leakage current, following conditioning may be made. SPEC: 1) 电容量的变化 change in capacitance: $\pm 30\%$初始值以内 within 30% of the initial value; 2) 损耗角正切 tangent of loss angle: $\leq 300\%$初始规定值 Not more than 300% of the initial specified value; 3) 漏电流 leakage current: 小于等于初始规定值 The initial specified value or less
10	耐久性 load life	根据 IEC60384 - 4 No. 4.13 方法: $+105^{\circ}\text{C}$ 施加额定电压 2000 小时后, 电容器应满足以下要求: According to IEC60384-4 No.4.13 methods: After 2000 hours . application of rated voltage at 105°C, the capacitor shall meet the following requirement: SPEC: 1) 电容量的变化 change in capacitance: $\pm 30\%$初始值以内 within 30% of the initial value; 2) 损耗角正切 tangent of loss angle: $\leq 300\%$初始规定值 Not more than 300% of the initial specified value; 3) 漏电流 leakage current: 小于等于初始规定值 The initial specified value or less
11	高温纹波实验 High temperature ripple	根据 IEC60384-4 No. 4.13 方法: 电容器储存在 $105^{\circ}\text{C} \pm 2$ 的温度下, 直流偏置电压加上额定纹波电流 (直流和纹波峰值电压之和不得超过额定工作电压) 然后产品应在大气条件下 16 小时恢复时间后进行测试。 According to IEC60384-4 No.4.13 methods: The capacitor is stored at a at a temperature of $105^{\circ}\text{C} \pm 2$ with DC bias voltage plus the rated ripple current (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) Then the product should be tested after 16 hours recovering time at atmospheric conditions. SPEC: 1) 电容量的变化 change in capacitance: $\pm 30\%$初始值以内 within 30% of the initial value; 2) 损耗角正切 tangent of loss angle: $\pm 300\%$初始规定值以内 within $\pm 300\%$ of the initial value; 3) 漏电流 leakage current: 小于等于初始规定值 The initial specified value or less

12	高温回流焊 Solder Heat-Resistance Test	1. 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>4~10</td></tr><tr><td rowspan="2">Preheat 预热</td><td>Temp (T1-T2, °C)</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, °C)</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, °C)</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> SPEC: 1) 电容量的变化 change in capacitance: ±10%初始值以内 within ±10%of the initial value 2) 损耗角正切 tangent of loss angle: 初始规定值以内 within the initial value; 3) 漏电流 leakage current: 初始规定值 within the initial value 4) 物理特性 Physical: 完好无破损 No broken and undamaged	WV (V)		6.3~100	Case size(Φ)		4~10	Preheat 预热	Temp (T1-T2, °C)	160~190	Time (t1) (Max sec)	100	Duration 时间	Temp (T3, °C)	220	Time (t2) (sec)	40~70	Peak 最高点	Temp (T4, °C)	260	Time (t3, secs)	5	Reflow cycles		2 or less
		WV (V)		6.3~100																						
		Case size(Φ)		4~10																						
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Reflow cycles		2 or less																								

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

■ 额定纹波电流补偿系数 Frequency coefficient of ripple current

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

■ 环境温度修正系数 temperature multipliers:

Temperature(°C)	+45	+60	+65	+70	+75	+85	+105
Factor	2	2	2	2	1.7	1.7	1

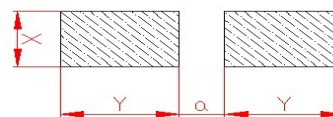
■ 铝电解电容器的寿命计算方法: The actual service life calculation method
寿命估算(Life Expectancy):

$$L_x = L_r \times 2^{\frac{T_0 - T_x}{10}} \times 2^{\frac{\Delta T_0 - \Delta T}{\Delta T_0}}$$

允许温升 Allowable temperature rise value	$\Delta T_0 =$	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	$\Delta T =$	0.8681	°C
制品最高使用温度 Maximum service temperature	$T_0 =$	105	°C
最高表面温度 Maximum surface temperature	$T_s =$	110 _{max}	°C
实际使用的周围温度 The environment temperature	$T_x =$	67.1	°C
保证使用寿命 Ensure service life	$L_r =$	2,000	Hrs
实际使用寿命 Actual service life	$L_x =$	49057.06	Hrs
每天使用时间 Daily use time	hour=	24	Hrs
实际使用年数 Actual usage years	YEAR=	5.600121	Year

以上寿命计算方法仅为举例说明，不针对任何规格。

焊盘尺寸推荐: mm



尺寸	X	Y	a
Φ4	1.6	2.6	1.0
Φ5	1.6	3.0	1.4
Φ6.3	1.6	3.5	2.1
Φ8X6.5	2.5	4.0	2.1
Φ8	2.5	3.5	3.0
Φ10	2.5	4.0	4.0

■ 产品编码原则

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
---	---	---	---	---	---	---	--	---	---	---	---	---	---	---	--	---	--	---	---	---

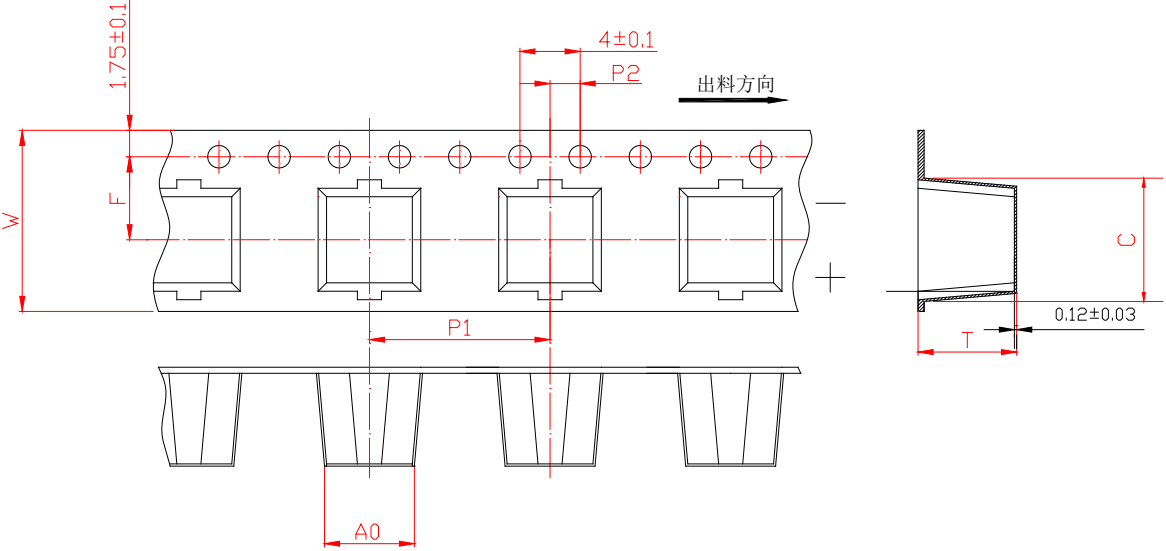
系列号	工作电压	容量	容量精度	产品尺寸	端子类型	商标	套管	等级	备用码
Series	Voltage (V)	Capacitance (μF)	Tolerance	Size code	Terminal Code	Brand	Sleeve	Other	Supplement Code

[illegible]

常州华威电子有限公司 CHANGZHOU HUAWEI ELECTRONICS CO.,LTD
产品规格书 Product Specification

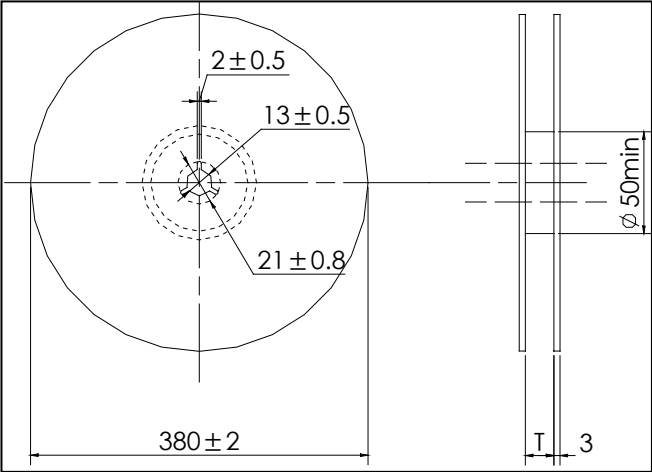
八、片式铝电解电容的编带 V- Chip Type Aluminum Electrolytic Capacitors

■ 编带 Carrier tape



适用规格	W±0.3	A0±0.1	C±0.1	F±0.1	T±0.2	P1±0.1	P2±0.1
Φ4	12	4.7	7.1	5.5	5.8	8.0	2.0
Φ5	12	5.7	7.8	5.5	5.8	12.0	2.0
Φ6.3	16	7.0	9.1	7.5	5.8	12.0	2.0
Φ6.3×5.8	16	7.0	9.2	7.5	6.3	12.0	2.0
Φ6.3×7.7	16	7.0	9.5	7.5	8.1	12.0	2.0
Φ8×6.5	16	8.7	11.2	7.5	6.8	12.0	2.0
Φ8	24	8.7	12.0	11.5	11.0	16.0	2.0
Φ10	24	10.7	13.7	11.5	11.0	16.0	2.0
Φ8×12.5	24	8.7	12.1	11.5	13.0	16.0	2.0
Φ10×12.5	24	10.7	13.8	11.5	13.1	16.0	2.0

■ 编带包装盘 Reel



Package quantity 包装数量

ΦD	Quantity / Reel 数量 / 每盘
4	2000pcs
5、6.3 8×6.5	1000pcs
8、10	500pcs
8×12.5 10×12.5	400pcs

Package size 卷盘尺寸

单位: mm

ΦD	4	5	6.3	8	10
T	14	14	18	26	26

■ 编带包装箱



包装数量:

壳号	盘包装数量	内箱包装数量	
单位	只/盘	盘/箱	只/箱
Φ4	2000	12	24000
Φ5	1000	12	12000
Φ6.3	1000	10	10000
Φ8x6.5	1000	10	10000
Φ8	500	7	3500
Φ10	500	7	3500
Φ8X12.5	400	7	2800
Φ10X12.5	400	7	2800

包装箱尺寸:

名称	适用规格	A±2	B ±2	C±2
包装箱 (内)	Φ4~Φ10	387	387	240
包装箱 (外)	Φ4~Φ10	506	405	410

