


承 认 书

APPROVAL SHEET

客 户 : CUSTOMER	<u>Ropla</u>	承认书编号 : APP. NO.	<u>TTP003224120043</u>
系 列 : SERIES	<u>CF</u>	使用温度范围 : OPERATION TEMP. RANGE	<u>-55~+105°C</u>

凯美品牌料号 JAMICON PART No. :	客户产品料号 CUSTOMER PART NO. :
VCF156M050S0ANE01L	

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Table of specification and characteristics 规格和特性表

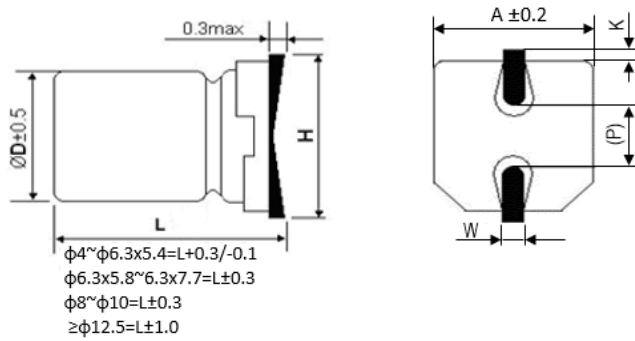
NO	料号 Part NO.	静电容量	容量公差	工作电压	损失角	阻抗	漏电流	纹波电流	耐久性	尺寸 Dimensions(mm)		
		容量	CAP	WV	DF(%)	Z (Ω)	LC(μA)	RC(mArms)	Endurance	φD	L	P
		120Hz 20°C	Tol. (%)		120Hz 20°C	100kHz 20°C	(MAX)	(MAX)	(MAX)			
1	VCF156M050S0ANE01L	15	±20	50	12	0.88	7.50	165	2000	6.3	5.4	2.1

I. Scope 范围

This standard defines characteristics and dimensions for aluminum electrolytic capacitors named CF series for Ultra Low Impedance Series.

此标准描述了铝电解电容器超低阻抗CF系列的特性和尺寸。

II. Construction & Dimensions 尺寸图 (mm)



* () : Reference size 参考尺寸

Size	ΦD	L	A	H	W	P	K	
B01	4	5.4	4.3	5.5Max	0.65±0.1	1.0±0.2	0.35	+0.15 -0.20
C01	5	5.4	5.3	6.5Max	0.65±0.1	1.5±0.2	0.35	+0.15 -0.20
E01	6.3	5.4	6.6	7.8Max	0.65±0.1	2.1±0.2	0.35	+0.15 -0.20
E04	6.3	7.7	6.6	7.8Max	0.65±0.1	2.1±0.2	0.35	+0.15 -0.20
G02	8	6.2	8.3	9.5Max	0.65±0.1	2.2±0.2	0.35	+0.15 -0.20
G03	8	10.2	8.3	10.0 Max	0.90±0.2	3.1±0.2	0.70±0.20	
H03	10	10.2	10.3	12.0 Max	0.90±0.2	4.6±0.2	0.70±0.20	
K05	12.5	13.5	13.0	15.0 Max	1.20±0.2	4.4±0.2	0.70±0.30	
K06	12.5	16	13.0	15.0 Max	1.20±0.2	4.4±0.2	0.70±0.30	
M06	16	16.5	17.0	19.0 Max	1.20±0.2	6.4±0.2	0.70±0.30	

III. Characteristics 特性

Standard test condition 标准试验条件

Unless otherwise specified all tests shall be performed at, or referred to, an ambient temperature of 20°C and a relative humidity not greater than 60%.

所有的试验应在环境温度20°C和相对湿度小于等于60%的条件下进行，除非另有规定。

Operating Temperature Range 工作温度范围

-55~+105°C

1. Electrical characteristics 电气特性

(1). Rated Voltage and Surge Voltage 额定电压和浪涌电压

WV: Working Voltage 工作电压(VDC)

SV: Surge Voltage 浪涌电压 (V)

WV	6.3	10	16	25	35	50	63	80	100
SV	8	13	20	32	44	63	79	100	125

(2). Leakage Current 漏电流

The maximum leakage current is specified in the following formula after DC working voltage applied.

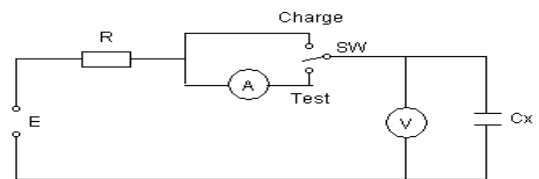
印加直流工作电压后的最大漏电流值如下列公式所示：

$$I \leq 0.01CV \text{ or } 3 (\mu A), \text{ whichever is greater}$$

After rated voltage applied for 2 minutes

在2分钟时测量取任意一个较大值。

Measurement circuit 测试电路



where I: Leakage Current (漏电流) (μA)

C: Nominal Capacitance (标称容量) (μF)

V: Rated Voltage (额定电压) (V)

(3). Capacitance Tolerance 容量公差

Capacitance tolerance should be within the range of $\pm 20\%$ which is measured at 120Hz/20 °C

在120Hz/20°C条件下测量时，容量公差应当在 $\pm 20\%$ 范围之内

(4). Dissipation Factor 损失角

Dissipation Factor at 120Hz/20°C shall not exceed the values given in the table below.

在120 Hz / 20°C条件下的DF值不应超过标准额定值表中给出的值。

详情请参阅第3页的规格和特性表。

(5). Low Temperature Characteristics 低温特性

The ratio of impedance at -25 °C/+20°C and -40°C/+20°C of the capacitor shall be less than the following value at 120Hz.

电容器在120Hz的条件下,分别在-25°C /+20°C和-40°C /+20°C的阻抗比,应小于以下的规格值:

WV额定电压 Z阻抗(120Hz)	6.3	10	16	25	35	50~100
Z(-25°C) / Z(+20°C)	2	2	2	2	2	2
Z(-40°C) / Z(+20°C)	3	3	3	3	3	3

(6). Multiplier for Ripple Current 纹波电流频率修正系数

Frequency coefficient 频率系数

Frequency 频率(Hz)	120	1K	10K	100K
Coefficient 系数	0.70	0.80	0.90	1.00

2. Endurance characteristics 耐久特性

(1). Endurance 耐久性

After applying rated voltage for 2000+12/-0 hours at 105±2°C, Stay back to 20°C temperature measurement, the capacitors shall meet the following requirements.

在105±2°C环境中,连续加载额定电压2000小时后,待温度恢复到20°C进行测量时,各项参数需符合以下要求。

Capacitance Change 容量变化	Within ±30% of initial value 在初始值的±30%以内
Dissipation Factor 损失角	Not more than 200% of specified value 不超过规格值的200%
Leakage Current 漏电流	Not more than the specified value 不超过规格值

(2). Shelf life 高温无负荷寿命

The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1000+12/-0 hours at 105±2°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.

在105°C±2°C环境中,无负荷放置1000+12/-0小时后待温度恢复到20°C,特性测量前需先进行实验前处理(处理方法参照JIS C 5101-4 4.1项),测量时应满足以下要求。

Capacitance Change 容量变化	Within ±30% of initial value 在初始值的±30%以内
Dissipation Factor 损失角	Not more than 200% of specified value 不超过规格值的200%
Leakage Current 漏电流	Not more than the specified value 不超过规格值

(3). Solderability test 焊锡性试验

The following specifications shall be satisfied when the lead wires are tested in solder bath at $245 \pm 5^{\circ}\text{C}$ for 2.5 ± 0.5 seconds, more than 95% of the terminal surface shall be covered with new solder.

当导线在 $245 \pm 5^{\circ}\text{C}$ 的焊锡槽中试验 2.5 ± 0.5 秒后，95%以上的端子表面应当要被新焊料覆盖。

(4). Solder Heat Resistance Test 焊锡耐热试验

The following specifications shall be satisfied when the lead wires are tested in solder bath at $275 + 2 / - 0^{\circ}\text{C}$ for 20 ± 0.5 seconds.

当导线在 $275 + 2 / - 0^{\circ}\text{C}$ 的焊锡槽中试验 20 ± 0.5 秒后，应当满足以下要求：

Capacitance Change 容量变化	$\leq \pm 5\%$ of the initial value \leq 初始值的 $\pm 5\%$
Dissipation factor 损失角	\leq Initial specified value 低于初始规格值
Leakage Current 漏电流	\leq Initial specified value 低于初始规格值

(5). Reflow Soldering Heat Resistance Test 回流焊耐热性试验

After reflow soldering , the following specifications shall be satisfied when the capacitors are restored to 20°C

回流焊后,在 20°C 下测试应满足以下要求:

Capacitance Change 容量变化	Within $\pm 10\%$ of initial value 在初始值的 $\pm 10\%$ 以内
Dissipation factor 损失角	Not more than the specified value 不超过规格值
Leakage Current 漏电流	Not more than the specified value 不超过规格值

(6). Lead Free Reflow Soldering Condition 无铅回流焊接条件

(1)For reflow, use a thermal conduction system such as infrared radiation (IR) or hot blast.

Vapor heat transfer systems (VPS) are not recommended.

对于回流，使用诸如红外辐射 (IR) 或热风的热传导系统.不推荐蒸汽热传递系统 (VPS).

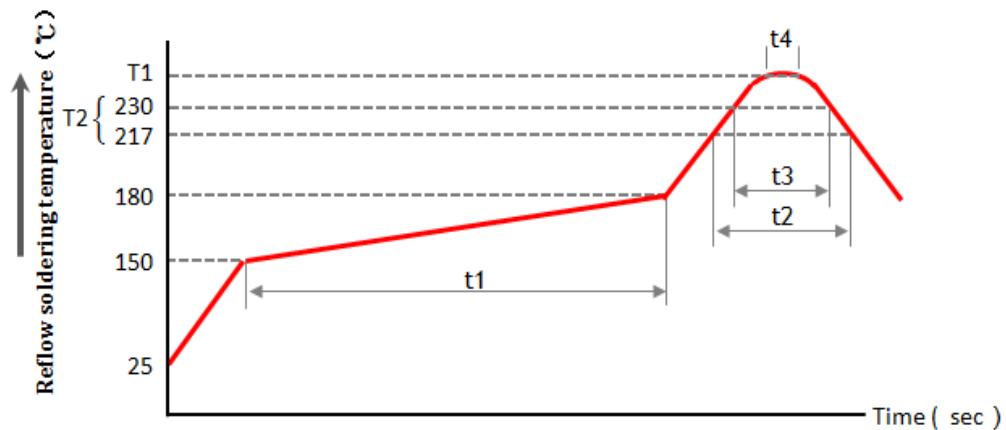
(2)Observe proper soldering conditions (temperature, time, etc.).Do not exceed the specified limits

观察适当的焊接条件 (温度、时间等) ,不要超过规定的限度。

(3)Please ensure that the capacitor became cold enough to the room temperature (5 ~ 35°C)

before the second reflow.

在第二次迴流之前，請確保電容器足夠冷却至室溫 (5~35°)



Type		Non-solid capacitor						
Rated Voltage (V)		4 ~ 50		63 ~100	4 ~ 100		160 up	
Case Diameter (mm)		4 ~ 5	6.3	4 ~ 6.3	8~16		≥8	
Preheat	Temp.(°C)	150 ~ 180						
	Time t1 (max., sec)	120	100					
Duration	T2 Temp.(°C)	230	217	230	217	217	230	217
	Time (max., sec)	t3	t2	t3	t2	t2	t3	t2
Peak	Temp.(T1, °C)	260	250					240
	Time t4 (max, sec)	5						
Reflow cycles		2 or less						

IV. Mounting 安装

The paper separators and the electrolytic-conductive electrolytes in a non-solid aluminum electrolytic capacitor is flammable.

非固态电容器内的电解纸和电解液都是易燃品。

Leaking electrolyte on a PC board can gradually erode the copper traces, possibly causing smoke or burning by short-circuiting the copper traces.

PC板上漏液会逐渐侵蚀铜丝,铜丝短路很可能会导致冒烟或燃烧。

Verify the following points when designing a PC board.

在设计PC板时需验证以下要点：

(1) Provide the appropriate hole spacing on the PC board to match the terminal spacing of the capacitor.在PC板上保留适当的孔距以匹配电容器的端子间距。

(2) Do not place any wires or copper traces over the vent of the capacitor.

请不要在电容器的防爆阀上方放置任何电线或铜丝。

(3) Installing a capacitor with the vent facing the PC board needs an appropriate ventilation hole in PC board. 在安装电容器时，如果防爆阀正对PC板，则PC板上需要开一个适当的通风孔。

(4) Do not pass any copper traces beneath the seal side of a capacitor.

The trace must pass 1 or 2 mm to the side of the capacitor.

请不要在电容器的封口部下面进行电路配线。如果在电容器附近配线,请确保线路与电容器间隔1~2mm。

(5) Avoid placing any heat-generating objects adjacent to a capacitor or even on the reverse side of the PC board.

请不要在电容器周围或PC板的背面放置任何发热部件。

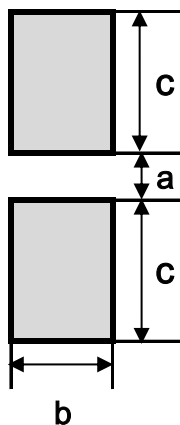
(6) Do not pass any via holes or underneath a capacitor.

请不要从电容器通孔或电容器底部穿过。

(7) In designing double-sided PC boards, do not locate any copper trace under the seal side of capacitor.设计双面PC板时，请不要在电容器的封口面放置任何铜丝。

(8) Recommend the bonding pad size .

推荐焊盘尺寸.



Unit 单位 : mm

Size Code 尺寸代码	a	b	c
Φ4	1.0	1.6	2.6
Φ5	1.4	1.6	3.0
Φ6.3	1.9	1.6	3.5
Φ8x6.2	2.1	1.6	4.0
Φ8	3.0	2.5	3.5
Φ10	4.0	2.5	4.0
Φ12.5	4.0	3.2	6.0
Φ16	6.0	3.2	7.0

V. Storage Condition 储存条件

(1) Aluminum Electrolytic Capacitors should not be stored in high temperatures or where there is a high level of humidity. The suitable storage condition is 5~35 °C and less than 75% in relative humidity. In principle, aluminum electrolytic capacitors should be used within one years (Surface Mount is two years) after production.

铝电解电容器不应当储存在高温或高湿的条件下。合适的储存条件为5~35℃，相对湿度低于75%。保管期限，原则上为制造后1年（表面贴片型2年）以内。

(2) Aluminum Electrolytic Capacitors should not be stored in damp conditions such as water, saltwater spray or oil spray.

铝电解电容器不应当储存在潮湿的条件下，如水、盐水喷雾或油雾

(3) Do not store Aluminum Electrolytic Capacitors in an environment full of hazardous gas (hydrogen sulfide, sulfurous acid gas, nitrous acid, chlorine gas, ammonium, etc...).

请不要将铝电解电容器存储在一个充满有害气体的环境下(硫化氢、二氧化硫、亚硝酸、氯气、铵气等...)。

(4) Aluminum Electrolytic Capacitors should not be stored under exposure to ozone, ultraviolet rays or radiation.

铝电解电容器储存不应暴露在臭氧、紫外线辐射和射线中。

(5) If a capacitor has been stored for more than two year under normal temperature (shorter if high temperature) and it shows increased leakage current, then a treatment by voltage application is recommended. The capacitor which hasn't been treated mustn't be used directly.

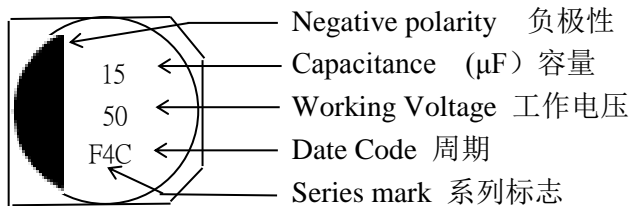
如果电容器在常温下储存超过二年(高温条件下不超过一年),出现漏电流上升现象,那么建议对电容器进行充电处理。未被处理过的电容器不能直接使用。

VI. Marking 标识

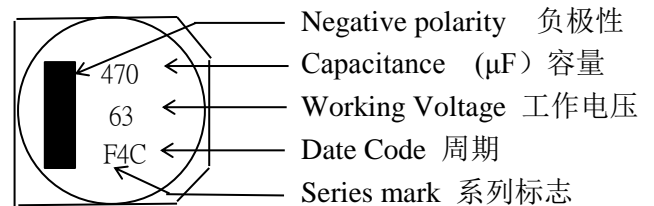
Marking on capacitor include 电容器上的标识包含：

(1) Following items shall be marked on the body of Capacitor. 电容器本体上应标明下列事项
(Note: color of the marking is black) (注意：标记的颜色为黑色)

$\phi D \leq 10mm$



$\phi D \geq 12.5mm$



- a) Rated Working Voltage 额定工作电压
- b) Nominal Capacitance 标称电容
- c) Negative polarity 负极性
- d) Series mark 系列标志
- e) Date Code 日期代码

Remark: Date code numbering system. Date code is indicated manufactured date

备注：周期编号系统，周期是表示生产日期。

Manufactured year 生产年份

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	0	1	2	3	4	5	6	7	8	9	0	1

Manufactured month 生产月份

Month	1	2	3	4	5	6	7	8	9	10	11	12
Code	1	2	3	4	5	6	7	8	9	A	B	C

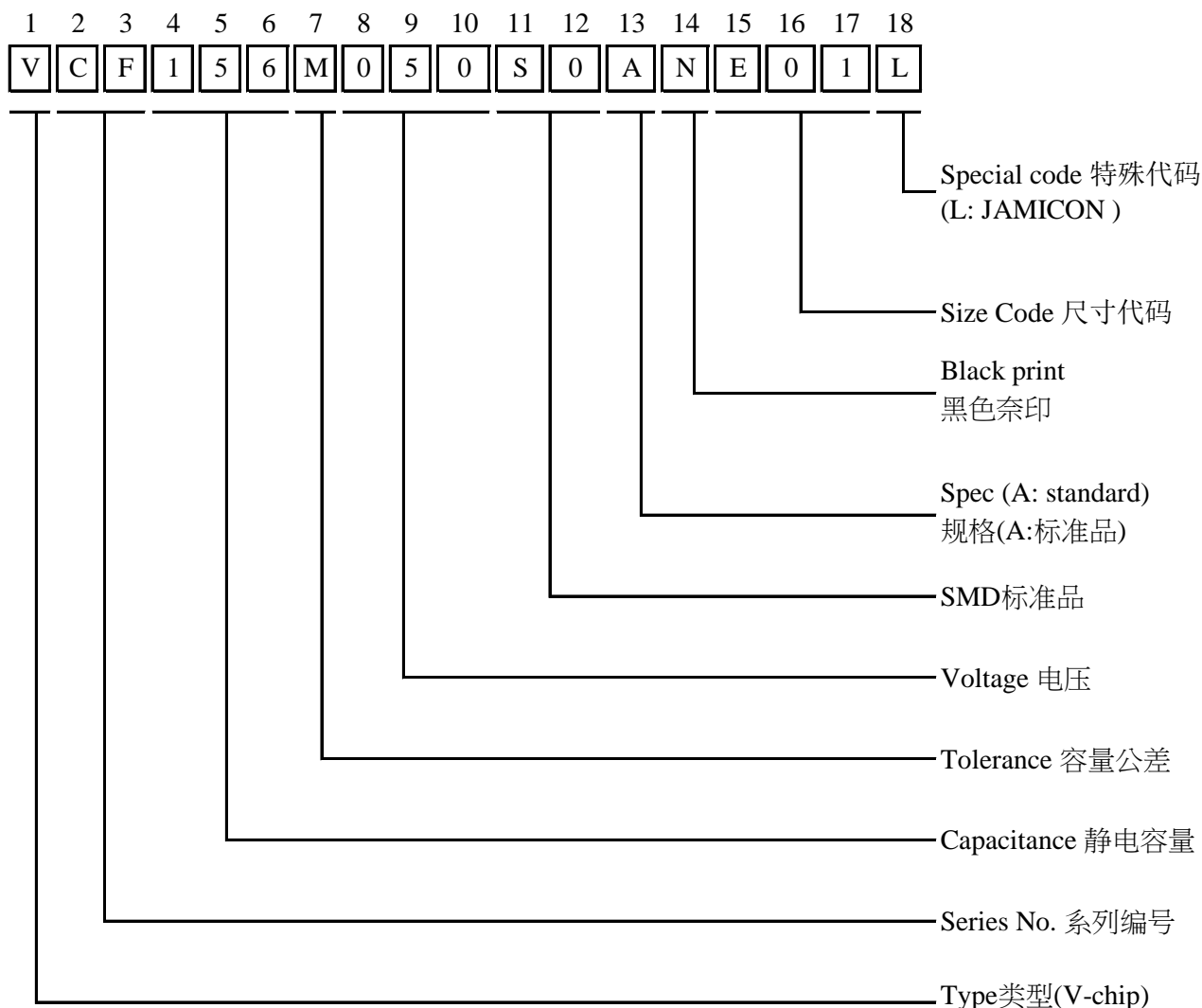
The last code for others 最后一码代表其它特殊代码

(2) On the Taping Reel 圆盘式贴品

- a) Rated working voltage, rated capacitance 额定工作电压、额定电容
- b) Jamicon electric trademark 凯美电机商标
- c) Part number 零件料号
- d) Packing quantity 包装数量
- e) Serial No 系列号
- f) Manufacturer's Name (SUZHOU KAIMEI ELECTRONICS CO., LTD)
制造商名称（苏州凯美电子有限公司）

VII. Catalog numbering

Jamicon TYPE 类型(Part Number 料号) :



Type code 类型代码

Code	Model Type 类型说明
J	Standard Dip Type (PET sleeve) JAMICON导针型电容器标准品(PET套管)
V	SMD (V-chip) Type (Nylon coating) 贴片型铝电解电容器(尼龙涂层)
T	Snap-in Type (PET sleeve) 牛角型电容器 (PET套管)
C	Snap-in Type (PVC sleeve) 牛角型电容器 (PVC套管)
N	Screw Terminal Type (PVC sleeve) 螺栓电容器(环保PVC胶管)
P	Conductive Polymer Solid Capacitor 高分子固态铝电解电容器

Capacitance code 静电容量

Capacitance 静电容量(uf)	0.47	4.7	47	470	4700
Code 代码	474	475	476	477	478

Capacitance tolerance: 静电容量公差

M = ±20% , K = ±10% , V = +20~-10%

Voltage Code 額定電壓

Voltage 額定電壓(WV)	2.5	4	6.3	10	16
Code 代碼	2R5	004	6R3	010	016

Code 13 Special specification: 第13碼 特殊說明

- | | |
|--------------------------|-------------------------------------|
| A : Standard 標準品 | D : Impedance 阻抗特殊 |
| B : DF (tanδ) DF(tanδ)特殊 | E : Ripple current 紋波電流特殊 |
| C : ESR ESR特殊 | F : Leakage current 漏電流特殊 |
| | G : Convex rubber GUM或端蓋板特殊或底部五凸點座板 |

Code 14 Sleeve code: 第14碼膠管顏色

N : SMD standard pack & solid capacitor SMD标准封装和固态电容器

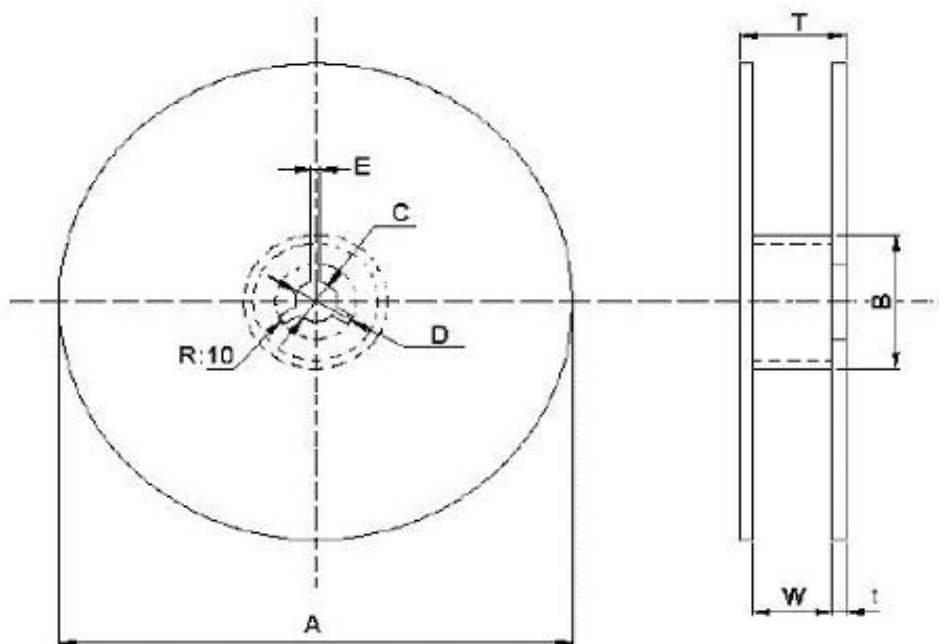
Code 15~17 Size Code 尺寸代碼

ψ DxL 尺寸	4x5.4	5x5.4	6.3x5.4	6.3x7.7	8x6.2	8x10.2	10x10.2	12.5x13.5	12.5x16	16x16.5
代碼	B01	C01	E01	E04	G02	G03	H03	K05	K06	M06

Code 18 其他特殊代碼 (“L” 为标准)

VIII. Packaging specification 包装规格

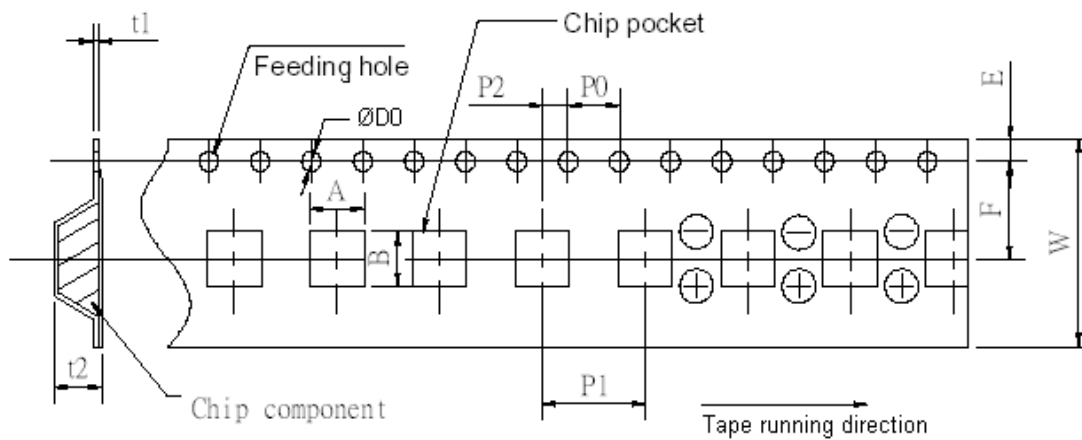
Reel Dimensions in mm(not to scale) 圆盘尺寸mm(不按比例绘制)



Size 尺寸	A	B	C	D	E	W	T	t
4φ ~ 5φ	380±2	84min	13.0±0.5	21.0±0.8	2.0±0.5	14±1	18±1	2.0
6.3φ ~ 8×6.2φ	380±2	84min	13.0±0.5	21.0±0.8	2.0±0.5	18±1	22±1	2.0
8×10.2 ~ 10φ	380±2	84min	13.0±0.5	21.0±0.8	2.0±0.5	26±1	30±1	2.0
12.5φ	380±2	84min	13.0±0.5	21.0±0.8	2.0±0.5	32±1	36±1	2.0
16φ	380±2	84min	13.0±0.5	21.0±0.8	2.0±0.5	44±1	48±1	2.0

Reel Tape 圆盘式编带

Taping Dimensions in mm (not to scale) 编带尺寸 mm(不按比例绘制)



*Ask factory for technical specifications. 技术规格参数请向工厂询问

SIZE	W	A	B	Po±0.1	P1	P2±0.1	F	φ Do	t1	E	t2
4x5.4	12.0	4.7	4.7	4.0	8.0	2.0	5.5	1.5+0.1-0	0.4	1.75	5.8
5x5.4	12.0	5.7	5.7	4.0	12.0	2.0	5.5	1.5+0.1-0	0.4	1.75	5.8
6.3x5.4	16.0	7.0	7.0	4.0	12.0	2.0	7.5	1.5+0.1-0	0.4	1.75	5.8
6.3x5.8	16.0	7.0	7.0	4.0	12.0	2.0	7.5	1.5+0.1-0	0.4	1.75	6.5
6.3x7.7	16.0	7.0	7.0	4.0	12.0	2.0	7.5	1.5+0.1-0	0.4	1.75	8.3
8x6.2	16.0	8.7	8.7	4.0	12.0	2.0	7.5	1.5+0.1-0	0.4	1.75	6.8
8x10.2	24.0	8.7	8.7	4.0	16.0	2.0	11.5	1.5+0.1-0	0.4	1.75	11.0
10x10.2	24.0	10.7	10.7	4.0	16.0	2.0	11.5	1.5+0.1-0	0.4	1.75	11.0
12.5x13.5	32.0	13.4	13.4	4.0	24.0	2.0	14.2	1.5+0.1-0	0.5	1.75	14.0
12.5x16	32.0	13.4	13.4	4.0	24.0	2.0	14.2	1.5+0.1-0	0.5	1.75	16.7
16x16.5	44.0	17.5	17.5	4.0	28.0	2.0	20.2	1.5+0.1-0	0.5	1.75	17.5
16x21.5	44.0	17.5	17.5	4.0	28.0	2.0	20.2	1.5+0.1-0	0.5	1.75	23.0

Packaging Specification 包装標準

Size (mm) 尺寸	Q'ty per reel 每盤數量	Inner box 內盒數量	measurement (mm) 包裝尺寸
4x5.4	2000PCS	20,000PCS	390x195x395
5x5.4	1000PCS	10,000PCS	390x195x395
6.3x5.4& 6.3x7.7	1000PCS	10,000PCS	390x225x395
8x6.2	1000PCS	10,000PCS	390x225x395
8x10.2	500PCS	4,000PCS	390x245x395
10x10.2	500PCS	4,000PCS	390x245x395
12.5x13.5	200PCS	1200PCS	390x225x395
12.5x16	150PCS	900PCS	390x225x395
16x16.5	125PCS	625PCS	390x245x395
16x21.5	110PCS	550PCS	390x245x395

IX. Others

(1) All the Jamicon capacitors, which are authenticated by the SGS, and test report shows that the inspection results of Hexavalent Chromium VI(Cr(VI)), Cadmium (Cd), Mercury (Hg), Lead (Pb), Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs), Bis(2-ethylhexyl) phthalate(DEHP),Butyl benzyl phthalate(BBP),Dibutyl phthalate(DBP) and Diisobutyl phthalate(DIBP) comply with the RoHS requirements.

凯美所有电容器经SGS认证测试报告中所检测的六价铬 (Cr⁶⁺)、镉(Cd)、汞 (Hg)、铅(Pb)、多溴联苯(PBBs)、多溴联苯醚(PBDEs)、磷苯二甲酸二丁酯 (DBP)、邻苯二甲酸丁苄酯 (BBP)、邻苯二甲酸二(2-乙基己基)酯 (DEHP) 和磷苯二甲酸二异丁酯 (DIBP) 均符合RoHS要求。

(2) Satisfied characteristic JIS C 5101. 符合JIS C 5101特性。

(3) Aluminum Electrolytic Capacitors may be damaged by corrosion which is caused by any halogenated hydrocarbon solvents.

铝电解电容器可能会被卤化烃类溶剂导致的腐蚀而损坏。

Please let us know in advance the solvent name and conditions for your PCB cleaning

请让我们事先了解贵司印刷电路板使用的清洗剂的名称和清洗条件。