SPECIFICATION

Customer:

Product Name:	Aluminium Electrolytic Capacitor (AEC-Q200 qualified)
Specifications：	VZS 50V100μF D6.3*7.7MM
Date：	June 07, 2023

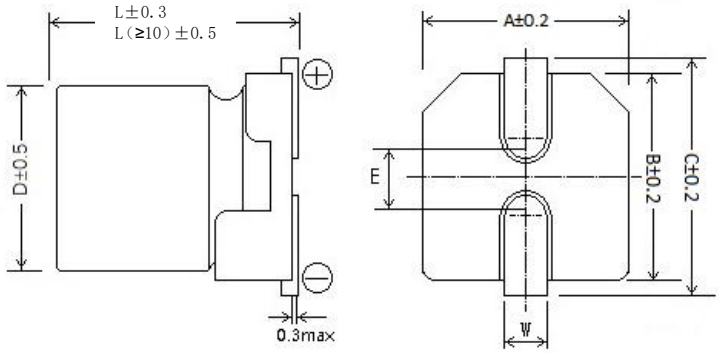
Supplier confirmation		
PREPARED BY	CHECKED BY	APPROVED BY

Customer confirmation

Leaguer product specification content

1、 Standard Rating

Unit : mm



No.	Customer Part No.	LEAGUER Part No.	Capacitance (μF)	Tolerance on Rated Capacitance (%)	Rated Voltage (Vdc)	Surge Voltage (Vdc)	Operating Temp. Range (℃)	tanδ (120Hz) (Max)	Leakage Current (μA)(2min.)	Max Ripple Current (mA) at105℃100kHz	Impedance (Ω) Max at 20℃,100kHz	Endurance at 105℃ (Hours)	Dimensions (mm)						
													ϕD	L	A	B	C	E	W
1		VZS1H101M0607V2C	100	±20	50	57.5	-55~+105	0.10	50	350	0.34	2000	6.3	7.7	6.6	6.6	7.2	2.2	0.5~0.9

2、 SCOPE

This specification covers “VZS series” longitudinal SMD aluminum electrolytic capacitor ，Leaguer reserves the right of final interpretation for this technical specification.

3、 APPLICABLE SPECIFICATION

This approval sheet consulted the institute of JIS-C-5101-1 and JIS-C-5101-4.

4、OPERATING TEMPERATURE RANGE

Operating temperature range is the range of ambient temperature at which the capacitor can be operated continuously at rated voltage.

-55℃~+105℃（6.3V.DC~80V.DC）

5、CONDITION OF TEST

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

Ambient temperature： 15℃ to 35℃

Relative humidity ： 45% to 75%

Air pressure ： 86kpa to 106kpa

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

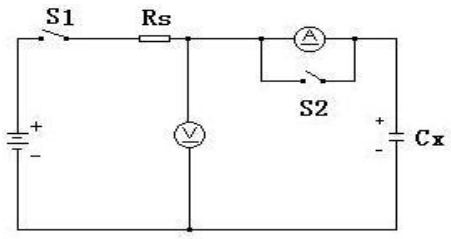
Ambient temperature ： 20±1℃

Relative humidity ： 60% to 67%

Air pressure ： 86kpa to 106kpa

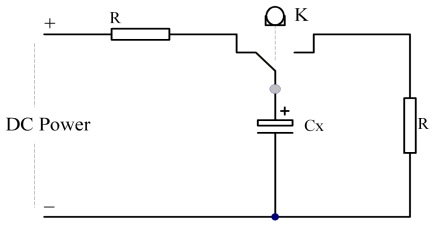
6、 Electrical Requirements

<table>
<tr><td>No.</td><td>Item</td><td>Test method</td><td>Performance</td></tr>
<tr><td>6.1</td><td>Rated voltage</td><td></td><td>6.3V.DC~80V.DC</td></tr>
<tr><td>6.2</td><td>Capacitance</td><td>Measuring frequency: 120Hz±20%
Measuring circuit : Series equivalent circuit
Measuring voltage : 0.5Vrms</td><td>Range of Capacitance:
10 μ F ~2200 μ F
Capacitance tolerance:
-20%~+20%</td></tr>
<tr><td>6.3</td><td>ssipation factor</td><td colspan="2">Testing conditions are the same as 6.2 for capacitance
<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></tr>
<tr><td>Tg δ</td><td>0.26</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.08</td><td>0.08</td></tr>
</table></td></tr>
<tr><td>6.4</td><td>Leakage current</td><td>The rated voltage shall be applied across the capacitor and its protective resistor shall be 1000±100Ω. The leakage current shall then be measured after an electrification period of schedule time.

Measurement circuit
 

Rs: Protective resistor(1000±100Ω)
DC ammeter
DC voltmeter
S_1: Switch
S_2: Protective switch for an ammeter</td><td>6.3V~80V:
I≤0.01CV or 3 μ A
Whichever is greater（after 2 min）

I：Leakage current(μ A)
C：Capacitance(μ F)
V：Rated voltage (V)</td></tr>
<tr><td>6.5</td><td>Low Temperature Characteristics (at 120Hz)</td><td colspan="2">
<table>
<tr><td>WV</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></tr>
<tr><td>$Z_{-25℃}/Z_{+20℃}$</td><td>2</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>$Z_{-40℃}/Z_{+20℃}$</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td></tr>
</table></td></tr>
</table>

No.	Item	Test method	Performance	Reference
6.6	Temperature Cycling	The capacitor is placed in the upper and lower limit temperature of the product, - 55 ~105℃, and the residence time of each temperature is not more than 30 minutes. Conversion time not exceeding 1 minute After 1000 runs of the cycle, the measurement is taken out.	Capacitance Change: Within ±10% of the initial measured value Tangent of Loss Angle : Less than the specified value Leakage Current : Less than the specified value Appearance : No significant change can be observed.	JESD22 Method JA-104 AEC-Q200 Rev D TABLE
6.7	Surge Test	After surge voltage(the value of P2) applied at a cycling rate of 30 seconds charge and 5.5 minutes discharge 1000 successive test cycle. Test temperature:15~35℃.	Leakage Current : Less than the specified value of page 2 Capacitance Change : Within ±15%of the initial measured value Tangent of Loss Angle : Less than 130% of specified value	JIS-C51011 AEC-Q200-007
		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.		
6.8	Solderability	Chip type: Install the product on the circuit board coated with solder paste. After reflow welding at 230 - 250 C, check whether the product is well welded.	More than 95% of the terminal surface shall be covered with new solder.	IPC/JEDEC J-STD-002D-2013 AEC-Q200 Rev D TABLE 3
6.9	Electrical Characterization	Testing for abnormalities in product characteristics The first stage is to measure Z (capacity) at 20 ℃. The second stage is to measure Z (capacity) at -55 ℃. Third order: +105 ℃ measurement (capacity).	Appearance: No abnormality	AEC-Q200 Rev D TABLE 3

No.	Item	Test method	Performance	Reference
6.10	Vibration	Frequency: 10~2000Hz reciprocation for 1 min Vibration Direction: Three Vertical Directions: X, Y and Z Vibration test time: 5 g force 20 minutes; 12 cycles in three directions Capacitance restored at room temperature for 2 hours after test to test corresponding electrical characteristics and check appearance	Appearance: No significant change can be observe Capacitance change : Within ±10% of initial measured value	MIL-STD-202 Method 204 AEC-Q200 Rev D TABLE
6.11	Solder Heat-Resistance Test	After reflow soldering the capacitor, recover it at room temperature for 24 ± 4 hours.	Appearance: No significant change can be observe Capacitance change : Within ±10% of initial measured value	MIL-STD-202 Method 210 AEC-Q200 Rev D TABLE 3
6.12	Solvent Resistance of the Marking	Class of Reagent:Water Test Temperature：55℃	There shall be no damage end legibly marked. Marking can be deciphered easily.	AEC-Q200 Rev D TABLE 3
6.13	Resistance to damp heat (steady state)	Place the capacitor at 85 ℃ and 85% humidity for 1000 ± 6 hours, apply the rated voltage, and then place it in the standard environment for 24 ± 4 hours	Capacitance Change: Within ±20% of the initial measured value Tangent of Loss Angle : Less than 200%of the specified value Leakage Current : Less than the specified value Appearance : No significant change can be observed.	MIL-STD-202 Method 103 AEC-Q200 Rev D TABLE
6.14	Mechanical Shock	Capacitor is placed on the PCB and fixed.Conditions as below: Test items ： For automobile Acceleration speed ： 100g(1000 m/s^2) Shocking direction ： X-Y-Z three axles (6 planes) Duration(D)(ms)：6 Velocity(m/s)：3.75 ； Wave ： Half sine； Test times ： 18times (3*6=18)	Capacitance Change: Within±10% of the initial measured value Tangent of Loss Angle : Less than 200%of the specified value Leakage Current : Less than the specified value Appearance: No significant change can be observed.	MIL-STD-202-213 AEC-Q200 Rev D TABLE

No.	Item	Test method	Performance	Reference
6.15	High Temperature Unload Life Test	Test Duration: 2000hours。 Applied Voltage: Rated Voltage After subjected to the test, the capacitors shall be left at the room temperature for 24±4 hours prior to the measurement.	Capacitance Change: Within ±30% of the initial measured value Tangent of Loss Angle : Less than 200% of the specified value Leakage Current : Less than the specified value Appearance: No significant change can be observed.	MIL-STD-202 Method 108 AEC-Q200 Rev D TABLE 3
6.16	High Temperature Unload Life Test	Test Temperature: 105±2℃ Test Duration: 1000 hours After subjected to the test, the capacitors shall be left at the room temperature for 24±4 hours prior to the measurement.	Capacitance Change: Within ±30% of the initial measured value Tangent of Loss Angle : Less than 200% of the specified value Leakage Current : Less than 200% of the specified value Appearance: No significant change can be observed.	JISC4101-4 AEC-Q200 Rev D TABLE 8
6.17	Bending of electric plate	Capacitor is placed in the PCB and pressed to deviate from Original fulcrum less than 2mm for 60+5s.	Capacitance Change: Within ±10% of the initial measured value Tangent of Loss Angle : Less than the specified value Leakage Current : Less than the specified value Appearance: No significant change can be observed.	AEC-Q200- 005
6.18	Terminal Strength (SMD)	Test condition: Capacitor is placed in the PCB by solder paste and do high temperature test (Reflow)2 twice to endurance the power of 1.8kg for 60S,no dropping condition.	Capacitance Change: Within ±20% of the initial measured value Tangent of Loss Angle : Less than 175% of the specified value Leakage Current : Less than the specified value Appearance: No significant change can be observed.	AEC-Q200 Rev D TABLE 3

■ Coefficient of Frequency for Rated Ripple Current

Frequency / Rated Voltage	120Hz	1KHz	10KHz	100KHz
6.3~80V	0.50	0.75	1.00	1.00

7、Marking

a) Following items shall be marked on the body of capacitor. The marking color is black.

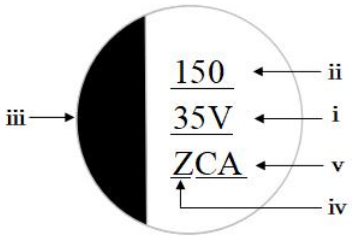
i. Rated Voltage

ii. Capacitance

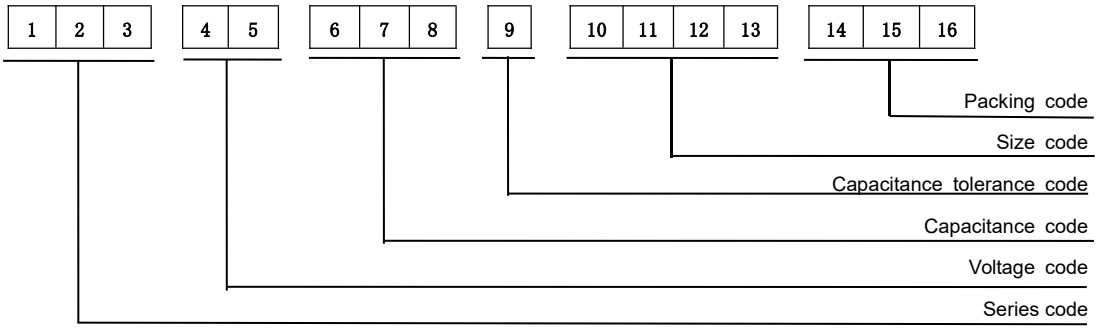
iii. Negative Polarity

iv. Series

v. Code



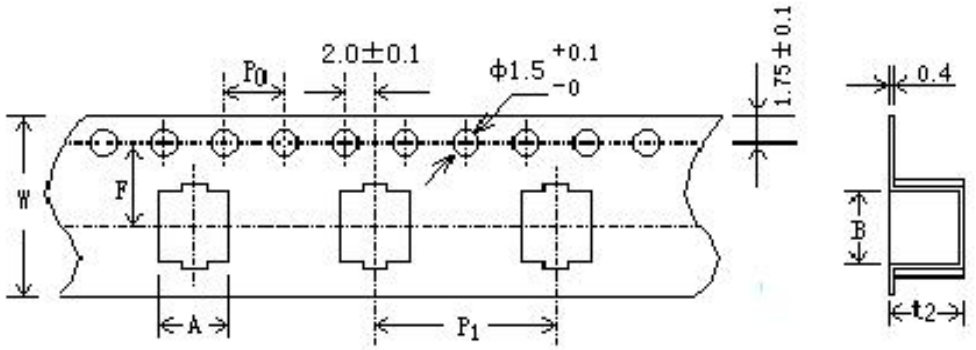
8、PART NO SYSTEM



1 2 3	4 5		6 7 8		9		10 11 12 13		14 15 16	
Series code	Voltage (V)	Code	Capacitance (μF)	Code	Capacitance tolerance	Code	Size	Code	Packing	Code
VZL	2.5	0E	0.1	0R1	±5%	J	4×5.4	0405	Paper reel	V1
VT1	4	0G	0.22	R22	±10%	K	5×5.4	0505		
VTD	6.3	0J	0.33	R33	±15%	Y	6.3×5.4	0605	Plastic reel	V2
VLD	10	1A	0.47	R47	±20%	M	6.3×7.7	0607		
VZ2	16	1C	0.68	R68	-10～-30%	Q	8×6.2	0806	Vacuum packaging	V3
VZS	25	1E	1.0	010	Others	T	8×8	0808		
VTG	35	1V	2..2	2R2			8×10.2	0810	Automotive Grade	V1C
VLG	50	1H	3.3	3R3			10×10.2	1010		
VKG	63	1J	4.7	4R7			10×12.5	1012	Anti-vibration	V1G
VTK	80	1K	6.8	6R8			12.5×13.5	1213		
VKZ	100	2A	10	100			12.5×16	1216	Automotive Grade	V2C
VTL	160	2C	22	220			16×16.5	1616		
VLL	180	2J	33	330			16×21.5	1621	Anti-vibration	V2G
	200	2D	47	470			18×16.5	1816		
	220	2P	68	680			18×21.5	1821		
	250	2E	100	101						
	315	2F	220	221						
	330	2U	330	331						
	350	2V	470	471						
	400	2G	680	681						
	420	2M	1000	102						
	450	2W	2200	222						
	500	2H	3300	332						
	550	2J	4700	472						
	600	2K	6800	682						
			10000	103						
			22000	223						
			33000	333						
			68000	683						

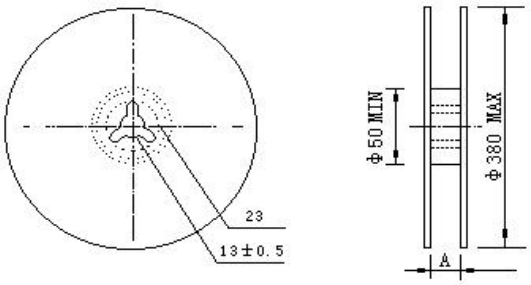
9、Taping shapes & Dimensions：mm

- Carrier tape



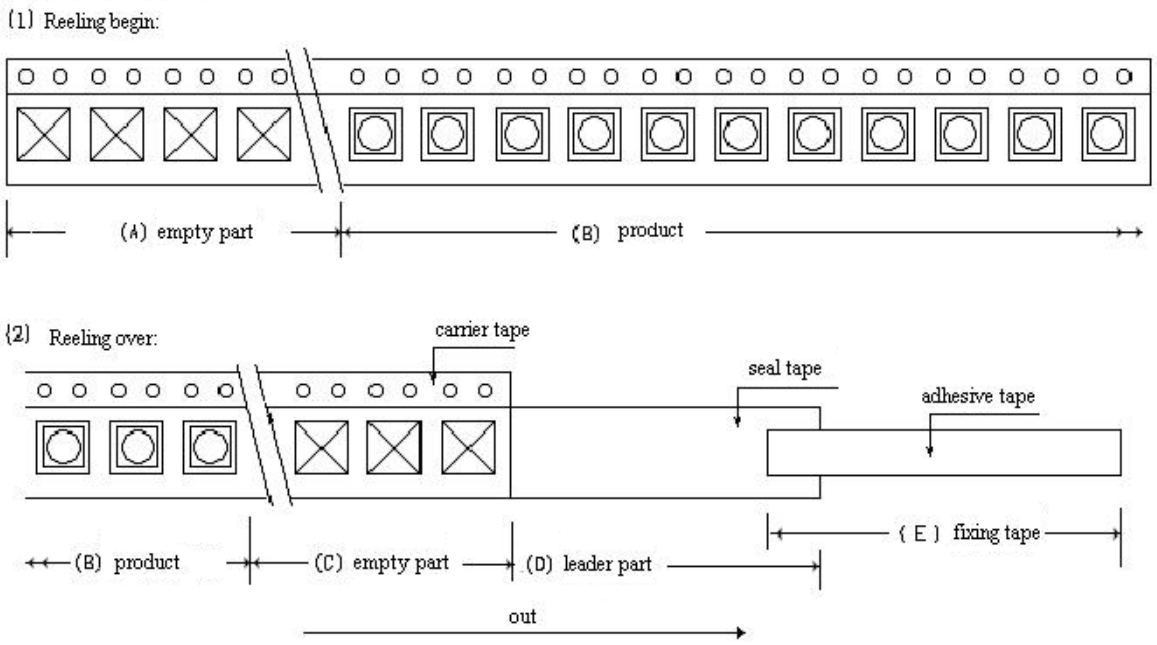
φD×L	W±0.3	A±0.2	B±0.2	F±0.1	P_1±0.1	t_2±0.2
φ4×5.4	12.0	4.7	4.7	5.5	8.0	5.8
φ5×5.4	12.0	6.0	6.0	5.5	12.0	5.8
φ6.3×5.4	16.0	7.0	7.0	7.5	12.0	5.8
φ6.3×7.7	16.0	7.0	7.0	7.5	12.0	8.0
φ8×6.2	16.0	8.7	8.7	7.5	12.0	6.8
φ8×10.2	24.0	8.7	8.7	11.5	16.0	11.0
φ10×10.2	24.0	10.7	10.7	11.5	16.0	11.0
φ10×12.5	24.0	10.7	10.7	11.5	16.0	13.0
φ12.5×13.5	32.0	13.4	13.4	14.2	24	14.5
φ12.5×16	32.0	13.4	13.4	14.2	24	17.0
φ16×16.5	44.0	17.5	17.5	20.2	28	17.0
φ16×21.5	44.0	17.5	17.5	20.2	28	22.4
Φ18×16.5	44.0	19.5	19.5	20.2	32	17.0
Φ18×21.5	44.0	19.5	19.5	20.2	32	22.4

- Reel



φD	4	5	6.3	8	10	12.5	16	18
A	14	14	18	26	26	34	46	46

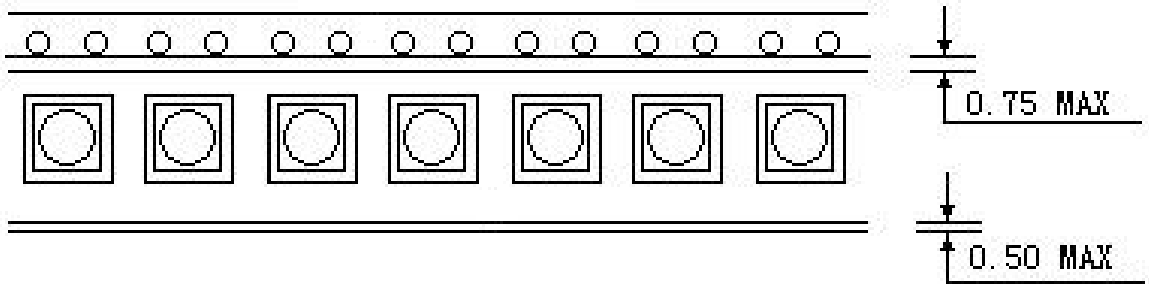
10、Details of Carrier Tape



Last reeling empty part of carrier tape shall be more than 10cm.

Leader part of seal tape shall be more than 20cm.

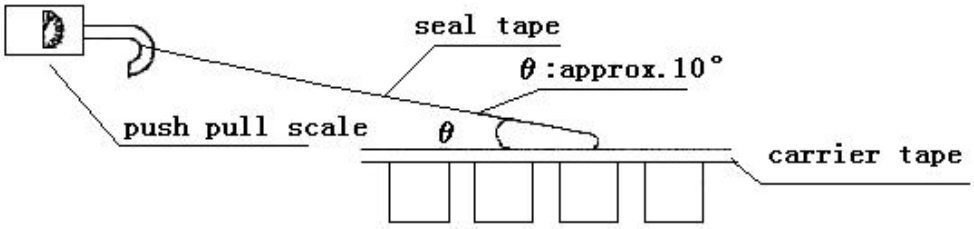
Adhesive tape fixing the end of the leader part shall be approx. 10cm.



Deviation between carrier tape and seal tape shall be less than 0.5mm

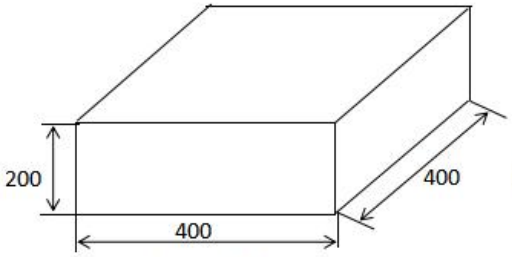
Seal tape shall not cover on the feeling hoes .

11、Adhesion Test

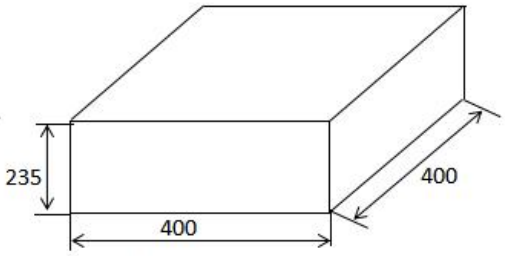


Reasonable pulling strength: 0.092~0.882N; Pulling speed: 200～300mm/min.

12、Dimensions of Outer Carton Box



Drawing 1



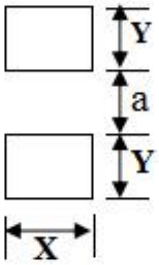
Drawing 2

13、Packing Quantity

Size	Quantity/one reel (pcs)	Quantity/one box (pcs)	Outer box size
φ4×5.4	2000	20000	Drawing 1
φ5×5.4	1000	10000	Drawing 1
φ6.3×5.4	1000	10000	Drawing 2
φ6.3×7.7	1000	10000	Drawing 2
φ8×10.2	500	3000	Drawing 1
φ10×10.2	500	3000	Drawing 1
φ10×12.5	400	2400	Drawing 1
φ12.5×13.5	250	1250	Drawing 1
φ12.5×16	200	1000	Drawing 1
φ16×16.5	200	800	Drawing 2
φ16×21.5	125	500	Drawing 2
φ18×16.5	150	600	Drawing 2
φ18×21.5	125	500	Drawing 2

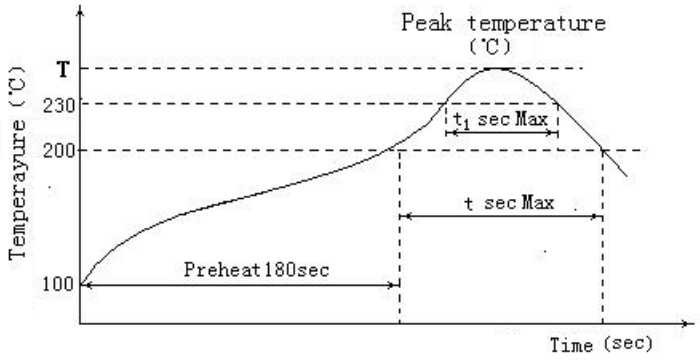
14、Fixing

Recommend land size



side	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
Φ8	2.2	3.9	3.0
Φ10	2.5	4.5	4.0
Φ12	3.0	5.5	5.0
Φ16	3.0	6.5	7.0
Φ18	3.0	7.5	7.0

■ **Temperature/ Time profile**



■ Allowable Range of Peak Temperature

Size	T(℃)	t (second)	t_1 (second)
φ4～φ6.3	255	100	50
φ8~10	245	100	40
Φ12.5~18	245	100	40

- Preheat shall be dade at 100℃～200℃ and for maximum 180 seconds.
- If capacitors are subject to the conditions other than the allowable range of reflow , please contact to us.

15、OTHER REMARKS

15.1 IMPORTANT INFORMATION ON THE APPLICATION OF ALUMINUM ELECTROLYTIC CAPACITORS

(1) When reverse voltage is applied on DC aluminum electrolytic capacitor ,the circuit will be short out and the capacitor will be damaged due to abnormal current flows through the capacitor. Please use non- polar types of capacitors when the positive voltage is applied on the cathode terminal.

(2)When capacitor is used at higher voltage than the rated voltage, leakage current may increase and characteristics may be drastically deteriorated and damaged in a short period. Please take extra caution that the peak voltage should not exceed the rated voltage.

(3) Sudden charge and discharge

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

(3)Storage of the capacitor

①we recommend the following conditions for storage: Ambient temperature：5~35℃,Ambient humidity：<75%RH;

(a) Storage life: ≤ 12 months;

(b) If storage life >12 months，the products need to be charged again before using;

(c) If Storage time > two years, the products need to be discarded;

(5) Use capacitor within rated ripple current

If excessive ripple current is applied on the capacitor, which will result in generating excessive heat inside, reducing capacitance and shortening life of capacitor. Therefore the peak value of the ripple voltage should be less than the rated value.

(6) Ambient temperature

Life of aluminum electrolytic capacitor is affected by the ambient temperature. It is generally known that the life doubles for each 10℃ decrease in temperature.

(7) Tensile strength of lead wire

When a strong force is applied to the lead wires or terminals, stress is put on the internal

connections, which may result in short circuit, open circuit or leakage current increase. Therefore it is not advisable to bend or handle a capacitor after it has been soldered to the PC board.

(8) Heat resistance at the soldering process

During soldering process, secondary shrinkage or sleeve crack may occur when soldering temperature is too high or soldering time is too long.

(9) Hole pitch and position of PC board

When designig a PC board , its hole pitch should be designed to coincide with the lead pitch (lead spacing) of the capacitor specified in the catalog or specifications.When a capacitor is forcibly inserted into an unmatched hole pitch, a force will put on the leads and which could result in a short circuit or increased leakage current.

(10) Cleaning after soldering

① The aluminum electrolytic capacitors should be free of halogenated solvents during board cleaning after soldering. Use solvent proof capacitors when halogenated solvents are used.

② After cleaned with the solvent which can guarantee the quality of capacitors, the capacitors should not be kept in solvent environments of non-ventilated places. Let the capacitors after cleaning dry with hot blast fully above 10mins and the temperature of hot blast should not be over than specified upper limit of that of capacitors.

(11) Adhesives、fixative and coating materials(coating agent)

① Do not use halogenated adhesives and coating materials to fix aluminum electrolytic capacitors.

② Do not cover up all the sealing area of capacitors with adhesives、fixative or coating materials (coating agent), make coverage only partial.

15.2 **RoHS** **RoHS compliance**

Completely in accordance with the latest standard of RoHS or relevant agreements reached by both parts if customer has special requirements.