

- 105°C high temperature resistance and ripple current resistance, high reliability
- Suitable for wave filtering return circuit for power of equipment, such as computers

Specifications

Items	Characteristics										
Capacitance Tolerance	±20%(120Hz, 20°C)										
Operating Temperature Range	-40~+105°C						-25~+105°C				
Rated Voltage Range	10~250V						350~450V				
Leakage Current	I ≦ 3VCV or 3000 (uA), which is greater. (After 5 minutes application of working voltage)										
Dissipation Factor (tan δ)	Measurement Frequency:120Hz. Temperature:20°C										
	Rated Voltage(V)	10	16	25	35	50	63	80	100	160~250	350~450
	tan δ (MAX)	0.45	0.40	0.35	0.30	0.25	0.25	0.20	0.20	0.15	0.20
Low Temperature Stability Impedance Ratio(MAX)	Measurement Frequency:120Hz.										
	Rated Voltage(V)	10	16	25	35	50	63~100		160~250	350~450	
	Z(-25°C)/Z(20°C)	6	6	4	4	4	4		4	8	
	Z(-40°C)/Z(20°C)	16	15	10	10	8	6		15	-	
Load Life	2000hours, with application of working voltage at 105°C										
	Capacitance Change	Within ± 20% of Initial Value									
	tan δ	200% or less of Initial Specified Value									
	Leakage Current	Initial Specified Value or less									
Shelf Life	1000hours, no voltage applied, at 105°C。 After Test: U _R to be applied for 30 minutes, 24 to 48 hours before measurement.										
	Capacitance Change	Within ± 15% of Initial Value									
	tan δ	200% or less of Initial Specified Value									
	Leakage Current	Initial Specified Value or less									
Standards	JIS C 5141 and JIS C 5102										

Permissible Ripple Current Temperature Coefficient

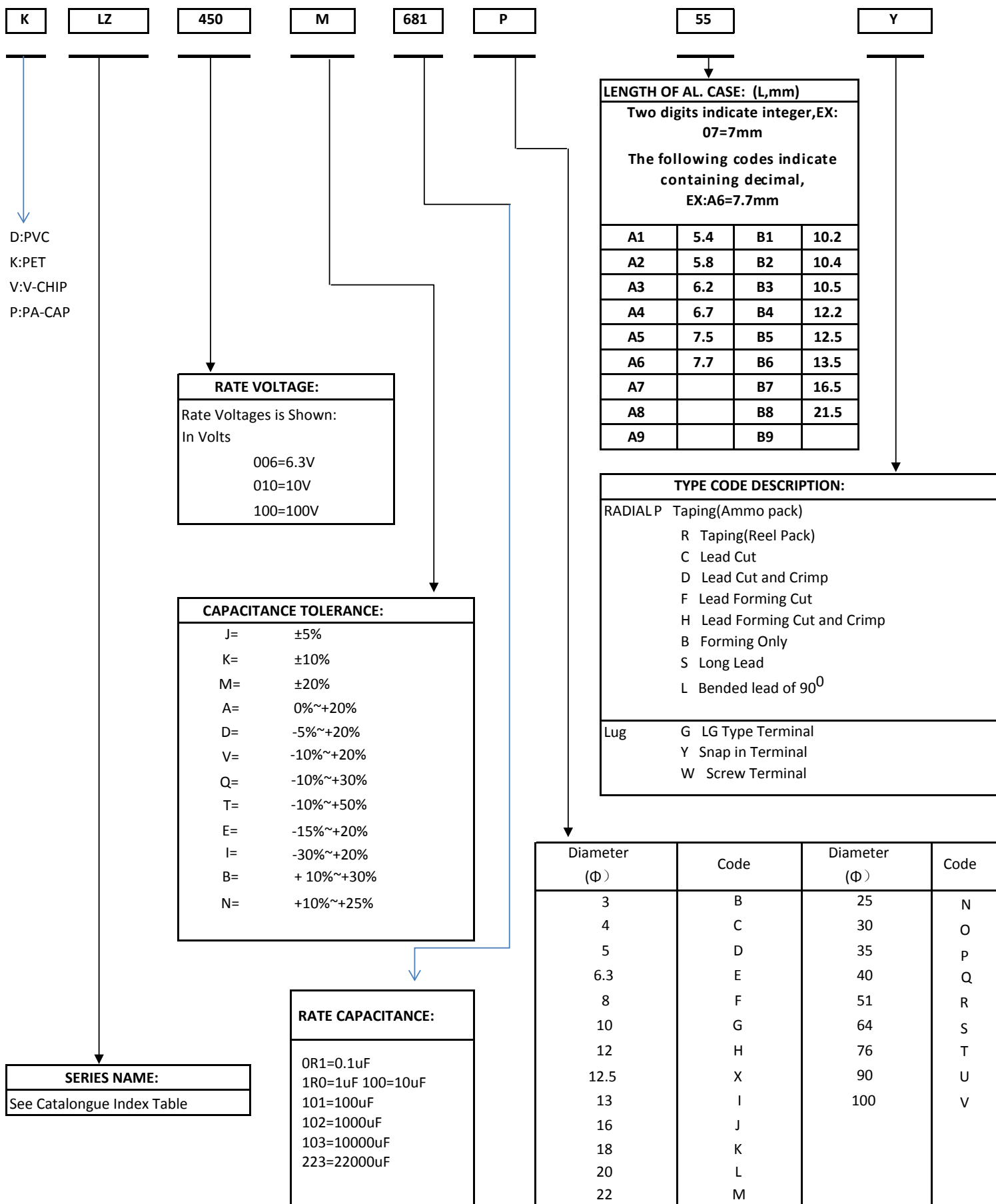
TEMP(°C)	45	60	85	105
Coefficient	2.50	2.20	1.65	1.00

Frequency Coefficient

WV(V)	Frequency (Hz)				
	50	120	1K	10K	100K
10~100	0.88	1.00	1.15	1.15	1.20
160~250	0.85	1.00	1.15	1.20	1.20
350~450	0.88	1.00	1.10	1.15	1.20

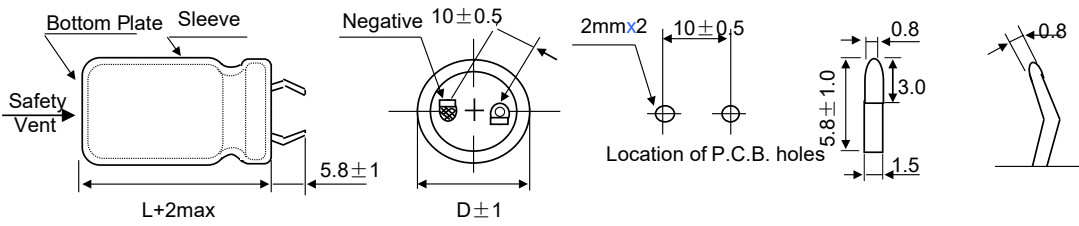
Aluminum Electrolytic Capacitors

Part Number Codes



Aluminum Electrolytic Capacitors

Dimensions (mm)



Standard Ratings

DxL(mm); R.C.: (A rms) at 105°C, 120Hz; IMP: (Ω max)

Cap (uF)	WV(V)	10			16			25			35			50		
		Item	DxL	R.C.	IMP	DxL	R.C.	IMP	DxL	R.C.	IMP	DxL	R.C.	IMP	DxL	R.C.
1500														22x25	1.20	0.268
1800														22x30	1.40	0.222
2200														22x25	1.21	0.174
2700														22x25	1.21	0.174
3300														22x30		
3900														22x25	1.36	0.142
4700														22x30		
5600														22x25	1.35	0.137
6800														22x30	1.35	0.137
8200														22x30	1.35	0.137
10000														22x25	1.58	0.114
12000														22x30	1.58	0.114
15000														22x25	1.58	0.114
18000														22x30	1.58	0.114
22000														22x30	1.58	0.114
27000														22x30	1.58	0.114
33000														22x30	1.58	0.114
39000														22x30	1.58	0.114
47000														22x30	1.58	0.114
56000														22x30	1.58	0.114
68000														22x30	1.58	0.114

Aluminum Electrolytic Capacitors

Standard Ratings

D×L(mm); R.C.: (A rms) at 105°C, 120Hz; IMP: (Ω max)

Cap (µF)	WV (V)	63			80			100			160			200		
		Item	D×L	R.C.	IMP	D×L	R.C.	IMP	D×L	R.C.	IMP	D×L	R.C.	IMP	D×L	R.C.
150														22×25	0.82	1.050
220											22×25	1.04	0.738	22×25	1.07	0.738
330											22×30	1.26	0.605	22×30	1.20	0.605
390											22×30	1.29	0.514	22×35	1.34	0.514
470								22×25	0.95	0.523	25×30	1.56	0.426	25×30	1.48	0.426
560								22×25	1.02	0.476	25×30	1.69	0.357	25×35	1.65	0.356
680								22×25	1.12	0.393	25×35	1.72	0.294	30×30	1.75	0.293
820					22×25	1.04	0.326	22×30			25×40	1.99	0.246	25×50	2.04	0.245
1000					22×25	1.21	0.275	22×30			25×40	2.20	0.202	25×50	2.30	0.202
1200		25×25	1.21	0.276	22×35			25×30	1.45	0.268	30×40			30×50		
1500		25×25	1.45	0.223	25×25	1.29	0.227	22×40			35×35	2.45	0.168	35×40	2.65	0.167
1800		22×30			22×40			25×45			30×50					
2200		25×30	1.59	0.187	25×30	1.57	0.186	25×40	1.98	0.177	35×40	3.06	0.138	35×45	2.98	0.134
2700		22×40			22×45			25×45								
3300		25×30	1.84	0.158	25×35	1.72	0.155	30×35	2.23	0.148	35×45	3.14	0.112			
3900		22×45			25×45			30×45								
4700		25×35	2.12	0.126	30×35	2.32	0.099	35×35	2.82	0.098						
5600		22×40			22×50			25×50								
6800		30×30	2.30	0.102	35×30	2.62	0.086	30×40	3.32	0.081						
8200		25×45			30×45			35×45	3.62	0.068						
10000		30×40	2.91	0.075	25×50	3.29	0.068	30×50	3.80	0.058						
12000		30×45			35×45	3.82	0.048									
		35×35	3.18	0.060	35×45	3.82	0.048									
		25×50			30×50	3.92	0.038	35×50	4.03	0.048						
		35×40	3.54	0.050	30×50	3.92	0.038	35×50	4.03	0.048						
		35×45	3.82	0.042	35×50	4.05	0.033									
		35×50	4.50	0.033	35×55	4.20	0.027	35×80	4.80	0.020						
					35×95	4.40	0.024									

Standard Ratings

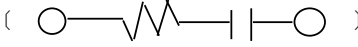
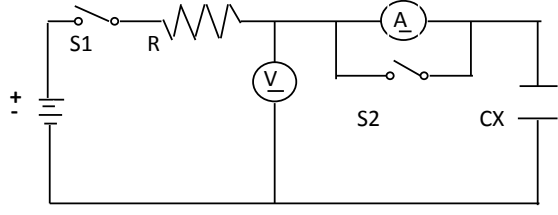
D×L(mm); R.C.: (A rms) at 105°C, 120Hz; IMP: (Ω max)

Cap (μ F)	WV(V)	250			350			400			450		
		Item	D×L	R.C.	IMP	D×L	R.C.	IMP	D×L	R.C.	IMP	D×L	R.C.
47								22×25	0.46	5.120	22×25	0.43	5.160
68								22×25	0.52	4.880	22×25 25×30	0.55	4.880
100					22×30 22×25	0.69	2.654	22×30 25×25	0.72	3.318	22×35 25×35	0.75	3.318
120					22×35 25×30	0.76	2.215	22×40 25×30	0.75	2.766	22×45 25×40	0.83	2.766
150		22×25	0.76	1.328	22×35 25×30	0.79	1.770	22×40 30×25	0.89	2.214	22×45 25×40	0.95	2.214
180		22×30	0.98	1.106	22×45 25×35	0.88	1.475	22×50 25×40	0.98	1.842	25×45 30×40	1.15	1.842
220		22×30 25×25	1.09	0.905	22×45 25×40	0.98	1.208	22×45 25×40	1.12	1.506	25×50 35×40	1.24	1.506
270		22×35 25×30	1.19	0.738	25×45 30×35	1.10	0.984	25×50 30×40	1.29	1.230	30×50 35×45	1.46	1.230
330		22×40 22×35	1.35	0.605	30×40 35×35	1.22	0.806	30×40 35×35	1.45	1.015	30×45	1.45	1.115
390		22×45 25×35	1.52	0.512	30×45 35×40	1.42	0.681	30×50 35×40	1.59	0.847	35×55	1.78	0.852
470		22×45 25×40	1.63	0.425	35×45	1.62	0.567	35×40 30×50	1.75	0.710	35×45	2.12	0.760
560		25×45 30×35	1.84	0.357	35×50	1.89	0.473	35×50	2.12	0.588			
680		25×50 30×40	2.05	0.294	35×50	2.10	0.420	40×50	2.20	0.485	35×55	2.30	
820		30×45 35×35	2.29	0.246	35×65	2.35	0.352	35×65	2.50	0.412			
1000		30×50	2.49	0.201									
1500		35×50	2.95	0.15									

1. Scope:

This specification applies to aluminium electrolytic capacitor , used in electronic equipment.

2. Electrical characteristics:

NO.	ITEM	TEST METHOD	SPECIFICATION															
2.1	Rated voltage		Voltage range、 capacitance range, see specification of this series.															
2.2	Capacitance	1. Measuring frequency : 120 ± 12Hz 2. Measuring voltage : ≅ 0.5Vrms + 0.5 ~ 2.0VDC																
2.3	Dissipation factor	3. Measurement circuit : 																
2.4	Leakage current	DC leakage current shall be measured after 1~2 minutes application of the DC rated working voltage through the 1000 Ω resistor at 20°C.  R : 1000 ± 100Ω A : DC current meter S1 : Switch S2 : Switch for protect of current meter V : DC voltage meter CX : Testing capacitor	Dissipation factor、 leakage current, see specification of this series.															
2.5	Temperature characteristics	<table border="1"> <thead> <tr> <th>STEP</th> <th>TEMPERATURE</th> <th>STORAGE TIME</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20 ± 2 °C</td> <td>30 minutes</td> </tr> <tr> <td>2</td> <td>-40 ± 3 °C</td> <td>2 hours</td> </tr> <tr> <td>3</td> <td>20 ± 2 °C</td> <td>15 minutes</td> </tr> <tr> <td>4</td> <td>105 ± 2 °C</td> <td>2 hours</td> </tr> </tbody> </table>	STEP	TEMPERATURE	STORAGE TIME	1	20 ± 2 °C	30 minutes	2	-40 ± 3 °C	2 hours	3	20 ± 2 °C	15 minutes	4	105 ± 2 °C	2 hours	Step 2. Impedance ratio (Z_r / Z_{r0}) less than specified value. Step 4. Capacitance change : within ± 20% of the initial measured value. Leakage current : Less than 10 times of initial specified value.
		STEP	TEMPERATURE	STORAGE TIME														
		1	20 ± 2 °C	30 minutes														
		2	-40 ± 3 °C	2 hours														
		3	20 ± 2 °C	15 minutes														
4	105 ± 2 °C	2 hours																
Step 1. Measure the capacitance and impedance. ($ Z $, 20°C , 120Hz ± 10%) Step 2. Measure the impedance at thermal balance after 2 hours ($ Z $, -40°C , 120Hz ± 10%) Step 4. Measure the capacitance and leakage current at thermal balance after 2 hours.																		

NO.	ITEM	TEST METHOD	SPECIFICATION
2.6	Surge test	Rated surge voltage shall be applied (switch on) for 30 ± 5 seconds and then shall be applied (switch off) with discharge for 5 ± 0.5 min at room temperature. This cycle shall be repeated for 1000 cycles. Duration of one cycle is 6 ± 0.5 minutes.	Capacitance change : within $\pm 20\%$ of the initial specified value. Dissipation factor : less than 200% of the initial specified value.
2.7	Applicable ripple current	The maximum A.C. current having frequency of 100K Hz which can be applied to the capacitor at $105 \pm 2^\circ\text{C}$ continuously. Peak voltage not to exceed rated D.C. voltage.	Leakage current : within initial specified value.

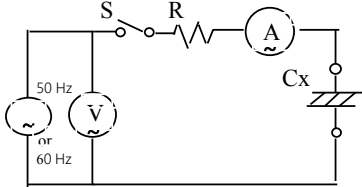



3. Mechanical characteristics

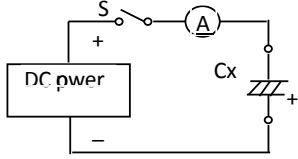

NO.	ITEM	TEST METHOD	SPECIFICATION																										
3.1	Lead strength	<p>(A) Tensile strength: wire lead terminal:</p> <table border="1"> <tr> <td>d (mm)</td> <td>≤ 0.45</td> <td>0.5 ~ 0.8</td> <td>$0.8 < d \leq 1.25$</td> </tr> <tr> <td>load (Kg)</td> <td>0.51</td> <td>1.0</td> <td>2.0</td> </tr> </table> <p>snap-in terminal:</p> <table border="1"> <tr> <td>d (mm)</td> <td>snap-in terminal</td> </tr> <tr> <td>load (Kg)</td> <td>2.0</td> </tr> </table> <p>The capacitor shall withstand the constant tensile force specified between the body and each lead for 10 seconds without damage either mechanical or electrical.</p> <p>(B) Bending strength:</p> <p>wire lead terminal:</p> <table border="1"> <tr> <td>d (mm)</td> <td>≤ 0.45</td> <td>0.5 ~ 0.8</td> <td>$0.8 < d \leq 1.25$</td> </tr> <tr> <td>load (Kg)</td> <td>0.25</td> <td>0.51</td> <td>1.0</td> </tr> </table> <p>snap-in terminal:</p> <table border="1"> <tr> <td>cross section area of terminal (mm^2)</td> <td>force (Kg)</td> </tr> <tr> <td>$0.5 < S \leq 1$</td> <td>1.0</td> </tr> <tr> <td>$S > 1$</td> <td>2.5</td> </tr> </table> <p>With the capacitor in a vertical position apply the load specified axially to each lead. The capacitor shall be rotated slowly from the vertical to the horizontal position, back to the vertical position. The 90° in the opposite direction and back the original position. Performance of capacitor shall not have changed and leads shall be undaged.</p>	d (mm)	≤ 0.45	0.5 ~ 0.8	$0.8 < d \leq 1.25$	load (Kg)	0.51	1.0	2.0	d (mm)	snap-in terminal	load (Kg)	2.0	d (mm)	≤ 0.45	0.5 ~ 0.8	$0.8 < d \leq 1.25$	load (Kg)	0.25	0.51	1.0	cross section area of terminal (mm^2)	force (Kg)	$0.5 < S \leq 1$	1.0	$S > 1$	2.5	<p>When the capacitance is measured, there shall be no intermittent contacts, or open- or short- circuiting.</p> <p>There shall be no such mechanical damage as terminal damage etc.</p>
d (mm)	≤ 0.45	0.5 ~ 0.8	$0.8 < d \leq 1.25$																										
load (Kg)	0.51	1.0	2.0																										
d (mm)	snap-in terminal																												
load (Kg)	2.0																												
d (mm)	≤ 0.45	0.5 ~ 0.8	$0.8 < d \leq 1.25$																										
load (Kg)	0.25	0.51	1.0																										
cross section area of terminal (mm^2)	force (Kg)																												
$0.5 < S \leq 1$	1.0																												
$S > 1$	2.5																												

NO.	ITEM	TEST METHOD	SPECIFICATION
3.2	Vibration resistance	<p>The frequency of the vibration shall vary uniformly within the range 10 to 55 Hz with the amplitude of 1.5 mm , completing the cycle in the internal of one minute .</p> <p>The capacitor shall be securely mounted by its leads with hold the body of capacitor .</p> <p>The capacitor shall be vibrated in three mutually perpendicular directions for a period of 2 hours in each direction .</p>	<p>Capacitance : no unsteady .</p> <p>Appearance : no abnormal .</p> <p>Capacitance change : within $\pm 5\%$ of initial measured value .</p>
3.3	Solderability	<p>The leads are dipped in the solder bath of Sn at $260 \pm 5 \text{ }^\circ\text{C}$ for 2 ± 0.5 seconds . The dipping depth should be set at 1.5 ~ 2.0 mm .</p>	<p>The solder alloy shall cover the 95% or more of the dipped lead's area .</p>

4. Reliability

NO.	ITEM	TEST METHOD	SPECIFICATION
4.1	Soldering heat resistance	<p>The leads immerse in the solder bath of Sn at $260 \pm 5 \text{ }^\circ\text{C}$ for 10 ± 1 seconds until a distance of 1.5 ~ 2mm from the case .</p>	<p>No damage or leakage of electrolyte .</p> <p>Capacitance change : within $\pm 10\%$ of the initial measured value .</p> <p>Tan δ : less than specified value .</p> <p>Leakage current : less than specified value .</p>
4.2	Damp heat (steady state)	<p>Subject the capacitors to $40 \pm 2 \text{ }^\circ\text{C}$ and 90% to 95% relative humidity for 240 ± 8 hours .</p>	<p>Capacitance change : within $\pm 10\%$ of the initial measured value .</p> <p>Tan δ : less than specified value .</p> <p>Leakage current : less than specified value .</p>

NO.	ITEM	TEST METHOD	SPECIFICATION														
4.3	Load life	After X hours continuous application of DC rated working voltage at $105 \pm 2 \text{ }^\circ\text{C}$, the measurements shall meet the following limits. Measurements shall be performed after 2 hours exposed at room temperature.	Standard of judgement is according to requirement of this series.														
4.4	Shelf life	After storage for Y hours at $105 \pm 2 \text{ }^\circ\text{C}$ without voltage application, the measurements shall meet the following limits. Measurements shall be performed after exposed for 1 to 2 hrs at room temperature after application of DC rated voltage to the capacitor for Z minutes.															
4.5	Storage at low temperature	The capacitor shall be stored at temperature of $-40 \pm 3 \text{ }^\circ\text{C}$ for 240 ± 8 hours, during which time no voltage shall be applied. And then the capacitor shall be subjected to standard atmospheric conditions for 16 hours or more, after which measurements shall be made.	Capacitance change : within $\pm 10\%$ of the initial value . Tan δ : less than specified value . Leakage current : less than specified value . Appearance : no abnormal . 外觀 : 無異常 .														
4.6	Pressure relief	AC test: Applied voltage : AC voltage not exceeding 0.7 times of the rated direct voltage or 250 V AC whichever is the lower . Frequency : 50 Hz or 60 Hz . Series resistor : refer to the table below . <table border="1" data-bbox="432 1608 1031 1854"> <thead> <tr> <th>Capacitance (C)</th> <th>Series resistor</th> </tr> </thead> <tbody> <tr> <td>$C \leq 1 \mu\text{F}$</td> <td>1000 Ω</td> </tr> <tr> <td>$1 \mu\text{F} < C \leq 10 \mu\text{F}$</td> <td>100 Ω</td> </tr> <tr> <td>$10 \mu\text{F} < C \leq 100 \mu\text{F}$</td> <td>10 Ω</td> </tr> <tr> <td>$100 \mu\text{F} < C \leq 1000 \mu\text{F}$</td> <td>1 Ω</td> </tr> <tr> <td>$1000 \mu\text{F} < C \leq 10000 \mu\text{F}$</td> <td>0.1 Ω</td> </tr> <tr> <td>$10000 \mu\text{F} < C$</td> <td>*</td> </tr> </tbody> </table> <p>* Resistance is equivalent to a half impedance by test frequency .</p>	Capacitance (C)	Series resistor	$C \leq 1 \mu\text{F}$	1000 Ω	$1 \mu\text{F} < C \leq 10 \mu\text{F}$	100 Ω	$10 \mu\text{F} < C \leq 100 \mu\text{F}$	10 Ω	$100 \mu\text{F} < C \leq 1000 \mu\text{F}$	1 Ω	$1000 \mu\text{F} < C \leq 10000 \mu\text{F}$	0.1 Ω	$10000 \mu\text{F} < C$	*	AC test circuit  <ul style="list-style-type: none">  : AC power S : Switch  : AC voltage  : AC current meter R : protection resistor Cx : testing capacitor
Capacitance (C)	Series resistor																
$C \leq 1 \mu\text{F}$	1000 Ω																
$1 \mu\text{F} < C \leq 10 \mu\text{F}$	100 Ω																
$10 \mu\text{F} < C \leq 100 \mu\text{F}$	10 Ω																
$100 \mu\text{F} < C \leq 1000 \mu\text{F}$	1 Ω																
$1000 \mu\text{F} < C \leq 10000 \mu\text{F}$	0.1 Ω																
$10000 \mu\text{F} < C$	*																

NO.	ITEM	TEST METHOD	SPECIFICATION
4.6	Pressure relief	<p>DC test: Send the following electricities while applying the inverse voltage .</p> <p>where case size:</p> <p style="text-align: center;">$D \leq 22.4 \text{ mm} : 1 \text{ A d.c. max}$ $D > 22.4 \text{ mm} : 10 \text{ A d.c. max}$</p> <p>Note : 1. This requirement applies to capacitors with a diameter of 6 mm or more .</p> <p style="text-align: center;">the test may be ended .</p>	<p>DC test circuit</p>  <p>S : Switch  : DC current meter Cx : testing capacitor</p> <p>of fire or explosion of capacitor elements (terminal and metal foil etc) or cover .</p>

5 Marking:

Marking on capacitors include :

■ trade-mark
■ Working voltage
■ Norminal capacitance
■ Tolerance
■ Polarity
■ Operating temperature range
■ Date code

