

- 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℃)										
Operating Temperature Range	-40~+105℃						-25~+105℃				
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℃										
	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℃)/Z(20℃)	6	6	4	4	4	4		4		8
	Z(-40℃)/Z(20℃)	16	15	10	10	8	6		15		-
Load Life	2000hours, with application of working voltage at 105℃										
	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℃ 。 After Test: UR 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										

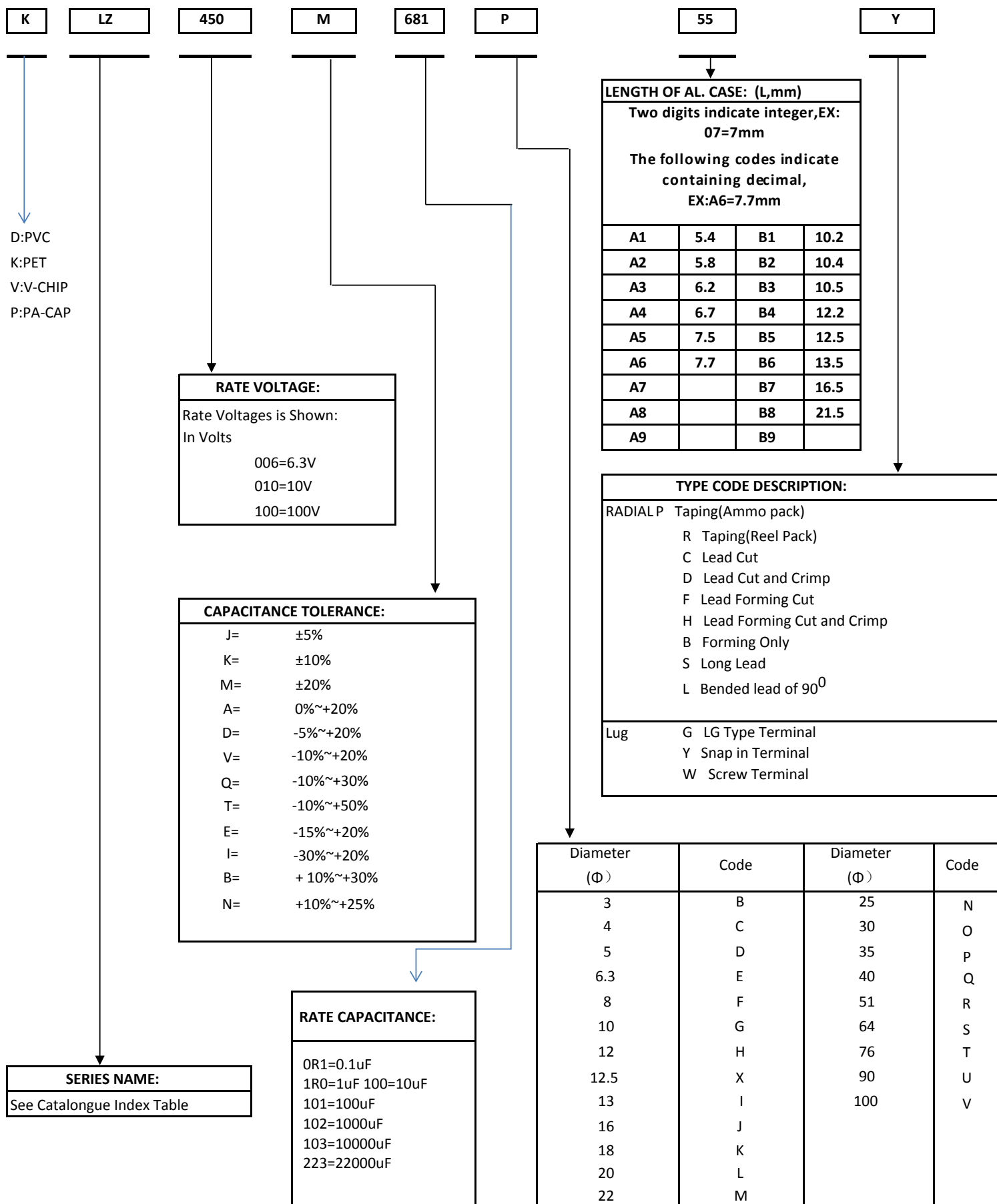
Permissible Ripple Current Temperature Coefficient

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

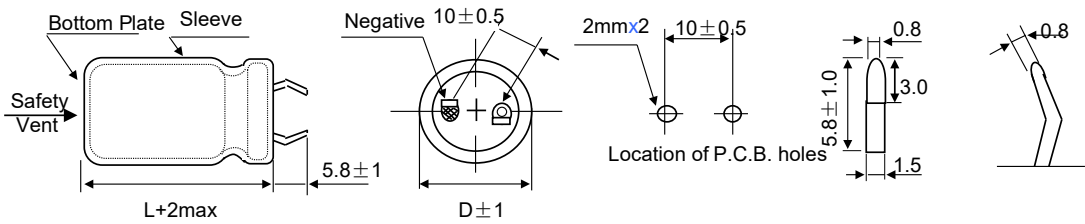
Frequency Coefficient

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

Part Number Codes



Dimensions (mm)



Standard Ratings

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

Cap (μF)	WV(V)	10			16			25			35			50		
	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.	IMP
1500														22×25	1.20	0.268
1800														22×30	1.40	0.222
2200											22×25	1.21	0.174	22×25	1.60	0.182
2700											22×25	1.21	0.174	22×30	1.73	0.148
3300											22×25	1.36	0.142	22×30	1.97	0.123
3900								22×25	1.35	0.137	22×30	1.57	0.120	22×45	2.23	0.104
4700								22×25	1.58	0.114	22×30	1.77	0.098	22×35	2.45	0.086
5600								22×30			22×40			25×45		
6800					22×25	1.80	0.098	22×30	2.02	0.079	22×45	2.29	0.069	30×35	2.74	0.074
8200					22×30			22×40			22×50			35×35	3.60	0.050
10000					25×25	2.08	0.082	25×35	2.18	0.066	25×40	2.58	0.057	35×35	3.60	0.050
12000					22×30			22×45			25×45			30×40		
15000					25×30	2.15	0.062	25×40	2.48	0.058	30×40	2.90	0.054	35×40	4.02	0.046
18000					22×30	2.18	0.068	25×45	2.86	0.050	30×40	3.24	0.046	35×50	4.52	0.039
22000					22×35			22×50			30×45			35×40		
27000					25×30	2.27	0.055	25×40	3.15	0.040	25×50	3.65	0.037	30×50	5.56	0.026
33000					22×40			30×45			35×40	4.13	0.030			
39000					25×30	2.41	0.048	35×35	3.55	0.038	30×45					
47000					22×45			25×50			35×50	4.78	0.025	35×50	6.35	0.020
56000					25×35	2.68	0.045	30×35	3.40	0.040	35×40	4.00	0.034			
68000					30×40			35×45	4.55	0.030						
					25×45			35×50	5.56	0.024						
					30×35	3.39	0.036									
					35×40	4.32	0.025									
					25×50											
					30×40	3.72	0.033									
					35×40	4.85	0.023									
					30×45											
					35×35	4.22	0.030									
					35×50	5.56	0.020									

Aluminum Electrolytic Capacitors

Standard Ratings

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

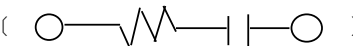
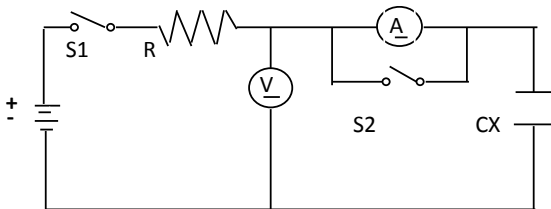
Cap (μ F)	WV (V)	63			80			100			160			200		
	Item	D×L	R.C.	IMP	D×L	R.C.	IMP	D×L	R.C.	IMP	D×L	R.C.	IMP	D×L	R.C.	IMP
150														22×25	0.82	1.050
220											22×25	1.04	0.738	22×25	1.07	0.738
330											22×30	1.26	0.605	22×30	1.20	0.605
390											22×30			22×35		
											25×25	1.29	0.514	25×30	1.34	0.514
470								22×25	0.95	0.523	22×30			22×35		
								25×30	1.56	0.426	25×30	1.56	0.426	25×30	1.48	0.426
560								22×25	1.02	0.476	22×40			22×45		
								25×30	1.69	0.357	25×30	1.69	0.357	25×35	1.65	0.356
680								22×25	1.12	0.393	22×45			25×40		
								25×35	1.72	0.294	25×35	1.72	0.294	30×30	1.75	0.293
820					22×25	1.04	0.326	22×30			22×50			25×50		
					25×25	1.32	0.324	25×25	1.32	0.324	25×40	1.99	0.246	30×35	2.04	0.245
1000					22×25	1.21	0.275	22×30			25×45			25×50		
					25×30	1.45	0.268	25×30	1.45	0.268	30×35	2.20	0.202	35×35	2.30	0.202
1200		25×25	1.21	0.276	22×35			22×40			30×40			30×50		
		25×25	1.29	0.227	25×25	1.29	0.227	25×35	1.68	0.223	35×35	2.45	0.168	35×40	2.65	0.167
1500		22×30			22×40			22×45			30×50					
		25×25	1.45	0.223	25×30	1.57	0.186	25×40	1.98	0.177	35×40	3.06	0.138	35×45	2.98	0.134
1800		22×35			22×45			25×45								
		25×30	1.59	0.187	25×35	1.72	0.155	30×35	2.23	0.148	35×45	3.14	0.112			
2200		22×40			22×40			22×50								
		22×25	1.84	0.158	30×30	2.01	0.133	30×40	2.53	0.123	35×50	3.50	0.093	35×50	3.56	0.126
2700		22×45			25×45			30×45								
		25×35	2.12	0.126	30×35	2.32	0.099	35×35	2.82	0.098						
3300		22×40			22×50			25×50								
		30×30	2.30	0.102	35×30	2.62	0.086	30×40	3.32	0.081						
3900		25×45			30×45			35×45								
		30×35	2.42	0.087	35×35	2.84	0.070	35×45	3.62	0.068						
4700		25×45														
		30×40	2.91	0.075	25×50	3.29	0.068	30×50	3.80	0.058						
5600		30×45														
		35×35	3.18	0.060	35×45	3.82	0.048									
6800		25×50														
		35×40	3.54	0.050	30×50	3.92	0.038	35×50	4.03	0.048						
8200		35×45	3.82	0.042	35×50	4.05	0.033									
10000		35×50	4.50	0.033	35×55	4.20	0.027	35×80	4.80	0.020						
12000					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.	IMP
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 charateristics:

NO.	ITEM	TEST METHOD			SPECIFICATION
2. 1	Rated voltage	1. Measuring frequency : 120 ± 12Hz 2. Measuring voltage : ≦ 0.5Vrms + 0.5 ~ 2.0VDC 3. Measurement circuit : 			Voltage range、 capacitance range, see specification of this series.
2. 2	Capacitance				
2. 3	Dissipation factor				
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℃.  R : 1000 ± 100Ω A : DC current meter S1 : Swich S2 : Swich 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				Step 2. Impedance ratio (Z_r / Z_{r0}) less than specified value.
		STEP	TEMPERATURE	STORAGE TIME	
		1	20 ± 2 °℃	30 minutes	
		2	-40 ± 3 °℃	2 hours	
		3	20 ± 2 °℃	15 minutes	
		4	105 ± 2 °℃	2 hours	
		Step 1. Measure the capacitance and impedance. ($ Z $, 20℃ , 120Hz ± 10%) Step 2. Measure the impedance at thermal balance after 2 hours ($ Z $, -40℃, 120Hz ± 10%) Step 4. Measure the capacitance and leakage current at thermal balance after 2 hours.			
			Step 4 Capacitance change : within ± 20% of the initial measured value. Leakage current : Less than 10 times of initial specified value.		

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.

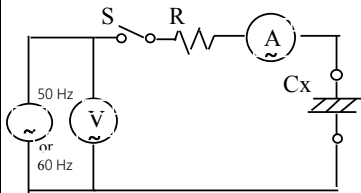
3. Mechanical characteristics

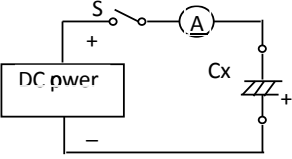
NO.	ITEM	TEST METHOD	SPECIFICATION																										
3. 1	Lead strength	(A) Tensile strength: wire lead terminal: <table><tr><td>d (mm)</td><td>≦0.45</td><td>0.5 ~ 0.8</td><td>0.8<d ≦1.25</td></tr><tr><td>load (Kg)</td><td>0. 51</td><td>1.0</td><td>2.0</td></tr></table> snap-in terminal: <table><tr><td>d (mm)</td><td>snap-in terminal</td></tr><tr><td>load (Kg)</td><td>2.0</td></tr></table> The capacitor shall withstand the constant tensile force specified between the body and each lead for 10 seconds without damage either mechanical or electrical. (B) Bending strength: wire lead terminal: <table><tr><td>d (mm)</td><td>≦0.45</td><td>0.5 ~ 0.8</td><td>0.8<d ≦1.25</td></tr><tr><td>load (Kg)</td><td>0. 25</td><td>0.51</td><td>1.0</td></tr></table> snap-in terminal: <table><tr><td>cross section area of terminal (mm²)</td><td>force (Kg)</td></tr><tr><td>0.5<S ≦1</td><td>1.0</td></tr><tr><td>S>1</td><td>2. 5</td></tr></table> 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 .	d (mm)	≦0.45	0.5 ~ 0.8	0.8<d ≦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 ≦1.25	load (Kg)	0. 25	0.51	1.0	cross section area of terminal (mm²)	force (Kg)	0.5<S ≦1	1.0	S>1	2. 5	When the capacitance is measured, there shall be no intermittent contacts, or open- or short- circuiting. There shall be no such mechanical damage as terminal damage etc.
d (mm)	≦0.45	0.5 ~ 0.8	0.8<d ≦1.25																										
load (Kg)	0. 51	1.0	2.0																										
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cross section area of terminal (mm²)	force (Kg)																												
0.5<S ≦1	1.0																												
S>1	2. 5																												

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

4. Reliability

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

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><tr><th>Capacitance (C)</th><th>Series resistor</th></tr><tr><td>$C \leq 1\text{ }\mu\text{F}$</td><td>1000 Ω</td></tr><tr><td>$1\text{ }\mu\text{F} < C \leq 10\text{ }\mu\text{F}$</td><td>100 Ω</td></tr><tr><td>$10\text{ }\mu\text{F} < C \leq 100\text{ }\mu\text{F}$</td><td>10 Ω</td></tr><tr><td>$100\text{ }\mu\text{F} < C \leq 1000\text{ }\mu\text{F}$</td><td>1 Ω</td></tr><tr><td>$1000\text{ }\mu\text{F} < C \leq 10000\text{ }\mu\text{F}$</td><td>0.1 Ω</td></tr><tr><td>$10000\text{ }\mu\text{F} < C$</td><td>*</td></tr></table> * Resistance is equivalent to a half impedance by test frequency .	Capacitance (C)	Series resistor	$C \leq 1\text{ }\mu\text{F}$	1000 Ω	$1\text{ }\mu\text{F} < C \leq 10\text{ }\mu\text{F}$	100 Ω	$10\text{ }\mu\text{F} < C \leq 100\text{ }\mu\text{F}$	10 Ω	$100\text{ }\mu\text{F} < C \leq 1000\text{ }\mu\text{F}$	1 Ω	$1000\text{ }\mu\text{F} < C \leq 10000\text{ }\mu\text{F}$	0.1 Ω	$10000\text{ }\mu\text{F} < C$	*	AC test circuit  ⊖ : AC power S : Switch ⓧ : AC voltage ⓐ : AC current meter R : protection resistor Cx : testing capacitor
Capacitance (C)	Series resistor																
$C \leq 1\text{ }\mu\text{F}$	1000 Ω																
$1\text{ }\mu\text{F} < C \leq 10\text{ }\mu\text{F}$	100 Ω																
$10\text{ }\mu\text{F} < C \leq 100\text{ }\mu\text{F}$	10 Ω																
$100\text{ }\mu\text{F} < C \leq 1000\text{ }\mu\text{F}$	1 Ω																
$1000\text{ }\mu\text{F} < C \leq 10000\text{ }\mu\text{F}$	0.1 Ω																
$10000\text{ }\mu\text{F} < C$	*																

NO.	ITEM	TEST METHOD	SPECIFICATION
4. 6	Pressure relief	DC test: Send the following electricities while applying the inverse voltage . where case size: $D \leq 22.4 \text{ mm} : 1 \text{ A d.c. max}$ $D > 22.4 \text{ mm} : 10 \text{ A d.c. max}$ Note : 1. This requirement applies to capacitors with a diameter of 6 mm or more . the test may be ended .	DC test circuit  S : Switch Ⓐ : DC current meter Cx : testing capacitor of fire or explosion of capacitor elements (terminal and metal foil etc) or cover .

5 Marking:

Marking on capacitors include :

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

