Snap In Aluminium Electrolytic Capacitors

Features:

- 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°C to +105°C / -25°C to +105°C
Rated Voltage Range	10 ~ 250V / 350 ~ 450V
Leakage Current	I ≦ 3√CV or 3000 (μA), 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	0.4	0.35	0.3	0.25	0.25	0.2	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

2000 hours,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

1000 hours, 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	2.5	2.2	1.65	1

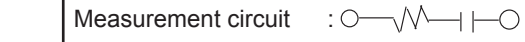
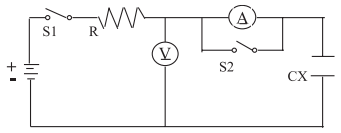
Frequency Coefficient

WV (V)	Frequency (Hz)				
	50	120	1K	10K	100K
10~100	0.88	1	1.15	1.15	1.2
160~250	0.85	1	1.15	1.2	1.2
350~450	0.88	1	1.1	1.15	1.2

Scope

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

Electrical Characteristics

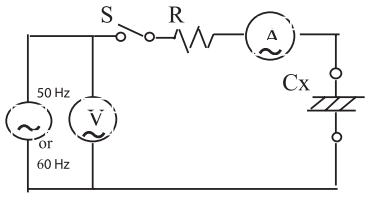
<table>
<tr><th>Item</th><th>Test Method</th><th>Specification</th></tr>
<tr><td>Rated Voltage</td><td></td><td>Voltage range, capacitance range, see specification of this series.</td></tr>
<tr><td>Capacitance
Dissipation factor</td><td>Measuring frequency : 120 ±12Hz
Measuring voltage : ≦0.5Vrms + 0.5 ~ 2V DC
Measurement circuit :  </td><td>Voltage range, capacitance range, see specification of this series.
Dissipation factor, leakage current, see specification of this series.</td></tr>
<tr><td>Leakage current</td><td>DC leakage current shall be measured after 1~2 minutes application of the DC rated working voltage through the 1000Ω resistor at 20°C
 
R : 1000 ±100Ω S1 : Switch
A : DC current meter S2 : Switch for protect of current meter
V : DC voltage meter CX : Testing capacitor</td><td>Dissipation factor leakage current, see specification of this series.</td></tr>
<tr><td>Temperature characteristics</td><td><table><tr><th>Step</th><th>Temperature</th><th>Storage Time</th></tr><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></table>Step 1. Measure the capacitance and impedance. (Z_{r0}) (|Z|, 20°C , 120Hz ±10%)
Step 2. Measure the impedance at thermal balance after 2 hours. (|Z|, 20°C , 120Hz ±10%)
Step 4. Measure the capacitance and leakage current at thermal balance after 2 hours.</td><td>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 .</td></tr>
</table>

<table>
<tr><th>Item</th><th>Test Method</th><th>Specification</th></tr>
<tr><td>Surge test</td><td>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 .</td><td rowspan="2">Capacitance change : within ± 20% of the initial specified value.
Dissipation factor : less than 200% of the initial specified value.
Leakage current : within initial specified value.</td></tr>
<tr><td>Applicable Ripple Current</td><td>The maximum A.C. current having frequency of 100k Hz which can be applied to the capacitor at 105 ±2°C continuously. Peak voltage not to exceed rated D.C. voltage.</td></tr>
</table>

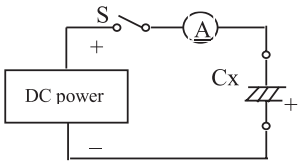
Mechanical characteristics

<table>
<tr><td>Lead strength</td><td>(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</td><td>2</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</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</td></tr>
</table>
Snap-in terminal
<table>
<tr><td>Cross section area of terminal</td><td>Force (kg)</td></tr>
<tr><td>0.5<S≦1</td><td>1</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 undamaged</td><td>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.</td></tr>
<tr><td>Vibration resistance</td><td>The frequency of the vibration shall vary uniformly within the range 10 to 55 Hz with the amplitude of 1.5mm, 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 .</td><td>Capacitance : no unsteady.
Appearance : no abnormal.
Capacitance change : within ± 5% of initial measured value .</td></tr>
<tr><td>Solderability</td><td>The leads are dipped in the solder bath of Sn at 260 ±5°C for 2 ±0.5 seconds . The dipping depth should be set at 1.5 ~ 2mm .</td><td>The solder alloy shall cover the 95% or more of the dipped lead's area .</td></tr>
</table>

Reliability

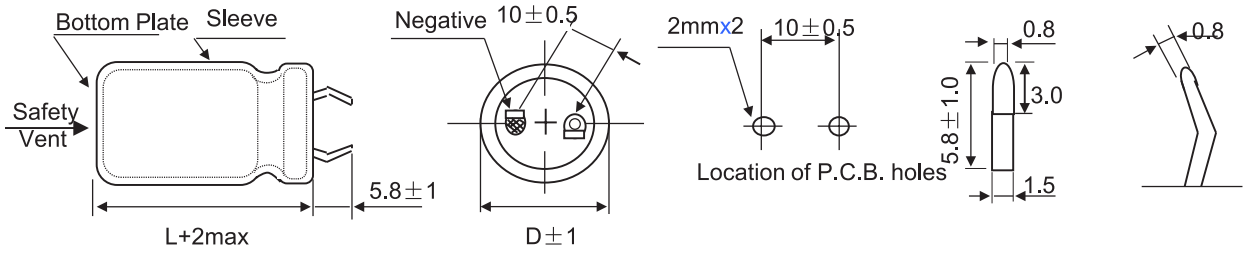
<table>
<tr><th>Item</th><th>Test Method</th><th>Specification</th></tr>
<tr><td>Soldering heat resistance</td><td>The leads immerse in the solder bath of Sn at 260 ±5°C for 10 ± 1 seconds until a distance of 1.5 ~ 2mm from the case.</td><td>No damage or leakage of electrolyte.
Capacitance change : within ±10% of the initial measured value.
Tan δ : less than specified value.
Leakage current : less than specified value.</td></tr>
<tr><td>Damp heat (Steady state)</td><td>Subject the capacitors to 40 ±2°C and 90% to 95% relative humidity for 240 ±8 hours.</td><td>Capacitance change : within ±10% of the initial measured value.
Tan δ : less than specified value.
Leakage current : less than specified value.</td></tr>
<tr><td>Load life</td><td>After X hours continuous application of DC rated working voltage at 105 ±2°C, the measurements shall meet the following limits. Measurements shall be performed after 2 hours exposed at room temperature.</td><td rowspan="2">Standard of judgement is according to requirement of this series.</td></tr>
<tr><td>Shelf life</td><td>After storage for Y hours at 105 ±2°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 .</td></tr>
<tr><td>Storage at Low Temperature</td><td>The capacitor shall be stored at temperature of -40 ±3°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.</td><td>Capacitance change : within ±10% of the initial value.
Tan δ : less than specified value.
Leakage current : less than specified value
Appearance : no abnormal.</td></tr>
<tr><td>Pressure relief</td><td>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 : 50Hz or 60Hz
Series resistor : refer to the table below
<table>
<tr><th>Capacitance (C)</th><th>Series resistor</th></tr>
<tr><td>C ≦ 1μF</td><td>1000Ω</td></tr>
<tr><td>1μF < C ≦ 10μF</td><td>100Ω</td></tr>
<tr><td>10μF < C ≦ 100μF</td><td>10Ω</td></tr>
<tr><td>100μF < C ≦ 1000μF</td><td>1Ω</td></tr>
<tr><td>1000μF < C ≦ 10000μF</td><td>0.1Ω</td></tr>
<tr><td>10000μF < C</td><td>*</td></tr>
</table>
* Resistance is equivalent to a half impedance by test frequency.</td><td>AC test circuit
 

: AC power
S : Switch
V : AC voltage meter
A : AC current meter
R : Protection Resistor
Cx : Testing Capacitor</td></tr>
</table>

Item	Test Method	Specification
Pressure relief	**DC test** Send the following electricitios while applying the inverse voltage . Where case size (D diameter) D ≦ 22.4 mm : 1 A DC max. D > 22.4 mm : 10 A DC max. Note : 1. This requirement applies to capacitors with a diameter of 6 mm or more .	**DC test circuit**  S : Swich Ⓐ : DC current meter Cx : Testing Capacitor

MCKLZ Series

Dimensions:



Standard Ratings

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

Cap (uF)	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	1.2	0.268
1800														22×30	1.4	0.222
2200														22×30 25×25	1.6	0.182
2700											22×25	1.21	0.174	22×35 25×30	1.73	0.148
3300											22×30	1.36	0.142	22×40 25×30	1.97	0.123
3900								22×25	1.35	0.137	22×30	1.57	0.12	22×45 25×35	2.23	0.104
4700								22×30	1.58	0.114	22×35 25×25	1.77	0.098	22×50 25×40	2.45	0.086
5600								22×30 25×25	1.75	0.096	22×40 25×30	1.99	0.083	25×45 30×35	2.74	0.074

Cap (uF)	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
6800					22×25	1.8	0.098	22×35 25×30	2.02	0.079	22×45 25×35	2.29	0.069	30×40 35×30	3.31	0.069
8200					22×30 25×25	2.08	0.082	22×40 25×35	2.18	0.066	22×50 25×40	2.58	0.057	30×45 35×35	3.6	0.050
10000		22×25	1.88	0.077	22×35 25×30	2.15	0.062	22×45 25×40	2.48	0.058	25×45 30×40	2.9	0.054	35×40	4.02	0.046
12000		22×30 25×25	2.18	0.068	22×40 25×30	2.31	0.056	22×50 25×45	2.86	0.05	25×50 30×40	3.24	0.046	35×50	4.52	0.039
15000		22×35 25×30	2.27	0.055	22×45 25×35	2.69	0.045	25×50 30×40	3.15	0.04	30×45 35×35	3.65	0.037			
18000		22×40 25×30	2.41	0.048	22×50 25×40	3.2	0.042	30×45 35×35	3.55	0.038	35×40 30×50 35×50	4.13	0.03			
22000		22×45 25×35	2.68	0.045	25×45 30×35	3.4	0.04	30×50 35×40	4	0.034		4.78	0.025			
27000		25×40 30×35	3.17	0.04	30×40 35×35	3.85	0.035	35×45	4.55	0.03						
33000		25×45 30×35	3.39	0.036	30×50 35×40	4.32	0.025	35×50	5.56	0.024						
39000		25×50 30×40	3.72	0.033	35×40	4.85	0.023									
47000		30×45 35×35	4.22	0.03	35×50	5.56	0.02									
56000		35×40	5	0.019												
68000		35×50	5.21	0.016												

Standard Ratings

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

Cap (uF)	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	22×30	1.07	0.738
330											22×30	1.26	0.605	22×30 25×25	1.20	0.605
390											22×30 25×25	1.29	0.514	22×35 25×30	1.34	0.514
470											22×35 25×30	1.56	0.426	22×40 25×30	1.48	0.426
560								22×25	1.02	0.476	22×40 25×30	1.69	0.357	22×45 25×35	1.65	0.356

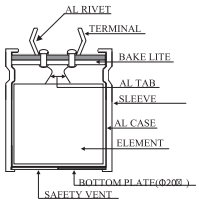
Cap (uF)	WV (V)	63			80			100			160			200		
	Item	D×L	R.C.	IMP	D×L	R.C.	IMP	D×L	R.C.	IMP	D×L	R.C.	IMP	D×L	R.C.	IMP
680								22×30	1.12	0.393	22×45 25×35	1.72	0.294	25×40 30×30	1.75	0.293
820					22×25	1.04	0.326	22×30 25×25	1.32	0.324	22×50 25×40	1.99	0.246	25×50 30×35	2.04	0.245
1000					22×30	1.21	0.275	22×35 25×30	1.45	0.268	25×45 30×35	2.20	0.202	30×45 35×35	2.30	0.202
1200		25×25	1.21	0.276	22×35 25×25	1.29	0.227	22×40 25×35	1.68	0.223	30×40 35×35	2.45	0.168	30×50 35×40	2.65	0.167
1500		22×30 25×25	1.45	0.223	22×40 25×30	1.57	0.186	22×45 25×40	1.98	0.177	30×50 35×40	3.06	0.138	35×45	2.98	0.134
1800		22×35 25×30	1.59	0.187	22×45 25×35	1.72	0.155	25×45 30×35	2.23	0.148	35×45	3.14	0.112			
2200		22×40 22×30	1.84	0.158	25×40 30×30	2.01	0.133	25×45 30×40	2.53	0.123	35×50	3.50	0.093			
2700		22×45 25×35	2.12	0.126	25×45 30×35	2.32	0.099	30×45 35×35	2.82	0.098						
3300		25×40 30×30	2.30	0.102	30×40 35×30	2.62	0.086	30×50 35×40	3.32	0.081						
3900		25×45 30×35	2.42	0.087	30×45 35×35	2.84	0.070	35×45	3.62	0.068						
4700		25×50 35×35	2.91	0.075	30×50	3.29	0.068	35×40	3.80	0.058						
5600		30×45 35×35	3.18	0.060	35×45	3.82	0.048									
6800		35×50 35×40	3.54	0.050	35×50	3.92	0.038									
8200		35×45	3.82	0.042	35×50	4.05	0.033									
10000		35×51	4.50	0.033	35×60	4.20	0.027	35×70	4.80	0.020						
12000					35×95	4.40	0.024									

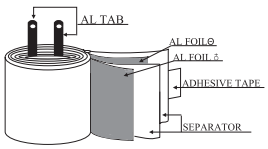
Standard Ratings

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

Cap (uF)	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
68								22×25	0.52	4.88	22×35 25×30	0.55	4.88
82					22×25	0.6	3.233	22×30 22×25	0.66	4.047	22×35 25×30	0.65	4.047
100					22×30 22×25	0.69	2.654	22×35 25×25	0.72	3.318	22×40 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	22×40 25×30	0.79	1.77	22×25 22×30	0.89	2.214	22×50 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	22×50 25×40	0.98	1.208	25×45 30×35	1.12	1.506	30×45 35×40	1.24	1.506
270		22×35 25×30	1.19	0.738	25×45 30×35	1.1	0.984	25×50 30×40	1.29	1.23	30×50 35×45	1.46	1.23
330		22×40 25×35	1.35	0.605	30×40 35×35	1.22	0.806	30×40 35×35	1.45	1.015	35×40	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		22×50 25×40	1.63	0.425	35×45	1.62	0.567	35×45	1.75	0.71	35×50	2	0.8
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	35×70	2.2	0.485	35×55	2.3	
820		30×45 35×35	2.29	0.246	35×65	2.35	0.352	35×65	2.5	0.412			
1000		35×40	2.49	0.201									
1200		35×45	2.84	0.167									

Structure and Materials





Part Number Table

Description	Dia. × Length	Part Number
Snap In Aluminium Electrolytic Capacitor, 63V, 10000µF, ± 20%	35mm × 51mm	MCKLZ063M103P51Y
Snap In Aluminium Electrolytic Capacitor, 63V, 4700µF, ± 20%	35mm × 35mm	MCKLZ063M472P35Y
Snap In Aluminium Electrolytic Capacitor, 63V, 6800µF, ± 20%	35mm × 50mm	MCKLZ063M682P50Y
Snap In Aluminium Electrolytic Capacitor, 100V, 4700µF, ± 20%	35mm × 40mm	MCKLZ100M472P40Y
Snap In Aluminium Electrolytic Capacitor, 250V, 330µF, ± 20%	22mm × 30mm	MCKLZ250M331M30Y
Snap In Aluminium Electrolytic Capacitor, 400V, 220µF, ± 20%	25mm × 35mm	MCKLZ400M221N35Y
Snap In Aluminium Electrolytic Capacitor, 400V, 220µF, ± 20%	25mm × 40mm	MCKLZ400M221N40Y
Snap In Aluminium Electrolytic Capacitor, 400V, 270µF, ± 20%	25mm × 40mm	MCKLZ400M271N40Y
Snap In Aluminium Electrolytic Capacitor, 400V, 270µF, ± 20%	25mm × 50mm	MCKLZ400M271N50Y
Snap In Aluminium Electrolytic Capacitor, 400V, 330µF, ± 20%	30mm × 40mm	MCKLZ400M331O40Y
Snap In Aluminium Electrolytic Capacitor, 400V, 470µF, ± 20%	30mm × 50mm	MCKLZ400M471O50Y
Snap In Aluminium Electrolytic Capacitor, 400V, 680µF, ± 20%	35mm × 50mm	MCKLZ400M681P50Y
Snap In Aluminium Electrolytic Capacitor, 450V, 100µF, ± 20%	25mm × 25mm	MCKLZ450M101N25Y
Snap In Aluminium Electrolytic Capacitor, 450V, 150µF, ± 20%	25mm × 30mm	MCKLZ450M151N30Y
Snap In Aluminium Electrolytic Capacitor, 450V, 220µF, ± 20%	25mm × 40mm	MCKLZ450M221N40Y
Snap In Aluminium Electrolytic Capacitor, 450V, 220µF, ± 20%	25mm × 45mm	MCKLZ450M221N45Y
Snap In Aluminium Electrolytic Capacitor, 450V, 270µF, ± 20%	25mm × 45mm	MCKLZ450M271N45Y
Snap In Aluminium Electrolytic Capacitor, 450V, 330µF, ± 20%	30mm × 50mm	MCKLZ450M331O50Y
Snap In Aluminium Electrolytic Capacitor, 450V, 470µF, ± 20%	35mm × 50mm	MCKLZ450M471P50Y
Snap In Aluminium Electrolytic Capacitor, 200V, 680µF, ± 20%	25mm × 40mm	MCKLZ200M681N40Y
Snap In Aluminium Electrolytic Capacitor, 250V, 1500µF, ± 20%	35mm × 50mm	MCKLZ250M152P50Y
Snap In Aluminium Electrolytic Capacitor, 250V, 330µF, ± 20%	22mm × 40mm	MCKLZ250M331M40Y
Snap In Aluminium Electrolytic Capacitor, 250V, 470µF, ± 20%	25mm × 40mm	MCKLZ250M471N40Y
Snap In Aluminium Electrolytic Capacitor, 250V, 680µF, ± 20%	25mm × 50mm	MCKLZ250M681N50Y
Snap In Aluminium Electrolytic Capacitor, 400V, 150µF, ± 20%	22mm × 25mm	MCKLZ400M151M25Y
Snap In Aluminium Electrolytic Capacitor, 400V, 150µF, ± 20%	22mm × 30mm	MCKLZ400M151M30Y
Snap In Aluminium Electrolytic Capacitor, 450V, 100µF, ± 20%	25mm × 35mm	MCKLZ450M101N35Y