



### Low Leakage Radial – Type LLR

#### ALUMINUM ELECTROLYTIC CAPACITORS

- \* It should be considered for applications where standard types of aluminum electrolytic capacitors cannot be utilized because of their high L.C.
- \* Another application is the replacement of tantalum capacitors with aluminum electrolytic capacitors.

**Operating temperature range:** -40°C ~ +85°C.

**Capacitance and tolerance:** Capacitance measurements shall be made by referred to a frequency of 120Hz  $\pm 10$ /<sub>-5</sub> Hz. The capacitance shall be within the specified tolerance of  $\pm 20\%$ . ( $\pm 10\%$  units are available on request).

**Leakage current:** Measurement shall be made at rated DC voltage with an application of a steady source of power, such as a regulated power supply. A current-limiting resistor of 1,000 ohms shall be connected in series with each capacitor under test. Rated DC working voltage shall be applied to the capacitor for a minimum of 30 minutes, 24 to 48 hours prior to making leakage current measurements.

The maximum leakage current at 5 minutes shall not exceed the value determined from the following equation or 0.4 $\mu$ A, whichever is greater:

$$I = 0.002CV$$

- where: I = Leakage Current ( $\mu$ A)
- C = Nominal Capacitance ( $\mu$ F)
- V = Rated DC Voltage (V. DC)

**Dissipation factor:** Capacitors shall be measured at a frequency of 120Hz at 20°C with a maximum of 1 volt RMS applied during measurement. The dissipation factor shall not exceed the values in Table 1.

Table 1.

Rated Voltage (V. DC)	Dissipation Factor (%)
6.3	17
10	15
16	10
25	8
35	6
50 ~ 100	6

**Low-temperature characteristics:** The ratio of the impedance of -25°C to that of +20°C shall be less than the values in Table 2.

Table 2.

Rated Voltage (V. DC)	Z @ -25°C	Z @ -40°C
	Z @ +20°C	Z @ +20°C
6.3	3	5
10	2	4
16	1.5	3
25	1.5	2
35	1.5	2
50 ~ 100	1.5	2

**Life test:** Rated voltage shall be applied to the capacitors in series with a one thousand ohm resistor. All tests shall be conducted in a dry oven with circulating air. Capacitors shall be separated by a distance not less than 2.5CM and air circulation shall be provided to prevent temperature within 15CM of any capacitors from departing more than +0°C -5°C from the normal ambient temperature of the chamber. Capacitors shall not be exposed to direct radiation from heating elements.

Capacitors shall be subjected to for a period of 1000 hours at 85°C.

After the completion of the life test capacitors shall be returned to standard test conditions.

Table 3.

Capacitance	Within $\pm 15\%$ of initial measurements
Dissipation factor	150% less of value in Table 1
Leakage current	Same as specified under Leakage Current
Appearance	Free from leakage of electrolyte and/or other noticeable deformation

**Shelf life test:** Capacitors shall be subjected to +85°C  $\pm 2$ °C for 1000 $\pm 12$  hours during which time no voltage shall be applied.

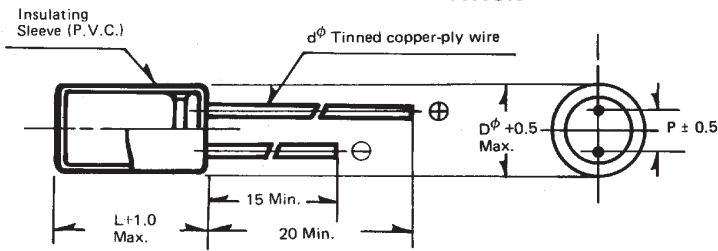
Following this period the capacitors shall be cool to room temperature and then D.C. rated voltage shall be applied to the capacitors for 30 minutes after which the capacitors shall be discharged.

After completion of these procedures, the capacitors shall meet the requirements as listed in Table 3.

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• **CONFIGURATION**

Dimensions: mm



Outside Diameter	D $\phi$	5	6	8	10
Lead Spacing	P	2.0	2.5	3.5	5.0
Lead Wire	d $\phi$	0.5	0.5	0.6	0.6

DIMENSIONS: mm

**RIPPLE CURRENT IN mA-RMS (at 120Hz +85°C)—peak voltage not to exceed rated DV voltage—**

Rated Voltage (V)	6.3	10	16	25	35	50	63	80	100
Surge Voltage (V)	8	13	20	32	44	63	79	100	125
CAP. ( $\mu$ F)									
0.47	24	24	24	24	24	24	24	26	26
1.0	36	36	36	36	36	36	36	38	38
2.2	50	50	50	50	50	50	50	55	60
3.3	65	65	65	65	65	65	65	70	75
4.7	68	68	68	68	70	80	80	90	90
10	75	75	75	90	105	125	125	135	135
22	105	105	120	140	165	185	190	200	
33	135	135	150	175	205	230	230		
47	165	165	185	215	245	275			
100	245	245	275	315					

DIMENSIONS: Diameter (D $\phi$ ) x Length (L): mm

Rated Voltage (V)	6.3	10	16	25	35	50	63	80	100
Surge Voltage (V)	8	13	20	32	44	63	79	100	125
CAP. ( $\mu$ F)									
0.47	5x11	5x11	5x11	5x11	5x11	5x11	5x11	5x11	5x11
1.0	5x11	5x11	5x11	5x11	5x11	5x11	5x11	5x11	5x11
2.2	5x11	5x11	5x11	5x11	5x11	5x11	5x11	5x11	6x11
3.3	5x11	5x11	5x11	5x11	5x11	5x11	5x11	6x11	8x11.5
4.7	5x11	5x11	5x11	5x11	5x11	6x11	6x11	8x11.5	8x11.5
10	5x11	5x11	5x11	6x11	6x11	8x11.5	8x11.5	10x12.5	10x16
22	5x11	5x11	6x11	8x11.5	8x11.5	10x12.5	10x16	10x16	
33	6x11	6x11	6x11	8x11.5	8x11.5	10x16	10x16		
47	6x11	6x11	6x11.5	10x12.5	10x12.5	10x16			
100	8x11.5	8x11.5	10x12.5	10x16					