



# LARGE SIZED ALUMINUM ELECTROLYTIC CAPACITORS

## TLS Series

• 105°C 3,000Hrs assured.

- Non-solvent proof.
- Downsized.
- High ripple capability
- For SMPS, Inverter
- RoHS compliant.
- Halogen-free capacitors are also available.



## SPECIFICATIONS

Item	Characteristics						
Rated Voltage Range	160 ~ 450 V <sub>DC</sub>						
Operating Temperature Range	-25 ~ +105°C						
Capacitance Tolerance	±20%(M) (at 20°C, 120Hz)						
Leakage Current	I = 0.02CV or 3mA, whichever is smaller. Where, I: Leakage Current(µA), C: Nominal capacitance(µF), V: Rated voltage(V <sub>DC</sub> ) (at 20°C, 5minutes)						
※ Dissipation Factor(Tanδ)	<table border="1"> <tr> <td>Rated voltage(V<sub>DC</sub>)</td> <td>160~400</td> <td>450</td> </tr> <tr> <td>Tanδ(Max.)</td> <td>0.15</td> <td>0.2</td> </tr> </table> (at 20°C, 120Hz)	Rated voltage(V <sub>DC</sub> )	160~400	450	Tanδ(Max.)	0.15	0.2
Rated voltage(V <sub>DC</sub> )	160~400	450					
Tanδ(Max.)	0.15	0.2					
Temperature Characteristics (Max. Impedance ratio)	<table border="1"> <tr> <td>Rated voltage(V<sub>DC</sub>)</td> <td>160~400</td> <td>450</td> </tr> <tr> <td>Z(-25°C)/Z(20°C)</td> <td>4</td> <td>8</td> </tr> </table> (at 120Hz)	Rated voltage(V <sub>DC</sub> )	160~400	450	Z(-25°C)/Z(20°C)	4	8
Rated voltage(V <sub>DC</sub> )	160~400	450					
Z(-25°C)/Z(20°C)	4	8					
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 3,000 hours at 105°C. Capacitance change ≤ ±20% of the initial value Tanδ ≤ ±200% of the initial specified value Leakage current ≤ The initial specified value						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after the exposing them at max. operating temperature for 1,000 hours without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements. Capacitance change ≤ ±20% of the initial value Tanδ ≤ ±200% of the initial specified value Leakage current ≤ The initial specified value						
Others	Satisfied characteristics KS C IEC 60384-4						

※ For capacitors with CV products >100,000 higher Tanδ value may apply.  
 When the capacitance exceeds 1,000µF, 0.01 shall be added every 1,000µF increase.

## RATED RIPPLE CURRENT

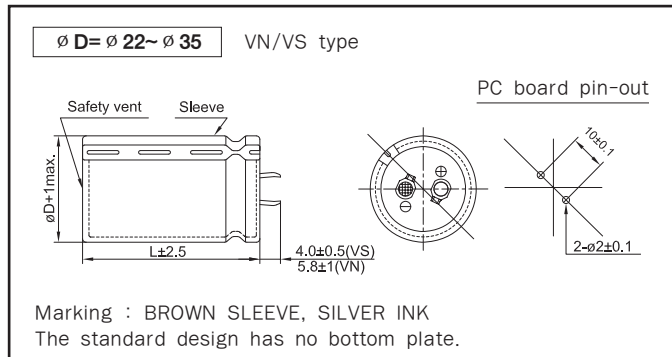
When capacitor are operated in any other condition at 120Hz, the maximum ripple current must be multiplied by the figure shown in the table.

Frequency multiplying factor

Frequency(Hz)	60	120	300	1k	10k~
160~250V <sub>DC</sub>	0.81	1.00	1.17	1.32	1.45
350~450V <sub>DC</sub>	0.77	1.00	1.16	1.30	1.41

## DIMENSIONS OF TLS Series

Unit(mm)



## RATINGS OF TLS Series

μF \ V <sub>DC</sub> / ∅D	160				200				250			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
270									22 × 25 1.11			
330					22 × 25 1.23				22 × 25 1.29			
390					22 × 30 1.40				22 × 35 1.44	25.4 × 25 1.40		
470	22 × 25 1.47				22 × 30 1.54				22 × 40 1.61	25.4 × 30 1.57		
560	22 × 30 1.68				22 × 35 1.72	25.4 × 25 1.67			22 × 45 1.79	25.4 × 35 1.79	30 × 25 1.87	
680	22 × 35 1.86	25.4 × 25 1.84			22 × 40 1.94	25.4 × 30 1.89	30 × 25 2.05		22 × 50 2.02	25.4 × 40 2.02	30 × 30 2.08	35 × 25 2.19
820	22 × 40 2.12	25.4 × 30 2.08			22 × 45 2.17	25.4 × 35 2.17	30 × 30 2.28			25.4 × 45 2.26	30 × 35 2.34	35 × 30 2.44
1,000	22 × 45 2.40	25.4 × 35 2.40	30 × 25 2.50			25.4 × 40 2.45	30 × 30 2.52	35 × 25 2.66		25.4 × 50 2.53	30 × 40 2.66	35 × 30 2.70
1,200	22 × 50 2.69	25.4 × 40 2.68	30 × 30 2.77	35 × 25 2.91		25.4 × 45 2.78	30 × 35 2.83	35 × 30 2.96			30 × 45 2.99	35 × 35 3.00
1,500		25.4 × 45 3.05	30 × 35 3.17	35 × 30 3.30			30 × 40 3.26	35 × 35 3.36				35 × 40 3.48
1,800		25.4 × 50 3.40	30 × 40 3.57	35 × 30 3.62			30 × 50 3.72	35 × 40 3.81				35 × 50 3.98
2,200			30 × 45 4.05	35 × 35 4.07				35 × 45 4.32				
2,700			30 × 50 4.56	35 × 40 4.67				35 × 50 4.88				
3,300				35 × 50 5.40								

μF \ V <sub>DC</sub> / ∅D	315				400				450			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
100									22 × 25 0.70			
120					22 × 25 0.77				22 × 30 0.81			
150					22 × 30 0.90				22 × 35 0.92	25.4 × 25 0.90		
180	22 × 25 0.95				22 × 35 1.02	25.4 × 25 0.99			22 × 40 1.02	25.4 × 35 1.05	30 × 25 1.06	
220	22 × 30 1.10				22 × 40 1.15	25.4 × 30 1.13			22 × 45 1.17	25.4 × 35 1.16	30 × 30 1.18	
270	22 × 35 1.24	25.4 × 25 1.21			22 × 45 1.29	25.4 × 35 1.30	30 × 25 1.29			25.4 × 40 1.32	30 × 30 1.30	35 × 25 1.37
330	22 × 40 1.40	25.4 × 30 1.38	30 × 25 1.43		22 × 50 1.47	25.4 × 40 1.47	30 × 30 1.45			25.4 × 45 1.48	30 × 35 1.51	35 × 30 1.54
390	22 × 45 1.56	25.4 × 35 1.57	30 × 30 1.57			25.4 × 45 1.63	30 × 35 1.61	35 × 25 1.65		25.4 × 50 1.65	30 × 40 1.65	35 × 30 1.67
470	22 × 50 1.70	25.4 × 40 1.76	30 × 30 1.73	35 × 25 1.82		25.4 × 50 1.82	30 × 40 1.82	35 × 30 1.85			30 × 45 1.86	35 × 35 1.87
560		25.4 × 45 1.96	30 × 35 1.93	35 × 30 2.02			30 × 45 2.04	35 × 35 2.05				35 × 40 2.05
680			30 × 40 2.19	35 × 30 2.20			30 × 50 2.30	35 × 40 2.34				35 × 50 2.44
820			30 × 45 2.47	35 × 35 2.48				35 × 45 2.63				
1,000				35 × 40 2.83				35 × 50 2.96				
1,200				35 × 45 3.18	← Case Size ∅D × L (mm) ← Rated Ripple Current (Arms/105°C, 120Hz)							