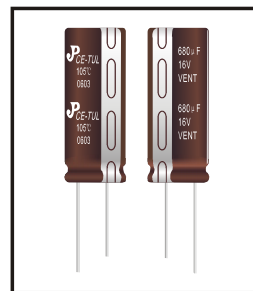




# Radial Lead Aluminum Electrolytic Capacitors

## TUL Series

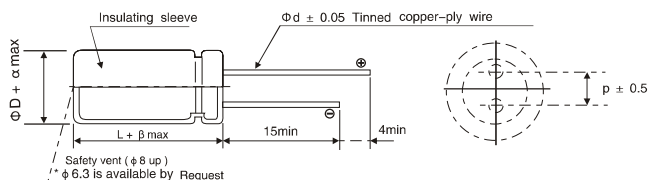
- Low impedance for high frequency, Anti-Solvent Design.
- Load Life 2000hrs at 105°C depending on case size.
- Radial type for switching power supply.



### SPECIFICATIONS

Item	Characteristics																											
Category Temperature Range	-40~+105℃																											
Voltage Range	6.3 ~100V.DC																											
Nominal Cap. Range	10 ~ 12000 μ F																											
Capacitance Tolerance	- 20% ~ + 20% (at 20℃, 120Hz)																											
Leakage Current	I = 0.01CV or 3( μ A) Whichever is greater.(after 2 minutes) where,I:Max Leakage Current( μ A), C: Nominal Capacitance( μ F), V: Rated Voltage(V) (at 20℃)																											
Dissipation Factor (tan δ ) ( at 120Hz, +20℃ )	<table><tr><td>WV</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr><tr><td>tan δ</td><td>0.15</td><td>0.15</td><td>0.12</td><td>0.10</td><td>0.10</td><td>0.10</td><td>0.09</td><td>0.08</td></tr></table> <p>Add 0.02 per 1,000 μ F for more than 1,000 μ F items.</p>	WV	6.3	10	16	25	35	50	63	100	tan δ	0.15	0.15	0.12	0.10	0.10	0.10	0.09	0.08									
WV	6.3	10	16	25	35	50	63	100																				
tan δ	0.15	0.15	0.12	0.10	0.10	0.10	0.09	0.08																				
Low Temp. Impedance Stability at 120Hz	<table><tr><td>W. V .</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr><tr><td>Z(- 25℃ )/Z (+ 20℃)</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(- 40℃ )/Z (+ 20℃)</td><td>8</td><td>6</td><td>4</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td></tr></table>	W. V .	6.3	10	16	25	35	50	63	100	Z(- 25℃ )/Z (+ 20℃)	4	3	2	2	2	2	2	2	Z(- 40℃ )/Z (+ 20℃)	8	6	4	3	3	3	3	3
W. V .	6.3	10	16	25	35	50	63	100																				
Z(- 25℃ )/Z (+ 20℃)	4	3	2	2	2	2	2	2																				
Z(- 40℃ )/Z (+ 20℃)	8	6	4	3	3	3	3	3																				
Impedance (Ω )	See case size table																											
High Temp. Load Test	<p>After 2000 hours application of DC ratedworking voltage at 105 ℃, the capacitor shall meet the following limits .</p> <p>Capacitance Change    ∙ ∙ ∙ ≒ ± 20% of the initial measured value tan δ                        ∙ ∙ ∙ ≒ 200% of the initial specified value DC Leakage Current    ∙ ∙ ∙ ≒ the initial specified value</p>																											
High Temp. Non-Load Test	<p>After storage for 1000 hours at 105℃ with no voltage applied, voltage treatment of JIS-C-5102 article 4-4 is to be given and then measurement shall be made, at which time requirements specified in the table "High Temperature Loading" can be met.</p>																											

### DRAWING



Unit:(mm)

ΦD	5	6.3	8	10	13	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Φd	0.5	0.5	0.5	0.6	0.6	0.8	0.8
β	+1.5						
α	+0.5						

### MULTIPLIER FOR RIPPLE CURRENT

(1) Frequency Coefficient

Freq.(Hz)	120	1K	10K	100K
Cap(µ F)				
6.8 ~ 680	0.49	0.73	0.92	1.00
820 ~ 1800	0.60	0.80	0.96	1.00
2200~18000	0.70	0.85	0.98	1.00

(2) Temperature Coefficient

Ambient Temperature(°C)	40	60	70	85	105
Coefficient	2.40	2.10	1.78	1.65	1.00



# Radial Lead Aluminum Electrolytic Capacitors

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### STANDARD RATINGS

<div>WV(vdc) Parameter Cap.(μ F)</div>	6.3				<div>WV(vdc) Parameter Cap.(μ F)</div>	10			
	ΦD×L (mm)	Ripple Current (mArms) 105℃, 100KHz	Impedance			ΦD×L (mm)	Ripple Current (mArms) 105℃, 100KHz	Impedance	
			20℃ 100KHz	−10℃ 100KHz				20℃ 100KHz	−10℃ 100KHz
100	5 × 11	155	0.85	1.7	100	6.3 × 11	170	0.80	1.6
220	6.3 × 11	255	0.35	0.7	220	6.3 × 11	260	0.24	0.48
330	8 × 11.5	330	0.25	0.5	470	8 × 14	550	0.12	0.24
470	8 × 11.5	550	0.14	0.28	680	8 × 20	640	0.085	0.17
560	8 × 16	635	0.12	0.24	1000	10 × 16	1010	0.060	0.12
680	8 × 20	695	0.10	0.20	1000	10 × 20	1060	0.055	0.11
820	8 × 20	795	0.09	0.18	1200	10 × 20	1240	0.050	0.10
1000	10 × 16	820	0.08	0.16	1500	10 × 25	1450	0.045	0.09
1200	10 × 16	1060	0.065	0.13	2200	10 × 28	1700	0.034	0.68
1500	10 × 20	1240	0.055	0.11	2200	13 × 25	1780	0.030	0.060
2200	10 × 20	1450	0.043	0.086	2700	13 × 30	1980	0.028	0.056
2700	13 × 20	1700	0.038	0.072	3300	13 × 30	2230	0.026	0.052
3300	13 × 25	1750	0.034	0.068	4700	16 × 31.5	2510	0.023	0.046
3900	13 × 30	1980	0.031	0.062	6800	16 × 35	2770	0.020	0.040
4700	13 × 30	2230	0.029	0.058	8200	16 × 35.5	3110	0.019	0.038
5600	13 × 34	2460	0.026	0.052	8200	18 × 31.5	3200	0.018	0.036
6800	16 × 31.5	2510	0.024	0.048	10000	18 × 35.5	3250	0.017	0.034
8200	16 × 35.5	2770	0.022	0.044	10000	18 × 40	3300	0.016	0.032
10000	16 × 40	3110	0.020	0.04	12000	18 × 40	3450	0.015	0.030

<div>WV(vdc)</div> <div>Parameter</div> <div>Cap.(μ F)</div>	16				<div>WV(vdc)</div> <div>Parameter</div> <div>Cap.(μ F)</div>	25			
	ΦD×L (mm)	Ripple Current (mArms) 105℃, 100KHz:	Impedance			ΦD×L (mm)	Ripple Current (mArms) 105℃, 100KHz:	Impedance	
			20℃ 100KHz	−10℃ 100KHz				20℃ 100KHz	−10℃ 100KHz
100	6.3 × 11	185	0.35	0.70	47	5 × 11	220	0.50	1.0
120	6.3 × 11	215	0.33	0.66	100	8 × 11.5	270	0.24	0.48
220	8 × 11.5	340	0.16	0.32	220	8 × 14	495	0.18	0.36
330	8 × 14	495	0.12	0.24	330	8 × 16	640	0.12	0.24
470	8 × 16	750	0.09	0.18	470	10 × 20	1060	0.065	0.13
560	8 × 20	810	0.075	0.15	680	10 × 25	1280	0.046	0.096
680	8 × 20	1060	0.065	0.13	820	10 × 25	1450	0.041	0.082
820	10 × 20	1240	0.055	0.11	1000	13 × 25	1700	0.036	0.072
1000	10 × 20	1380	0.047	0.094	1200	13 × 25	1750	0.032	0.064
1200	10 × 20	1450	0.041	0.082	1500	13 × 30	1980	0.029	0.058
2200	13 × 25	1980	0.028	0.056	2200	13 × 34	2460	0.024	0.048
2700	13 × 25	2230	0.025	0.05	2700	16 × 30	2510	0.022	0.044
3300	13 × 30	2460	0.023	0.046	3300	16 × 35	2770	0.020	0.040
3900	16 × 30	2510	0.022	0.044	4700	18 × 35.5	3300	0.018	0.036
4700	16 × 30	2770	0.020	0.040					



# Radial Lead Aluminum Electrolytic Capacitors

## TUL Series

### ■ STANDARD RATINGS

WV(vdc)  Parameter  Cap.(μ F)	35				WV(vdc)  Parameter  Cap.(μ F)	50			
	ΦD×L (mm)	Ripple Current (mArms) 105℃, 100KHz	Impedance			ΦD×L (mm)	Ripple Current (mArms) 105℃, 100KHz	Impedance	
			20℃ 100KHz	−10℃ 100KHz				20℃ 100KHz	−10℃ 100KHz
56	6.3 × 11	255	0.28	0.56	56	8 × 11.5	310	0.25	0.50
100	8 × 11.5	350	0.35	0.70	68	8 × 11.5	415	0.20	0.40
150	8 × 11.5	420	0.25	0.50	100	8 × 16	510	0.14	0.28
220	8 × 20	640	0.12	0.24	150	10 × 16	680	0.10	0.20
330	10 × 16	1060	0.08	0.16	220	10 × 20	1060	0.075	0.15
470	10 × 25	1300	0.055	0.11	330	10 × 25	1230	0.055	0.11
560	10 × 25	1450	0.041	0.082	470	13 × 25	1500	0.044	0.088
680	13 × 25	1700	0.036	0.072	560	13 × 25	1680	0.040	0.080
1000	13 × 25	1980	0.027	0.054	680	13 × 30	1900	0.036	0.072
1200	13 × 30	2230	0.026	0.052	820	13 × 34	2120	0.033	0.066
1500	13 × 35	2460	0.024	0.048	1000	16 × 30	2150	0.030	0.060
1800	16 × 31.5	2930	0.023	0.046	1200	16 × 30	2320	0.028	0.056
2200	16 × 35	2770	0.020	0.040	1500	16 × 35	2650	0.026	0.052
2700	16 × 35	3110	0.018	0.036	2200	18 × 40	2790	0.024	0.048
3300	18 × 40	3300	0.017	0.034					
3900	18 × 40	3680	0.016	0.032					

WV(vdc)  Parameter  Cap.(μ F)	63				WV(vdc)  Parameter  Cap.(μ F)	100			
	ΦD×L (mm)	Ripple Current (mArms) 105℃, 100KHz	Impedance			ΦD×L (mm)	Ripple Current (mArms) 105℃, 100KHz	Impedance	
			20℃ 100KHz	−10℃ 100KHz				20℃ 100KHz	−10℃ 100KHz
47	8×11.5	290	0.56	1.12	10	6.3×11	130	1.77	3.54
56	8×11.5	320	0.38	0.76	22	8×11.5	220	0.85	1.7
68	10×16	480	0.31	0.62	33	8×16	320	0.69	1.38
100	10×16	590	0.24	0.48	47	8×16	370	0.58	1.18
120	10×16	660	0.16	0.32	56	10×16	400	0.42	0.84
150	10×20	790	0.11	0.22	100	10×25	560	0.30	0.60
220	10×25	1020	0.082	0.164	120	10×25	660	0.22	0.44
330	13×25	1200	0.064	0.128	150	13×20	780	0.174	0.348
470	16×25	1750	0.048	0.096	180	13×20	820	0.142	0.284
560	16×25	1830	0.044	0.088	220	13×25	880	0.13	0.26
680	16×31.5	2070	0.040	0.080	330	16×25	1440	0.10	0.20
820	16×31.5	2300	0.035	0.070	470	16×31.5	1650	0.090	0.18
1000	16×35.5	2450	0.031	0.062	560	16×35.5	1720	0.085	0.17
1200	18×31.5	2500	0.026	0.052	680	18×35.5	1790	0.080	0.16
1500	18×31.5	2700	0.025	0.050	820	18×35.5	1840	0.071	0.14