TL series LOW IMPEDANCE,HIGH RELIABILITY

- Low impedance at 100kHz with selected matarials
- Load life:105℃ 5000~6000 hours
- High quality

■SPECIFICATIONS

Item	Performance Characteristics
Operating Temperature Range	-55℃~105℃
Rated Voltage Range	6.3~100V
Capacitance Range	0.47~15000uF
Capacitance Tolerance	±20%,120Hz,20℃
Leakage Current (MAX)	I≤0.01CV or 3uA whichever is greater.(after 2minutes) I=Leakage Currnt(uA),C=Nominal Capacitance(uF),V=Rated Voltage(V)
Dissipation Factor (tan δ)	When nominal capacitance is over 1000uF,tan δ shall be added 0.02 to the listed value with increase of every 1000uF.

Rated voltage(V)	6.3	10	16	25	35	50	63	100
Tan δ	0.22	0.19	0.16	0.14	0.12	0.11	0.09	0.08

MAX (20℃120Hz)

Low Temperature Stability Impedance Ratio

Z(-25℃) /Z (+20℃)	≤2
Z(-55℃) /Z (+20℃)	≤3

(120Hz)

Load Life

After life test at conditions stated in the table below, the capacitors shall meet the following requirement.

Leakage Current	Not more than the specified
Capacitance Change	Within ±20% of initial value (6.3,10VDC : ≤30%)
Dissipation Factor	Not more than 200% of the specified

Case Dia	Life Time (hrs)	
	6.3~16V	25~100V
ΦD=5~8	5000	5000
ΦD=10~18	6000	6000

Shelf Life

After leaving capacitors under no load at 105℃ for 1000hours and applying voltage according to JIS C-5102 4-3,they meet the specified value for load life characteristics listed above.

Leakage Current	Not more than the specified
Capacitance Change	Within ±20% of initial value (6.3,10VDC : ≤30%)
Dissipation Factor	Not more than 200% of the specified

■MULTIPLIER FOR RIPPLE CURRENT

Frequency coefficient

Frequency(Hz) / Cap(uF)	120	1k	10k	≥100k
0.47-150	0.40	0.75	0.90	1.00
220-560	0.50	0.85	0.94	1.00
680-1800	0.60	0.87	0.95	1.00
2200-3900	0.75	0.90	0.95	1.00
4700-8200	0.85	0.95	0.98	1.00

Temperature	40℃	55℃	65℃	75℃	85℃	105℃
Coefficient	2.41	2.41	2.12	2.00	1.70	1.00

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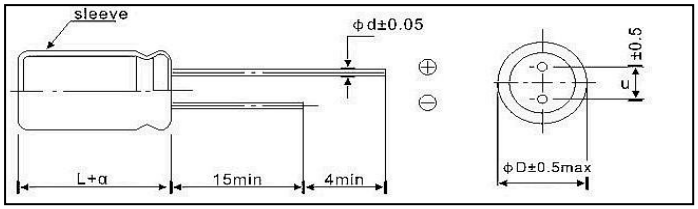
■DIMENSIONS(mm)



ΦD	5	6.3	8	10	13	16	18
Φd	0.5			0.6		0.8	
F	2.0	2.5	3.5	5.0		7.5	
α	L≤16：α=1.5 L≥16：α=2.0						

■STANDARD SIZE,MAXIUM PERMISSIBLE RIPPLE CURRENT,IMPEDANCE

Ripple Current(mA 105℃,100kHz)r.m.s

Rated voltage 6.3V				
Nominal capacitance (uF)	Size	Ripple Current	Impedance(ΩMAX)	
	ΦD×L(mm)		20℃,100kHz	-10℃，100kHz
100	5×11	148	0.88	1.98
220	6.3×12	245	0.40	0.92
330	6.3×12	300	0.40	0.92
470	8×12	391	0.26	0.624
1000	8×16	483	0.22	0.508
	10×13	576	0.17	0.391
1500	10×16	1116	0.101	0.232
2200	10×25	1250	0.084	0.195
	13×21	1296	0.078	0.179
3300	13×21	1496	0.078	0.179
4700	16×25	1639	0.034	0.082
6800	16×25	1900	0.034	0.082
10000	16×31	1994	0.029	0.069
15000	18×35	2195	0.029	0.069

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Ripple Current(mA 105℃,100kHz)r.m.s

Rated voltage 10V				
Nominal capacitance (uF)	Size ΦD×L(mm)	Ripple Current	Impedance(ΩMAX) 20℃,100kHz	Impedance(ΩMAX) -10℃ , 100kHz
100	5×11	170	0.88	1.98
220	6.3×12	300	0.40	0.92
330	8×12	391	0.26	0.624
470	8×12	576	0.26	0.624
680	8×12	622	0.24	0.566
	8×16	650	0.23	0.55
1000	8×14	705	0.17	0.391
	10×13	740	0.13	0.300
	10×16	762	0.12	0.276
	10×20	800	0.11	0.25
1200	10×16	762	0.10	0.23
2200	13×21	1496	0.078	0.179
	10×25	1300	0.070	0.16
3300	13×25	1646	0.060	0.144
4700	16×25	1839	0.034	0.082
6800	16×31	1994	0.029	0.069
10000	18×35	2195	0.029	0.069

Ripple Current(mA 105℃,100kHz)r.m.s

Rated voltage 16V				
Nominal capacitance (uF)	Size ΦD×L(mm)	Ripple Current	Impedance(ΩMAX) 20℃,100kHz	Impedance(ΩMAX) -10℃ , 100kHz
10	5×11	60	1.4	3.2
22	5×11	98	1.0	2.10
47	5×11	148	0.88	1.98
100	5×11	180	0.65	1.30
	6.3×12	245	0.40	0.92
220	6.3×12	264	0.38	0.85
	8×12	391	0.29	0.69
330	8×12	576	0.26	0.624
	8×14	590	0.255	0.58
470	8×12	580	0.255	0.58
	8×14	610	0.25	0.57
	8×16	622	0.24	0.566
	8×20	670	0.20	0.46
	10×13	650	0.22	0.508
	10×16	680	0.19	0.44
680	8×14	650	0.20	0.45
	10×13	650	0.20	0.45
	8×16	680	0.19	0.42
1000	10×16	820	0.158	0.369
	10×20	900	0.140	0.32
1200	10×20	947	0.114	0.269
1500	10×20	1300	0.070	0.165
	13×21	1410	0.058	0.15
2200	13×21	1600	0.057	0.148
	13×25	1646	0.056	0.144
2700	13×30	1694	0.054	0.129
3300	13×25	1700	0.060	0.144
	13×25	1743	0.047	0.113
	16×25	1839	0.034	0.082
4700	16×31	1994	0.029	0.069
6800	18×35	2195	0.029	0.069

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Ripple Current(mA 105℃,100kHz)r.m.s

Rated voltage 25V				
Nominal capacitance (uF)	Size	Ripple Current	Impedance(ΩMAX)	
	ΦD×L(mm)		20℃,100kHz	-10℃，100kHz
4.7	5×11	75	1.65	3.5
10	5×11	88	1.21	2.76
22	5×11	118	1.05	2.37
33	5×11	148	0.88	1.98
47	5×11	220	0.88	1.98
	6.3×12	230	0.75	1.84
68	6.3×12	235	0.72	1.75
82	6.3×12	245	0.55	1.45
100	6.3×12	391	0.40	0.92
150	8×12	450	0.28	0.66
220	8×12	576	0.26	0.624
	8×14	630	0.23	0.58
330	10×13	762	0.17	0.391
	10×16	785	0.145	0.32
	8×20	700	0.185	0.45
470	10×13	860	0.130	0.30
	10×15	995	0.128	0.29
	10×16	1009	0.12	0.276
	8×25	1100	0.118	0.264
	8×20	900	0.13	0.29
680	10×20	1150	0.115	0.24
820	10×25	1280	0.11	0.23
	13×21	1280	0.11	0.23
1000	10×20	1000	0.105	0.229
	10×25	1328	0.10	0.228
	10×30	1350	0.095	0.21
	13×21	1646	0.078	0.179
2200	13×25	1694	0.067	0.155
	16×25	1839	0.034	0.082
2700	16×31	1916	0.032	0.076
3300	16×31	1994	0.029	0.069
4700	18×35	2195	0.029	0.069

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Ripple Current(mA 105℃,100kHz)r.m.s

Rated voltage 35V				
Nominal capacitance (uF)	Size	Ripple Current	Impedance(ΩMAX)	
	ΦD×L(mm)		20℃,100kHz	-10℃，100kHz
10	5×11	118	1.05	2.37
22	5×11	138	1.0	2.31
	6.3×12	160	0.99	2.24
27	5×11	181	0.965	2.175
33	5×11	245	0.88	1.98
	6.3×12	250	0.84	1.86
47	6.3×12	345	0.45	1.12
	8×12	450	0.35	0.81
56	6.3×12	410	0.38	0.86
100	6.3×12	385	0.36	0.85
	8×12	576	0.26	0.624
150	8×12	622	0.24	0.566
220	8×12	550	0.23	0.538
	8×16	669	0.22	0.508
	10×13	762	0.17	0.391
	10×16	880	0.15	0.35
330	10×16	1009	0.12	0.276
	10×20	1480	0.10	0.238
390	13×14	1200	0.11	0.252
470	10×20	1646	0.095	0.228
560	10×25	1694	0.086	0.207
680	13×21	1742	0.077	0.186
1000	13×25	1839	0.060	0.144
1200	16×25	1850	0.055	0.12
1500	16×32	1890	0.051	0.11
2200	16×32	1990	0.029	0.069
3300	18×35	2195	0.029	0.069

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Ripple Current(mA 105℃,100kHz)r.m.s

Rated voltage 50V				
Nominal capacitance (uF)	Size	Ripple Current	Impedance(ΩMAX)	
	ΦD×L(mm)		20℃,100kHz	-10℃，100kHz
0.47	5×11	18	5.5	12.6
1	5×11	29	4.0	8.40
2.2	5×11	43	2.5	5.75
3.3	5×11	53	2.2	5.28
4.7	5×11	88	1.9	4.37
6.8	5×11	118	1.7	3.84
10	5×11	148	1.5	3.30
	6.3×12	155	1.4	3.25
22	5×11	245	0.9	1.98
	6.3×12	340	0.75	1.6
33	6.3×12	265	0.5	1.02
47	6.3×12	245	0.55	1.10
	8×12	265	0.5	1.02
56	6.3×12	650	0.28	0.736
68	8×12	720	0.27	0.68
100	8×12	762	0.26	0.621
	8×14	800	0.24	0.58
220	8×20	950	0.15	0.322
	10×16	1009	0.12	0.276
	10×20	1100	0.11	0.25
330	10×20	1320	0.095	0.228
	13×21	1580	0.090	0.208
470	10×20	1350	0.087	0.202
	10×30	1480	0.056	0.12
	13×21	1450	0.080	0.185
	13×31	1780	0.075	0.16
560	13×25	1480	0.056	0.12
680	13×21	1800	0.075	0.158
	13×31	1840	0.068	0.145
820	13×31	1900	0.060	0.13
1000	16×30	2094	0.032	0.075
2200	18×35	2195	0.029	0.067

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Ripple Current(mA 105℃,100kHz)r.m.s

Rated voltage 63V				
Nominal capacitance (uF)	Size ΦD×L(mm)	Ripple Current	Impedance(ΩMAX) 20℃,100kHz	-10℃ , 100kHz
10	5×11	88	2.5	5.75
22	6.3×12	138	1.2	2.76
33	6.3×12	160	1.2	2.76
47	8×12	210	0.65	1.369
56	8×12	215	0.60	1.24
82	8×16	220	0.40	0.86
100	10×13	300	0.45	0.99
	10×20	400	0.43	0.85
120	10×16	450	0.37	0.78
150	10×20	500	0.23	0.52
220	10×20	520	0.21	0.483
	13×21	580	0.19	0.41
330	10×25	640	0.17	0.38
	13×21	660	0.16	0.352
	18×21	680	0.12	0.252
470	13×25	750	0.14	0.322
	16×25	900	0.125	0.28
	18×21	720	0.11	0.23
1000	16×31	1390	0.060	0.126
	16×36	1450	0.055	0.11yt

Ripple Current(mA 105℃,100kHz)r.m.s

Rated voltage 100V				
Nominal capacitance (uF)	Size ΦD×L(mm)	Ripple Current	Impedance(ΩMAX) 20℃,100kHz	-10℃ , 100kHz
0.47	5×11	16	9.0	20.7
1	5×11	20	7.0	16.8
2.2	5×11	30	6.0	13.8
3.3	5×11	40	5.0	10.5
4.7	5×11	65	4.5	9.90
10	6.3×12	138	2.2	5.06
	8×12	150	1.8	4.15
22	8×12	160	1.1	2.64
	10×16	180	1.7	4.08
33	8×12	200	0.95	2.40
	10×13	130	0.76	1.78
47	8×14	235	0.75	1.68
	10×13	260	0.60	1.45
	10×16	290	0.53	1.27
68	10×16	350	0.48	1.04
100	10×20	390	0.39	0.96
	13×17	410	0.38	0.90
	13×21	430	0.37	0.85
120	13×21	540	0.32	0.72
150	13×21	580	0.25	0.54
220	13×25	610	0.20	0.46
	16×25	660	0.12	0.252
330	16×25	900	0.11	0.252
680	18×32	1380	0.08	0.195

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