

## TY

series

### LOW IMPEDANCE, HIGH RELIABILITY

- Low impedance at 100kHz with selected materials
- Load life: 105°C 4000~10,000 hours
- High quality

### ■ SPECIFICATIONS

Item	Performance Characteristics																														
Operating Temperature Range	-40°C~105°C																														
Rated Voltage Range	6.3~100V																														
Capacitance Range	0.47~18000uF																														
Capacitance Tolerance	±20%, 120Hz, 20°C																														
Leakage Current (MAX)	$I \leq 0.01CV$ or $3\mu A$ whichever is greater. (after 2 minutes) $I$ =Leakage Current( $\mu A$ ), $C$ =Nominal Capacitance( $\mu F$ ), $V$ =Rated Voltage(V)																														
Dissipation Factor (tan $\delta$ )	When nominal capacitance is over 1000uF, tan $\delta$ shall be added 0.02 to the listed value with increase of every 1000uF. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Rated voltage(V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>80</th> <th>100</th> </tr> </thead> <tbody> <tr> <td>Tan <math>\delta</math></td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.09</td> <td>0.09</td> <td>0.08</td> </tr> </tbody> </table> MAX (20°C 120Hz)	Rated voltage(V)	6.3	10	16	25	35	50	63	80	100	Tan $\delta$	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.09	0.08										
Rated voltage(V)	6.3	10	16	25	35	50	63	80	100																						
Tan $\delta$	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.09	0.08																						
Low Temperature Stability Impedance Ratio	<table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Rated voltage(V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>80</th> <th>100</th> </tr> </thead> <tbody> <tr> <td>Z(-25°C) / Z (+20°C)</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> <td>2</td> </tr> <tr> <td>Z(-55°C) / Z (+20°C)</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> <td>3</td> </tr> </tbody> </table> MAX (20°C 120Hz)	Rated voltage(V)	6.3	10	16	25	35	50	63	80	100	Z(-25°C) / Z (+20°C)	4	3	2	2	2	2	2	2	2	Z(-55°C) / Z (+20°C)	8	6	4	3	3	3	3	3	3
Rated voltage(V)	6.3	10	16	25	35	50	63	80	100																						
Z(-25°C) / Z (+20°C)	4	3	2	2	2	2	2	2	2																						
Z(-55°C) / Z (+20°C)	8	6	4	3	3	3	3	3	3																						
Load Life	After life test at conditions stated in the table below, the capacitors shall meet the following requirement. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Leakage Current</th> <th>Not more than the specified</th> <th>Case Dia</th> <th colspan="2">Life Time ( hrs )</th> </tr> </thead> <tbody> <tr> <td>Capacitance Change</td> <td>Within ±20% of initial value</td> <td></td> <td>6.3~10V</td> <td>16~100V</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than 200% of the specified</td> <td>ΦD=5~6.3</td> <td>4000</td> <td>5000</td> </tr> <tr> <td></td> <td></td> <td>ΦD=8~10</td> <td>6000</td> <td>7000</td> </tr> <tr> <td></td> <td></td> <td>ΦD=13~18</td> <td>8000</td> <td>10000</td> </tr> </tbody> </table>	Leakage Current	Not more than the specified	Case Dia	Life Time ( hrs )		Capacitance Change	Within ±20% of initial value		6.3~10V	16~100V	Dissipation Factor	Not more than 200% of the specified	ΦD=5~6.3	4000	5000			ΦD=8~10	6000	7000			ΦD=13~18	8000	10000					
Leakage Current	Not more than the specified	Case Dia	Life Time ( hrs )																												
Capacitance Change	Within ±20% of initial value		6.3~10V	16~100V																											
Dissipation Factor	Not more than 200% of the specified	ΦD=5~6.3	4000	5000																											
		ΦD=8~10	6000	7000																											
		ΦD=13~18	8000	10000																											
Shelf Life	After leaving capacitors under no load at 105°C for 1000hours and applying voltage according to JIS C-5102 4-3, they meet the specified value for load life characteristics listed above.																														
Standard	According to JIS C 5141																														

### ■ MULTIPLIER FOR RIPPLE CURRENT

Frequency coefficient

Frequency(Hz) \ Cap(uF)	120	1k	10k	≥100k
0.47-80	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	0.98	1.00
4700-18000	0.85	0.95	0.98	1.00

Temperature coefficient

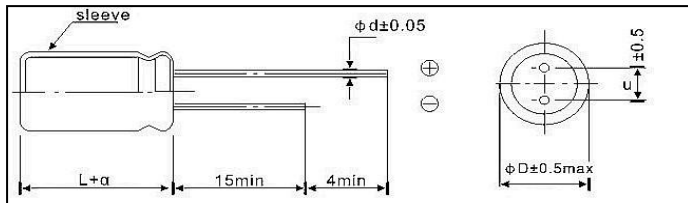
Temperature	40°C	55°C	65°C	75°C	85°C	105°C
Coefficient	2.41	2.41	2.12	2.00	1.70	1.00

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LOW IMPEDANCE, HIGH RELIABILITY

### ■ 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, MAXIMUM PERMISSIBLE RIPPLE CURRENT, IMPEDANCE

Ripple Current(mA 105°C, 100kHz)r.m.s

Rated voltage 6.3V				
Nominal capacitance (uF)	Size ΦD×L(mm)	Ripple Current	Impedance(ΩMAX)	
			20°C, 100kHz	-10°C, 100kHz
150	5×11	210	0.58	2.3
330	6.3×12	340	0.22	0.87
680	8×12	640	0.13	0.52
820	10×13	865	0.080	0.32
1000	8×16	840	0.087	0.35
1200	8×20	1050	0.069	0.27
	10×16	1210	0.060	0.24
1500	10×20	1400	0.046	0.18
1800	13×17	1450	0.049	0.19
2200	10×25	1650	0.042	0.17
2700	10×30	1910	0.031	0.12
	16×18	1940	0.042	0.12
3300	13×21	1900	0.035	0.12
3900	13×25	2230	0.027	0.089
	18×15	2210	0.043	0.11
4700	13×30	2650	0.024	0.078
5600	13×35	2880	0.020	0.065
	16×22	2530	0.027	0.078
6800	13×40	3350	0.017	0.056
	16×25	2930	0.021	0.060
	18×21	2860	0.026	0.067
8200	16×32	3450	0.017	0.050
10000	16×35	3610	0.015	0.044
	18×25	3140	0.019	0.049
12000	16×40	4080	0.013	0.038
15000	18×35	4220	0.014	0.038
18000	18×40	4280	0.012	0.032

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LOW IMPEDANCE, HIGH RELIABILITY

Ripple Current(mA 105°C,100kHz)r.m.s

Rated voltage 10V				
Nominal capacitance (uF)	Size ΦD×L(mm)	Ripple Current	Impedance(ΩMAX)	
			20°C,100kHz	-10°C , 100kHz
100	5×11	210	0.58	2.3
220	6.3×12	340	0.22	0.87
470	8×12	640	0.13	0.52
680	8×16	840	0.087	0.35
	10×13	865	0.080	0.32
1000	8×20	1050	0.069	0.27
	10×16	1210	0.060	0.24
1200	10×20	1400	0.046	0.18
1500	10×25	1650	0.042	0.17
	13×17	1450	0.049	0.16
2200	10×30	1910	0.031	0.12
	13×21	1900	0.035	0.12
	16×16	1940	0.042	0.12
2700	18×16	2210	0.043	0.11
3300	13×25	2230	0.027	0.089
3900	13×30	2650	0.024	0.078
	16×22	2530	0.027	0.078
4700	13×35	2880	0.020	0.065
5600	13×40	3350	0.017	0.056
	16×25	2930	0.021	0.060
	18×21	2860	0.026	0.067
6800	16×32	3450	0.017	0.050
	18×25	3140	0.019	0.049
8200	16×35	3610	0.015	0.044
10000	16×40	4080	0.013	0.038
	18×35	4220	0.014	0.038
12000	18×40	4280	0.012	0.032

Ripple Current(mA 105°C,100kHz)r.m.s

Rated voltage 16V				
Nominal capacitance (uF)	Size ΦD×L(mm)	Ripple Current	Impedance(ΩMAX)	
			20°C,100kHz	-10°C , 100kHz
56	5×11	210	0.58	2.3
120	6.3×12	340	0.22	0.87
330	8×12	640	0.13	0.52
470	8×16	840	0.087	0.35
	8×20	885	0.080	0.32
680	10×16	865	0.085	0.34
	10×20	1050	0.069	0.27
	13×17	1210	0.060	0.24
1000	10×25	1400	0.046	0.18
	13×17	1450	0.049	0.16
1200	10×25	1650	0.042	0.17
1500	10×20	1600	0.050	0.165
	10×30	1910	0.031	0.12
	13×21	1900	0.035	0.12
	16×18	1940	0.042	0.12
2200	13×25	2230	0.027	0.089
	18×16	2210	0.043	0.11
2700	13×30	2650	0.024	0.078
	16×22	2530	0.027	0.078
3300	13×35	2880	0.020	0.065
3900	13×40	3350	0.017	0.056
	16×25	2930	0.021	0.060
4700	18×21	2860	0.026	0.067
	16×32	3450	0.017	0.050
	18×25	3140	0.019	0.049
5600	16×35	3610	0.015	0.044
	18×32	4170	0.015	0.040
6800	16×40	4080	0.013	0.038
8200	18×35	4220	0.014	0.038
10000	18×40	4280	0.012	0.032

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LOW IMPEDANCE, HIGH RELIABILITY

Ripple Current(mA 105°C,100kHz)r.m.s

Rated voltage 25V

Nominal capacitance (uF)	Size	Ripple Current	Impedance(ΩMAX)	
	ΦD×L(mm)		20°C,100kHz	-10°C , 100kHz
47	5×11	210	0.58	2.3
100	6.3×12	340	0.22	0.87
180	8×12	560	0.18	0.60
220	8×12	640	0.13	0.52
270	8×12	700	0.12	0.48
330	8×12	780	0.10	0.43
	8×16	840	0.087	0.35
	10×13	865	0.080	0.32
470	8×20	1050	0.069	0.27
	10×16	1210	0.060	0.24
680	10×20	1400	0.046	0.18
	13×17	1450	0.049	0.16
820	10×25	1650	0.042	0.17
1000	10×30	1910	0.031	0.12
	13×21	1900	0.035	0.12
	16×18	1940	0.042	0.12
1200	18×16	2210	0.043	0.11
1500	13×25	2230	0.027	0.089
1800	13×30	2650	0.024	0.078
	16×22	2530	0.027	0.078
2200	13×35	2880	0.020	0.065
	18×22	2860	0.026	0.067
2700	13×40	3350	0.017	0.056
	16×25	2930	0.021	0.060
3300	16×32	3450	0.017	0.050
	18×25	3140	0.019	0.049
3900	16×35	3610	0.015	0.044
	18×32	4170	0.015	0.040
4700	16×40	4080	0.013	0.038
	18×35	4220	0.014	0.038
5600	18×40	4280	0.012	0.032

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**LOW IMPEDANCE, HIGH RELIABILITY**

Ripple Current(mA 105°C,100kHz)r.m.s

Rated voltage 35V				
Nominal capacitance (uF)	Size	Ripple Current	Impedance(ΩMAX)	
	ΦD×L(mm)		20°C,100kHz	-10°C , 100kHz
33	5×11	210	0.58	2.3
56	6.3×12	340	0.22	0.87
150	8×12	640	0.13	0.52
220	8×16	840	0.087	0.35
	10×13	865	0.080	0.32
270	8×20	1050	0.069	0.27
330	10×16	1210	0.060	0.24
470	10×20	1400	0.046	0.18
	13×17	1450	0.049	0.16
560	10×25	1650	0.042	0.17
680	10×30	1910	0.031	0.12
	13×20	1900	0.035	0.12
	16×18	1940	0.042	0.12
1000	13×25	2230	0.027	0.089
	18×16	2210	0.043	0.11
1200	13×30	2650	0.024	0.078
	16×22	2530	0.027	0.078
1500	13×35	2880	0.020	0.065
1800	13×40	3350	0.017	0.056
	16×25	2930	0.021	0.060
	18×21	2860	0.026	0.067
2200	16×32	3450	0.017	0.050
	18×25	3140	0.019	0.049
2700	16×35	3610	0.015	0.044
	18×32	4170	0.015	0.040
3300	16×40	4080	0.013	0.038
	18×35	4220	0.014	0.038
3900	18×40	4280	0.012	0.032

**TY**

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LOW IMPEDANCE, HIGH RELIABILITY

Ripple Current(mA 105°C,100kHz)r.m.s

Rated voltage 50V				
Nominal capacitance (uF)	Size	Ripple Current	Impedance(QMAX)	
	ΦD×L(mm)		20°C,100kHz	-10°C , 100kHz
0.47	5×11	17	5.5	22.0
1.0	5×11	30	4.0	16.0
2.2	5×11	43	2.5	10.0
3.3	5×11	53	2.2	8.8
4.7	5×11	88	1.9	7.6
10	5×11	100	1.5	6.0
22	5×11	180	0.70	2.8
	6.3×12	200	0.68	2.64
56	6.3×12	295	0.30	1.2
100	8×12	555	0.17	0.68
	8×16	570	0.165	0.65
120	8×16	730	0.12	0.48
150	10×13	760	0.12	0.48
180	8×20	910	0.091	0.36
220	10×16	1050	0.084	0.34
	10×20	1120	0.080	0.30
270	10×20	1220	0.060	0.24
	13×17	1260	0.061	0.20
330	10×25	1440	0.055	0.22
470	10×30	1690	0.043	0.17
	13×21	1660	0.045	0.15
	16×18	1690	0.055	0.17
560	13×25	1950	0.034	0.11
	18×16	1930	0.054	0.15
680	13×30	2310	0.030	0.10
	16×22	2200	0.047	0.18
	18×21	2250	0.043	0.15
820	13×35	2510	0.025	0.083
	16×22	2210	0.034	0.10
1000	13×40	2920	0.021	0.069
	16×25	2555	0.025	0.075
	18×22	2490	0.036	0.097
1200	16×32	3010	0.022	0.066
	18×25	2740	0.026	0.070
1500	16×35	3150	0.019	0.057
1800	16×40	3710	0.016	0.048
	18×32	3635	0.021	0.057
2200	18×35	3680	0.017	0.046
2700	18×40	3800	0.014	0.038

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**LOW IMPEDANCE, HIGH RELIABILITY**

Ripple Current(mA 105°C,100kHz)r.m.s

**Rated voltage 63V**

Nominal capacitance (uF)	Size	Ripple Current	Impedance(ΩMAX)	
	ΦD×L(mm)		20°C,100kHz	-10°C , 100kHz
15	5×11	165	0.88	3.5
	6.3×12	200	0.754	2.94
33	6.3×12	265	0.35	1.4
56	8×12	500	0.22	0.88
82	8×16	665	0.16	0.64
	10×13	690	0.11	0.44
120	8×20	820	0.12	0.48
	10×16	950	0.076	0.31
180	10×20	1150	0.056	0.23
	13×17	1150	0.072	0.29
220	10×20	1200	0.052	0.215
	10×25	1350	0.046	0.19
270	13×21	1500	0.041	0.13
330	10×25	1410	0.069	0.28
390	13×25	1900	0.031	0.093
470	13×30	2300	0.028	0.084
	16×22	2000	0.032	0.096
560	13×35	2500	0.024	0.072
680	13×40	2800	0.021	0.063
	16×25	2600	0.025	0.075
	18×21	2500	0.030	0.090
820	16×32	2850	0.021	0.063
	18×25	2800	0.024	0.072
1000	16×35	2900	0.019	0.057
1200	16×40	3400	0.018	0.054
	18×32	3300	0.020	0.060
1500	18×35	3400	0.018	0.054
1800	18×40	3500	0.017	0.051

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LOW IMPEDANCE, HIGH RELIABILITY

Ripple Current(mA 105°C,100kHz)r.m.s

Nominal capacitance (uF)	Size ΦD×L(mm)	Rated voltage 80V		
		Ripple Current	Impedance(QMAX)	
			20°C,100kHz	-10°C , 100kHz
68	10×13	480	0.17	0.66
100	10×16	600	0.11	0.47
120	10×20	800	0.084	0.34
150	10×25	900	0.069	0.28
	13×17	750	0.11	0.34
220	13×20	1100	0.062	0.18
330	13×25	1250	0.047	0.14
	16×22	1350	0.048	0.15
390	13×30	1500	0.042	0.13
470	13×35	1650	0.036	0.11
	16×25	1700	0.038	0.12
	18×22	1500	0.045	0.14
560	13×40	1800	0.032	0.095
680	16×32	1850	0.032	0.095
	18×25	1750	0.036	0.11
820	16×35	2000	0.029	0.086
	18×32	1900	0.030	0.090
1000	16×40	2200	0.027	0.081
	18×35	2200	0.027	0.081
1200	18×40	2700	0.026	0.077

Ripple Current(mA 105°C,100kHz)r.m.s

Nominal capacitance (uF)	Size ΦD×L(mm)	Rated voltage 80V		
		Ripple Current	Impedance(QMAX)	
			20°C,100kHz	-10°C , 100kHz
10	6.3×12	175	1.2	4.8
6.8	5×11	125	1.4	5.6
15	6.3×12	205	0.57	2.3
27	8×12	355	0.36	1.4
33	8×12	400	0.31	1.2
39	8×16	450	0.25	1.0
47	10×13	480	0.17	0.66
56	8×20	565	0.19	0.76
68	10×16	600	0.11	0.47
82	10×20	800	0.084	0.34
100	13×17	750	0.11	0.34
120	10×25	900	0.069	0.28
150	13×21	1100	0.062	0.18
220	13×25	1250	0.047	0.14
	16×22	1350	0.048	0.15
270	13×30	1500	0.042	0.13
330	13×35	1650	0.036	0.11
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390	13×40	1800	0.032	0.095
470	16×32	1850	0.032	0.095
	18×25	1750	0.036	0.11
560	16×35	2000	0.029	0.086
	18×32	1900	0.030	0.090
680	16×40	2200	0.027	0.081
	18×35	2200	0.027	0.081
820	18×40	2700	0.026	0.077