



# ZH series

## ZH Series 105°C Miniaturized, Long Life, Low impedance

### Features

- ◆ Long Life: 105°C 6000~10000hours.
- ◆ RoHS compliance.

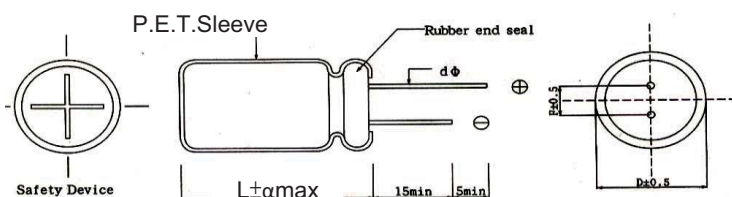
### Specifications

Item	Performance Characteristics																											
Operating Temperature Range	-40 to +105°C																											
Rated Voltage Range	6.3~100V.DC																											
Capacitance Tolerance	±20% (120Hz, +20°C)																											
Leakage Current (+20°C, max.)	$I \leq 0.01CV$ or $3\mu A$ whichever is greater. (After 2 minutes) $I$ = Leakage Current( $\mu A$ ) $C$ = Rated Capacitance $V$ = Rated voltage(V)																											
Dissipation Factor (tan $\delta$ , at 20°C, 120Hz)	<table border="1"> <tr> <td>working voltage(VDC)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>63</td> <td>80</td> <td>100</td> </tr> <tr> <td>D.F.(%)max</td> <td>22</td> <td>19</td> <td>16</td> <td>14</td> <td>12</td> <td>9</td> <td>8</td> <td>8</td> </tr> </table> <p>For capacitance &gt; 1000<math>\mu F</math>, add 2% per another 1000<math>\mu F</math></p>	working voltage(VDC)	6.3	10	16	25	35	63	80	100	D.F.(%)max	22	19	16	14	12	9	8	8									
working voltage(VDC)	6.3	10	16	25	35	63	80	100																				
D.F.(%)max	22	19	16	14	12	9	8	8																				
Low Temperature Characteristics (at 120Hz)	<p>Impedance ratio max</p> <table border="1"> <tr> <td>Working Voltage(VDC)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>63</td> <td>80</td> <td>100</td> </tr> <tr> <td>Z-25°C / Z+20°C</td> <td>2</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-40°C / Z+20°C</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table> <p>For capacitance &gt; 1000<math>\mu F</math>, add 0.5 per another 1000<math>\mu F</math> for -25°C/+20°C add 1 per another 1000<math>\mu F</math> for -40°C/+20°C</p>	Working Voltage(VDC)	6.3	10	16	25	35	63	80	100	Z-25°C / Z+20°C	2	2	2	2	2	2	2	2	Z-40°C / Z+20°C	3	3	3	3	3	3	3	3
Working Voltage(VDC)	6.3	10	16	25	35	63	80	100																				
Z-25°C / Z+20°C	2	2	2	2	2	2	2	2																				
Z-40°C / Z+20°C	3	3	3	3	3	3	3	3																				
Endurance	<p>Test conditions</p> <p>Duration time :As right</p> <p>Ambient temperature :+105°C</p> <p>Applied voltage :Rated DC working voltage</p> <p>After test requirement at +20°C</p> <p>Capacitance change :<math>\leq \pm 25\%</math> of the initial measured value(6.3V, 10V:±30%)</p> <p>Dissipation factor :<math>\leq 200\%</math> of the initial specified value</p> <p>Leakage current :<math>\leq</math> The initial specified value</p> <table border="1"> <tr> <td>D<math>\phi</math></td> <td>life hours</td> </tr> <tr> <td><math>\leq 6.3</math></td> <td>6000</td> </tr> <tr> <td>8</td> <td>8000</td> </tr> <tr> <td><math>\geq 10</math></td> <td>10000</td> </tr> </table>	D $\phi$	life hours	$\leq 6.3$	6000	8	8000	$\geq 10$	10000																			
D $\phi$	life hours																											
$\leq 6.3$	6000																											
8	8000																											
$\geq 10$	10000																											
Shelf Life	<p>Test conditions</p> <p>Duration time :1000Hrs</p> <p>Ambient temperature :+105°C</p> <p>Applied voltage :None</p> <p>After test requirement at +20°C: Same limits as Endurance.</p> <p>Pre-treatment for measurements shall be conducted after application of DC working voltage for 30 minutes.</p>																											

### Multiplier for Ripple Current vs. Frequency

CAP( $\mu F$ )\Frequency(Hz)	120	1K	10K	100KHz $\leq$
8.2~33	0.42	0.70	0.90	1.00
47~270	0.50	0.73	0.92	1.00
330~680	0.55	0.77	0.94	1.00
820~1800	0.60	0.80	0.96	1.00
2200~8200	0.70	0.85	0.98	1.00

### Diagram of Dimensions:(unit:mm)



$\phi D$	5	6	8	10	13	16	18
F	2	3	3.5	5		7.5	
$\phi d$	0.5		$L < 20$ 0.5	$L \geq 20$ 0.6	0.6	0.8	
$\alpha$	$L \leq 16: \alpha = 1.5$ $L \geq 20: \alpha = 2.0$						

## Case Size

WV (Vdc)	Cap (uF)	Size mm	Rated Ripple current (Arms/105°C /100KHz)	Max ESR( Ω) at 20°C /100kHz	WV (Vdc)	Cap (uF)	Size mm	Rated Ripple current (Arms/105°C /100KHz)	Max ESR( Ω) at 20°C /100kHz
6.3	220	5×11	355	0.230	25	2700	13×35	3580	0.017
6.3	470	6.3×11	550	0.100	25	3300	16×25	3640	0.018
6.3	820	8×11.5	955	0.060	35	47	5×11	355	0.500
6.3	1200	8×16	1260	0.050	35	100	6.3×11	550	0.110
6.3	1200	10×12.5	1340	0.044	35	220	8×11.5	955	0.062
6.3	1500	8×20	1510	0.034	35	270	8×16	1260	0.060
6.3	1800	10×16	1770	0.033	35	330	10×12.5	1340	0.043
6.3	2200	10×20	1970	0.025	35	390	8×20	1510	0.032
6.3	2700	10×25	2260	0.023	35	470	10×16	1770	0.033
6.3	3900	13×20	2490	0.022	35	560	10×20	1970	0.030
6.3	4700	13×25	2910	0.020	35	680	10×25	2260	0.028
6.3	5600	13×30	3460	0.018	35	820	10×25	2360	0.027
6.3	6800	13×35	3580	0.017	35	1000	10×30	2580	0.025
6.3	6800	16×21	3260	0.020	35	1000	13×20	2490	0.022
6.3	8200	16×25	3640	0.018	35	1200	13×25	2910	0.018
10	150	5×11	355	0.230	35	1500	13×30	3460	0.018
10	330	6.3×11	550	0.100	35	1500	16×21	3260	0.023
10	680	8×11.5	955	0.060	35	1800	13×35	3580	0.017
10	1000	8×16	1260	0.050	35	2200	16×25	3640	0.018
10	1000	10×12.5	1340	0.049	50	27	5×11	248	0.400
10	1500	8×20	1510	0.034	50	56	6.3×11	395	0.150
10	1500	10×16	1770	0.033	50	100	8×11.5	755	0.110
10	1800	10×20	1970	0.025	50	120	8×16	960	0.065
10	2200	10×25	2260	0.023	50	150	10×12.5	989	0.067
10	2700	13×20	2440	0.022	50	180	8×20	1200	0.051
10	3300	13×20	2490	0.021	50	220	10×16	1380	0.046
10	3900	13×25	2910	0.020	50	270	10×20	1590	0.033
10	4700	13×30	3460	0.018	50	330	10×20	1600	0.033
10	4700	16×21	3260	0.020	50	330	10×25	1880	0.032
10	5600	13×35	3580	0.017	50	470	13×20	2060	0.032
10	6800	16×25	3640	0.018	50	560	13×25	2420	0.028
16	100	5×11	355	0.230	50	680	13×30	2870	0.026
16	220	6.3×11	550	0.100	50	820	13×35	2970	0.024
16	470	8×11.5	955	0.060	50	820	16×21	2740	0.028
16	680	8×16	1260	0.050	50	1000	16×25	3020	0.026
16	680	10×12.5	1340	0.044	63	18	5×11	183	0.980
16	1000	8×20	1510	0.034	63	47	6.3×11	288	0.600
16	1000	10×16	1770	0.033	63	82	8×11.5	535	0.300
16	1500	10×20	1970	0.025	63	100	8×16	698	0.200
16	1800	10×25	2260	0.023	63	120	10×12.5	735	0.165
16	2200	13×20	2490	0.022	63	150	8×20	871	0.140
16	2700	13×25	2910	0.020	63	180	10×16	1008	0.130
16	3300	13×30	3460	0.018	63	220	10×20	1110	0.120
16	3300	16×21	3260	0.023	63	270	10×20	1210	0.086
16	3900	13×35	3580	0.017	63	270	13×16	1210	0.090
16	4700	16×25	3640	0.018	63	270	13×20	1330	0.088
25	68	5×11	355	0.240	63	330	10×25	1420	0.076
25	150	6.3×11	550	0.100	63	330	13×25	1610	0.073
25	330	8×11.5	955	0.060	63	390	13×20	1580	0.066
25	390	8×16	1260	0.050	63	470	13×25	2000	0.048
25	470	10×12.5	1340	0.044	63	470	13×30	2170	0.046
25	560	8×20	1510	0.034	63	470	16×21	2090	0.047
25	680	10×16	1770	0.033	63	560	13×30	2420	0.040
25	820	10×20	1970	0.025	63	560	16×21	2110	0.048
25	1000	10×20	2045	0.024	63	680	13×35	2630	0.038
25	1000	10×25	2260	0.023	63	820	13×40	2950	0.032
25	1500	13×20	2490	0.022	63	820	16×25	2740	0.037
25	1800	13×25	2910	0.020	63	820	18×21	2510	0.043
25	2200	13×30	3460	0.018	63	1200	16×31.5	3000	0.029
25	2200	16×21	3260	0.020	63	1200	18×25	2810	0.036

## Case Size

WV (Vdc)	Cap (uF)	Size mm	Rated Ripple current (Arms/105 °C /100KHz)	Max ESR( Ω) at 20 °C /100kHz
63	1500	16×35.5	3050	0.026
63	1500	18×31.5	3310	0.030
63	1800	16×41	3580	0.024
63	1800	18×35.5	3580	0.025
63	2200	18×41	3680	0.023
80	12	5×11	173	1.540
80	33	6.3×11	277	0.630
80	56	8×11.5	472	0.400
80	68	8×16	595	0.280
80	82	10×12.5	634	0.250
80	100	8×20	745	0.210
80	120	10×16	790	0.187
80	180	10×20	1050	0.130
80	180	13×16	985	0.140
80	220	10×25	1180	0.120
80	270	13×20	1440	0.094
80	330	13×25	1630	0.066
80	390	13×30	1960	0.056
80	390	16×21	1760	0.064
80	470	13×35	2150	0.047
80	560	13×40	2350	0.045
80	560	16×25	2220	0.049
80	560	18×21	1960	0.059
80	680	16×31.5	2410	0.038
80	820	16×35.5	2610	0.032
80	820	18×25	2280	0.042
80	1000	16×41	2870	0.033
80	1000	18×31.5	2480	0.036
80	1200	18×35.5	2870	0.033
80	1500	18×41	3520	0.032
100	8.2	5×11	173	1.540
100	18	6.3×11	277	0.627
100	33	8×11.5	472	0.420
100	47	8×16	595	0.400
100	56	10×12.5	634	0.350
100	68	8×20	745	0.300
100	82	10×16	790	0.220
100	100	10×20	1050	0.150
100	100	13×16	985	0.160
100	120	10×25	1180	0.140
100	150	13×20	1440	0.094
100	220	13×25	1660	0.066
100	270	13×30	1960	0.056
100	270	16×21	1760	0.064
100	330	13×35	2150	0.047
100	390	13×40	2350	0.040
100	390	16×25	2220	0.049
100	390	18×21	1960	0.059
100	470	16×31.5	2410	0.036
100	470	18×25	2280	0.042
100	560	16×35.5	2610	0.032
100	560	18×31.5	2480	0.034
100	680	16×41	2870	0.030
100	680	18×35.5	2870	0.030
100	820	18×41	3520	0.029