

ZLH SERIES
105°C Miniaturized, Long Life, Low Impedance

*Load Life : 105°C 6000~10000 hours.

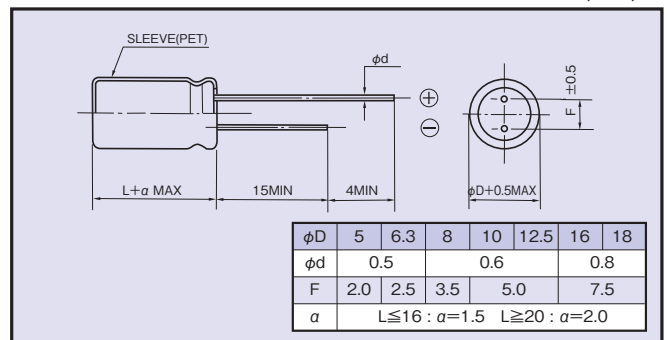
RoHS compliance


◆SPECIFICATIONS

| Items | Characteristics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---------------------|---|-----------|-----------------|--------------------|--|----------|------|-----------------|------------------------------------|------------------|------|------|------|---------|-------|------|------|------|------|------------------|---|---|---|---|---|---|---|---|---|
| Category Temperature Range | -40~+105°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated Voltage Range | 6.3~100Vdc | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacitance Tolerance | ±20% (20°C, 120Hz) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leakage Current(MAX) | I=0.01CV or 3µA whichever is greater.(After 2 minutes) I=Leakage Current(µA) C=Capacitance(µF) V=Rated Voltage(Vdc) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissipation Factor(MAX) (tanδ) | <table border="1"> <thead> <tr> <th>Rated Voltage (Vdc)</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>tanδ</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>0.08</td> <td>0.08</td> </tr> </tbody> </table> (20°C, 120Hz) When capacitance is over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF. | Rated Voltage (Vdc) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | tanδ | 0.22 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 | 0.08 | | | | | | | | | | |
| Rated Voltage (Vdc) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | | | | | | | | | | | | | | | | | | | | | | |
| tanδ | 0.22 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 | 0.08 | | | | | | | | | | | | | | | | | | | | | | |
| Endurance | After applying rated voltage with rated ripple current for specified time at 105°C, the capacitors shall meet the following requirements. <table border="1"> <thead> <tr> <th>Capacitance Change</th> <td>Within ±25% of the initial value. (6.3Vdc, 10Vdc:±30%)</td> <th>Case Size</th> <th>Life Time (hrs)</th> </tr> </thead> <tbody> <tr> <td>Dissipation Factor</td> <td>Not more than 200% of the specified value.</td> <td>φD ≤ 6.3</td> <td>6000</td> </tr> <tr> <td>Leakage Current</td> <td>Not more than the specified value.</td> <td>φD = 8</td> <td>8000</td> </tr> <tr> <td></td> <td></td> <td>φD ≥ 10</td> <td>10000</td> </tr> </tbody> </table> | Capacitance Change | Within ±25% of the initial value. (6.3Vdc, 10Vdc:±30%) | Case Size | Life Time (hrs) | Dissipation Factor | Not more than 200% of the specified value. | φD ≤ 6.3 | 6000 | Leakage Current | Not more than the specified value. | φD = 8 | 8000 | | | φD ≥ 10 | 10000 | | | | | | | | | | | | | | |
| Capacitance Change | Within ±25% of the initial value. (6.3Vdc, 10Vdc:±30%) | Case Size | Life Time (hrs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissipation Factor | Not more than 200% of the specified value. | φD ≤ 6.3 | 6000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leakage Current | Not more than the specified value. | φD = 8 | 8000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | φD ≥ 10 | 10000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Low Temperature Stability Impedance Ratio(MAX) | <table border="1"> <thead> <tr> <th>Rated Voltage (Vdc)</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>2</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> <td>3</td> </tr> </tbody> </table> (120Hz) | Rated Voltage (Vdc) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | Z(-25°C)/Z(20°C) | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | Z(-40°C)/Z(20°C) | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Rated Voltage (Vdc) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | | | | | | | | | | | | | | | | | | | | | | |
| Z(-25°C)/Z(20°C) | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | |
| Z(-40°C)/Z(20°C) | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | |

◆MULTIPLIER FOR RIPPLE CURRENT

| Frequency (Hz) | | 120 | 1k | 10k | 100k≤ |
|----------------|-------------|------|------|------|-------|
| Coefficient | 8.2~33µF | 0.42 | 0.70 | 0.90 | 1.00 |
| | 47~270µF | 0.50 | 0.73 | 0.92 | 1.00 |
| | 330~680µF | 0.55 | 0.77 | 0.94 | 1.00 |
| | 820~1800µF | 0.60 | 0.80 | 0.96 | 1.00 |
| | 2200~8200µF | 0.70 | 0.85 | 0.98 | 1.00 |

◆DIMENSIONS

◆PART NUMBER

| | | | | | | |
|---------------|--------|-------------|-----------------------|--------|--------------|-----------|
| □□□ | ZLH | □□□□□ | M | □□□ | □□ | DXL |
| Rated Voltage | Series | Capacitance | Capacitance Tolerance | Option | Lead Forming | Case Size |

◆OPTION

| Option | Code |
|------------|------|
| PET Sleeve | EFC |

◆STANDARD SIZE

| Rated Voltage (Vdc) | Capacitance (μF) | Size φD×L(mm) | Rated ripple current (mA r.m.s./105°C, 100kHz) | Impedance (Ω MAX) | |
|---------------------|------------------|---------------|--|-------------------|---------------|
| | | | | 20°C, 100kHz | -10°C, 100kHz |
| 6.3 | 220 | 5×11 | 345 | 0.22 | 0.80 |
| | 470 | 6.3×11 | 540 | 0.094 | 0.35 |
| | 820 | 8×11.5 | 945 | 0.056 | 0.19 |
| | 1200 | 8×16 | 1250 | 0.045 | 0.15 |
| | 1200 | 10×12.5 | 1330 | 0.039 | 0.14 |
| | 1500 | 8×20 | 1500 | 0.029 | 0.11 |
| | 1800 | 10×16 | 1760 | 0.028 | 0.10 |
| | 2200 | 10×20 | 1960 | 0.020 | 0.060 |
| | 2700 | 10×23 | 2250 | 0.018 | 0.054 |
| | 3900 | 12.5×20 | 2480 | 0.017 | 0.043 |
| | 4700 | 12.5×25 | 2900 | 0.015 | 0.038 |
| | 5600 | 12.5×30 | 3450 | 0.013 | 0.033 |
| | 6800 | 16×20 | 3250 | 0.015 | 0.038 |
| | 6800 | 12.5×35 | 3570 | 0.012 | 0.031 |
| 8200 | 16×25 | 3630 | 0.013 | 0.035 | |
| 10 | 150 | 5×11 | 345 | 0.22 | 0.80 |
| | 330 | 6.3×11 | 540 | 0.094 | 0.35 |
| | 680 | 8×11.5 | 945 | 0.056 | 0.19 |
| | 1000 | 8×16 | 1250 | 0.045 | 0.15 |
| | 1000 | 10×12.5 | 1330 | 0.039 | 0.14 |
| | 1500 | 8×20 | 1500 | 0.029 | 0.11 |
| | 1500 | 10×16 | 1760 | 0.028 | 0.10 |
| | 1800 | 10×20 | 1960 | 0.020 | 0.060 |
| | 2200 | 10×23 | 2250 | 0.018 | 0.054 |
| | 3300 | 12.5×20 | 2480 | 0.017 | 0.043 |
| | 3900 | 12.5×25 | 2900 | 0.015 | 0.038 |
| | 4700 | 12.5×30 | 3450 | 0.013 | 0.033 |
| | 4700 | 16×20 | 3250 | 0.015 | 0.038 |
| | 5600 | 12.5×35 | 3570 | 0.012 | 0.031 |
| 6800 | 16×25 | 3630 | 0.013 | 0.035 | |
| 16 | 100 | 5×11 | 345 | 0.22 | 0.80 |
| | 220 | 6.3×11 | 540 | 0.094 | 0.35 |
| | 470 | 8×11.5 | 945 | 0.056 | 0.19 |
| | 680 | 8×16 | 1250 | 0.045 | 0.15 |
| | 680 | 10×12.5 | 1330 | 0.039 | 0.14 |
| | 1000 | 8×20 | 1500 | 0.029 | 0.11 |
| | 1000 | 10×16 | 1760 | 0.028 | 0.10 |
| | 1500 | 10×20 | 1960 | 0.020 | 0.060 |
| | 1800 | 10×23 | 2250 | 0.018 | 0.054 |
| | 2200 | 12.5×20 | 2480 | 0.017 | 0.043 |
| | 2700 | 12.5×25 | 2900 | 0.015 | 0.038 |
| | 3300 | 12.5×30 | 3450 | 0.013 | 0.033 |
| | 3300 | 16×20 | 3250 | 0.015 | 0.038 |
| | 3900 | 12.5×35 | 3570 | 0.012 | 0.031 |
| 4700 | 16×25 | 3630 | 0.013 | 0.035 | |
| 25 | 68 | 5×11 | 345 | 0.22 | 0.80 |
| | 150 | 6.3×11 | 540 | 0.094 | 0.35 |
| | 330 | 8×11.5 | 945 | 0.056 | 0.19 |
| | 390 | 8×16 | 1250 | 0.045 | 0.15 |
| | 470 | 10×12.5 | 1330 | 0.039 | 0.14 |
| | 560 | 8×20 | 1500 | 0.029 | 0.11 |
| | 680 | 10×16 | 1760 | 0.028 | 0.10 |
| | 820 | 10×20 | 1960 | 0.020 | 0.060 |
| | 1000 | 10×23 | 2250 | 0.018 | 0.054 |
| | 1500 | 12.5×20 | 2480 | 0.017 | 0.043 |
| | 1800 | 12.5×25 | 2900 | 0.015 | 0.038 |
| | 2200 | 12.5×30 | 3450 | 0.013 | 0.033 |
| | 2200 | 16×20 | 3250 | 0.015 | 0.038 |
| | 2700 | 12.5×35 | 3570 | 0.012 | 0.031 |
| 3300 | 16×25 | 3630 | 0.013 | 0.035 | |
| 35 | 47 | 5×11 | 345 | 0.22 | 0.80 |
| | 100 | 6.3×11 | 540 | 0.094 | 0.35 |
| | 220 | 8×11.5 | 945 | 0.056 | 0.19 |
| | 270 | 8×16 | 1250 | 0.045 | 0.15 |
| | 330 | 10×12.5 | 1330 | 0.039 | 0.14 |
| | 390 | 8×20 | 1500 | 0.029 | 0.11 |
| | 470 | 10×16 | 1760 | 0.028 | 0.10 |
| | 560 | 10×20 | 1960 | 0.020 | 0.060 |
| | 680 | 10×23 | 2250 | 0.018 | 0.054 |
| | 1000 | 12.5×20 | 2480 | 0.017 | 0.043 |
| | 1200 | 12.5×25 | 2900 | 0.015 | 0.038 |
| | 1500 | 12.5×30 | 3450 | 0.013 | 0.033 |
| | 1500 | 16×20 | 3250 | 0.015 | 0.038 |
| | 1800 | 12.5×35 | 3570 | 0.012 | 0.031 |
| 2200 | 16×25 | 3630 | 0.013 | 0.035 | |
| 50 | 27 | 5×11 | 238 | 0.34 | 1.18 |
| | 56 | 6.3×11 | 385 | 0.14 | 0.50 |
| | 100 | 8×11.5 | 724 | 0.074 | 0.22 |
| | 120 | 8×16 | 950 | 0.061 | 0.18 |
| | 150 | 10×12.5 | 979 | 0.061 | 0.18 |
| | 180 | 8×20 | 1190 | 0.046 | 0.14 |
| | 220 | 10×16 | 1370 | 0.042 | 0.12 |
| | 270 | 10×20 | 1580 | 0.030 | 0.090 |
| | 330 | 10×23 | 1870 | 0.028 | 0.085 |
| | 470 | 12.5×20 | 2050 | 0.027 | 0.068 |
| | 560 | 12.5×25 | 2410 | 0.023 | 0.059 |
| | 680 | 12.5×30 | 2860 | 0.021 | 0.052 |
| | 820 | 12.5×35 | 2960 | 0.019 | 0.051 |
| | 820 | 16×20 | 2730 | 0.023 | 0.059 |
| 1000 | 16×25 | 3010 | 0.021 | 0.056 | |

◆STANDARD SIZE

| Rated Voltage (Vdc) | Capacitance (μF) | Size φD×L(mm) | Rated ripple current (mA r.m.s./105°C, 100kHz) | Impedance (Ω MAX) | |
|---------------------|------------------|---------------|--|-------------------|---------------|
| | | | | 20°C, 100kHz | -10°C, 100kHz |
| 63 | 18 | 5×11 | 173 | 0.88 | 3.5 |
| | 47 | 6.3×11 | 278 | 0.35 | 1.4 |
| | 82 | 8×11.5 | 525 | 0.22 | 0.88 |
| | 100 | 8×16 | 688 | 0.16 | 0.64 |
| | 120 | 10×12.5 | 725 | 0.15 | 0.60 |
| | 150 | 8×20 | 861 | 0.12 | 0.48 |
| | 180 | 10×16 | 998 | 0.11 | 0.44 |
| | 270 | 10×20 | 1200 | 0.078 | 0.31 |
| | 270 | 12.5×16 | 1200 | 0.082 | 0.27 |
| | 330 | 10×23 | 1410 | 0.069 | 0.28 |
| | 390 | 12.5×20 | 1570 | 0.060 | 0.19 |
| | 470 | 12.5×25 | 1990 | 0.043 | 0.14 |
| | 560 | 12.5×30 | 2410 | 0.035 | 0.13 |
| | 560 | 16×20 | 2100 | 0.043 | 0.14 |
| | 680 | 12.5×35 | 2620 | 0.033 | 0.11 |
| | 820 | 12.5×40 | 2940 | 0.027 | 0.090 |
| | 820 | 16×25 | 2730 | 0.032 | 0.096 |
| | 820 | 18×20 | 2500 | 0.038 | 0.10 |
| | 1200 | 16×31.5 | 2990 | 0.024 | 0.068 |
| | 1200 | 18×25 | 2800 | 0.031 | 0.084 |
| 1500 | 16×35.5 | 3040 | 0.021 | 0.057 | |
| 1500 | 18×31.5 | 3300 | 0.025 | 0.068 | |
| 1800 | 16×40 | 3570 | 0.019 | 0.057 | |
| 1800 | 18×35.5 | 3570 | 0.020 | 0.054 | |
| 2200 | 18×40 | 3670 | 0.018 | 0.049 | |
| 80 | 12 | 5×11 | 163 | 1.4 | 5.6 |
| | 33 | 6.3×11 | 267 | 0.57 | 2.3 |
| | 56 | 8×11.5 | 462 | 0.36 | 1.4 |
| | 68 | 8×16 | 585 | 0.25 | 1.0 |
| | 82 | 10×12.5 | 624 | 0.23 | 0.96 |
| | 100 | 8×20 | 735 | 0.19 | 0.76 |
| | 120 | 10×16 | 780 | 0.17 | 0.72 |
| | 180 | 10×20 | 1040 | 0.12 | 0.52 |
| | 180 | 12.5×16 | 975 | 0.13 | 0.43 |
| | 220 | 10×23 | 1170 | 0.11 | 0.47 |
| | 270 | 12.5×20 | 1430 | 0.085 | 0.31 |
| | 330 | 12.5×25 | 1620 | 0.060 | 0.23 |
| | 390 | 12.5×30 | 1950 | 0.051 | 0.21 |
| | 390 | 16×20 | 1750 | 0.058 | 0.21 |
| | 470 | 12.5×35 | 2140 | 0.043 | 0.17 |
| | 560 | 12.5×40 | 2340 | 0.036 | 0.15 |
| | 560 | 16×25 | 2210 | 0.044 | 0.16 |
| | 560 | 18×20 | 1950 | 0.054 | 0.18 |
| | 680 | 16×31.5 | 2400 | 0.033 | 0.12 |
| | 820 | 16×35.5 | 2600 | 0.029 | 0.10 |
| 820 | 18×25 | 2270 | 0.038 | 0.13 | |
| 1000 | 16×40 | 2860 | 0.027 | 0.090 | |
| 1000 | 18×31.5 | 2470 | 0.031 | 0.11 | |
| 1200 | 18×35.5 | 2860 | 0.027 | 0.084 | |
| 1500 | 18×40 | 3510 | 0.026 | 0.076 | |

| Rated Voltage (Vdc) | Capacitance (μF) | Size φD×L(mm) | Rated ripple current (mA r.m.s./105°C, 100kHz) | Impedance (Ω MAX) | |
|---------------------|------------------|---------------|--|-------------------|---------------|
| | | | | 20°C, 100kHz | -10°C, 100kHz |
| 100 | 8.2 | 5×11 | 163 | 1.4 | 5.6 |
| | 18 | 6.3×11 | 267 | 0.57 | 2.3 |
| | 33 | 8×11.5 | 462 | 0.36 | 1.4 |
| | 47 | 8×16 | 585 | 0.25 | 1.0 |
| | 56 | 10×12.5 | 624 | 0.23 | 0.96 |
| | 68 | 8×20 | 735 | 0.19 | 0.76 |
| | 82 | 10×16 | 780 | 0.17 | 0.72 |
| | 100 | 10×20 | 1040 | 0.12 | 0.52 |
| | 100 | 12.5×16 | 975 | 0.13 | 0.43 |
| | 120 | 10×23 | 1170 | 0.11 | 0.47 |
| | 150 | 12.5×20 | 1430 | 0.085 | 0.31 |
| | 220 | 12.5×25 | 1620 | 0.060 | 0.23 |
| | 270 | 12.5×30 | 1950 | 0.051 | 0.21 |
| | 270 | 16×20 | 1750 | 0.058 | 0.21 |
| | 330 | 12.5×35 | 2140 | 0.043 | 0.17 |
| | 390 | 12.5×40 | 2340 | 0.036 | 0.15 |
| | 390 | 16×25 | 2210 | 0.044 | 0.16 |
| | 390 | 18×20 | 1950 | 0.054 | 0.18 |
| | 470 | 16×31.5 | 2400 | 0.033 | 0.12 |
| | 470 | 18×25 | 2270 | 0.038 | 0.13 |
| 560 | 16×35.5 | 2600 | 0.029 | 0.10 | |
| 560 | 18×31.5 | 2470 | 0.031 | 0.11 | |
| 680 | 16×40 | 2860 | 0.027 | 0.090 | |
| 680 | 18×35.5 | 2860 | 0.027 | 0.084 | |
| 820 | 18×40 | 3510 | 0.026 | 0.076 | |

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