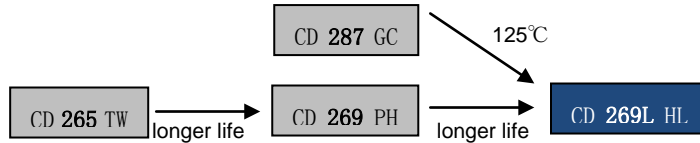


# CD 269L HL Series



2000 ~ 5000h at 125°C

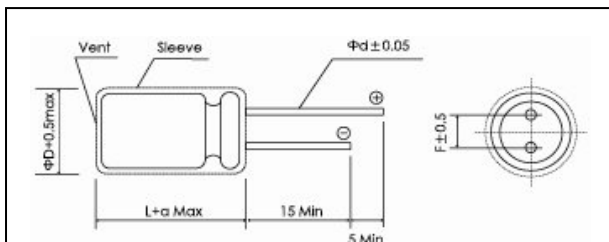
- Load life of 2000~ 5000hours at 125°C
- High Reliability at High Temperature
- Automotive
- Professional Long-Life Applications



| Items   | Characteristics  |                  |      |      |      |      |      |    |     |                          |      |      |      |      |      |      |      |                          |   |   |  |  |  |  |  |
|---|--|------------------|------|------|------|------|------|----|-----|--------------------------|------|------|------|------|------|------|------|--------------------------|---|---|--|--|--|--|--|
| Operating Temperature Range(°C)                         | -40 ~ +125   |                  |      |      |      |      |      |    |     |                          |      |      |      |      |      |      |      |                          |   |   |  |  |  |  |  |
| Voltage Range (V)                                       | 10~ 100  |                  |      |      |      |      |      |    |     |                          |      |      |      |      |      |      |      |                          |   |   |  |  |  |  |  |
| Capacitance Range(μF)                                   | 1 ~ 4700   |                  |      |      |      |      |      |    |     |                          |      |      |      |      |      |      |      |                          |   |   |  |  |  |  |  |
| Capacitance Tolerance (20°C,120Hz)                      | ±20%   |                  |      |      |      |      |      |    |     |                          |      |      |      |      |      |      |      |                          |   |   |  |  |  |  |  |
| Leakage Current (μA)                                    | After 1 minutes at 20°C application of rated voltage, leakage current is not more than 0.03CV or 4, whichever is greater<br>C:Nominal Capacitance(μF) V:Rated Voltage(V)   |                  |      |      |      |      |      |    |     |                          |      |      |      |      |      |      |      |                          |   |   |  |  |  |  |  |
| Dissipation Factor (20°C, 120Hz)                        | <table border="1"> <thead> <tr> <th>WV(V)</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> </tr> </thead> <tbody> <tr> <td>Tan δ(max)</td> <td>0.20</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> </tr> </tbody> </table> <p>For Capacitances&gt;1000μF add 0.02 to every 1000μF</p> | WV(V)            | 10   | 16   | 25   | 35   | 50   | 63 | 100 | Tan δ(max)               | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 |                          |   |   |  |  |  |  |  |
| WV(V)   | 10   | 16               | 25   | 35   | 50   | 63   | 100  |    |     |                          |      |      |      |      |      |      |      |                          |   |   |  |  |  |  |  |
| Tan δ(max)  | 0.20   | 0.16             | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 |    |     |                          |      |      |      |      |      |      |      |                          |   |   |  |  |  |  |  |
| Stability at Low Temperature (Impedance Ratio at 120Hz) | <table border="1"> <thead> <tr> <th>Rated Voltage(V)</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> </tr> </thead> <tbody> <tr> <td>Z<sub>-25°C/+20°C</sub></td> <td>3</td> <td colspan="6">2</td> </tr> <tr> <td>Z<sub>-40°C/+20°C</sub></td> <td>6</td> <td colspan="6">4</td> </tr> </tbody> </table>                      | Rated Voltage(V) | 10   | 16   | 25   | 35   | 50   | 63 | 100 | Z <sub>-25°C/+20°C</sub> | 3    | 2    |      |      |      |      |      | Z <sub>-40°C/+20°C</sub> | 6 | 4 |  |  |  |  |  |
| Rated Voltage(V)  | 10   | 16               | 25   | 35   | 50   | 63   | 100  |    |     |                          |      |      |      |      |      |      |      |                          |   |   |  |  |  |  |  |
| Z <sub>-25°C/+20°C</sub>                                | 3  | 2                |      |      |      |      |      |    |     |                          |      |      |      |      |      |      |      |                          |   |   |  |  |  |  |  |
| Z <sub>-40°C/+20°C</sub>                                | 6  | 4                |      |      |      |      |      |    |     |                          |      |      |      |      |      |      |      |                          |   |   |  |  |  |  |  |

|   | Useful Life                                 |  | Load Life                                   | Endurance Test                                | Shelf Life   |
|---|---|--|---|---|--|
| Lifetime  | φ 8 :4000h<br>φ 10 :6000h<br>φ ≥12.5:10000h | ≥180000h                                       | φ 8 :2000h<br>φ 10 :3000h<br>φ ≥12.5 :5000h | φ 8 :3000h<br>φ 10 :5000h<br>φ ≥12.5 :7000h   | 1000h  |
| Leakage Current   | Not more than specified value               |  | Not more than specified value               | Not more than specified value                 | Not more than specified value  |
| Capacitance Change  | Within ±50% of initial value                |  | Within ± 30% of initial value               | Within ±30% of initial value                  | Within ±30% of initial value   |
| Dissipation Factor  | Not more than 500% of specified value       |  | Not more than 300% of specified value       | Not more than 300% of specified value         | Not more than 300% of specified value  |
| Condition:<br>Applied Voltage<br>Applied Current<br>Applied Temperature | U <sub>R</sub><br>I <sub>R</sub><br>125°C   | U <sub>R</sub><br>1.4 x I <sub>R</sub><br>60°C | U <sub>R</sub><br>I <sub>R</sub><br>125°C   | U <sub>R</sub><br>I <sub>R</sub> = 0<br>125°C | After test:<br>U <sub>R</sub> to be applied for<br>30min>24h before<br>measurement |

## Dimensions



| ΦD | 8   | 10  | 12.5 | 16  | 18 |
|----|-----|-----|------|-----|----|
| F  | 3.5 | 5.0 |      | 7.5 |    |
| Φd | 0.6 |     |      | 0.8 |    |
| a  | 2.0 |     |      |     |    |

mm

## Frequency Coefficient

| Frequency   |           | 50/60Hz | 120-Hz | 500Hz | 1kHz | 100kHz |
|-------------|-----------|---------|--------|-------|------|--------|
| Coefficient | 1-4.7     | 0.35    | 0.42   | 0.60  | 0.80 | 1.00   |
|             | 10-33     | 0.45    | 0.55   | 0.75  | 0.90 | 1.00   |
|             | 47-330    | 0.60    | 0.70   | 0.85  | 0.95 | 1.00   |
|             | 470-1500  | 0.65    | 0.75   | 0.90  | 0.98 | 1.00   |
|             | 2200-4700 | 0.75    | 0.80   | 0.95  | 1.00 | 1.00   |

## Temperature Coefficient

| Temperature(°C) | +65 | +85 | +105 | +125 |
|-----------------|-----|-----|------|------|
| Coefficient     | 2.2 | 2.0 | 1.7  | 1.0  |

## Ratings for CD 269L HL Series

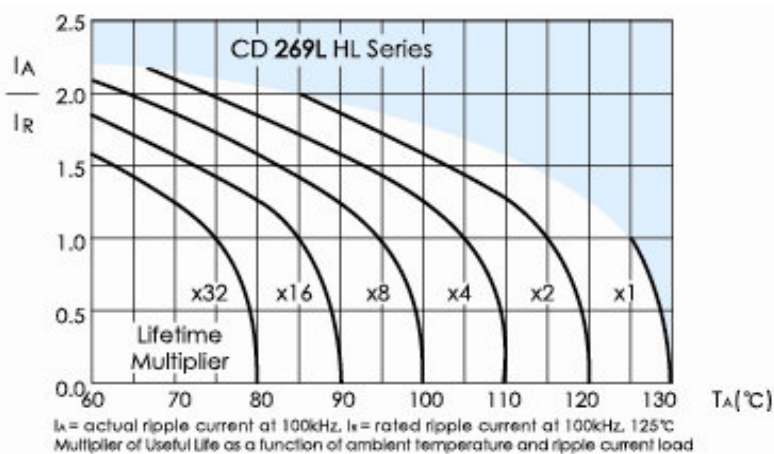
| U <sub>R</sub><br>(Surge Voltage)<br>Code | Rated Capacitance | Max ESR<br>20°C, 120Hz | Max Impedance<br>20°C, 100kHz | Rated Ripple Current<br>125°C, 100kHz | Size<br>ΦD×L        | P/N                 |
|---|-------------------|------------------------|-------------------------------|---------------------------------------|---------------------|---------------------|
| (V)                                       | (μF)              | (Ω)                    | (Ω)                           | (mA <sub>rms</sub> )                  | (mm)                | -                   |
| <b>10</b><br>(13)<br><b>1A</b>            | 330               | 0.804                  | 0.22                          | 360                                   | 8×11.5              | ECR1AHL331M□□080011 |
|   | 470               | 0.565                  | 0.15                          | 620                                   | 10×12.5             | ECR1AHL471M□□100012 |
|   | 1000              | 0.265                  | 0.073                         | 960                                   | 10×20               | ECR1AHL102M□□100020 |
|   | 2200              | 0.133                  | 0.040                         | 1430                                  | 12.5×25             | ECR1AHL222M□□125025 |
|   | 3300              | 0.097                  | 0.038                         | 1900                                  | 16×25               | ECR1AHL332M□□160025 |
|   | 4700              | 0.073                  | 0.034                         | 2300                                  | 16×31.5             | ECR1AHL472M□□160031 |
| <b>16</b><br>(20)<br><b>1C</b>            | 330               | 0.643                  | 0.22                          | 360                                   | 8×11.5              | ECR1CHL331M□□080011 |
|   | 470               | 0.452                  | 0.15                          | 620                                   | 10×12.5             | ECR1CHL471M□□100012 |
|   | 1000              | 0.212                  | 0.073                         | 960                                   | 10×20               | ECR1CHL102M□□100020 |
|   | 2200              | 0.109                  | 0.040                         | 1430                                  | 12.5×25             | ECR1CHL222M□□125025 |
|   | 3300              | 0.080                  | 0.034                         | 2300                                  | 16×31.5             | ECR1CHL332M□□160031 |
|   | 4700              | 0.062                  | 0.031                         | 2550                                  | 16×35.5             | ECR1CHL472M□□160035 |
| <b>25</b><br>(32)<br><b>1E</b>            | 220               | 0.844                  | 0.22                          | 360                                   | 8×11.5              | ECR1EHL221M□□080011 |
|   | 330               | 0.563                  | 0.15                          | 620                                   | 10×12.5             | ECR1EHL331M□□100012 |
|   | 470               | 0.395                  | 0.10                          | 800                                   | 10×16               | ECR1EHL471M□□100016 |
|   | 1000              | 0.186                  | 0.055                         | 1100                                  | 12.5×20             | ECR1EHL102M□□125020 |
|   | 2200              | 0.097                  | 0.034                         | 2300                                  | 16×31.5             | ECR1EHL222M□□160031 |
|   | 3300              | 0.072                  | 0.031                         | 2550                                  | 16×35.5             | ECR1EHL332M□□160035 |
| <b>35</b><br>(44)<br><b>1V</b>            | 100               | 1.592                  | 0.22                          | 360                                   | 8×11.5              | ECR1VHL101M□□080011 |
|   | 220               | 0.724                  | 0.15                          | 620                                   | 10×12.5             | ECR1VHL221M□□100012 |
|   | 330               | 0.483                  | 0.10                          | 800                                   | 10×16               | ECR1VHL331M□□100016 |
|   | 470               | 0.339                  | 0.073                         | 960                                   | 10×20               | ECR1VHL471M□□100020 |
|   | 1000              | 0.159                  | 0.040                         | 1430                                  | 12.5×25             | ECR1VHL102M□□125025 |
|   | 2200              | 0.084                  | 0.031                         | 2550                                  | 16×35.5             | ECR1VHL222M□□160035 |
|   | 3300              | 0.064                  | 0.028                         | 2800                                  | 18×35.5             | ECR1VHL332M□□180035 |
| <b>50</b><br>(63)<br><b>1H</b>            | 1                 | 132.6                  | 2.5                           | 35                                    | 8×11.5              | ECR1HHL010M□□080011 |
|   | 2.2               | 60.31                  | 1.8                           | 50                                    | 8×11.5              | ECR1HHL2R2M□□080011 |
|   | 3.3               | 40.21                  | 1.3                           | 70                                    | 8×11.5              | ECR1HHL3R3M□□080011 |
|   | 4.7               | 28.23                  | 0.85                          | 100                                   | 8×11.5              | ECR1HHL4R7M□□080011 |
|   | 10                | 13.27                  | 0.60                          | 200                                   | 8×11.5              | ECR1HHL100M□□080011 |
|   | 22                | 6.032                  | 0.35                          | 260                                   | 8×11.5              | ECR1HHL220M□□080011 |
|   | 33                | 4.021                  | 0.28                          | 300                                   | 8×11.5              | ECR1HHL330M□□080011 |
|   | 47                | 2.823                  | 0.28                          | 300                                   | 8×11.5              | ECR1HHL470M□□080011 |
|   | 100               | 1.327                  | 0.18                          | 520                                   | 10×12.5             | ECR1HHL101M□□100012 |
|   | 220               | 0.603                  | 0.082                         | 890                                   | 10×20               | ECR1HHL221M□□100020 |
|   | 330               | 0.402                  | 0.065                         | 1000                                  | 12.5×20             | ECR1HHL331M□□125020 |
|   | 470               | 0.282                  | 0.051                         | 1200                                  | 12.5×25             | ECR1HHL471M□□125025 |
|   | 1000              | 0.133                  | 0.037                         | 2180                                  | 16×31.5             | ECR1HHL102M□□160031 |
| 2200                                      | 0.072             | 0.029                  | 2800                          | 18×40                                 | ECR1HHL222M□□180040 |                     |
| <b>63</b><br>(79)<br><b>1J</b>            | 33                | 3.619                  | 0.40                          | 250                                   | 8×11.5              | ECR1JHL330M□□080011 |
|   | 47                | 2.541                  | 0.27                          | 400                                   | 10×12.5             | ECR1JHL470M□□100012 |
|   | 100               | 1.194                  | 0.20                          | 450                                   | 10×16               | ECR1JHL101M□□100016 |
|   | 220               | 0.543                  | 0.10                          | 820                                   | 12.5×20             | ECR1JHL221M□□125020 |
|   | 330               | 0.362                  | 0.072                         | 1000                                  | 12.5×25             | ECR1JHL331M□□125025 |
|   | 470               | 0.254                  | 0.069                         | 1500                                  | 16×25               | ECR1JHL471M□□160025 |
|   | 1000              | 0.119                  | 0.056                         | 1850                                  | 16×31.5             | ECR1JHL102M□□160031 |
|   | 1500              | 0.080                  | 0.043                         | 2350                                  | 18×40               | ECR1JHL152M□□180040 |

## Ratings for CD 269L HL Series

| $U_R$<br>(Surge Voltage)<br>Code | Rated Capacitance | Max ESR<br>20°C, 120Hz | Max Impedance<br>20°C, 100kHz | Rated Ripple Current<br>125°C, 100kHz | Size<br>$\Phi D \times L$ | P/N                 |
|----------------------------------|-------------------|------------------------|-------------------------------|---------------------------------------|---------------------------|---------------------|
| (V)                              | ( $\mu F$ )       | ( $\Omega$ )           | ( $\Omega$ )                  | (mA <sub>rms</sub> )                  | (mm)                      | -                   |
| 100<br>(125)<br>2A               | 4.7               | 22.58                  | 1.3                           | 100                                   | 8×11.5                    | ECR2AHL4R7M□□080011 |
|                                  | 10                | 10.61                  | 1                             | 200                                   | 8×11.5                    | ECR2AHL100M□□080011 |
|                                  | 22                | 4.825                  | 0.67                          | 220                                   | 8×11.5                    | ECR2AHL220M□□080011 |
|                                  | 33                | 3.217                  | 0.45                          | 260                                   | 10×12.5                   | ECR2AHL330M□□100012 |
|                                  | 47                | 2.259                  | 0.33                          | 330                                   | 10×16                     | ECR2AHL470M□□100016 |
|                                  | 100               | 1.062                  | 0.17                          | 670                                   | 12.5×20                   | ECR2AHL101M□□125020 |
|                                  | 220               | 0.483                  | 0.13                          | 1100                                  | 16×25                     | ECR2AHL221M□□160025 |
|                                  | 330               | 0.322                  | 0.10                          | 1300                                  | 16×31.5                   | ECR2AHL331M□□160031 |
|                                  | 470               | 0.226                  | 0.092                         | 1600                                  | 18×31.5                   | ECR2AHL471M□□180031 |

Customer products are available on request.

## Lifetime Diagram



## Typical Curves

