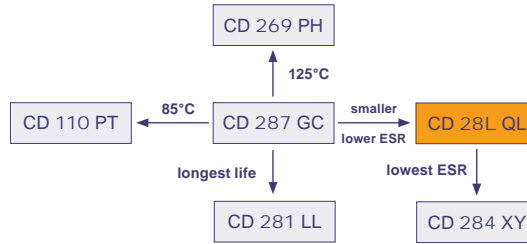


CD 28L QL Series



4000 - 10000h at 105°C

- Miniaturized
- Low Impedance, High Current
- Switching Power Supply



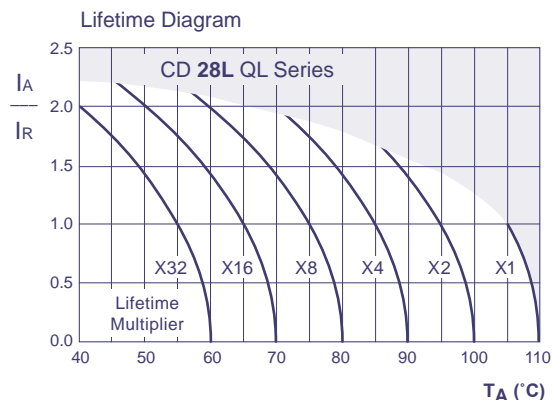
| Item | Characteristics | | | | | | | | | | | | | | | | |
|---|--|-------------------|------|------|------|------|------|----|----|-------------|------|------|------|------|------|------|------|
| Operating Temperature Range (°C) | -55 ~ +105 | | | | | | | | | | | | | | | | |
| Voltage Range (V) | 6,3 ~ 63 | | | | | | | | | | | | | | | | |
| Capacitance Range (µF) | 12 ~ 18000 | | | | | | | | | | | | | | | | |
| Capacitance Tolerance (20°C, 120Hz) | ± 20% | | | | | | | | | | | | | | | | |
| Leakage Current (µA) | After 2 minutes at 20°C application of rated voltage, leakage current is not more than 0,01CV or 3, whichever is greater. C: Nominal Capacitance (µF) V: Rated Voltage (V) | | | | | | | | | | | | | | | | |
| Dissipation Factor (20°C, 120Hz) | <table border="1"> <tr> <td>Rated Voltage (V)</td> <td>6,3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <td>Tan δ (max)</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>0,08</td> </tr> </table> | Rated Voltage (V) | 6,3 | 10 | 16 | 25 | 35 | 50 | 63 | Tan δ (max) | 0,22 | 0,19 | 0,16 | 0,14 | 0,12 | 0,10 | 0,08 |
| | Rated Voltage (V) | 6,3 | 10 | 16 | 25 | 35 | 50 | 63 | | | | | | | | | |
| Tan δ (max) | 0,22 | 0,19 | 0,16 | 0,14 | 0,12 | 0,10 | 0,08 | | | | | | | | | | |
| For Capacitances >1000µF add 0,02 to every 1000µF | | | | | | | | | | | | | | | | | |
| Stability at Low Temperature (Impedance Ratio at 120Hz) | Rated Voltage (V) | 6,3 ~ 63 | | | | | | | | | | | | | | | |
| | Z _{-55°C} / Z _{+20°C} | 3 | | | | | | | | | | | | | | | |

| | Useful Life | | Load Life | Endurance Test | Shelf Life |
|---------------------|--|---------------------------------|--|--|---|
| Lifetime | $\emptyset \leq 6,3$: 4 000h $\emptyset 8 \sim 10$: 6 000h $\emptyset \geq 12$: 10 000h | $\emptyset \geq 8$: > 250 000h | $\emptyset \leq 6,3$: 2000h $\emptyset 8 \sim 10$: 3000h $\emptyset \geq 12$: 5000h | $\emptyset \leq 6,3$: 3000h $\emptyset 8 \sim 10$: 5000h $\emptyset \geq 12$: 7000h | 1000h |
| Leakage Current | Not more than specified value | | Not more than specified value | Not more than specified value | Not more than specified value |
| Capacity Change | Within ± 30% of initial value | | Within ± 20% of initial value | Within ± 20% of initial value | Within ± 20% of initial value |
| Dissipation Factor | Not more than 300% of specified value | | Not more than 200% of specified value | Not more than 200% of specified value | Not more than 200% of specified value |
| Condition: | | | | | |
| Applied Voltage | U_R | U_R | U_R | U_R | $U_R = 0$ |
| Applied Current | I_R | $1,4 \times I_R$ | I_R | $I_R = 0$ | $I_R = 0$ |
| Applied Temperature | 105°C | 40°C | 105°C | 105°C | 105°C |
| Failure Rate Level | ≤ 1% Failure Rate | | guaranteed | | After test: U_R to be applied for 30min >24h before measurement |

Multiplier for Ripple Current

Frequency Coefficient

| Capacitance (µF) | Frequency | | | |
|------------------|-----------|------|-------|--------|
| | 120Hz | 1kHz | 10kHz | 100kHz |
| 12 ~ 180 | 0,40 | 0,75 | 0,90 | 1,00 |
| 220 ~ 560 | 0,50 | 0,83 | 0,93 | 1,00 |
| 680 ~ 1800 | 0,60 | 0,86 | 0,95 | 1,00 |
| 2200 ~ 3900 | 0,75 | 0,90 | 0,97 | 1,00 |
| 4700 ~ 18000 | 0,85 | 0,95 | 0,98 | 1,00 |



I_A = actual ripple current at 100kHz, I_R = rated ripple current at 100kHz, 105°C
Multiplier of Useful Life as a function of ambient temperature and ripple current load

Radial

Ratings for CD 28L QL Series

| V _{DC} (Surge Voltage) Code | Rated Capa- cance | Max ESR 20°C, 120Hz | Max Imp 20°C, 100kHz | Max Imp -10°C, 100kHz | Max Ripple Current 105°C, 100kHz | Size Ø D x L |
|---|-------------------------|---------------------------|----------------------------|-----------------------------|--|-----------------|
| (V) | (µF) | (Ω) | (Ω) | (Ω) | (mArms) | (mm) |
| 6,3 (7,2) 0J | 150 | 1,95 | 0,50 | 1,0 | 175 | 5 x 11,5 |
| | 330 | 0,885 | 0,25 | 0,50 | 290 | 6,3 x 11,5 |
| | 470 | 0,621 | 0,18 | 0,36 | 400 | 6,3 x 15 |
| | 680 | 0,430 | 0,12 | 0,24 | 555 | 8 x 11,5 |
| | 820 | 0,356 | 0,090 | 0,18 | 760 | 10 x 12,5 |
| | 1000 | 0,292 | 0,090 | 0,18 | 730 | 8 x 16 |
| | 1200 | 0,244 | 0,080 | 0,16 | 810 | 8 x 20 |
| | 1500 | 0,244 | 0,068 | 0,14 | 1050 | 10 x 16 |
| | 1500 | 0,195 | 0,052 | 0,104 | 1220 | 10 x 20 |
| | 2200 | 0,145 | 0,045 | 0,090 | 1440 | 10 x 25 |
| | 2700 | 0,118 | 0,037 | 0,074 | 1690 | 10 x 30 |
| | 3300 | 0,105 | 0,038 | 0,076 | 1660 | 12,5 x 20 |
| | 3900 | 0,089 | 0,030 | 0,060 | 1950 | 12,5 x 25 |
| | 4700 | 0,080 | 0,025 | 0,050 | 2310 | 12,5 x 30 |
| | 5600 | 0,072 | 0,022 | 0,044 | 2510 | 12,5 x 35 |
| | 5600 | 0,072 | 0,029 | 0,058 | 2210 | 16 x 20 |
| | 6800 | 0,063 | 0,017 | 0,034 | 2870 | 12,5 x 40 |
| | 6800 | 0,063 | 0,022 | 0,044 | 2560 | 16 x 25 |
| | 6800 | 0,063 | 0,028 | 0,056 | 2490 | 18 x 20 |
| | 8200 | 0,059 | 0,019 | 0,038 | 3010 | 16 x 31,5 |
| 10000 | 0,054 | 0,017 | 0,034 | 3150 | 16 x 35,5 | |
| 10000 | 0,054 | 0,020 | 0,040 | 2740 | 18 x 25 | |
| 12000 | 0,049 | 0,015 | 0,030 | 3710 | 16 x 40 | |
| 12000 | 0,049 | 0,018 | 0,036 | 3330 | 18 x 31,5 | |
| 15000 | 0,045 | 0,016 | 0,032 | 3680 | 18 x 35,5 | |
| 18000 | 0,042 | 0,015 | 0,030 | 3800 | 18 x 40 | |
| 10 (13) 1A | 100 | 2,52 | 0,50 | 1,0 | 175 | 5 x 11,5 |
| | 220 | 1,15 | 0,25 | 0,50 | 290 | 6,3 x 11,5 |
| | 330 | 0,764 | 0,18 | 0,36 | 400 | 6,3 x 15 |
| | 470 | 0,537 | 0,12 | 0,24 | 555 | 8 x 11,5 |
| | 680 | 0,371 | 0,090 | 0,18 | 730 | 8 x 16 |
| | 680 | 0,371 | 0,090 | 0,18 | 760 | 10 x 12,5 |
| | 1000 | 0,252 | 0,080 | 0,16 | 810 | 8 x 20 |
| | 1000 | 0,252 | 0,068 | 0,14 | 1050 | 10 x 16 |
| | 1200 | 0,210 | 0,052 | 0,104 | 1220 | 10 x 20 |
| | 1500 | 0,168 | 0,045 | 0,090 | 1440 | 10 x 25 |
| | 1800 | 0,140 | 0,037 | 0,074 | 1690 | 10 x 30 |
| | 2200 | 0,127 | 0,038 | 0,076 | 1660 | 12,5 x 20 |
| | 3300 | 0,093 | 0,030 | 0,060 | 1950 | 12,5 x 25 |
| | 3900 | 0,079 | 0,025 | 0,050 | 2310 | 12,5 x 30 |
| | 3900 | 0,079 | 0,029 | 0,058 | 2210 | 16 x 20 |
| | 4700 | 0,071 | 0,022 | 0,044 | 2510 | 12,5 x 35 |
| | 5600 | 0,064 | 0,017 | 0,034 | 2870 | 12,5 x 40 |
| | 5600 | 0,064 | 0,022 | 0,044 | 2560 | 16 x 25 |
| | 5600 | 0,064 | 0,028 | 0,056 | 2490 | 18 x 20 |
| | 6800 | 0,057 | 0,019 | 0,038 | 3010 | 16 x 31,5 |
| 6800 | 0,057 | 0,020 | 0,040 | 2740 | 18 x 25 | |
| 8200 | 0,054 | 0,017 | 0,034 | 3150 | 16 x 35,5 | |
| 8200 | 0,054 | 0,018 | 0,036 | 3330 | 18 x 31,5 | |
| 10000 | 0,049 | 0,015 | 0,030 | 3710 | 16 x 40 | |
| 10000 | 0,049 | 0,016 | 0,032 | 3680 | 18 x 35,5 | |
| 12000 | 0,046 | 0,015 | 0,030 | 3800 | 18 x 40 | |

| V _{DC} (Surge Voltage) Code | Rated Capa- cance | Max ESR 20°C, 120Hz | Max Imp 20°C, 100kHz | Max Imp -10°C, 100kHz | Max Ripple Current 105°C, 100kHz | Size Ø D x L |
|---|-------------------------|---------------------------|----------------------------|-----------------------------|--|-----------------|
| (V) | (µF) | (Ω) | (Ω) | (Ω) | (mArms) | (mm) |
| 16 (20) 1C | 47 | 4,52 | 0,50 | 1,0 | 175 | 5 x 11,5 |
| | 100 | 2,13 | 0,25 | 0,50 | 290 | 6,3 x 11,5 |
| | 220 | 0,965 | 0,18 | 0,36 | 400 | 6,3 x 15 |
| | 330 | 0,644 | 0,12 | 0,24 | 555 | 8 x 11,5 |
| | 470 | 0,452 | 0,090 | 0,18 | 730 | 8 x 16 |
| | 470 | 0,452 | 0,090 | 0,18 | 760 | 10 x 12,5 |
| | 560 | 0,379 | 0,080 | 0,16 | 810 | 8 x 20 |
| | 680 | 0,313 | 0,068 | 0,14 | 1050 | 10 x 16 |
| | 1000 | 0,213 | 0,052 | 0,104 | 1220 | 10 x 20 |
| | 1200 | 0,177 | 0,045 | 0,090 | 1440 | 10 x 25 |
| | 1200 | 0,142 | 0,037 | 0,074 | 1690 | 10 x 30 |
| | 1500 | 0,142 | 0,038 | 0,076 | 1660 | 12,5 x 20 |
| | 2200 | 0,109 | 0,030 | 0,060 | 1950 | 12,5 x 25 |
| | 2700 | 0,089 | 0,025 | 0,050 | 2310 | 12,5 x 30 |
| | 2700 | 0,089 | 0,029 | 0,058 | 2210 | 16 x 20 |
| | 3300 | 0,081 | 0,022 | 0,044 | 2510 | 12,5 x 35 |
| | 3900 | 0,069 | 0,017 | 0,034 | 2870 | 12,5 x 40 |
| | 3900 | 0,069 | 0,022 | 0,044 | 2560 | 16 x 25 |
| | 3900 | 0,069 | 0,028 | 0,056 | 2490 | 18 x 20 |
| | 4700 | 0,063 | 0,019 | 0,038 | 3010 | 16 x 31,5 |
| 4700 | 0,063 | 0,020 | 0,040 | 2740 | 18 x 25 | |
| 5600 | 0,057 | 0,017 | 0,034 | 3150 | 16 x 35,5 | |
| 5600 | 0,057 | 0,018 | 0,036 | 3330 | 18 x 31,5 | |
| 6800 | 0,051 | 0,015 | 0,030 | 3710 | 16 x 40 | |
| 8200 | 0,049 | 0,016 | 0,032 | 3680 | 18 x 35,5 | |
| 10000 | 0,046 | 0,015 | 0,030 | 3800 | 18 x 40 | |
| 25 (32) 1E | 47 | 3,96 | 0,50 | 1,0 | 175 | 5 x 11,5 |
| | 100 | 1,86 | 0,25 | 0,50 | 290 | 6,3 x 11,5 |
| | 150 | 1,24 | 0,18 | 0,36 | 400 | 6,3 x 15 |
| | 220 | 0,845 | 0,12 | 0,24 | 555 | 8 x 11,5 |
| | 330 | 0,563 | 0,090 | 0,18 | 730 | 8 x 16 |
| | 330 | 0,563 | 0,090 | 0,18 | 760 | 10 x 12,5 |
| | 390 | 0,477 | 0,080 | 0,16 | 810 | 8 x 20 |
| | 470 | 0,396 | 0,068 | 0,14 | 1050 | 10 x 16 |
| | 680 | 0,274 | 0,052 | 0,104 | 1220 | 10 x 20 |
| | 820 | 0,227 | 0,045 | 0,090 | 1440 | 10 x 25 |
| | 1000 | 0,186 | 0,037 | 0,074 | 1690 | 10 x 30 |
| | 1000 | 0,186 | 0,038 | 0,076 | 1660 | 12,5 x 20 |
| | 1500 | 0,124 | 0,030 | 0,060 | 1950 | 12,5 x 25 |
| | 1800 | 0,104 | 0,025 | 0,050 | 2310 | 12,5 x 30 |
| | 1800 | 0,104 | 0,029 | 0,058 | 2210 | 16 x 20 |
| | 2200 | 0,097 | 0,022 | 0,044 | 2510 | 12,5 x 35 |
| | 2200 | 0,097 | 0,028 | 0,056 | 2490 | 18 x 20 |
| | 2700 | 0,079 | 0,017 | 0,034 | 2870 | 12,5 x 40 |
| | 2700 | 0,079 | 0,022 | 0,044 | 2560 | 16 x 25 |
| | 3300 | 0,073 | 0,019 | 0,038 | 3010 | 16 x 31,5 |
| 3300 | 0,073 | 0,020 | 0,040 | 2740 | 18 x 25 | |
| 3900 | 0,062 | 0,017 | 0,034 | 3150 | 16 x 35,5 | |
| 3900 | 0,062 | 0,018 | 0,036 | 3330 | 18 x 31,5 | |
| 4700 | 0,057 | 0,015 | 0,030 | 3710 | 16 x 40 | |
| 4700 | 0,057 | 0,016 | 0,032 | 3680 | 18 x 35,5 | |
| 5600 | 0,053 | 0,015 | 0,030 | 3800 | 18 x 40 | |

Radial

Custom products are available on request.

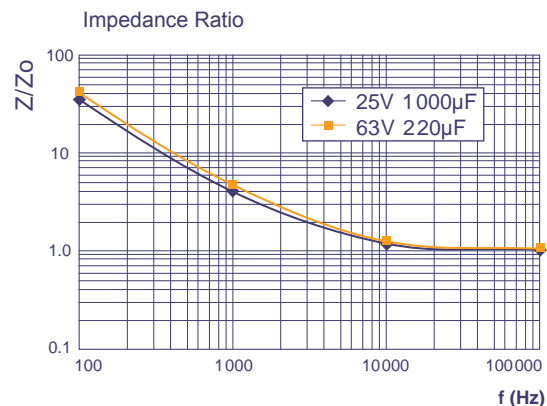
Ratings for CD 28L QL Series

Radial

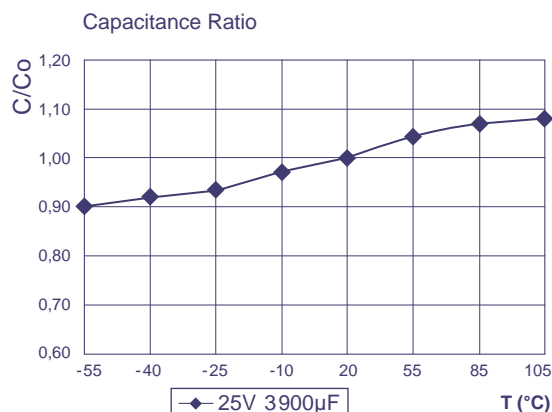
| V _{DC} (Surge Voltage) Code | Rated Capacitance | Max ESR 20°C, 120Hz | Max Imp 20°C, 100kHz | Max Imp -10°C, 100kHz | Max Ripple Current 105°C, 100kHz | Size Ø D x L |
|--|-------------------|---------------------------|----------------------------|-----------------------------|--|-----------------|
| (V) | (µF) | (Ω) | (Ω) | (Ω) | (mArms) | (mm) |
| 35 (44) 1V | 33 | 4,83 | 0,50 | 1,0 | 175 | 5 x 11,5 |
| | 56 | 2,85 | 0,25 | 0,50 | 290 | 6,3 x 11,5 |
| | 100 | 1,60 | 0,18 | 0,36 | 400 | 6,3 x 15 |
| | 150 | 1,062 | 0,12 | 0,24 | 555 | 8 x 11,5 |
| | 220 | 0,724 | 0,090 | 0,18 | 730 | 8 x 16 |
| | | 0,724 | 0,090 | 0,18 | 760 | 10 x 12,5 |
| | 270 | 0,590 | 0,080 | 0,16 | 810 | 8 x 20 |
| | 330 | 0,483 | 0,068 | 0,14 | 1050 | 10 x 16 |
| | 470 | 0,339 | 0,052 | 0,104 | 1220 | 10 x 20 |
| | 560 | 0,285 | 0,045 | 0,090 | 1440 | 10 x 25 |
| | 680 | 0,235 | 0,037 | 0,074 | 1690 | 10 x 30 |
| | | 0,235 | 0,038 | 0,076 | 1660 | 12,5 x 20 |
| | 1000 | 0,160 | 0,030 | 0,060 | 1950 | 12,5 x 25 |
| | 1200 | 0,133 | 0,025 | 0,050 | 2310 | 12,5 x 30 |
| | | 0,133 | 0,029 | 0,058 | 2210 | 16 x 20 |
| | 1500 | 0,107 | 0,022 | 0,044 | 2510 | 12,5 x 35 |
| | | 0,089 | 0,017 | 0,034 | 2870 | 12,5 x 40 |
| | 1800 | 0,089 | 0,022 | 0,044 | 2560 | 16 x 25 |
| | | 0,089 | 0,028 | 0,056 | 2490 | 18 x 20 |
| | 2200 | 0,085 | 0,019 | 0,038 | 3010 | 16 x 31,5 |
| 0,085 | | 0,020 | 0,040 | 2740 | 18 x 25 | |
| 2700 | 0,069 | 0,017 | 0,034 | 3150 | 16 x 35,5 | |
| | 0,069 | 0,018 | 0,036 | 3330 | 18 x 31,5 | |
| 3300 | 0,065 | 0,015 | 0,030 | 3710 | 16 x 40 | |
| | 0,065 | 0,016 | 0,032 | 3680 | 18 x 35,5 | |
| 3900 | 0,055 | 0,015 | 0,030 | 3800 | 18 x 40 | |
| 50 (63) 1H | 22 | 6,03 | 0,90 | 1,8 | 155 | 5 x 11,5 |
| | 47 | 2,83 | 0,45 | 0,9 | 260 | 6,3 x 11,5 |
| | 68 | 1,96 | 0,31 | 0,62 | 360 | 6,3 x 15 |
| | 100 | 1,33 | 0,22 | 0,44 | 485 | 8 x 11,5 |
| | 120 | 1,106 | 0,16 | 0,32 | 635 | 8 x 16 |
| | | 1,106 | 0,16 | 0,32 | 620 | 10 x 12,5 |
| | 180 | 0,737 | 0,12 | 0,24 | 730 | 8 x 20 |
| | | 0,737 | 0,13 | 0,26 | 850 | 10 x 16 |
| | 220 | 0,603 | 0,088 | 0,18 | 1050 | 10 x 20 |
| | | 0,402 | 0,073 | 0,15 | 1250 | 10 x 25 |
| | 330 | 0,341 | 0,054 | 0,11 | 1500 | 10 x 30 |
| | | 0,341 | 0,059 | 0,12 | 1480 | 12,5 x 20 |
| | 560 | 0,237 | 0,044 | 0,088 | 1840 | 12,5 x 25 |
| | | 0,196 | 0,039 | 0,078 | 2220 | 12,5 x 30 |
| | 680 | 0,196 | 0,048 | 0,096 | 1840 | 16 x 20 |
| | | 0,162 | 0,033 | 0,066 | 2290 | 12,5 x 35 |
| | 820 | 0,162 | 0,042 | 0,084 | 1980 | 18 x 20 |
| | | 0,133 | 0,029 | 0,058 | 2500 | 12,5 x 40 |
| | 1000 | 0,133 | 0,034 | 0,068 | 2240 | 16 x 25 |
| | | 0,111 | 0,028 | 0,056 | 2700 | 16 x 31,5 |
| 1200 | 0,111 | 0,029 | 0,058 | 1610 | 18 x 25 | |
| | 0,089 | 0,025 | 0,050 | 2800 | 16 x 35,5 | |
| 1800 | 0,074 | 0,021 | 0,042 | 3200 | 16 x 40 | |
| | 0,074 | 0,025 | 0,050 | 3000 | 18 x 31,5 | |
| 2200 | 0,073 | 0,023 | 0,046 | 3100 | 18 x 35,5 | |
| 2700 | 0,059 | 0,020 | 0,040 | 3400 | 18 x 40 | |

| V _{DC} (Surge Voltage) Code | Rated Capacitance | Max ESR 20°C, 120Hz | Max Imp 20°C, 100kHz | Max Imp -10°C, 100kHz | Max Ripple Current 105°C, 100kHz | Size Ø D x L |
|--|-------------------|---------------------------|----------------------------|-----------------------------|--|-----------------|
| (V) | (µF) | (Ω) | (Ω) | (Ω) | (mArms) | (mm) |
| 63 (79) 1J | 12 | 8,85 | 1,9 | 4,0 | 145 | 5 x 11,5 |
| | 22 | 4,83 | 1,0 | 2,0 | 240 | 6,3 x 11,5 |
| | 39 | 2,73 | 0,61 | 1,4 | 330 | 6,3 x 15 |
| | 68 | 1,57 | 0,34 | 0,75 | 405 | 8 x 11,5 |
| | 100 | 1,062 | 0,27 | 0,65 | 535 | 8 x 16 |
| | | 1,062 | 0,26 | 0,51 | 540 | 10 x 12,5 |
| | 120 | 0,885 | 0,19 | 0,38 | 600 | 10 x 16 |
| | 150 | 0,708 | 0,21 | 0,52 | 690 | 8 x 20 |
| | 180 | 0,590 | 0,15 | 0,29 | 890 | 10 x 20 |
| | 220 | 0,483 | 0,13 | 0,26 | 1050 | 10 x 25 |
| | 330 | 0,322 | 0,090 | 0,18 | 1300 | 10 x 30 |
| | | 0,322 | 0,085 | 0,17 | 1290 | 12,5 x 20 |
| | 390 | 0,273 | 0,070 | 0,14 | 1720 | 12,5 x 25 |
| | 470 | 0,226 | 0,055 | 0,11 | 2090 | 12,5 x 30 |
| | | 0,226 | 0,059 | 0,12 | 1770 | 16 x 20 |
| | 680 | 0,157 | 0,047 | 0,094 | 2270 | 12,5 x 35 |
| | | 0,157 | 0,050 | 0,100 | 2160 | 16 x 25 |
| | 820 | 0,157 | 0,055 | 0,110 | 2290 | 18 x 20 |
| | | 0,130 | 0,042 | 0,084 | 2560 | 12,5 x 40 |
| | 1000 | 0,130 | 0,043 | 0,086 | 2670 | 16 x 31,5 |
| 0,130 | | 0,043 | 0,086 | 2590 | 18 x 25 | |
| 1200 | 0,107 | 0,036 | 0,072 | 2770 | 16 x 35,5 | |
| | 0,089 | 0,030 | 0,060 | 2850 | 16 x 40 | |
| 1500 | 0,089 | 0,032 | 0,064 | 2950 | 18 x 31,5 | |
| | 0,071 | 0,030 | 0,060 | 3100 | 18 x 35,5 | |
| 1800 | 0,059 | 0,025 | 0,050 | 3210 | 18 x 40 | |

Custom products are available on request.



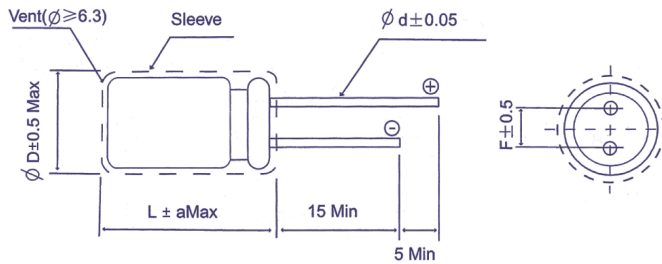
Z = actual Impedance of each frequency at 20°C
Zo = Impedance at 100kHz, 20°C,
Impedance Ratio as a function of frequency



C = actual capacitance of each temperature at 100Hz
Co = Capacitance at 20°C, 100Hz,
Capacitance Ratio as a function of temperature (typical curve)

Technical Specification Radial Type

Dimensions for loose, long-lead type, (bulk)
Order Code: LL



| L | L ≤ 7 | | | | | | L ≥ 11 | | | | | | | | |
|------------------|-------|------|-----|-----|-----|-----|--------|-----|-----|------|-----|----|------|----|------|
| | 3 | 4 | 5 | 6,3 | 8 | 5 | 6,3 | 8 | 10 | 12,5 | 16 | 18 | 20 | 22 | 25 |
| ∅ D | 3 | 4 | 5 | 6,3 | 8 | 5 | 6,3 | 8 | 10 | 12,5 | 16 | 18 | 20 | 22 | 25 |
| F | 1 | 1,5 | 2,0 | 2,5 | 3,5 | 2,0 | 2,5 | 3,5 | 5,0 | | 7,5 | | 10,0 | | 12,5 |
| ∅ d | 0,4 | 0,45 | | | 0,5 | | | 0,6 | | | 0,8 | | 1,0 | | |
| a _{Max} | 1,0 | | | | | | 2,0 | | | | | | | | |

in mm

Dimensions for Ammopack taping
Order Code: FF (FD)

| Code | Case Range | | Dimensions | | | | Form | Ammopack |
|------|------------|---------|------------|----------|---------|---------|------|----------|
| | ∅ D | L (max) | H ± 0,75 | Ho ± 0,5 | F ± 0,5 | P ± 0,1 | | |
| FF | 4 ~ 6 | 13 | 18,5 | - | 2,5 | 12,7 | A | |
| | 8 | 13 | 18,5 | - | 3,5 | 12,7 | | |
| | 4 ~ 8 | 7 | 17,5 | 16 | 5 | 12,7 | B | |
| | 5 ~ 6,3 | 13 | 18,5 | | | | | |
| | 8 | 22 | 20,0 | | | | | |
| | FD | 10 | 22 | 18,5 | - | 15,0 | A | |
| 12,5 | | 27 | 18,5 | - | | | | |
| FD | 12,5 | 27 | 18,5 | - | 25,4 | C | | |
| FF | 16 ~ 18 | 27 | 18,5 | - | 7,5 | 30,0 | C | |

in mm

Dimensions for loose, short cut leads, (bulk)
Order Code: CC (CB,CD,CE,CF)

| Straight Lead | | | | | | Bended Lead | |
|---------------|-----------|-----------|-----------|-----------|-----------|-------------|--|
| | | | | | | | |
| Code | CB | CC | CD | CE | CF | | |
| I | 5,0 ± 0,5 | 4,5 ± 0,5 | 4,0 ± 0,5 | 3,5 ± 0,5 | 3,0 ± 0,5 | | |

preferred

in mm