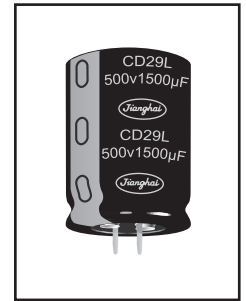
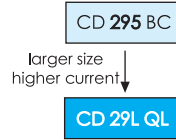


5000h at 85°C

- Larger Size Components
- Long Useful Life
- High Ripple Current
- Industrial Power Supplies



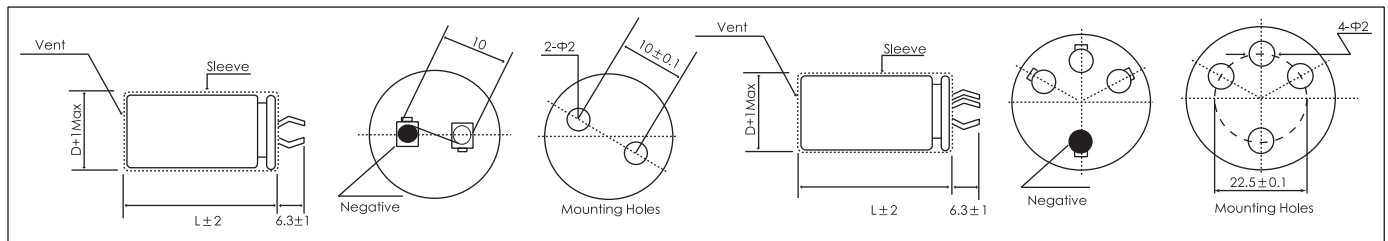
SNAP-IN/LUG

| Items | Characteristics | |
|---|---|---|
| Operating Temperature Range (°C) | -40 ~ +85 | -25 ~ +85 |
| Voltage Range (V) | 16 ~ 400 | 450 ~ 500 |
| Capacitance Range (μF) | 390 ~ 120000 | |
| Capacitance Tolerance (20°C, 120Hz) | ± 20% | |
| Leakage Current (μA) | After 5 minutes at 20°C application of rated voltage, leakage current is not more than 0.01CV or 1.5mA, whichever is smaller. C: Nominal Capacitance (μF) V: Rated Voltage (V) | |
| Dissipation Factor (20°C, 120Hz) | Rated Voltage (V) | 16 25 35 50 63~100 160~250 350~450 500 |
| | Tan δ (max) | 0.60 0.50 0.40 0.30 0.20 0.15 |
| Stability at Low Temperature (Impedance Ratio at 120Hz) | Rated Voltage (V) | 16~35 50~100 160~200 250~400 450 500 |
| | $Z_{-25°C} / Z_{+20°C}$ | 4 3 3 4 |
| | $Z_{-40°C} / Z_{+20°C}$ | 15 10 6 8 - |

| | Useful Life | | Load Life | Endurance Test | Shelf Life |
|---|---------------------------------------|-----------------------------------|---------------------------------------|---------------------------------------|---|
| Lifetime | 7000h | >100000h | 5000h | 5000h | 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 ± 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 Applied Current Applied Temperature | U_R I_R 85°C | U_R $1.2 \times I_R$ 40°C | U_R I_R 85°C | U_R $I_R = 0$ 85°C | $U_R = 0$ $I_R = 0$ 85°C After test: U_R to be applied for 30min >24h before measurement |

Dimensions

mm



Temperature Coefficient

| Temperature(°C) | +40 | +55 | +70 | +85 |
|-----------------|-----|-----|-----|-----|
| Coefficient | | | | |
| <160V | 2.1 | 1.8 | 1.5 | 1.0 |
| ≥160V | 1.7 | 1.5 | 1.3 | 1.0 |

Frequency Coefficient

| Rated Voltage (V) | Frequency | | | | | |
|-------------------|-----------|-------|-------|------|-------|--------|
| | 50/60Hz | 120Hz | 300Hz | 1kHz | 10kHz | ≥50kHz |
| ≤ 50 | 0.90 | 1.00 | 1.07 | 1.15 | 1.15 | 1.15 |
| 63 ~ 100 | 0.90 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |
| ≥ 160 | 0.80 | 1.00 | 1.16 | 1.30 | 1.41 | 1.45 |

CD 29L QL SERIES



Ratings for CD 29L QL Series

SNAP-IN/LUG

| U _r (Surge Voltage) Code | Rated Capacitance | Max ESR 20°C, 120Hz | Typ ESR 20°C, 120Hz | Rated Ripple Current 85°C, 120Hz | Size ΦD x L | P/N | |
|---|--------------------|---------------------------|---------------------------|--|----------------|---------------------|---------------------|
| (V) | (μF) | (mΩ) | (mΩ) | (Arms) | (mm) | - | |
| 16 (20) 1C | 56000 | 14 | 10 | 10.4 | 30×45 | ECS1CQL563M□□300045 | |
| | | 14 | 10 | 9.8 | 40×40 | ECS1CQL563M□□400040 | |
| | 68000 | 12 | 8 | 10.8 | 35×50 | ECS1CQL683M□□350050 | |
| | | 12 | 8 | 11.5 | 40×50 | ECS1CQL683M□□400050 | |
| | 82000 | 10 | 7 | 11.8 | 35×60 | ECS1CQL823M□□350060 | |
| | | 10 | 7 | 11.8 | 40×50 | ECS1CQL823M□□400050 | |
| | 100000 | 8 | 6 | 13.2 | 35×80 | ECS1CQL104M□□350080 | |
| | | | 6 | 13.5 | 40×60 | ECS1CQL104M□□400060 | |
| | | 7 | 5 | 15.3 | 35×105 | ECS1CQL124M□□350105 | |
| | 120000 | 7 | 5 | 14.8 | 40×80 | ECS1CQL124M□□400080 | |
| | | | 8 | 6 | 8.1 | 35×40 | ECS1EQL333M□□350040 |
| | | 20 | 14 | 8.7 | 40×40 | ECS1EQL333M□□400040 | |
| 25 (32) 1E | 33000 | 17 | 12 | 9.0 | 35×45 | ECS1EQL393M□□350045 | |
| | | 17 | 12 | 9.6 | 40×40 | ECS1EQL393M□□400040 | |
| | 47000 | 14 | 10 | 9.6 | 35×50 | ECS1EQL473M□□350050 | |
| | | 12 | 8 | 10.3 | 35×60 | ECS1EQL563M□□350060 | |
| | 56000 | 12 | 8 | 10.8 | 40×50 | ECS1EQL563M□□400050 | |
| | | 10 | 7 | 11.3 | 35×80 | ECS1EQL683M□□350080 | |
| | 68000 | 10 | 7 | 11.8 | 40×60 | ECS1EQL683M□□400060 | |
| | | 8 | 6 | 13.5 | 40×80 | ECS1EQL823M□□400080 | |
| | 35 (44) 1V | 27000 | 20 | 14 | 8.2 | 35×45 | ECS1VQL273M□□350045 |
| | | | 20 | 14 | 8.0 | 40×40 | ECS1VQL273M□□400040 |
| | | 33000 | 16 | 11 | 8.7 | 35×50 | ECS1VQL333M□□350050 |
| | | | 14 | 10 | 10.3 | 35×60 | ECS1VQL393M□□350060 |
| 39000 | | 14 | 10 | 9.6 | 40×50 | ECS1VQL393M□□400050 | |
| | | 11 | 8 | 11.4 | 35×80 | ECS1VQL473M□□350080 | |
| 47000 | | 11 | 8 | 10.8 | 40×60 | ECS1VQL473M□□400060 | |
| | | 10 | 7 | 12.1 | 40×70 | ECS1VQL563M□□400070 | |
| 56000 | | 8 | 6 | 14.2 | 40×80 | ECS1VQL683M□□400080 | |
| | | 27 | 19 | 7.7 | 35×40 | ECS1HQL153M□□350040 | |
| 50 (63) 1H | | 15000 | 27 | 19 | 8.1 | 40×40 | ECS1HQL153M□□400040 |
| | | | 22 | 16 | 8.3 | 35×45 | ECS1HQL183M□□350045 |
| | 18000 | 22 | 16 | 8.3 | 40×40 | ECS1HQL183M□□400040 | |
| | | 18 | 13 | 9.1 | 35×50 | ECS1HQL223M□□350050 | |
| | 22000 | 18 | 13 | 9.4 | 40×50 | ECS1HQL223M□□400050 | |
| | | 15 | 10 | 11.2 | 35×80 | ECS1HQL273M□□350080 | |
| | 27000 | 15 | 10 | 10.8 | 40×60 | ECS1HQL273M□□400060 | |
| | | 12 | 8 | 13.4 | 35×80 | ECS1HQL333M□□350080 | |
| | 33000 | 12 | 8 | 13.4 | 40×70 | ECS1HQL333M□□400070 | |
| | | 10 | 7 | 15.5 | 40×80 | ECS1HQL393M□□400080 | |
| | 63 (79) 1J | 12000 | 22 | 16 | 8.7 | 35×50 | ECS1JQL123M□□350050 |
| | | | 22 | 16 | 8.6 | 40×40 | ECS1JQL123M□□400040 |
| 15000 | | 18 | 12 | 10.2 | 35×70 | ECS1JQL153M□□350070 | |
| | | 18 | 12 | 9.5 | 40×50 | ECS1JQL153M□□400050 | |
| 18000 | | 15 | 10 | 11.2 | 35×80 | ECS1JQL183M□□350080 | |
| | | 15 | 10 | 10.7 | 40×60 | ECS1JQL183M□□400060 | |
| 27000 | | 10 | 7 | 12.7 | 40×80 | ECS1JQL273M□□400080 | |
| | | 32 | 23 | 6.9 | 35×50 | ECS1KQL822M□□350050 | |
| 80 (100) 1K | | 8200 | 27 | 19 | 8.7 | 35×60 | ECS1KQL103M□□350060 |
| | | | 22 | 16 | 9.7 | 35×70 | ECS1KQL123M□□350070 |
| | | 10000 | 22 | 16 | 9.0 | 40×50 | ECS1KQL123M□□400050 |
| | | | 18 | 12 | 10.5 | 35×80 | ECS1KQL153M□□350080 |
| | 12000 | 18 | 12 | 10.2 | 40×60 | ECS1KQL153M□□400060 | |
| | | 15 | 10 | 12.3 | 40×80 | ECS1KQL183M□□400080 | |
| | 100 (125) 2A | 5600 | 47 | 33 | 7.0 | 35×45 | ECS2AQL562M□□350045 |
| | | | 47 | 33 | 7.4 | 40×40 | ECS2AQL562M□□400040 |
| | | 6800 | 39 | 27 | 8.0 | 35×50 | ECS2AQL682M□□350050 |
| | | | 39 | 27 | 8.9 | 40×50 | ECS2AQL682M□□400050 |
| | | 8200 | 32 | 23 | 9.6 | 35×70 | ECS2AQL822M□□350070 |
| | | | 32 | 23 | 9.6 | 40×60 | ECS2AQL822M□□400060 |
| 10000 | | 27 | 19 | 10.4 | 35×80 | ECS2AQL103M□□350080 | |
| | | 27 | 19 | 10.2 | 40×60 | ECS2AQL103M□□400060 | |
| 12000 | | 22 | 16 | 12.3 | 40×80 | ECS2AQL123M□□400080 | |

| U _r (Surge Voltage) Code | Rated Capacitance | Max ESR 20°C, 120Hz | Typ ESR 20°C, 120Hz | Rated Ripple Current 85°C, 120Hz | Size ΦD x L | P/N | |
|---|--------------------|---------------------------|---------------------------|--|---------------------|---------------------|---------------------|
| (V) | (μF) | (mΩ) | (mΩ) | (Arms) | (mm) | - | |
| 160 (200) 2C | 2200 | 91 | 63 | 4.9 | 35×45 | ECS2CQL222M□□350045 | |
| | | 74 | 52 | 5.3 | 35×50 | ECS2CQL272M□□350050 | |
| | 3300 | 60 | 42 | 5.5 | 35×70 | ECS2CQL332M□□350070 | |
| | | 60 | 42 | 5.5 | 40×60 | ECS2CQL332M□□400060 | |
| | 3900 | 51 | 36 | 5.9 | 35×80 | ECS2CQL392M□□350080 | |
| | 4700 | 42 | 30 | 7.3 | 40×80 | ECS2CQL472M□□400080 | |
| 200 (250) 2D | 1500 | 133 | 93 | 4.3 | 35×40 | ECS2DQL152M□□350040 | |
| | | 111 | 77 | 4.7 | 35×45 | ECS2DQL182M□□350045 | |
| | 2200 | 91 | 63 | 5.4 | 35×50 | ECS2DQL222M□□350050 | |
| | | 91 | 63 | 5.4 | 40×40 | ECS2DQL222M□□400040 | |
| | 2700 | 74 | 52 | 5.9 | 35×60 | ECS2DQL272M□□350060 | |
| | | 74 | 52 | 5.9 | 40×50 | ECS2DQL272M□□400050 | |
| | 3300 | 60 | 42 | 6.5 | 35×80 | ECS2DQL332M□□350080 | |
| | | 60 | 42 | 6.5 | 40×60 | ECS2DQL332M□□400060 | |
| | 3900 | 51 | 36 | 7.0 | 40×80 | ECS2DQL392M□□400080 | |
| | 4700 | 42 | 30 | 9.2 | 40×90 | ECS2DQL472M□□400090 | |
| | 250 (300) 2E | 1000 | 199 | 139 | 3.7 | 35×40 | ECS2EQL102M□□350040 |
| | | | 166 | 116 | 3.8 | 35×45 | ECS2EQL122M□□350045 |
| 1500 | | 133 | 93 | 4.4 | 35×50 | ECS2EQL152M□□350050 | |
| | | 133 | 93 | 4.5 | 40×40 | ECS2EQL152M□□400040 | |
| 1800 | | 111 | 77 | 5.0 | 35×70 | ECS2EQL182M□□350070 | |
| | | 111 | 77 | 5.0 | 40×50 | ECS2EQL182M□□400050 | |
| 2200 | | 91 | 63 | 5.4 | 35×70 | ECS2EQL222M□□350070 | |
| | | 74 | 52 | 6.9 | 40×80 | ECS2EQL272M□□400080 | |
| 350 (400) 2V | | 680 | 293 | 205 | 3.6 | 35×45 | ECS2VQL681M□□350045 |
| | | | 293 | 205 | 3.6 | 40×40 | ECS2VQL681M□□400040 |
| | | 820 | 243 | 170 | 4.5 | 35×60 | ECS2VQL821M□□350060 |
| | | | 243 | 170 | 4.3 | 40×50 | ECS2VQL821M□□400050 |
| | 1000 | 199 | 139 | 5.2 | 35×70 | ECS2VQL102M□□350070 | |
| | | 199 | 139 | 4.9 | 40×60 | ECS2VQL102M□□400060 | |
| | 1200 | 166 | 116 | 5.5 | 35×80 | ECS2VQL122M□□350080 | |
| | | 166 | 116 | 5.6 | 40×70 | ECS2VQL122M□□400070 | |
| | 1500 | 133 | 93 | 6.5 | 40×80 | ECS2VQL152M□□400080 | |
| | | 133 | 93 | 6.2 | 45×70 | ECS2VQL152M□□450070 | |
| | 1800 | 111 | 77 | 7.9 | 40×100 | ECS2VQL182M□□400100 | |
| | | 111 | 77 | 7.1 | 45×70 | ECS2VQL182M□□450070 | |
| 2200 | 91 | 63 | 8.7 | 40×100 | ECS2VQL222M□□400100 | | |
| 400 (450) 2G | 560 | 355 | 249 | 3.2 | 35×50 | ECS2GQL561M□□350050 | |
| | | 355 | 249 | 2.8 | 40×40 | ECS2GQL561M□□400040 | |
| | 680 | 293 | 205 | 3.7 | 35×60 | ECS2GQL681M□□350060 | |
| | | 293 | 205 | 3.8 | 40×50 | ECS2GQL681M□□400050 | |
| | 820 | 243 | 170 | 4.2 | 35×60 | ECS2GQL821M□□350060 | |
| | | 243 | 170 | 4.1 | 40×50 | ECS2GQL821M□□400050 | |
| | 1000 | 199 | 139 | 4.9 | 35×70 | ECS2GQL102M□□350070 | |
| | | 199 | 139 | 4.8 | 40×60 | ECS2GQL102M□□400060 | |
| | 1200 | 199 | 139 | 4.6 | 45×50 | ECS2GQL102M□□450050 | |
| | | 166 | 116 | 5.8 | 35×80 | ECS2GQL122M□□350080 | |
| | 1500 | 166 | 116 | 5.5 | 40×60 | ECS2GQL122M□□400060 | |
| | | 133 | 93 | 6.9 | 40×90 | ECS2GQL152M□□400090 | |
| 1800 | 133 | 93 | 6.6 | 45×70 | ECS2GQL152M□□450070 | | |
| | 133 | 93 | 6.8 | 45×80 | ECS2GQL152M□□450080 | | |
| 2200 | 111 | 77 | 7.9 | 40×100 | ECS2GQL182M□□400100 | | |
| | 111 | 77 | 7.3 | 45×80 | ECS2GQL182M□□450080 | | |
| 450 (500) 2W | 470 | 91 | 63 | 8.8 | 40×110 | ECS2WQL222M□□400100 | |
| | | 91 | 63 | 8.3 | 45×90 | ECS2WQL222M□□450090 | |
| | 560 | 424 | 296 | 3.0 | 35×50 | ECS2WQL471M□□350050 | |
| | | 424 | 296 | 3.0 | 40×40 | ECS2WQL471M□□400040 | |
| | 680 | 355 | 249 | 3.1 | 35×50 | ECS2WQL561M□□350050 | |
| | | 355 | 249 | 3.3 | 35×60 | ECS2WQL561M□□350060 | |
| | 820 | 355 | 249 | 3.4 | 40×50 | ECS2WQL561M□□400050 | |
| | | 293 | 205 | 3.5 | 35×60 | ECS2WQL681M□□350060 | |
| | 1000 | 293 | 205 | 3.8 | 35×70 | ECS2WQL681M□□350070 | |
| | | 293 | 205 | 3.8 | 40×60 | ECS2WQL681M□□400060 | |
| | 1200 | 243 | 170 | 4.6 | 35×80 | ECS2WQL821M□□350080 | |
| | | 243 | 170 | 4.4 | 40×60 | ECS2WQL821M□□400060 | |



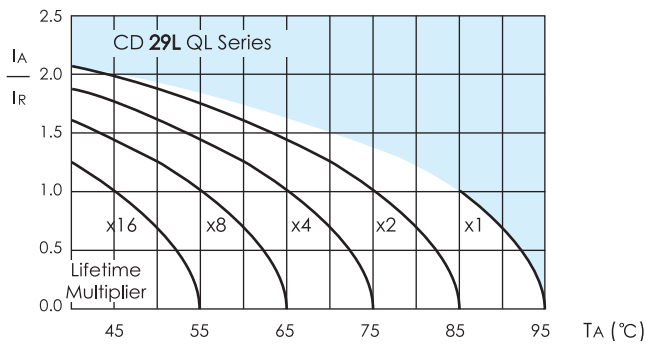
Ratings for CD 29L QL Series

| U_R (Surge Voltage) Code | Rated Capacitance | Max ESR 20°C, 120Hz | Typ ESR 20°C, 120Hz | Rated Ripple Current 85°C, 120Hz | Size $\Phi D \times L$ | P/N |
|----------------------------------|-------------------|---------------------------|---------------------------|--|---------------------------|---------------------|
| (V) | (μF) | (m Ω) | (m Ω) | (Arms) | (mm) | - |
| 450 (500) 2W | 1000 | 199 | 139 | 5.7 | 35×80 | ECS2WQL102M□□350080 |
| | | 199 | 139 | 5.2 | 40×60 | ECS2WQL102M□□400060 |
| | 1200 | 166 | 116 | 5.9 | 40×70 | ECS2WQL122M□□400070 |
| | | 166 | 116 | 6.2 | 45×70 | ECS2WQL122M□□450070 |
| | 1500 | 133 | 93 | 7.3 | 40×100 | ECS2WQL152M□□400100 |
| | | 133 | 93 | 7.0 | 45×80 | ECS2WQL152M□□450080 |
| 1800 | 111 | 77 | 7.9 | 45×100 | ECS2WQL182M□□450100 | |
| 500 (550) 2H | 390 | 510 | 357 | 1.9 | 35×50 | ECS2HQL391M□□350050 |
| | 470 | 424 | 296 | 2.3 | 35×60 | ECS2HQL471M□□350060 |
| | 560 | 355 | 249 | 2.5 | 35×60 | ECS2HQL561M□□350060 |
| | | 355 | 249 | 2.7 | 40×60 | ECS2HQL561M□□400060 |
| | 680 | 293 | 205 | 3.1 | 35×80 | ECS2HQL681M□□350080 |
| | | 293 | 205 | 2.8 | 40×70 | ECS2HQL681M□□400070 |
| | 820 | 243 | 170 | 3.4 | 35×90 | ECS2HQL821M□□350090 |
| | | 243 | 170 | 3.3 | 40×70 | ECS2HQL821M□□400070 |
| | 1000 | 199 | 139 | 3.9 | 40×80 | ECS2HQL102M□□400080 |
| | | 199 | 139 | 3.9 | 45×70 | ECS2HQL102M□□450070 |
| | 1200 | 166 | 116 | 4.3 | 40×90 | ECS2HQL122M□□400090 |
| | 1500 | 133 | 93 | 4.8 | 40×100 | ECS2HQL152M□□400100 |

Customer products are available on request.

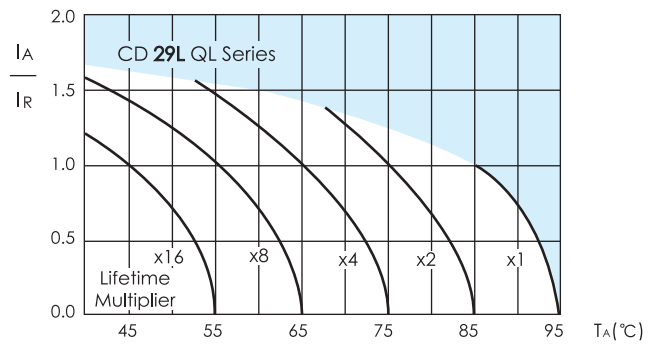
Lifetime Diagram

Lifetime Diagram $U_R < 160V$



I_A = actual ripple current at 120Hz, I_R = rated ripple current at 120Hz, 85°C
Multiplier of Useful Life as a function of ambient temperature and ripple current load

Lifetime Diagram $U_R \geq 160V$



I_A = actual ripple current at 120Hz, I_R = rated ripple current at 120Hz, 85°C
Multiplier of Useful Life as a function of ambient temperature and ripple current load

