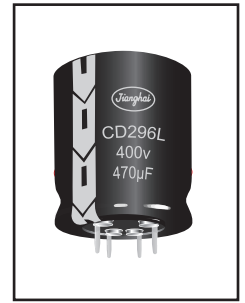
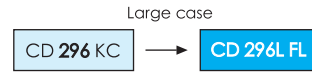


CD 296L FL SERIES



3000h at 105°C

- Long Life at High Temperature
- High Ripple Current
- Suit for high frequency regenerative voltage for AC servomotor, general inverter.

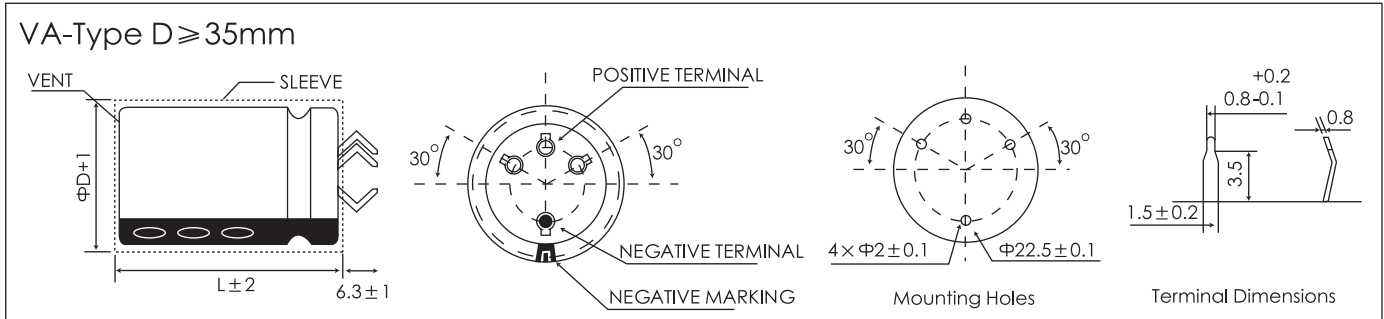


| Items | Characteristics | | |
|---|---|------------|---------|
| Operating Temperature Range (°C) | -40 ~ +105 | -25 ~ +105 | |
| Voltage Range (V) | 350 ~ 420 | 450 ~ 500 | |
| Capacitance Range (µF) | 390 ~ 3300 | | |
| Capacitance Tolerance (20°C, 120Hz) | ± 20% | | |
| Leakage Current (µA) | After 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) | WV (V) | 350~500 | |
| | Tan δ | 0.15 | |
| Stability at Low Temperature (Impedance Ratio at 120Hz) | Rated Voltage (V) | 350~420 | 450~500 |
| | $Z_{-25°C} / Z_{+20°C}$ | 4 | 7 |
| | $Z_{-40°C} / Z_{+20°C}$ | 7 | - |

| | Useful Life | | Load Life | Endurance Test | Shelf Life |
|---|---------------------------------------|-----------------------------------|---------------------------------------|---------------------------------------|--|
| Lifetime | 6000h | >200000h | 3000h | 4000h | 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 105°C | U_R $1.2 \times I_R$ 40°C | U_R I_R 105°C | U_R $I_R = 0$ 105°C | $U_R = 0$ $I_R = 0$ 105°C After test: U_R to be applied for 30min >24h before measurement |

Dimensions

mm



Frequency Coefficient

| Frequency | 50/60Hz | 120Hz | 300Hz | 1kHz | 10kHz | ≥50kHz |
|-----------|---------|-------|-------|------|-------|--------|
| Factor | 0.8 | 1.0 | 1.16 | 1.3 | 1.41 | 1.43 |

Temperature Coefficient

| Temperature(°C) | +40 | +55 | +70 | +85 | +105 |
|-----------------|-----|-----|-----|-----|------|
| Factor | 3.0 | 2.8 | 2.5 | 2.0 | 1.0 |

Ratings for CD 296L FL Series

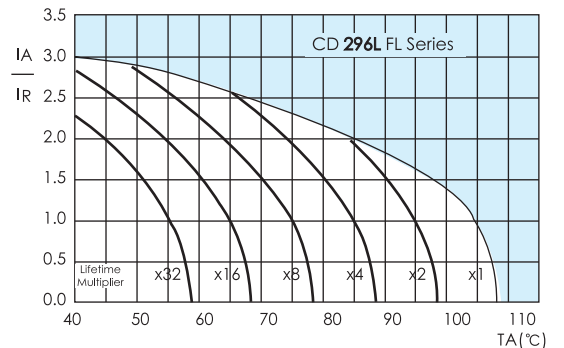
| U _R (Surge Voltage) Code | Rated Capacitance | Max ESR 20°C, 120Hz | Typ ESR 20°C, 120Hz | Rated Ripple Current 105°C, 120Hz | Size ΦD x L | P/N | |
|---|--------------------|---------------------------|---------------------------|---|----------------|-----------------------|-----------------------|
| (V) | (μF) | (mΩ) | (mΩ) | (Arms) | (mm) | - | |
| 350 (400) 2V | 560 | 355 | 178 | 2.30 | 30 x 55 | ECS2VFL561M□□300055 | |
| | | 355 | 178 | 2.33 | 35 x 40 | ECS2VFL561M□□350040 | |
| | 680 | 293 | 146 | 2.73 | 35 x 50 | ECS2VFL681M□□350050 | |
| | | 293 | 146 | 2.68 | 40 x 40 | ECS2VFL681M□□400040 | |
| | 820 | 243 | 121 | 2.99 | 35 x 60 | ECS2VFL821M□□350060 | |
| | | 243 | 121 | 3.05 | 40 x 45 | ECS2VFL821M□□400045 | |
| | | 243 | 121 | 2.85 | 45 x 40 | ECS2VFL821M□□450040 | |
| | 1000 | 199 | 100 | 3.50 | 35 x 65 | ECS2VFL102M□□350065 | |
| | | 199 | 100 | 3.37 | 40 x 55 | ECS2VFL102M□□400055 | |
| | | 199 | 100 | 3.06 | 45 x 45 | ECS2VFL102M□□450045 | |
| | 1200 | 166 | 83 | 3.81 | 35 x 75 | ECS2VFL122M□□350075 | |
| | | 166 | 83 | 3.81 | 40 x 65 | ECS2VFL122M□□400065 | |
| | | 166 | 83 | 3.47 | 45 x 50 | ECS2VFL122M□□450050 | |
| | 1500 | 133 | 66 | 4.62 | 40 x 80 | ECS2VFL152M□□400080 | |
| | | 133 | 66 | 4.27 | 45 x 65 | ECS2VFL152M□□450065 | |
| | 1800 | 111 | 55 | 5.43 | 40 x 95 | ECS2VFL182M□□400095 | |
| | | 111 | 55 | 5.10 | 45 x 75 | ECS2VFL182M□□450075 | |
| | 2200 | 90 | 45 | 5.86 | 45 x 90 | ECS2VFL222M□□450090 | |
| | | 90 | 45 | 5.86 | 50 x 75 | ECS2VFL222M□□500075 | |
| | 2700 | 74 | 37 | 6.77 | 45 x 100 | ECS2VFL272M□□450100 | |
| | | 74 | 37 | 6.77 | 50 x 90 | ECS2VFL272M□□500090 | |
| | 3300 | 60 | 30 | 6.77 | 50 x 105 | ECS2VFL332M□□500105 | |
| | 400 (450) 2G | 470 | 423 | 169 | 2.11 | 35 x 45 | ECS2GFL471M□□350045 |
| | | | 423 | 169 | 2.14 | 40 x 40 | ECS2GFL471M□□400040 |
| | | 560 | 355 | 142 | 2.48 | 35 x 50 | ECS2GFL561M□□350050 |
| | | | 355 | 142 | 2.43 | 40 x 45 | ECS2GFL561M□□400045 |
| | | 680 | 355 | 142 | 2.35 | 45 x 40 | ECS2GFL561M□□450040 |
| | | | 293 | 117 | 2.73 | 35 x 60 | ECS2GFL681M□□350060 |
| 820 | | 293 | 117 | 2.78 | 40 x 50 | ECS2GFL681M□□400050 | |
| | | 293 | 117 | 2.59 | 45 x 40 | ECS2GFL681M□□450040 | |
| | | 243 | 97 | 3.17 | 35 x 65 | ECS2GFL821M□□350065 | |
| 1000 | | 243 | 97 | 3.05 | 40 x 55 | ECS2GFL821M□□400055 | |
| | | 243 | 97 | 2.90 | 45 x 45 | ECS2GFL821M□□450045 | |
| | | 199 | 80 | 3.48 | 35 x 80 | ECS2GFL102M□□350080 | |
| 1200 | | 199 | 80 | 3.48 | 40 x 65 | ECS2GFL102M□□400065 | |
| | | 199 | 80 | 3.17 | 45 x 55 | ECS2GFL102M□□450055 | |
| 1500 | | 166 | 66 | 4.13 | 35 x 90 | ECS2GFL122M□□350090 | |
| | | 166 | 66 | 4.13 | 40 x 80 | ECS2GFL122M□□400080 | |
| 1800 | | 166 | 66 | 4.00 | 45 x 60 | ECS2GFL122M□□450060 | |
| | | 133 | 53 | 4.39 | 40 x 90 | ECS2GFL152M□□400090 | |
| 2200 | | 133 | 53 | 4.39 | 45 x 75 | ECS2GFL152M□□450075 | |
| | | 133 | 53 | 4.39 | 50 x 70 | ECS2GFL152M□□500070 | |
| 2700 | | 111 | 44 | 5.30 | 45 x 90 | ECS2GFL182M□□450090 | |
| | | 111 | 44 | 5.30 | 50 x 80 | ECS2GFL182M□□500080 | |
| 3300 | | 90 | 36 | 5.90 | 50 x 90 | ECS2GFL222M□□500090 | |
| 3700 | | 74 | 29 | 6.50 | 50 x 105 | ECS2GFL272M□□500105 | |
| 420 (470) 2X | | 390 | 510 | 203 | 1.92 | 35 x 40 | ECS2 x FL391M□□350040 |
| | | | 510 | 203 | 1.95 | 40 x 35 | ECS2 x FL391M□□400035 |
| | | 470 | 423 | 169 | 2.27 | 35 x 45 | ECS2 x FL471M□□350045 |
| | | | 423 | 169 | 2.23 | 40 x 40 | ECS2 x FL471M□□400040 |
| | 560 | 355 | 142 | 2.56 | 35 x 50 | ECS2 x FL561M□□350050 | |
| | | 355 | 142 | 2.52 | 40 x 45 | ECS2 x FL561M□□400045 | |
| | 680 | 355 | 142 | 2.35 | 45 x 40 | ECS2 x FL561M□□450040 | |
| | | 293 | 117 | 2.81 | 35 x 60 | ECS2 x FL681M□□350060 | |
| | | 293 | 117 | 2.78 | 40 x 50 | ECS2 x FL681M□□400050 | |
| | 820 | 293 | 117 | 2.52 | 45 x 45 | ECS2 x FL681M□□450045 | |
| | | 243 | 97 | 3.26 | 35 x 70 | ECS2 x FL821M□□350070 | |
| | | 243 | 97 | 3.05 | 40 x 60 | ECS2 x FL821M□□400060 | |
| | 1000 | 243 | 97 | 2.87 | 45 x 50 | ECS2 x FL821M□□450050 | |
| | | 199 | 80 | 3.67 | 35 x 80 | ECS2 x FL102M□□350080 | |
| | | 199 | 80 | 3.67 | 40 x 70 | ECS2 x FL102M□□400070 | |
| | 1200 | 199 | 80 | 3.38 | 45 x 60 | ECS2 x FL102M□□450060 | |
| | | 166 | 66 | 4.33 | 40 x 80 | ECS2 x FL122M□□400080 | |
| | 1500 | 166 | 66 | 3.92 | 45 x 65 | ECS2 x FL122M□□450065 | |
| | | 133 | 53 | 4.62 | 45 x 80 | ECS2 x FL152M□□450080 | |
| | 1800 | 133 | 53 | 4.62 | 50 x 75 | ECS2 x FL152M□□500075 | |
| | | 111 | 44 | 5.42 | 45 x 95 | ECS2 x FL182M□□450095 | |
| | 2200 | 111 | 44 | 5.42 | 50 x 85 | ECS2 x FL182M□□500085 | |
| | | 90 | 36 | 6.00 | 50 x 100 | ECS2 x FL222M□□500100 | |

| U _R (Surge Voltage) Code | Rated Capacitance | Max ESR 20°C, 120Hz | Typ ESR 20°C, 120Hz | Rated Ripple Current 105°C, 120Hz | Size ΦD x L | P/N | |
|---|--------------------|---------------------------|---------------------------|---|----------------|---------------------|---------------------|
| (V) | (μF) | (mΩ) | (mΩ) | (Arms) | (mm) | - | |
| 450 (500) 2W | 390 | 510 | 225 | 2.00 | 35 x 40 | ECS2WFL391M□□350040 | |
| | | 423 | 186 | 2.27 | 35 x 45 | ECS2WFL471M□□350045 | |
| | 470 | 423 | 186 | 2.23 | 40 x 40 | ECS2WFL471M□□400040 | |
| | | 423 | 186 | 2.15 | 40 x 60 | ECS2WFL471M□□450065 | |
| | 560 | 355 | 156 | 2.47 | 35 x 55 | ECS2WFL561M□□350055 | |
| | | 355 | 186 | 2.52 | 40 x 50 | ECS2WFL561M□□400050 | |
| | | 355 | 186 | 2.35 | 45 x 40 | ECS2WFL561M□□450040 | |
| | 680 | 293 | 129 | 2.89 | 35 x 65 | ECS2WFL681M□□350065 | |
| | | 293 | 129 | 2.78 | 40 x 60 | ECS2WFL681M□□400060 | |
| | | 293 | 129 | 2.61 | 45 x 50 | ECS2WFL681M□□450050 | |
| | 820 | 243 | 107 | 3.24 | 35 x 75 | ECS2WFL821M□□350075 | |
| | | 243 | 107 | 3.24 | 40 x 65 | ECS2WFL821M□□400065 | |
| | | 243 | 107 | 3.10 | 45 x 50 | ECS2WFL821M□□450050 | |
| | 1000 | 199 | 88 | 3.77 | 35 x 90 | ECS2WFL102M□□350090 | |
| | | 199 | 88 | 3.77 | 40 x 80 | ECS2WFL102M□□400080 | |
| | | 199 | 88 | 3.68 | 45 x 65 | ECS2WFL102M□□450065 | |
| | 1200 | 166 | 73 | 4.43 | 40 x 95 | ECS2WFL122M□□400095 | |
| | | 166 | 73 | 4.23 | 45 x 75 | ECS2WFL122M□□450075 | |
| | 1500 | 133 | 58 | 4.84 | 50 x 65 | ECS2WFL122M□□500065 | |
| | | 133 | 58 | 4.84 | 40 x 100 | ECS2WFL152M□□400100 | |
| | 1800 | 133 | 58 | 4.84 | 45 x 90 | ECS2WFL152M□□450090 | |
| | | 133 | 58 | 4.84 | 50 x 80 | ECS2WFL152M□□500080 | |
| | 2200 | 111 | 49 | 5.30 | 45 x 105 | ECS2WFL182M□□450105 | |
| | | 111 | 49 | 5.30 | 50 x 95 | ECS2WFL182M□□500095 | |
| | 500 (550) 2H | 390 | 510 | 225 | 1.80 | 35 x 50 | ECS2HFL391M□□350050 |
| | | | 510 | 225 | 1.80 | 40 x 45 | ECS2HFL391M□□400045 |
| | | 470 | 423 | 186 | 2.00 | 35 x 55 | ECS2HFL471M□□350055 |
| | | | 423 | 186 | 2.00 | 40 x 50 | ECS2HFL471M□□400050 |
| 560 | | 423 | 186 | 2.00 | 45 x 40 | ECS2HFL471M□□450040 | |
| | | 355 | 156 | 2.25 | 35 x 65 | ECS2HFL561M□□350065 | |
| 680 | | 355 | 156 | 2.25 | 40 x 55 | ECS2HFL561M□□400055 | |
| | | 355 | 156 | 2.25 | 45 x 50 | ECS2HFL561M□□450050 | |
| | | 293 | 129 | 2.60 | 35 x 75 | ECS2HFL681M□□350075 | |
| 820 | | 293 | 129 | 2.60 | 40 x 70 | ECS2HFL681M□□400070 | |
| | | 293 | 129 | 2.60 | 45 x 55 | ECS2HFL681M□□450055 | |
| | | 243 | 107 | 2.85 | 40 x 75 | ECS2HFL821M□□400075 | |
| 1000 | | 243 | 107 | 2.85 | 45 x 60 | ECS2HFL821M□□450060 | |
| | | 199 | 88 | 3.30 | 40 x 90 | ECS2HFL102M□□400090 | |
| 1200 | | 199 | 88 | 3.30 | 45 x 75 | ECS2HFL102M□□450075 | |
| | | 166 | 73 | 4.00 | 40 x 100 | ECS2HFL122M□□400100 | |
| 1500 | | 166 | 73 | 4.00 | 45 x 85 | ECS2HFL122M□□450085 | |
| | | 166 | 73 | 4.00 | 50 x 80 | ECS2HFL122M□□500080 | |
| 1800 | | 133 | 58 | 4.45 | 45 x 100 | ECS2HFL152M□□450100 | |
| | | 133 | 58 | 4.45 | 50 x 95 | ECS2HFL152M□□500095 | |
| 2200 | | 111 | 49 | 4.85 | 50 x 105 | ECS2HFL152M□□500105 | |

SNAP-IN/LUG

Customer products are available on request.

Lifetime Diagram



IA = actual ripple current at 120Hz, IR = rated ripple current at 120Hz, 105°C
Multiplier of Useful Life as a function of ambient temperature and ripple current load