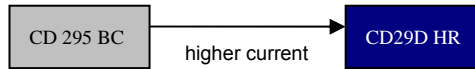


# CD 29D HR SERIES



5000h at 85°C

- Small Size
- Long Useful Life
- High Ripple Current
- Industrial Power Supplies and Inverters



| Items   | Characteristics  |         |     |     |      |     |
|---|--|---------|-----|-----|------|-----|
| Operating Temperature Range(°C)                         | -40 ~ +85  |         |     |     |      |     |
| Voltage Range (V)                                       | 160~450  |         |     |     |      |     |
| Capacitance Range(µF)                                   | 47~2200  |         |     |     |      |     |
| 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<br>C: Nominal Capacitance(µF) V: Rated Voltage(V) |         |     |     |      |     |
| Dissipation Factor (20°C, 120Hz)                        | Rated Voltage(V)   | 160     | 200 | 250 | 400  | 450 |
|   | Tan δ(max)   | 0.15    |     |     | 0.12 |     |
| Stability at Low Temperature (Impedance Ratio at 120Hz) | Rated Voltage(V)   | 160~450 |     |     |      |     |
|   | Z <sub>-40°C</sub> /Z <sub>+20°C</sub>   | 4       |     |     |      |     |

|                     | 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:          |                                       |                    |                                       |                                       | After test:<br>U <sub>R</sub> to be applied for<br>30min>24h before<br>measurement |
| Applied Voltage     | U <sub>R</sub>                        | U <sub>R</sub>     | U <sub>R</sub>                        | U <sub>R</sub>                        |  |
| Applied Current     | I <sub>R</sub>                        | 1.2×I <sub>R</sub> | I <sub>R</sub>                        | I <sub>R</sub> =0                     |  |
| Applied Temperature | 85°C                                  | 40°C               | 85°C                                  | 85°C                                  |  |

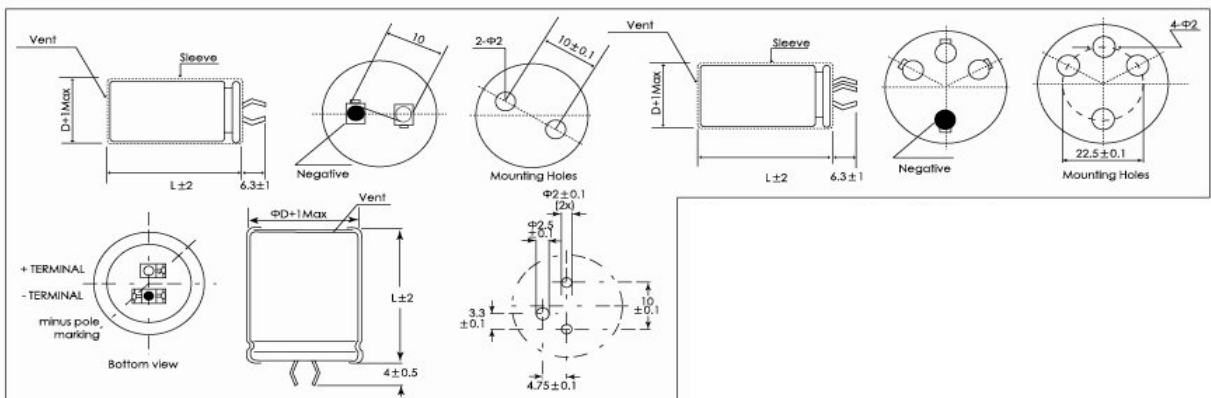
## Frequency Coefficient

| Frequency   | 50/60Hz | 120Hz | 300Hz | 1kHz | 10kHz | ≥ 50kHz |
|-------------|---------|-------|-------|------|-------|---------|
| Coefficient | 0.80    | 1.00  | 1.16  | 1.30 | 1.41  | 1.43    |

## Temperature Coefficient

| Temperature(°C) | +40 | +55 | +70 | +85 |
|-----------------|-----|-----|-----|-----|
| Coefficient     | 1.7 | 1.5 | 1.3 | 1.0 |

## Dimensions





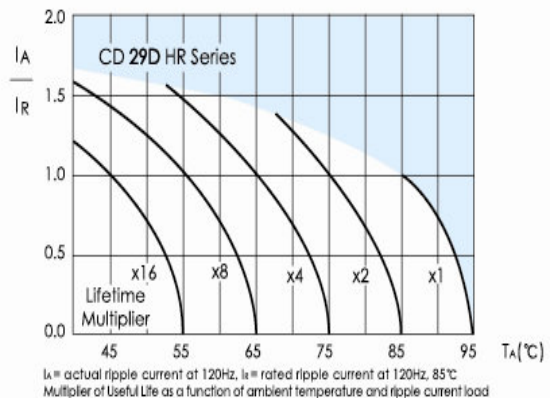
# CD 29D HR SERIES

## Ratings for CD29D HR Series

| U <sub>r</sub><br>(Surge Voltage)<br>Code | Rated Capacitance | Max ESR<br>20°C,<br>120Hz | Typ ESR<br>20°C,<br>120Hz | Rated Ripple Current<br>85°C,<br>120Hz | Size<br>Φ DxL       | P/N                 |
|---|-------------------|---------------------------|---------------------------|--|---------------------|---------------------|
| (v)                                       | (μF)              | (mΩ)                      | (mΩ)                      | (Arms)                                 | (mm)                | -                   |
| 160<br>(200)<br>2C                        | 330               | 603                       | 355                       | 1.5                                    | 22x25               | ECS2CHR331M□□220025 |
|   | 390               | 510                       | 300                       | 1.6                                    | 25x25               | ECS2CHR391M□□250025 |
|   | 470               | 424                       | 245                       | 1.8                                    | 22X35               | ECS2CHR471M□□220035 |
|   | 560               | 355                       | 215                       | 2.1                                    | 22X35               | ECS2CHR561M□□220035 |
|   |                   | 355                       | 215                       | 2.2                                    | 25X30               | ECS2CHR561M□□250030 |
|   |                   | 355                       | 215                       | 2.1                                    | 30X25               | ECS2CHR561M□□300025 |
|   | 680               | 293                       | 178                       | 2.6                                    | 22X40               | ECS2CHR681M□□220040 |
|   |                   | 293                       | 178                       | 2.5                                    | 25X35               | ECS2CHR681M□□250035 |
|   | 820               | 243                       | 145                       | 2.8                                    | 22X50               | ECS2CHR821M□□220050 |
|   |                   | 243                       | 145                       | 2.7                                    | 25X40               | ECS2CHR821M□□250040 |
|   |                   | 243                       | 145                       | 2.9                                    | 30X30               | ECS2CHR821M□□300030 |
|   |                   | 243                       | 145                       | 2.8                                    | 35X25               | ECS2CHR821M□□350025 |
|   | 1000              | 199                       | 115                       | 3.3                                    | 25X45               | ECS2CHR102M□□250045 |
|   |                   | 199                       | 115                       | 3.4                                    | 30X35               | ECS2CHR102M□□300035 |
|   |                   | 199                       | 115                       | 3.3                                    | 35X30               | ECS2CHR102M□□350030 |
|   | 1200              | 166                       | 95                        | 3.7                                    | 25X50               | ECS2CHR122M□□250050 |
|   |                   | 166                       | 95                        | 3.8                                    | 30X40               | ECS2CHR122M□□300040 |
|   |                   | 166                       | 95                        | 3.6                                    | 35X35               | ECS2CHR122M□□350035 |
|   | 1500              | 133                       | 75                        | 4.4                                    | 30X45               | ECS2CHR152M□□300045 |
|   |                   | 133                       | 75                        | 4.3                                    | 35X40               | ECS2CHR152M□□350040 |
| 1800                                      | 111               | 75                        | 4.4                       | 35X45                                  | ECS2CHR182M□□350045 |                     |
| 2200                                      | 91                | 58                        | 4.9                       | 35X50                                  | ECS2CHR222M□□350050 |                     |
| 200<br>(250)<br>2D                        | 220               | 905                       | 375                       | 1.2                                    | 22X25               | ECS2DHR221M□□220025 |
|   | 330               | 603                       | 258                       | 1.5                                    | 22X30               | ECS2DHR331M□□220030 |
|   | 390               | 603                       | 258                       | 1.6                                    | 25X25               | ECS2DHR331M□□250025 |
|   |                   | 510                       | 221                       | 1.8                                    | 22X35               | ECS2DHR391M□□220035 |
|   | 510               | 221                       | 1.8                       | 25X30                                  | ECS2DHR391M□□250030 |                     |
|   | 470               | 424                       | 175                       | 2                                      | 22X40               | ECS2DHR471M□□220040 |
|   |                   | 424                       | 175                       | 2.1                                    | 30X25               | ECS2DHR471M□□300025 |
|   | 560               | 355                       | 150                       | 2.2                                    | 22X45               | ECS2DHR561M□□220045 |
|   |                   | 355                       | 150                       | 2.2                                    | 25X35               | ECS2DHR561M□□250035 |
|   |                   | 355                       | 150                       | 2.3                                    | 30X30               | ECS2DHR561M□□300030 |
|   | 680               | 355                       | 150                       | 2.2                                    | 35X25               | ECS2DHR561M□□350025 |
|   |                   | 293                       | 128                       | 2.6                                    | 25X40               | ECS2DHR681M□□250040 |
|   |                   | 293                       | 128                       | 2.4                                    | 30X30               | ECS2DHR681M□□300030 |
|   | 820               | 243                       | 105                       | 2.7                                    | 25X50               | ECS2DHR821M□□250050 |
|   |                   | 243                       | 105                       | 2.8                                    | 30X40               | ECS2DHR821M□□300040 |
|   |                   | 243                       | 105                       | 2.6                                    | 35X30               | ECS2DHR821M□□350030 |
|   | 1000              | 199                       | 80                        | 3.4                                    | 30X40               | ECS2DHR102M□□300040 |
|   |                   | 199                       | 80                        | 3.6                                    | 35X35               | ECS2DHR102M□□350035 |
|   |                   | 166                       | 70                        | 3.8                                    | 30X50               | ECS2DHR122M□□300050 |
|   | 1200              | 166                       | 70                        | 3.7                                    | 35X40               | ECS2DHR122M□□350040 |
| 1500                                      |                   | 133                       | 55                        | 4.2                                    | 35X50               | ECS2DHR152M□□350050 |
| 250<br>(300)<br>2E                        | 150               | 1327                      | 550                       | 0.92                                   | 22X25               | ECS2EHR151M□□220025 |
|   | 180               | 1106                      | 470                       | 0.98                                   | 22X25               | ECS2EHR181M□□220025 |
|   | 220               | 905                       | 370                       | 1.25                                   | 22X30               | ECS2EHR221M□□220030 |
|   | 220               | 905                       | 370                       | 1.25                                   | 25X25               | ECS2EHR221M□□250025 |
|   | 270               | 737                       | 370                       | 1.25                                   | 22X35               | ECS2EHR271M□□220035 |
|   |                   | 603                       | 250                       | 1.64                                   | 22X40               | ECS2EHR331M□□220040 |
|   | 330               | 603                       | 255                       | 1.64                                   | 25X30               | ECS2EHR331M□□250030 |
|   |                   | 603                       | 255                       | 1.64                                   | 30X25               | ECS2EHR331M□□300025 |
|   |                   | 510                       | 220                       | 1.9                                    | 22X45               | ECS2EHR391M□□220045 |
|   | 390               | 510                       | 220                       | 1.9                                    | 25X35               | ECS2EHR391M□□250035 |
|   |                   | 424                       | 175                       | 2.2                                    | 22X50               | ECS2EHR471M□□220050 |
|   | 470               | 424                       | 175                       | 2.2                                    | 25X40               | ECS2EHR471M□□250040 |
|   |                   | 424                       | 175                       | 2.2                                    | 30X30               | ECS2EHR471M□□300030 |
|   |                   | 424                       | 175                       | 2.2                                    | 35X25               | ECS2EHR471M□□350025 |
|   | 560               | 355                       | 150                       | 2.4                                    | 25X45               | ECS2EHR561M□□250045 |
|   |                   | 355                       | 150                       | 2.4                                    | 30X35               | ECS2EHR561M□□300035 |
|   | 680               | 293                       | 123                       | 2.8                                    | 30X40               | ECS2EHR681M□□300040 |
|   |                   | 293                       | 123                       | 2.8                                    | 35X30               | ECS2EHR681M□□350030 |
|   | 820               | 243                       | 105                       | 3.2                                    | 30X45               | ECS2EHR821M□□300045 |
|   |                   | 243                       | 105                       | 3.2                                    | 35X35               | ECS2EHR821M□□350035 |
| 1000                                      | 199               | 80                        | 3.7                       | 35X40                                  | ECS2EHR102M□□350040 |                     |
| 1200                                      | 166               | 70                        | 4.1                       | 35X45                                  | ECS2EHR122M□□350045 |                     |
| 1500                                      | 133               | 60                        | 4.6                       | 35X50                                  | ECS2EHR152M□□350050 |                     |

| U <sub>r</sub><br>(Surge Voltage)<br>Code | Rated Capacitance | Max ESR<br>20°C,<br>120Hz | Typ ESR<br>20°C,<br>120Hz | Rated Ripple Current<br>85°C,<br>120KHz | Size<br>Φ DxL       | P/N                 |
|---|-------------------|---------------------------|---------------------------|---|---------------------|---------------------|
| (v)                                       | (μF)              | (mΩ)                      | (mΩ)                      | (Arms)                                  | (mm)                | -                   |
| 400<br>(450)<br>2G                        | 68                | 2342                      | 960                       | 0.62                                    | 22X25               | ECS2GHR680M□□220025 |
|   | 100               | 1592                      | 600                       | 0.81                                    | 22X30               | ECS2GHR101M□□220030 |
|   |                   | 1592                      | 660                       | 0.83                                    | 25X25               | ECS2GHR101M□□250025 |
|   | 120               | 1327                      | 550                       | 0.93                                    | 22X35               | ECS2GHR121M□□220035 |
|   |                   | 1062                      | 440                       | 1.2                                     | 22X40               | ECS2GHR151M□□220040 |
|   | 150               | 1062                      | 440                       | 1.2                                     | 25X30               | ECS2GHR151M□□250030 |
|   |                   | 1062                      | 440                       | 1.2                                     | 30X25               | ECS2GHR151M□□300025 |
|   |                   | 885                       | 360                       | 1.3                                     | 22X45               | ECS2GHR181M□□220045 |
|   | 180               | 885                       | 360                       | 1.3                                     | 25X35               | ECS2GHR181M□□250035 |
|   |                   | 885                       | 360                       | 1.3                                     | 30X30               | ECS2GHR181M□□300030 |
|   |                   | 885                       | 180                       | 1.3                                     | 35X25               | ECS2GHR181M□□350025 |
|   |                   | 724                       | 300                       | 1.5                                     | 22X50               | ECS2GHR221M□□220050 |
|   | 220               | 724                       | 300                       | 1.5                                     | 25X40               | ECS2GHR221M□□250040 |
|   |                   | 724                       | 300                       | 1.5                                     | 30X35               | ECS2GHR221M□□300035 |
|   | 270               | 590                       | 240                       | 1.7                                     | 25X45               | ECS2GHR271M□□250045 |
|   |                   | 590                       | 240                       | 1.7                                     | 30X40               | ECS2GHR271M□□300040 |
|   | 330               | 590                       | 240                       | 1.7                                     | 35X30               | ECS2GHR271M□□350030 |
|   |                   | 483                       | 200                       | 2.1                                     | 30X45               | ECS2GHR331M□□300045 |
|   | 390               | 483                       | 200                       | 2.1                                     | 35X35               | ECS2GHR331M□□350035 |
|   |                   | 408                       | 170                       | 2.3                                     | 30X50               | ECS2GHR391M□□300050 |
| 470                                       | 408               | 170                       | 2.3                       | 35X40                                   | ECS2GHR391M□□350040 |                     |
| 560                                       | 339               | 140                       | 2.7                       | 35X45                                   | ECS2GHR471M□□350045 |                     |
| 47  | 3388              | 2800                      | 0.52                      | 22X25                                   | ECS2WHR470M□□220025 |                     |
| 68  | 2342              | 1940                      | 0.66                      | 22X30                                   | ECS2WHR680M□□220030 |                     |
|   | 2342              | 1940                      | 0.66                      | 25X25                                   | ECS2WHR680M□□250025 |                     |
| 100                                       | 1592              | 1310                      | 0.9                       | 22X35                                   | ECS2WHR101M□□220035 |                     |
|   | 1592              | 1310                      | 0.9                       | 30X25                                   | ECS2WHR101M□□300025 |                     |
| 120                                       | 1327              | 910                       | 1.1                       | 22X40                                   | ECS2WHR121M□□220040 |                     |
|   | 1327              | 910                       | 1.1                       | 25X35                                   | ECS2WHR121M□□250035 |                     |
| 150                                       | 1062              | 880                       | 1.3                       | 22X50                                   | ECS2WHR151M□□220050 |                     |
|   | 1062              | 880                       | 1.3                       | 25X40                                   | ECS2WHR151M□□250040 |                     |
|   | 1062              | 880                       | 1.3                       | 30X30                                   | ECS2WHR151M□□300030 |                     |
| 180                                       | 885               | 740                       | 1.4                       | 25X45                                   | ECS2WHR181M□□250045 |                     |
|   | 885               | 740                       | 1.4                       | 30X35                                   | ECS2WHR181M□□300035 |                     |
|   | 885               | 740                       | 1.4                       | 35X25                                   | ECS2WHR181M□□350025 |                     |
| 220                                       | 724               | 590                       | 1.6                       | 25X50                                   | ECS2WHR221M□□250050 |                     |
|   | 724               | 590                       | 1.6                       | 30X40                                   | ECS2WHR221M□□300040 |                     |
|   | 724               | 590                       | 1.6                       | 35X30                                   | ECS2WHR221M□□350030 |                     |
| 270                                       | 590               | 490                       | 1.9                       | 30X45                                   | ECS2WHR271M□□300045 |                     |
|   | 590               | 490                       | 1.9                       | 35X35                                   | ECS2WHR271M□□350035 |                     |
| 330                                       | 483               | 395                       | 2.2                       | 35X40                                   | ECS2WHR331M□□350040 |                     |
| 390                                       | 408               | 300                       | 2.4                       | 35X45                                   | ECS2WHR391M□□350045 |                     |
| 470                                       | 339               | 280                       | 2.8                       | 35X50                                   | ECS2WHR471M□□350050 |                     |

### Lifetime Diagram



Customer products are available on request.