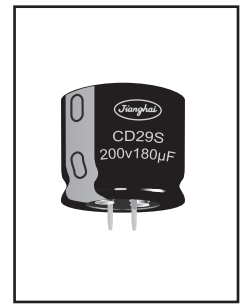
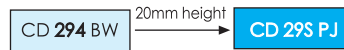


# CD 29S PJ SERIES



2000h at 105°C

- 20mm height
- For laminated electrical devices

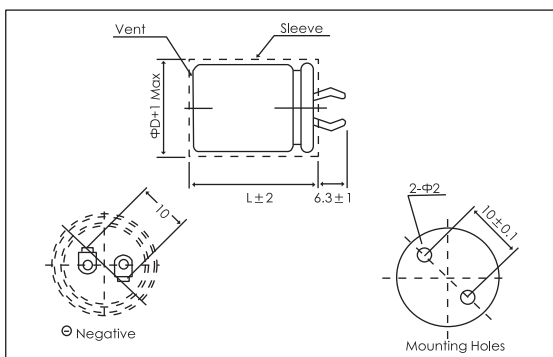


| Items   | Characteristics   |   |
|---|---|---|
| Operating Temperature Range (°C)                        | -40 ~ +105  | -25 ~ +105  |
| Voltage Range (V)                                       | 10 ~ 100  | 160 ~ 450   |
| Capacitance Range (μF)                                  | 33 ~ 10000  |   |
| 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)                        | WV (V)  | 10 16 25 35 50 60 80 100 160~250 350~450                        |
|   | Tan δ (max)   | 0.55 0.50 0.45 0.40 0.35 0.30 0.25 0.20 0.15 0.25               |
| Stability at Low Temperature (Impedance Ratio at 120Hz) | Rated Voltage (V)   | 10~100 160~250 350~450  |
|   | Impedance Ratio   | $Z_{-25°C} / Z_{+20°C}$ 3 3 8<br>$Z_{-40°C} / Z_{+20°C}$ 12 - - |

|   | Useful Life                           |                              | Load Life                             | Endurance Test                        | Shelf Life   |
|---|---------------------------------------|------------------------------|---------------------------------------|---------------------------------------|--|
| Lifetime  | 4000h                                 | >180000h                     | 2000h                                 | 3000h                                 | 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:<br>Applied Voltage<br>Applied Current<br>Applied Temperature | $U_R$<br>$I_R$<br>105°C               | $U_R$<br>1.4 x $I_R$<br>40°C | $U_R$<br>$I_R$<br>105°C               | $U_R$<br>$I_R = 0$<br>105°C           | $U_R = 0$<br>$I_R = 0$<br>105°C<br>After test:<br>$U_R$ to be applied<br>for 30min<br>>24h before<br>measurement |

## Dimensions

mm



## Frequency Coefficient

| Frequency | Rated Voltage (V) |       |       |      |       |        |
|-----------|-------------------|-------|-------|------|-------|--------|
|           | 50/60Hz           | 120Hz | 500Hz | 1kHz | 10kHz | ≥50kHz |
| 10 ~ 100  | 0.90              | 1.00  | 1.10  | 1.15 | 1.15  | 1.15   |
| 160 ~ 250 | 0.90              | 1.00  | 1.20  | 1.30 | 1.45  | 1.50   |
| 350 ~ 450 | 0.85              | 1.00  | 1.20  | 1.30 | 1.42  | 1.45   |

## Temperature Coefficient

| Temperature(°C) | +40 | +55 | +70 | +80 | +105 |
|-----------------|-----|-----|-----|-----|------|
| Coefficient     | 2.7 | 2.5 | 2.1 | 1.7 | 1.0  |

## Ratings for CD 29S PJ Series

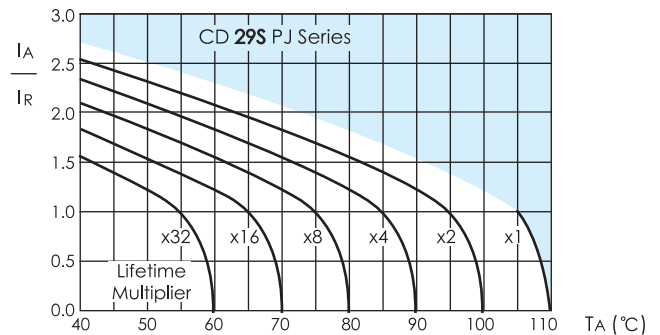
| U <sub>r</sub><br>(Surge<br>Voltage)<br>Code | Rated<br>Capa-<br>cance | Max ESR<br>20°C,<br>120Hz | Typ ESR<br>20°C,<br>120Hz | Rated<br>Ripple<br>Current<br>105°C,<br>120Hz | Size<br>ΦD x L | P/N                 |
|--|-------------------------|---------------------------|---------------------------|---|----------------|---------------------|
| (V)  | (μF)                    | (mΩ)                      | (mΩ)                      | (Arms)  | (mm)           | -                   |
| 10<br>(13)<br>1A                             | 4700                    | 155                       | 109                       | 0.98  | 22×20          | ECS1APJ472M□□220020 |
|  | 5600                    | 130                       | 91                        | 1.16  | 25×20          | ECS1APJ562M□□250020 |
|  | 6800                    | 107                       | 75                        | 1.31  | 25×20          | ECS1APJ682M□□250020 |
|  | 8200                    | 89                        | 62                        | 1.59  | 30×20          | ECS1APJ822M□□300020 |
|  | 10000                   | 73                        | 51                        | 1.77  | 30×20          | ECS1APJ103M□□300020 |
| 16<br>(20)<br>1C                             | 3300                    | 201                       | 141                       | 1.06  | 22×20          | ECS1CPJ332M□□220020 |
|  | 3900                    | 170                       | 119                       | 1.25  | 25×20          | ECS1CPJ392M□□250020 |
|  | 4700                    | 141                       | 99                        | 1.38  | 25×20          | ECS1CPJ472M□□250020 |
|  | 5600                    | 119                       | 83                        | 1.68  | 30×20          | ECS1CPJ562M□□300020 |
| 25<br>(32)<br>1E                             | 6800                    | 98                        | 68                        | 1.80  | 30×20          | ECS1CPJ682M□□300020 |
|  | 2200                    | 271                       | 190                       | 0.98  | 22×20          | ECS1EPJ222M□□220020 |
|  | 2700                    | 221                       | 155                       | 1.08  | 25×20          | ECS1EPJ272M□□250020 |
|  | 3300                    | 181                       | 127                       | 1.29  | 25×20          | ECS1EPJ332M□□250020 |
| 35<br>(44)<br>1V                             | 3900                    | 153                       | 107                       | 1.58  | 30×20          | ECS1EPJ392M□□300020 |
|  | 4700                    | 127                       | 89                        | 1.61  | 30×20          | ECS1EPJ472M□□300020 |
|  | 1500                    | 354                       | 248                       | 0.80  | 22×20          | ECS1VPJ152M□□220020 |
|  | 1800                    | 295                       | 206                       | 0.94  | 25×20          | ECS1VPJ182M□□250020 |
| 50<br>(63)<br>1H                             | 2200                    | 241                       | 169                       | 1.04  | 25×20          | ECS1VPJ222M□□250020 |
|  | 2700                    | 197                       | 138                       | 1.29  | 30×20          | ECS1VPJ272M□□300020 |
|  | 3300                    | 161                       | 113                       | 1.45  | 30×20          | ECS1VPJ332M□□300020 |
|  | 1000                    | 464                       | 325                       | 0.87  | 22×20          | ECS1HPJ102M□□220020 |
| 63<br>(79)<br>1J                             | 1200                    | 387                       | 271                       | 1.02  | 25×20          | ECS1HPJ122M□□250020 |
|  | 1500                    | 310                       | 217                       | 1.15  | 25×20          | ECS1HPJ152M□□250020 |
|  | 1800                    | 258                       | 181                       | 1.34  | 30×20          | ECS1HPJ182M□□300020 |
|  | 2200                    | 211                       | 148                       | 1.60  | 30×20          | ECS1HPJ222M□□300020 |
| 80<br>(100)<br>1K                            | 680                     | 585                       | 410                       | 0.83  | 22×20          | ECS1JPJ681M□□220020 |
|  | 820                     | 486                       | 340                       | 0.99  | 25×20          | ECS1JPJ821M□□250020 |
|  | 1000                    | 398                       | 279                       | 1.10  | 25×20          | ECS1JPJ102M□□250020 |
|  | 1200                    | 332                       | 232                       | 1.20  | 30×20          | ECS1JPJ122M□□300020 |
|  | 1500                    | 265                       | 186                       | 1.47  | 30×20          | ECS1JPJ152M□□300020 |
| 100<br>(125)<br>2A                           | 1800                    | 221                       | 155                       | 1.52  | 30×20          | ECS1JPJ182M□□300020 |
|  | 470                     | 706                       | 494                       | 0.65  | 22×20          | ECS1KPJ471M□□220020 |
|  | 560                     | 592                       | 415                       | 0.70  | 22×20          | ECS1KPJ561M□□220020 |
|  | 680                     | 488                       | 342                       | 0.84  | 25×20          | ECS1KPJ681M□□250020 |
|  | 820                     | 405                       | 283                       | 1.04  | 30×20          | ECS1KPJ821M□□300020 |
| 160<br>(200)<br>2C                           | 1000                    | 332                       | 232                       | 1.19  | 30×20          | ECS1KPJ102M□□300020 |
|  | 1200                    | 277                       | 194                       | 1.44  | 30×20          | ECS1KPJ122M□□300020 |
|  | 330                     | 804                       | 563                       | 0.60  | 22×20          | ECS2APJ331M□□220020 |
|  | 390                     | 681                       | 476                       | 0.71  | 25×20          | ECS2APJ391M□□250020 |
|  | 470                     | 565                       | 395                       | 0.78  | 25×20          | ECS2APJ471M□□250020 |
| 180<br>(225)<br>2K                           | 560                     | 474                       | 332                       | 0.95  | 30×20          | ECS2APJ561M□□300020 |
|  | 680                     | 390                       | 273                       | 1.09  | 30×20          | ECS2APJ681M□□300020 |
|  | 820                     | 324                       | 227                       | 1.32  | 30×20          | ECS2APJ821M□□300020 |
|  | 120                     | 1659                      | 1161                      | 0.53  | 22×20          | ECS2CPJ121M□□220020 |
|  | 150                     | 1327                      | 929                       | 0.59  | 22×20          | ECS2CPJ151M□□220020 |
|  | 180                     | 1106                      | 774                       | 0.70  | 25×20          | ECS2CPJ181M□□250020 |
|  | 220                     | 905                       | 633                       | 0.75  | 25×20          | ECS2CPJ221M□□250020 |
|  | 270                     | 737                       | 516                       | 0.95  | 30×20          | ECS2CPJ271M□□300020 |
|  | 330                     | 603                       | 422                       | 1.05  | 30×20          | ECS2CPJ331M□□300020 |

| U <sub>r</sub><br>(Surge<br>Voltage)<br>Code | Rated<br>Capa-<br>cance | Max ESR<br>20°C,<br>120Hz | Typ ESR<br>20°C,<br>120Hz | Rated<br>Ripple<br>Current<br>105°C,<br>120Hz | Size<br>ΦD x L | P/N                 |
|--|-------------------------|---------------------------|---------------------------|---|----------------|---------------------|
| (V)  | (μF)                    | (mΩ)                      | (mΩ)                      | (Arms)  | (mm)           | -                   |
| 180<br>(225)<br>2K                           | 100                     | 1990                      | 1393                      | 0.50  | 22×20          | ECS2KPJ101M□□220020 |
|  | 120                     | 1659                      | 1161                      | 0.54  | 22×20          | ECS2KPJ121M□□220020 |
|  | 150                     | 1327                      | 929                       | 0.63  | 25×20          | ECS2KPJ151M□□250020 |
|  | 180                     | 1106                      | 774                       | 0.70  | 25×20          | ECS2KPJ181M□□250020 |
|  | 220                     | 905                       | 633                       | 0.85  | 30×20          | ECS2KPJ221M□□300020 |
|  | 270                     | 737                       | 516                       | 0.95  | 30×20          | ECS2KPJ271M□□300020 |
| 200<br>(250)<br>2D                           | 100                     | 1990                      | 1393                      | 0.51  | 22×20          | ECS2DPJ101M□□220020 |
|  | 120                     | 1659                      | 1161                      | 0.56  | 22×20          | ECS2DPJ121M□□220020 |
|  | 150                     | 1327                      | 929                       | 0.65  | 25×20          | ECS2DPJ151M□□250020 |
|  | 180                     | 1106                      | 774                       | 0.78  | 30×20          | ECS2DPJ181M□□300020 |
| 250<br>(300)<br>2E                           | 220                     | 905                       | 633                       | 0.85  | 30×20          | ECS2DPJ221M□□300020 |
|  | 68                      | 2927                      | 2049                      | 0.39  | 22×20          | ECS2EPJ680M□□220020 |
|  | 82                      | 2427                      | 1699                      | 0.45  | 22×20          | ECS2EPJ820M□□220020 |
|  | 100                     | 1990                      | 1393                      | 0.59  | 25×20          | ECS2EPJ101M□□250020 |
|  | 120                     | 1659                      | 1161                      | 0.62  | 25×20          | ECS2EPJ121M□□250020 |
|  | 150                     | 1327                      | 929                       | 0.76  | 30×20          | ECS2EPJ151M□□300020 |
| 350<br>(400)<br>2V                           | 180                     | 1106                      | 774                       | 0.79  | 30×20          | ECS2EPJ181M□□300020 |
|  | 47                      | 7058                      | 4941                      | 0.28  | 22×20          | ECS2VPJ470M□□220020 |
|  | 56                      | 5924                      | 4147                      | 0.34  | 25×20          | ECS2VPJ560M□□250020 |
|  | 68                      | 4879                      | 3415                      | 0.39  | 25×20          | ECS2VPJ680M□□250020 |
| 400<br>(450)<br>2G                           | 82                      | 4046                      | 2832                      | 0.45  | 30×20          | ECS2VPJ820M□□300020 |
|  | 100                     | 3317                      | 2322                      | 0.49  | 30×20          | ECS2VPJ101M□□300020 |
|  | 39                      | 8506                      | 5954                      | 0.27  | 22×20          | ECS2GPJ390M□□220020 |
|  | 47                      | 7058                      | 4941                      | 0.31  | 25×20          | ECS2GPJ470M□□250020 |
| 450<br>(500)<br>2W                           | 56                      | 5924                      | 4147                      | 0.34  | 25×20          | ECS2GPJ560M□□250020 |
|  | 68                      | 4879                      | 3415                      | 0.40  | 30×20          | ECS2GPJ680M□□300020 |
|  | 82                      | 4046                      | 2832                      | 0.45  | 30×20          | ECS2GPJ820M□□300020 |
|  | 33                      | 10053                     | 7037                      | 0.25  | 22×20          | ECS2WPJ330M□□220020 |
| 450<br>(500)<br>2W                           | 39                      | 8506                      | 5954                      | 0.28  | 25×20          | ECS2WPJ390M□□250020 |
|  | 47                      | 7058                      | 4941                      | 0.31  | 25×20          | ECS2WPJ470M□□250020 |
|  | 56                      | 5924                      | 4147                      | 0.36  | 30×20          | ECS2WPJ560M□□300020 |
|  | 68                      | 4879                      | 3415                      | 0.40  | 30×20          | ECS2WPJ680M□□300020 |

SNAP-IN/LUG

Customer products are available on request.

## Lifetime Diagram



I<sub>A</sub> = actual ripple current at 120Hz, I<sub>R</sub> = rated ripple current at 120Hz, 105°C  
Multiplier of Useful Life as a function of ambient temperature and ripple current load