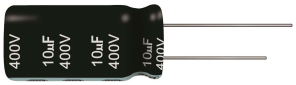
# PF Series




- **General standard size**
- **Load life 2,000 hours at 105℃**

## ◆ SPECIFICATIONS

| Item | Performance Characteristics | |
|---|---|---|
| Category Temperature Range | -40 ~ +105℃ | -25 ~ +105℃ |
| Working Voltage Range | 6.3 ~ 100Vdc | 160 ~ 450Vdc |
| Capacitance Range | 0.47 ~ 22,000μF | 0.47 ~ 560 μF |
| Capacitance Tolerance | ±20% (at 25℃ and 120Hz) | |

**Dissipation Factor (tanδ) (at 25℃, 120Hz)**

| Rated Voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 ~ 250 | 350 ~ 450 |
|---|---|---|---|---|---|---|---|---|---|---|
| tanδ(Max) | 0.26 | 0.22 | 0.18 | 0.16 | 0.14 | 0.12 | 0.10 | 0.10 | 0.15 | 0.20 |

The above values should be increased by 0.02 for every additional 1000μF

**Leakage Current**

I=0.01CV or 3μA whichever is greater(6.3 ~ 100V)
I=0.03CV + 10μA(160 ~ 450V)
I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V)
Impress the rated voltage for 2 minutes

**Low Temperature Characteristics Impedance Ratio(MAX)**

| Rated voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 ~ 250 | 350 | 400 ~ 450 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Z(-40℃)/Z(+20℃) | 12 | 10 | 8 | 5 | 4 | 3 | 3 | 3 | — | — | — |
| Z(-25℃)/Z(+20℃) | — | — | — | — | — | — | — | — | 3 | 6 | 6 |

(at 120Hz)

**Endurance**

The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 2,000 hours at 105℃.

| | |
|---|---|
| Capacitance change | ≦ ±20% of the initial value |
| Dissipation factor(tanδ) | ≦ 200% of the specified value |
| Leakage current | ≦ specified value |

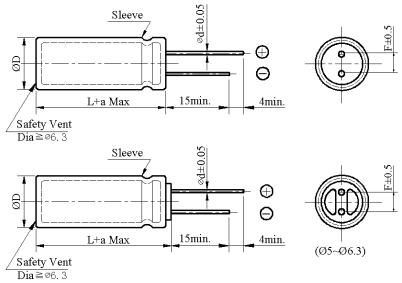
**Shelf Life**

The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied.

| | |
|---|---|
| Capacitance change | ≦ ±20% of the initial value |
| Dissipation factor(tanδ) | ≦ 200% of the specified value |
| Leakage current | ≦ 200% of the specified value |

| Others | Conforms to JIS-C-5101-4 (1998), characteristic W |
|---|---|

## ◆ DIMENSIONS (mm)




| ΦD | 5 | 6.3 | 8 | 10 | 12.5 L＜35 | 12.5 L≧35 | 16 | 18 | 20 | 22 |
|---|---|---|---|---|---|---|---|---|---|---|
| ΦD | ΦD +0.5 Max | | | | | | | | ΦD +1.0 Max | |
| Φd | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 1.0 | 1.0 |
| F | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | | 7.5 | 7.5 | 10 | 10 |
| a | L+1.5 Max | | | | ≦ 35 L+1.5Max<br>≧ 40 L+2.0 Max | | L+1.5 Max | | L+2.0 Max | |

## ◆ PART NUMBER SYSTEM( Example : 200V 330μF )

| P | F | 2 | D | 3 | 3 | 1 | M | N | N | 1 | 8 | 3 | 6 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Special Request
Size code(1836 : 18×36)
Lead length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code(330μF)
Voltage code(200V)
Series code(PF)

# PF Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

| uF \ Vdc | 6.3 | | 10 | | 16 | | 25 | |
|---|---|---|---|---|---|---|---|---|
| | ΦD × L | RC | ΦD × L | RC | ΦD × L | RC | ΦD × L | RC |
| 10 | | | | | 5×11 | 40 | 5×11 | 43 |
| 15 | | | | | 5×11 | 45 | 5×11 | 47 |
| 22 | 5×11 | 45 | 5×11 | 51 | 5×11 | 55 | 5×11 | 60 |
| 33 | 5×11 | 55 | 5×11 | 60 | 5×11 | 70 | 5×11 | 75 |
| 47 | 5×11 | 65 | 5×11 | 75 | 5×11 | 85 | 5×11 | 90 |
| 68 | 5×11 | 70 | 5×11 | 80 | 5×11 | 100 | 6.3×11 | 125 |
| 100 | 5×11 | 100 | 5×11 | 110 | 6.3×11 | 140 | 6.3×11 | 145 |
| 150 | 6.3×11 | 120 | 6.3×11 | 130 | 8×11.5 | 180 | 8×11.5 | 200 |
| 220 | 6.3×11 | 180 | 6.3×11 | 190 | 8×11.5 | 240 | 8×11.5 | 250 |
| 330 | 6.3×11 | 190 | 8×11.5 | 270 | 8×11.5 | 285 | 10×12.5 | 350 |
| 470 | 8×11.5 | 300 | 8×11.5 | 330 | 10×12.5 | 380 | 10×16 | 460 |
| 680 | 10×12.5 | 320 | 10×12.5 | 420 | 10×16 | 530 | 10×20 | 650 |
| 1000 | 10×12.5 | 480 | 10×16 | 570 | 10×20 | 680 | 12.5×20 | 830 |
| 1500 | 10×16 | 600 | 10×20 | 750 | 12.5×20 | 860 | 12.5×25 | 1020 |
| 2200 | 10×20 | 830 | 12.5×20 | 980 | 12.5×25 | 1130 | 16×25 | 1210 |
| 3300 | 12.5×20 | 1100 | 12.5×25 | 1250 | 16×25 | 1270 | 16×31.5 | 1540 |
| 4700 | 12.5×25 | 1320 | 16×25 | 1350 | 16×31.5 | 1570 | 16×35.5 | 1650 |
| 6800 | 16×25 | 1495 | 16×31.5 | 1670 | 18×35.5 | 1930 | 18×35.5 | 1950 |
| 10000 | 16×31.5 | 1832 | 18×35.5 | 2010 | 18×40 | 2060 | 18×40 | 2100 |
| 15000 | 18×35.5 | 2235 | 18×40 | 2360 | | | | |
| 22000 | 18×40 | 2375 | | | | | | |

| uF \ Vdc | 35 | | 50 | | 63 | | 100 | |
|---|---|---|---|---|---|---|---|---|
| | ΦD × L | RC | ΦD × L | RC | ΦD × L | RC | ΦD × L | RC |
| 0.47 | | | 5×11 | 11 | 5×11 | 8 | 5×11 | 12 |
| 1 | | | 5×11 | 16 | 5×11 | 12 | 5×11 | 18 |
| 2.2 | | | 5×11 | 23 | 5×11 | 20 | 5×11 | 27 |
| 3.3 | | | 5×11 | 29 | 5×11 | 24 | 5×11 | 33 |
| 4.7 | | | 5×11 | 34 | 5×11 | 34 | 5×11 | 39 |
| 6.8 | | | 5×11 | 35 | 5×11 | 37 | 5×11 | 46 |
| 10 | 5×11 | 47 | 5×11 | 50 | 5×11 | 50 | 6.3×11 | 65 |
| 15 | 5×11 | 50 | 5×11 | 52 | 5×11 | 65 | 6.3×11 | 66 |
| 22 | 5×11 | 65 | 5×11 | 75 | 6.3×11 | 85 | 6.3×11 | 85 |
| 33 | 5×11 | 88 | 6.3×11 | 100 | 6.3×11 | 110 | 8×11.5 | 125 |
| 47 | 6.3×11 | 115 | 6.3×11 | 125 | 8×11.5 | 150 | 10×12.5 | 165 |
| 68 | 8×11.5 | 130 | 8×11.5 | 159 | 10×12.5 | 198 | 10×16 | 200 |
| 100 | 8×11.5 | 200 | 8×11.5 | 210 | 10×12.5 | 250 | 10×20 | 265 |
| 150 | 10×12.5 | 240 | 10×12.5 | 290 | 10×16 | 330 | 12.5×20 | 335 |
| 220 | 10×12.5 | 320 | 10×16 | 370 | 10×20 | 410 | 12.5×25 | 440 |
| 330 | 10×16 | 420 | 10×20 | 550 | 12.5×20 | 550 | 16×25 | 660 |
| 470 | 10×20 | 570 | 12.5×20 | 660 | 12.5×25 | 720 | 16×31.5 | 880 |
| 680 | 12.5×20 | 730 | 12.5×25 | 860 | 16×25 | 1000 | 16×35.5 | 1202 |
| 1000 | 12.5×25 | 1000 | 16×25 | 1020 | 16×31.5 | 1130 | 18×35.5 | 1300 |
| 1500 | 16×25 | 1110 | 16×31.5 | 1350 | 16×35.5 | 1450 | | |
| 2200 | 16×31.5 | 1450 | 18×35.5 | 1690 | 18×40 | 1780 | | |
| 3300 | 18×31.5 | 1600 | 18×40 | 2060 | | | | |
| 4700 | 18×35.5 | 1910 | | | | | | |

# PF Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

| Vdc / uF | 160 | | 200 | | 250 | | 350 | |
|---|---|---|---|---|---|---|---|---|
| | ΦD × L | RC | ΦD × L | RC | ΦD × L | RC | ΦD × L | RC |
| 0.47 | 5×11 | 13 | 5×11 | 13 | 5×11 | 13 | 5×11 | 11 |
| 1 | 5×11 | 18 | 5×11 | 15 | 6.3×11 | 18 | 6.3×11 | 15 |
| 2.2 | 6.3×11 | 27 | 6.3×11 | 27 | 6.3×11 | 23 | 8×11.5 | 23 |
| 3.3 | 6.3×11 | 28 | 6.3×11 | 28 | 8×11.5 | 30 | 8×11.5 | 30 |
| 4.7 | 6.3×11 | 32 | 8×11.5 | 36 | 8×11.5 | 39 | 10×12.5 | 40 |
| 6.8 | 8×11.5 | 38 | 8×11.5 | 40 | 10×12.5 | 42 | 10×16 | 42 |
| 10 | 8×11.5 | 55 | 10×12.5 | 60 | 10×16 | 75 | 10×20 | 70 |
| 15 | 10×12.5 | 70 | 10×16 | 75 | 10×16 | 85 | 12.5×20 | 140 |
| 22 | 10×20 | 140 | 10×20 | 150 | 12.5×20 | 160 | 12.5×25 | 145 |
| 33 | 10×20 | 145 | 12.5×20 | 160 | 12.5×20 | 165 | 16×25 | 165 |
| 47 | 12.5×20 | 195 | 12.5×20 | 195 | 12.5×25 | 195 | 16×25 | 200 |
| 56 | 12.5×20 | 215 | 12.5×20 | 215 | 12.5×25 | 215 | 16×31.5 | 230 |
| 68 | 12.5×25 | 270 | 12.5×25 | 250 | 16×25 | 240 | 16×35.5 | 240 |
| 82 | 12.5×25 | 290 | 16×25 | 270 | 16×25 | 280 | 18×31.5 | 280 |
| 100 | 16×25 | 340 | 16×25 | 320 | 16×31.5 | 310 | 18×31.5 | 320 |
| 120 | 16×25 | 360 | 16×31.5 | 340 | 16×31.5 | 330 | 18×35.5 | 365 |
| 150 | 16×31.5 | 435 | 16×31.5 | 360 | 16×35.5 | 460 | 18×40 | 400 |
| 180 | 16×35.5 | 450 | 16×35.5 | 400 | 18×35.5 | 470 | 18×45 | 460 |
| 220 | 16×35.5 | 500 | 16×35.5 | 500 | 18×35.5 | 485 | | |
| 330 | 18×35.5 | 600 | 18×35.5 | 610 | 18×45 | 610 | | |
| 470 | 18×45 | 740 | 18×45 | 750 | | | | |
| 560 | 18×50 | 800 | 18×50 | 805 | | | | |

| Vdc / uF | 400 | | 450 | |
|---|---|---|---|---|
| | ΦD × L | RC | ΦD × L | RC |
| 0.47 | 6.3×11 | 15 | 6.3×11 | 16 |
| 1 | 6.3×11 | 14 | 8×11.5 | 21 |
| 2.2 | 8×11.5 | 25 | 8×11.5 | 22 |
| 3.3 | 8×11.5 | 30 | 10×12.5 | 30 |
| 4.7 | 10×16 | 42 | 10×16 | 36 |
| 6.8 | 10×16 | 45 | 10×20 | 40 |
| 10 | 10×20 | 70 | 12.5×20 | 75 |
| 15 | 12.5×20 | 90 | 12.5×25 | 80 |
| 22 | 12.5×25 | 140 | 16×25 | 105 |
| 33 | 16×25 | 165 | 16×31.5 | 130 |
| 47 | 16×25 | 200 | 18×31.5 | 160 |
| 56 | 16×31.5 | 210 | 18×31.5 | 170 |
| 68 | 16×35.5 | 240 | 18×35.5 | 190 |
| 82 | 18×31.5 | 270 | 18×40 | 200 |
| 100 | 18×31.5 | 310 | 18×40 | 215 |
| 120 | 18×35.5 | 340 | 18×45 | 230 |
| 150 | 18×40 | 375 | | |
| 180 | 18×45 | 410 | | |

◆ **RIPPLE CURRENT MULTIPLIERS**

**Frequency Multipliers**

| Vdc | Cap(uF) | Frequency (Hz) | | | | |
|---|---|---|---|---|---|---|
| | | 50/60 | 120 | 1K | 10K | 100K |
| 6.3 ~ 250 | 0.47 ~ 68 | 0.75 | 1.00 | 1.57 | 2.00 | 2.00 |
| | 100 ~ 680 | 0.80 | 1.00 | 1.34 | 1.40 | 1.50 |
| | 1000 ~ 22000 | 0.85 | 1.00 | 1.13 | 1.13 | 1.13 |
| 350 ~ 450 | 0.47 ~ 220 | 0.80 | 1.00 | 1.40 | 1.40 | 1.40 |
| | 330 ~ 560 | 0.90 | 1.00 | 1.13 | 1.13 | 1.13 |

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