

## Part Numbering System



① Category code

| Type                   | Code |
|------------------------|------|
|                        | 1    |
| Electrolytic Capacitor | E    |
| Conductive Polymer     | S    |

② Series code

| Series name | Code |   |
|-------------|------|---|
|             | 2    | 3 |
| WH          | W    | H |
| CD11GE      | G    | E |
| CD11GES     | G    | X |
| CD11GAS     | G    | W |
| CD11GHS     | G    | S |
| NR          | N    | R |
| PZ          | P    | Z |

③ Voltage code

| WV (V <sub>dc</sub> ) | Code |   |
|-----------------------|------|---|
|                       | 4    | 5 |
| 2.5                   | 0    | E |
| 3                     | 0    | D |
| 4                     | 0    | G |
| 6.3                   | 0    | J |
| 6.8                   | 0    | C |
| 7                     | 0    | Q |
| 7.5                   | 0    | A |
| 10                    | 1    | A |
| 12                    | 1    | T |
| 16                    | 1    | C |
| 25                    | 1    | E |
| 35                    | 1    | V |
| 40                    | 1    | G |
| 50                    | 1    | H |
| 63                    | 1    | J |
| 80                    | 1    | B |
| 100                   | 1    | K |
| 120                   | 2    | B |
| 160                   | 2    | C |
| 180                   | 2    | L |
| 200                   | 2    | D |
| 220                   | 2    | N |
| 250                   | 2    | E |
| 315                   | 2    | F |
| 350                   | 2    | V |
| 380                   | 2    | P |
| 400                   | 2    | G |
| 420                   | 2    | T |
| 450                   | 2    | W |
| 500                   | 2    | H |
| 550                   | 2    | J |
| 600                   | 2    | K |

④ Capacitance tolerance code

| Tol. (%) | Code |
|----------|------|
|          | 6    |
| -10~+10  | K    |
| -20~+20  | M    |
| -10~+30  | Q    |
| -10~+20  | V    |
| 0~+20    | A    |
| -5~+20   | C    |
| -10~-20  | B    |
| -5~+5    | D    |
| 0~+10    | E    |
| -5~-20   | F    |
| -15~+5   | N    |

⑤ Capacitance code

| Cap (μF) | Code |   |   |
|----------|------|---|---|
|          | 7    | 8 | 9 |
| 0.10     | R    | 1 | 0 |
| 0.22     | R    | 2 | 2 |
| 0.33     | R    | 3 | 3 |
| 0.47     | R    | 4 | 7 |
| 0.68     | R    | 6 | 8 |
| 1        | 0    | 1 | 0 |
| 2.2      | 2    | R | 2 |
| 3.3      | 3    | R | 3 |
| 4.7      | 4    | R | 7 |
| 6.8      | 6    | R | 8 |
| 10       | 1    | 0 | 0 |
| 22       | 2    | 2 | 0 |
| 33       | 3    | 3 | 0 |
| 47       | 4    | 7 | 0 |
| 68       | 6    | 8 | 0 |
| 100      | 1    | 0 | 1 |
| 220      | 2    | 2 | 1 |
| 330      | 3    | 3 | 1 |
| 470      | 4    | 7 | 1 |
| 680      | 6    | 8 | 1 |
| 1000     | 1    | 0 | 2 |
| 2200     | 2    | 2 | 2 |
| 3300     | 3    | 3 | 2 |
| 4700     | 4    | 7 | 2 |
| 6800     | 6    | 8 | 2 |
| 10000    | 1    | 0 | 3 |
| 22000    | 2    | 2 | 3 |
| 33000    | 3    | 3 | 3 |
| 68000    | 6    | 8 | 3 |

⑥ Size code

| ΦD (mm) | Code |
|---------|------|
| 10      |      |
| 4       | C    |
| 5       | D    |
| 6.3     | E    |
| 8       | F    |
| 10      | G    |
| 11      | H    |
| 12      | J    |
| 12.5    | W    |
| 13      | K    |
| 14      | X    |
| 16      | L    |
| 18      | M    |
| 19      | Z    |
| 20      | N    |
| 22      | O    |
| 25      | P    |
| 30      | Q    |
| 35      | R    |
| 40      | Y    |
| 51.6    | S    |
| 64.3    | T    |
| 76.9    | U    |
| 91      | V    |
| 100     | A    |

| L (mm) | Code |    |
|--------|------|----|
|        | 11   | 12 |
| 5      | 0    | 5  |
| 7      | 0    | 7  |
| 11     | 1    | 1  |
| 12     | 1    | 2  |
| 16     | 1    | 6  |
| 20     | 2    | 0  |
| 25     | 2    | 5  |
| 30     | 3    | 0  |
| 35     | 3    | 5  |
| 40     | 4    | 0  |
| 46     | 4    | 6  |
| 50     | 5    | 0  |
| 60     | 6    | 0  |
| 80     | 8    | 0  |
| 100    | A    | 0  |
| 115    | B    | 5  |
| 120    | C    | 0  |
| 130    | D    | 0  |
| 140    | E    | 0  |
| 160    | G    | 0  |
| 200    | K    | 0  |
| 220    | M    | 0  |
| 236    | N    | 6  |
| 250    | P    | 0  |

⑦ Terminal code

| Specification                         | Code | Size |    |
|---------------------------------------|------|------|----|
|                                       | 13   | 14   | 15 |
| Bulk packing                          | O    | -    | -  |
| Taping (SMD Type)                     | D    | 0    | 0  |
| Φ4~8 Taping F=5.0mm                   | P    | 5    | 0  |
| Φ10~12.5 Taping F=5.0mm               | B    | 5    | 0  |
| Lead Cut L=3.5mm                      | C    | 3    | 5  |
| Lead Cut L=11.0mm                     | C    | B    | 0  |
| Lead Forming & Cut L=4.5mm            | F    | -    | -  |
| Kink & Cut L=4.5mm                    | J    | -    | -  |
| Snap-in type Terminal 4.0mm in length | K    | -    | -  |
| Three Terminals                       | T    | -    | -  |
| Ring clip mounting standard design    | A    | 0    | 0  |
| Ring clip mounting special design     | S    | -    | -  |

⑧ Sleeve/Marking code

| Sleeve/Marking | Code |
|----------------|------|
|                | 16   |
| PVC            | C    |
| PET            | T    |
| Dark blue      | B    |
| Bright red     | R    |
| Sky-blue       | S    |
| Light blue     | T    |
| Pink           | Z    |
| Black          | H    |
| Purple-blue    | V    |
| Red            | O    |

Lead Forming  
Taping Specifications

Fig.1 code: X



Fig.2 code: B



Fig.3 code: B



Fig.4 code: P



## Lead Forming

Specification Fig.1 & Fig.2 & Fig.3

| Items                                         | Symbol | Case size  |     |            |      |      |      |       |                |                  |                                   | Tolerance |              |                                            |
|-----------------------------------------------|--------|------------|-----|------------|------|------|------|-------|----------------|------------------|-----------------------------------|-----------|--------------|--------------------------------------------|
|                                               |        | 4*5<br>4*7 |     | 5*5<br>5*7 |      | 5*11 |      | 6.3*5 | 6.3*7<br>6.3*9 | 6.3*11<br>6.3*12 | 8*5/7<br>8*9/11<br>8*11.5<br>8*12 |           | 8*16<br>8*20 | 10*9/12<br>10*12.5<br>10*13/16<br>10*20/25 |
| Pin Code                                      |        | X          | B   | X          | B    | X    | B    | B     | B              | B                | B                                 | B         | B            |                                            |
| Lead wire diameter                            | Φd     | 0.45       |     | 0.45       |      | 0.5  |      | 0.45  | 0.5            | 0.5              | 0.45/0.5                          | 0.6       | 0.6          | ±0.05                                      |
| Pitch of body                                 | P      | 12.7       |     | 12.7       |      | 12.7 |      | 12.7  | 12.7           | 12.7             | 12.7                              | 12.7      | 12.7         | ±1.0                                       |
| Feed hole pitch                               | P0     | 12.7       |     | 12.7       |      | 12.7 |      | 12.7  | 12.7           | 12.7             | 12.7                              | 12.7      | 12.7         | ±0.2                                       |
| Distance from hole center to lead             | P1     | 5.1        | 5.6 | 5.1        | 5.35 | 5.1  | 5.35 | 5.1   | 5.1            | 5.1              | 4.6                               | 4.6       | 3.85         | ±0.7                                       |
| Distance from feed hole center to body center | P2     | 6.35       |     | 6.35       |      | 6.35 |      | 6.35  | 6.35           | 6.35             | 6.35                              | 6.35      | 6.35         | ±1.0                                       |
| Lead-to-lead distance                         | F      | 2.5        | 1.5 | 2.5        | 2.0  | 2.5  | 2.0  | 2.5   | 2.5            | 2.5              | 3.5                               | 3.5       | 5.0          | ±0.5                                       |
| Height of body from tape center               | H      | 18.5       |     | 18.5       |      | 18.5 |      | 18.5  | 18.5           | 18.5             | 18.5                              | 18.5      | 18.5         | ±0.75                                      |
| Base tape width                               | W      | 18.0       |     | 18.0       |      | 18.0 |      | 18.0  | 18.0           | 18.0             | 18.0                              | 18.0      | 18.0         | ±0.5                                       |
| Adhesive tape width                           | W0     | 6.0        |     | 6.0        |      | 6.0  |      | 6.0   | 6.0            | 8.0              | 8.0                               | 8.0       | 11.0         | min                                        |
| Hole position                                 | W1     | 9.0        |     | 9.0        |      | 9.0  |      | 9.0   | 9.0            | 9.0              | 9.0                               | 9.0       | 9.0          | +0.75<br>-0.5                              |
| Hole down tape position                       | W2     | 3.0        |     | 3.0        |      | 3.0  |      | 3.0   | 3.0            | 3.0              | 3.0                               | 3.0       | 3.0          | max                                        |

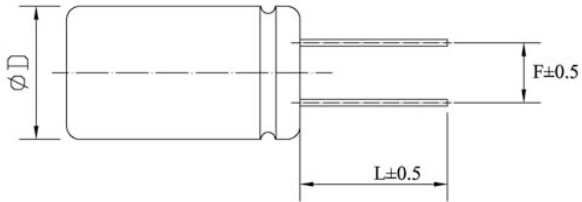
Specification Fig.4

| Items                                         | Symbol | Case size  |      |      |      |       |                |                  |                              |              | Tolerance     |
|-----------------------------------------------|--------|------------|------|------|------|-------|----------------|------------------|------------------------------|--------------|---------------|
|                                               |        | 4*5<br>4*7 | 5*5  | 5*7  | 5*11 | 6.3*5 | 6.3*7<br>6.3*9 | 6.3*11<br>6.3*12 | 8*5/7<br>8*9/11<br>8*11.5/12 | 8*16<br>8*20 |               |
| Pin Code                                      |        | P          | P    | P    | P    | P     | P              | P                | P                            | P            |               |
| Lead wire diameter                            | Φd     | 0.45       | 0.45 | 0.45 | 0.5  | 0.45  | 0.5            | 0.5              | 0.45/0.5                     | 0.6          | ±0.05         |
| Pitch of body                                 | P      | 12.7       | 12.7 | 12.7 | 12.7 | 12.7  | 12.7           | 12.7             | 12.7                         | 12.7         | ±1.0          |
| Feed hole pitch                               | P0     | 12.7       | 12.7 | 12.7 | 12.7 | 12.7  | 12.7           | 12.7             | 12.7                         | 12.7         | ±0.2          |
| Distance from hole center to lead             | P1     | 3.85       | 3.85 | 3.85 | 3.85 | 3.85  | 3.85           | 3.85             | 3.85                         | 3.85         | ±0.7          |
| Distance from feed hole center to body center | P2     | 6.35       | 6.35 | 6.35 | 6.35 | 6.35  | 6.35           | 6.35             | 6.35                         | 6.35         | ±1.0          |
| Lead-to-lead distance                         | F      | 1.5        | 2.0  | 2.0  | 2.0  | 2.5   | 2.5            | 2.5              | 3.5                          | 3.5          | ±0.5          |
| Lead to lead distance                         | F1     | 5.0        | 5.0  | 5.0  | 5.0  | 5.0   | 5.0            | 5.0              | 5.0                          | 5.0          | +0.8<br>-0.2  |
| Height of body from tape center               | H      | 18.5       | 18.5 | 18.5 | 18.5 | 18.5  | 18.5           | 18.5             | 18.5                         | 18.5         | ±0.75         |
| Lead wire clinch height                       | H0     | 16.0       | 16.0 | 16.0 | 16.0 | 16.0  | 16.0           | 16.0             | 16.0                         | 16.0         | ±0.5          |
| Base tape width                               | W      | 18.0       | 18.0 | 18.0 | 18.0 | 18.0  | 18.0           | 18.0             | 18.0                         | 18.0         | ±0.5          |
| Adhesive tape width                           | W0     | 6.0        | 6.0  | 6.0  | 6.0  | 6.0   | 6.0            | 8.0              | 8.0                          | 8.0          | min           |
| Hole position                                 | W1     | 9.0        | 9.0  | 9.0  | 9.0  | 9.0   | 9.0            | 9.0              | 9.0                          | 9.0          | +0.75<br>-0.5 |
| Hole down tape position                       | W2     | 3.0        | 3.0  | 3.0  | 3.0  | 3.0   | 3.0            | 3.0              | 3.0                          | 3.0          | max           |

**Lead Forming**

Lead Forming & Cut

Code:C  
RANGE:  $\Phi 4\sim\Phi 18$



Code:F  
RANGE:  $\Phi 4\sim\Phi 8$



| $\Phi D$ | F   | L        | $\Phi D$ | F   | L                  |
|----------|-----|----------|----------|-----|--------------------|
| 4        | 1.5 | 3.0~12.0 | 4        | 5.0 | 3.5, 4.5, 5.0, 7.0 |
| 5        | 2.0 | 3.0~12.0 | 5        | 5.0 | 3.5, 4.5, 5.0, 7.0 |
| 6.3      | 2.5 | 3.0~12.0 | 6.3      | 5.0 | 3.5, 4.5, 5.0, 7.0 |
| 8        | 3.5 | 3.0~12.0 | 8        | 5.0 | 3.5, 4.5, 5.0, 7.0 |
| 10       | 5.0 | 3.0~12.0 | -        | -   | -                  |
| 12.5     | 5.0 | 3.0~12.0 | -        | -   | -                  |
| 16       | 7.5 | 3.0~12.0 | -        | -   | -                  |
| 18       | 7.5 | 3.0~12.0 | -        | -   | -                  |

Code:J  
RANGE:  $\Phi 10\sim\Phi 18$



| $\Phi D$ | F   | L             |
|----------|-----|---------------|
| 10       | 5.0 | 4.0, 4.5, 5.0 |
| 12.5     | 5.0 | 4.0, 4.5, 5.0 |
| 16       | 7.5 | 4.0, 4.5, 5.0 |
| 18       | 7.5 | 4.0, 4.5, 5.0 |

### Solering Recommendation

■ Flow Soldering(Radial Lead Type)



■ Reflow Soldering

- (For Polymer SMD Type)

#### Recommended Reflow Profile



| Item        | Preheating                      | T1(°C) | T2(°C) | T3(°C) | t1(sec.) | t2(sec.) | t3(sec.) | Reflow cycle |
|-------------|---------------------------------|--------|--------|--------|----------|----------|----------|--------------|
| Condition 1 | 150°C to 180°C<br>Within 90sec. | ≤260   | 230    | 200    | ≤10      | ≤40      | ≤60      | 1            |
| Condition 2 |                                 | ≤250   | 230    | 200    | ≤10      | ≤40      | ≤60      | 2            |

• (For Liquid SMD Type)

Case size:  $\Phi 6.3$ – $\Phi 10$ mm:

- Temperature at surface of capacitor shall not exceed  $T^{\circ}\text{C}$ .
- The duration for over  $200^{\circ}\text{C}$  temperature and  $T_1^{\circ}\text{C}$  at surface of capacitor shall not exceed  $t$  and  $t_1$  seconds, respectively.
- Preheat shall be done at  $100^{\circ}\text{C}$  to  $200^{\circ}\text{C}$  and for Maximum 180 seconds.

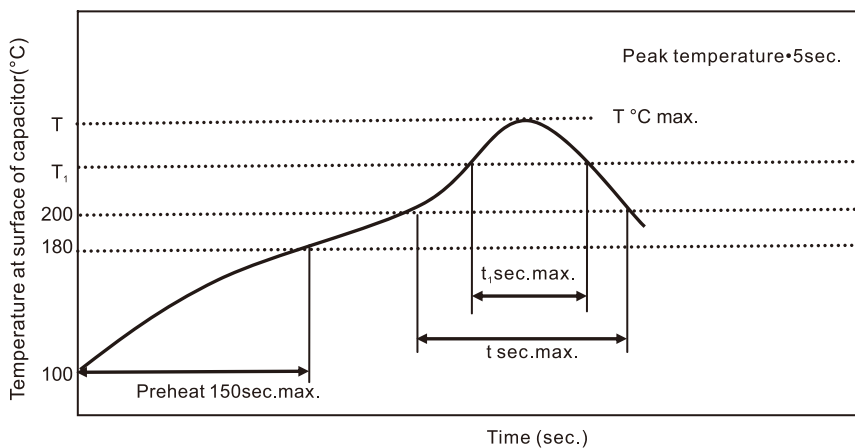


| Case size (mm) | $T(^{\circ}\text{C})$ ① | $T_1(^{\circ}\text{C})$ | $t(\text{sec.})$ ② | $t_1(\text{sec.})$ ③ | Reflow cycle |
|----------------|-------------------------|-------------------------|--------------------|----------------------|--------------|
| $\Phi 6.3$     | 250                     | 230                     | 90                 | 40                   | 1            |
| $\Phi 8$       | 240                     | 230                     | 90                 | 30                   | 1            |
| $\Phi 10$      | 235                     | 230                     | 60                 | 30                   | 1            |

- ① Peak temperature
- ② The duration over  $200^{\circ}\text{C}$  (max.)
- ③ The duration over  $T_1^{\circ}\text{C}$
- Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.

Case size:  $\Phi 12.5$ – $\Phi 18$ mm:

- Temperature at surface of capacitor shall not exceed  $T^{\circ}\text{C}$ .
- The duration for over  $200^{\circ}\text{C}$  temperature and  $T_1^{\circ}\text{C}$  at surface of capacitor shall not exceed  $t$  and  $t_1$  seconds, respectively.
- Preheat shall be done at  $100^{\circ}\text{C}$  to  $180^{\circ}\text{C}$  and for Maximum 150 seconds.



| Case size (mm)          | $T(^{\circ}\text{C})$ ① | $T_1(^{\circ}\text{C})$ | $t(\text{sec.})$ ② | $t_1(\text{sec.})$ ③ | Reflow cycle |
|-------------------------|-------------------------|-------------------------|--------------------|----------------------|--------------|
| $\Phi 12.5$ – $\Phi 18$ | 240                     | 230                     | 60                 | 30                   | 1            |

- ① Peak temperature
- ② The duration over  $200^{\circ}\text{C}$  (max.)
- ③ The duration over  $T_1^{\circ}\text{C}$
- Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.

### RF series

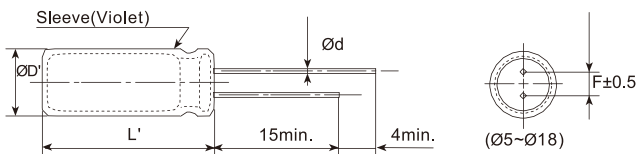
- Ultra-low impedance, high ripple current
- Endurance: +105°C 3,000~6,000 hours
- RoHS Compliant



#### SPECIFICATIONS

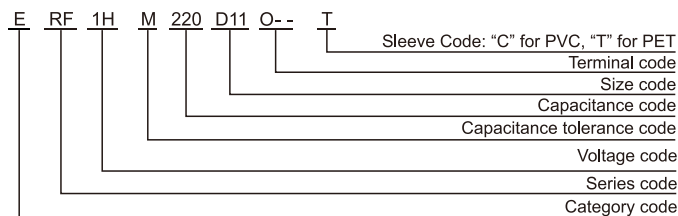
| Items                                                  | Characteristics                                                                                                                                                                    |                                                                     |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------|--------|-------|------|-------|-------|-------|---------|-------|
| Category Temperature Range                             | -40~+105°C                                                                                                                                                                         |                                                                     |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
| Rated Voltage Range                                    | 6.3~120 V <sub>dc</sub>                                                                                                                                                            |                                                                     |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C,120Hz)                                                                                                                                                            |                                                                     |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
| Leakage Current                                        | I≤0.01CV or 3μA, whichever is greater.<br>Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)                              |                                                                     |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
| Dissipation Factor (tanδ)                              | Rated Voltage(V <sub>dc</sub> )                                                                                                                                                    | 6.3 10 16 25 35 50 63 80 100 120                                    |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
|                                                        | tanδ (max.)                                                                                                                                                                        | 0.15 : 0.14 : 0.12 : 0.10 : 0.10 : 0.08 : 0.08 : 0.08 : 0.08 : 0.12 |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
|                                                        | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C,120Hz)                                                                   |                                                                     |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage(V <sub>dc</sub> )                                                                                                                                                    | 6.3 10 16 25 35 50 63 80 100 120                                    |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                  | 5 4 3 3 (at 120Hz)                                                  |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
|                                                        | Z(-40°C)/Z(+20°C)                                                                                                                                                                  | 10 8 5 4 6                                                          |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
| Endurance                                              | The following specifications shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 105 °C. |                                                                     |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
|                                                        | Capacitance Change                                                                                                                                                                 | ≤±25% of the initial value                                          | <table border="1"> <tr><th>Dia.</th><th>Load life (hours)</th></tr> <tr><td>ØD≤6.3</td><td>3,000</td></tr> <tr><td>ØD=8</td><td>4,000</td></tr> <tr><td>ØD=10</td><td>5,000</td></tr> <tr><td>ØD≥12.5</td><td>6,000</td></tr> </table> | Dia. | Load life (hours) | ØD≤6.3 | 3,000 | ØD=8 | 4,000 | ØD=10 | 5,000 | ØD≥12.5 | 6,000 |
|                                                        | Dia.                                                                                                                                                                               | Load life (hours)                                                   |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
|                                                        | ØD≤6.3                                                                                                                                                                             | 3,000                                                               |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
| ØD=8                                                   | 4,000                                                                                                                                                                              |                                                                     |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
| ØD=10                                                  | 5,000                                                                                                                                                                              |                                                                     |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
| ØD≥12.5                                                | 6,000                                                                                                                                                                              |                                                                     |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
| D.F. (tanδ)                                            | ≤200% of the initial specified value                                                                                                                                               |                                                                     |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
| Leakage Current                                        | ≤The initial specified value                                                                                                                                                       |                                                                     |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.                                |                                                                     |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
|                                                        | Capacitance Change                                                                                                                                                                 | ≤±25% of the initial value                                          |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
|                                                        | D.F. (tanδ)                                                                                                                                                                        | ≤200% of the initial specified value                                |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |
|                                                        | Leakage Current                                                                                                                                                                    | ≤200% of the initial specified value                                |                                                                                                                                                                                                                                        |      |                   |        |       |      |       |       |       |         |       |

#### DIMENSIONS[mm]



| ØD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|
| Ød  | 0.5        | 0.5 | 0.5 | 0.6 | 0.6  | 0.6 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| ØD' | ØD+0.5max. |     |     |     |      |     |     |
| L'  | L+2max.    |     |     |     |      |     |     |

#### PART NUMBERING SYSTEM



#### RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Freq.(Hz)      | 120  | 1k   | 10k  | 100k |
|----------------|------|------|------|------|
| Cap.<220       | 0.40 | 0.75 | 0.90 | 1.00 |
| 220≤Cap.<680   | 0.50 | 0.85 | 0.94 | 1.00 |
| 680≤Cap.<2200  | 0.60 | 0.87 | 0.95 | 1.00 |
| 2200≤Cap.<4700 | 0.75 | 0.90 | 0.95 | 1.00 |
| Cap.≥4700      | 0.85 | 0.95 | 0.98 | 1.00 |

# RF series

■ STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Size ΦDxL(mm) | tanδ  | Impedance (Ω <sub>max</sub> /20°C, 100kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) |
|-----------------------|----------|---------------|-------|--------------------------------------------|---------------------------------------------------------|
| 6.3(0J)               | 150      | 5*11          | 0.15  | 0.29                                       | 300                                                     |
|                       |          | 6.3*9         | 0.15  | 0.37                                       | 270                                                     |
|                       | 220      | 6.3*11        | 0.15  | 0.205                                      | 377                                                     |
|                       |          | 8*9           | 0.15  | 0.26                                       | 337                                                     |
|                       | 330      | 6.3*11        | 0.15  | 0.12                                       | 455                                                     |
|                       |          | 8*9           | 0.15  | 0.15                                       | 408                                                     |
|                       | 470      | 8*11          | 0.15  | 0.09                                       | 632                                                     |
|                       |          | 10*9          | 0.15  | 0.12                                       | 565                                                     |
|                       | 820      | 8*16          | 0.15  | 0.055                                      | 1045                                                    |
|                       | 1000     | 8*16          | 0.15  | 0.052                                      | 1000                                                    |
|                       | 1200     | 8*20          | 0.15  | 0.04                                       | 1300                                                    |
|                       |          | 10*16         | 0.15  | 0.037                                      | 1480                                                    |
|                       | 1500     | 10*20         | 0.15  | 0.022                                      | 1870                                                    |
|                       | 2200     | 10*20         | 0.17  | 0.021                                      | 2200                                                    |
|                       | 2700     | 10*25         | 0.17  | 0.02                                       | 2250                                                    |
|                       | 3300     | 12.5*20       | 0.19  | 0.02                                       | 2410                                                    |
| 3900                  | 12.5*25  | 0.19          | 0.017 | 2820                                       |                                                         |
| 4700                  | 12.5*30  | 0.21          | 0.015 | 3340                                       |                                                         |
| 5600                  | 12.5*35  | 0.23          | 0.014 | 3400                                       |                                                         |
|                       | 16*20    | 0.23          | 0.017 | 3190                                       |                                                         |
| 6800                  | 16*25    | 0.25          | 0.015 | 3510                                       |                                                         |
| 10(1A)                | 100      | 5*11          | 0.14  | 0.29                                       | 300                                                     |
|                       |          | 6.3*9         | 0.14  | 0.37                                       | 270                                                     |
|                       | 220      | 6.3*11        | 0.14  | 0.12                                       | 455                                                     |
|                       |          | 8*9           | 0.14  | 0.15                                       | 408                                                     |
|                       | 470      | 8*11          | 0.14  | 0.071                                      | 810                                                     |
|                       |          | 10*9          | 0.14  | 0.092                                      | 720                                                     |
|                       | 680      | 8*16          | 0.14  | 0.055                                      | 1046                                                    |
|                       |          | 10*12.5       | 0.14  | 0.052                                      | 1080                                                    |
|                       | 1000     | 8*20          | 0.14  | 0.04                                       | 1300                                                    |
|                       |          | 10*16         | 0.14  | 0.037                                      | 1480                                                    |
|                       | 1200     | 10*20         | 0.14  | 0.022                                      | 1870                                                    |
|                       | 1500     | 10*20         | 0.14  | 0.021                                      | 2220                                                    |
|                       | 2200     | 12.5*20       | 0.16  | 0.02                                       | 2410                                                    |
|                       | 3300     | 12.5*25       | 0.18  | 0.017                                      | 2820                                                    |
| 3900                  | 12.5*30  | 0.18          | 0.015 | 3340                                       |                                                         |
| 4700                  | 12.5*35  | 0.20          | 0.014 | 3450                                       |                                                         |
| 5600                  | 16*25    | 0.22          | 0.015 | 3510                                       |                                                         |
| 16(1C)                | 56       | 5*11          | 0.12  | 0.29                                       | 300                                                     |
|                       |          | 6.3*9         | 0.12  | 0.37                                       | 270                                                     |
|                       | 120      | 6.3*11        | 0.12  | 0.12                                       | 455                                                     |
|                       |          | 8*9           | 0.12  | 0.15                                       | 408                                                     |
|                       | 150      | 6.3*11        | 0.12  | 0.096                                      | 632                                                     |
|                       |          | 8*9           | 0.12  | 0.12                                       | 565                                                     |
|                       | 220      | 6.3*12        | 0.12  | 0.084                                      | 721                                                     |
|                       |          | 8*9           | 0.12  | 0.1                                        | 650                                                     |
|                       | 330      | 8*11          | 0.12  | 0.071                                      | 810                                                     |
|                       |          | 10*9          | 0.12  | 0.092                                      | 720                                                     |
|                       | 470      | 8*16          | 0.12  | 0.055                                      | 1045                                                    |
|                       |          | 10*12.5       | 0.12  | 0.052                                      | 1080                                                    |
|                       | 680      | 8*20          | 0.12  | 0.04                                       | 1300                                                    |
|                       |          | 10*16         | 0.12  | 0.04                                       | 1480                                                    |
|                       | 1000     | 10*20         | 0.12  | 0.022                                      | 1870                                                    |
|                       | 1200     | 10*25         | 0.12  | 0.021                                      | 2200                                                    |
|                       | 1500     | 12.5*20       | 0.12  | 0.02                                       | 2410                                                    |
|                       | 2200     | 12.5*25       | 0.14  | 0.017                                      | 2820                                                    |
|                       |          | 12.5*30       | 0.14  | 0.015                                      | 3340                                                    |
|                       | 2700     | 16*20         | 0.14  | 0.017                                      | 3190                                                    |
| 12.5*35               |          | 0.16          | 0.014 | 3450                                       |                                                         |
| 3300                  | 16*25    | 0.16          | 0.016 | 3350                                       |                                                         |
|                       | 16*25    | 0.16          | 0.015 | 3510                                       |                                                         |

| WV (V <sub>dc</sub> ) | Cap (μF) | Size ΦDxL(mm) | tanδ  | Impedance (Ω <sub>max</sub> /20°C, 100kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) |
|-----------------------|----------|---------------|-------|--------------------------------------------|---------------------------------------------------------|
| 25(1E)                | 47       | 5*11          | 0.10  | 0.29                                       | 300                                                     |
|                       |          | 6.3*9         | 0.10  | 0.37                                       | 270                                                     |
|                       | 100      | 6.3*11        | 0.10  | 0.12                                       | 455                                                     |
|                       |          | 8*9           | 0.10  | 0.15                                       | 408                                                     |
|                       | 220      | 8*11          | 0.10  | 0.071                                      | 810                                                     |
|                       |          | 10*9          | 0.10  | 0.092                                      | 720                                                     |
|                       | 330      | 8*16          | 0.10  | 0.055                                      | 1045                                                    |
|                       |          | 10*12.5       | 0.10  | 0.052                                      | 1080                                                    |
|                       | 390      | 8*20          | 0.10  | 0.044                                      | 1236                                                    |
|                       | 470      | 10*16         | 0.10  | 0.037                                      | 1480                                                    |
|                       | 560      | 10*16         | 0.10  | 0.03                                       | 1675                                                    |
|                       | 680      | 10*20         | 0.10  | 0.022                                      | 1870                                                    |
|                       | 820      | 10*25         | 0.10  | 0.021                                      | 2200                                                    |
|                       | 1000     | 12.5*20       | 0.10  | 0.019                                      | 2550                                                    |
|                       | 1500     | 12.5*25       | 0.10  | 0.017                                      | 2820                                                    |
|                       | 1800     | 12.5*30       | 0.10  | 0.015                                      | 3340                                                    |
| 16*20                 |          | 0.10          | 0.017 | 3190                                       |                                                         |
| 2200                  | 12.5*35  | 0.12          | 0.014 | 3450                                       |                                                         |
| 2700                  | 16*25    | 0.12          | 0.015 | 3510                                       |                                                         |
| 35(1V)                | 33       | 5*11          | 0.10  | 0.29                                       | 300                                                     |
|                       |          | 6.3*9         | 0.10  | 0.37                                       | 270                                                     |
|                       | 56       | 6.3*11        | 0.10  | 0.12                                       | 455                                                     |
|                       |          | 8*9           | 0.10  | 0.15                                       | 408                                                     |
|                       | 100      | 8*11          | 0.10  | 0.095                                      | 632                                                     |
|                       |          | 10*9          | 0.10  | 0.12                                       | 565                                                     |
|                       | 150      | 8*11          | 0.10  | 0.071                                      | 810                                                     |
|                       |          | 10*9          | 0.10  | 0.092                                      | 720                                                     |
|                       | 220      | 8*16          | 0.10  | 0.055                                      | 1045                                                    |
|                       |          | 10*12.5       | 0.10  | 0.052                                      | 1080                                                    |
|                       | 270      | 8*20          | 0.10  | 0.04                                       | 1300                                                    |
|                       | 330      | 10*16         | 0.10  | 0.037                                      | 1480                                                    |
|                       | 470      | 10*20         | 0.10  | 0.022                                      | 1870                                                    |
|                       | 560      | 10*25         | 0.10  | 0.021                                      | 2200                                                    |
| 680                   | 12.5*20  | 0.10          | 0.02  | 2410                                       |                                                         |
| 1000                  | 12.5*25  | 0.10          | 0.017 | 2820                                       |                                                         |
| 1200                  | 12.5*30  | 0.10          | 0.015 | 3340                                       |                                                         |
| 1500                  | 16*20    | 0.10          | 0.017 | 3190                                       |                                                         |
|                       | 12.5*35  | 0.10          | 0.014 | 3450                                       |                                                         |
| 50(1H)                | 22       | 5*11          | 0.08  | 0.33                                       | 288                                                     |
|                       |          | 6.3*9         | 0.08  | 0.43                                       | 260                                                     |
|                       | 56       | 6.3*11        | 0.08  | 0.13                                       | 435                                                     |
|                       |          | 8*9           | 0.08  | 0.17                                       | 390                                                     |
|                       | 100      | 8*11          | 0.08  | 0.073                                      | 774                                                     |
|                       |          | 10*9          | 0.08  | 0.095                                      | 695                                                     |
|                       | 120      | 8*16          | 0.08  | 0.06                                       | 1000                                                    |
|                       | 150      | 10*12.5       | 0.08  | 0.06                                       | 1029                                                    |
|                       | 180      | 8*20          | 0.08  | 0.045                                      | 1240                                                    |
|                       | 220      | 10*16         | 0.08  | 0.041                                      | 1420                                                    |
|                       | 270      | 10*20         | 0.08  | 0.029                                      | 1630                                                    |
|                       | 330      | 10*25         | 0.08  | 0.027                                      | 1920                                                    |
|                       | 470      | 12.5*20       | 0.08  | 0.026                                      | 2100                                                    |
|                       | 560      | 12.5*25       | 0.08  | 0.022                                      | 2460                                                    |
|                       | 680      | 12.5*30       | 0.08  | 0.02                                       | 2910                                                    |
|                       | 820      | 12.5*35       | 0.08  | 0.018                                      | 3010                                                    |
| 16*20                 |          | 0.08          | 0.022 | 2780                                       |                                                         |
| 1000                  | 16*25    | 0.08          | 0.02  | 3060                                       |                                                         |

Radial Type



# RF series

■ STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Size ΦDxL(mm) | tanδ  | Impedance (Ω <sub>max</sub> /20°C, 100kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) |
|-----------------------|----------|---------------|-------|--------------------------------------------|---------------------------------------------------------|
| 63(1J)                | 15       | 5*11          | 0.08  | 0.88                                       | 165                                                     |
|                       |          | 6.3*9         | 0.08  | 1.14                                       | 148                                                     |
|                       | 33       | 6.3*11        | 0.08  | 0.35                                       | 265                                                     |
|                       |          | 8*9           | 0.08  | 0.45                                       | 235                                                     |
|                       | 56       | 8*11          | 0.08  | 0.22                                       | 500                                                     |
|                       |          | 10*9          | 0.08  | 0.28                                       | 450                                                     |
|                       | 82       | 8*16          | 0.08  | 0.16                                       | 665                                                     |
|                       |          | 10*12.5       | 0.08  | 0.11                                       | 690                                                     |
|                       | 120      | 8*20          | 0.08  | 0.12                                       | 820                                                     |
|                       |          | 10*16         | 0.08  | 0.076                                      | 950                                                     |
|                       | 180      | 10*20         | 0.08  | 0.056                                      | 1150                                                    |
|                       |          | 12.5*16       | 0.08  | 0.072                                      | 1150                                                    |
|                       | 220      | 10*25         | 0.08  | 0.046                                      | 1350                                                    |
|                       | 270      | 12.5*20       | 0.08  | 0.041                                      | 1500                                                    |
|                       | 390      | 12.5*25       | 0.08  | 0.031                                      | 1900                                                    |
|                       |          | 12.5*30       | 0.08  | 0.028                                      | 2300                                                    |
|                       | 470      | 16*20         | 0.08  | 0.032                                      | 2000                                                    |
|                       |          | 12.5*35       | 0.08  | 0.024                                      | 2500                                                    |
|                       | 680      | 12.5*40       | 0.08  | 0.021                                      | 2800                                                    |
|                       |          | 16*25         | 0.08  | 0.025                                      | 2600                                                    |
| 820                   | 18*20    | 0.08          | 0.03  | 2500                                       |                                                         |
|                       | 16*30    | 0.08          | 0.021 | 2850                                       |                                                         |
| 1000                  | 18*25    | 0.08          | 0.024 | 2800                                       |                                                         |
|                       | 16*35    | 0.08          | 0.019 | 2900                                       |                                                         |
| 1200                  | 16*40    | 0.08          | 0.018 | 3400                                       |                                                         |
|                       | 18*30    | 0.08          | 0.02  | 3300                                       |                                                         |
| 1500                  | 18*35    | 0.08          | 0.018 | 3400                                       |                                                         |
| 1800                  | 18*40    | 0.08          | 0.017 | 3500                                       |                                                         |
| 80(1B)                | 68       | 10*12.5       | 0.08  | 0.17                                       | 480                                                     |
|                       | 100      | 10*16         | 0.08  | 0.11                                       | 600                                                     |
|                       | 120      | 10*20         | 0.08  | 0.084                                      | 800                                                     |
|                       | 150      | 10*25         | 0.08  | 0.069                                      | 900                                                     |
|                       |          | 12.5*16       | 0.08  | 0.11                                       | 750                                                     |
|                       | 220      | 12.5*20       | 0.08  | 0.062                                      | 1100                                                    |
|                       |          | 12.5*25       | 0.08  | 0.047                                      | 1250                                                    |
|                       | 330      | 16*20         | 0.08  | 0.048                                      | 1350                                                    |
|                       |          | 12.5*30       | 0.08  | 0.042                                      | 1500                                                    |
|                       | 470      | 12.5*35       | 0.08  | 0.036                                      | 1650                                                    |
|                       |          | 16*25         | 0.08  | 0.038                                      | 1700                                                    |
|                       | 560      | 18*20         | 0.08  | 0.045                                      | 1500                                                    |
|                       |          | 12.5*40       | 0.08  | 0.032                                      | 1800                                                    |
|                       | 680      | 16*30         | 0.08  | 0.032                                      | 1850                                                    |
|                       |          | 18*25         | 0.08  | 0.036                                      | 1750                                                    |
|                       | 820      | 16*35         | 0.08  | 0.029                                      | 2000                                                    |
|                       |          | 18*30         | 0.08  | 0.03                                       | 1900                                                    |
|                       | 1000     | 16*40         | 0.08  | 0.027                                      | 2200                                                    |
|                       |          | 18*35         | 0.08  | 0.027                                      | 2200                                                    |
|                       | 1200     | 18*40         | 0.08  | 0.026                                      | 2700                                                    |

| WV (V <sub>dc</sub> ) | Cap (μF) | Size ΦDxL(mm) | tanδ  | Impedance (Ω <sub>max</sub> /20°C, 100kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) |
|-----------------------|----------|---------------|-------|--------------------------------------------|---------------------------------------------------------|
| 100(1K)               | 6.8      | 5*11          | 0.08  | 1.4                                        | 125                                                     |
|                       |          | 6.3*9         | 0.08  | 1.8                                        | 110                                                     |
|                       | 15       | 6.3*11        | 0.08  | 0.57                                       | 205                                                     |
|                       |          | 8*9           | 0.08  | 0.74                                       | 180                                                     |
|                       | 27       | 8*12          | 0.08  | 0.36                                       | 355                                                     |
|                       |          | 10*9          | 0.08  | 0.47                                       | 320                                                     |
|                       | 39       | 8*16          | 0.08  | 0.25                                       | 450                                                     |
|                       | 47       | 10*12.5       | 0.08  | 0.17                                       | 480                                                     |
|                       | 56       | 8*20          | 0.08  | 0.19                                       | 565                                                     |
|                       | 68       | 10*16         | 0.08  | 0.11                                       | 600                                                     |
|                       | 82       | 10*20         | 0.08  | 0.084                                      | 800                                                     |
|                       | 100      | 12.5*16       | 0.08  | 0.11                                       | 750                                                     |
|                       | 120      | 10*25         | 0.08  | 0.069                                      | 900                                                     |
|                       | 150      | 12.5*20       | 0.08  | 0.062                                      | 1100                                                    |
|                       | 220      | 12.5*25       | 0.08  | 0.047                                      | 1250                                                    |
|                       |          | 16*20         | 0.08  | 0.048                                      | 1350                                                    |
|                       | 270      | 12.5*30       | 0.08  | 0.042                                      | 1500                                                    |
|                       |          | 12.5*35       | 0.08  | 0.036                                      | 1650                                                    |
|                       | 330      | 16*25         | 0.08  | 0.038                                      | 1700                                                    |
|                       |          | 18*20         | 0.08  | 0.045                                      | 1500                                                    |
| 390                   | 12.5*40  | 0.08          | 0.032 | 1800                                       |                                                         |
|                       | 16*30    | 0.08          | 0.032 | 1850                                       |                                                         |
| 470                   | 18*25    | 0.08          | 0.036 | 1750                                       |                                                         |
|                       | 16*35    | 0.08          | 0.029 | 2000                                       |                                                         |
| 560                   | 18*30    | 0.08          | 0.03  | 1900                                       |                                                         |
|                       | 16*40    | 0.08          | 0.027 | 2200                                       |                                                         |
| 680                   | 18*35    | 0.08          | 0.027 | 2200                                       |                                                         |
|                       | 18*40    | 0.08          | 0.026 | 2700                                       |                                                         |
| 120(2B)               | 10       | 6.3*11        | 0.12  | 5.5                                        | 80                                                      |
|                       | 15       | 6.3*12        | 0.12  | 4.5                                        | 100                                                     |
|                       | 18       | 8*9           | 0.12  | 4.0                                        | 120                                                     |
|                       | 22       | 8*12          | 0.12  | 3.5                                        | 130                                                     |
|                       | 33       | 8*16          | 0.12  | 3.0                                        | 220                                                     |
|                       |          | 10*12.5       | 0.12  | 3.0                                        | 220                                                     |
|                       | 47       | 8*20          | 0.12  | 2.5                                        | 270                                                     |
|                       |          | 10*16         | 0.12  | 2.5                                        | 270                                                     |
|                       | 56       | 10*16         | 0.12  | 2.2                                        | 285                                                     |
|                       | 68       | 10*16         | 0.12  | 2.0                                        | 285                                                     |
|                       | 82       | 10*20         | 0.12  | 1.8                                        | 300                                                     |
|                       | 100      | 10*25         | 0.12  | 1.5                                        | 380                                                     |
|                       | 120      | 12.5*20       | 0.12  | 1.3                                        | 520                                                     |
|                       | 150      | 12.5*25       | 0.12  | 1.0                                        | 570                                                     |
|                       | 220      | 13*30         | 0.12  | 0.75                                       | 700                                                     |
|                       |          | 16*20         | 0.12  | 0.75                                       | 700                                                     |
|                       | 270      | 16*25         | 0.12  | 0.55                                       | 800                                                     |
|                       |          | 18*20         | 0.12  | 0.55                                       | 800                                                     |
|                       | 330      | 16*30         | 0.12  | 0.42                                       | 860                                                     |
|                       |          | 18*25         | 0.12  | 0.42                                       | 860                                                     |
| 470                   | 16*40    | 0.12          | 0.30  | 960                                        |                                                         |
|                       | 18*30    | 0.12          | 0.30  | 960                                        |                                                         |

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