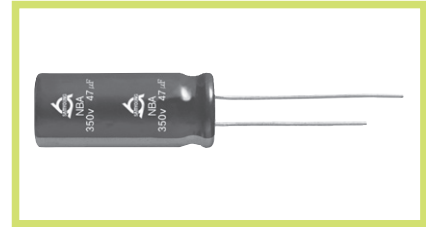
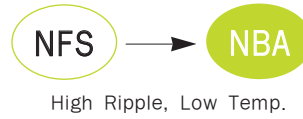


## NBA Series

• 105°C 3,000~5,000Hrs assured.

- Non-solvent proof.
- High Ripple, Long Life, Low Temp.
- For SMPS, IP-Board, Adaptor, LED Lighting.
- RoHS compliant.
- Halogen-free capacitors are also available.



## SPECIFICATIONS

| Item   | Characteristics  |                                 |                |                  |            |                  |                 |        |                  |                 |
|--|--|---------------------------------|----------------|------------------|------------|------------------|-----------------|--------|------------------|-----------------|
| Rated Voltage Range                                | 160~500 V <sub>DC</sub>  |                                 |                |                  |            |                  |                 |        |                  |                 |
| Operating Temperature Range                        | -40~+105°C   |                                 |                |                  |            |                  |                 |        |                  |                 |
| Capacitance Tolerance                              | ±20%(M) (at 20°C, 120Hz)   |                                 |                |                  |            |                  |                 |        |                  |                 |
| Leakage Current                                    | <table border="1"> <thead> <tr> <th>C · V \ Time</th> <th>After 1 minute</th> <th>After 5 minutes</th> </tr> </thead> <tbody> <tr> <td>≤ 1000</td> <td>I = 0.1CV + 40</td> <td>I = 0.03CV + 15</td> </tr> <tr> <td>&gt; 1000</td> <td>I = 0.04CV + 100</td> <td>I = 0.02CV + 25</td> </tr> </tbody> </table> <p>Where, I:Max. Leakage current(μA) C:Nominal capacitance(μF) V:Rated voltage(V<sub>DC</sub>) (at 20°C)</p>  | C · V \ Time                    | After 1 minute | After 5 minutes  | ≤ 1000     | I = 0.1CV + 40   | I = 0.03CV + 15 | > 1000 | I = 0.04CV + 100 | I = 0.02CV + 25 |
| C · V \ Time                                       | After 1 minute   | After 5 minutes                 |                |                  |            |                  |                 |        |                  |                 |
| ≤ 1000   | I = 0.1CV + 40   | I = 0.03CV + 15                 |                |                  |            |                  |                 |        |                  |                 |
| > 1000   | I = 0.04CV + 100   | I = 0.02CV + 25                 |                |                  |            |                  |                 |        |                  |                 |
| Dissipation Factor(Tanδ)                           | <table border="1"> <thead> <tr> <th>Rated Voltage(V<sub>DC</sub>)</th> <th>160~250</th> <th>350~500</th> </tr> </thead> <tbody> <tr> <td>Tanδ(Max.)</td> <td>0.20</td> <td>0.24</td> </tr> </tbody> </table> <p>(at 20°C, 120Hz)</p>   | Rated Voltage(V <sub>DC</sub> ) | 160~250        | 350~500          | Tanδ(Max.) | 0.20             | 0.24            |        |                  |                 |
| Rated Voltage(V <sub>DC</sub> )                    | 160~250  | 350~500                         |                |                  |            |                  |                 |        |                  |                 |
| Tanδ(Max.)   | 0.20   | 0.24                            |                |                  |            |                  |                 |        |                  |                 |
| Temperature Characteristics (Max. Impedance ratio) | <table border="1"> <thead> <tr> <th>Rated Voltage(V<sub>DC</sub>)</th> <th>160~500</th> </tr> </thead> <tbody> <tr> <td>Z(-25°C)/Z(20°C)</td> <td>3</td> </tr> <tr> <td>Z(-40°C)/Z(20°C)</td> <td>6</td> </tr> </tbody> </table> <p>(at 120Hz)</p>   | Rated Voltage(V <sub>DC</sub> ) | 160~500        | Z(-25°C)/Z(20°C) | 3          | Z(-40°C)/Z(20°C) | 6               |        |                  |                 |
| Rated Voltage(V <sub>DC</sub> )                    | 160~500  |                                 |                |                  |            |                  |                 |        |                  |                 |
| Z(-25°C)/Z(20°C)                                   | 3  |                                 |                |                  |            |                  |                 |        |                  |                 |
| Z(-40°C)/Z(20°C)                                   | 6  |                                 |                |                  |            |                  |                 |        |                  |                 |
| Load Life  | <p>The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105°C. (where 3,000hour for ø6.3)</p> <p>Capacitance change ≤ ±20% of the initial value<br/>           Tanδ ≤ 200% of the initial specified value<br/>           Leakage current ≤ The initial specified value</p>   |                                 |                |                  |            |                  |                 |        |                  |                 |
| Shelf Life   | <p>The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements.</p> <p>Capacitance change ≤ ±20% of the initial value<br/>           Tanδ ≤ 200% of the initial specified value<br/>           Leakage current ≤ 500% of the initial specified value</p> |                                 |                |                  |            |                  |                 |        |                  |                 |
| Others   | Satisfied characteristics KS C IEC 60384-4   |                                 |                |                  |            |                  |                 |        |                  |                 |

## DIMENSIONS OF NBA Series

Unit(mm)

Marking : DARK BLUE SLEEVE, SILVER INK

|     | øD            | 6.3 | 8   | 10  | 12.5         | 16  | 18  | 20  | 22   |
|-----|---------------|-----|-----|-----|--------------|-----|-----|-----|------|
| ød  | 0.5           | 0.6 | 0.6 | 0.6 | 0.8          | 0.8 | 0.8 | 0.8 | 0.8  |
| F   | 2.5           | 3.5 | 5.0 | 5.0 | 7.5          | 7.5 | 7.5 | 7.5 | 10.0 |
| øD' | øD + 0.5 max. |     |     |     |              |     |     |     |      |
| L'  | L + 1.5 max.  |     |     |     | L + 2.0 max. |     |     |     |      |

※ ø10 x 12L, L' ≤ L + 1.5



RATINGS OF NBA Series

| Vdc | 160       |  | 200       |  | 250       |  | 350       |  |
|-----|-----------|--|-----------|--|-----------|--|-----------|--|
| μF  | Items     | Rated Ripple Current (mA <sub>RMS</sub> /105°C, 120Hz) | Items     | Rated Ripple Current (mA <sub>RMS</sub> /105°C, 120Hz) | Items     | Rated Ripple Current (mA <sub>RMS</sub> /105°C, 120Hz) | Items     | Rated Ripple Current (mA <sub>RMS</sub> /105°C, 120Hz) |
| 4.7 |           |  | 8 × 11.5  | 77   | 8 × 15    | 80   | 8 × 11.5  | 93   |
| 6.8 | 8 × 11.5  | 90   | 8 × 15    | 103  | 8 × 20    | 106  | 8 × 15    | 101  |
|     |           |  |           |  | 10 × 12   | 119  |           |  |
|     |           |  |           |  | 10 × 12.5 | 119  |           |  |
| 10  | 8 × 15    | 121  | 8 × 11.5  | 113  | 10 × 12   | 160  | 10 × 12   | 153  |
|     |           |  | 8 × 20    | 140  | 10 × 12.5 | 160  | 10 × 16   | 158  |
| 15  | 8 × 15    | 148  | 8 × 15    | 148  | 10 × 12   | 174  | 10 × 20   | 197  |
|     |           |  |           |  | 10 × 12.5 |  |           |  |
| 22  | 10 × 10   | 205  | 10 × 16   | 264  | 10 × 16   | 230  | 12.5 × 20 | 297  |
|     | 10 × 12   | 221  |           |  |           |  |           |  |
|     | 10 × 12.5 | 221  |           |  |           |  |           |  |
|     | 10 × 16   | 243  |           |  |           |  |           |  |
| 27  | 10 × 12   | 240  | 10 × 16   | 264  | 10 × 20   | 270  | 12.5 × 20 | 314  |
|     | 10 × 12.5 | 240  |           |  |           |  |           |  |
|     | 10 × 16   | 264  |           |  |           |  |           |  |
| 33  | 10 × 16   | 270  | 10 × 20   | 308  | 12.5 × 20 | 323  | 12.5 × 20 | 319  |
| 39  | 10 × 16   | 292  | 10 × 20   | 336  | 12.5 × 20 | 354  | 12.5 × 25 | 352  |
| 47  | 10 × 20   | 369  | 10 × 20   | 369  | 12.5 × 20 | 440  | 12.5 × 30 | 451  |
|     |           |  | 12.5 × 20 | 440  |           |  |           |  |
| 68  | 10 × 20   | 400  | 12.5 × 20 | 492  | 12.5 × 25 | 594  | 16 × 25   | 605  |
|     |           |  | 12.5 × 25 | 594  |           |  |           |  |
| 82  | 10 × 25   | 455  | 12.5 × 25 | 616  | 12.5 × 30 | 660  | 18 × 25   | 688  |
|     | 12.5 × 20 | 495  | 16 × 20   | 616  |           |  |           |  |
| 100 | 12.5 × 20 | 561  | 12.5 × 30 | 700  | 16 × 25   | 717  | 18 × 31.5 | 817  |
|     |           |  | 16 × 25   | 717  |           |  |           |  |
| 120 | 10 × 33   | 638  | 12.5 × 35 | 815  | 16 × 25   | 785  | 18 × 35.5 | 924  |
|     | 12.5 × 25 | 638  | 16 × 25   | 785  |           |  |           |  |
| 150 | 16 × 25   | 825  | 16 × 25   | 836  | 18 × 25   | 902  | 18 × 35.5 | 1,036  |
| 180 | 16 × 25   | 891  | 16 × 31.5 | 935  | 18 × 31.5 | 1,012  | 18 × 40   | 1,155  |
| 220 | 16 × 31.5 | 968  | 18 × 31.5 | 1,100  | 18 × 31.5 | 1,100  |           |  |
|     | 18 × 25   | 968  |           |  |           |  |           |  |
| 270 | 16 × 35.5 | 1,100  | 18 × 35.5 | 1,265  |           |  |           |  |
| 330 | 16 × 40   | 1,256  | 18 × 40   | 1,375  |           |  |           |  |
|     | 18 × 31.5 | 1,231  |           |  |           |  |           |  |
| 470 | 18 × 40   | 1,541  |           |  |           |  |           |  |

| Vdc       | 400       |  | 420       |  | 450       |  | 500       |  |
|-----------|-----------|--|-----------|--|-----------|--|-----------|--|
| μF        | Items     | Rated Ripple Current (mA <sub>RMS</sub> /105°C, 120Hz) | Items     | Rated Ripple Current (mA <sub>RMS</sub> /105°C, 120Hz) | Items     | Rated Ripple Current (mA <sub>RMS</sub> /105°C, 120Hz) | Items     | Rated Ripple Current (mA <sub>RMS</sub> /105°C, 120Hz) |
| 1         | 6.3 × 11  | 22   | 6.3 × 11  | 17   | 6.3 × 11  | 17   |           |  |
| 1.5       | 6.3 × 15  | 32   | 6.3 × 15  | 24   | 6.3 × 15  | 24   |           |  |
|           | 8 × 11.5  | 34   | 8 × 11.5  | 26   | 8 × 11.5  | 26   |           |  |
| 2.2       | 8 × 11.5  | 41   | 8 × 11.5  | 30   | 8 × 15    | 33   |           |  |
| 3.3       | 8 × 11.5  | 50   | 8 × 11.5  | 37   | 8 × 11.5  | 37   | 10 × 12   | 63   |
|           |           |  |           |  |           |  | 10 × 12.5 | 63   |
| 4.7       | 8 × 11.5  | 60   | 8 × 11.5  | 44   | 10 × 12   | 76   | 10 × 12   | 75   |
|           |           |  |           |  | 10 × 12.5 | 76   | 10 × 12.5 | 75   |
| 6.8       | 8 × 15    | 94   | 8 × 20    | 105  | 8 × 20    | 105  | 10 × 16   | 110  |
|           | 8 × 20    | 119  |           |  |           |  |           |  |
| 8.2       | 10 × 12   | 132  | 10 × 16   | 113  | 10 × 16   | 113  | 10 × 20   | 141  |
|           | 10 × 12.5 |  |           |  |           |  |           |  |
| 10        | 10 × 16   | 145  | 10 × 20   | 135  | 10 × 20   | 135  | 12.5 × 20 | 165  |
| 22        | 12.5 × 20 | 297  | 12.5 × 20 | 225  | 12.5 × 25 | 250  | 12.5 × 30 | 260  |
| 27        | 12.5 × 20 | 314  | 12.5 × 20 | 254  | 12.5 × 25 | 265  | 12.5 × 40 | 329  |
|           |           |  | 12.5 × 30 | 340  | 12.5 × 30 | 340  | 12.5 × 45 | 370  |
| 33        | 12.5 × 25 | 343  | 16 × 20   | 345  | 16 × 20   | 345  | 16 × 25   | 350  |
|           |           |  | 12.5 × 25 | 352  | 12.5 × 35 | 380  | 12.5 × 35 | 380  |
| 39        | 12.5 × 30 | 378  | 16 × 25   | 400  | 16 × 25   | 400  | 16 × 31.5 | 413  |
|           | 12.5 × 35 | 462  | 12.5 × 40 | 450  | 12.5 × 40 | 450  | 16 × 35.5 | 462  |
| 47        | 16 × 25   | 480  | 16 × 25   | 450  | 16 × 25   | 450  | 18 × 31.5 | 468  |
|           | 12.5 × 40 | 550  | 18 × 25   | 520  | 18 × 25   | 560  | 16 × 45   | 630  |
| 68        | 18 × 25   | 627  | 18 × 31.5 | 580  | 18 × 31.5 | 590  | 18 × 35.5 | 600  |
|           | 18 × 31.5 | 770  | 18 × 25   | 600  | 16 × 40   | 650  | 16 × 50   | 685  |
| 18 × 31.5 |           |  | 650       | 18 × 31.5  | 650       | 18 × 40  | 670       |  |
| 100       | 18 × 31.5 | 817  | 16 × 45   | 770  | 16 × 45   | 770  | 18 × 45   | 800  |
|           | 18 × 35.5 | 875  | 18 × 35.5 | 770  | 18 × 35.5 | 770  | 20 × 40   | 800  |
| 120       | 18 × 35.5 | 924  | 16 × 50   | 850  | 16 × 50   | 850  | 22 × 35   | 800  |
|           | 18 × 40   | 1,003  | 18 × 40   | 850  | 18 × 40   | 850  | 18 × 50   | 920  |
| 150       | 18 × 40   | 1,122  | 18 × 45   | 1,000  |           |  |           |  |
|           |           |  | 20 × 40   | 1,000  |           |  |           |  |
| 180       | 18 × 45   | 1,188  |           |  |           |  |           |  |
|           | 20 × 40   | 1,188  |           |  |           |  |           |  |

RATED RIPPLE CURRENT MULTIPLIERS

Frequency Multipliers

| Cap.(μF)  | Freq.(Hz) | 120  | 1k   | 10k  | 50k  | 100k |
|-----------|-----------|------|------|------|------|------|
| 1 ~ 82    |           | 1.00 | 1.75 | 2.25 | 2.35 | 2.50 |
| 100 ~ 470 |           | 1.00 | 1.67 | 2.05 | 2.15 | 2.25 |