

# ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

# UKW

Standard, For Audio Equipment



**UKW**



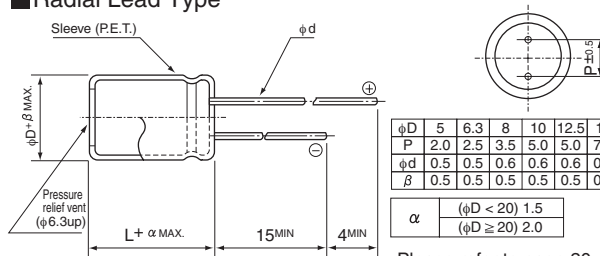
- Realization of a harmonious balance of sound quality, made possible by the development of new electrolyte.
- Most suited for AV equipment like DVD.
- Compliant to the RoHS directive (2011/65/EU).



## Specifications

| Item                                                                        | Performance Characteristics                                                                                                                                                                                                                                                        |                 |      |      |      |                                                                                                                                                                                                                                                                                                                      |                                               |      |      |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------|------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------|------|-------------------|--------------------|----------------------------------------------|----|----|----|-------|-----------------------------------------------|-----|--------------|------|-----------------|---------------------------------------------------|------|------|------|------|------|---------------------------------------|
| Category Temperature Range                                                  | -40 to +85°C                                                                                                                                                                                                                                                                       |                 |      |      |      |                                                                                                                                                                                                                                                                                                                      |                                               |      |      |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
| Rated Voltage Range                                                         | 6.3 to 100V                                                                                                                                                                                                                                                                        |                 |      |      |      |                                                                                                                                                                                                                                                                                                                      |                                               |      |      |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
| Rated Capacitance Range                                                     | 2.2 to 33000μF                                                                                                                                                                                                                                                                     |                 |      |      |      |                                                                                                                                                                                                                                                                                                                      |                                               |      |      |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
| Capacitance Tolerance                                                       | ± 20% at 120Hz, 20°C                                                                                                                                                                                                                                                               |                 |      |      |      |                                                                                                                                                                                                                                                                                                                      |                                               |      |      |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
| Leakage Current                                                             | After 1 minute's application of rated voltage at 20°C, leakage current is not more than 0.03 CV or 4 (μA) , whichever is greater.<br>After 2 minutes' application of rated voltage at 20°C, leakage current is not more than 0.01 CV or 3 (μA) , whichever is greater.             |                 |      |      |      |                                                                                                                                                                                                                                                                                                                      |                                               |      |      |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
| Tangent of loss angle (tan δ)                                               | <table><tr><td>Rated voltage (V)</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr><tr><td>tan δ (MAX.)</td><td>0.28</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.08</td></tr></table> |                 |      |      |      |                                                                                                                                                                                                                                                                                                                      |                                               |      |      | Rated voltage (V) | 6.3                | 10                                           | 16 | 25 | 35 | 50    | 63                                            | 100 | tan δ (MAX.) | 0.28 | 0.24            | 0.20                                              | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 | Measurement frequency : 120Hz at 20°C |
|                                                                             | Rated voltage (V)                                                                                                                                                                                                                                                                  | 6.3             | 10   | 16   | 25   | 35                                                                                                                                                                                                                                                                                                                   | 50                                            | 63   | 100  |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
|                                                                             | tan δ (MAX.)                                                                                                                                                                                                                                                                       | 0.28            | 0.24 | 0.20 | 0.16 | 0.14                                                                                                                                                                                                                                                                                                                 | 0.12                                          | 0.10 | 0.08 |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
| For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF. |                                                                                                                                                                                                                                                                                    |                 |      |      |      |                                                                                                                                                                                                                                                                                                                      |                                               |      |      |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
|                                                                             |                                                                                                                                                                                                                                                                                    |                 |      |      |      |                                                                                                                                                                                                                                                                                                                      |                                               |      |      |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
| Stability at Low Temperature                                                | Measurement frequency : 120Hz                                                                                                                                                                                                                                                      |                 |      |      |      |                                                                                                                                                                                                                                                                                                                      |                                               |      |      |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
|                                                                             | Rated voltage (V)                                                                                                                                                                                                                                                                  |                 | 6.3  | 10   | 16   | 25                                                                                                                                                                                                                                                                                                                   | 35                                            | 50   | 63   | 100               |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
|                                                                             | Impedance ratio<br>ZT / Z20 (MAX.)                                                                                                                                                                                                                                                 | Z-25°C / Z+20°C | 5    | 4    | 3    | 2                                                                                                                                                                                                                                                                                                                    | 2                                             | 2    | 2    | 2                 |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
|                                                                             |                                                                                                                                                                                                                                                                                    | Z-40°C / Z+20°C | 12   | 10   | 8    | 5                                                                                                                                                                                                                                                                                                                    | 4                                             | 3    | 3    | 3                 |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
| Endurance                                                                   | The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C.                                                                                                                                |                 |      |      |      | <table><tr><td>Capacitance change</td><td colspan="4">Within ±20% of the initial capacitance value</td></tr><tr><td>tan δ</td><td colspan="4">200% or less than the initial specified value</td></tr><tr><td>Leakage current</td><td colspan="4">Less than or equal to the initial specified value</td></tr></table> |                                               |      |      |                   | Capacitance change | Within ±20% of the initial capacitance value |    |    |    | tan δ | 200% or less than the initial specified value |     |              |      | Leakage current | Less than or equal to the initial specified value |      |      |      |      |      |                                       |
|                                                                             |                                                                                                                                                                                                                                                                                    |                 |      |      |      | Capacitance change                                                                                                                                                                                                                                                                                                   | Within ±20% of the initial capacitance value  |      |      |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
|                                                                             |                                                                                                                                                                                                                                                                                    |                 |      |      |      | tan δ                                                                                                                                                                                                                                                                                                                | 200% or less than the initial specified value |      |      |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
| Leakage current                                                             | Less than or equal to the initial specified value                                                                                                                                                                                                                                  |                 |      |      |      |                                                                                                                                                                                                                                                                                                                      |                                               |      |      |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
| Shelf Life                                                                  | After storing the capacitors under no load at 85°C for 1000 hours and then performing voltage treatment based on JIS C 5101-4 clause 4.1 at 20°C, they shall meet the specified values for the endurance characteristics listed above.                                             |                 |      |      |      |                                                                                                                                                                                                                                                                                                                      |                                               |      |      |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |
| Marking                                                                     | Printed with gold color letter on black sleeve.                                                                                                                                                                                                                                    |                 |      |      |      |                                                                                                                                                                                                                                                                                                                      |                                               |      |      |                   |                    |                                              |    |    |    |       |                                               |     |              |      |                 |                                                   |      |      |      |      |      |                                       |

## Radial Lead Type



| φD | 5   | 6.3 | 8   | 10  | 12.5 | 16  | 18  | 20  | 22  | 25   |
|----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|
| P  | 2.0 | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 | 10  | 10  | 12.5 |
| φd | 0.5 | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 | 1.0 | 1.0 | 1.0  |
| β  | 0.5 | 0.5 | 0.5 | 0.5 | 0.5  | 0.5 | 0.5 | 1.0 | 1.0 | 1.0  |

| α | φD < 20 | φD ≥ 20 |
|---|---------|---------|
|   | 1.5     | 2.0     |

## Type numbering system (Example : 10V 1000µF)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|----|----|
| U | K | W | 1 | A | 1 | 0 | 2 | M | P  | D  |

Configuration

| φ D        | Pb-free leadwire<br>Pb-free PET sleeve |
|------------|----------------------------------------|
| 5          | DD                                     |
| 6.3        | ED                                     |
| 8 · 10     | PD                                     |
| 12.5 to 18 | HD                                     |
| 20 to 25   | RD                                     |

Capacitance tolerance (±20%)  
Rated capacitance (1000µF)  
Rated voltage (10V)  
Series name  
Type

## Dimensions

• Please refer to page 20 about the end seal configuration.

| Cap.<br>(µF) | V<br>Code | 6.3       |      | 10        |      | 16        |      | 25        |      | 35        |      | 50        |      | 63        |      | 100                                |      |
|--------------|-----------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|------------------------------------|------|
|              |           | 0J        |      | 1A        |      | 1C        |      | 1E        |      | 1V        |      | 1H        |      | 1J        |      | 2A                                 |      |
| 2.2          | 2R2       |           |      |           |      |           |      |           |      |           |      | 5 × 11    | 23   |           |      | 5 × 11                             | 30   |
| 3.3          | 3R3       |           |      |           |      |           |      |           |      |           |      | 5 × 11    | 35   |           |      | 5 × 11                             | 40   |
| 4.7          | 4R7       |           |      |           |      |           |      |           |      |           |      | 5 × 11    | 40   |           |      | 5 × 11                             | 45   |
| 10           | 100       |           |      |           |      |           |      |           |      |           |      | 5 × 11    | 65   | 5 × 11    | 70   | 6.3 × 11                           | 75   |
| 22           | 220       |           |      |           |      |           |      |           |      |           |      | 5 × 11    | 95   | 5 × 11    | 100  | 6.3 × 11                           | 120  |
| 33           | 330       |           |      |           |      |           |      |           |      | 5 × 11    | 105  | 5 × 11    | 120  | 6.3 × 11  | 140  | 8 × 11.5                           | 160  |
| 47           | 470       |           |      |           |      |           |      | 5 × 11    | 115  | 5 × 11    | 120  | 6.3 × 11  | 150  | 6.3 × 11  | 165  | 10 × 12.5                          | 210  |
| 100          | 101       |           |      | 5 × 11    | 145  | 5 × 11    | 155  | 6.3 × 11  | 185  | 6.3 × 11  | 200  | 8 × 11.5  | 250  | 10 × 12.5 | 300  | 10 × 20                            | 350  |
| 220          | 221       |           |      | 6.3 × 11  | 230  | 6.3 × 11  | 250  | 8 × 11.5  | 320  | 10 × 12.5 | 370  | 10 × 12.5 | 410  | 10 × 16   | 470  | 12.5 × 25                          | 600  |
| 330          | 331       | 6.3 × 11  | 265  | 6.3 × 11  | 270  | 8 × 11.5  | 360  | 10 × 12.5 | 420  | 10 × 12.5 | 470  | 10 × 16   | 570  | 10 × 20   | 650  | 12.5 × 25                          | 750  |
| 470          | 471       | 6.3 × 11  | 310  | 6.3 × 11  | 330  | 8 × 11.5  | 420  | 10 × 12.5 | 530  | 10 × 16   | 630  | 12.5 × 20 | 760  | 12.5 × 20 | 880  | 16 × 25                            | 1000 |
| 1000         | 102       | 8 × 11.5  | 530  | 10 × 12.5 | 630  | 10 × 16   | 770  | 10 × 20   | 950  | 12.5 × 20 | 1100 | 12.5 × 25 | 1300 | 16 × 25   | 1300 | 18 × 40                            | 1370 |
| 2200         | 222       | 10 × 20   | 980  | 10 × 20   | 1050 | 12.5 × 20 | 1250 | 12.5 × 25 | 1550 | 16 × 25   | 1800 | 16 × 35.5 | 2090 | 18 × 35.5 | 2200 | 22 × 50                            | 2400 |
| 3300         | 332       | 10 × 20   | 1170 | 12.5 × 20 | 1420 | 12.5 × 25 | 1700 | 16 × 25   | 1950 | 16 × 35.5 | 2220 | 18 × 35.5 | 2360 | 20 × 40   | 2700 | 25 × 50                            | 2900 |
| 4700         | 472       | 12.5 × 20 | 1350 | 12.5 × 25 | 1800 | 16 × 25   | 2100 | 16 × 31.5 | 2360 | 18 × 35.5 | 2490 | 20 × 40   | 2900 | 22 × 50   | 3400 |                                    |      |
| 6800         | 682       | 12.5 × 25 | 1600 | 16 × 25   | 2150 | 16 × 35.5 | 2500 | 18 × 35.5 | 2590 | 20 × 40   | 3000 | 22 × 50   | 3500 | 25 × 50   | 3500 |                                    |      |
| 10000        | 103       | 16 × 25   | 2000 | 16 × 35.5 | 2500 | 18 × 35.5 | 2640 | 20 × 40   | 3000 | 22 × 50   | 3700 | 25 × 50   | 4000 |           |      |                                    |      |
| 15000        | 153       | 16 × 35.5 | 2550 | 18 × 35.5 | 2720 | 20 × 40   | 3400 | 22 × 50   | 3800 | 25 × 50   | 4300 |           |      |           |      |                                    |      |
| 22000        | 223       | 18 × 40   | 3200 | 20 × 40   | 3700 | 22 × 50   | 4200 | 25 × 50   | 4500 |           |      |           |      |           |      |                                    |      |
| 33000        | 333       | 22 × 50   | 3900 | 22 × 50   | 4500 | 25 × 50   | 4800 |           |      |           |      |           |      |           |      | Case size øD × L (mm) Rated ripple |      |

Case size φD × L (mm) ; Rated ripple

## Frequency coefficient of rated ripple current

| Cap. (µF)     | Frequency | 50Hz | 120Hz | 300Hz | 1kHz | 10kHz or more |
|---------------|-----------|------|-------|-------|------|---------------|
| 2.2 to 47     |           | 0.75 | 1.00  | 1.35  | 1.57 | 2.00          |
| 100 to 470    |           | 0.80 | 1.00  | 1.23  | 1.34 | 1.50          |
| 1000 to 33000 |           | 0.85 | 1.00  | 1.10  | 1.13 | 1.15          |

Rated ripple current (mArms) at 85°C 120Hz

Please refer to page 20, 21, 22 about the formed or taped product spec.  
Please refer to page 4 for the minimum order quantity.