

# NPCAP™-PXA Series

- Super low ESR, impedance and high heat resistance have been obtained by using conductive polymer as electrolyte
- Rated voltage range : 2.5 to 25V<sub>dc</sub>, case size range :  $\phi 4 \times 5.2L$  to  $\phi 10 \times 12.2L$
- Suitable for DC-DC converters, voltage regulators and decoupling applications used on computer motherboards etc.
- RoHS Compliant
- Halogen Free

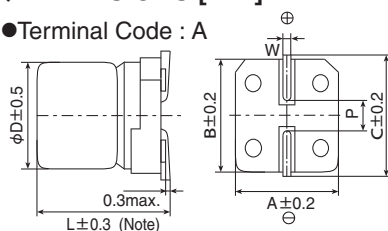
## ◆ SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------------|--------------------|--------------------------------------|-----------|---------------------------------------------|-----|---------------------------------------------|-----------------|------------------------------------|
| Category                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Temperature Range                                      | -55 to +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Rated Voltage Range                                    | 2.5 to 25V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Capacitance Tolerance                                  | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Surge Voltage                                          | Rated voltage × 1.15 (Rated voltage 2.5 to 20V <sub>dc</sub> , 25V <sub>dc</sub> ) / Rated voltage × 1.00 (Rated voltage 23V <sub>dc</sub> ) (at 105°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Leakage Current                                        | Shall not exceed values shown in STANDARD RATINGS. (at 20°C after 2 minutes)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Dissipation Factor (tanδ)                              | 0.12 max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Low Temperature Characteristics (Max. Impedance Ratio) | $Z(-25^{\circ}\text{C})/Z(+20^{\circ}\text{C}) \leq 1.15$<br>$Z(-55^{\circ}\text{C})/Z(+20^{\circ}\text{C}) \leq 1.25$ (at 100kHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours (F46 : 1,000 hours) at 105°C. <table border="1"> <tr> <td>Appearance</td><td>No significant damage</td></tr> <tr> <td>Capacitance change</td><td><math>\leq \pm 20\%</math> of the initial value</td></tr> <tr> <td>DF (tanδ)</td><td><math>\leq 150\%</math> of the initial specified value</td></tr> <tr> <td>ESR</td><td><math>\leq 150\%</math> of the initial specified value</td></tr> <tr> <td>Leakage current</td><td><math>\leq</math> The initial specified value</td></tr> </table>                                          | Appearance | No significant damage | Capacitance change | $\leq \pm 20\%$ of the initial value | DF (tanδ) | $\leq 150\%$ of the initial specified value | ESR | $\leq 150\%$ of the initial specified value | Leakage current | $\leq$ The initial specified value |
| Appearance                                             | No significant damage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Capacitance change                                     | $\leq \pm 20\%$ of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| DF (tanδ)                                              | $\leq 150\%$ of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| ESR                                                    | $\leq 150\%$ of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Leakage current                                        | $\leq$ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Bias Humidity                                          | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to the DC rated voltage at 60°C, 90 to 95% RH for 1,000 hours (F46 : 500 hours). <table border="1"> <tr> <td>Appearance</td><td>No significant damage</td></tr> <tr> <td>Capacitance change</td><td><math>\leq \pm 20\%</math> of the initial value</td></tr> <tr> <td>DF (tanδ)</td><td><math>\leq 150\%</math> of the initial specified value</td></tr> <tr> <td>ESR</td><td><math>\leq 150\%</math> of the initial specified value</td></tr> <tr> <td>Leakage current</td><td><math>\leq</math> The initial specified value</td></tr> </table>                    | Appearance | No significant damage | Capacitance change | $\leq \pm 20\%$ of the initial value | DF (tanδ) | $\leq 150\%$ of the initial specified value | ESR | $\leq 150\%$ of the initial specified value | Leakage current | $\leq$ The initial specified value |
| Appearance                                             | No significant damage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Capacitance change                                     | $\leq \pm 20\%$ of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| DF (tanδ)                                              | $\leq 150\%$ of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| ESR                                                    | $\leq 150\%$ of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Leakage current                                        | $\leq$ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Surge Voltage                                          | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105°C for 30 seconds through a protective resistor (R=1kΩ) and discharge for 5 minutes 30 seconds. <table border="1"> <tr> <td>Appearance</td><td>No significant damage</td></tr> <tr> <td>Capacitance change</td><td><math>\leq \pm 20\%</math> of the initial value</td></tr> <tr> <td>DF (tanδ)</td><td><math>\leq 150\%</math> of the initial specified value</td></tr> <tr> <td>ESR</td><td><math>\leq 150\%</math> of the initial specified value</td></tr> <tr> <td>Leakage current</td><td><math>\leq</math> The initial specified value</td></tr> </table> | Appearance | No significant damage | Capacitance change | $\leq \pm 20\%$ of the initial value | DF (tanδ) | $\leq 150\%$ of the initial specified value | ESR | $\leq 150\%$ of the initial specified value | Leakage current | $\leq$ The initial specified value |
| Appearance                                             | No significant damage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Capacitance change                                     | $\leq \pm 20\%$ of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| DF (tanδ)                                              | $\leq 150\%$ of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| ESR                                                    | $\leq 150\%$ of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Leakage current                                        | $\leq$ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |
| Failure Rate                                           | 0.5% per 1,000 hours maximum (Confidence level 60% at 105°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |                       |                    |                                      |           |                                             |     |                                             |                 |                                    |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

## ◆ DIMENSIONS [mm]

### ● Terminal Code : A



Note : L+0.1/-0.2 for F46  
L±0.5 for HC0 and JC0

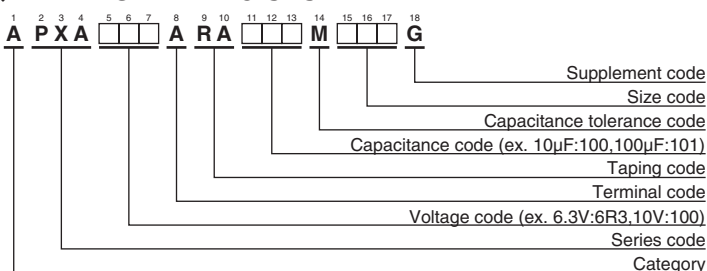
| Size code | φD  | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| D55       | 4   | 5.2  | 4.3  | 4.3  | 5.1  | 0.5 to 0.8 | 1.0 |
| E60       | 5   | 5.7  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F46       | 6.3 | 4.5  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F55       | 6.3 | 5.2  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F60       | 6.3 | 5.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| H70       | 8   | 6.7  | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| HC0       | 8   | 12.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| J80       | 10  | 7.7  | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| JC0       | 10  | 12.2 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## ◆ MARKING

EX) 16V39μF



## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size code | Leakage current (μAmax/ after 2 min.) | ESR (mΩmax/ 20°C, 100k to 300kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|----------|----------|-----------|---------------------------------------|-----------------------------------|---------------------------------------------------------|--------------------|
| 2.5      | 220      | F55       | 110                                   | 25                                | 2,500                                                   | APXA2R5ARA221MF55G |
|          | 220      | F60       | 110                                   | 25                                | 2,500                                                   | APXA2R5ARA221MF60G |
|          | 560      | H70       | 280                                   | 23                                | 3,100                                                   | APXA2R5ARA561MH70G |
|          | 680      | HC0       | 340                                   | 12                                | 4,770                                                   | APXA2R5ARA681MHC0G |
|          | 1,000    | J80       | 500                                   | 19                                | 4,240                                                   | APXA2R5ARA102MJ80G |
| 4        | 1,500    | JC0       | 750                                   | 10                                | 5,500                                                   | APXA2R5ARA152MJC0G |
|          | 33       | D55       | 66.0                                  | 200                               | 740                                                     | APXA4R0ARA330MD55G |
|          | 100      | F55       | 80.0                                  | 26                                | 2,450                                                   | APXA4R0ARA101MF55G |
|          | 100      | F60       | 80.0                                  | 26                                | 2,450                                                   | APXA4R0ARA101MF60G |
|          | 120      | F46       | 240                                   | 38                                | 1,710                                                   | APXA4R0ARA121MF46G |
|          | 150      | E60       | 120                                   | 30                                | 1,490                                                   | APXA4R0ARA151ME60G |
|          | 150      | F55       | 120                                   | 26                                | 2,450                                                   | APXA4R0ARA151MF55G |
|          | 150      | F60       | 120                                   | 26                                | 2,450                                                   | APXA4R0ARA151MF60G |
|          | 220      | H70       | 176                                   | 25                                | 3,020                                                   | APXA4R0ARA221MH70G |
|          | 330      | H70       | 264                                   | 25                                | 3,020                                                   | APXA4R0ARA331MH70G |
|          | 470      | J80       | 376                                   | 20                                | 4,130                                                   | APXA4R0ARA471MJ80G |
|          | 560      | HC0       | 448                                   | 12                                | 4,770                                                   | APXA4R0ARA561MHC0G |
|          | 680      | J80       | 544                                   | 20                                | 4,130                                                   | APXA4R0ARA681MJ80G |
|          | 820      | JC0       | 656                                   | 10                                | 5,500                                                   | APXA4R0ARA821MJC0G |
|          | 1,200    | JC0       | 960                                   | 10                                | 5,500                                                   | APXA4R0ARA122MJC0G |
| 6.3      | 22       | D55       | 69.0                                  | 200                               | 740                                                     | APXA6R3ARA220MD55G |
|          | 47       | E60       | 59.2                                  | 35                                | 1,380                                                   | APXA6R3ARA470ME60G |
|          | 68       | F60       | 85.6                                  | 27                                | 2,400                                                   | APXA6R3ARA680MF60G |
|          | 82       | F46       | 267                                   | 40                                | 1,670                                                   | APXA6R3ARA820MF46G |
|          | 82       | F55       | 103                                   | 27                                | 2,400                                                   | APXA6R3ARA820MF55G |
|          | 82       | F60       | 103                                   | 27                                | 2,400                                                   | APXA6R3ARA820MF60G |
|          | 100      | E60       | 126                                   | 35                                | 1,380                                                   | APXA6R3ARA101ME60G |
|          | 100      | F46       | 315                                   | 40                                | 1,670                                                   | APXA6R3ARA101MF46G |
|          | 100      | F55       | 126                                   | 27                                | 2,400                                                   | APXA6R3ARA101MF55G |
|          | 100      | F60       | 126                                   | 27                                | 2,400                                                   | APXA6R3ARA101MF60G |
|          | 120      | F60       | 151                                   | 27                                | 2,400                                                   | APXA6R3ARA121MF60G |
|          | 150      | H70       | 189                                   | 25                                | 3,020                                                   | APXA6R3ARA151MH70G |
|          | 220      | H70       | 277                                   | 25                                | 3,020                                                   | APXA6R3ARA221MH70G |
|          | 330      | J80       | 416                                   | 20                                | 4,130                                                   | APXA6R3ARA331MJ80G |
|          | 390      | HC0       | 491                                   | 12                                | 4,770                                                   | APXA6R3ARA391MHC0G |
|          | 470      | HC0       | 592                                   | 12                                | 4,770                                                   | APXA6R3ARA471MHC0G |
|          | 470      | J80       | 592                                   | 20                                | 4,130                                                   | APXA6R3ARA471MJ80G |
|          | 680      | JC0       | 857                                   | 10                                | 5,500                                                   | APXA6R3ARA681MJC0G |
|          | 820      | JC0       | 1,030                                 | 10                                | 5,500                                                   | APXA6R3ARA821MJC0G |
| WV (Vdc) | Cap (μF) | Size code | Leakage current (μAmax/ after 2 min.) | ESR (mΩmax/ 20°C, 100k to 300kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
| 10       | 4.7      | D55       | 24.0                                  | 240                               | 670                                                     | APXA100ARA4R7MD55G |
|          | 6.8      | D55       | 34.0                                  | 240                               | 670                                                     | APXA100ARA6R8MD55G |
|          | 10       | D55       | 50.0                                  | 220                               | 700                                                     | APXA100ARA100MD55G |
|          | 15       | D55       | 75.0                                  | 200                               | 740                                                     | APXA100ARA150MD55G |
|          | 33       | E60       | 66.0                                  | 40                                | 1,270                                                   | APXA100ARA330ME60G |
|          | 47       | E60       | 94.0                                  | 40                                | 1,270                                                   | APXA100ARA470ME60G |
|          | 47       | F46       | 235                                   | 41                                | 1,560                                                   | APXA100ARA470MF46G |
|          | 47       | F60       | 94.0                                  | 31                                | 2,250                                                   | APXA100ARA470MF60G |
|          | 56       | F55       | 112                                   | 31                                | 2,250                                                   | APXA100ARA560MF55G |
|          | 56       | F60       | 112                                   | 31                                | 2,250                                                   | APXA100ARA560MF60G |
|          | 120      | H70       | 240                                   | 27                                | 2,800                                                   | APXA100ARA121MH70G |
|          | 150      | H70       | 300                                   | 27                                | 2,800                                                   | APXA100ARA150MH70G |
|          | 270      | HC0       | 540                                   | 14                                | 4,420                                                   | APXA100ARA271MHC0G |
|          | 270      | J80       | 540                                   | 24                                | 3,770                                                   | APXA100ARA271MJ80G |
|          | 330      | HC0       | 660                                   | 14                                | 4,420                                                   | APXA100ARA331MHC0G |
| 16       | 330      | J80       | 660                                   | 24                                | 3,770                                                   | APXA100ARA331MJ80G |
|          | 470      | JC0       | 940                                   | 12                                | 5,300                                                   | APXA100ARA471MJC0G |
|          | 560      | JC0       | 1,120                                 | 12                                | 5,300                                                   | APXA100ARA561MJC0G |
|          | 3.3      | D55       | 26.0                                  | 260                               | 660                                                     | APXA160ARA3R3MD55G |
|          | 22       | E60       | 70.4                                  | 45                                | 1,210                                                   | APXA160ARA220ME60G |
|          | 22       | F46       | 176                                   | 45                                | 1,490                                                   | APXA160ARA220MF46G |
|          | 33       | F60       | 106                                   | 37                                | 2,050                                                   | APXA160ARA330MF60G |
|          | 39       | F55       | 125                                   | 37                                | 2,050                                                   | APXA160ARA390MF55G |
|          | 39       | F60       | 125                                   | 37                                | 2,050                                                   | APXA160ARA390MF60G |
|          | 82       | H70       | 262                                   | 30                                | 2,700                                                   | APXA160ARA820MH70G |
|          | 150      | J80       | 480                                   | 26                                | 3,430                                                   | APXA160ARA151MJ80G |
|          | 180      | HC0       | 576                                   | 16                                | 4,360                                                   | APXA160ARA181MHC0G |
|          | 180      | J80       | 576                                   | 26                                | 3,430                                                   | APXA160ARA181MJ80G |
|          | 220      | JC0       | 704                                   | 14                                | 5,050                                                   | APXA160ARA221MJC0G |
|          | 330      | JC0       | 1,050                                 | 14                                | 5,050                                                   | APXA160ARA331MJC0G |
| 20       | 15       | F46       | 150                                   | 57                                | 1,300                                                   | APXA200ARA150MF46G |
|          | 22       | F55       | 88.0                                  | 50                                | 1,650                                                   | APXA200ARA220MF55G |
|          | 22       | F60       | 88.0                                  | 50                                | 1,650                                                   | APXA200ARA220MF60G |
|          | 39       | H70       | 156                                   | 45                                | 2,000                                                   | APXA200ARA390MH70G |
|          | 47       | H70       | 188                                   | 45                                | 2,000                                                   | APXA200ARA470MH70G |
|          | 82       | J80       | 328                                   | 40                                | 2,500                                                   | APXA200ARA820MJ80G |
| 23       | 150      | JC0       | 600                                   | 20                                | 4,320                                                   | APXA200ARA151MJC0G |
|          | 15       | F46       | 172                                   | 57                                | 1,300                                                   | APXA230ARA150MF46G |
|          | 10       | F60       | 125                                   | 65                                | 1,500                                                   | APXA250ARA100MF60G |
| 25       | 22       | H70       | 275                                   | 50                                | 1,800                                                   | APXA250ARA220MH70G |
|          | 39       | J80       | 488                                   | 45                                | 2,100                                                   | APXA250ARA390MJ80G |