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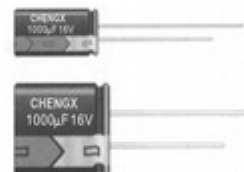
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# GR Series

**+105°C, High Ripple Current(高纹波), Low Impedance(低阻抗品)**

## FEATURES

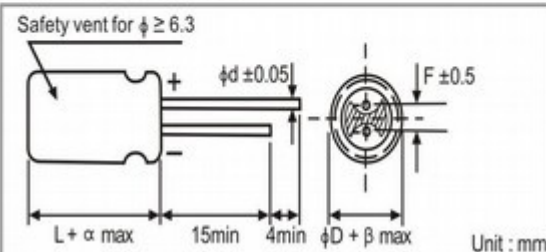
1. Low impedance for high frequency.
2. Life time: 2000~4000 hours at 105°C.



## SPECIFICATIONS

| Item                                                                 | Performance Characteristics                                                                                    |       |         |        |                                                     |                                             |      |      |      |  |  |  |  |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-------|---------|--------|-----------------------------------------------------|---------------------------------------------|------|------|------|--|--|--|--|
| Operating Temperature Range                                          | -40 to +105°C                                                                                                  |       |         |        |                                                     |                                             |      |      |      |  |  |  |  |
| Rated Working Voltage Range                                          | 6.3 to 100V                                                                                                    |       |         |        |                                                     |                                             |      |      |      |  |  |  |  |
| Nominal Capacitance Range                                            | 2.2 to 4700μF                                                                                                  |       |         |        |                                                     |                                             |      |      |      |  |  |  |  |
| Capacitance Tolerance                                                | ±20% (120Hz, +20°C)                                                                                            |       |         |        |                                                     |                                             |      |      |      |  |  |  |  |
| Leakage Current                                                      | I ≤ 0.01CV or 3(μA) whichever is greater measured after 2 minutes application of rated working voltage at 20°C |       |         |        |                                                     |                                             |      |      |      |  |  |  |  |
| tan δ (120Hz, +20°C)                                                 | Working Voltage (V)                                                                                            | 6.3   | 10      | 16     | 25                                                  | 35                                          | 50   | 63   | 100  |  |  |  |  |
|                                                                      | tan δ (max.)                                                                                                   | 0.22  | 0.19    | 0.16   | 0.14                                                | 0.12                                        | 0.10 | 0.09 | 0.08 |  |  |  |  |
|                                                                      | For capacitance value > 1000μF, add 0.02 per another 1000μF                                                    |       |         |        |                                                     |                                             |      |      |      |  |  |  |  |
| Low Temperature Characteristics                                      | Impedance ratio max. at 120Hz                                                                                  |       |         |        |                                                     |                                             |      |      |      |  |  |  |  |
|                                                                      | Working Voltage (V)                                                                                            | 6.3   | 10      | 16     | 25                                                  | 35                                          | 50   | 63   | 100  |  |  |  |  |
|                                                                      | Z-25°C / Z+20°C                                                                                                | 4     | 3       | 2      | 2                                                   | 2                                           | 2    | 2    | 2    |  |  |  |  |
|                                                                      | Z-40°C / Z+20°C                                                                                                | 8     | 6       | 4      | 3                                                   | 3                                           | 3    | 3    | 3    |  |  |  |  |
| High Temperature Loading                                             | Test conditions                                                                                                |       |         |        | Post test requirements at +20°C                     |                                             |      |      |      |  |  |  |  |
|                                                                      | Duration :                                                                                                     | φD    | 5 ~ 6.3 | 8 ~ 10 | 12.5                                                | Leakage current : ≤ Initial specified value |      |      |      |  |  |  |  |
|                                                                      | Load life                                                                                                      | 2000h | 3000h   | 4000h  | Cap. change : within ±25% of initial measured value |                                             |      |      |      |  |  |  |  |
|                                                                      | Ambient temp. : +105°C                                                                                         |       |         |        | tan δ : ≤ 150% of initial specified value           |                                             |      |      |      |  |  |  |  |
| Applied voltage : Rated DC working voltage with rated ripple current |                                                                                                                |       |         |        |                                                     |                                             |      |      |      |  |  |  |  |
| Shelf Life                                                           | Test conditions                                                                                                |       |         |        | Post test requirements at +20°C                     |                                             |      |      |      |  |  |  |  |
|                                                                      | Duration : 1000 hours                                                                                          |       |         |        | Same limits for high temperature loading.           |                                             |      |      |      |  |  |  |  |
|                                                                      | Ambient temp. : +105°C                                                                                         |       |         |        |                                                     |                                             |      |      |      |  |  |  |  |
|                                                                      | Applied voltage : (None)                                                                                       |       |         |        |                                                     |                                             |      |      |      |  |  |  |  |
| Others                                                               | JIS C - 5101 ( IEC 60384 )                                                                                     |       |         |        |                                                     |                                             |      |      |      |  |  |  |  |

## CASE SIZE TABLE



| φD | 5            | 6.3 | 8(L<20) | 8(L≥20) | 10           | 12.5 |  |  |  |
|----|--------------|-----|---------|---------|--------------|------|--|--|--|
| F  | 2.0          | 2.5 | 3.5     |         | 5.0          | 5.0  |  |  |  |
| φd | 0.5          |     |         | 0.6     | 0.6          |      |  |  |  |
| α  | (L < 20) 1.5 |     |         |         | (L ≥ 20) 2.0 |      |  |  |  |
| β  | (D < 20) 0.5 |     |         |         | (D ≥ 20) 1.0 |      |  |  |  |

+105°C, High Ripple Current(高紋波), Low Impedance(低阻抗品)

## STANDARD RATINGS

| Voltage (Code) |      | 6.3V (0J) |           |                | 10V (1A)  |           |                | 16V (1C)  |           |                |
|----------------|------|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|
| Cap.(μF)       | Code | Case Size | Impedance | Ripple Current | Case Size | Impedance | Ripple Current | Case Size | Impedance | Ripple Current |
| 100            | 107  |           |           |                |           |           |                | 6.3x11    | 0.220     | 340            |
| 120            | 127  |           |           |                |           |           |                | 6.3x11    | 0.220     | 340            |
| 150            | 157  |           |           |                | 6.3x11    | 0.220     | 340            | 6.3x11    | 0.220     | 340            |
|                |      |           |           |                |           |           |                | 8x12      | 0.130     | 640            |
| 180            | 187  | 6.3x11    | 0.220     | 340            | 6.3x11    | 0.220     | 340            | 6.3x11    | 0.220     | 340            |
|                |      |           |           |                |           |           |                | 8x12      | 0.130     | 640            |
| 220            | 227  | 6.3x11    | 0.220     | 340            | 6.3x11    | 0.220     | 340            | 6.3x11    | 0.220     | 340            |
|                |      |           |           |                |           |           |                | 8x12      | 0.130     | 640            |
| 270            | 277  | 6.3x11    | 0.220     | 340            | 6.3x11    | 0.220     | 340            | 8x12      | 0.130     | 640            |
|                |      |           |           |                | 8x12      | 0.130     | 640            |           |           |                |
| 330            | 337  | 6.3x11    | 0.220     | 340            | 6.3x11    | 0.220     | 340            | 8x12      | 0.130     | 640            |
|                |      | 8x12      | 0.130     | 640            | 8x12      | 0.130     | 640            |           |           |                |
| 390            | 397  | 8x12      | 0.130     | 640            | 8x12      | 0.130     | 640            | 8x12      | 0.130     | 640            |
| 470            | 477  | 8x12      | 0.130     | 640            | 8x12      | 0.130     | 640            | 8x12      | 0.130     | 640            |
|                |      |           |           |                |           |           |                | 10x12.5   | 0.080     | 865            |
| 560            | 567  | 8x12      | 0.130     | 640            | 8x12      | 0.130     | 640            | 10x12.5   | 0.080     | 865            |
| 680            | 687  | 8x12      | 0.130     | 640            | 8x12      | 0.130     | 640            | 8x16      | 0.087     | 640            |
|                |      |           |           |                |           |           |                | 10x12.5   | 0.080     | 865            |
| 820            | 827  | 8x12      | 0.130     | 640            | 10x12.5   | 0.080     | 865            | 10x16     | 0.060     | 1210           |
|                |      | 10x12.5   | 0.080     | 865            |           |           |                |           |           |                |
| 1000           | 108  | 8x12      | 0.130     | 640            | 8x16      | 0.087     | 640            | 10x16     | 0.060     | 1210           |
|                |      | 10x12.5   | 0.080     | 865            | 10x16     | 0.060     | 1210           |           |           |                |
| 1200           | 128  | 8x16      | 0.087     | 840            | 10x20     | 0.046     | 1400           | 10x20     | 0.046     | 1400           |
|                |      | 10x12.5   | 0.080     | 865            |           |           |                |           |           |                |
| 1500           | 158  | 8x20      | 0.069     | 1050           | 10x20     | 0.046     | 1400           | 10x20     | 0.046     | 1400           |
|                |      | 10x16     | 0.060     | 1210           |           |           |                |           |           |                |
| 1800           | 188  | 10x20     | 0.046     | 1400           | 10x20     | 0.046     | 1400           | 10x25     | 0.042     | 1650           |
|                |      |           |           |                |           |           |                | 12.5x20   | 0.035     | 1900           |
| 2200           | 228  | 10x20     | 0.046     | 1400           | 10x20     | 0.046     | 1400           | 12.5x20   | 0.035     | 1900           |
| 2700           | 278  | 10x25     | 0.042     | 1650           | 10x25     | 0.042     | 1650           | 12.5x25   | 0.030     | 2124           |
|                |      | 12.5x20   | 0.035     | 1900           | 12.5x20   | 0.035     | 1900           |           |           |                |
| 3300           | 338  | 10x25     | 0.042     | 1650           | 12.5x25   | 0.030     | 2124           |           |           |                |
|                |      | 12.5x20   | 0.035     | 1900           |           |           |                |           |           |                |
| 3900           | 398  | 12.5x20   | 0.035     | 1900           |           |           |                |           |           |                |
| 4700           | 478  | 12.5x25   | 0.030     | 2124           |           |           |                |           |           |                |

Maximum Allowable Ripple Current (mA rms) at 105°C 100kHz

Case Size φD x L(mm)

Maximum Impedance (Ω) at 20°C 100kHz

+105°C, High Ripple Current(高紋波), Low Impedance(低阻抗品)

## STANDARD RATINGS

| Voltage (Code) |      | 25V (1E)  |           |                | 35V (1V)  |           |                | 50V (1H)  |           |                |
|----------------|------|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|
| Cap.(μF)       | Code | Case Size | Impedance | Ripple Current | Case Size | Impedance | Ripple Current | Case Size | Impedance | Ripple Current |
| 33             | 336  |           |           |                |           |           |                | 6.3x11    | 0.300     | 295            |
| 39             | 396  |           |           |                |           |           |                | 6.3x11    | 0.300     | 295            |
| 47             | 476  |           |           |                | 6.3x11    | 0.220     | 340            | 6.3x11    | 0.300     | 295            |
| 56             | 566  |           |           |                | 6.3x11    | 0.220     | 340            | 8x12      | 0.170     | 555            |
| 68             | 686  |           |           |                | 6.3x11    | 0.220     | 340            | 8x12      | 0.170     | 555            |
| 82             | 826  | 6.3x11    | 0.220     | 340            | 8x12      | 0.130     | 640            | 8x12      | 0.170     | 555            |
| 100            | 107  | 6.3x11    | 0.220     | 340            | 8x12      | 0.130     | 640            | 10x12.5   | 0.120     | 760            |
| 120            | 127  | 8x12      | 0.130     | 640            | 8x12      | 0.130     | 640            | 8x16      | 0.120     | 730            |
|                |      |           |           |                |           |           |                | 10x12.5   | 0.120     | 760            |
| 150            | 157  | 8x12      | 0.130     | 640            | 8x12      | 0.130     | 640            | 10x16     | 0.084     | 1050           |
| 180            | 187  | 8x12      | 0.130     | 640            | 10x12.5   | 0.080     | 865            | 8x20      | 0.091     | 910            |
|                |      |           |           |                |           |           |                | 10x16     | 0.084     | 1050           |
| 220            | 227  | 8x12      | 0.130     | 640            | 8x12      | 0.130     | 640            | 10x16     | 0.084     | 1050           |
|                |      |           |           |                | 8x16      | 0.087     | 840            |           |           |                |
|                |      |           |           |                | 10x12.5   | 0.080     | 865            |           |           |                |
| 270            | 277  | 8x12      | 0.130     | 640            | 10x16     | 0.060     | 1210           | 10x25     | 0.055     | 1440           |
|                |      | 10x12.5   | 0.080     | 865            |           |           |                |           |           |                |
| 330            | 337  | 8x12      | 0.130     | 640            | 8x20      | 0.069     | 1050           | 12.5x20   | 0.045     | 1660           |
|                |      | 10x12.5   | 0.080     | 865            | 10x12.5   | 0.080     | 865            |           |           |                |
|                |      |           |           |                | 10x16     | 0.060     | 1210           |           |           |                |
| 390            | 397  | 10x12.5   | 0.080     | 865            | 10x16     | 0.060     | 1210           | 12.5x20   | 0.045     | 1660           |
| 470            | 477  | 8x16      | 0.087     | 840            | 10x16     | 0.060     | 1210           | 12.5x25   | 0.034     | 1950           |
|                |      | 10x12.5   | 0.080     | 865            |           |           |                |           |           |                |
| 560            | 567  | 10x16     | 0.060     | 1210           | 10x20     | 0.046     | 1400           | 12.5x25   | 0.034     | 1950           |
| 680            | 687  | 10x16     | 0.060     | 1210           | 10x20     | 0.046     | 1400           |           |           |                |
| 820            | 827  | 10x20     | 0.046     | 1400           | 10x25     | 0.042     | 1650           |           |           |                |
|                |      |           |           |                | 12.5x20   | 0.035     | 1900           |           |           |                |
| 1000           | 108  | 10x20     | 0.046     | 1400           | 12.5x20   | 0.035     | 1900           |           |           |                |
|                |      |           |           |                | 12.5x25   | 0.030     | 2124           |           |           |                |
| 1200           | 128  | 10x20     | 0.046     | 1400           |           |           |                |           |           |                |
| 1500           | 158  | 10x25     | 0.042     | 1650           |           |           |                |           |           |                |
|                |      | 12.5x20   | 0.035     | 1900           |           |           |                |           |           |                |
| 1800           | 188  | 12.5x25   | 0.030     | 2124           |           |           |                |           |           |                |
| 2200           | 228  | 12.5x25   | 0.030     | 2124           |           |           |                |           |           |                |

Maximum Allowable Ripple Current (mA rms) at 105°C 100kHz

Case Size φD x L(mm)

Maximum Impedance (Ω) at 20°C 100kHz

+105°C, High Ripple Current(高紋波), Low Impedance(低阻抗品)

## STANDARD RATINGS

| Voltage(Code) |      | 63V (1J)  |           |                | 100V(2A)  |           |                |  |  |  |
|---------------|------|-----------|-----------|----------------|-----------|-----------|----------------|--|--|--|
| Cap.(μF)      | Code | Case Size | Impedance | Ripple Current | Case Size | Impedance | Ripple Current |  |  |  |
| 15            | 156  |           |           |                | 6.3x11    | 0.960     | 115            |  |  |  |
| 22            | 226  | 6.3x11    | 0.960     | 115            |           |           |                |  |  |  |
| 27            | 276  | 6.3x11    | 0.960     | 115            | 8x12      | 0.504     | 232            |  |  |  |
| 33            | 336  | 6.3x11    | 0.960     | 115            |           |           |                |  |  |  |
| 39            | 396  | 8x12      | 0.504     | 232            | 8x16      | 0.360     | 300            |  |  |  |
| 47            | 476  | 8x12      | 0.504     | 232            | 10x12.5   | 0.344     | 314            |  |  |  |
| 56            | 566  | 8x12      | 0.504     | 232            | 8x20      | 0.264     | 362            |  |  |  |
| 68            | 686  | 8x12      | 0.504     | 232            | 10x16     | 0.248     | 357            |  |  |  |
| 82            | 826  | 10x12.5   | 0.344     | 314            | 10x20     | 0.168     | 466            |  |  |  |
| 100           | 107  | 8x16      | 0.360     | 300            | 10x20     | 0.168     | 466            |  |  |  |
|               |      | 10x12.5   | 0.344     | 314            |           |           |                |  |  |  |
| 120           | 127  | 10x16     | 0.248     | 357            | 12.5x20   | 0.128     | 690            |  |  |  |
| 150           | 157  | 8x20      | 0.264     | 362            |           |           |                |  |  |  |
| 180           | 187  | 10x20     | 0.168     | 466            | 12.5x25   | 0.096     | 922            |  |  |  |
| 220           | 227  | 10x20     | 0.168     | 466            | 12.5x25   | 0.096     | 922            |  |  |  |
| 270           | 277  | 12.5x20   | 0.128     | 690            |           |           |                |  |  |  |
| 330           | 337  | 12.5x20   | 0.128     | 690            |           |           |                |  |  |  |
| 390           | 397  | 12.5x25   | 0.096     | 922            |           |           |                |  |  |  |

Maximum Allowable Ripple Current (mA rms) at 105 °C 100kHz

Case Size φD x L(mm)

Maximum Impedance(Ω) at 20 °C 100kHz

## RIPPLE CURRENT MULTIPLIER

| Frequency Coefficient |             |           |      |      |      |      |
|-----------------------|-------------|-----------|------|------|------|------|
| Cap(μF)               | Coefficient | Freq.(Hz) | 120  | 1k   | 10k  | 100k |
|                       | ~180        |           | 0.40 | 0.75 | 0.90 | 1.00 |
|                       | 220 ~ 560   |           | 0.50 | 0.85 | 0.94 | 1.00 |
|                       | 680 ~ 1800  |           | 0.60 | 0.87 | 0.95 | 1.00 |
|                       | 2200 ~ 3900 |           | 0.75 | 0.90 | 0.95 | 1.00 |
|                       | 4700        |           | 0.85 | 0.95 | 0.98 | 1.00 |