

# GXE Series

- For automobile modules and other high temperature applications
- Downsize, long life, low impedance and better low temperature characteristics
- Endurance with ripple current : 2,000 to 5,000 hours at 125°C
- Solvent resistant type except 63 to 450V (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

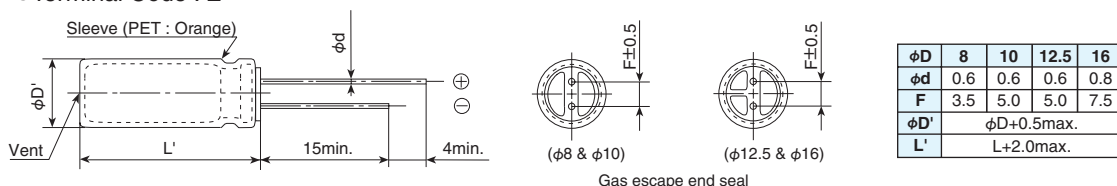


## SPECIFICATIONS

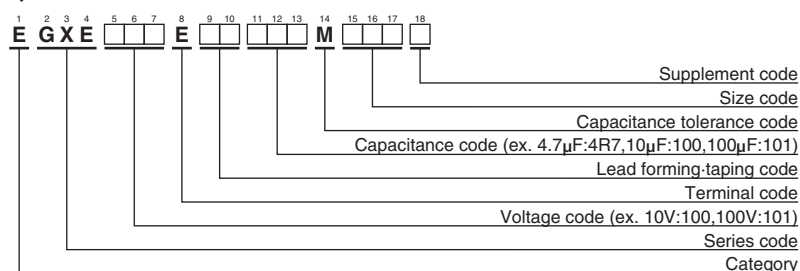
| Items                                                        | Characteristics                                                                                                                                                                                                                                                                                                                  |  |                                                           |      |                           |      |              |      |                                      |      |             |             |  |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------|------|---------------------------|------|--------------|------|--------------------------------------|------|-------------|-------------|--|
| Category                                                     | -40 to +125℃ (10 to 250V <sub>dc</sub> ) -25 to +125℃ (350 to 450V <sub>dc</sub> )                                                                                                                                                                                                                                               |  |                                                           |      |                           |      |              |      |                                      |      |             |             |  |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                                                                  |  |                                                           |      |                           |      |              |      |                                      |      |             |             |  |
| Rated Voltage Range                                          | 10 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                                                                         |  |                                                           |      |                           |      |              |      |                                      |      |             |             |  |
| Capacitance Tolerance                                        | ±20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                                                                         |  |                                                           |      |                           |      |              |      |                                      |      |             |             |  |
| Leakage Current                                              | 10 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                                                                         |  |                                                           |      | 160 to 450V <sub>dc</sub> |      |              |      |                                      |      |             |             |  |
|                                                              | I=0.03CV or 4μA, whichever is greater.                                                                                                                                                                                                                                                                                           |  |                                                           |      | CV≤1,000                  |      | I=0.1CV+40   |      |                                      |      |             |             |  |
|                                                              |                                                                                                                                                                                                                                                                                                                                  |  |                                                           |      | CV>1,000                  |      | I=0.04CV+100 |      |                                      |      |             |             |  |
|                                                              | Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃, 1 minute)                                                                                                                                                                                                                     |  |                                                           |      |                           |      |              |      |                                      |      |             |             |  |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                 |  | 10V                                                       | 16V  | 25V                       | 35V  | 50V          | 63V  | 80V                                  | 100V | 160 to 250V | 350 to 450V |  |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                                                                     |  | 0.20                                                      | 0.16 | 0.14                      | 0.12 | 0.10         | 0.10 | 0.08                                 | 0.08 | 0.20        | 0.24        |  |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                                                                 |  |                                                           |      |                           |      |              |      |                                      |      |             |             |  |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                 |  | 10V                                                       | 16V  | 25V                       | 35V  | 50V          | 63V  | 80V                                  | 100V | 160 to 250V | 350 to 450V |  |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                  |  | 3                                                         | 2    | 2                         | 2    | 2            | 2    | 2                                    | 2    | 3           | 6           |  |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                  |  | 6                                                         | 4    | 4                         | 4    | 4            | 4    | 4                                    | 4    | 6           | —           |  |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified time at 125℃.                                                                             |  |                                                           |      |                           |      |              |      |                                      |      |             |             |  |
|                                                              |                                                                                                                                                                                                                                                                                                                                  |  | 10 to 100V <sub>dc</sub>                                  |      |                           |      |              |      | 160 to 450V <sub>dc</sub>            |      |             |             |  |
|                                                              | Time                                                                                                                                                                                                                                                                                                                             |  | φ8 : 2,000hours φ10 : 3,000hours φ12.5 & φ16 : 5,000hours |      |                           |      |              |      | 2,000hours                           |      |             |             |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                                                               |  | ≤ ±30% of the initial value                               |      |                           |      |              |      | ≤ ±20% of the initial value          |      |             |             |  |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                                                                    |  | ≤300% of the initial specified value                      |      |                           |      |              |      | ≤200% of the initial specified value |      |             |             |  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                                                                  |  | ≤The initial specified value                              |      |                           |      |              |      | ≤The initial specified value         |      |             |             |  |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours (500 hours for 350 to 450V <sub>dc</sub> ) at 125℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |  |                                                           |      |                           |      |              |      |                                      |      |             |             |  |
|                                                              |                                                                                                                                                                                                                                                                                                                                  |  | 10 to 100V <sub>dc</sub>                                  |      |                           |      |              |      | 160 to 450V <sub>dc</sub>            |      |             |             |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                                                               |  | ≤ ±30% of the initial value                               |      |                           |      |              |      | ≤ ±20% of the initial value          |      |             |             |  |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                                                                    |  | ≤300% of the initial specified value                      |      |                           |      |              |      | ≤200% of the initial specified value |      |             |             |  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                                                                  |  | ≤The initial specified value                              |      |                           |      |              |      | ≤500% of the initial specified value |      |             |             |  |
|                                                              |                                                                                                                                                                                                                                                                                                                                  |  |                                                           |      |                           |      |              |      |                                      |      |             |             |  |

## DIMENSIONS [mm]

### Terminal Code : E



## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

## ◆STANDARD RATINGS

□ is not solvent resistant.

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./<br>20°C, 100kHz) | Rated ripple<br>current<br>(mA rms/<br>125°C, Note1) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./<br>20°C, 100kHz) | Rated ripple<br>current<br>(mA rms/<br>125°C, Note1) | Part No.           |
|--------------------------|-------------|-----------------------|----------------------------------------|------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|----------------------------------------|------------------------------------------------------|--------------------|
| 10                       | 220         | 8×12                  | 0.32                                   | 340                                                  | EGXE100E□□221MH12D | 80                       | 47          | 10×12.5               | 0.80                                   | 480                                                  | EGXE800E□□470MJC5S |
|                          | 330         | 10×12.5               | 0.15                                   | 620                                                  | EGXE100E□□331MJC5S |                          | 100         | 10×20                 | 0.39                                   | 790                                                  | EGXE800E□□101MJ20S |
|                          | 470         | 10×12.5               | 0.15                                   | 620                                                  | EGXE100E□□471MJC5S |                          | 220         | 12.5×25               | 0.18                                   | 1,240                                                | EGXE800E□□221MK25S |
|                          | 1,000       | 10×20                 | 0.075                                  | 950                                                  | EGXE100E□□102MJ20S |                          | 330         | 12.5×30               | 0.16                                   | 1,390                                                | EGXE800E□□331MK30S |
|                          | 2,200       | 12.5×25               | 0.040                                  | 1,350                                                | EGXE100E□□222MK25S |                          | 470         | 16×25                 | 0.11                                   | 1,500                                                | EGXE800E□□471ML25S |
|                          | 3,300       | 16×25                 | 0.031                                  | 1,620                                                | EGXE100E□□332ML25S | 100                      | 4.7         | 8×12                  | 2.0                                    | 130                                                  | EGXE101E□□4R7MH12D |
|                          | 4,700       | 16×31.5               | 0.025                                  | 1,860                                                | EGXE100E□□472MLN3S |                          | 10          | 8×12                  | 1.5                                    | 150                                                  | EGXE101E□□100MH12D |
| 16                       | 100         | 8×12                  | 0.32                                   | 340                                                  | EGXE160E□□101MH12D |                          | 22          | 10×12.5               | 0.80                                   | 480                                                  | EGXE101E□□220MJC5S |
|                          | 220         | 10×12.5               | 0.15                                   | 620                                                  | EGXE160E□□221MJC5S |                          | 33          | 10×12.5               | 0.80                                   | 480                                                  | EGXE101E□□330MJC5S |
|                          | 330         | 10×12.5               | 0.15                                   | 620                                                  | EGXE160E□□331MJC5S |                          | 47          | 10×16                 | 0.55                                   | 630                                                  | EGXE101E□□470MJ16S |
|                          | 470         | 10×16                 | 0.094                                  | 790                                                  | EGXE160E□□471MJ16S |                          | 100         | 12.5×20               | 0.25                                   | 990                                                  | EGXE101E□□100MK20S |
|                          | 1,000       | 12.5×20               | 0.058                                  | 1,080                                                | EGXE160E□□102MK20S |                          | 220         | 16×25                 | 0.11                                   | 1,500                                                | EGXE101E□□221ML25S |
|                          | 2,200       | 16×25                 | 0.031                                  | 1,620                                                | EGXE160E□□222ML25S |                          | 330         | 16×31.5               | 0.079                                  | 1,790                                                | EGXE101E□□331MLN3S |
|                          | 3,300       | 16×31.5               | 0.025                                  | 1,860                                                | EGXE160E□□332MLN3S | 160                      | 22          | 10×20                 | —                                      | 115                                                  | EGXE161E□□220MJ20S |
| 25                       | 100         | 8×12                  | 0.32                                   | 340                                                  | EGXE250E□□101MH12D |                          | 33          | 10×25                 | —                                      | 154                                                  | EGXE161E□□330MH12S |
|                          | 220         | 10×12.5               | 0.15                                   | 620                                                  | EGXE250E□□221MJC5S |                          | 47          | 12.5×20               | —                                      | 187                                                  | EGXE161E□□470MK20S |
|                          | 330         | 10×16                 | 0.094                                  | 790                                                  | EGXE250E□□331MJ16S |                          | 68          | 12.5×25               | —                                      | 245                                                  | EGXE161E□□680MK25S |
|                          | 470         | 10×20                 | 0.075                                  | 950                                                  | EGXE250E□□471MJ20S |                          | 100         | 16×25                 | —                                      | 329                                                  | EGXE161E□□101ML25S |
|                          | 1,000       | 12.5×25               | 0.040                                  | 1,350                                                | EGXE250E□□102MK25S |                          | 150         | 16×31.5               | —                                      | 434                                                  | EGXE161E□□151MLN3S |
|                          | 2,200       | 16×31.5               | 0.025                                  | 1,860                                                | EGXE250E□□222MLN3S | 200                      | 10          | 10×20                 | —                                      | 78                                                   | EGXE201E□□100MJ20S |
|                          | 100         | 8×12                  | 0.32                                   | 340                                                  | EGXE350E□□101MH12D |                          | 22          | 10×25                 | —                                      | 126                                                  | EGXE201E□□220MJ25S |
| 35                       | 100         | 10×12.5               | 0.15                                   | 620                                                  | EGXE350E□□101MJC5S |                          | 33          | 12.5×20               | —                                      | 157                                                  | EGXE201E□□330MK20S |
|                          | 220         | 10×16                 | 0.094                                  | 790                                                  | EGXE350E□□221MJ16S |                          | 47          | 12.5×25               | —                                      | 204                                                  | EGXE201E□□470MK25S |
|                          | 330         | 10×20                 | 0.075                                  | 950                                                  | EGXE350E□□331MJ20S |                          | 68          | 16×20                 | —                                      | 250                                                  | EGXE201E□□680ML20S |
|                          | 470         | 12.5×20               | 0.058                                  | 1,080                                                | EGXE350E□□471MK20S |                          | 100         | 16×25                 | —                                      | 329                                                  | EGXE201E□□101ML25S |
|                          | 1,000       | 16×25                 | 0.031                                  | 1,620                                                | EGXE350E□□102ML25S | 250                      | 10          | 10×20                 | —                                      | 78                                                   | EGXE251E□□100MJ20S |
| 50                       | 10          | 8×12                  | 0.75                                   | 180                                                  | EGXE500E□□100MH12D |                          | 22          | 12.5×20               | —                                      | 128                                                  | EGXE251E□□220MK20S |
|                          | 22          | 8×12                  | 0.50                                   | 250                                                  | EGXE500E□□220MH12D |                          | 33          | 12.5×25               | —                                      | 171                                                  | EGXE251E□□330MK25S |
|                          | 33          | 8×12                  | 0.50                                   | 280                                                  | EGXE500E□□330MH12D |                          | 47          | 16×25                 | —                                      | 225                                                  | EGXE251E□□470ML25S |
|                          | 47          | 8×12                  | 0.50                                   | 280                                                  | EGXE500E□□470MH12D |                          | 68          | 16×31.5               | —                                      | 292                                                  | EGXE251E□□680MLN3S |
|                          | 100         | 10×12.5               | 0.20                                   | 520                                                  | EGXE500E□□101MJC5S | 350                      | 4.7         | 10×20                 | —                                      | 53                                                   | EGXE351E□□4R7MJ20S |
|                          | 220         | 10×20                 | 0.098                                  | 880                                                  | EGXE500E□□221MJ20S |                          | 10          | 10×25                 | —                                      | 85                                                   | EGXE351E□□100MJ25S |
|                          | 330         | 12.5×20               | 0.081                                  | 990                                                  | EGXE500E□□331MK20S |                          | 22          | 12.5×25               | —                                      | 139                                                  | EGXE351E□□220MK25S |
|                          | 470         | 12.5×25               | 0.059                                  | 1,150                                                | EGXE500E□□471MK25S |                          | 33          | 16×25                 | —                                      | 189                                                  | EGXE351E□□330ML25S |
|                          | 1,000       | 16×31.5               | 0.032                                  | 1,590                                                | EGXE500E□□102MLN3S |                          | 47          | 16×31.5               | —                                      | 243                                                  | EGXE351E□□470MLN3S |
| 63                       | 33          | 8×12                  | 1.5                                    | 150                                                  | EGXE630E□□330MH12D | 400                      | 4.7         | 10×20                 | —                                      | 53                                                   | EGXE401E□□4R7MJ20S |
|                          | 47          | 10×12.5               | 0.59                                   | 530                                                  | EGXE630E□□470MJC5S |                          | 10          | 10×25                 | —                                      | 86                                                   | EGXE401E□□100MJ25S |
|                          | 100         | 10×16                 | 0.41                                   | 690                                                  | EGXE630E□□101MJ16S |                          | 22          | 12.5×30               | —                                      | 142                                                  | EGXE401E□□220MK30S |
|                          | 220         | 12.5×20               | 0.16                                   | 1,050                                                | EGXE630E□□221MK20S |                          | 33          | 16×25                 | —                                      | 189                                                  | EGXE401E□□330ML25S |
|                          | 330         | 12.5×25               | 0.12                                   | 1,290                                                | EGXE630E□□331MK25S |                          | 47          | 16×31.5               | —                                      | 243                                                  | EGXE401E□□470MLN3S |
|                          | 470         | 12.5×30               | 0.097                                  | 1,460                                                | EGXE630E□□471MK30S | 450                      | 4.7         | 10×25                 | —                                      | 58                                                   | EGXE451E□□4R7MJ25S |
|                          | 1,000       | 16×31.5               | 0.059                                  | 1,850                                                | EGXE630E□□102MLN3S |                          | 10          | 12.5×20               | —                                      | 86                                                   | EGXE451E□□100MK20S |
| 80                       | 22          | 8×12                  | 1.5                                    | 150                                                  | EGXE800E□□220MH12D |                          | 22          | 16×25                 | —                                      | 154                                                  | EGXE451E□□220ML25S |
|                          | 33          | 10×12.5               | 0.80                                   | 480                                                  | EGXE800E□□330MJC5S |                          | 33          | 16×31.5               | —                                      | 203                                                  | EGXE451E□□330MLN3S |

□ : Enter the appropriate lead forming or taping code.

(Note1) Ripple current frequency

10 to 100V = 100kHz

160 to 450V = 120Hz

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

(10 to 100V<sub>dc</sub>)

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 4.7 to 100      |               | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 to 470      |               | 0.50 | 0.85 | 0.94 | 1.00 |
| 1,000           |               | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,200 to 3,300  |               | 0.75 | 0.90 | 0.95 | 1.00 |
| 4,700           |               | 0.85 | 0.95 | 0.98 | 1.00 |

(160 to 450V<sub>dc</sub>)

| Capacitance(μF) | Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|------|------|
| 4.7 to 33       |               | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 1.80 |
| 47 to 150       |               | 0.80 | 1.00 | 1.15 | 1.30 | 1.40 | 1.50 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.