

# 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)
- RoHS Compliant

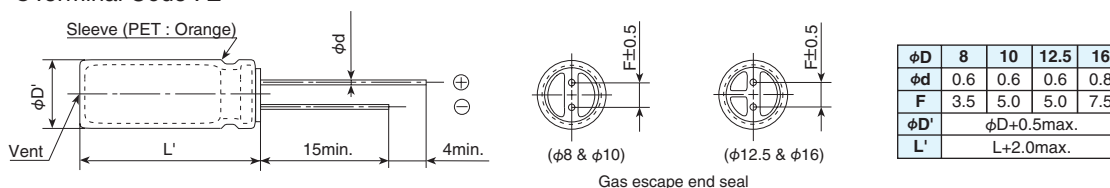


## SPECIFICATIONS

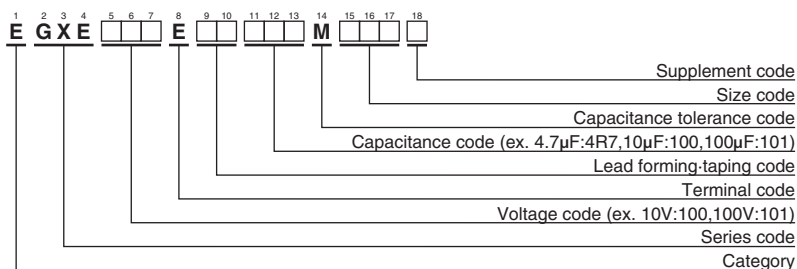
| Items                                                  | Characteristics                                                                                                                                                                                                                                                                                                                    |                                                               |      |      |      |                           |                                      |              |      |                                      |             |                  |  |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------|------|------|---------------------------|--------------------------------------|--------------|------|--------------------------------------|-------------|------------------|--|
| Category                                               |                                                                                                                                                                                                                                                                                                                                    |                                                               |      |      |      |                           |                                      |              |      |                                      |             |                  |  |
| Temperature Range                                      | -40 to +125°C (10 to 250V <sub>dc</sub> )   -25 to +125°C (350 to 450V <sub>dc</sub> )                                                                                                                                                                                                                                             |                                                               |      |      |      |                           |                                      |              |      |                                      |             |                  |  |
| Rated Voltage Range                                    | 10 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                                                                           |                                                               |      |      |      |                           |                                      |              |      |                                      |             |                  |  |
| Capacitance Tolerance                                  | ±20% (M) (at 20°C, 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°C, 1 minute)                                                                                                                                                                                                                      |                                                               |      |      |      |                           |                                      |              |      |                                      |             |                  |  |
| Dissipation Factor (tanδ)                              | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                   | 10V                                                           | 16V  | 25V  | 35V  | 50V                       | 63V                                  | 80V          | 100V | 160 to 250V                          | 350 to 450V | (at 20°C, 120Hz) |  |
|                                                        | tanδ (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°C, 120Hz)                                                                                                                                                                                                                  |                                                               |      |      |      |                           |                                      |              |      |                                      |             |                  |  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                   | 10V                                                           | 16V  | 25V  | 35V  | 50V                       | 63V                                  | 80V          | 100V | 160 to 250V                          | 350 to 450V | (at 120Hz)       |  |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                                                                  | 3                                                             | 2    | 2    | 2    | 2                         | 2                                    | 2            | 2    | 3                                    | 6           |                  |  |
|                                                        | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                                                                  | 6                                                             | 4    | 4    | 4    | 4                         | 4                                    | 4            | 4    | 6                                    | —           |                  |  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C 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°C.                                                                             |                                                               |      |      |      |                           |                                      |              |      |                                      |             |                  |  |
|                                                        |                                                                                                                                                                                                                                                                                                                                    | 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. (tanδ)                                                                                                                                                                                                                                                                                                                        | ≤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°C after exposing them for 1,000 hours (500 hours for 350 to 450V <sub>dc</sub> ) at 125°C 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. (tanδ)                                                                                                                                                                                                                                                                                                                        | ≤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>(Vdc) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω <sub>max</sub> /20°C,<br>100kHz) | Rated ripple<br>current<br>(mA <sub>rms</sub> /125°C,<br>Note1) | Part No.           | WV<br>(Vdc) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω <sub>max</sub> /20°C,<br>100kHz) | Rated ripple<br>current<br>(mA <sub>rms</sub> /125°C,<br>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□□101MK20S |
|             | 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□□222MK25S |             | 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□□330MJ25S |
|             | 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 |
| 35          | 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 |
| 50          | 100         | 8×12                  | 0.32                                             | 340                                                             | EGXE350E□□101MH12D |             | 22          | 10×25                 | —                                                | 126                                                             | EGXE201E□□220MJ25S |
|             | 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 |
| 63          | 1,000       | 16×25                 | 0.031                                            | 1,620                                                           | EGXE350E□□102ML25S | 250         | 10          | 10×20                 | —                                                | 78                                                              | EGXE251E□□100MJ20S |
|             | 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 |
| 80          | 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 |
| 80          | 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 |
|             | 22          | 8×12                  | 1.5                                              | 150                                                             | EGXE800E□□220MH12D |             | 22          | 16×25                 | —                                                | 154                                                             | EGXE451E□□220ML25S |
|             | 33          | 10×12.5               | 0.8                                              | 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.