

# SMG Series

- Endurance : 2,000 hours at 85°C
- Solvent resistant type except 350 to 450V<sub>dc</sub>  
(see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant

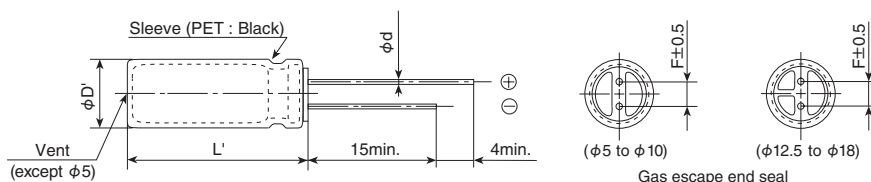


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                        |      |                                      |      |      |      |      |      |                                      |             |                   |      |                  |  |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------------------|------|------|------|------|------|--------------------------------------|-------------|-------------------|------|------------------|--|
| Category                                                     | -40 to +85°C(6.3 to 400V <sub>dc</sub> ) -25 to +85°C(450V <sub>dc</sub> )                                                                                                                                                                                                             |      |                                      |      |      |      |      |      |                                      |             |                   |      |                  |  |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                        |      |                                      |      |      |      |      |      |                                      |             |                   |      |                  |  |
| Rated Voltage Range                                          | 6.3 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                              |      |                                      |      |      |      |      |      |                                      |             |                   |      |                  |  |
| Capacitance Tolerance                                        | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                              |      |                                      |      |      |      |      |      |                                      |             |                   |      |                  |  |
| Leakage Current                                              | 6.3 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                              |      |                                      |      |      |      |      |      | 160 to 450V <sub>dc</sub>            |             |                   |      |                  |  |
|                                                              | I=0.03CV or 4μA, whichever is greater.<br><br>(after 1 minute)                                                                                                                                                                                                                         |      |                                      |      |      |      |      |      | CV \ Time                            |             | After 1 minute    |      | After 5minute    |  |
|                                                              |                                                                                                                                                                                                                                                                                        |      |                                      |      |      |      |      |      | CV≤1,000                             |             | I=0.1CV+40 max.   |      | I=0.03CV+15 max. |  |
|                                                              |                                                                                                                                                                                                                                                                                        |      |                                      |      |      |      |      |      | CV>1,000                             |             | I=0.04CV+100 max. |      | I=0.02CV+25 max. |  |
|                                                              | Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C)                                                                                                                                                                                    |      |                                      |      |      |      |      |      |                                      |             |                   |      |                  |  |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 6.3V | 10V                                  | 16V  | 25V  | 35V  | 50V  | 63V  | 100V                                 | 160 to 250V | 350 to 400V       | 450V |                  |  |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                           | 0.34 | 0.24                                 | 0.20 | 0.16 | 0.14 | 0.12 | 0.09 | 0.08                                 | 0.20        | 0.24              | 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<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 6.3V | 10V                                  | 16V  | 25V  | 35V  | 50V  | 63V  | 100V                                 | 160 to 250V | 350 to 400V       | 450V |                  |  |
|                                                              | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                      | 5    | 4                                    | 3    | 2    | 2    | 2    | 2    | 2                                    | 3           | 6                 | 6    |                  |  |
|                                                              | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                      | 12   | 10                                   | 8    | 5    | 4    | 3    | 3    | 3                                    | 4           | 6                 | —    |                  |  |
| (at 120Hz)                                                   |                                                                                                                                                                                                                                                                                        |      |                                      |      |      |      |      |      |                                      |             |                   |      |                  |  |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 85°C.                                                                                                                                   |      |                                      |      |      |      |      |      |                                      |             |                   |      |                  |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                     |      | ≤±20% of the initial value           |      |      |      |      |      |                                      |             |                   |      |                  |  |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                           |      | ≤200% of the initial specified value |      |      |      |      |      |                                      |             |                   |      |                  |  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                        |      | ≤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 at 85°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. |      |                                      |      |      |      |      |      |                                      |             |                   |      |                  |  |
|                                                              | Rated voltage                                                                                                                                                                                                                                                                          |      | 6.3 to 100V <sub>dc</sub>            |      |      |      |      |      | 160 to 450V <sub>dc</sub>            |             |                   |      |                  |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                     |      | ≤±20% of the initial value           |      |      |      |      |      | ≤±20% of the initial value           |             |                   |      |                  |  |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                           |      | ≤200% of the initial specified value |      |      |      |      |      | ≤200% of the initial specified value |             |                   |      |                  |  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                        |      | ≤The initial specified value         |      |      |      |      |      | ≤500% of the initial specified value |             |                   |      |                  |  |

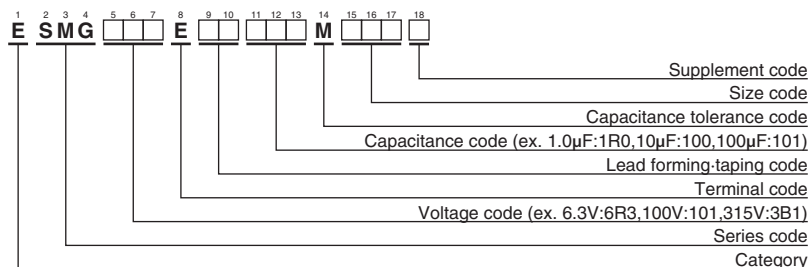
## DIMENSIONS [mm]

- Terminal Code : E



| φD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|
| φd  | 0.5        | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| φD' | φD+0.5max. |     |     |     |      |     |     |
| L'  | L+1.5max.  |     |     |     |      |     |     |

## 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) | tan δ  | Rated ripple<br>current<br>(mA <sub>rms</sub> /85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|--------|-------------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|-------------------------------------------------------------|--------------------|
| 6.3                      | 220         | 5 × 11                | 0.34   | 200                                                         | ESMG6R3E□□221ME11D | 63                       | 22          | 5 × 11                | 0.09  | 100                                                         | ESMG630E□□220ME11D |
|                          | 330         | 6.3 × 11              | 0.34   | 270                                                         | ESMG6R3E□□331MF11D |                          | 33          | 6.3 × 11              | 0.09  | 140                                                         | ESMG630E□□330MF11D |
|                          | 470         | 6.3 × 11              | 0.34   | 320                                                         | ESMG6R3E□□471MF11D |                          | 47          | 6.3 × 11              | 0.09  | 170                                                         | ESMG630E□□470MF11D |
|                          | 1,000       | 8 × 11.5              | 0.34   | 540                                                         | ESMG6R3E□□102MHB5D |                          | 100         | 10 × 12.5             | 0.09  | 300                                                         | ESMG630E□□101MJC5S |
|                          | 2,200       | 10 × 20               | 0.36   | 1,000                                                       | ESMG6R3E□□222MJ20S |                          | 220         | 10 × 16               | 0.09  | 490                                                         | ESMG630E□□221MJ16S |
|                          | 3,300       | 10 × 20               | 0.38   | 1,185                                                       | ESMG6R3E□□332MJ20S |                          | 330         | 10 × 20               | 0.09  | 710                                                         | ESMG630E□□331MJ20S |
|                          | 4,700       | 12.5 × 20             | 0.40   | 1,545                                                       | ESMG6R3E□□472MK20S |                          | 470         | 12.5 × 20             | 0.09  | 900                                                         | ESMG630E□□471MK20S |
|                          | 6,800       | 12.5 × 25             | 0.44   | 1,915                                                       | ESMG6R3E□□682MK25S |                          | 1,000       | 16 × 25               | 0.09  | 1,300                                                       | ESMG630E□□102ML25S |
|                          | 10,000      | 16 × 25               | 0.52   | 2,330                                                       | ESMG6R3E□□103ML25S |                          | 1.0         | 5 × 11                | 0.08  | 21                                                          | ESMG101E□□1R0ME11D |
|                          | 15,000      | 16 × 35.5             | 0.62   | 2,845                                                       | ESMG6R3E□□153MLP1S |                          | 2.2         | 5 × 11                | 0.08  | 30                                                          | ESMG101E□□2R2ME11D |
| 10                       | 22,000      | 18 × 40               | 0.76   | 3,320                                                       | ESMG6R3E□□223MM40S |                          | 3.3         | 5 × 11                | 0.08  | 40                                                          | ESMG101E□□3R3ME11D |
|                          | 220         | 5 × 11                | 0.24   | 240                                                         | ESMG100E□□221ME11D | 100                      | 4.7         | 5 × 11                | 0.08  | 45                                                          | ESMG101E□□4R7ME11D |
|                          | 330         | 6.3 × 11              | 0.24   | 290                                                         | ESMG100E□□331MF11D |                          | 10          | 6.3 × 11              | 0.08  | 75                                                          | ESMG101E□□100MF11D |
|                          | 470         | 6.3 × 11              | 0.24   | 350                                                         | ESMG100E□□471MF11D |                          | 22          | 8 × 11.5              | 0.08  | 130                                                         | ESMG101E□□220MHB5D |
|                          | 1,000       | 10 × 12.5             | 0.24   | 650                                                         | ESMG100E□□102MJC5S |                          | 33          | 8 × 11.5              | 0.08  | 180                                                         | ESMG101E□□330MHB5D |
|                          | 2,200       | 10 × 20               | 0.26   | 1,070                                                       | ESMG100E□□222MJ20S |                          | 47          | 10 × 12.5             | 0.08  | 230                                                         | ESMG101E□□470MJC5S |
|                          | 3,300       | 12.5 × 20             | 0.28   | 1,420                                                       | ESMG100E□□332MK20S |                          | 100         | 10 × 20               | 0.08  | 370                                                         | ESMG101E□□101MJ20S |
|                          | 4,700       | 12.5 × 25             | 0.30   | 1,780                                                       | ESMG100E□□472MK25S |                          | 220         | 12.5 × 25             | 0.08  | 620                                                         | ESMG101E□□221MK25S |
|                          | 6,800       | 16 × 25               | 0.34   | 2,220                                                       | ESMG100E□□682ML25S |                          | 330         | 12.5 × 25             | 0.08  | 760                                                         | ESMG101E□□331MK25S |
|                          | 10,000      | 16 × 35.5             | 0.42   | 2,670                                                       | ESMG100E□□103MLP1S |                          | 470         | 16 × 25               | 0.08  | 1,000                                                       | ESMG101E□□471ML25S |
|                          | 15,000      | 18 × 35.5             | 0.52   | 3,080                                                       | ESMG100E□□153MMP1S |                          | 1,000       | 18 × 40               | 0.08  | 1,380                                                       | ESMG101E□□102MM40S |
| 16                       | 100         | 5 × 11                | 0.20   | 160                                                         | ESMG160E□□101ME11D | 160                      | 3.3         | 6.3 × 11              | 0.20  | 40                                                          | ESMG161E□□3R3MF11D |
|                          | 220         | 6.3 × 11              | 0.20   | 260                                                         | ESMG160E□□221MF11D |                          | 4.7         | 6.3 × 11              | 0.20  | 48                                                          | ESMG161E□□4R7MF11D |
|                          | 330         | 8 × 11.5              | 0.20   | 370                                                         | ESMG160E□□331MHB5D |                          | 10          | 10 × 12.5             | 0.20  | 94                                                          | ESMG161E□□100MJC5S |
|                          | 470         | 8 × 11.5              | 0.20   | 440                                                         | ESMG160E□□471MHB5D |                          | 22          | 10 × 20               | 0.20  | 170                                                         | ESMG161E□□220MJ20S |
|                          | 1,000       | 10 × 16               | 0.20   | 785                                                         | ESMG160E□□102MJ16S |                          | 33          | 10 × 20               | 0.20  | 205                                                         | ESMG161E□□330MJ20S |
|                          | 2,200       | 12.5 × 20             | 0.22   | 1,295                                                       | ESMG160E□□222MK20S |                          | 47          | 12.5 × 20             | 0.20  | 270                                                         | ESMG161E□□470MK20S |
|                          | 3,300       | 12.5 × 25             | 0.24   | 1,655                                                       | ESMG160E□□332MK25S |                          | 100         | 12.5 × 25             | 0.20  | 430                                                         | ESMG161E□□101MK25S |
|                          | 4,700       | 16 × 25               | 0.26   | 2,090                                                       | ESMG160E□□472ML25S |                          | 220         | 16 × 31.5             | 0.20  | 760                                                         | ESMG161E□□221MLN3S |
|                          | 6,800       | 16 × 31.5             | 0.30   | 2,520                                                       | ESMG160E□□682MLN3S |                          | 330         | 18 × 35.5             | 0.20  | 995                                                         | ESMG161E□□331MMP1S |
|                          | 10,000      | 18 × 35.5             | 0.38   | 2,920                                                       | ESMG160E□□103MMP1S |                          | 3.3         | 6.3 × 11              | 0.20  | 40                                                          | ESMG201E□□3R3MF11D |
| 25                       | 47          | 5 × 11                | 0.16   | 115                                                         | ESMG250E□□470ME11D | 200                      | 4.7         | 8 × 11.5              | 0.20  | 55                                                          | ESMG201E□□4R7MHB5D |
|                          | 100         | 6.3 × 11              | 0.16   | 190                                                         | ESMG250E□□101MF11D |                          | 10          | 10 × 12.5             | 0.20  | 94                                                          | ESMG201E□□100MJC5S |
|                          | 220         | 8 × 11.5              | 0.16   | 330                                                         | ESMG250E□□221MHB5D |                          | 22          | 10 × 20               | 0.20  | 170                                                         | ESMG201E□□220MJ20S |
|                          | 330         | 8 × 11.5              | 0.16   | 440                                                         | ESMG250E□□331MHB5D |                          | 33          | 10 × 20               | 0.20  | 205                                                         | ESMG201E□□330MJ20S |
|                          | 470         | 10 × 12.5             | 0.16   | 545                                                         | ESMG250E□□471MJC5S |                          | 47          | 12.5 × 20             | 0.20  | 270                                                         | ESMG201E□□470MK20S |
|                          | 1,000       | 10 × 20               | 0.16   | 955                                                         | ESMG250E□□102MJ20S |                          | 100         | 16 × 25               | 0.20  | 475                                                         | ESMG201E□□101ML25S |
|                          | 2,200       | 12.5 × 25             | 0.18   | 1,540                                                       | ESMG250E□□222MK25S |                          | 220         | 18 × 35.5             | 0.20  | 810                                                         | ESMG201E□□221MMP1S |
|                          | 3,300       | 16 × 25               | 0.20   | 1,975                                                       | ESMG250E□□332ML25S | 250                      | 2.2         | 6.3 × 11              | 0.20  | 32                                                          | ESMG251E□□2R2MF11D |
|                          | 4,700       | 16 × 31.5             | 0.22   | 2,420                                                       | ESMG250E□□472MLN3S |                          | 3.3         | 8 × 11.5              | 0.20  | 46                                                          | ESMG251E□□3R3MHB5D |
|                          | 6,800       | 18 × 35.5             | 0.26   | 2,880                                                       | ESMG250E□□682MMP1S |                          | 4.7         | 8 × 11.5              | 0.20  | 55                                                          | ESMG251E□□4R7MHB5D |
| 35                       | 47          | 5 × 11                | 0.14   | 130                                                         | ESMG350E□□470ME11D |                          | 10          | 10 × 16               | 0.20  | 105                                                         | ESMG251E□□100MJ16S |
|                          | 100         | 6.3 × 11              | 0.14   | 210                                                         | ESMG350E□□101MF11D |                          | 22          | 10 × 20               | 0.20  | 170                                                         | ESMG251E□□220MJ20S |
|                          | 220         | 8 × 11.5              | 0.14   | 385                                                         | ESMG350E□□221MHB5D |                          | 33          | 12.5 × 20             | 0.20  | 230                                                         | ESMG251E□□330MK20S |
|                          | 330         | 10 × 12.5             | 0.14   | 490                                                         | ESMG350E□□331MJC5S |                          | 47          | 12.5 × 25             | 0.20  | 295                                                         | ESMG251E□□470MK25S |
|                          | 470         | 10 × 16               | 0.14   | 645                                                         | ESMG350E□□471MJ16S |                          | 100         | 16 × 31.5             | 0.20  | 515                                                         | ESMG251E□□101MLN3S |
|                          | 1,000       | 12.5 × 20             | 0.14   | 1,145                                                       | ESMG350E□□102MK20S |                          | 220         | 18 × 40               | 0.20  | 825                                                         | ESMG251E□□221MM40S |
|                          | 2,200       | 16 × 25               | 0.16   | 1,785                                                       | ESMG350E□□222ML25S | 350                      | 1.0         | 6.3 × 11              | 0.24  | 22                                                          | ESMG351E□□1R0MF11D |
|                          | 3,300       | 16 × 35.5             | 0.18   | 2,275                                                       | ESMG350E□□332MLP1S |                          | 2.2         | 8 × 11.5              | 0.24  | 38                                                          | ESMG351E□□2R2MHB5D |
|                          | 4,700       | 18 × 35.5             | 0.20   | 2,700                                                       | ESMG350E□□472MMP1S |                          | 3.3         | 8 × 11.5              | 0.24  | 46                                                          | ESMG351E□□3R3MHB5D |
| 50                       | 1.0         | 5 × 11                | 0.12   | 17                                                          | ESMG500E□□1R0ME11D |                          | 4.7         | 10 × 12.5             | 0.24  | 65                                                          | ESMG351E□□4R7MJC5S |
|                          | 2.2         | 5 × 11                | 0.12   | 28                                                          | ESMG500E□□2R2ME11D |                          | 10          | 10 × 20               | 0.24  | 115                                                         | ESMG351E□□100MJ20S |
|                          | 3.3         | 5 × 11                | 0.12   | 35                                                          | ESMG500E□□3R3ME11D |                          | 22          | 12.5 × 20             | 0.24  | 185                                                         | ESMG351E□□220MK20S |
|                          | 4.7         | 5 × 11                | 0.12   | 41                                                          | ESMG500E□□4R7ME11D |                          | 33          | 16 × 25               | 0.24  | 275                                                         | ESMG351E□□330ML25S |
|                          | 10          | 5 × 11                | 0.12   | 60                                                          | ESMG500E□□100ME11D |                          | 47          | 16 × 25               | 0.24  | 325                                                         | ESMG351E□□470ML25S |
|                          | 22          | 5 × 11                | 0.12   | 95                                                          | ESMG500E□□220ME11D |                          | 100         | 18 × 31.5             | 0.24  | 530                                                         | ESMG351E□□101MMN3S |
|                          | 33          | 5 × 11                | 0.12   | 125                                                         | ESMG500E□□330ME11D | 400                      | 1.0         | 6.3 × 11              | 0.24  | 22                                                          | ESMG401E□□1R0MF11D |
|                          | 47          | 6.3 × 11              | 0.12   | 155                                                         | ESMG500E□□470MF11D |                          | 2.2         | 8 × 11.5              | 0.24  | 38                                                          | ESMG401E□□2R2MHB5D |
|                          | 100         | 8 × 11.5              | 0.12   | 260                                                         | ESMG500E□□101MHB5D |                          | 3.3         | 10 × 12.5             | 0.24  | 54                                                          | ESMG401E□□3R3MJC5S |
|                          | 220         | 10 × 12.5             | 0.12   | 430                                                         | ESMG500E□□221MJC5S |                          | 4.7         | 10 × 16               | 0.24  | 71                                                          | ESMG401E□□4R7MJ16S |
|                          | 330         | 10 × 16               | 0.12   | 585                                                         | ESMG500E□□331MJ16S |                          | 10          | 10 × 20               | 0.24  | 115                                                         | ESMG401E□□100MJ20S |
|                          | 470         | 10 × 20               | 0.12   | 755                                                         | ESMG500E□□471MJ20S |                          | 22          | 12.5 × 25             | 0.24  | 205                                                         | ESMG401E□□220MK25S |
|                          | 1,000       | 12.5 × 25             | 0.12   | 1,340                                                       | ESMG500E□□102MK25S |                          | 33          | 16 × 25               | 0.24  | 275                                                         | ESMG401E□□330ML25S |
|                          | 2,200       | 16 × 35.5             | 0.14   | 2,075                                                       | ESMG500E□□222MLP1S |                          | 47          | 16 × 31.5             | 0.24  | 350                                                         | ESMG401E□□470MLN3S |
|                          | 3,300       | 18 × 35.5             | 0.16   | 2,500                                                       | ESMG500E□□332MMP1S |                          | 2.2         | 10 × 12.5             | 0.24  | 32                                                          | ESMG451E□□2R2MJC5S |
|                          | 63          | 10                    | 5 × 11 | 0.09                                                        | 65                 | ESMG630E□□100ME11D       | 3.3         | 10 × 16               | 0.24  | 44                                                          | ESMG451E□□3R3MJ16S |

□ □ : Enter the appropriate lead forming or taping code.

# SMG Series

## ◆STANDARD RATINGS

□□ is not solvent resistant.

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|-------------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|-------------------------------------------------------------|--------------------|
| 450                      | 4.7         | 10 × 20               | 0.24  | 56                                                          | ESMG451E□□4R7MJ20S | 450                      | 33          | 16 × 31.5             | 0.24  | 215                                                         | ESMG451E□□330MLN3S |
|                          | 10          | 12.5 × 20             | 0.24  | 91                                                          | ESMG451E□□100MK20S |                          | 47          | 16 × 35.5             | 0.24  | 265                                                         | ESMG451E□□470MLP1S |
|                          | 22          | 16 × 25               | 0.24  | 165                                                         | ESMG451E□□220ML25S |                          |             |                       |       |                                                             |                    |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

### ●Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|------|------|
| 1.0 to 4.7                      | 0.65 | 1.00 | 1.35 | 1.75 | 2.30 | 2.50 |
| 10 to 47                        | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 1.80 |
| 100 to 1,000                    | 0.80 | 1.00 | 1.15 | 1.30 | 1.40 | 1.50 |
| 2,200 to                        | 0.85 | 1.00 | 1.03 | 1.05 | 1.08 | 1.08 |

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.