

# SMQ Series

- Downsized from current standard SMG series
- Endurance : 2,000 hours at 85°C
- Non solvent resistant type
- RoHS Compliant

SMQ

↓ Downsized  
SMG P138

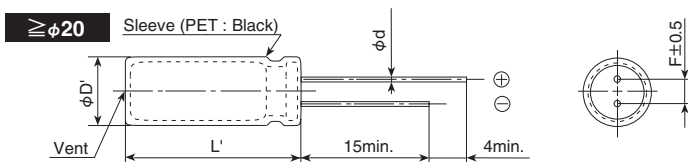
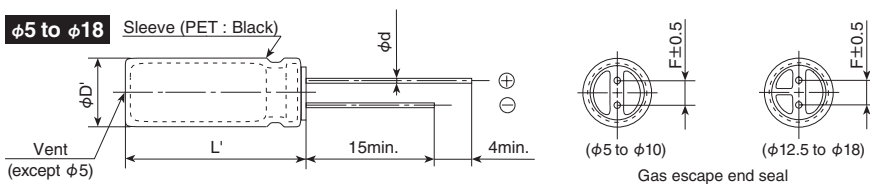


## ◆ SPECIFICATIONS

| 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.   |                                       |      |      |      |      |      | CV \ Time After 1 minute     |                                       |             |             |      |      |      |   |
|   | (at 20°C after 1 minute)   |                                       |      |      |      |      |      | (at 20°C)                    |                                       |             |             |      |      |      |   |
| ≤ φ 18  |  |                                       |      |      |      |      |      | CV ≤ 1,000 I=0.1CV+40 max.   |                                       |             |             |      |      |      |   |
| ≥ φ 20  | I=0.03CV   |                                       |      |      |      |      |      | CV > 1,000 I=0.04CV+100 max. |                                       |             |             |      |      |      |   |
| (at 20°C after 3 minutes)   |  |                                       |      |      |      |      |      |                              |                                       |             |             |      |      |      |   |
| Where, I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V)                         |  |                                       |      |      |      |      |      |                              |                                       |             |             |      |      |      |   |
| Dissipation Factor (tan δ)  | Rated voltage (V <sub>dc</sub> )   | 6.3V                                  | 10V  | 16V  | 25V  | 35V  | 50V  | 63V                          | 100V                                  | 160 to 250V | 315 to 400V | 450V |      |      |   |
|   | tan δ (Max.)   | 0.28                                  | 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 Characteristics (Max. Impedance Ratio)  | Rated voltage (V <sub>dc</sub> )   | 6.3V                                  | 10V  | 16V  | 25V  | 35V  | 50V  | 63V                          | 100V                                  | 160 to 200V | 250V        | 350V | 400V | 450V |   |
|   | Z(-25°C)/Z(+20°C)  | ≤ φ 8                                 | 5    | 4    | 3    | 2    | 2    | 2                            | 2                                     | 2           | 3           | 3    | 4    | 4    | 6 |
|   |  | ≥ φ 10                                | 5    | 4    | 3    | 2    | 2    | 2                            | 2                                     | 2           | 3           | 3    | 4    | 4    | 6 |
|   | Z(-40°C)/Z(+20°C)  | ≤ φ 8                                 | 12   | 10   | 8    | 5    | 4    | 3                            | 3                                     | 3           | 8           | 10   | 8    | 8    | — |
|   | ≥ φ 10   | 12                                    | 10   | 8    | 5    | 4    | 3    | 3                            | 3                                     | 4           | 4           | 6    | 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 |             |             |      |      |      |   |

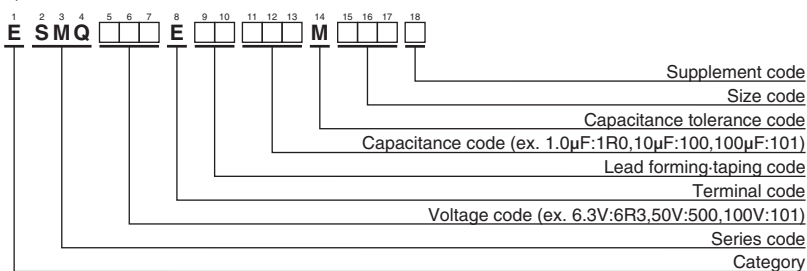
## ◆ DIMENSIONS [mm]

- Terminal Code : E



| φ D  | 5           | 6.3 | 8   | 10  | 12.5 | 16  | 18  | 20          | 22   |
|------|-------------|-----|-----|-----|------|-----|-----|-------------|------|
| φ d  | 0.5         | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 | 1.0         | 1.0  |
| F    | 2.0         | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 | 10.0        | 10.0 |
| φ D' | φ D+0.5max. |     |     |     |      |     |     | φ D+0.5max. |      |
| L'   | L+1.5max.   |     |     |     |      |     |     | L+2.0max.   |      |

## ◆ PART NUMBERING SYSTEM



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

◆ STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF)  | Case size φD×L(mm) | tan δ | Rated ripple current (mArms/85°C, 120Hz) | Part No.            | WV (V <sub>dc</sub> ) | Cap (μF)  | Case size φD×L(mm) | tan δ              | Rated ripple current (mArms/85°C, 120Hz) | Part No.           |                    |
|-----------------------|-----------|--------------------|-------|--|---------------------|-----------------------|-----------|--------------------|--------------------|--|--------------------|--------------------|
| 6.3                   | 1,000     | 8 × 11.5           | 0.28  | 540                                      | ESMQ6R3E□□102MHB5D  | 50                    | 330       | 10 × 16            | 0.12               | 590                                      | ESMQ500E□□331MJ16S |                    |
|                       | 2,200     | 10 × 16            | 0.30  | 890                                      | ESMQ6R3E□□222MJ16S  |                       | 470       | 10 × 20            | 0.12               | 760                                      | ESMQ500E□□471MJ20S |                    |
|                       | 3,300     | 10 × 20            | 0.32  | 1,190                                    | ESMQ6R3E□□332MJ20S  |                       | 1,000     | 12.5 × 25          | 0.12               | 1,350                                    | ESMQ500E□□102MK25S |                    |
|                       | 4,700     | 12.5 × 20          | 0.34  | 1,550                                    | ESMQ6R3E□□472MK20S  |                       | 2,200     | 16 × 31.5          | 0.14               | 1,980                                    | ESMQ500E□□222MLN3S |                    |
|                       | 6,800     | 12.5 × 25          | 0.38  | 1,920                                    | ESMQ6R3E□□682MK25S  |                       | 3,300     | 18 × 35.5          | 0.16               | 2,500                                    | ESMQ500E□□332MMP1S |                    |
|                       | 10,000    | 16 × 25            | 0.46  | 2,350                                    | ESMQ6R3E□□103ML25S  |                       | 4,700     | 20 × 40            | 0.18               | 2,900                                    | ESMQ500E□□472MN40S |                    |
|                       | 15,000    | 16 × 31.5          | 0.56  | 2,550                                    | ESMQ6R3E□□153MLN3S  |                       | 6,800     | 22 × 50            | 0.22               | 3,500                                    | ESMQ500E□□682MP50S |                    |
|                       | 22,000    | 18 × 35.5          | 0.70  | 3,200                                    | ESMQ6R3E□□223MMP1S  |                       | 63        | 22                 | 5 × 11             | 0.09                                     | 100                | ESMQ630E□□220ME11D |
|                       | 33,000    | 20 × 40            | 0.92  | 3,500                                    | ESMQ6R3E□□333MMN40S |                       |           | 33                 | 6.3 × 11           | 0.09                                     | 140                | ESMQ630E□□330MF11D |
|                       | 47,000    | 22 × 50            | 1.20  | 3,900                                    | ESMQ6R3E□□473MP50S  |                       |           | 47                 | 6.3 × 11           | 0.09                                     | 170                | ESMQ630E□□470MF11D |
| 10                    | 220       | 5 × 11             | 0.24  | 240                                      | ESMQ100E□□221ME11D  | 68                    |           | 8 × 11.5           | 0.09               | 220                                      | ESMQ630E□□680MHB5D |                    |
|                       | 330       | 6.3 × 11           | 0.24  | 290                                      | ESMQ100E□□331MF11D  | 100                   |           | 8 × 11.5           | 0.09               | 280                                      | ESMQ630E□□101MHB5D |                    |
|                       | 470       | 6.3 × 11           | 0.24  | 350                                      | ESMQ100E□□471MF11D  | 220                   |           | 10 × 16            | 0.09               | 490                                      | ESMQ630E□□221MJ16S |                    |
|                       | 1,000     | 10 × 12.5          | 0.24  | 650                                      | ESMQ100E□□102MJC5S  | 330                   |           | 10 × 20            | 0.09               | 710                                      | ESMQ630E□□331MJ20S |                    |
|                       | 2,200     | 10 × 16            | 0.26  | 990                                      | ESMQ100E□□222MJ16S  | 470                   |           | 12.5 × 20          | 0.09               | 900                                      | ESMQ630E□□471MK20S |                    |
|                       | 3,300     | 12.5 × 20          | 0.28  | 1,450                                    | ESMQ100E□□332MK20S  | 1,000                 |           | 16 × 25            | 0.09               | 1,300                                    | ESMQ630E□□102ML25S |                    |
|                       | 4,700     | 12.5 × 25          | 0.30  | 1,800                                    | ESMQ100E□□472MK25S  | 2,200                 |           | 18 × 35.5          | 0.11               | 2,300                                    | ESMQ630E□□222MMP1S |                    |
|                       | 6,800     | 16 × 25            | 0.34  | 2,250                                    | ESMQ100E□□682ML25S  | 3,300                 | 20 × 40   | 0.13               | 2,700              | ESMQ630E□□332MMN40S                      |                    |                    |
|                       | 10,000    | 16 × 31.5          | 0.42  | 2,550                                    | ESMQ100E□□103MLN3S  | 4,700                 | 22 × 50   | 0.15               | 3,400              | ESMQ630E□□472MP50S                       |                    |                    |
|                       | 15,000    | 16 × 35.5          | 0.52  | 2,880                                    | ESMQ100E□□153MLP1S  | 100                   | 1.0       | 5 × 11             | 0.08               | 21                                       | ESMQ101E□□1R0ME11D |                    |
| 22,000                | 18 × 40   | 0.66               | 3,400 | ESMQ100E□□223MM40S                       | 2.2                 |                       | 5 × 11    | 0.08               | 30                 | ESMQ101E□□2R2ME11D                       |                    |                    |
| 33,000                | 22 × 50   | 0.88               | 4,500 | ESMQ100E□□333MP50S                       | 3.3                 |                       | 5 × 11    | 0.08               | 40                 | ESMQ101E□□3R3ME11D                       |                    |                    |
| 16                    | 220       | 6.3 × 11           | 0.20  | 260                                      | ESMQ160E□□221MF11D  |                       | 4.7       | 5 × 11             | 0.08               | 45                                       | ESMQ101E□□4R7ME11D |                    |
|                       | 330       | 6.3 × 11           | 0.20  | 320                                      | ESMQ160E□□331MF11D  |                       | 10        | 5 × 11             | 0.08               | 70                                       | ESMQ101E□□100ME11D |                    |
|                       | 470       | 8 × 11.5           | 0.20  | 440                                      | ESMQ160E□□471MHB5D  |                       | 22        | 6.3 × 11           | 0.08               | 130                                      | ESMQ101E□□220MF11D |                    |
|                       | 1,000     | 10 × 12.5          | 0.20  | 700                                      | ESMQ160E□□102MJC5S  |                       | 33        | 8 × 11.5           | 0.08               | 180                                      | ESMQ101E□□330MHB5D |                    |
|                       | 2,200     | 10 × 20            | 0.22  | 1,000                                    | ESMQ160E□□222MJ20S  |                       | 47        | 8 × 11.5           | 0.08               | 200                                      | ESMQ101E□□470MHB5D |                    |
|                       | 3,300     | 12.5 × 25          | 0.24  | 1,700                                    | ESMQ160E□□332MK25S  |                       | 68        | 10 × 12.5          | 0.08               | 270                                      | ESMQ101E□□680MJC5S |                    |
|                       | 4,700     | 16 × 25            | 0.26  | 2,100                                    | ESMQ160E□□472ML25S  |                       | 100       | 10 × 16            | 0.08               | 340                                      | ESMQ101E□□101MJ16S |                    |
|                       | 6,800     | 16 × 25            | 0.30  | 2,250                                    | ESMQ160E□□682ML25S  | 220                   | 12.5 × 20 | 0.08               | 550                | ESMQ101E□□221MK20S                       |                    |                    |
|                       | 10,000    | 16 × 35.5          | 0.38  | 2,710                                    | ESMQ160E□□103MLP1S  | 330                   | 12.5 × 25 | 0.08               | 760                | ESMQ101E□□331MK25S                       |                    |                    |
|                       | 15,000    | 18 × 40            | 0.48  | 3,100                                    | ESMQ160E□□153MM40S  | 470                   | 16 × 25   | 0.08               | 1,000              | ESMQ101E□□471ML25S                       |                    |                    |
| 22,000                | 22 × 40   | 0.62               | 3,800 | ESMQ160E□□223MP40S                       | 1,000               | 18 × 35.5             | 0.08      | 1,350              | ESMQ101E□□102MMP1S |  |                    |                    |
| 25                    | 100       | 5 × 11             | 0.16  | 180                                      | ESMQ250E□□101ME11D  | 2,200                 | 22 × 50   | 0.10               | 2,400              | ESMQ101E□□222MP50S                       |                    |                    |
|                       | 220       | 6.3 × 11           | 0.16  | 280                                      | ESMQ250E□□221MF11D  | 160                   | 10        | 8 × 11.5           | 0.20               | 80                                       | ESMQ161E□□100MHB5D |                    |
|                       | 330       | 8 × 11.5           | 0.16  | 440                                      | ESMQ250E□□331MHB5D  |                       | 22        | 10 × 12.5          | 0.20               | 130                                      | ESMQ161E□□220MJC5S |                    |
|                       | 470       | 10 × 12.5          | 0.16  | 550                                      | ESMQ250E□□471MJC5S  |                       | 33        | 10 × 16            | 0.20               | 180                                      | ESMQ161E□□330MJ16S |                    |
|                       | 1,000     | 10 × 16            | 0.16  | 860                                      | ESMQ250E□□102MJ16S  |                       | 47        | 10 × 20            | 0.20               | 210                                      | ESMQ161E□□470MJ20S |                    |
|                       | 2,200     | 12.5 × 25          | 0.18  | 1,550                                    | ESMQ250E□□222MK25S  |                       | 68        | 12.5 × 20          | 0.20               | 350                                      | ESMQ161E□□680MK20S |                    |
|                       | 3,300     | 16 × 25            | 0.20  | 1,980                                    | ESMQ250E□□332ML25S  |                       | 100       | 12.5 × 25          | 0.20               | 430                                      | ESMQ161E□□101MK25S |                    |
|                       | 4,700     | 16 × 25            | 0.22  | 2,200                                    | ESMQ250E□□472ML25S  |                       | 220       | 16 × 31.5          | 0.20               | 760                                      | ESMQ161E□□221MLN3S |                    |
|                       | 6,800     | 16 × 35.5          | 0.26  | 2,600                                    | ESMQ250E□□682MLP1S  |                       | 330       | 18 × 35.5          | 0.20               | 995                                      | ESMQ161E□□331MMP1S |                    |
|                       | 10,000    | 18 × 40            | 0.34  | 2,800                                    | ESMQ250E□□103MMP40S |                       | 470       | 18 × 40            | 0.20               | 1,200                                    | ESMQ161E□□471MM40S |                    |
| 15,000                | 22 × 50   | 0.44               | 3,800 | ESMQ250E□□153MP50S                       | 200                 |                       | 1.0       | 6.3 × 11           | 0.20               | 22                                       | ESMQ201E□□1R0MF11D |                    |
| 35                    | 47        | 5 × 11             | 0.14  | 130                                      |                     | ESMQ350E□□470ME11D    | 2.2       | 6.3 × 11           | 0.20               | 33                                       | ESMQ201E□□2R2MF11D |                    |
|                       | 68        | 6.3 × 11           | 0.14  | 160                                      |                     | ESMQ350E□□680MF11D    | 3.3       | 6.3 × 11           | 0.20               | 40                                       | ESMQ201E□□3R3MF11D |                    |
|                       | 100       | 6.3 × 11           | 0.14  | 210                                      |                     | ESMQ350E□□101MF11D    | 4.7       | 6.3 × 11           | 0.20               | 50                                       | ESMQ201E□□4R7MF11D |                    |
|                       | 220       | 8 × 11.5           | 0.14  | 385                                      |                     | ESMQ350E□□221MHB5D    | 10        | 8 × 11.5           | 0.20               | 80                                       | ESMQ201E□□100MHB5D |                    |
|                       | 330       | 10 × 12.5          | 0.14  | 490                                      |                     | ESMQ350E□□331MJC5S    | 22        | 10 × 16            | 0.20               | 150                                      | ESMQ201E□□220MJ16S |                    |
|                       | 470       | 10 × 16            | 0.14  | 650                                      |                     | ESMQ350E□□471MJ16S    | 33        | 10 × 20            | 0.20               | 205                                      | ESMQ201E□□330MJ20S |                    |
|                       | 1,000     | 12.5 × 20          | 0.14  | 1,150                                    |                     | ESMQ350E□□102MK20S    | 47        | 12.5 × 20          | 0.20               | 270                                      | ESMQ201E□□470MK20S |                    |
|                       | 2,200     | 16 × 25            | 0.16  | 1,800                                    |                     | ESMQ350E□□222ML25S    | 68        | 12.5 × 25          | 0.20               | 350                                      | ESMQ201E□□680MK25S |                    |
|                       | 3,300     | 16 × 31.5          | 0.18  | 2,100                                    |                     | ESMQ350E□□332MLN3S    | 100       | 16 × 25            | 0.20               | 475                                      | ESMQ201E□□101ML25S |                    |
|                       | 4,700     | 16 × 35.5          | 0.20  | 2,500                                    | ESMQ350E□□472MLP1S  | 220                   | 16 × 35.5 | 0.20               | 700                | ESMQ201E□□221MLP1S                       |                    |                    |
| 6,800                 | 18 × 40   | 0.24               | 2,800 | ESMQ350E□□682MM40S                       | 330                 | 18 × 40               | 0.20      | 950                | ESMQ201E□□331MM40S |  |                    |                    |
| 10,000                | 22 × 50   | 0.32               | 3,700 | ESMQ350E□□103MP50S                       | 250                 | 3.3                   | 6.3 × 11  | 0.20               | 40                 | ESMQ251E□□3R3MF11D                       |                    |                    |
| 50                    | 1.0       | 5 × 11             | 0.12  | 17                                       |                     | ESMQ500E□□1R0ME11D    | 4.7       | 6.3 × 11           | 0.20               | 50                                       | ESMQ251E□□4R7MF11D |                    |
|                       | 2.2       | 5 × 11             | 0.12  | 28                                       |                     | ESMQ500E□□2R2ME11D    | 10        | 10 × 12.5          | 0.20               | 100                                      | ESMQ251E□□100MJC5S |                    |
|                       | 3.3       | 5 × 11             | 0.12  | 35                                       |                     | ESMQ500E□□3R3ME11D    | 22        | 10 × 20            | 0.20               | 170                                      | ESMQ251E□□220MJ20S |                    |
|                       | 4.7       | 5 × 11             | 0.12  | 41                                       |                     | ESMQ500E□□4R7ME11D    | 33        | 10 × 20            | 0.20               | 200                                      | ESMQ251E□□330MJ20S |                    |
|                       | 10        | 5 × 11             | 0.12  | 60                                       |                     | ESMQ500E□□100ME11D    | 47        | 12.5 × 20          | 0.20               | 270                                      | ESMQ251E□□470MK20S |                    |
|                       | 22        | 5 × 11             | 0.12  | 95                                       |                     | ESMQ500E□□220ME11D    | 68        | 16 × 25            | 0.20               | 380                                      | ESMQ251E□□680ML25S |                    |
|                       | 33        | 5 × 11             | 0.12  | 125                                      |                     | ESMQ500E□□330ME11D    | 100       | 16 × 25            | 0.20               | 440                                      | ESMQ251E□□101ML25S |                    |
|                       | 47        | 6.3 × 11           | 0.12  | 155                                      |                     | ESMQ500E□□470MF11D    | 220       | 18 × 35.5          | 0.20               | 680                                      | ESMQ251E□□221MMP1S |                    |
|                       | 68        | 6.3 × 11           | 0.12  | 210                                      |                     | ESMQ500E□□680MF11D    | 350       | 2.2                | 6.3 × 11           | 0.24                                     | 30                 | ESMQ351E□□2R2MF11D |
|                       | 100       | 8 × 11.5           | 0.12  | 260                                      | ESMQ500E□□101MHB5D  | 3.3                   |           | 8 × 11.5           | 0.24               | 46                                       | ESMQ351E□□3R3MHB5D |                    |
| 220                   | 10 × 12.5 | 0.12               | 430   | ESMQ500E□□221MJC5S                       | 4.7                 | 8 × 11.5              |           | 0.24               | 55                 | ESMQ351E□□4R7MHB5D                       |                    |                    |

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

◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Case size φD×L(mm) | tan δ | Rated ripple current (mA <sub>rms</sub> /85°C, 120Hz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Case size φD×L(mm) | tan δ | Rated ripple current (mA <sub>rms</sub> /85°C, 120Hz) | Part No.           |
|-----------------------|----------|--------------------|-------|---|--------------------|-----------------------|----------|--------------------|-------|---|--------------------|
| 350                   | 10       | 10 × 12.5          | 0.24  | 90  | ESMQ351E□□100MJC5S | 450                   | 2.2      | 8 × 11.5           | 0.24  | 28  | ESMQ451E□□2R2MHB5D |
|                       | 22       | 12.5 × 20          | 0.24  | 185   | ESMQ351E□□220MK20S |                       | 3.3      | 10 × 12.5          | 0.24  | 40  | ESMQ451E□□3R3MJC5S |
|                       | 33       | 12.5 × 25          | 0.24  | 240   | ESMQ351E□□330MK25S |                       | 4.7      | 10 × 12.5          | 0.24  | 46  | ESMQ451E□□4R7MJC5S |
|                       | 47       | 16 × 25            | 0.24  | 325   | ESMQ351E□□470ML25S |                       | 10       | 10 × 20            | 0.24  | 80  | ESMQ451E□□100MJ20S |
|                       | 68       | 16 × 25            | 0.24  | 400   | ESMQ351E□□680ML25S |                       | 22       | 12.5 × 25          | 0.24  | 140   | ESMQ451E□□220MK25S |
|                       | 100      | 18 × 31.5          | 0.24  | 530   | ESMQ351E□□101MMN3S |                       | 33       | 16 × 25            | 0.24  | 180   | ESMQ451E□□330ML25S |
| 400                   | 1.0      | 6.3 × 11           | 0.24  | 22  | ESMQ401E□□1R0MF11D |                       | 47       | 16 × 31.5          | 0.24  | 220   | ESMQ451E□□470MLN3S |
|                       | 2.2      | 8 × 11.5           | 0.24  | 38  | ESMQ401E□□2R2MHB5D |                       | 68       | 18 × 35.5          | 0.24  | 260   | ESMQ451E□□680MMP1S |
|                       | 3.3      | 8 × 11.5           | 0.24  | 48  | ESMQ401E□□3R3MHB5D |                       | 100      | 18 × 40            | 0.24  | 280   | ESMQ451E□□101MM40S |
|                       | 4.7      | 10 × 12.5          | 0.24  | 60  | ESMQ401E□□4R7MJC5S |                       |          |                    |       |   |                    |
|                       | 10       | 10 × 16            | 0.24  | 90  | ESMQ401E□□100MJ16S |                       |          |                    |       |   |                    |
|                       | 22       | 12.5 × 25          | 0.24  | 205   | ESMQ401E□□220MK25S |                       |          |                    |       |   |                    |
|                       | 33       | 16 × 25            | 0.24  | 275   | ESMQ401E□□330ML25S |                       |          |                    |       |   |                    |
|                       | 47       | 16 × 25            | 0.24  | 280   | ESMQ401E□□470ML25S |                       |          |                    |       |   |                    |
|                       | 68       | 16 × 31.5          | 0.24  | 340   | ESMQ401E□□680MLN3S |                       |          |                    |       |   |                    |
|                       | 100      | 18 × 35.5          | 0.24  | 440   | ESMQ401E□□101MMP1S |                       |          |                    |       |   |                    |

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

◆RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Multipliers

(φ5 to φ18)

| 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 68        |               | 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 |

(φ20 to φ22)

| Rated Voltage (V <sub>r</sub> ) | Frequency (Hz) | 50   | 120  | 300  | 1k   | 10k  | 100k |
|---------------------------------|----------------|------|------|------|------|------|------|
| 6.3 to 50                       |                | 0.95 | 1.00 | 1.03 | 1.05 | 1.08 | 1.08 |
| 63 to 100                       |                | 0.92 | 1.00 | 1.07 | 1.13 | 1.19 | 1.20 |

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.