

SMG Series

- Endurance : 2,000 hours at 85°C
- Solvent resistant type except 350 to 450V_{dc}
(see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant

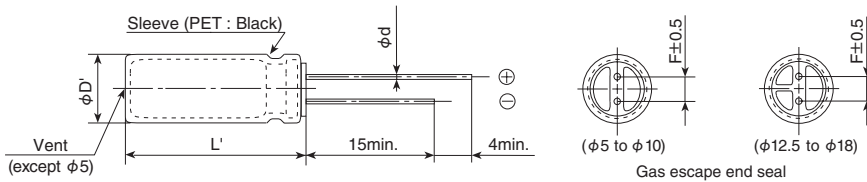


SPECIFICATIONS

| Items | Characteristics | | | | | | | | | | | | | |
|---|--|--------------------------------------|------|------|------|------|------|--------------------------------------|------|---------------------------|-------------|-----------------|-------------------|------------------|
| Category | -40 to +85°C (6.3 to 400V _{dc}) -25 to +85°C (450V _{dc}) | | | | | | | | | | | | | |
| Temperature Range | | | | | | | | | | | | | | |
| Rated Voltage Range | 6.3 to 450V _{dc} | | | | | | | | | | | | | |
| Capacitance Tolerance | ±20% (M) (at 20°C, 120Hz) | | | | | | | | | | | | | |
| Leakage Current | 6.3 to 100V _{dc} | | | | | | | | | 160 to 450V _{dc} | | | | |
| | I=0.03CV or 4μA, whichever is greater. | | | | | | | | | | | | | |
| | | | | | | | | | | CV | Time | After 1 minute | After 5 minute | |
| | | | | | | | | | | 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 (tan δ) | Rated voltage (V _{dc}) | 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 Characteristics (Max. Impedance Ratio) | Rated voltage (V _{dc}) | 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 _{dc} | | | | | | 160 to 450V _{dc} | | | | | | |
| | 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 | | | | | | |
| | | | | | | | | | | | | | | |

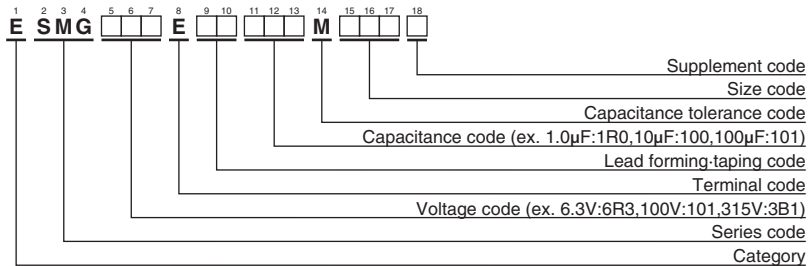
DIMENSIONS [mm]

- 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 (V _{dc}) | Cap (μF) | Case size φD×L(mm) | tan δ | Rated ripple current (mA rms/85°C, 120Hz) | Part No. | WV (V _{dc}) | Cap (μF) | Case size φD×L(mm) | tan δ | Rated ripple current (mA rms/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 |
| 22,000 | 18 × 40 | 0.76 | 3,320 | ESMG6R3E□□223MM40S | 3.3 | 5 × 11 | 0.08 | 40 | ESMG101E□□3R3ME11D | | |
| 10 | 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□□331MJC5S | | 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 | | 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 | 250 | 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 | | 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 | 350 | 4.7 | 10 × 12.5 | 0.24 |
| 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 | 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 |
| 63 | 330 | 10 × 16 | 0.12 | 585 | ESMG500E□□331MJ16S | 400 | 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 |
| | 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 (V _{dc}) | Cap (μF) | Case size φD×L(mm) | tan δ | Rated ripple current (mA _{rms} /85°C, 120Hz) | Part No. | WV (V _{dc}) | Cap (μF) | Case size φD×L(mm) | tan δ | Rated ripple current (mA _{rms} /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.