



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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SMG Series

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

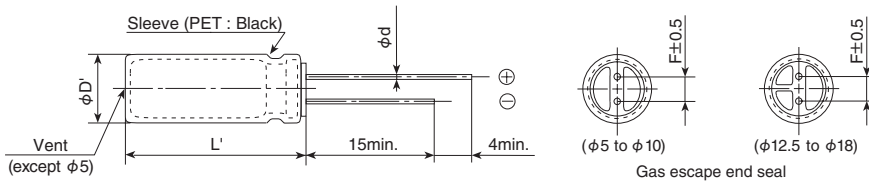


SPECIFICATIONS

| 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 | | | | | | |
| | | | | | | | | | | | | | | |

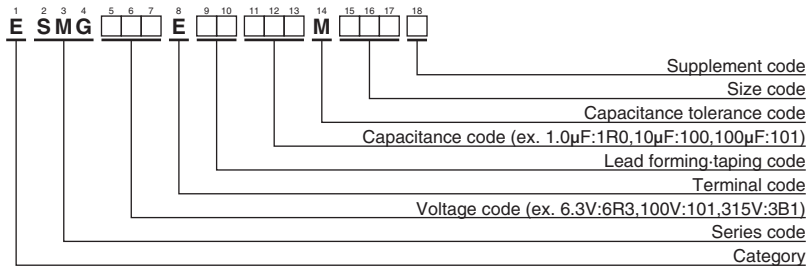
DIMENSIONS [mm]

- 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 (mAmps/85°C, 120Hz) | Part No. | WV (V _{dc}) | Cap (μF) | Case size φD×L(mm) | tan δ | Rated ripple current (mAmps/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 | 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 | 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 | | |
| | 63 | 10 | 5 × 11 | 0.09 | 65 | | ESMG630E□□100ME11D | 450 | 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.