

## SME Series

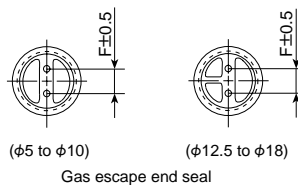
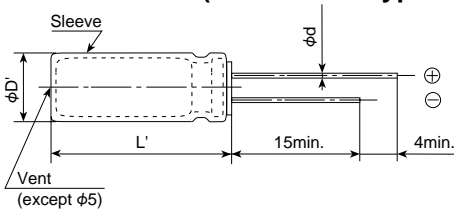
- Endurance : 85°C 2000 hours
- Solvent-proof type except 350 to 450V<sub>dc</sub>  
(see PRECAUTIONS AND GUIDELINES)



### ◆SPECIFICATIONS

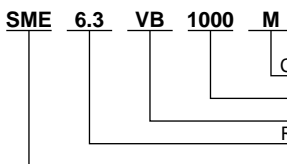
| Items   | Characteristics  |                                      |      |      |      |      |                           |                                      |      |              |                                      |      |   |  |  |                 |  |  |
|---|--|--------------------------------------|------|------|------|------|---------------------------|--------------------------------------|------|--------------|--------------------------------------|------|---|--|--|-----------------|--|--|
| <b>Category</b>   | -40 to +85°C (6.3 to 400V <sub>dc</sub> ) -25 to +85°C (450V <sub>dc</sub> )   |                                      |      |      |      |      |                           |                                      |      |              |                                      |      |   |  |  |                 |  |  |
| <b>Temperature Range</b>                                      |  |                                      |      |      |      |      |                           |                                      |      |              |                                      |      |   |  |  |                 |  |  |
| <b>Rated Voltage Range</b>                                    | 6.3 to 450V <sub>dc</sub>  |                                      |      |      |      |      |                           |                                      |      |              |                                      |      |   |  |  |                 |  |  |
| <b>Capacitance Tolerance</b>                                  | ±20% (M) (at 20°C, 120Hz)  |                                      |      |      |      |      |                           |                                      |      |              |                                      |      |   |  |  |                 |  |  |
| <b>Leakage Current</b>  | 6.3 to 100V <sub>dc</sub>  |                                      |      |      |      |      | 160 to 450V <sub>dc</sub> |                                      |      |              |                                      |      |   |  |  |                 |  |  |
|   | I=0.03CV or 4µA, whichever is greater. (at 20°C after 1 minute)  |                                      |      |      |      |      | CV                        |                                      |      | Time         |                                      |      | After 1 minute  |  |  | After 5 minutes |  |  |
|   | I=0.01CV or 3µA, whichever is greater. (at 20°C after 2 minutes)   |                                      |      |      |      |      | CV≤1000                   |                                      |      | I=0.1CV+40   |                                      |      | I=0.03CV+15   |  |  |                 |  |  |
|   |  |                                      |      |      |      |      | CV>1000                   |                                      |      | I=0.04CV+100 |                                      |      | I=0.02CV+25   |  |  |                 |  |  |
|   |  |                                      |      |      |      |      |                           |                                      |      |              |                                      |      | (at 20°C)   |  |  |                 |  |  |
|   |  |                                      |      |      |      |      |                           |                                      |      |              |                                      |      | Where, I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V) |  |  |                 |  |  |
| <b>Dissipation Factor (tanδ)</b>                              | Rated voltage (V <sub>dc</sub> )   | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V                       | 63V                                  | 100V | 160 to 250V  | 350 to 400V                          | 450V |   |  |  |                 |  |  |
|   | tanδ (Max.)  | 0.22                                 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10                      | 0.09                                 | 0.08 | 0.20         | 0.24                                 | 0.24 |   |  |  |                 |  |  |
|   | When nominal capacitance exceeds 1000µF, add 0.02 to the value above for each 1000µF increase. (at 20°C, 120Hz)  |                                      |      |      |      |      |                           |                                      |      |              |                                      |      |   |  |  |                 |  |  |
| <b>Low Temperature Characteristics (Max. Impedance Ratio)</b> | 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)  | 4                                    | 3    | 2    | 2    | 2    | 2                         | 2                                    | 2    | 3            | 6                                    | 16   |   |  |  |                 |  |  |
|   | Z(-40°C)/Z(+20°C)  | 8                                    | 6    | 4    | 3    | 3    | 3                         | 3                                    | 3    | 4            | 6                                    | —    |   |  |  |                 |  |  |
|   |  |                                      |      |      |      |      |                           |                                      |      |              |                                      |      | (at 120Hz)  |  |  |                 |  |  |
| <b>Endurance</b>  | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C.          |                                      |      |      |      |      |                           |                                      |      |              |                                      |      |   |  |  |                 |  |  |
|   | Rated voltage  | 6.3 to 100V <sub>dc</sub>            |      |      |      |      |                           | 160 to 400V <sub>dc</sub>            |      |              | 450V <sub>dc</sub>                   |      |   |  |  |                 |  |  |
|   | Capacitance change   | ≤±20% of the initial value           |      |      |      |      |                           | ≤±20% of the initial value           |      |              | ≤±20% of the initial value           |      |   |  |  |                 |  |  |
|   | D.F. (tanδ)  | ≤150% of the initial specified value |      |      |      |      |                           | ≤200% of the initial specified value |      |              | ≤150% of the initial specified value |      |   |  |  |                 |  |  |
|   | Leakage current  | ≤The initial specified value         |      |      |      |      |                           | ≤The initial specified value         |      |              | ≤The initial specified value         |      |   |  |  |                 |  |  |
| <b>Shelf Life</b>   | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1000 hours at 85°C without voltage applied. |                                      |      |      |      |      |                           |                                      |      |              |                                      |      |   |  |  |                 |  |  |
|   | Rated voltage  | 6.3 to 100V <sub>dc</sub>            |      |      |      |      |                           | 160 to 400V <sub>dc</sub>            |      |              | 450V <sub>dc</sub>                   |      |   |  |  |                 |  |  |
|   | Capacitance change   | ≤±20% of the initial value           |      |      |      |      |                           | ≤±20% of the initial value           |      |              | ≤±20% of the initial value           |      |   |  |  |                 |  |  |
|   | D.F. (tanδ)  | ≤150% of the initial specified value |      |      |      |      |                           | ≤200% of the initial specified value |      |              | ≤200% of the initial specified value |      |   |  |  |                 |  |  |
|   | Leakage current  | ≤The initial specified value         |      |      |      |      |                           | ≤500% of the initial specified value |      |              | ≤500% of the initial specified value |      |   |  |  |                 |  |  |

### ◆DIMENSIONS (Radial Lead Type=VB) [mm]



| 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



| Capacitance | Code |
|-------------|------|
| 0.1µF       | R1   |
| 0.47µF      | R47  |
| 1.0µF       | 1    |
| 4.7µF       | 4R7  |
| 10µF        | 10   |
| 100µF       | 100  |

### ◆RATED RIPPLE CURRENT MULTIPLIERS

- Frequency Multipliers

| Capacitance (µF) | Frequency (Hz) |      |      |      |      |      |
|------------------|----------------|------|------|------|------|------|
|                  | 50             | 120  | 300  | 1k   | 10k  | 100k |
| 0.1 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 |

### ◆STANDARD RATINGS

| μF     | V <sub>dc</sub> |  | 6.3   |  | 10      |  | 16    |  | 25      |  | 35    |  | 50      |  | 63     |  | 100     |  |       |  |
|--------|-----------------|--|-------|--|---------|--|-------|--|---------|--|-------|--|---------|--|--------|--|---------|--|-------|--|
|        |                 |  |       |  |         |  |       |  |         |  |       |  |         |  |        |  |         |  |       |  |
| 0.1    |                 |  |       |  |         |  |       |  |         |  |       |  | 5×11    |  | 1.3    |  | 5×11    |  | 2.6   |  |
| 0.22   |                 |  |       |  |         |  |       |  |         |  |       |  | 5×11    |  | 2.9    |  | 5×11    |  | 5.8   |  |
| 0.33   |                 |  |       |  |         |  |       |  |         |  |       |  | 5×11    |  | 4.4    |  | 5×11    |  | 8.8   |  |
| 0.47   |                 |  |       |  |         |  |       |  |         |  |       |  | 5×11    |  | 7      |  | 5×11    |  | 12    |  |
| 1.0    |                 |  |       |  |         |  |       |  |         |  |       |  | 5×11    |  | 13     |  | 5×11    |  | 22    |  |
| 2.2    |                 |  |       |  |         |  |       |  |         |  |       |  | 5×11    |  | 29     |  | 5×11    |  | 33    |  |
| 3.3    |                 |  |       |  |         |  |       |  |         |  |       |  | 5×11    |  | 35     |  | 5×11    |  | 40    |  |
| 4.7    |                 |  |       |  |         |  |       |  |         |  |       |  | 5×11    |  | 42     |  | 5×11    |  | 48    |  |
| 10     |                 |  |       |  |         |  |       |  |         |  |       |  | 5×11    |  | 65     |  | 5×11    |  | 70    |  |
| 22     |                 |  |       |  |         |  |       |  |         |  |       |  | 5×11    |  | 95     |  | 6.3×11  |  | 115   |  |
| 33     |                 |  |       |  |         |  |       |  |         |  | 5×11  |  | 105     |  | 6.3×11 |  | 6.3×11  |  | 140   |  |
| 47     |                 |  |       |  |         |  | 5×11  |  | 110     |  | 5×11  |  | 115     |  | 6.3×11 |  | 6.3×11  |  | 195   |  |
| 100    | 5×11            |  | 130   |  | 5×11    |  | 145   |  | 6.3×11  |  | 180   |  | 6.3×11  |  | 190    |  | 8×11.5  |  | 240   |  |
| 220    | 6.3×11          |  | 230   |  | 6.3×11  |  | 250   |  | 8×11.5  |  | 300   |  | 8×11.5  |  | 320    |  | 10×12.5 |  | 420   |  |
| 330    | 6.3×11          |  | 280   |  | 8×11.5  |  | 350   |  | 8×11.5  |  | 370   |  | 10×12.5 |  | 470    |  | 10×16   |  | 570   |  |
| 470    | 8×11.5          |  | 380   |  | 8×11.5  |  | 415   |  | 10×12.5 |  | 520   |  | 10×16   |  | 620    |  | 10×20   |  | 740   |  |
| 1,000  | 10×12.5         |  | 650   |  | 10×16   |  | 790   |  | 10×20   |  | 910   |  | 12.5×20 |  | 1,090  |  | 12.5×25 |  | 1,300 |  |
| 2,200  | 12.5×20         |  | 1,150 |  | 12.5×20 |  | 1,240 |  | 12.5×25 |  | 1,420 |  | 16×25   |  | 1,660  |  | 16×31.5 |  | 1,890 |  |
| 3,300  | 12.5×20         |  | 1,380 |  | 12.5×25 |  | 1,590 |  | 16×25   |  | 1,840 |  | 16×31.5 |  | 2,070  |  | 18×35.5 |  | 2,340 |  |
| 4,700  | 16×25           |  | 1,880 |  | 16×25   |  | 1,980 |  | 16×31.5 |  | 2,260 |  | 18×35.5 |  | 2,520  |  | 18×40   |  | 2,690 |  |
| 6,800  | 16×25           |  | 2,120 |  | 16×31.5 |  | 2,390 |  | 18×35.5 |  | 2,690 |  | 18×40   |  | 2,830  |  |         |  |       |  |
| 10,000 | 16×31.5         |  | 2,500 |  | 18×35.5 |  | 2,840 |  | 18×40   |  | 2,920 |  |         |  |        |  |         |  |       |  |
| 15,000 | 18×35.5         |  | 2,990 |  |         |  |       |  |         |  |       |  |         |  |        |  |         |  |       |  |

Case size φD×L (mm)  
Rated ripple current (mA<sub>rms</sub>) at 85°C, 120Hz

| Non solvent-proof |                 |  |     |  |         |  |     |  |         |  |     |  |         |  |     |  |
|-------------------|-----------------|--|-----|--|---------|--|-----|--|---------|--|-----|--|---------|--|-----|--|
| μF                | V <sub>dc</sub> |  | 160 |  | 200     |  | 250 |  | 350     |  | 400 |  | 450     |  |     |  |
|                   |                 |  |     |  |         |  |     |  |         |  |     |  |         |  |     |  |
| 0.47              | 6.3×11          |  | 12  |  | 6.3×11  |  | 12  |  | 6.3×11  |  | 12  |  | 8×11.5  |  | 15  |  |
| 1.0               | 6.3×11          |  | 17  |  | 6.3×11  |  | 17  |  | 6.3×11  |  | 17  |  | 8×11.5  |  | 22  |  |
| 2.2               | 6.3×11          |  | 26  |  | 6.3×11  |  | 26  |  | 8×11.5  |  | 30  |  | 10×12.5 |  | 39  |  |
| 3.3               | 8×11.5          |  | 36  |  | 8×11.5  |  | 36  |  | 10×12.5 |  | 43  |  | 10×16   |  | 53  |  |
| 4.7               | 8×11.5          |  | 44  |  | 10×12.5 |  | 51  |  | 10×12.5 |  | 51  |  | 10×16   |  | 63  |  |
| 10                | 10×16           |  | 83  |  | 10×16   |  | 83  |  | 10×20   |  | 90  |  | 12.5×20 |  | 115 |  |
| 22                | 10×20           |  | 130 |  | 10×20   |  | 130 |  | 12.5×25 |  | 160 |  | 12.5×25 |  | 180 |  |
| 33                | 12.5×20         |  | 180 |  | 12.5×25 |  | 190 |  | 12.5×25 |  | 190 |  | 16×25   |  | 245 |  |
| 47                | 12.5×25         |  | 230 |  | 12.5×25 |  | 230 |  | 16×25   |  | 260 |  | 16×31.5 |  | 315 |  |
| 100               | 16×25           |  | 380 |  | 16×31.5 |  | 400 |  | 18×35.5 |  | 440 |  | 18×40   |  | 500 |  |
| 220               | 18×35.5         |  | 640 |  | 18×40   |  | 660 |  |         |  |     |  |         |  |     |  |

### ◆MAXIMUM ESR

(Ω) at 20°C, 120Hz

| μF     | V <sub>dc</sub> |  | 6.3    |  | 10     |  | 16     |  | 25     |  | 35    |  | 50     |  | 63    |  | 100   |  | 160 to 250 |  | 350 to 450 |  |
|--------|-----------------|--|--------|--|--------|--|--------|--|--------|--|-------|--|--------|--|-------|--|-------|--|------------|--|------------|--|
|        |                 |  |        |  |        |  |        |  |        |  |       |  |        |  |       |  |       |  |            |  |            |  |
| 0.1    |                 |  |        |  |        |  |        |  |        |  |       |  | 1,660  |  |       |  | 1,330 |  |            |  |            |  |
| 0.22   |                 |  |        |  |        |  |        |  |        |  |       |  | 754    |  |       |  | 603   |  |            |  |            |  |
| 0.33   |                 |  |        |  |        |  |        |  |        |  |       |  | 503    |  |       |  | 402   |  |            |  |            |  |
| 0.47   |                 |  |        |  |        |  |        |  |        |  |       |  | 353    |  |       |  | 282   |  | 706        |  | 847        |  |
| 1.0    |                 |  |        |  |        |  |        |  |        |  |       |  | 166    |  |       |  | 133   |  | 332        |  | 398        |  |
| 2.2    |                 |  |        |  |        |  |        |  |        |  |       |  | 75.4   |  |       |  | 60.3  |  | 151        |  | 181        |  |
| 3.3    |                 |  |        |  |        |  |        |  |        |  |       |  | 50.3   |  |       |  | 40.3  |  | 101        |  | 121        |  |
| 4.7    |                 |  |        |  |        |  |        |  |        |  |       |  | 35.3   |  | 31.8  |  | 28.2  |  | 70.6       |  | 84.7       |  |
| 10     |                 |  |        |  |        |  |        |  |        |  |       |  | 16.6   |  | 14.9  |  | 13.3  |  | 33.2       |  | 39.8       |  |
| 22     |                 |  |        |  |        |  |        |  |        |  |       |  | 7.54   |  | 6.79  |  | 6.03  |  | 15.1       |  | 18.1       |  |
| 33     |                 |  |        |  |        |  |        |  |        |  | 6.03  |  | 5.03   |  | 4.52  |  | 4.02  |  | 10.1       |  | 12.1       |  |
| 47     |                 |  |        |  | 5.65   |  | 4.94   |  | 4.23   |  | 3.53  |  | 3.18   |  | 2.82  |  | 2.82  |  | 7.06       |  | 8.47       |  |
| 100    | 3.70            |  | 3.15   |  | 2.65   |  | 2.32   |  | 1.99   |  | 1.66  |  | 1.49   |  | 1.33  |  | 1.33  |  | 3.32       |  | 3.98       |  |
| 220    | 1.66            |  | 1.43   |  | 1.21   |  | 1.06   |  | 0.905  |  | 0.754 |  | 0.679  |  | 0.603 |  | 0.603 |  | 1.51       |  |            |  |
| 330    | 1.11            |  | 0.955  |  | 0.804  |  | 0.704  |  | 0.603  |  | 0.503 |  | 0.452  |  | 0.402 |  | 0.402 |  |            |  |            |  |
| 470    | 0.776           |  | 0.671  |  | 0.565  |  | 0.494  |  | 0.423  |  | 0.353 |  | 0.318  |  | 0.282 |  | 0.282 |  |            |  |            |  |
| 1,000  | 0.370           |  | 0.315  |  | 0.265  |  | 0.232  |  | 0.199  |  | 0.166 |  | 0.149  |  |       |  |       |  |            |  |            |  |
| 2,200  | 0.181           |  | 0.158  |  | 0.136  |  | 0.121  |  | 0.106  |  | 0.106 |  | 0.0905 |  |       |  |       |  |            |  |            |  |
| 3,300  | 0.131           |  | 0.116  |  | 0.101  |  | 0.0905 |  | 0.0804 |  |       |  |        |  |       |  |       |  |            |  |            |  |
| 4,700  | 0.0988          |  | 0.0882 |  | 0.0776 |  | 0.0706 |  | 0.0635 |  |       |  |        |  |       |  |       |  |            |  |            |  |
| 6,800  | 0.0781          |  | 0.0707 |  | 0.0634 |  | 0.0585 |  |        |  |       |  |        |  |       |  |       |  |            |  |            |  |
| 10,000 | 0.0630          |  | 0.0581 |  | 0.0531 |  |        |  |        |  |       |  |        |  |       |  |       |  |            |  |            |  |
| 15,000 | 0.0531          |  |        |  |        |  |        |  |        |  |       |  |        |  |       |  |       |  |            |  |            |  |