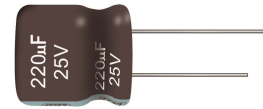




# EM Series

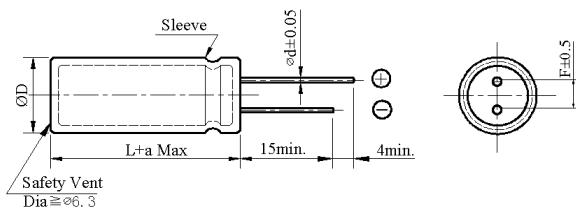
- Low impedance, high ripple current and miniature size with 7 to 9 mm height



◆ SPECIFICATIONS

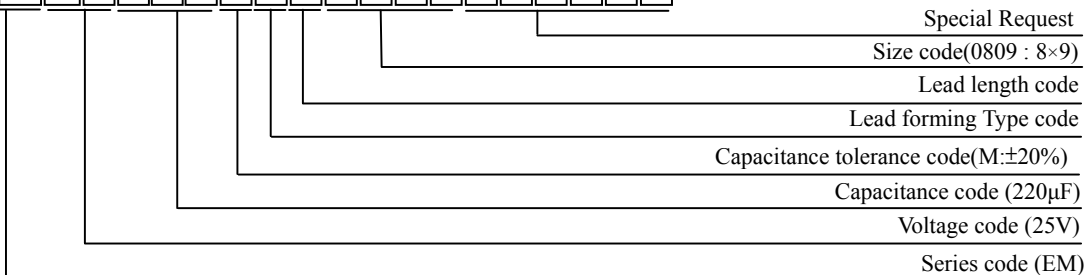
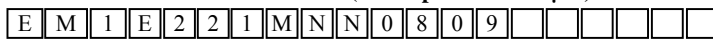
| Item   | Performance Characteristics   |                    |  |                          |                               |                          |                               |        |                   |                 |                   |       |       |      |      |
|--|---|--------------------|--|--------------------------|-------------------------------|--------------------------|-------------------------------|--------|-------------------|-----------------|-------------------|-------|-------|------|------|
| Category Temperature Range                           | -40 ~ +105°C  |                    |  |                          |                               |                          |                               |        |                   |                 |                   |       |       |      |      |
| Working Voltage Range                                | 6.3 ~ 35Vdc   |                    |  |                          |                               |                          |                               |        |                   |                 |                   |       |       |      |      |
| Capacitance Range                                    | 33 ~ 470 µF   |                    |  |                          |                               |                          |                               |        |                   |                 |                   |       |       |      |      |
| Capacitance Tolerance                                | ±20% (at 25°C and 120Hz)  |                    |  |                          |                               |                          |                               |        |                   |                 |                   |       |       |      |      |
| Dissipation Factor (tanδ) (at 25°C, 120Hz)           | <table border="1"> <tr> <td>Rated Voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>30</td> <td>35</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.14</td> <td>0.14</td> </tr> </table>  | Rated Voltage (V)  | 6.3  | 10                       | 16                            | 25                       | 30                            | 35     | tanδ(Max)         | 0.24            | 0.20              | 0.16  | 0.14  | 0.14 | 0.14 |
| Rated Voltage (V)                                    | 6.3   | 10                 | 16   | 25                       | 30                            | 35                       |                               |        |                   |                 |                   |       |       |      |      |
| tanδ(Max)  | 0.24  | 0.20               | 0.16   | 0.14                     | 0.14                          | 0.14                     |                               |        |                   |                 |                   |       |       |      |      |
| Leakage Current                                      | I=0.01CV or 3 µA, whichever is greater<br>I : Leakage current (µA) C : Rated capacitance (µF) V : Rated voltage (V)<br>Impress the rated voltage for 2 minutes  |                    |  |                          |                               |                          |                               |        |                   |                 |                   |       |       |      |      |
| Low Temperature Characteristics Impedance Ratio(MAX) | <table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>30</td> <td>35</td> </tr> <tr> <td>Z(-40°C)/Z(+20°C)</td> <td>8</td> <td>6</td> <td>6</td> <td>5</td> <td>4</td> <td>4</td> </tr> </table> (at 120Hz)   | Rated voltage (V)  | 6.3  | 10                       | 16                            | 25                       | 30                            | 35     | Z(-40°C)/Z(+20°C) | 8               | 6                 | 6     | 5     | 4    | 4    |
| Rated voltage (V)                                    | 6.3   | 10                 | 16   | 25                       | 30                            | 35                       |                               |        |                   |                 |                   |       |       |      |      |
| Z(-40°C)/Z(+20°C)                                    | 8   | 6                  | 6  | 5                        | 4                             | 4                        |                               |        |                   |                 |                   |       |       |      |      |
| Endurance  | The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 1,000~2,000 hours at 105°C. <table border="1"> <tr> <td>Capacitance change</td> <td>≅ ±25% of the initial value (6.3V、10V: ≅ ±30%)</td> <td>Size</td> <td>Life time (hours)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≅ 200% of the specified value</td> <td>≅ 6.3Φ</td> <td>1,000</td> </tr> <tr> <td>Leakage current</td> <td>≅ specified value</td> <td>≅ 8 Φ</td> <td>2,000</td> </tr> </table> | Capacitance change | ≅ ±25% of the initial value (6.3V、10V: ≅ ±30%) | Size                     | Life time (hours)             | Dissipation factor(tanδ) | ≅ 200% of the specified value | ≅ 6.3Φ | 1,000             | Leakage current | ≅ specified value | ≅ 8 Φ | 2,000 |      |      |
| Capacitance change                                   | ≅ ±25% of the initial value (6.3V、10V: ≅ ±30%)  | Size               | Life time (hours)                              |                          |                               |                          |                               |        |                   |                 |                   |       |       |      |      |
| Dissipation factor(tanδ)                             | ≅ 200% of the specified value   | ≅ 6.3Φ             | 1,000  |                          |                               |                          |                               |        |                   |                 |                   |       |       |      |      |
| Leakage current                                      | ≅ specified value   | ≅ 8 Φ              | 2,000  |                          |                               |                          |                               |        |                   |                 |                   |       |       |      |      |
| Shelf Life   | The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 500 hours at 105°C without voltage applied. <table border="1"> <tr> <td>Capacitance change</td> <td>≅ ±25% of the initial value (6.3V、10V: ≅ ±30%)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≅ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≅ 200% of the specified value</td> </tr> </table>   | Capacitance change | ≅ ±25% of the initial value (6.3V、10V: ≅ ±30%) | Dissipation factor(tanδ) | ≅ 200% of the specified value | Leakage current          | ≅ 200% of the specified value |        |                   |                 |                   |       |       |      |      |
| Capacitance change                                   | ≅ ±25% of the initial value (6.3V、10V: ≅ ±30%)  |                    |  |                          |                               |                          |                               |        |                   |                 |                   |       |       |      |      |
| Dissipation factor(tanδ)                             | ≅ 200% of the specified value   |                    |  |                          |                               |                          |                               |        |                   |                 |                   |       |       |      |      |
| Leakage current                                      | ≅ 200% of the specified value   |                    |  |                          |                               |                          |                               |        |                   |                 |                   |       |       |      |      |
| Others   | Conforms to JIS-C-5101-4 (1998), characteristic W   |                    |  |                          |                               |                          |                               |        |                   |                 |                   |       |       |      |      |

◆ DIMENSIONS (mm)



|    |              |       |
|----|--------------|-------|
| ΦD | 8 × 7        | 8 × 9 |
| ΦD | ΦD + 0.5 Max |       |
| Φd | 0.45         | 0.50  |
| F  | 3.5          |       |
| a  | L + 1.0 Max  |       |

◆ PART NUMBER SYSTEM( Example : 25V 220µF )





## EM Series

◆ Case size & Permissible rated ripple current

| Nominal Capacitance (uF) | 6.3V                |                               |  | 10V                 |                               |  | 16V                 |                               |  |
|--------------------------|---------------------|-------------------------------|--|---------------------|-------------------------------|--|---------------------|-------------------------------|--|
|                          | Case size ΦD×L (mm) | Impedance @20°C (Ωmax/100kHz) | Max. Rated ripple current @105°C 100kHz (mA rms) | Case size ΦD×L (mm) | Impedance @20°C (Ωmax/100kHz) | Max. Rated ripple current @105°C 100kHz (mA rms) | Case size ΦD×L (mm) | Impedance @20°C (Ωmax/100kHz) | Max. Rated ripple current @105°C 100kHz (mA rms) |
| 100                      |                     |                               |  |                     |                               |  | 8×7                 | 0.240                         | 330  |
| 150                      | 8×7                 | 0.230                         | 305  | 8×7                 | 0.210                         | 315  | 8×7                 | 0.150                         | 385  |
| 220                      | 8×7                 | 0.150                         | 380  | 8×7                 | 0.140                         | 390  | 8×7                 | 0.130                         | 405  |
| 330                      | 8×7                 | 0.140                         | 405  | 8×9                 | 0.130                         | 465  | 8×9                 | 0.120                         | 505  |
| 470                      | 8×9                 | 0.130                         | 465  | 8×9                 | 0.120                         | 480  | 8×9                 | 0.110                         | 535  |

| Nominal Capacitance (uF) | 25V                 |                               |  | 30V                 |                               |  | 35V                 |                               |  |
|--------------------------|---------------------|-------------------------------|--|---------------------|-------------------------------|--|---------------------|-------------------------------|--|
|                          | Case size ΦD×L (mm) | Impedance @20°C (Ωmax/100kHz) | Max. Rated ripple current @105°C 100kHz (mA rms) | Case size ΦD×L (mm) | Impedance @20°C (Ωmax/100kHz) | Max. Rated ripple current @105°C 100kHz (mA rms) | Case size ΦD×L (mm) | Impedance @20°C (Ωmax/100kHz) | Max. Rated ripple current @105°C 100kHz (mA rms) |
| 33                       | 8×7                 | 0.360                         | 215  |                     |                               |  | 8×7                 | 0.300                         | 250  |
| 47                       | 8×7                 | 0.280                         | 250  |                     |                               |  | 8×7                 | 0.230                         | 310  |
| 56                       | 8×7                 | 0.230                         | 310  |                     |                               |  | 8×7                 | 0.160                         | 380  |
| 68                       | 8×7                 | 0.190                         | 330  |                     |                               |  | 8×7                 | 0.150                         | 400  |
| 100                      | 8×7                 | 0.150                         | 380  |                     |                               |  | 8×7                 | 0.140                         | 420  |
| 150                      | 8×7                 | 0.140                         | 465  | 8×7                 | 0.130                         | 680  | 8×9                 | 0.120                         | 700  |
| 180                      | 8×9                 | 0.120                         | 760  | 8×9                 | 0.110                         | 765  |                     |                               |  |
| 220                      | 8×9                 | 0.100                         | 800  |                     |                               |  |                     |                               |  |

◆ RIPPLE CURRENT MULTIPLIERS

Frequency Multipliers

| Vdc      | Cap(uF)   | Frequency (Hz) |      |      |             |
|----------|-----------|----------------|------|------|-------------|
|          |           | 120            | 1K   | 10K  | 100K ≤ 200K |
| 6.3 ~ 35 | 33 ~ 82   | 0.50           | 0.80 | 0.98 | 1.00        |
|          | 100 ~ 470 | 0.55           | 0.85 | 0.95 | 1.00        |