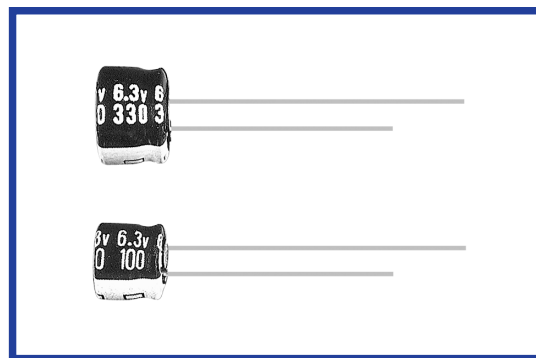


## MS5 SERIES

**85°C 5mm Height**

### ◆FEATURES

•RoHS compliance.



### ◆SPECIFICATIONS

| Items                                             | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |  |                     |                                   |     |    |    |    |    |    |                    |                                            |      |      |      |      |      |      |                 |                                    |    |    |   |   |   |   |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|--|---------------------|-----------------------------------|-----|----|----|----|----|----|--------------------|--------------------------------------------|------|------|------|------|------|------|-----------------|------------------------------------|----|----|---|---|---|---|
| Category Temperature Range                        | -40~+85℃                                                                                                                                                                                                                                                                                                                                                                                                                               |      |      |      |      |      |      |  |                     |                                   |     |    |    |    |    |    |                    |                                            |      |      |      |      |      |      |                 |                                    |    |    |   |   |   |   |
| Rated Voltage Range                               | 4~50Vdc                                                                                                                                                                                                                                                                                                                                                                                                                                |      |      |      |      |      |      |  |                     |                                   |     |    |    |    |    |    |                    |                                            |      |      |      |      |      |      |                 |                                    |    |    |   |   |   |   |
| Capacitance Tolerance                             | ±20%(20℃,120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |  |                     |                                   |     |    |    |    |    |    |                    |                                            |      |      |      |      |      |      |                 |                                    |    |    |   |   |   |   |
| Leakage Current(MAX)                              | I=0.01CV or 3μA whichever is greater.(After 2 minutes application of rated voltage)<br>I=Leakage Current(μA)                      C=Capacitance(μF)                      V=Rated Voltage(Vdc)                                                                                                                                                                                                                                          |      |      |      |      |      |      |  |                     |                                   |     |    |    |    |    |    |                    |                                            |      |      |      |      |      |      |                 |                                    |    |    |   |   |   |   |
| (tanδ)<br>Dissipation Factor(MAX)                 | <table><tr><td>Rated Voltage (Vdc)</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>tanδ</td><td>0.35</td><td>0.26</td><td>0.22</td><td>0.18</td><td>0.16</td><td>0.14</td><td>0.12</td></tr></table> (20℃,120Hz)                                                                                                                                                                         |      |      |      |      |      |      |  | Rated Voltage (Vdc) | 4                                 | 6.3 | 10 | 16 | 25 | 35 | 50 | tanδ               | 0.35                                       | 0.26 | 0.22 | 0.18 | 0.16 | 0.14 | 0.12 |                 |                                    |    |    |   |   |   |   |
| Rated Voltage (Vdc)                               | 4                                                                                                                                                                                                                                                                                                                                                                                                                                      | 6.3  | 10   | 16   | 25   | 35   | 50   |  |                     |                                   |     |    |    |    |    |    |                    |                                            |      |      |      |      |      |      |                 |                                    |    |    |   |   |   |   |
| tanδ                                              | 0.35                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.26 | 0.22 | 0.18 | 0.16 | 0.14 | 0.12 |  |                     |                                   |     |    |    |    |    |    |                    |                                            |      |      |      |      |      |      |                 |                                    |    |    |   |   |   |   |
| Endurance                                         | After applying rated voltage with rated ripple current for 1000 hrs at 85℃, the capacitors shall meet the following requirements. <table><tr><td>Capacitance Change</td><td colspan="7">Within ±25% of the initial value.</td></tr><tr><td>Dissipation Factor</td><td colspan="7">Not more than 200% of the specified value.</td></tr><tr><td>Leakage Current</td><td colspan="7">Not more than the specified value.</td></tr></table> |      |      |      |      |      |      |  | Capacitance Change  | Within ±25% of the initial value. |     |    |    |    |    |    | Dissipation Factor | Not more than 200% of the specified value. |      |      |      |      |      |      | Leakage Current | Not more than the specified value. |    |    |   |   |   |   |
| Capacitance Change                                | Within ±25% of the initial value.                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |      |      |      |      |  |                     |                                   |     |    |    |    |    |    |                    |                                            |      |      |      |      |      |      |                 |                                    |    |    |   |   |   |   |
| Dissipation Factor                                | Not more than 200% of the specified value.                                                                                                                                                                                                                                                                                                                                                                                             |      |      |      |      |      |      |  |                     |                                   |     |    |    |    |    |    |                    |                                            |      |      |      |      |      |      |                 |                                    |    |    |   |   |   |   |
| Leakage Current                                   | Not more than the specified value.                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |      |      |      |      |  |                     |                                   |     |    |    |    |    |    |                    |                                            |      |      |      |      |      |      |                 |                                    |    |    |   |   |   |   |
| Low Temperature Stability<br>Impedance Ratio(MAX) | <table><tr><td>Rated Voltage (Vdc)</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Z(-25℃)/Z(20℃)</td><td>7</td><td>6</td><td>4</td><td>4</td><td>3</td><td>2</td><td>2</td></tr><tr><td>Z(-40℃)/Z(20℃)</td><td>15</td><td>12</td><td>10</td><td>8</td><td>6</td><td>4</td><td>4</td></tr></table> (120Hz)                                                                               |      |      |      |      |      |      |  | Rated Voltage (Vdc) | 4                                 | 6.3 | 10 | 16 | 25 | 35 | 50 | Z(-25℃)/Z(20℃)     | 7                                          | 6    | 4    | 4    | 3    | 2    | 2    | Z(-40℃)/Z(20℃)  | 15                                 | 12 | 10 | 8 | 6 | 4 | 4 |
| Rated Voltage (Vdc)                               | 4                                                                                                                                                                                                                                                                                                                                                                                                                                      | 6.3  | 10   | 16   | 25   | 35   | 50   |  |                     |                                   |     |    |    |    |    |    |                    |                                            |      |      |      |      |      |      |                 |                                    |    |    |   |   |   |   |
| Z(-25℃)/Z(20℃)                                    | 7                                                                                                                                                                                                                                                                                                                                                                                                                                      | 6    | 4    | 4    | 3    | 2    | 2    |  |                     |                                   |     |    |    |    |    |    |                    |                                            |      |      |      |      |      |      |                 |                                    |    |    |   |   |   |   |
| Z(-40℃)/Z(20℃)                                    | 15                                                                                                                                                                                                                                                                                                                                                                                                                                     | 12   | 10   | 8    | 6    | 4    | 4    |  |                     |                                   |     |    |    |    |    |    |                    |                                            |      |      |      |      |      |      |                 |                                    |    |    |   |   |   |   |

### ◆MULTIPLIER FOR RIPPLE CURRENT

Frequency coefficient

| Frequency (Hz)  | 60(50) | 120  | 500  | 1k   | 10k≤ |
|-----------------|--------|------|------|------|------|
| Coefficient     |        |      |      |      |      |
| 0.47~1 $\mu F$  | 0.50   | 1.00 | 1.20 | 1.30 | 1.50 |
| 1.5~6.8 $\mu F$ | 0.65   | 1.00 | 1.20 | 1.30 | 1.50 |
| 10~68 $\mu F$   | 0.80   | 1.00 | 1.20 | 1.30 | 1.50 |
| 100~470 $\mu F$ | 0.80   | 1.00 | 1.10 | 1.15 | 1.20 |

### ◆OPTION

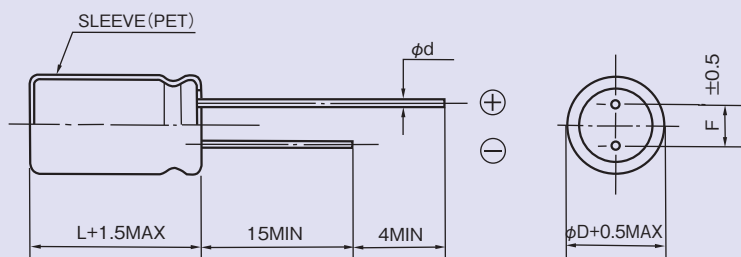
|            | Code |
|------------|------|
| PET Sleeve | EFC  |

### ◆PART NUMBER

|                      |        |                      |                       |                      |                      |           |
|----------------------|--------|----------------------|-----------------------|----------------------|----------------------|-----------|
| <input type="text"/> | MS5    | <input type="text"/> | M                     | <input type="text"/> | <input type="text"/> | D×L       |
| Rated Voltage        | Series | Capacitance          | Capacitance Tolerance | Option               | Lead Forming         | Case Size |

**◆DIMENSIONS**

(mm)



| $\phi D$ | 4    | 5   | 6.3 | 8 |
|----------|------|-----|-----|---|
| $\phi d$ | 0.45 |     |     |   |
| F        | 1.5  | 2.0 | 2.5 |   |

**◆STANDARD SIZE**

 Size  $\phi D \times L$ (mm), Rated Ripple Current (mA r.m.s./85°C, 120Hz)

| Vdc<br>Cap( $\mu F$ ) | 4     |        | 6.3   |        | 10    |        | 16    |        |
|-----------------------|-------|--------|-------|--------|-------|--------|-------|--------|
|                       | Size  | Ripple | Size  | Ripple | Size  | Ripple | Size  | Ripple |
| 4.7                   |       |        |       |        |       |        | 4×5   | 11     |
| 6.8                   |       |        |       |        | 4×5   | 10     | 4×5   | 13     |
| 10                    |       |        | 4×5   | 14     | 4×5   | 16     | 4×5   | 18     |
| 15                    |       |        | 4×5   | 18     | 4×5   | 22     | 5×5   | 26     |
| 22                    | 4×5   | 20     | 4×5   | 22     | 5×5   | 30     | 5×5   | 35     |
| 33                    | 4×5   | 27     | 5×5   | 34     | 5×5   | 45     | 6.3×5 | 51     |
| 47                    | 4×5   | 37     | 5×5   | 37     | 6.3×5 | 50     | 6.3×5 | 65     |
| 68                    | 5×5   | 45     | 6.3×5 | 55     | 6.3×5 | 59     | 6.3×5 | 70     |
| 100                   | 5×5   | 62     | 6.3×5 | 62     | 6.3×5 | 80     | 8×5   | 92     |
| 220                   | 6.3×5 | 74     | 8×5   | 120    | 8×5   | 145    |       |        |
| 330                   | 8×5   | 145    | 8×5   | 145    |       |        |       |        |
| 470                   | 8×5   | 181    |       |        |       |        |       |        |

| Vdc<br>Cap( $\mu F$ ) | 25    |        | 35    |        | 50    |        |
|-----------------------|-------|--------|-------|--------|-------|--------|
|                       | Size  | Ripple | Size  | Ripple | Size  | Ripple |
| 0.47                  |       |        |       |        | 4×5   | 6      |
| 0.68                  |       |        |       |        | 4×5   | 7      |
| 1                     |       |        |       |        | 4×5   | 8.6    |
| 1.5                   |       |        |       |        | 4×5   | 8.7    |
| 2.2                   |       |        | 4×5   | 9      | 4×5   | 9.1    |
| 3.3                   | 4×5   | 11     | 4×5   | 12     | 4×5   | 13     |
| 4.7                   | 4×5   | 13     | 4×5   | 14     | 5×5   | 20     |
| 6.8                   | 4×5   | 19     | 5×5   | 20     | 6.3×5 | 26     |
| 10                    | 5×5   | 27     | 5×5   | 27     | 6.3×5 | 31     |
| 15                    | 5×5   | 33     | 6.3×5 | 35     | 6.3×5 | 39     |
| 22                    | 6.3×5 | 46     | 6.3×5 | 46     | 8×5   | 60     |
| 33                    | 6.3×5 | 54     | 8×5   | 65     | 8×5   | 80     |
| 47                    | 6.3×5 | 65     | 8×5   | 85     |       |        |
| 68                    | 8×5   | 90     |       |        |       |        |
| 100                   | 8×5   | 120    |       |        |       |        |