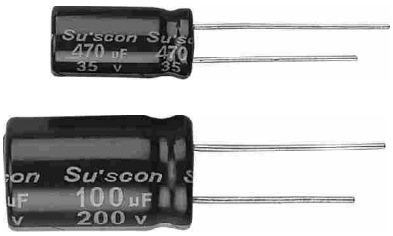
# MF series



- Low IMP, high reliability, long life.
- Suitable for switching regulator of computer, etc.
- 低阻抗、高信賴度、長壽命。
- 適用於電腦類產品的開關調節器。




## SPECIFICATIONS

| Items 項目 | Characteristics 特 性 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Capacitance Tolerance<br>靜電容量誤差 | ±20% (120Hz, 20°C) | | | | | | | | | | |
| Operating Temperature Range<br>適用溫度範圍 | -55 ~ +105°C | | | -40 ~ +105°C | | | -25 ~ +105°C | | | | |
| Rated Voltage Range<br>工作電壓範圍 | 6.3 ~ 100V | | | 160 ~ 400V | | | 450V | | | | |
| Leakage Current<br>洩漏電流 | WV≦100V, I≦0.01CV or 3μA (After 2 minutes application of DC working voltage, at 20°C)<br>WV＞100V, I≦0.03CV+20 (μA) (After 5 minutes application of DC working voltage, at 20°C) | | | | | | | | | | |
| Dissipation Factor<br>散逸因素 (tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | | |
| | Rated Voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160~250 | 350 | 400~450 |
| | tan δ (Max) | 0.20 | 0.17 | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 | 0.08 | 0.15 | 0.20 | 0.25 |
| | When nominal capacitance exceeds 1000μF,<br>add 0.02 to the value above for each 1000μF increase. (20°C、120Hz) | | | | | | | | | | |
| Low Temperature Stability<br>低溫特性<br>Impedance Ratio (Max)<br>阻抗比率 (最大值) | Measurement Frequency: 120Hz | | | | | | | | | | |
| | Rated Voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63~100 | | 160~250 | 350, 400 | 450 |
| | Z (-25°C) / Z (20°C) | 4 | 3 | 2 | 2 | 2 | 2 | 2 | | 3 | 6 | 15 |
| | Z (-40°C) / Z (20°C) | - | - | - | - | - | 3 | 3 | | 4 | 10 | - |
| | Z (-55°C) / Z (20°C) | 8 | 6 | 4 | 3 | 3 | 3 | - | | - | - | - |
| Load Life 負荷壽命 | 5,000hours, with application of working voltage at 105°C ( φD≦8mm, 2,000hrs) | | | | | | | | | | |
| | Capacitance Change | Within ±20% of Initial Value | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | |
| Shelf Life 放置壽命 | 1,000hours, no voltage applied, at 105°C。<br>After Test：UR to be applied for 30 minutes, 24 to 48hours before measurement. | | | | | | | | | | |
| | Capacitance Change | Within ±20% of Initial Value | | | | | | | | | |
| | tan δ | 150% or less of Initial Specified Value | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4-1 and JIS C 5101-2 | | | | | | | | | | |

## PERMISSIBLE RIPPLE CURRENT

### Temperature Coefficient

| TEMP (°C) | 65 | 75 | 85 | 95 | 105 |
|---|---|---|---|---|---|
| Coefficient | 2.10 | 1.90 | 1.70 | 1.50 | 1.00 |

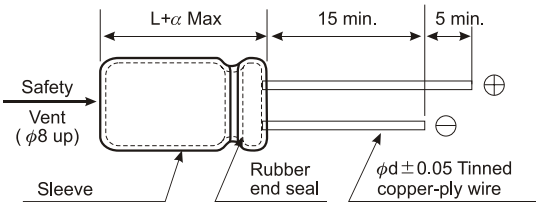
### Frequency Coefficient

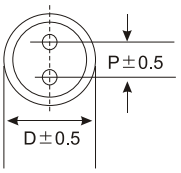
| WV (V) | Capacitance ( μF ) | Frequency (Hz) | | | | |
|---|---|---|---|---|---|---|
| | | 50 | 120 | 1K | 10K | 100K |
| 6.3 ~ 100 | 10 ~ 100 | 0.60 | 0.70 | 0.85 | 0.95 | 1.00 |
| | 220 ~ 1800 | 0.65 | 0.75 | 0.90 | 0.98 | 1.00 |
| | 2200 ~ 15000 | 0.75 | 0.80 | 1.00 | 1.00 | 1.00 |
| 160 ~ 450 | 1 ~ 330 | 0.55 | 0.65 | 0.80 | 0.90 | 1.00 |

# MF series



## DIMENSIONS (mm)




| φ D | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 |
|---|---|---|---|---|---|---|---|
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 |
| φ d | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |

| α | ( L＜16) 1.0<br>( L≧16) 2.0 |
|---|---|

## STANDARD RATINGS

DxL (mm); R.C.: (mA rms) at 105°C, 100KHz; IMP: (Ω max) at 20°C, 100KHz.

| Cap (μF) | WV(V) (Code) | 6.3 (0J) | | | 10 (1A) | | | 16 (1C) | | | 25 (1E) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP |
| 33 | | | | | | | | | | | 5x11 | 145 | 0.920 |
| 47 | | | | | | | | 5x11 | 145 | 0.920 | 6.3x11 | 200 | 0.750 |
| 100 | | 5x11 | 140 | 0.920 | 6.3x11 | 200 | 0.900 | 6.3x11 | 240 | 0.450 | 8x12 | 360 | 0.350 |
| 220 | | 6.3x11 | 275 | 0.390 | 8x12 | 360 | 0.410 | 8x12 | 450 | 0.270 | 10x13 | 550 | 0.170 |
| 330 | | 8x12 | 395 | 0.270 | 8x12 | 450 | 0.220 | 10x13 | 615 | 0.180 | 10x16 | 800 | 0.110 |
| 470 | | 10x13 | 570 | 0.160 | 10x13 | 610 | 0.160 | 10x16 | 820 | 0.095 | 10x20 | 1050 | 0.072 |
| 560 | | 10x13 | 590 | 0.120 | 10x16 | 650 | 0.120 | 10x20 | 900 | 0.085 | 10x25 | 1250 | 0.058 |
| 680 | | 10x16 | 824 | 0.110 | 10x16 | 825 | 0.110 | 10x20 | 1050 | 0.065 | 10x30 | 1350 | 0.077 |
| 820 | | 10x16 | 840 | 0.076 | 10x20 | 900 | 0.075 | 10x25 | 1250 | 0.058 | 13x21 | 1400 | 0.048 |
| 1000 | | 10x20 | 940 | 0.066 | 10x20 | 1050 | 0.063 | 10x30 | 1350 | 0.052 | 13x25 | 1680 | 0.036 |
| 1200 | | 10x20 | 1000 | 0.063 | 10x25 | 1250 | 0.055 | 13x21 | 1400 | 0.045 | 13x25 | 1800 | 0.034 |
| 1500 | | 10x25 | 1200 | 0.053 | 10x30 | 1450 | 0.049 | 13x25 | 1700 | 0.035 | 13x30 | 1970 | 0.032 |
| 1800 | | 10x30 | 1350 | 0.050 | 13x21 | 1450 | 0.042 | 13x30 | 1970 | 0.032 | 13x35 | 2230 | 0.028 |
| 2200 | | 10x30 | 1450 | 0.045 | 13x25 | 1650 | 0.035 | 13x30 | 2000 | 0.030 | 13x40 | 2450 | 0.025 |
| 2700 | | 13x25 | 1705 | 0.035 | 13x30 | 1970 | 0.032 | 13x35 | 2200 | 0.028 | 16x32 | 2700 | 0.024 |
| 3300 | | 13x25 | 1800 | 0.033 | 13x35 | 2100 | 0.029 | 13x40 | 2450 | 0.026 | 16x36 | 2760 | 0.022 |
| 3900 | | 13x30 | 1900 | 0.032 | 13x40 | 2300 | 0.026 | 16x32 | 2500 | 0.025 | 18x35 | 3100 | 0.019 |
| 4700 | | 13x35 | 2232 | 0.028 | 16x32 | 2400 | 0.024 | 16x36 | 2780 | 0.022 | 18x40 | 3300 | 0.017 |
| 5600 | | 13x40 | 2460 | 0.025 | 16x32 | 2550 | 0.023 | 18x35 | 3110 | 0.021 | | | |
| 6800 | | 16x32 | 2520 | 0.024 | 16x36 | 2650 | 0.022 | 18x35 | 3100 | 0.020 | | | |
| 8200 | | 16x36 | 2760 | 0.023 | 18x35 | 3100 | 0.020 | 18x40 | 3300 | 0.018 | | | |
| 10000 | | 18x32 | 3100 | 0.018 | 18x40 | 3300 | 0.017 | | | | | | |
| 12000 | | 18x35 | 3450 | 0.018 | | | | | | | | | |
| 15000 | | 18x40 | 4000 | 0.017 | | | | | | | | | |

| Cap (μF) | WV(V) (Code) | 35 (1V) | | | 50 (1H) | | | 63 (1J) | | | 100 (2A) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP |
| 10 | | | | | 5x11 | 100 | 1.550 | 5x11 | 125 | 1.650 | 6.3x11 | 130 | 1.250 |
| 22 | | 5x11 | 150 | 0.920 | 6.3x11 | 185 | 0.780 | 6.3x11 | 205 | 0.830 | 8x12 | 220 | 0.600 |
| 33 | | 6.3x11 | 210 | 0.780 | 6.3x11 | 230 | 0.520 | 8x12 | 240 | 0.570 | 10x13 | 330 | 0.430 |
| 47 | | 6.3x11 | 260 | 0.400 | 8x12 | 320 | 0.380 | 8x12 | 350 | 0.420 | 10x20 | 410 | 0.330 |
| 100 | | 8x12 | 450 | 0.200 | 10x16 | 590 | 0.180 | 10x20 | 680 | 0.230 | 10x30 | 720 | 0.190 |
| 220 | | 10x16 | 820 | 0.085 | 10x25 | 1140 | 0.069 | 13x21 | 1250 | 0.100 | 16x26 | 1150 | 0.098 |
| 330 | | 10x20 | 1050 | 0.063 | 10x30 | 1260 | 0.060 | 13x25 | 1370 | 0.077 | 16x32 | 1470 | 0.067 |
| 470 | | 10x30 | 1300 | 0.058 | 13x25 | 1500 | 0.044 | 16x26 | 1600 | 0.068 | 18x35 | 1720 | 0.061 |
| 560 | | 13x21 | 1450 | 0.045 | 13x30 | 1710 | 0.040 | 16x32 | 1900 | 0.052 | 18x35 | 2020 | 0.046 |
| 680 | | 13x25 | 1700 | 0.035 | 13x35 | 1910 | 0.032 | 16x32 | 2000 | 0.048 | 18x40 | 2250 | 0.041 |
| 820 | | 13x25 | 1860 | 0.033 | 13x40 | 2120 | 0.030 | 16x36 | 2170 | 0.045 | | | |
| 1000 | | 13x30 | 1970 | 0.031 | 16x32 | 2150 | 0.029 | 18x35 | 2230 | 0.042 | | | |
| 1200 | | 16x26 | 2200 | 0.028 | 16x36 | 2310 | 0.026 | 18x40 | 2460 | 0.039 | | | |
| 1500 | | 16x26 | 2300 | 0.027 | 18x32 | 2340 | 0.026 | | | | | | |
| 1800 | | 16x32 | 2500 | 0.026 | 18x35 | 2610 | 0.024 | | | | | | |
| 2200 | | 16x36 | 2760 | 0.023 | 18x40 | 2800 | 0.020 | | | | | | |
| 2700 | | 18x35 | 3100 | 0.021 | | | | | | | | | |
| 3300 | | 18x40 | 3300 | 0.017 | | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

# MF series



## STANDARD RATINGS

DxL (mm); R.C.: (mA rms) at 105°C, 100KHz.

| Cap (μF) | WV(V) (Code) | 160 (2C) | | 200 (2D) | | 250 (2E) | |
|---|---|---|---|---|---|---|---|
| | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 1 | | 6.3x11 | 50 | 6.3x11 | 56 | 8x12 | 58 |
| 2.2 | | 6.3x11 | 76 | 8x12 | 76 | 10x13 | 83 |
| 3.3 | | 8x12 | 120 | 10x13 | 120 | 10x16 | 132 |
| 4.7 | | 10x13 | 145 | 10x16 | 153 | 10x16 | 156 |
| 10 | | 10x16 | 235 | 10x20 | 243 | 10x20 | 300 |
| 22 | | 10x20 | 445 | 10x20 | 445 | 13x21 | 490 |
| 33 | | 13x21 | 570 | 13x21 | 590 | 13x25 | 640 |
| 47 | | 13x25 | 640 | 13x25 | 750 | 13x25 | 800 |
| 100 | | 16x26 | 1300 | 16x26 | 1300 | 16x32 | 1450 |
| 150 | | 16x32 | 1350 | 16x36 | 1450 | 18x32 | 1500 |
| 220 | | 16x36 | 1400 | 18x35 | 1550 | 18x40 | 1800 |
| 330 | | 18x35 | 1800 | | | | |

| Cap (μF) | WV(V) (Code) | 350 (2V) | | 400 (2G) | | 450 (2W) | |
|---|---|---|---|---|---|---|---|
| | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 1 | | 8x12 | 53 | 8x12 | 45 | 10x16 | 48 |
| 2.2 | | 10x13 | 87 | 10x13 | 73 | 10x20 | 72 |
| 3.3 | | 10x16 | 138 | 10x16 | 123 | 10x20 | 160 |
| 4.7 | | 10x20 | 160 | 10x20 | 140 | 13x21 | 210 |
| 10 | | 10x20 | 190 | 13x21 | 200 | 13x25 | 320 |
| 22 | | 13x21 | 280 | 13x25 | 320 | 16x26 | 580 |
| 33 | | 16x22 | 600 | 16x22 | 600 | 16x32 | 630 |
| 47 | | 16x26 | 750 | 16x26 | 720 | 18x32 | 950 |
| 100 | | 18x32 | 1200 | 18x40 | 1300 | | |

※ 13mm may be replaced by 12.5mm upon customer's request.