

## MF series

sales016@heyuecap.com

- Low impedance、High reliability、2000~5000 hours Long life at 105°C.
- Suitable for switching regulator of computer,etc.
- RoHS Compliance
- 低阻抗、高信賴性、105°C 2000~5000小時壽命。
- 適用於電腦類開關調節器。



## 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                                  | -40 ~ +105°C                                                                                                                                                                                                                                                                        |      |                                         |      |      |      |      | -25 ~ +105°C |         |         |         |      |         |      |
| Rated Voltage Range<br>額定電壓範圍                                          | 6.3 ~ 400VDC                                                                                                                                                                                                                                                                        |      |                                         |      |      |      |      | 450VDC       |         |         |         |      |         |      |
| Leakage Current<br>洩漏電流                                                | V ≤ 100V I ≤ 0.01CV or 3 ( μA ) ( After 2 minutes application of DC rated voltage, at 20°C)<br>V > 100V I ≤ 0.03CV +20 ( μA ) ( After 5 minutes application of DC rated 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           | 80      | 100     | 160~250 | 350  | 400~450 | 500  |
|                                                                        | tan δ(Max)                                                                                                                                                                                                                                                                          | 0.20 | 0.17                                    | 0.16 | 0.14 | 0.12 | 0.10 | 0.08         | 0.08    | 0.08    | 0.15    | 0.20 | 0.25    | 0.25 |
|                                                                        | When nominal capacitance over 1000μF, tanδ shall be added 0.02 to the listed value with increase of every 1000μF .                                                                                                                                                                  |      |                                         |      |      |      |      |              |         |         |         |      |         |      |
| 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)                                                                                                                                                                                                                                                                    | 8    | 6                                       | 4    | 3    | 3    | 3    | 3            | 4       | 10      | -       |      |         |      |
| Load Life 負荷壽命                                                         | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for 5,000 hours (ΦD≤6.3:2,000 hours;ΦD=8:3,000 hours) at 105°C.                                                     |      |                                         |      |      |      |      |              |         |         |         |      |         |      |
|                                                                        | 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                                                        | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. |      |                                         |      |      |      |      |              |         |         |         |      |         |      |
|                                                                        | 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                                                         | IEC 60384-4(JIS C5101-4)                                                                                                                                                                                                                                                            |      |                                         |      |      |      |      |              |         |         |         |      |         |      |

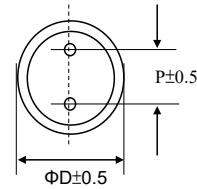
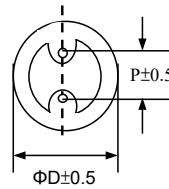
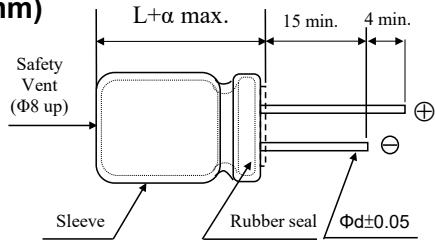
## Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Capacitance ( $\mu F$ ) | Frequency (Hz) |      |      |      |      |
|-------------------|-------------------------|----------------|------|------|------|------|
|                   |                         | 50             | 120  | 1K   | 10K  | 100K |
| 6.3 ~ 100         | 10 ~ 150                | 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 |

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## DIMENSIONS(mm)



| ΦD | 5   | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|----|-----|-----|-----|-----|------|-----|-----|
| P  | 2.0 | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| Φd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6  | 0.8 | 0.8 |

|          |               |     |
|----------|---------------|-----|
| $\alpha$ | $(L < 20)$    | 1.5 |
|          | $(L \geq 20)$ | 2.0 |

## STANDARD RATINGS

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

| Cap<br>(μF) | V       | 6.3   |       |     | 10      |      |       | 16      |      |       | 25      |      |       |
|-------------|---------|-------|-------|-----|---------|------|-------|---------|------|-------|---------|------|-------|
|             | 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    | 180  | 0.650 | 6.3x11  | 210  | 0.600 |
| 100         | 5x11    | 140   | 0.920 |     | 5x11    | 180  | 0.650 | 5x11    | 230  | 0.550 | 6.3x11  | 370  | 0.350 |
| 220         | 6.3x11  | 275   | 0.300 |     | 6.3x11  | 340  | 0.300 | 8x11.5  | 580  | 0.280 | 8x11.5  | 640  | 0.230 |
| 330         | 6.3x11  | 320   | 0.300 |     | 8x11.5  | 580  | 0.280 | 8x11.5  | 640  | 0.230 | 10x12.5 | 865  | 0.080 |
| 470         | 8x11.5  | 580   | 0.280 |     | 8x11.5  | 640  | 0.230 | 8x15    | 840  | 0.150 | 10x16   | 1210 | 0.060 |
| 560         | 8x11.5  | 640   | 0.230 |     | 10x12.5 | 780  | 0.160 | 10x12.5 | 880  | 0.100 | 10x16   | 1320 | 0.055 |
| 680         | 8x11.5  | 720   | 0.140 |     | 10x12.5 | 820  | 0.110 | 10x16   | 1000 | 0.085 | 10x20   | 1380 | 0.052 |
| 820         | 8x15    | 840   | 0.087 |     | 8x15    | 865  | 0.080 | 10x16   | 1040 | 0.076 | 10x20   | 1400 | 0.046 |
| 1000        | 10x12.5 | 865   | 0.080 |     | 10x16   | 1040 | 0.076 | 10x20   | 1210 | 0.060 | 12.5x20 | 1900 | 0.035 |
| 1200        | 10x16   | 960   | 0.064 |     | 10x16   | 1210 | 0.060 | 10x25   | 1580 | 0.042 | 12.5x20 | 2058 | 0.032 |
| 1500        | 10x16   | 1210  | 0.060 |     | 10x20   | 1400 | 0.058 | 12.5x20 | 1870 | 0.035 | 12.5x20 | 2124 | 0.030 |
| 1800        | 10x20   | 1400  | 0.058 |     | 12.5x20 | 1580 | 0.042 | 12.5x20 | 1900 | 0.032 | 12.5x30 | 2340 | 0.028 |
| 2200        | 10x25   | 1450  | 0.046 |     | 12.5x20 | 1900 | 0.032 | 12.5x20 | 2124 | 0.030 | 12.5x35 | 2450 | 0.026 |
| 2700        | 12.5x20 | 1580  | 0.042 |     | 12.5x20 | 2124 | 0.030 | 12.5x30 | 2340 | 0.028 | 12.5x35 | 2743 | 0.024 |
| 3300        | 12.5x20 | 1870  | 0.035 |     | 12.5x30 | 2340 | 0.028 | 12.5x35 | 2450 | 0.026 | 16x31.5 | 3029 | 0.022 |
| 3900        | 12.5x20 | 1900  | 0.032 |     | 12.5x35 | 2450 | 0.026 | 16x25   | 2500 | 0.028 | 16x35.5 | 3124 | 0.020 |
| 4700        | 12.5x20 | 2124  | 0.030 |     | 16x25   | 2500 | 0.028 | 16x31.5 | 3029 | 0.022 | 18x35.5 | 3638 | 0.019 |
| 5600        | 12.5x30 | 2524  | 0.026 |     | 16x25   | 2552 | 0.026 | 16x35.5 | 3124 | 0.020 | 18x40   | 3781 | 0.016 |
| 6800        | 16x25   | 2760  | 0.028 |     | 16x31.5 | 3029 | 0.022 | 16x40   | 3586 | 0.019 |         |      |       |
| 8200        | 16x31.5 | 3029  | 0.022 |     | 16x31.5 | 3600 | 0.020 | 18x35.5 | 3750 | 0.018 |         |      |       |
| 10000       | 16x35.5 | 3124  | 0.020 |     | 18x35.5 | 3638 | 0.019 |         |      |       |         |      |       |
| 12000       | 18x31.5 | 3600  | 0.020 |     |         |      |       |         |      |       |         |      |       |
| 15000       | 18x35.5 | 3781  | 0.018 |     |         |      |       |         |      |       |         |      |       |

| Cap<br>(μF) | V       | 35    |       |     | 50      |      |       | 63      |      |       | 100     |      |       |
|-------------|---------|-------|-------|-----|---------|------|-------|---------|------|-------|---------|------|-------|
|             | 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    | 120  | 1.400 | 5x11    | 125  | 1.650 | 6.3x11  | 130  | 1.250 |
| 22          | 5x11    | 150   | 0.920 |     | 5x11    | 160  | 1.200 | 6.3x11  | 240  | 0.780 | 8x11.5  | 230  | 0.850 |
| 33          | 5x11    | 220   | 0.430 |     | 6.3x11  | 230  | 0.300 | 8x11.5  | 270  | 0.650 | 10x12.5 | 330  | 0.690 |
| 47          | 6.3x11  | 280   | 0.300 |     | 6.3x11  | 295  | 0.300 | 8x11.5  | 300  | 0.504 | 10x12.5 | 370  | 0.450 |
| 100         | 8x11.5  | 450   | 0.200 |     | 10x12.5 | 760  | 0.120 | 10x16   | 610  | 0.160 | 10x25   | 560  | 0.300 |
| 220         | 10x12.5 | 760   | 0.100 |     | 10x16   | 1150 | 0.078 | 10x20   | 1100 | 0.120 | 12.5x20 | 880  | 0.280 |
| 330         | 10x16   | 1210  | 0.060 |     | 12.5x20 | 1660 | 0.055 | 12.5x20 | 1280 | 0.100 | 16x25   | 1440 | 0.130 |
| 470         | 10x20   | 1400  | 0.058 |     | 12.5x20 | 1950 | 0.046 | 12.5x20 | 1710 | 0.082 | 18x31.5 | 1690 | 0.110 |
| 560         | 12.5x20 | 1660  | 0.055 |     | 12.5x20 | 2124 | 0.034 | 16x25   | 1820 | 0.058 | 18x35.5 | 2020 | 0.043 |
| 680         | 12.5x20 | 1900  | 0.035 |     | 12.5x30 | 2310 | 0.030 | 16x25   | 1850 | 0.055 | 18x35.5 | 2100 | 0.043 |
| 820         | 12.5x20 | 2124  | 0.030 |     | 12.5x35 | 2510 | 0.025 | 16x31.5 | 2250 | 0.043 |         |      |       |
| 1000        | 12.5x20 | 2340  | 0.028 |     | 12.5x35 | 2920 | 0.022 | 16x35.5 | 2450 | 0.036 |         |      |       |
| 1200        | 12.5x30 | 2524  | 0.026 |     | 16x31.5 | 3010 | 0.022 | 18x31.5 | 2580 | 0.031 |         |      |       |
| 1500        | 16x25   | 2600  | 0.026 |     | 16x35.5 | 3150 | 0.020 |         |      |       |         |      |       |
| 1800        | 16x25   | 2850  | 0.025 |     | 18x31.5 | 3635 | 0.020 |         |      |       |         |      |       |
| 2200        | 16x31.5 | 3029  | 0.022 |     | 18x35.5 | 3680 | 0.017 |         |      |       |         |      |       |
| 2700        | 18x31.5 | 3600  | 0.020 |     |         |      |       |         |      |       |         |      |       |
| 3300        | 18x40   | 3781  | 0.015 |     |         |      |       |         |      |       |         |      |       |

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STANDARD RATINGS

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

| Cap<br>(μF) | V    | 160     |      | 200     |      | 250     |      |
|-------------|------|---------|------|---------|------|---------|------|
|             | Item | D x L   | R.C. | D x L   | R.C. | D x L   | R.C. |
| 4.7         |      |         |      |         |      | 8x11.5  | 150  |
| 10          |      | 10x16   | 330  | 10x16   | 330  | 10x16   | 330  |
| 22          |      | 10x20   | 510  | 10x20   | 510  | 10x20   | 510  |
| 33          |      | 10x20   | 650  | 10x20   | 650  | 12.5x20 | 800  |
| 47          |      | 10x20   | 750  | 12.5x20 | 980  | 12.5x20 | 980  |
| 100         |      | 12.5x25 | 1420 | 16x25   | 1580 | 16x31.5 | 1750 |
| 150         |      | 16x25   | 1900 | 16x25   | 1900 | 18x31.5 | 2050 |
| 330         |      | 18x25   | 2100 | 18x31.5 | 2300 |         |      |

| Cap<br>(μF) | V    | 350     |      | 400     |      | 450     |      |
|-------------|------|---------|------|---------|------|---------|------|
|             | Item | D x L   | R.C. | D x L   | R.C. | D x L   | R.C. |
| 2.2         |      |         |      | 10x13   | 150  |         |      |
| 3.3         |      |         |      | 10x13   | 160  |         |      |
| 4.7         |      | 10x13   | 140  | 10x16   | 230  | 10x20   | 210  |
| 10          |      | 10x20   | 350  | 10x20   | 350  | 12.5x20 | 450  |
| 22          |      | 12.5x20 | 640  | 12.5x20 | 640  | 16x20   | 750  |
| 33          |      | 16x20   | 850  | 16x20   | 850  | 16x25   | 950  |
| 47          |      | 16x25   | 1030 | 16x25   | 1030 | 18x25   | 1050 |
| 100         |      | 16x31.5 | 1180 | 18x31.5 | 1180 | 18x31.5 | 1230 |