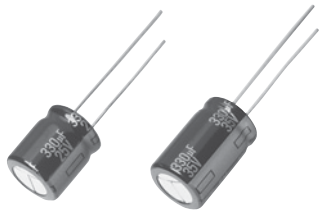
# Radial Lead Type

Series : **FM** Type : **A**



## Features

- Low impedance (40 % to 70 % less than FC Series)
- Endurance : 105 °C 2000 h to 7000 h
- RoHS compliant

## Attention

- Not applicable for automotive

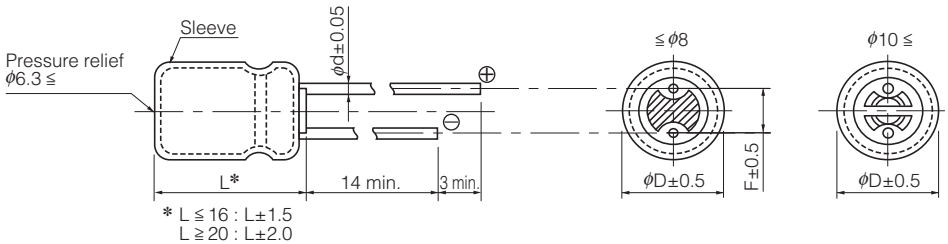
## Specifications

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Category temperature range | –40 °C to +105 °C | | | | | | | |
| Rated voltage range | 6.3 V.DC to 50 V.DC | | | | | | | |
| Capacitance range | 22 µF to 6800 µF | | | | | | | |
| Capacitance tolerance | ±20 % (120 Hz/+20 °C) | | | | | | | |
| Leakage current | I ≦ 0.01 CV (µA) After 2 minutes | | | | | | | |
| Dissipation factor (tan $\delta$) | V.DC | 6.3 | 10 | 16 | 25 | 35 | 50 | (max.) (120 Hz/+20 °C) |
| | tan $\delta$ | 0.22 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | |
| | Add 0.02 per 1000 µF for products of 1000 µF or more. | | | | | | | |
| Endurance | After following life test with DC voltage and +105 °C±2 °C ripple current value applied. (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below.<br>Duration<br>$\phi$5 to $\phi$6.3 : 2000 hours, $\phi$8×11.5 to $\phi$8×15: 3000 hours<br>$\phi$8×20 to $\phi$10×16 : 4000 hours, $\phi$10×20 to $\phi$12.5×20/ $\phi$16×20 : 5000 hours<br>$\phi$12.5×25 to $\phi$12.5×35/ $\phi$16×25 : 7000 hours | | | | | | | |
| | Capacitance change | Within ±25 % of the initial value (6.3 V.DC to 10 V.DC : ±30 %) | | | | | | |
| | tan $\delta$ | ≦ 200 % of the initial limit | | | | | | |
| | DC leakage current | Within the initial limit | | | | | | |
| Shelf life | After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment) | | | | | | | |

## Frequency correction factor for ripple current

| Rated voltage (V.DC) | Capacitance (µF) | Frequency (Hz) | | | | |
|---|---|---|---|---|---|---|
| | | 60 | 120 | 1 k | 10 k | 100 k |
| 6.3 to 50 | 22 to 33 | 0.45 | 0.55 | 0.75 | 0.90 | 1.00 |
| | 47 to 330 | 0.60 | 0.70 | 0.85 | 0.95 | 1.00 |
| | 390 to 1000 | 0.65 | 0.75 | 0.90 | 0.98 | 1.00 |
| | 1200 to 6800 | 0.75 | 0.80 | 0.95 | 1.00 | 1.00 |

## Dimensions




* L ≦ 16 : L±1.5
L ≧ 20 : L±2.0

(Unit : mm)

| φD | 5 | 6.3 | 8 | 10 | 12.5 | | 16 |
|---|---|---|---|---|---|---|---|
| L | — | — | — | — | 12.5 to 25 | 30 to 40 | — |
| 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 |

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

## Case size/ Impedance/ Ripple current

| Rated voltage (V.DC) / Case size (mm) (φD×L) | 6.3 V.DC to 35 V.DC | | | 50 V.DC | | |
|---|---|---|---|---|---|---|
| | Impedance (Ω/100 kHz) | | Ripple current (mA r.m.s./100 kHz) | Impedance (Ω/100 kHz) | | Ripple current (mA r.m.s./100 kHz) |
| | +20 °C | –10 °C | +105 °C | +20 °C | –10 °C | +105 °C |
| 5 × 11 | 0.300 | 1.000 | 280 | 0.340 | 1.130 | 250 |
| 6.3 × 11.2 | 0.130 | 0.430 | 455 | 0.140 | 0.460 | 405 |
| 8 × 11.5 | 0.056 | 0.168 | 950 | 0.061 | 0.183 | 870 |
| 8 × 15 | 0.041 | 0.123 | 1240 | 0.045 | 0.135 | 1140 |
| 8 × 20 | 0.030 | 0.090 | 1560 | 0.033 | 0.099 | 1430 |
| 10 × 12.5 | 0.038 | 0.114 | 1290 | 0.042 | 0.126 | 1170 |
| 10 × 16 | 0.026 | 0.078 | 1790 | 0.030 | 0.090 | 1650 |
| 10 × 20 | 0.019 | 0.057 | 2180 | 0.023 | 0.069 | 1890 |
| 10 × 25 | 0.018 | 0.054 | 2470 | 0.022 | 0.066 | 2150 |
| 12.5 × 20 | 0.018 | 0.045 | 2600 | 0.022 | 0.055 | 2260 |
| 12.5 × 25 | 0.015 | 0.038 | 3190 | 0.018 | 0.045 | 2660 |
| 12.5 × 30 | 0.013 | 0.033 | 3630 | 0.016 | 0.040 | 3160 |
| 12.5 × 35 | 0.012 | 0.030 | 3750 | 0.014 | 0.035 | 3270 |
| 16 × 20 | 0.017 | 0.043 | 3300 | 0.019 | 0.048 | 2870 |
| 16 × 25 | 0.014 | 0.035 | 3820 | 0.016 | 0.040 | 3320 |

## Characteristics list

| Rated voltage (V.DC) | Cap. (±20 %) (μF) | Case size (mm) | | Specification | | | Lead length (mm) | | | | Part No. | Min. Packaging Q'ty | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Lead space | | | | | |
| | | φD | L | Ripple current (100 kHz) (+105 °C) (mA r.m.s.) | Impedance (100 kHz) (+20 °C) (Ω) | Endurance (hours) | Lead dia. φd | Straight | Taping ✻B | Taping ✻H | | Long lead (pcs) | Taping (pcs) |
| 6.3 | 150 | 5 | 11 | 280 | 0.300 | 2000 | 0.5 | 2.0 | 5.0 | 2.5 | EEUFM0J151( ) | 200 | 2000 |
| | 330 | 6.3 | 11.2 | 455 | 0.130 | 2000 | 0.5 | 2.5 | 5.0 | 2.5 | EEUFM0J331( ) | 200 | 2000 |
| | 560 | 8 | 11.5 | 950 | 0.056 | 3000 | 0.6 | 3.5 | 5.0 | | EEUFM0J561( ) | 200 | 1000 |
| | 820 | 8 | 15 | 1240 | 0.041 | 3000 | 0.6 | 3.5 | 5.0 | | EEUFM0J821L( ) | 200 | 1000 |
| | 1000 | 10 | 12.5 | 1290 | 0.038 | 4000 | 0.6 | 5.0 | 5.0 | | EEUFM0J102( ) | 200 | 500 |
| | 1200 | 8 | 20 | 1560 | 0.030 | 4000 | 0.6 | 3.5 | 5.0 | | EEUFM0J122L( ) | 200 | 1000 |
| | | 10 | 16 | 1790 | 0.026 | 4000 | 0.6 | 5.0 | 5.0 | | EEUFM0J122( ) | 200 | 500 |
| | 1500 | 10 | 20 | 2180 | 0.019 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM0J152( ) | 200 | 500 |
| | 2200 | 10 | 25 | 2470 | 0.018 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM0J222L( ) | 200 | 500 |
| | 3300 | 12.5 | 20 | 2600 | 0.018 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM0J332( ) | 200 | 500 |
| | 3900 | 12.5 | 25 | 3190 | 0.015 | 7000 | 0.6 | 5.0 | 5.0 | | EEUFM0J392( ) | 200 | 500 |
| | 4700 | 12.5 | 30 | 3630 | 0.013 | 7000 | 0.8 | 5.0 | | | EEUFM0J472L | 100 | |
| | 5600 | 12.5 | 35 | 3750 | 0.012 | 7000 | 0.8 | 5.0 | | | EEUFM0J562L | 100 | |
| | | 16 | 20 | 3300 | 0.017 | 5000 | 0.8 | 7.5 | 7.5 | | EEUFM0J562S( ) | 100 | 250 |
| | 6800 | 16 | 25 | 3820 | 0.014 | 7000 | 0.8 | 7.5 | 7.5 | | EEUFM0J682( ) | 100 | 250 |
| 10 | 100 | 5 | 11 | 280 | 0.300 | 2000 | 0.5 | 2.0 | 5.0 | 2.5 | EEUFM1A101( ) | 200 | 2000 |
| | 220 | 6.3 | 11.2 | 455 | 0.130 | 2000 | 0.5 | 2.5 | 5.0 | 2.5 | EEUFM1A221( ) | 200 | 2000 |
| | 470 | 8 | 11.5 | 950 | 0.056 | 3000 | 0.6 | 3.5 | 5.0 | | EEUFM1A471( ) | 200 | 1000 |
| | 680 | 8 | 15 | 1240 | 0.041 | 3000 | 0.6 | 3.5 | 5.0 | | EEUFM1A681L( ) | 200 | 1000 |
| | | 10 | 12.5 | 1290 | 0.038 | 4000 | 0.6 | 5.0 | 5.0 | | EEUFM1A681( ) | 200 | 500 |
| | 1000 | 8 | 20 | 1560 | 0.030 | 4000 | 0.6 | 3.5 | 5.0 | | EEUFM1A102L( ) | 200 | 1000 |
| | | 10 | 16 | 1790 | 0.026 | 4000 | 0.6 | 5.0 | 5.0 | | EEUFM1A102( ) | 200 | 500 |
| | 1200 | 10 | 20 | 2180 | 0.019 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM1A122( ) | 200 | 500 |
| | 1500 | 10 | 25 | 2470 | 0.018 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM1A152L( ) | 200 | 500 |
| | 2200 | 12.5 | 20 | 2600 | 0.018 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM1A222( ) | 200 | 500 |
| | 3300 | 12.5 | 25 | 3190 | 0.015 | 7000 | 0.6 | 5.0 | 5.0 | | EEUFM1A332( ) | 200 | 500 |
| | 3900 | 12.5 | 30 | 3630 | 0.013 | 7000 | 0.8 | 5.0 | | | EEUFM1A392L | 100 | |
| | | 16 | 20 | 3300 | 0.017 | 5000 | 0.8 | 7.5 | 7.5 | | EEUFM1A392S( ) | 100 | 250 |
| | 4700 | 12.5 | 35 | 3750 | 0.012 | 7000 | 0.8 | 5.0 | | | EEUFM1A472L | 100 | |
| | 5600 | 16 | 25 | 3820 | 0.014 | 7000 | 0.8 | 7.5 | 7.5 | | EEUFM1A562( ) | 100 | 250 |
| 16 | 68 | 5 | 11 | 280 | 0.300 | 2000 | 0.5 | 2.0 | 5.0 | 2.5 | EEUFM1C680( ) | 200 | 2000 |
| | 120 | 6.3 | 11.2 | 455 | 0.130 | 2000 | 0.5 | 2.5 | 5.0 | 2.5 | EEUFM1C121( ) | 200 | 2000 |
| | 330 | 8 | 11.5 | 950 | 0.056 | 3000 | 0.6 | 3.5 | 5.0 | | EEUFM1C331( ) | 200 | 1000 |
| | 470 | 8 | 15 | 1240 | 0.041 | 3000 | 0.6 | 3.5 | 5.0 | | EEUFM1C471L( ) | 200 | 1000 |
| | | 10 | 12.5 | 1290 | 0.038 | 4000 | 0.6 | 5.0 | 5.0 | | EEUFM1C471( ) | 200 | 500 |
| | 680 | 8 | 20 | 1560 | 0.030 | 4000 | 0.6 | 3.5 | 5.0 | | EEUFM1C681L( ) | 200 | 1000 |
| | | 10 | 16 | 1790 | 0.026 | 4000 | 0.6 | 5.0 | 5.0 | | EEUFM1C681( ) | 200 | 500 |
| | 1000 | 10 | 20 | 2180 | 0.019 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM1C102( ) | 200 | 500 |
| | 1200 | 10 | 25 | 2470 | 0.018 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM1C122L( ) | 200 | 500 |
| | 1500 | 12.5 | 20 | 2600 | 0.018 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM1C152( ) | 200 | 500 |
| | 2200 | 12.5 | 25 | 3190 | 0.015 | 7000 | 0.6 | 5.0 | 5.0 | | EEUFM1C222( ) | 200 | 500 |
| | 2700 | 12.5 | 30 | 3630 | 0.013 | 7000 | 0.8 | 5.0 | | | EEUFM1C272L | 100 | |
| | | 16 | 20 | 3300 | 0.017 | 5000 | 0.8 | 7.5 | 7.5 | | EEUFM1C272S( ) | 100 | 250 |
| | 3300 | 12.5 | 35 | 3750 | 0.012 | 7000 | 0.8 | 5.0 | | | EEUFM1C332L | 100 | |
| | 3900 | 16 | 25 | 3820 | 0.014 | 7000 | 0.8 | 7.5 | 7.5 | | EEUFM1C392( ) | 100 | 250 |

· When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch ✻B=5 mm, 7.5 mm, H=2.5 mm.

· Please refer to the page of "Taping dimensions".

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

## Characteristics list

| Rated voltage (V.DC) | Cap. (±20 %) (μF) | Case size (mm) | | Specification | | | Lead length (mm) | | | | Part No. | Min. Packaging Q'ty | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Lead space | | | | | |
| | | φD | L | Ripple current (100 kHz) (+105 °C) (mA r.m.s.) | Impedance (100 kHz) (+20 °C) (Ω) | Endurance (hours) | Lead dia. φd | Straight | Taping ✻B | Taping ✻H | | Long lead (pcs) | Taping (pcs) |
| 25 | 47 | 5 | 11 | 280 | 0.300 | 2000 | 0.5 | 2.0 | 5.0 | 2.5 | EEUFM1E470( ) | 200 | 2000 |
| | 100 | 6.3 | 11.2 | 455 | 0.130 | 2000 | 0.5 | 2.5 | 5.0 | 2.5 | EEUFM1E101( ) | 200 | 2000 |
| | 220 | 8 | 11.5 | 950 | 0.056 | 3000 | 0.6 | 3.5 | 5.0 | | EEUFM1E221( ) | 200 | 1000 |
| | 330 | 8 | 15 | 1240 | 0.041 | 3000 | 0.6 | 3.5 | 5.0 | | EEUFM1E331L( ) | 200 | 1000 |
| | | 10 | 12.5 | 1290 | 0.038 | 4000 | 0.6 | 5.0 | 5.0 | | EEUFM1E331( ) | 200 | 500 |
| | 470 | 8 | 20 | 1560 | 0.030 | 4000 | 0.6 | 3.5 | 5.0 | | EEUFM1E471L( ) | 200 | 1000 |
| | | 10 | 16 | 1790 | 0.026 | 4000 | 0.6 | 5.0 | 5.0 | | EEUFM1E471( ) | 200 | 500 |
| | 680 | 10 | 20 | 2180 | 0.019 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM1E681( ) | 200 | 500 |
| | 820 | 10 | 25 | 2470 | 0.018 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM1E821L( ) | 200 | 500 |
| | 1000 | 12.5 | 20 | 2600 | 0.018 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM1E102( ) | 200 | 500 |
| | 1500 | 12.5 | 25 | 3190 | 0.015 | 7000 | 0.6 | 5.0 | 5.0 | | EEUFM1E152( ) | 200 | 500 |
| | 1800 | 12.5 | 30 | 3630 | 0.013 | 7000 | 0.8 | 5.0 | | | EEUFM1E182L | 100 | |
| | | 16 | 20 | 3300 | 0.017 | 5000 | 0.8 | 7.5 | 7.5 | | EEUFM1E182S( ) | 100 | 250 |
| | 2200 | 12.5 | 35 | 3750 | 0.012 | 7000 | 0.8 | 5.0 | | | EEUFM1E222L | 100 | |
| | 2700 | 16 | 25 | 3820 | 0.014 | 7000 | 0.8 | 7.5 | 7.5 | | EEUFM1E272( ) | 100 | 250 |
| 35 | 33 | 5 | 11 | 280 | 0.300 | 2000 | 0.5 | 2.0 | 5.0 | 2.5 | EEUFM1V330( ) | 200 | 2000 |
| | 68 | 6.3 | 11.2 | 455 | 0.130 | 2000 | 0.5 | 2.5 | 5.0 | 2.5 | EEUFM1V680( ) | 200 | 2000 |
| | 150 | 8 | 11.5 | 950 | 0.056 | 3000 | 0.6 | 3.5 | 5.0 | | EEUFM1V151( ) | 200 | 1000 |
| | 220 | 8 | 15 | 1240 | 0.041 | 3000 | 0.6 | 3.5 | 5.0 | | EEUFM1V221L( ) | 200 | 1000 |
| | | 10 | 12.5 | 1290 | 0.038 | 4000 | 0.6 | 5.0 | 5.0 | | EEUFM1V221( ) | 200 | 500 |
| | 330 | 8 | 20 | 1560 | 0.030 | 4000 | 0.6 | 3.5 | 5.0 | | EEUFM1V331L( ) | 200 | 1000 |
| | | 10 | 16 | 1790 | 0.026 | 4000 | 0.6 | 5.0 | 5.0 | | EEUFM1V331( ) | 200 | 500 |
| | 470 | 10 | 20 | 2180 | 0.019 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM1V471( ) | 200 | 500 |
| | 560 | 10 | 25 | 2470 | 0.018 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM1V561L( ) | 200 | 500 |
| | 680 | 12.5 | 20 | 2600 | 0.018 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM1V681( ) | 200 | 500 |
| | 1000 | 12.5 | 25 | 3190 | 0.015 | 7000 | 0.6 | 5.0 | 5.0 | | EEUFM1V102( ) | 200 | 500 |
| | 1200 | 12.5 | 30 | 3630 | 0.013 | 7000 | 0.8 | 5.0 | | | EEUFM1V122L | 100 | |
| | | 16 | 20 | 3300 | 0.017 | 5000 | 0.8 | 7.5 | 7.5 | | EEUFM1V122S( ) | 100 | 250 |
| | 1500 | 12.5 | 35 | 3750 | 0.012 | 7000 | 0.8 | 5.0 | | | EEUFM1V152L | 100 | |
| | 1800 | 16 | 25 | 3820 | 0.014 | 7000 | 0.8 | 7.5 | 7.5 | | EEUFM1V182( ) | 100 | 250 |
| 50 | 22 | 5 | 11 | 250 | 0.340 | 2000 | 0.5 | 2.0 | 5.0 | 2.5 | EEUFM1H220( ) | 200 | 2000 |
| | 56 | 6.3 | 11.2 | 405 | 0.140 | 2000 | 0.5 | 2.5 | 5.0 | 2.5 | EEUFM1H560( ) | 200 | 2000 |
| | 100 | 8 | 11.5 | 870 | 0.061 | 3000 | 0.6 | 3.5 | 5.0 | | EEUFM1H101( ) | 200 | 1000 |
| | 120 | 8 | 15 | 1140 | 0.045 | 3000 | 0.6 | 3.5 | 5.0 | | EEUFM1H121L( ) | 200 | 1000 |
| | 150 | 10 | 12.5 | 1170 | 0.042 | 4000 | 0.6 | 5.0 | 5.0 | | EEUFM1H151( ) | 200 | 500 |
| | 180 | 8 | 20 | 1430 | 0.033 | 4000 | 0.6 | 3.5 | 5.0 | | EEUFM1H181L( ) | 200 | 1000 |
| | 220 | 10 | 16 | 1650 | 0.030 | 4000 | 0.6 | 5.0 | 5.0 | | EEUFM1H221( ) | 200 | 500 |
| | 270 | 10 | 20 | 1890 | 0.023 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM1H271( ) | 200 | 500 |
| | 330 | 10 | 25 | 2150 | 0.022 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM1H331L( ) | 200 | 500 |
| | 470 | 12.5 | 20 | 2260 | 0.022 | 5000 | 0.6 | 5.0 | 5.0 | | EEUFM1H471( ) | 200 | 500 |
| | 560 | 12.5 | 25 | 2660 | 0.018 | 7000 | 0.6 | 5.0 | 5.0 | | EEUFM1H561( ) | 200 | 500 |
| | 680 | 12.5 | 30 | 3160 | 0.016 | 7000 | 0.8 | 5.0 | | | EEUFM1H681L | 100 | |
| | 820 | 12.5 | 35 | 3270 | 0.014 | 7000 | 0.8 | 5.0 | | | EEUFM1H821L | 100 | |
| | | 16 | 20 | 2870 | 0.019 | 5000 | 0.8 | 7.5 | 7.5 | | EEUFM1H821S( ) | 100 | 250 |
| | 1000 | 16 | 25 | 3320 | 0.016 | 7000 | 0.8 | 7.5 | 7.5 | | EEUFM1H102( ) | 100 | 250 |

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· Please refer to the page of “Taping dimensions”.

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## Panasonic:

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