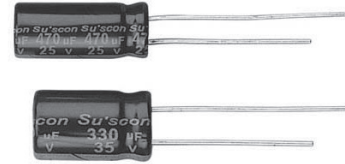


# HFN series

- Anhydrous product.
- Low impedance at High frequency range.
- High ripple current resistance, 105°C 4000~8000 hours long life.
- RoHS Compliance
- 無水系產品。
- 高頻低阻抗。
- 耐高紋波電流、105°C 4000~8000小時長壽命產品。



## 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 |       |       |       |       |
| Rated Voltage Range<br>額定電壓範圍   | 6.3 ~ 50VDC   |   |       |       | 63 ~ 100VDC  |       |       |       |       |
| Leakage Current<br>洩漏電流   | I ≤ 0.01CV or 3 (µA) which is greater.( After 2 minutes application of DC rated voltage, at 20 °C)  |   |       |       |              |       |       |       |       |
| Dissipation Factor<br>散逸因素( tan δ)  | Rated Voltage(V)  | 6.3                                     | 10    | 16    | 25           | 35    | 50    | 63    | 100   |
|   | tan δ(Max)  | 0.24                                    | 0.20  | 0.16  | 0.15         | 0.12  | 0.10  | 0.09  | 0.08  |
| 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   |
|   | Z(-25°C)/Z(20°C)  | 4                                       | 3     | 2     | 2            | 2     | 2     | 2     | 2     |
|   | Z(-40°C)/Z(20°C)  | -                                       | -     | -     | -            | -     | -     | 3     | 3     |
| Z(-55°C)/Z(20°C)  | 8   | 6                                       | 4     | 3     | 3            | 3     | -     | -     |       |
| 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 varied hours according to varied ϕ [ please refer to below sheet ] at 105°C.                                    |   |       |       |              |       |       |       |       |
|   | Time  | ϕ                                       | 5     | 6.3   | 8            | 10    | 13    | 16    | 18    |
|   |   | hours                                   | 4,000 | 4,000 | 5,000        | 6,000 | 7,000 | 8,000 | 8,000 |
|   | Capacitance Change  | within ±25% 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 ±25% of Initial Value            |       |       |              |       |       |       |       |
|   | tan δ   | 200% or less of Initial Specified Value |       |       |              |       |       |       |       |
|   | Leakage Current   | Initial Specified Value or less         |       |       |              |       |       |       |       |
| Standards 參照標準  | JIS C 5101-4 (IEC 60384)  |   |       |       |              |       |       |       |       |

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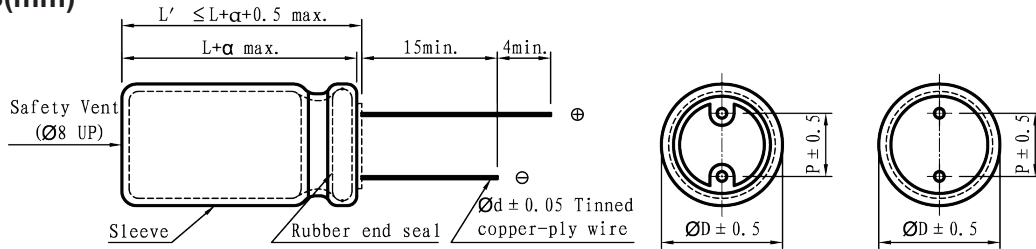
## Frequency Coefficient of Permissible Ripple Current

| Capacitance (µF) | Frequency (Hz) |      |      |      |
|------------------|----------------|------|------|------|
|                  | 120            | 1K   | 10K  | 100K |
| 5.6 ~ 180        | 0.40           | 0.75 | 0.90 | 1.00 |
| 220 ~ 560        | 0.50           | 0.85 | 0.94 | 1.00 |
| 680 ~ 1800       | 0.60           | 0.87 | 0.95 | 1.00 |
| 2200 ~ 3900      | 0.75           | 0.90 | 0.95 | 1.00 |
| 4700 ~ 18000     | 0.85           | 0.95 | 0.98 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

# HFN series

**DIMENSIONS(mm)**



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

|          |              |
|----------|--------------|
| $\alpha$ | (L < 16) 1.0 |
|          | (L ≥ 16) 2.0 |

**STANDARD RATINGS**

D×L(mm),R.C.(mA rms) at 105°C 100KHz; IMP (Ω max)at 20°C,-10°C 100KHz.

| Cap (μF) | V | Item   | 6.3   |       |       | 10     |       |       | 16    |        |       | 25    |        |        |       |       |      |
|----------|---|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|--------|--------|-------|-------|------|
|          |   |        | D x L | IMP   |       | R.C.   | D x L | IMP   |       | R.C.   | D x L | IMP   |        | R.C.   |       |       |      |
|          |   |        |       | 20°C  | -10°C |        |       | 20°C  | -10°C |        |       | 20°C  | -10°C  |        | 20°C  | -10°C |      |
| 47       |   |        |       |       |       |        |       |       | 5x11  | 0.550  | 1.100 | 170   | 5x11   | 0.600  | 1.210 | 175   |      |
| 100      |   |        |       |       |       | 5x11   | 0.550 | 1.100 | 170   | 6.3x11 | 0.290 | 0.550 | 295    | 6.3x11 | 0.310 | 0.610 | 295  |
| 150      |   | 5x11   | 0.550 | 1.100 | 170   |        |       |       |       |        |       |       | 6.3x15 | 0.220  | 0.430 | 420   |      |
| 220      |   |        |       |       |       | 6.3x11 | 0.270 | 0.550 | 295   | 6.3x15 | 0.190 | 0.400 | 410    | 8x12   | 0.150 | 0.290 | 650  |
| 330      |   | 6.3x11 | 0.270 | 0.550 | 295   | 6.3x15 | 0.200 | 0.390 | 400   | 8x12   | 0.140 | 0.260 | 660    | 8x16   | 0.110 | 0.220 | 750  |
| 390      |   |        |       |       |       |        |       |       |       |        |       |       | 10x13  | 0.110  | 0.220 | 770   |      |
| 470      |   | 6.3x15 | 0.200 | 0.400 | 400   | 8x12   | 0.140 | 0.260 | 650   | 8x20   | 0.091 | 0.180 | 830    | 8x20   | 0.096 | 0.180 | 820  |
| 560      |   |        |       |       |       |        |       |       |       | 8x16   | 0.100 | 0.200 | 740    |        |       |       |      |
| 680      |   | 8x12   | 0.140 | 0.280 | 655   | 8x16   | 0.100 | 0.200 | 830   | 10x13  | 0.100 | 0.200 | 770    | 10x16  | 0.085 | 0.170 | 1060 |
| 820      |   | 10x13  | 0.100 | 0.200 | 860   | 10x13  | 0.100 | 0.200 | 860   | 10x16  | 0.077 | 0.150 | 1070   | 10x20  | 0.067 | 0.130 | 1230 |
| 1000     |   | 8x16   | 0.100 | 0.210 | 830   | 8x20   | 0.091 | 0.170 | 1010  | 10x20  | 0.061 | 0.120 | 1270   | 10x25  | 0.057 | 0.110 | 1450 |
| 1200     |   | 10x16  | 0.077 | 0.150 | 1250  | 10x16  | 0.077 | 0.150 | 1250  | 10x20  | 0.061 | 0.120 | 1270   | 10x30  | 0.048 | 0.092 | 1720 |
| 1500     |   | 8x20   | 0.094 | 0.190 | 1060  | 10x20  | 0.061 | 0.120 | 1420  | 10x25  | 0.053 | 0.100 | 1450   | 13x21  | 0.048 | 0.097 | 1670 |
| 1800     |   | 10x20  | 0.059 | 0.120 | 1420  | 10x20  | 0.061 | 0.120 | 1420  | 10x30  | 0.043 | 0.085 | 1700   | 10x25  | 0.040 | 0.076 | 1960 |
| 2200     |   | 10x25  | 0.052 | 0.100 | 1640  | 10x30  | 0.043 | 0.085 | 1930  | 13x21  | 0.045 | 0.087 | 1670   | 13x25  | 0.025 | 0.051 | 2520 |
| 2700     |   | 10x30  | 0.045 | 0.086 | 1930  | 13x21  | 0.045 | 0.088 | 1650  | 13x25  | 0.036 | 0.069 | 1970   | 13x30  | 0.020 | 0.041 | 2860 |
| 3300     |   | 13x21  | 0.044 | 0.086 | 1650  | 13x25  | 0.036 | 0.069 | 1960  | 13x30  | 0.030 | 0.058 | 2330   | 16x26  | 0.025 | 0.051 | 2570 |
| 3900     |   | 13x25  | 0.036 | 0.069 | 1960  | 13x25  | 0.036 | 0.069 | 1960  | 13x35  | 0.028 | 0.051 | 2520   | 16x32  | 0.022 | 0.045 | 3020 |
| 4700     |   | 13x30  | 0.030 | 0.058 | 2320  | 13x30  | 0.030 | 0.058 | 2320  | 16x36  | 0.022 | 0.041 | 2880   | 18x25  | 0.025 | 0.047 | 2750 |
| 5600     |   | 13x35  | 0.026 | 0.051 | 2520  | 13x35  | 0.025 | 0.052 | 2520  | 16x36  | 0.022 | 0.041 | 3160   | 18x32  | 0.023 | 0.047 | 3340 |
| 6300     |   |        |       |       |       | 13x40  | 0.022 | 0.041 | 2880  | 18x25  | 0.025 | 0.047 | 2750   | 18x35  | 0.018 | 0.037 | 3690 |
| 6800     |   | 13x40  | 0.022 | 0.041 | 2880  | 16x26  | 0.020 | 0.052 | 2570  | 16x36  | 0.022 | 0.041 | 3160   | 18x40  | 0.018 | 0.036 | 3810 |
| 8200     |   | 16x32  | 0.024 | 0.045 | 3020  | 16x26  | 0.028 | 0.051 | 2570  | 18x32  | 0.022 | 0.041 | 3160   |        |       |       |      |
| 10000    |   | 16x36  | 0.021 | 0.040 | 3150  | 16x32  | 0.022 | 0.041 | 3150  | 18x32  | 0.022 | 0.041 | 3160   |        |       |       |      |
| 12000    |   | 18x25  | 0.025 | 0.047 | 2750  | 16x40  | 0.020 | 0.036 | 3720  | 18x32  | 0.022 | 0.041 | 3160   |        |       |       |      |
| 15000    |   | 16x40  | 0.020 | 0.036 | 3720  | 18x35  | 0.021 | 0.037 | 3670  | 18x35  | 0.021 | 0.039 | 3670   |        |       |       |      |
| 18000    |   | 18x35  | 0.021 | 0.037 | 3670  | 18x40  | 0.020 | 0.036 | 3810  | 18x40  | 0.020 | 0.035 | 3810   |        |       |       |      |

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

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# HFN series

## STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz; IMP (Ω max)at 20°C,-10°C 100KHz.

| Cap<br>(μF) | V      | 35    |       |      |       | 50     |       |       |       | 63     |       |       |       | 100    |       |       |       |      |
|-------------|--------|-------|-------|------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|------|
|             |        | Item  | D x L | IMP  |       | R.C.   | D x L | IMP   |       | R.C.   | D x L | IMP   |       | R.C.   | D x L | IMP   |       | R.C. |
|             |        |       |       | 20°C | -10°C |        |       | 20°C  | -10°C |        |       | 20°C  | -10°C |        |       | 20°C  | -10°C |      |
| 5.6         |        |       |       |      |       |        |       |       |       |        |       |       |       | 5x11   | 2.640 | 6.860 | 90    |      |
| 12          |        |       |       |      |       |        |       |       |       | 5x11   | 2.970 | 6.600 | 145   | 6.3x11 | 1.580 | 4.090 | 120   |      |
| 18          |        |       |       |      |       |        |       |       |       |        |       |       |       | 6.3x15 | 0.820 | 2.380 | 200   |      |
| 22          |        |       |       |      |       | 5x11   | 1.490 | 2.970 | 165   | 6.3x11 | 1.650 | 3.300 | 250   | 8x12   | 0.720 | 2.110 | 250   |      |
| 27          |        |       |       |      |       |        |       |       |       |        |       |       |       | 10x13  | 0.640 | 1.850 | 350   |      |
| 33          | 5x11   | 0.850 | 1.740 | 185  |       |        |       |       |       |        |       |       |       | 8x16   | 0.480 | 1.300 | 320   |      |
|             |        |       |       |      |       |        |       |       |       |        |       |       |       | 10x16  | 0.450 | 1.200 | 460   |      |
| 39          |        |       |       |      |       |        |       |       |       | 6.3x15 | 0.990 | 2.310 | 340   | 8x20   | 0.370 | 0.990 | 450   |      |
| 47          |        |       |       |      |       | 6.3x11 | 0.720 | 1.490 | 270   |        |       |       |       |        |       |       |       |      |
| 56          | 6.3x11 | 0.300 | 0.820 | 300  |       |        |       |       |       |        |       |       |       | 10x20  | 0.360 | 0.940 | 580   |      |
| 68          |        |       |       |      |       | 6.3x15 | 0.520 | 1.060 | 370   | 8x12   | 0.570 | 1.230 | 410   | 10x25  | 0.270 | 0.700 | 760   |      |
| 100         | 6.3x15 | 0.280 | 0.720 | 410  |       | 8x12   | 0.350 | 0.710 | 490   | 8x16   | 0.430 | 1.080 | 540   | 10x30  | 0.210 | 0.570 | 910   |      |
|             |        |       |       |      |       |        |       |       |       | 10x13  | 0.420 | 0.850 | 550   | 13x21  | 0.210 | 0.570 | 840   |      |
| 120         |        |       |       |      |       | 8x16   | 0.270 | 0.530 | 640   |        |       |       |       |        |       |       |       |      |
|             |        |       |       |      |       | 10x13  | 0.250 | 0.530 | 630   | 10x16  | 0.320 | 0.630 | 620   | 13x25  | 0.160 | 0.430 | 1010  |      |
| 150         | 8x12   | 0.150 | 0.280 | 625  |       |        |       |       |       | 8x20   | 0.350 | 0.850 | 690   |        |       |       |       |      |
| 180         |        |       |       |      |       | 8x20   | 0.200 | 0.400 | 740   |        |       |       |       |        |       |       |       |      |
|             |        |       |       |      |       | 10x16  | 0.220 | 0.420 | 860   | 10x20  | 0.240 | 0.480 | 890   | 13x30  | 0.130 | 0.360 | 1220  |      |
| 220         | 8x16   | 0.110 | 0.220 | 740  |       |        |       |       |       |        |       |       |       | 13x35  | 0.120 | 0.330 | 1420  |      |
|             | 10x13  | 0.110 | 0.210 | 770  | 10x20 | 0.150  | 0.300 | 1060  | 10x25 | 0.220  | 0.430 | 1060  | 16x26 | 0.110  | 0.310 | 1400  |       |      |
| 270         | 8x20   | 0.099 | 0.200 | 820  |       |        |       |       |       |        |       |       |       | 13x40  | 0.083 | 0.240 | 1600  |      |
| 330         | 10x16  | 0.085 | 0.170 | 1060 |       | 10x25  | 0.130 | 0.250 | 1260  | 10x30  | 0.150 | 0.300 | 1310  | 16x32  | 0.079 | 0.240 | 1740  |      |
|             |        |       |       |      |       |        |       |       |       | 13x21  | 0.140 | 0.290 | 1290  | 18x25  | 0.096 | 0.270 | 1610  |      |
| 390         |        |       |       |      |       | 10x30  | 0.095 | 0.190 | 1520  |        |       |       |       | 16x36  | 0.074 | 0.200 | 1950  |      |
|             |        |       |       |      |       | 13x21  | 0.100 | 0.200 | 1490  | 13x25  | 0.120 | 0.240 | 1730  | 18x32  | 0.082 | 0.230 | 1820  |      |
| 470         | 10x20  | 0.067 | 0.130 | 1230 |       |        |       |       |       | 13x30  | 0.095 | 0.190 | 2100  | 16x40  | 0.060 | 0.160 | 2100  |      |
| 560         | 10x25  | 0.057 | 0.110 | 1450 |       | 13x25  | 0.078 | 0.150 | 1850  |        |       |       |       | 18x35  | 0.074 | 0.200 | 2150  |      |
| 680         | 10x30  | 0.048 | 0.092 | 1700 |       |        |       |       |       |        |       |       |       |        |       |       |       |      |
|             | 13x21  | 0.050 | 0.096 | 1670 |       | 13x30  | 0.068 | 0.130 | 2230  | 13x35  | 0.081 | 0.160 | 2280  | 18x40  | 0.060 | 0.160 | 2250  |      |
|             |        |       |       |      |       |        |       |       |       | 16x26  | 0.087 | 0.170 | 2170  |        |       |       |       |      |
| 820         |        |       |       |      |       | 13x35  | 0.060 | 0.110 | 2300  | 13x40  | 0.075 | 0.140 | 2570  |        |       |       |       |      |
|             |        |       |       |      |       |        |       |       |       | 16x32  | 0.075 | 0.146 | 2680  |        |       |       |       |      |
|             |        |       |       |      |       |        |       |       |       | 18x25  | 0.075 | 0.150 | 2690  |        |       |       |       |      |
| 1000        | 13x25  | 0.040 | 0.076 | 1960 |       | 13x40  | 0.053 | 0.100 | 2510  |        |       |       |       |        |       |       |       |      |
|             |        |       |       |      |       | 16x26  | 0.062 | 0.120 | 2250  | 16x36  | 0.063 | 0.120 | 2780  |        |       |       |       |      |
| 1200        | 13x30  | 0.033 | 0.064 | 2320 |       | 16x32  | 0.050 | 0.096 | 2710  | 16x36  | 0.054 | 0.100 | 2860  |        |       |       |       |      |
|             |        |       |       |      |       | 18x25  | 0.051 | 0.099 | 2610  | 18x32  | 0.059 | 0.110 | 2960  |        |       |       |       |      |
| 1500        | 13x35  | 0.031 | 0.056 | 2520 |       | 16x36  | 0.047 | 0.087 | 2810  | 18x35  | 0.054 | 0.100 | 3120  |        |       |       |       |      |
| 1800        | 13x40  | 0.023 | 0.045 | 2880 |       | 16x40  | 0.038 | 0.075 | 3210  |        |       |       |       |        |       |       |       |      |
|             | 16x26  | 0.031 | 0.057 | 2570 |       | 18x32  | 0.047 | 0.087 | 3010  | 18x40  | 0.047 | 0.087 | 3220  |        |       |       |       |      |
| 2200        | 16x32  | 0.025 | 0.050 | 3020 |       |        |       |       |       |        |       |       |       |        |       |       |       |      |
|             | 18x25  | 0.028 | 0.052 | 2750 |       | 18x35  | 0.042 | 0.080 | 3110  |        |       |       |       |        |       |       |       |      |
| 2700        | 16x36  | 0.024 | 0.044 | 3160 |       |        |       |       |       |        |       |       |       |        |       |       |       |      |
|             | 18x32  | 0.025 | 0.047 | 3340 |       | 18x40  | 0.038 | 0.071 | 3410  |        |       |       |       |        |       |       |       |      |
| 3300        | 16x40  | 0.022 | 0.040 | 3720 |       |        |       |       |       |        |       |       |       |        |       |       |       |      |
|             | 18x35  | 0.023 | 0.041 | 3690 |       |        |       |       |       |        |       |       |       |        |       |       |       |      |
| 3900        | 18x40  | 0.022 | 0.040 | 3810 |       |        |       |       |       |        |       |       |       |        |       |       |       |      |

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