

LF seriesMinature Aluminum Electrolytic Capacitors

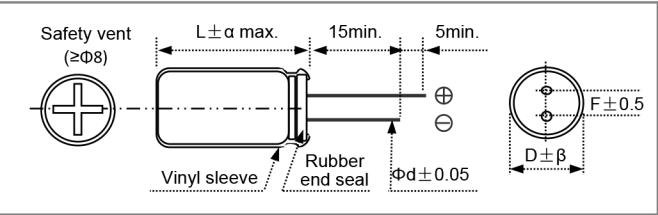
- Load life:105℃ 3,000~5,000hours.
- 105℃ high-temperature resistance,high ripple current and long life.
- Suitable for LED lighting driver and the electronic ballast.
- Rohs Compliance.
- 壽命: 3,000~5,000小時。
- 105℃耐高溫,耐高紋波及長壽命品
- 適用LED驅動及電子鎮流器.



SPECIFICATIONS 規格表

| Item 項目                                          | Performance Characteristics 特性參數                                                                                                                                                                                                         |                                                                                                             |    |        |    |         |    |       |                                                                                |         |     |      |     |      |     |      |  |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|----|--------|----|---------|----|-------|--------------------------------------------------------------------------------|---------|-----|------|-----|------|-----|------|--|
| Operation Temperature Range 工作溫度範圍               | -40 to +105℃                                                                                                                                                                                                                             |                                                                                                             |    |        |    |         |    |       | -25 to +105℃                                                                   |         |     |      |     |      |     |      |  |
| Rated Working Voltage Range 額定電壓範圍               | 6.3 to 100VDC                                                                                                                                                                                                                            |                                                                                                             |    |        |    |         |    |       | 160 to 450VDC                                                                  |         |     |      |     |      |     |      |  |
| Nominal Capacitance Range 靜電容量範圍                 | 0.47 to 22,000μF                                                                                                                                                                                                                         |                                                                                                             |    |        |    |         |    |       | 1 to 470μF                                                                     |         |     |      |     |      |     |      |  |
| Capacitance Tolerance 靜電容量允許偏差                   | ±20%(120Hz,+20℃)                                                                                                                                                                                                                         |                                                                                                             |    |        |    |         |    |       | ±20%(120Hz,+20℃)                                                               |         |     |      |     |      |     |      |  |
| Leakage Current 漏電流                              | LC≤0.01CV or 3(μA) Which is greater.(After 2 minutes application of DC rated voltage at +20 ℃)                                                                                                                                           |                                                                                                             |    |        |    |         |    |       | LC≤0.03CV+10 or 3(μA) after 2 minutes application of DC rated voltage at +20 ℃ |         |     |      |     |      |     |      |  |
| Dissipaion Factor (tan δ) 損失角正切值 (120Hz,+20℃)    | Working Voltage(v)                                                                                                                                                                                                                       | 6.3                                                                                                         |    | 10     |    | 16      |    | 25    |                                                                                | 35      |     | 50   |     | 63   |     | 100  |  |
|                                                  | tan δ(max)                                                                                                                                                                                                                               | 0.2                                                                                                         |    | 0.18   |    | 0.16    |    | 0.14  |                                                                                | 0.12    |     | 0.1  |     | 0.09 |     | 0.07 |  |
|                                                  | Working Voltage(v)                                                                                                                                                                                                                       | 160                                                                                                         |    | 200    |    | 250     |    | 350   |                                                                                | 400     |     | 450  |     |      |     |      |  |
|                                                  | tan δ(max)                                                                                                                                                                                                                               | 0.2                                                                                                         |    | 0.2    |    | 0.2     |    | 0.24  |                                                                                | 0.24    |     | 0.24 |     |      |     |      |  |
|                                                  | For capacitance value >1000μF, add 0.02 per another 1000μF 標稱容量值超過1000uF, 則每增加1000uF, 損失角正切值增加0.02                                                                                                                                       |                                                                                                             |    |        |    |         |    |       |                                                                                |         |     |      |     |      |     |      |  |
| Low Temperature characteristics 溫度特性(阻抗比)        | Impedance ratio max. at 120 Hz 阻抗比最大值                                                                                                                                                                                                    |                                                                                                             |    |        |    |         |    |       |                                                                                |         |     |      |     |      |     |      |  |
|                                                  | Working Voltage(V)                                                                                                                                                                                                                       | 6.3                                                                                                         | 10 | 16     | 25 | 35      | 50 | 63    | 100                                                                            | 160     | 200 | 250  | 350 | 400  | 450 |      |  |
|                                                  | Z(-40℃)/ Z(+20℃)                                                                                                                                                                                                                         | 8                                                                                                           | 6  | 4      | 4  | 3       | 3  | 3     | 3                                                                              | -       | -   | -    | -   | -    | -   |      |  |
|                                                  | Z(-25℃)/ Z(+20℃)                                                                                                                                                                                                                         | 4                                                                                                           | 4  | 3      | 2  | 2       | 2  | 2     | 2                                                                              | 4       | 4   | 4    | 6   | 6    | 6   |      |  |
| High Temperature Loading (Endurance) 高溫負荷壽命(耐久性) | Test conditions 試驗條件(+105℃)                                                                                                                                                                                                              |                                                                                                             |    |        |    |         |    |       |                                                                                |         |     |      |     |      |     |      |  |
|                                                  | Size                                                                                                                                                                                                                                     | ΦD ≤ 5                                                                                                      |    | ΦD ≤ 6 |    | ΦD=8,10 |    | ΦD=13 |                                                                                | ΦD ≥ 16 |     |      |     |      |     |      |  |
|                                                  | Duration 持續時間                                                                                                                                                                                                                            | 3,000                                                                                                       |    | 3,000  |    | 4,000   |    | 4,000 |                                                                                | 5,000   |     |      |     |      |     |      |  |
|                                                  | Applied voltage 施加電壓                                                                                                                                                                                                                     | DC voltage with maximum permissible ripple current specified at +105℃ 施加直流電壓與額定紋波電流(所加電壓峰值[DC+AC]不超過額定工作電壓) |    |        |    |         |    |       |                                                                                |         |     |      |     |      |     |      |  |
|                                                  | Post test requirements at +20℃ 試驗後特性應滿足如下要求                                                                                                                                                                                              |                                                                                                             |    |        |    |         |    |       |                                                                                |         |     |      |     |      |     |      |  |
| Shelf Life 高溫儲存壽命                                | Test conditions 試驗條件                                                                                                                                                                                                                     |                                                                                                             |    |        |    |         |    |       |                                                                                |         |     |      |     |      |     |      |  |
|                                                  | Duration 持續時間                                                                                                                                                                                                                            | 1,000 hours                                                                                                 |    |        |    |         |    |       |                                                                                |         |     |      |     |      |     |      |  |
|                                                  | Ambient temp. 環境溫度                                                                                                                                                                                                                       | +105℃                                                                                                       |    |        |    |         |    |       |                                                                                |         |     |      |     |      |     |      |  |
|                                                  | Applied voltage 施加電壓                                                                                                                                                                                                                     | (None) 無                                                                                                    |    |        |    |         |    |       |                                                                                |         |     |      |     |      |     |      |  |
|                                                  | ◆(Before the measurements, the capacitor shall be pretreated by applying DC working voltage for 30min, after discharged and then stored under standard atmospheric conditions for 24-48 hours) 測試前應將電容在常溫中施加工作電壓30分鐘, 放電後在標準氣壓下放置24~48小時 |                                                                                                             |    |        |    |         |    |       |                                                                                |         |     |      |     |      |     |      |  |
| Other 其他                                         | JIS C-5101 (IEC 60384)                                                                                                                                                                                                                   |                                                                                                             |    |        |    |         |    |       |                                                                                |         |     |      |     |      |     |      |  |

CASE SIZE TABLE 尺寸圖 (Unit: mm)



|    |            |     |     |     |     |            |     |     |
|----|------------|-----|-----|-----|-----|------------|-----|-----|
| ΦD | 5          | 6.3 | 8   | 10  | 13  | 16         | 18  | 22  |
| F  | 2.0        | 2.5 | 3.5 | 5.0 | 5.0 | 7.5        | 7.5 | 10  |
| Φd | 0.5        | 0.5 | 0.5 | 0.6 | 0.6 | 0.8        | 0.8 | 0.8 |
| α  | (L<20) 1.5 |     |     |     |     | (L≥20) 2.0 |     |     |
| β  | (D<20) 0.5 |     |     |     |     | (D≥20) 1.0 |     |     |

Multiplier for Ripple Current vs. Frequency 紋波電流頻率修正系數

| Rated Voltage(v) | Cap(μF)      | Frequency(HZ) |       |      |       |      |
|------------------|--------------|---------------|-------|------|-------|------|
|                  |              | 50HZ          | 120HZ | 1KHZ | 10KHZ | ≥20K |
| ≤ 100            | Cap<100      | 0.40          | 0.50  | 0.70 | 0.85  | 1.00 |
|                  | 100≤Cap<1000 | 0.55          | 0.65  | 0.80 | 0.90  | 1.00 |
|                  | Cap≥1500     | 0.65          | 0.75  | 0.90 | 0.95  | 1.00 |

## ●STANDARD RATINGS

Dimension:ΦDXL(mm)

Ripple Current: (mA/rms)at 105℃,100KHz; IMP: (Ωmax) at 20℃ 100KHz.

| WV(V)<br>(Code) | 6.3(7.2)        |                   |                   | 10(12)          |                   |                   | 16(18)          |                   |                   | 25(30)          |                   |                   |
|-----------------|-----------------|-------------------|-------------------|-----------------|-------------------|-------------------|-----------------|-------------------|-------------------|-----------------|-------------------|-------------------|
| Itc<br>μF       | SIZE<br>DXL(mm) | Impedance<br>Ωmax | Ripple<br>Current | SIZE<br>DXL(mm) | Impedance<br>Ωmax | Ripple<br>Current | SIZE<br>DXL(mm) | Impedance<br>Ωmax | Ripple<br>Current | SIZE<br>DXL(mm) | Impedance<br>Ωmax | Ripple<br>Current |
| 33              |                 |                   |                   |                 |                   |                   |                 |                   |                   | 5*11            | 1.000             | 105               |
| 47              |                 |                   |                   | 5*11            | 0.750             | 95                | 5*11            | 0.750             | 105               | 5*11            | 0.700             | 185               |
| 100             | 5*11            | 0.700             | 155               | 5*11            | 0.550             | 185               | 5*11            | 0.650             | 195               | 6.3*12          | 0.550             | 325               |
| 220             | 5*11            | 0.250             | 210               | 6.3*12          | 0.300             | 340               | 6.3*12          | 0.550             | 415               | 6.3*12          | 0.400             | 550               |
| 330             | 6.3*12          | 0.200             | 385               | 6.3*12          | 0.250             | 485               | 8*12            | 0.450             | 585               | 8*12            | 0.300             | 710               |
| 470             | 6.3*12          | 0.180             | 510               | 8*12            | 0.150             | 710               | 8*12            | 0.300             | 765               | 10*13           | 0.250             | 850               |
| 680             | 8*12            | 0.150             | 650               | 8*12            | 0.100             | 785               | 8*16            | 0.150             | 910               | 10*17           | 0.120             | 1200              |
|                 |                 |                   |                   |                 |                   |                   | 10*13           | 0.150             | 910               |                 |                   |                   |
| 1000            | 8*12            | 0.100             | 850               | 10*13           | 0.085             | 910               | 10*17           | 0.100             | 1200              | 10*20           | 0.095             | 1450              |
| 1500            | 10*13           | 0.080             | 1050              | 10*17           | 0.075             | 1250              | 10*20           | 0.070             | 1500              | 13*17           | 0.065             | 1750              |
| 2200            | 10*17           | 0.065             | 1300              | 10*20           | 0.055             | 1480              | 10*20           | 0.055             | 1800              | 13*25           | 0.055             | 2050              |
| 3300            | 13*17           | 0.055             | 1650              | 13*17           | 0.045             | 1850              | 13*20           | 0.050             | 2150              | 16*25           | 0.045             | 2400              |
| 4700            | 13*20           | 0.040             | 1850              | 13*25           | 0.035             | 2150              | 16*25           | 0.035             | 2450              | 16*30           | 0.030             | 2750              |
| 6800            | 13*25           | 0.035             | 2100              | 16*25           | 0.030             | 2450              | 16*30           | 0.025             | 2650              | 18*35           | 0.020             | 2950              |
| 10000           | 16*25           | 0.030             | 2350              | 16*30           | 0.025             | 2850              | 16*35           | 0.020             | 2900              |                 |                   |                   |
| 15000           | 16*35           | 0.025             | 2750              | 18*30           | 0.020             | 3000              | 18*40           | 0.019             | 3100              |                 |                   |                   |
| 22000           | 18*35           | 0.020             | 2950              | 18*40           | 0.018             | 3250              |                 |                   |                   |                 |                   |                   |
| WV(V)<br>(Code) | 35(40)          |                   |                   | 50(57)          |                   |                   | 63(73)          |                   |                   | 100(115)        |                   |                   |
| Itc<br>μF       | SIZE<br>DXL(mm) | Impedance<br>Ωmax | Ripple<br>Current | SIZE<br>DXL(mm) | Impedance<br>Ωmax | Ripple<br>Current | SIZE<br>DXL(mm) | Impedance<br>Ωmax | Ripple<br>Current | SIZE<br>DXL(mm) | Impedance<br>Ωmax | Ripple<br>Current |
| 1               |                 |                   |                   | 5*11            | 5.500             | 20                | 5*11            | 10.000            | 18                | 5*11            | 15.000            | 15                |
| 2.2             |                 |                   |                   | 5*11            | 5.000             | 35                | 5*11            | 8.000             | 30                | 5*11            | 10.000            | 25                |
| 3.3             |                 |                   |                   | 5*11            | 4.800             | 45                | 5*11            | 7.500             | 40                | 5*11            | 7.000             | 30                |
| 4.7             |                 |                   |                   | 5*11            | 2.500             | 65                | 5*11            | 6.500             | 60                | 5*11            | 5.500             | 50                |
| 10              |                 |                   |                   | 5*11            | 2.000             | 85                | 5*11            | 2.500             | 85                | 6.3*12          | 2.300             | 75                |
| 22              | 5*11            | 0.900             | 85                | 5*11            | 1.800             | 115               | 6.3*12          | 2.000             | 175               | 8*12            | 1.800             | 155               |
| 33              | 5*11            | 0.750             | 155               | 6.3*12          | 1.500             | 195               | 6.3*12          | 1.800             | 210               | 8*12            | 1.500             | 185               |
| 47              | 5*11            | 0.550             | 205               | 6.3*12          | 1.000             | 205               | 8*12            | 1.400             | 285               | 10*13           | 0.750             | 260               |
| 68              | 6.3*12          | 0.450             | 305               | 8*12            | 0.850             | 260               | 8*12            | 1.000             | 355               | 10*16           | 0.600             | 340               |
| 100             | 6.3*12          | 0.200             | 395               | 8*12            | 0.650             | 365               | 10*13           | 0.850             | 385               | 10*17           | 0.450             | 365               |
|                 |                 |                   |                   |                 |                   |                   | 10*16           | 0.750             | 410               | 10*20           | 0.400             | 405               |
| 150             | 6.3*12          | 0.150             | 510               | 10*13           | 0.500             | 450               | 10*16           | 0.650             | 550               | 13*17           | 0.350             | 525               |
| 220             | 8*12            | 0.100             | 710               | 10*16           | 0.350             | 550               | 10*20           | 0.350             | 710               | 13*25           | 0.250             | 650               |
| 330             | 10*16           | 0.070             | 950               | 10*20           | 0.300             | 700               | 13*17           | 0.300             | 810               | 16*25           | 0.150             | 780               |
|                 |                 |                   |                   |                 |                   |                   | 13*20           | 0.280             | 860               |                 |                   |                   |
| 470             | 10*20           | 0.065             | 1150              | 13*17           | 0.250             | 850               | 13*25           | 0.150             | 1250              | 16*30           | 0.100             | 1050              |
| 680             | 13*17           | 0.055             | 1300              | 13*25           | 0.150             | 950               | 16*20           | 0.100             | 1500              | 18*30           | 0.085             | 1200              |
| 1000            | 13*20           | 0.045             | 1650              | 16*25           | 0.095             | 1300              | 16*30           | 0.085             | 1750              | 18*40           | 0.065             | 1450              |
| 1500            | 13*25           | 0.040             | 1850              | 16*35           | 0.090             | 1650              | 16*35           | 0.075             | 1950              |                 |                   |                   |
| 2200            | 16*20           | 0.030             | 2150              | 18*35           | 0.065             | 2050              | 18*40           | 0.055             | 2250              |                 |                   |                   |
| 3300            | 16*30           | 0.025             | 2700              |                 |                   |                   |                 |                   |                   |                 |                   |                   |
| 4700            | 16*35           | 0.022             | 2950              |                 |                   |                   |                 |                   |                   |                 |                   |                   |
| 6800            | 18*35           | 0.020             | 3150              |                 |                   |                   |                 |                   |                   |                 |                   |                   |

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●STANDARD RATINGS

Dimension:ΦDXL(mm)  
Ripple Current: (mA/rms)at 105℃,100KHz; IMP: (Ωmax) at 20℃ 100KHz.

| WV(V)<br>(Code)        | 160(180)        |                   |                   | 200(230)        |                   |                   | 250(285)        |                   |                   |
|------------------------|-----------------|-------------------|-------------------|-----------------|-------------------|-------------------|-----------------|-------------------|-------------------|
| <div>Item<br/>μF</div> | SIZE<br>DXL(mm) | Impedance<br>Ωmax | Ripple<br>Current | SIZE<br>DXL(mm) | Impedance<br>Ωmax | Ripple<br>Current | SIZE<br>DXL(mm) | Impedance<br>Ωmax | Ripple<br>Current |
| 1                      |                 |                   |                   |                 |                   |                   | 5*11            | 25.00             | 30                |
| 2.2                    |                 |                   |                   |                 |                   |                   | 5*12            | 18.00             | 45                |
|                        |                 |                   |                   |                 |                   |                   | 6.3*12          | 15.00             | 65                |
| 3.3                    | 5*11            | 13.00             | 65                | 5*11            | 12.00             | 75                | 6.3*12          | 11.50             | 75                |
| 4.7                    | 6.3*12          | 11.00             | 75                | 6.3*12          | 9.50              | 90                | 6.3*12          | 8.50              | 95                |
| 6.8                    | 6.3*12          | 8.50              | 95                | 6.3*12          | 8.00              | 105               | 8*12            | 6.80              | 125               |
| 10                     | 8*12            | 6.50              | 125               | 8*12            | 6.00              | 135               | 8*12            | 4.50              | 175               |
| 22                     | 10*13           | 5.50              | 185               | 10*13           | 5.00              | 285               | 10*17           | 3.50              | 325               |
| 33                     | 10*16           | 5.00              | 375               | 10*16           | 4.50              | 410               | 10*20           | 3.00              | 435               |
| 47                     | 13*17           | 4.50              | 520               | 13*17           | 4.00              | 525               | 13*20           | 2.50              | 605               |
| 68                     | 13*20           | 2.50              | 620               | 13*20           | 2.00              | 710               | 13*25           | 1.80              | 755               |
| 100                    | 13*25           | 1.80              | 850               | 13*25           | 1.50              | 905               | 16*25           | 1.40              | 950               |
| 120                    | 16*20           | 1.60              | 900               | 16*25           | 1.30              | 955               | 16*25           | 1.20              | 980               |
| 150                    | 16*25           | 1.50              | 950               | 16*30           | 1.10              | 1050              | 16*30           | 1.00              | 1050              |
| 220                    | 16*35           | 1.30              | 1050              | 16*35           | 1.00              | 1100              | 18*30           | 0.90              | 1150              |
| 330                    | 18*35           | 1.00              | 1200              | 18*35           | 0.95              | 1250              | 22*35           | 0.80              | 1200              |
| 470                    | 18*40           | 0.85              | 1300              | 22*35           | 0.80              | 1350              | 22*40           | 0.75              | 1250              |
| 680                    | 22*40           | 0.70              | 1450              |                 |                   |                   |                 |                   |                   |
| WV(V)<br>(Code)        | 350(400)        |                   |                   | 400(450)        |                   |                   | 450(500)        |                   |                   |
| <div>Item<br/>μF</div> | SIZE<br>DXL(mm) | Impedance<br>Ωmax | Ripple<br>Current | SIZE<br>DXL(mm) | Impedance<br>Ωmax | Ripple<br>Current | SIZE<br>DXL(mm) | Impedance<br>Ωmax | Ripple<br>Current |
| 1                      | 5*11            | 18.00             | 25                | 6.3*12          | 17.00             | 30                | /               | /                 | /                 |
|                        |                 |                   |                   | 8*12            | 16.00             | 35                | /               | /                 | /                 |
| 2.2                    | 6.3*12          | 13.00             | 30                | 6.3*12          | 11.00             | 40                | 8*12            | 10.00             | 55                |
|                        |                 |                   |                   | 8*12            | 10.50             | 45                |                 |                   |                   |
| 3.3                    | 6.3*12          | 10.00             | 45                | 8*12            | 7.50              | 55                | 8*12            | 8.50              | 65                |
| 4.7                    | 8*12            | 7.50              | 65                | 8*12            | 6.50              | 75                | 8*12            | 8.00              | 75                |
|                        |                 |                   |                   |                 |                   |                   | 10*13           | 7.50              | 80                |
| 6.8                    | 8*12            | 6.00              | 75                | 8*12            | 5.50              | 85                | 10*13           | 6.80              | 105               |
|                        | 10*13           | 5.50              | 85                | 10*13           | 5.00              | 95                |                 |                   |                   |
| 10                     | 10*17           | 4.50              | 135               | 10*13           | 4.00              | 140               | 10*17           | 5.00              | 165               |
| 15                     | 10*20           | 4.00              | 165               | 10*17           | 3.50              | 175               | 13*17           | 4.50              | 220               |
| 22                     | 13*17           | 3.50              | 265               | 13*20           | 3.00              | 275               | 13*20           | 2.50              | 350               |
| 33                     | 13*20           | 2.80              | 380               | 13*25           | 2.80              | 410               | 13*25           | 2.00              | 420               |
| 47                     | 13*25           | 2.30              | 550               | 16*25           | 2.10              | 510               | 16*25           | 1.70              | 520               |
| 56                     | 16*25           | 2.10              | 610               | 16*25           | 1.80              | 630               | 16*30           | 1.50              | 650               |
| 68                     | 16*25           | 1.75              | 720               | 16*30           | 1.50              | 750               | 16*35           | 1.30              | 720               |
| 100                    | 16*30           | 1.20              | 850               | 18*30           | 1.00              | 900               | 18*30           | 0.85              | 810               |
| 120                    | 18*30           | 1.15              | 900               | 18*30           | 0.95              | 950               | 18*35           | 0.75              | 850               |
| 150                    | 18*35           | 0.95              | 950               | 18*35           | 0.80              | 1000              | 22*35           | 0.65              | 900               |
| 220                    | 22*35           | 0.85              | 1050              | 22*35           | 0.75              | 1100              | 22*40           | 0.60              | 1000              |
| 330                    | 22*40           | 0.75              | 1100              |                 |                   |                   |                 |                   |                   |

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