

E5 SERIES

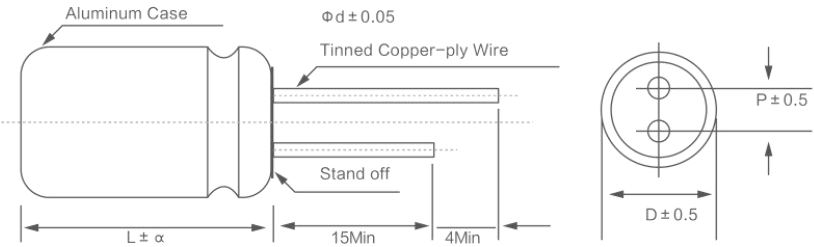
Low ESR, high ripple current, long life  
Load life of 5000 hours at 105°C



規格表 Specifications

| 項目 Items                                                           | 特性參數 Characteristics                                                                                                                                                                                                                                                                                                                                               |   |     |     |     |                              |    |    |    |    |                |          |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----|-----|-----|------------------------------|----|----|----|----|----------------|----------|
| 使用溫度範圍<br>Category<br>Temperture Range                             | -55 ~ +105℃                                                                                                                                                                                                                                                                                                                                                        |   |     |     |     |                              |    |    |    |    |                |          |
| 額定工作電壓範圍<br>Rated Voltage<br>Range                                 | 2.5 ~ 25V                                                                                                                                                                                                                                                                                                                                                          |   |     |     |     |                              |    |    |    |    |                |          |
| 靜電容量允許偏差<br>Capacitance<br>tolerance                               | ± 20%(M) (at 20℃,120Hz)                                                                                                                                                                                                                                                                                                                                            |   |     |     |     |                              |    |    |    |    |                |          |
| 漏電流<br>Leakage Current                                             | 施加額定工作電壓 2 分鐘後讀數, 小于或等于規格值 (at 20℃)<br>I≤0.2CV 或 500 μ A( 取大值 )<br>Less than or equal to the specified value. After 2 minutes application of rated Voltage at 20℃                                                                                                                                                                                                  |   |     |     |     |                              |    |    |    |    |                |          |
| 損耗角正切值tan δ<br>Dissipation Factor                                  | 2.5                                                                                                                                                                                                                                                                                                                                                                | 4 | 6.3 | 6.8 | 7.5 | 10                           | 12 | 16 | 20 | 25 | (at 20℃,120Hz) |          |
|                                                                    | 0.08                                                                                                                                                                                                                                                                                                                                                               |   |     |     |     | 0.12                         |    |    |    |    |                |          |
| 溫度特性<br>Low Temperture<br>Characteristics<br>(Max.Impedance Ratio) | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                                                    |   |     |     |     | ≤ 1.25                       |    |    |    |    |                | (100KHz) |
|                                                                    | Z(-55℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                                                    |   |     |     |     | ≤ 1.25                       |    |    |    |    |                |          |
| 耐久性<br>Endurence                                                   | 105℃施加額定工作電壓 2000 小時, 恢復到 20℃後, 產品性能應滿足以下要求<br>The specifications listed below shall be satisfied when the capacitors are restored to 20℃ after application of rated voltage for 2000 hours at 105℃.                                                                                                                                                               |   |     |     |     |                              |    |    |    |    |                |          |
|                                                                    | Appearance                                                                                                                                                                                                                                                                                                                                                         |   |     |     |     | No significant damage        |    |    |    |    |                |          |
|                                                                    | Capacitance change                                                                                                                                                                                                                                                                                                                                                 |   |     |     |     | ≤ ±20% of the initial value  |    |    |    |    |                |          |
|                                                                    | D.F.(tan δ )                                                                                                                                                                                                                                                                                                                                                       |   |     |     |     | ≤150% of the specified value |    |    |    |    |                |          |
|                                                                    | ESR                                                                                                                                                                                                                                                                                                                                                                |   |     |     |     | ≤150% of the specified value |    |    |    |    |                |          |
|                                                                    | Leakage current                                                                                                                                                                                                                                                                                                                                                    |   |     |     |     | ≤ The specified value        |    |    |    |    |                |          |
| 耐濕負荷特性<br>Damp Heat<br>(Steady State)                              | 在 60℃ 溫度, 濕度 90%~95%RH 的環境中, 施加額定電壓 1000 小時後, 恢復到 20℃後, 產品性能應滿足以下要求<br>The specifications listed below shall be satisfied when the capacitors are restored to 20℃After application of rated voltage for 1000 hours at 60℃,90% ~ 95% RH.                                                                                                                            |   |     |     |     |                              |    |    |    |    |                |          |
|                                                                    | Appearance                                                                                                                                                                                                                                                                                                                                                         |   |     |     |     | No significant damage        |    |    |    |    |                |          |
|                                                                    | Capacitance change                                                                                                                                                                                                                                                                                                                                                 |   |     |     |     | ≤ ±20% of the initial value  |    |    |    |    |                |          |
|                                                                    | D.F.(tan δ )                                                                                                                                                                                                                                                                                                                                                       |   |     |     |     | ≤150% of the specified value |    |    |    |    |                |          |
|                                                                    | ESR                                                                                                                                                                                                                                                                                                                                                                |   |     |     |     | ≤150% of the specified value |    |    |    |    |                |          |
|                                                                    | Leakage current                                                                                                                                                                                                                                                                                                                                                    |   |     |     |     | ≤ The specified value        |    |    |    |    |                |          |
| 浪涌電壓特性<br>(Surge Voltage)                                          | 浪涌電壓 = 額定電壓 × 1.15(V)<br>Surge Voltage=Rated voltage × 1.15(V)<br>在 105℃環境中, 按充電 30 秒; 放電 5 分 30 秒, 連續施加浪涌電壓 1000 次 (Rc=1kΩ), 待恢復後測試, 應滿足以下要求<br>The capacitors shall be subjected to 1000 cycles each consisting of charge with the surge voltages specified at 105℃ for 30 seconds through a protective resistor (Rc=1kΩ) and discharge for 5 minutes 30 seconds |   |     |     |     |                              |    |    |    |    |                |          |
|                                                                    | Appearance                                                                                                                                                                                                                                                                                                                                                         |   |     |     |     | No significant damage        |    |    |    |    |                |          |
|                                                                    | Capacitance change                                                                                                                                                                                                                                                                                                                                                 |   |     |     |     | ≤ ±20% of the initial value  |    |    |    |    |                |          |
|                                                                    | D.F.(tan δ )                                                                                                                                                                                                                                                                                                                                                       |   |     |     |     | ≤150% of the specified value |    |    |    |    |                |          |
|                                                                    | ESR                                                                                                                                                                                                                                                                                                                                                                |   |     |     |     | ≤150% of the specified value |    |    |    |    |                |          |
|                                                                    | Leakage current                                                                                                                                                                                                                                                                                                                                                    |   |     |     |     | ≤ The specified value        |    |    |    |    |                |          |

外形圖Dimensions (mm)



|    |     |     |     |     |
|----|-----|-----|-----|-----|
| ΦD | 5   | 6.3 | 8   | 10  |
| P  | 2.0 | 2.5 | 3.5 | 5.0 |
| Φd | 0.5 | 0.6 | 0.6 | 0.6 |

|   |                  |
|---|------------------|
| α | (L < 16)1.0      |
|   | (16 ≤ L < 22)1.5 |
|   | (L ≥ 22)2.0      |

## E5 SERIES

紋波電流補正係數 Rated Ripple Current Coefficient

| 頻率 Frequency(Hz) | 120Hz $\leq f < 1$ kHz | 1kHz $\leq f < 10$ kHz | 10kHz $\leq f < 100$ kHz | 100kHz $\leq f < 500$ kHz |
|------------------|------------------------|------------------------|--------------------------|---------------------------|
| 係數 Coefficient   | 0.05                   | 0.30                   | 0.70                     | 1.00                      |

尺寸與個技術參數一覽表Standard Ratings

| Rated voltage (V) | Rated capacitance (uF) | Case size $\Phi D \times L$ (mm) | ESR(m $\Omega$ ) at 20°C, 100 KHz | Leakage Current ( $\mu$ A) | Rated ripple current (mA <sub>rms</sub> /105°C/100kHz) |
|-------------------|------------------------|----------------------------------|-----------------------------------|----------------------------|--------------------------------------------------------|
| 2.5               | 560                    | 5*8                              | 15                                | 500                        | 2900                                                   |
|                   | 560                    | 6.3*8                            | 15                                | 500                        | 3500                                                   |
|                   | 680                    | 6.3*8                            | 15                                | 500                        | 3500                                                   |
|                   | 680                    | 8*9                              | 12                                | 500                        | 5200                                                   |
|                   | 820                    | 6.3*8                            | 15                                | 500                        | 3500                                                   |
|                   | 820                    | 8*9                              | 12                                | 500                        | 5200                                                   |
|                   | 1000                   | 8*9                              | 12                                | 500                        | 5500                                                   |
|                   | 1000                   | 8*12                             | 12                                | 500                        | 5500                                                   |
|                   | 1200                   | 8*9                              | 12                                | 600                        | 5500                                                   |
|                   | 1200                   | 8*12                             | 12                                | 600                        | 5500                                                   |
|                   | 1500                   | 8*12                             | 12                                | 750                        | 5500                                                   |
| 4                 | 560                    | 6.3*8                            | 15                                | 500                        | 3100                                                   |
|                   | 560                    | 8*9                              | 12                                | 500                        | 5100                                                   |
|                   | 680                    | 6.3*8                            | 15                                | 544                        | 3500                                                   |
|                   | 680                    | 8*9                              | 12                                | 544                        | 5100                                                   |
|                   | 820                    | 6.3*9                            | 15                                | 656                        | 4100                                                   |
|                   | 820                    | 8*9                              | 12                                | 656                        | 5100                                                   |
|                   | 1000                   | 6.3*12                           | 15                                | 800                        | 4100                                                   |
|                   | 1000                   | 8*9                              | 12                                | 800                        | 5100                                                   |
|                   | 1200                   | 6.3*12                           | 15                                | 960                        | 4500                                                   |
|                   | 1200                   | 8*9                              | 12                                | 960                        | 5100                                                   |
|                   |                        |                                  |                                   |                            |                                                        |
| 6.3               | 220                    | 5*8                              | 15                                | 500                        | 2690                                                   |
|                   | 270                    | 5*8                              | 15                                | 500                        | 2690                                                   |
|                   | 330                    | 5*8                              | 15                                | 500                        | 2690                                                   |
|                   | 330                    | 6.3*8                            | 15                                | 500                        | 3100                                                   |
|                   | 390                    | 5*9                              | 15                                | 500                        | 3100                                                   |
|                   | 390                    | 6.3*8                            | 15                                | 500                        | 3100                                                   |
|                   | 470                    | 5*9                              | 15                                | 592                        | 3300                                                   |
|                   | 470                    | 6.3*8                            | 15                                | 592                        | 4100                                                   |
|                   | 560                    | 6.3*8                            | 15                                | 706                        | 4100                                                   |
|                   | 560                    | 8*9                              | 12                                | 706                        | 5100                                                   |
|                   | 680                    | 6.3*8                            | 15                                | 857                        | 4100                                                   |
|                   | 680                    | 8*9                              | 12                                | 857                        | 5100                                                   |
|                   |                        |                                  |                                   |                            |                                                        |
|                   |                        |                                  |                                   |                            |                                                        |

## E5 SERIES

紋波電流補正係數 Rated Ripple Current Coefficient

尺寸與個技術參數一覽表 Standard Ratings

| Rated voltage<br>(V) | Rated capacitance<br>(uF) | Case size<br>ΦD × L(mm) | ESR(mΩ)<br>at 20°C, 100 KHz | Leakage Current<br>(μA) | Rated ripple current<br>(mA <sub>rms</sub> /105°C/100kHz) |
|----------------------|---------------------------|-------------------------|-----------------------------|-------------------------|-----------------------------------------------------------|
| 6.3                  | 820                       | 6.3*9                   | 15                          | 1033                    | 4500                                                      |
|                      | 820                       | 6.3*12                  | 15                          | 1033                    | 4800                                                      |
|                      | 820                       | 8*9                     | 12                          | 1033                    | 5100                                                      |
|                      | 1000                      | 6.3*12                  | 14                          | 1260                    | 4800                                                      |
|                      | 1000                      | 8*9                     | 12                          | 1260                    | 5100                                                      |
|                      | 1000                      | 8*12                    | 12                          | 1260                    | 5500                                                      |
|                      | 1200                      | 8*9                     | 12                          | 1512                    | 5100                                                      |
|                      | 1200                      | 8*12                    | 12                          | 1512                    | 5500                                                      |
|                      | 1500                      | 8*12                    | 12                          | 1890                    | 5500                                                      |
|                      | 1500                      | 10*12.5                 | 12                          | 1890                    | 5900                                                      |
|                      | 2200                      | 10*12.5                 | 12                          | 2772                    | 5900                                                      |
| 7.5                  | 270                       | 5*8                     | 18                          | 500                     | 2690                                                      |
|                      | 330                       | 6.3*8                   | 16                          | 500                     | 3100                                                      |
|                      | 390                       | 6.3*8                   | 16                          | 585                     | 3500                                                      |
|                      | 470                       | 6.3*8                   | 16                          | 705                     | 3500                                                      |
|                      | 560                       | 6.3*8                   | 16                          | 840                     | 3500                                                      |
|                      | 680                       | 6.3*12                  | 16                          | 1020                    | 3800                                                      |
|                      | 680                       | 8*9                     | 12                          | 1020                    | 4800                                                      |
|                      | 820                       | 6.3*12                  | 16                          | 1230                    | 3800                                                      |
|                      | 820                       | 8*9                     | 12                          | 1230                    | 4800                                                      |
|                      | 1000                      | 8*9                     | 12                          | 1500                    | 4800                                                      |
|                      | 1000                      | 8*12                    | 12                          | 1500                    | 5100                                                      |
|                      | 1200                      | 8*12                    | 12                          | 1800                    | 5100                                                      |
|                      | 1200                      | 10*12.5                 | 12                          | 1800                    | 5500                                                      |
|                      | 1500                      | 10*12.5                 | 12                          | 2250                    | 5500                                                      |
| 10                   | 220                       | 5*8                     | 20                          | 500                     | 2200                                                      |
|                      | 220                       | 6.3*8                   | 16                          | 500                     | 2900                                                      |
|                      | 270                       | 6.3*8                   | 16                          | 540                     | 2900                                                      |
|                      | 330                       | 6.3*8                   | 16                          | 660                     | 3100                                                      |
|                      | 330                       | 8*9                     | 14                          | 660                     | 4800                                                      |
|                      | 390                       | 6.3*8                   | 16                          | 780                     | 3100                                                      |
|                      | 390                       | 6.3*12                  | 16                          | 780                     | 3500                                                      |
|                      | 470                       | 6.3*8                   | 16                          | 940                     | 3100                                                      |
|                      | 470                       | 8*9                     | 14                          | 940                     | 4800                                                      |
|                      | 560                       | 6.3*12                  | 16                          | 1120                    | 3500                                                      |
|                      | 560                       | 8*9                     | 16                          | 1120                    | 4800                                                      |

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紋波電流補正係數 Rated Ripple Current Coefficient

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| Rated voltage<br>(V) | Rated capacitance<br>( $\mu$ F) | Case size<br>$\Phi$ D $\times$ L (mm) | ESR(m $\Omega$ )<br>at 20°C, 100 KHz | Leakage Current<br>( $\mu$ A) | Rated ripple current<br>(mA <sub>rms</sub> /105°C/100kHz) |
|----------------------|---------------------------------|---------------------------------------|--------------------------------------|-------------------------------|-----------------------------------------------------------|
| 10                   | 680                             | 6.3*12                                | 16                                   | 1360                          | 3500                                                      |
|                      | 680                             | 8*9                                   | 14                                   | 1360                          | 4800                                                      |
|                      | 820                             | 8*9                                   | 14                                   | 1640                          | 4800                                                      |
|                      | 820                             | 8*12                                  | 14                                   | 1640                          | 5100                                                      |
|                      | 1000                            | 8*12                                  | 14                                   | 2000                          | 5100                                                      |
|                      | 1000                            | 10*12.5                               | 14                                   | 2000                          | 5500                                                      |
|                      | 1200                            | 10*12.5                               | 14                                   | 2400                          | 5500                                                      |
|                      | 1500                            | 10*12.5                               | 14                                   | 3000                          | 5500                                                      |
| 12                   | 220                             | 5*9                                   | 20                                   | 528                           | 2690                                                      |
|                      | 220                             | 6.3*8                                 | 18                                   | 528                           | 3160                                                      |
|                      | 270                             | 6.3*8                                 | 18                                   | 648                           | 3160                                                      |
|                      | 330                             | 6.3*8                                 | 18                                   | 792                           | 3200                                                      |
|                      | 390                             | 6.3*8                                 | 18                                   | 936                           | 3200                                                      |
|                      | 470                             | 6.3*12                                | 18                                   | 1128                          | 3500                                                      |
|                      | 470                             | 8*9                                   | 15                                   | 1128                          | 4100                                                      |
|                      | 560                             | 6.3*12                                | 18                                   | 1344                          | 3500                                                      |
|                      | 560                             | 8*9                                   | 15                                   | 1344                          | 4100                                                      |
|                      | 680                             | 8*9                                   | 15                                   | 1632                          | 4100                                                      |
|                      | 820                             | 8*12                                  | 15                                   | 1968                          | 4500                                                      |
|                      | 1000                            | 8*12                                  | 15                                   | 2400                          | 4500                                                      |
|                      | 1000                            | 10*12.5                               | 12                                   | 2400                          | 5200                                                      |
|                      | 1200                            | 10*12.5                               | 12                                   | 2880                          | 5200                                                      |
|                      | 1500                            | 10*12.5                               | 12                                   | 3600                          | 5200                                                      |
| 16                   | 100                             | 5*8                                   | 25                                   | 500                           | 2100                                                      |
|                      | 150                             | 5*8                                   | 25                                   | 500                           | 2100                                                      |
|                      | 150                             | 6.3*8                                 | 20                                   | 500                           | 2690                                                      |
|                      | 180                             | 5*9                                   | 22                                   | 576                           | 2690                                                      |
|                      | 180                             | 6.3*8                                 | 20                                   | 576                           | 2900                                                      |
|                      | 220                             | 6.3*8                                 | 18                                   | 704                           | 3100                                                      |
|                      | 220                             | 6.3*12                                | 18                                   | 704                           | 3500                                                      |
|                      | 220                             | 8*9                                   | 15                                   | 704                           | 4100                                                      |
|                      | 270                             | 6.3*8                                 | 18                                   | 864                           | 3100                                                      |
|                      | 270                             | 8*9                                   | 15                                   | 864                           | 4100                                                      |
|                      | 270                             | 8*12                                  | 15                                   | 864                           | 4500                                                      |
|                      | 330                             | 6.3*8                                 | 18                                   | 1056                          | 3100                                                      |
|                      | 330                             | 6.3*12                                | 18                                   | 1056                          | 4100                                                      |

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| Rated voltage<br>(V) | Rated capacitance<br>( $\mu$ F) | Case size<br>$\Phi$ D $\times$ L(mm) | ESR(m $\Omega$ )<br>at 20°C, 100 KHz | Leakage Current<br>( $\mu$ A) | Rated ripple current<br>(mA <sub>rms</sub> /105°C/100kHz) |
|----------------------|---------------------------------|--------------------------------------|--------------------------------------|-------------------------------|-----------------------------------------------------------|
| 16                   | 330                             | 8*9                                  | 15                                   | 1056                          | 4100                                                      |
|                      | 470                             | 6.3*11                               | 18                                   | 1504                          | 3500                                                      |
|                      | 470                             | 8*9                                  | 15                                   | 1504                          | 4100                                                      |
|                      | 560                             | 6.3*11                               | 18                                   | 1792                          | 3500                                                      |
|                      | 560                             | 8*9                                  | 15                                   | 1792                          | 4100                                                      |
|                      | 680                             | 8*12                                 | 15                                   | 2176                          | 4500                                                      |
|                      | 820                             | 8*12                                 | 15                                   | 2624                          | 4500                                                      |
|                      | 1000                            | 10*12.5                              | 14                                   | 3200                          | 5200                                                      |
| 25                   | 68                              | 6.3*8                                | 30                                   | 500                           | 2100                                                      |
|                      | 68                              | 8*9                                  | 25                                   | 500                           | 3500                                                      |
|                      | 82                              | 6.3*8                                | 30                                   | 500                           | 2150                                                      |
|                      | 82                              | 8*9                                  | 20                                   | 500                           | 3800                                                      |
|                      | 100                             | 6.3*8                                | 30                                   | 500                           | 2200                                                      |
|                      | 100                             | 8*9                                  | 20                                   | 500                           | 3900                                                      |
|                      | 100                             | 8*12                                 | 20                                   | 500                           | 4200                                                      |
|                      | 150                             | 6.3*8                                | 20                                   | 750                           | 3900                                                      |
|                      | 150                             | 8*9                                  | 20                                   | 750                           | 4200                                                      |
|                      | 180                             | 8*12                                 | 20                                   | 900                           | 4200                                                      |
|                      | 220                             | 8*12                                 | 20                                   | 1100                          | 4200                                                      |
|                      | 270                             | 10*12.5                              | 18                                   | 1350                          | 4800                                                      |
|                      | 330                             | 10*12.5                              | 18                                   | 1650                          | 4800                                                      |
|                      | 470                             | 10*12.5                              | 18                                   | 2350                          | 4800                                                      |