

## E1 SERIES

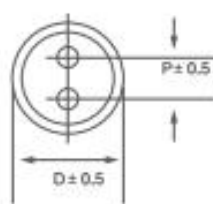
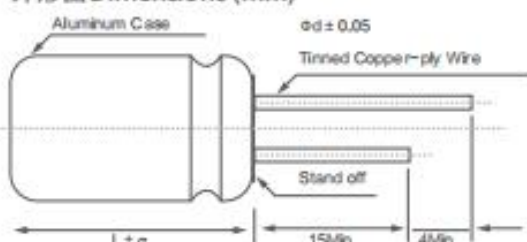
Super Low ESR, high ripple current  
Load life of 2000 hours at 105°C



## 规格表 Specifications

| 项目 Items                                                            | 特性参数 Characteristics                                                                                                                                                                                                                                                                                                                                              |   |     |     |     |      |                              |    |    |    |                |
|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----|-----|-----|------|------------------------------|----|----|----|----------------|
| 使用温度范围<br>Category<br>Temperature Range                             | -55 ~ +105℃                                                                                                                                                                                                                                                                                                                                                       |   |     |     |     |      |                              |    |    |    |                |
| 额定工作电压范围<br>Rated Voltage<br>Range                                  | 2.5 ~ 25V                                                                                                                                                                                                                                                                                                                                                         |   |     |     |     |      |                              |    |    |    |                |
| 静电容量允许偏差<br>Capacitance<br>tolerance                                | ±20%(M) (at 20℃,120Hz)                                                                                                                                                                                                                                                                                                                                            |   |     |     |     |      |                              |    |    |    |                |
| 漏电流<br>Leakage Current                                              | 施加额定工作电压 2 分钟后读数, 小于或等于规格值 (at 20℃)<br>I<0.2CV 或 500μA(取大值)<br>Less than or equal to the specified value. After 2 minutes application of rated Voltage at 20℃                                                                                                                                                                                                     |   |     |     |     |      |                              |    |    |    |                |
| 损耗角正切值 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 |                              |    |    |    |                |
| 温度特性<br>Low Temperature<br>Characteristics<br>(Max.Impedance Ratio) | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                                                   |   |     |     |     |      | ≤1.25                        |    |    |    | (100kHz)       |
|                                                                     | Z(-55℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                                                   |   |     |     |     |      | ≤1.25                        |    |    |    |                |
| 耐久性<br>Endurance                                                    | 105℃施加额定工作电压 2000 小时, 恢复到 20℃后, 产品性能应满足以下要求<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         |    |    |    |                |
| 耐湿负荷特性<br>Damp Heat<br>(Steady State)                               | 在 60℃ 温度, 湿度 90%~95%RH 的环境中, 施加额定电压 1000 小时后, 恢复到 20℃后, 产品性能应满足以下要求<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         |    |    |    |                |
| 浪涌电压特性<br>(Surge Voltage)                                           | 浪涌电压= 额定电压 × 1.15(V)<br>Surge Voltage=Rated voltage × 1.15(V)<br>在 105℃环境中, 按充电 30 秒; 放电 5 分 30 秒, 连续施加浪涌电压 1000 次 (Rc=1kΩ), 待恢复后测试, 应满足以下要求<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         |    |    |    |                |

## 外形图 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      |

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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                      |

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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) |
|----------------------|---------------------------------|-------------------------------------|--------------------------------------|-------------------------------|-----------------------------------------------------------|
| 係數Coefficient        | 560                             | 5*8                                 | 12                                   | 500                           | 4100                                                      |
| 2.5                  | 560                             | 6.3*8                               | 8                                    | 500                           | 5100                                                      |
|                      | 680                             | 6.3*8                               | 8                                    | 500                           | 5100                                                      |
|                      | 680                             | 8*9                                 | 8                                    | 500                           | 5900                                                      |
|                      | 820                             | 6.3*8                               | 8                                    | 500                           | 5200                                                      |
|                      | 820                             | 8*9                                 | 8                                    | 500                           | 5900                                                      |
|                      | 1000                            | 8*9                                 | 8                                    | 500                           | 5900                                                      |
|                      | 1000                            | 8*12                                | 8                                    | 500                           | 6100                                                      |
|                      | 1200                            | 8*9                                 | 8                                    | 600                           | 5900                                                      |
|                      | 1200                            | 8*12                                | 8                                    | 600                           | 6100                                                      |
|                      | 1500                            | 8*12                                | 8                                    | 750                           | 6100                                                      |
| 4                    | 560                             | 6.3*8                               | 8                                    | 500                           | 5100                                                      |
|                      | 560                             | 8*9                                 | 8                                    | 500                           | 5900                                                      |
|                      | 680                             | 6.3*8                               | 8                                    | 544                           | 5100                                                      |
|                      | 680                             | 8*9                                 | 8                                    | 544                           | 5900                                                      |
|                      | 820                             | 6.3*9                               | 8                                    | 656                           | 5200                                                      |
|                      | 820                             | 8*9                                 | 8                                    | 656                           | 5900                                                      |
|                      | 1000                            | 6.3*12                              | 8                                    | 800                           | 5500                                                      |
|                      | 1000                            | 8*9                                 | 8                                    | 800                           | 5900                                                      |
|                      | 1200                            | 6.3*12                              | 8                                    | 960                           | 5500                                                      |
|                      | 1200                            | 8*9                                 | 8                                    | 960                           | 5900                                                      |
| 6.3                  | 220                             | 5*8                                 | 12                                   | 500                           | 3900                                                      |
|                      | 270                             | 5*8                                 | 12                                   | 500                           | 3900                                                      |
|                      | 330                             | 5*8                                 | 12                                   | 500                           | 4100                                                      |
|                      | 330                             | 6.3*8                               | 10                                   | 500                           | 4450                                                      |
|                      | 390                             | 5*9                                 | 12                                   | 500                           | 4510                                                      |
|                      | 390                             | 6.3*8                               | 10                                   | 500                           | 4800                                                      |
|                      | 470                             | 5*9                                 | 12                                   | 592                           | 4510                                                      |
|                      | 470                             | 6.3*8                               | 8                                    | 592                           | 4900                                                      |
|                      | 560                             | 6.3*8                               | 8                                    | 706                           | 5100                                                      |
|                      | 560                             | 8*9                                 | 8                                    | 706                           | 5900                                                      |
|                      | 680                             | 6.3*8                               | 8                                    | 857                           | 5100                                                      |
|                      | 680                             | 8*9                                 | 8                                    | 857                           | 5900                                                      |

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| Rated voltage<br>(V) | Rated capacitance<br>( $\mu$ F) | Case size<br>$\Phi$ D×L(mm) | ESR(m $\Omega$ )<br>at 20 $\square$ ,100 KHz | Leakage Current<br>( $\mu$ A) | Rated ripple current<br>(mA <sub>rms</sub> /105 °C /100kHz) |
|----------------------|---------------------------------|-----------------------------|----------------------------------------------|-------------------------------|-------------------------------------------------------------|
| 系數Coefficient        | 680                             | 6.3*12                      | 12                                           | 1360                          | 4100                                                        |
| 10                   | 680                             | 8*9                         | 10                                           | 1360                          | 4200                                                        |
|                      | 820                             | 8*9                         | 10                                           | 1640                          | 4200                                                        |
|                      | 820                             | 8*12                        | 8                                            | 1640                          | 4500                                                        |
|                      | 1000                            | 8*12                        | 8                                            | 2000                          | 4500                                                        |
|                      | 1000                            | 10*12.5                     | 8                                            | 2000                          | 5200                                                        |
|                      | 1200                            | 10*12.5                     | 8                                            | 2400                          | 5200                                                        |
|                      | 1500                            | 10*12.5                     | 8                                            | 3000                          | 5200                                                        |
|                      | 1500                            | 10*12.5                     | 8                                            | 3000                          | 5200                                                        |
| 12                   | 220                             | 5*9                         | 15                                           | 528                           | 2690                                                        |
|                      | 220                             | 6.3*8                       | 13                                           | 528                           | 2900                                                        |
|                      | 270                             | 6.3*8                       | 13                                           | 648                           | 2900                                                        |
|                      | 330                             | 6.3*8                       | 13                                           | 792                           | 2900                                                        |
|                      | 390                             | 6.3*8                       | 13                                           | 936                           | 2900                                                        |
|                      | 470                             | 6.3*12                      | 13                                           | 1128                          | 3500                                                        |
|                      | 470                             | 8*9                         | 12                                           | 1128                          | 3800                                                        |
|                      | 560                             | 6.3*12                      | 13                                           | 1344                          | 3500                                                        |
|                      | 560                             | 8*9                         | 12                                           | 1344                          | 3800                                                        |
|                      | 680                             | 8*9                         | 12                                           | 1632                          | 3800                                                        |
|                      | 820                             | 8*12                        | 11                                           | 1968                          | 4100                                                        |
|                      | 1000                            | 8*12                        | 11                                           | 2400                          | 4100                                                        |
|                      | 1000                            | 10*12.5                     | 10                                           | 2400                          | 4800                                                        |
|                      | 1200                            | 10*12.5                     | 10                                           | 2880                          | 4800                                                        |
|                      | 1500                            | 10*12.5                     | 10                                           | 3600                          | 4800                                                        |
|                      | 1500                            | 10*12.5                     | 10                                           | 3600                          | 4800                                                        |
| 16                   | 100                             | 5*8                         | 15                                           | 500                           | 2100                                                        |
|                      | 150                             | 5*8                         | 15                                           | 500                           | 2100                                                        |
|                      | 150                             | 6.3*8                       | 13                                           | 500                           | 2900                                                        |
|                      | 180                             | 5*9                         | 15                                           | 576                           | 2690                                                        |
|                      | 180                             | 6.3*8                       | 13                                           | 576                           | 2900                                                        |
|                      | 220                             | 6.3*8                       | 13                                           | 704                           | 2900                                                        |
|                      | 220                             | 6.3*12                      | 13                                           | 704                           | 3500                                                        |
|                      | 220                             | 8*9                         | 12                                           | 704                           | 3500                                                        |
|                      | 270                             | 6.3*8                       | 13                                           | 864                           | 2900                                                        |
|                      | 270                             | 8*9                         | 12                                           | 864                           | 3500                                                        |
|                      | 270                             | 8*12                        | 11                                           | 864                           | 3790                                                        |
|                      | 330                             | 6.3*8                       | 13                                           | 1056                          | 2900                                                        |
|                      | 330                             | 6.3*12                      | 13vv                                         | 1056                          | 3500                                                        |
|                      | 330                             | 6.3*12                      | 13vv                                         | 1056                          | 3500                                                        |

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| Rated voltage<br>(V) | Rated capacitance<br>( $\mu$ F) | Case size<br>$\Phi$ D×L(mm) | ESR(m $\Omega$ )<br>at 20 $\pm$ 100 KHz | Leakage Current<br>( $\mu$ A) | Rated ripple current<br>(mA <sub>rms</sub> /105 °C/100kHz) |
|----------------------|---------------------------------|-----------------------------|-----------------------------------------|-------------------------------|------------------------------------------------------------|
| 系數Coefficient        | 330                             | 8*9                         | 12                                      | 1056                          | 3500                                                       |
| 16                   | 470                             | 6.3*12                      | 13                                      | 1504                          | 3500                                                       |
|                      | 470                             | 8*9                         | 12                                      | 1504                          | 3500                                                       |
|                      | 560                             | 6.3*12                      | 13                                      | 1792                          | 3500                                                       |
|                      | 560                             | 8*9                         | 12                                      | 1792                          | 3500                                                       |
|                      | 680                             | 8*12                        | 11                                      | 2176                          | 4800                                                       |
|                      | 820                             | 8*12                        | 11                                      | 2624                          | 4800                                                       |
|                      | 1000                            | 10*12.5                     | 10                                      | 3200                          | 5100                                                       |
|                      |                                 |                             |                                         |                               |                                                            |
| 25                   | 68                              | 6.3*8                       | 25                                      | 500                           | 2100                                                       |
|                      | 68                              | 8*9                         | 20                                      | 500                           | 2690                                                       |
|                      | 82                              | 6.3*8                       | 25                                      | 500                           | 2100                                                       |
|                      | 82                              | 8*9                         | 20                                      | 500                           | 2690                                                       |
|                      | 100                             | 6.3*8                       | 25                                      | 500                           | 2100                                                       |
|                      | 100                             | 8*9                         | 18                                      | 500                           | 2690                                                       |
|                      | 100                             | 8*12                        | 18                                      | 500                           | 2900                                                       |
|                      | 150                             | 8*9                         | 18                                      | 750                           | 2690                                                       |
|                      | 150                             | 8*12                        | 18                                      | 750                           | 2900                                                       |
|                      | 180                             | 8*12                        | 18                                      | 900                           | 2900                                                       |
|                      | 220                             | 8*12                        | 18                                      | 1100                          | 2900                                                       |
|                      | 270                             | 10*12.5                     | 15                                      | 1350                          | 3500                                                       |
|                      | 330                             | 10*12.5                     | 15                                      | 1650                          | 3500                                                       |
|                      | 470                             | 10*12.5                     | 15                                      | 2350                          | 3500                                                       |
|                      |                                 |                             |                                         |                               |                                                            |
|                      |                                 |                             |                                         |                               |                                                            |