

## VT series

- Low ESR, High reliability 低等效串联电阻, 高可靠性
- Load life of 4000 hours at 125°C 直流负载寿命 125°C-4000 小时
- Compliant to the RoHS2.0 directive 符合 RoHS2.0 规范



## Specifications 系列参数

| Items 项目                                                                                                            | Characteristics 特性                                                      |                                                                       |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------|
| Rated Voltage Range 额定电压范围                                                                                          | 2.5V ~ 63V DC                                                           |                                                                       |
| Capacitance Range 容量范围                                                                                              | 8.2 ~ 2200μF                                                            |                                                                       |
| Capacitance Tolerance 容量偏差                                                                                          | M : ±20%                                                                |                                                                       |
| Operating Temp. Range 工作温度范围                                                                                        | -55°C ~ +125°C                                                          |                                                                       |
| Dissipation Factor 损耗角正切                                                                                            | Not to exceed the value specified 不超过规格值                                |                                                                       |
| Leakage Current 漏电流                                                                                                 | Not to exceed the value specified (after 2 minutes) 不超过规格值 (充电 2 分钟后测试) |                                                                       |
| ESR (100K~300KHz) 等效串联电阻                                                                                            | Not to exceed the value specified 不超过规格值                                |                                                                       |
| Endurance<br>125°C, 4000h, Rated voltage applied<br>寿命:<br>125°C 加载额定电压连续工作 4000 小时                                 | Capacitance Change 容量变化                                                 | Within ±20% of the value before test 初始值±20%以内                        |
|                                                                                                                     | Dissipation Factor 损耗角正切                                                | Not to exceed 150% of the value specified 不超过 1.5 倍规格值                |
|                                                                                                                     | ESR 等效串联电阻                                                              | Not to exceed 150% of the value specified 不超过 1.5 倍规格值                |
|                                                                                                                     | Leakage current 漏电流                                                     | Not to exceed the value specified 不超过规格值                              |
| Moisture Resistance<br>60°C, RH90 ~ 95%, 1000h, Rated voltage applied<br>耐湿性<br>60°C, RH90 ~ 95% 加载额定电压连续工作 1000 小时 | Capacitance Change 容量变化                                                 | Within ±20% of the value before test 初始值±20%以内                        |
|                                                                                                                     | Dissipation Factor 损耗角正切                                                | Not to exceed 150% of the value specified 不超过 1.5 倍规格值                |
|                                                                                                                     | ESR 等效串联电阻                                                              | Not to exceed 150% of the value specified 不超过 1.5 倍规格值                |
|                                                                                                                     | Leakage Current 漏电流                                                     | Not to exceed the value specified 不超过规格值                              |
| Resistance to Soldering Heat<br>After the recommended soldering conditions<br>耐焊接热<br>推荐焊接条件处理后测试                   | Capacitance Change 容量变化                                                 | Within ±5% of the value before test 初始值±5%以内                          |
|                                                                                                                     | Dissipation Factor 损耗角正切                                                | Not to exceed the value specified 不超过规格值                              |
|                                                                                                                     | ESR 等效串联电阻                                                              | Not to exceed the value specified 不超过规格值                              |
|                                                                                                                     | Leakage Current 漏电流                                                     | Not to exceed the value specified 不超过规格值<br>(Charging treatment 充电处理) |

※ When there is any doubt, measure after charging treatment below.

Charging treatment: at 125 °C, Rated voltage is loaded for 60 minutes continuously.

如有疑问, 请进行充电处理后再测试, 测试条件: 在 125°C 环境温度下连续施加额定直流电压 60 分钟。

## Dimensions 尺寸 (Unit单位:mm)

|  |     |      |      |      |      |     |         |                                 |
|--|-----|------|------|------|------|-----|---------|---------------------------------|
|  | ΦD  | L    | W    | H    | C    | P   | R       | T <sub>1</sub> , T <sub>2</sub> |
|  | 6.3 | 4.5  | 6.6  | 6.6  | 7.2  | 2.1 | 0.5~0.8 | 0.2max.                         |
|  | 6.3 | 5.8  | 6.6  | 6.6  | 7.2  | 2.1 | 0.5~0.8 | 0.2max.                         |
|  | 6.3 | 7.7  | 6.6  | 6.6  | 7.2  | 2.1 | 0.5~0.8 | 0.2max.                         |
|  | 6.3 | 9    | 8.3  | 8.3  | 9.0  | 3.2 | 0.8~1.1 | 0.2max.                         |
|  | 8   | 9.2  | 8.3  | 8.3  | 9.0  | 3.2 | 0.8~1.1 | 0.2max.                         |
|  | 8   | 10.5 | 8.3  | 8.3  | 9.0  | 3.2 | 0.8~1.1 | 0.2max.                         |
|  | 8   | 12.2 | 8.3  | 8.3  | 9.0  | 3.2 | 0.8~1.1 | 0.2max.                         |
|  | 10  | 10.5 | 10.3 | 10.3 | 11.0 | 4.6 | 0.8~1.1 | 0.2max.                         |
|  | 10  | 12.8 | 10.3 | 10.3 | 11.0 | 4.6 | 0.8~1.1 | 0.2max.                         |

Capacitance List 容量对照表

| W.V (S.V)<br>SIZE | 2.5 (2.9)           | 6.3 (7.2)           | 16 (18)            | 25 (29)           | 35 (40)           | 50 (58)          | 63 (72)          |
|-------------------|---------------------|---------------------|--------------------|-------------------|-------------------|------------------|------------------|
| 6.3×4.5           | 220 ~ 330 $\mu$ F   | 150 ~ 220 $\mu$ F   | 56 ~ 100 $\mu$ F   | 39 ~ 47 $\mu$ F   |                   |                  |                  |
| 6.3×5.8           | 390 ~ 560 $\mu$ F   | 220 ~ 390 $\mu$ F   | 100 ~ 180 $\mu$ F  | 47 ~ 68 $\mu$ F   | 27 ~ 47 $\mu$ F   | 15 ~ 22 $\mu$ F  | 10 ~ 15 $\mu$ F  |
| 6.3×7.7           | 560 ~ 820 $\mu$ F   | 390 ~ 560 $\mu$ F   | 180 ~ 270 $\mu$ F  | 68 ~ 100 $\mu$ F  | 47 ~ 68 $\mu$ F   | 22 ~ 33 $\mu$ F  | 15 ~ 22 $\mu$ F  |
| 6.3×9             | 680 ~ 1000 $\mu$ F  | 470 ~ 680 $\mu$ F   | 220 ~ 330 $\mu$ F  | 82 ~ 120 $\mu$ F  | 56 ~ 82 $\mu$ F   | 27 ~ 39 $\mu$ F  | 18 ~ 27 $\mu$ F  |
| 8×9.2             | 1000 ~ 1500 $\mu$ F | 560 ~ 1200 $\mu$ F  | 270 ~ 470 $\mu$ F  | 100 ~ 220 $\mu$ F | 82 ~ 120 $\mu$ F  | 39 ~ 56 $\mu$ F  | 27 ~ 47 $\mu$ F  |
| 8×10.5            | 1200 ~ 1800 $\mu$ F | 820 ~ 1200 $\mu$ F  | 390 ~ 680 $\mu$ F  | 150 ~ 270 $\mu$ F | 100 ~ 180 $\mu$ F | 47 ~ 82 $\mu$ F  | 33 ~ 56 $\mu$ F  |
| 8×12.2            | 1500 ~ 2200 $\mu$ F | 820 ~ 1500 $\mu$ F  | 390 ~ 680 $\mu$ F  | 150 ~ 270 $\mu$ F | 120 ~ 180 $\mu$ F | 56 ~ 82 $\mu$ F  | 39 ~ 68 $\mu$ F  |
| 10×10.5           |                     | 1000 ~ 1800 $\mu$ F | 470 ~ 820 $\mu$ F  | 180 ~ 330 $\mu$ F | 120 ~ 220 $\mu$ F | 56 ~ 120 $\mu$ F | 47 ~ 82 $\mu$ F  |
| 10×12.8           |                     | 1200 ~ 2200 $\mu$ F | 680 ~ 1000 $\mu$ F | 220 ~ 470 $\mu$ F | 180 ~ 330 $\mu$ F | 82 ~ 150 $\mu$ F | 68 ~ 120 $\mu$ F |

Characteristics List 规格特性表

| W.V.<br>工作电压<br>(V) | Capacitance<br>容量<br>( $\mu$ F) | L.C.<br>漏电流<br>( $\mu$ A, 2min) | tg $\delta$<br>损耗角正切<br>(120Hz, 20°C) | ESR<br>等效串联电阻<br>(m $\Omega$ , 100kHz) | Rated Ripple Current<br>额定纹波电流<br>(mA, r.m.s) |                        | Size<br>尺寸<br>$\Phi$ D×L<br>(mm) | Part Number<br>物料编码 |
|---------------------|---------------------------------|---------------------------------|---------------------------------------|----------------------------------------|-----------------------------------------------|------------------------|----------------------------------|---------------------|
|                     |                                 |                                 |                                       |                                        | 105°C < T <sub>x</sub> < 125°C                | T <sub>x</sub> < 105°C |                                  |                     |
| 2.5                 | 330                             | 700                             | 0.08                                  | 18                                     | 830                                           | 2100                   | 6.3×4.5                          | PVT331M2R5E45TR□□□  |
|                     | 560                             | 280                             | 0.08                                  | 12                                     | 1110                                          | 2800                   | 6.3×5.8                          | PVT561M2R5E58TR□□□  |
|                     | 820                             | 410                             | 0.08                                  | 9                                      | 1460                                          | 3700                   | 6.3×7.7                          | PVT821M2R5E77TR□□□  |
|                     | 1000                            | 500                             | 0.08                                  | 7                                      | 1750                                          | 4500                   | 6.3×9                            | PVT102M2R5E09TR□□□  |
|                     | 1200                            | 600                             | 0.08                                  | 7                                      | 1930                                          | 5000                   | 8×9.2                            | PVT122M2R5F92TR□□□  |
|                     | 1500                            | 750                             | 0.08                                  | 7                                      | 2120                                          | 5400                   | 8×10.5                           | PVT152M2R5F1ETR□□□  |
|                     | 1800                            | 900                             | 0.08                                  | 7                                      | 2250                                          | 5800                   | 8×12.2                           | PVT182M2R5F1CTR□□□  |
| 6.3                 | 220                             | 700                             | 0.08                                  | 20                                     | 820                                           | 2100                   | 6.3×4.5                          | PVT221M6R3E45TR□□□  |
|                     | 330                             | 415                             | 0.08                                  | 15                                     | 1030                                          | 2600                   | 6.3×5.8                          | PVT331M6R3E58TR□□□  |
|                     | 470                             | 592                             | 0.08                                  | 12                                     | 1310                                          | 3400                   | 6.3×7.7                          | PVT471M6R3E77TR□□□  |
|                     | 560                             | 705                             | 0.08                                  | 9                                      | 1600                                          | 4100                   | 6.3×9                            | PVT561M6R3E09TR□□□  |
|                     | 820                             | 1000                            | 0.08                                  | 8                                      | 1870                                          | 4800                   | 8×9.2                            | PVT821M6R3F92TR□□□  |
|                     | 1000                            | 1000                            | 0.08                                  | 8                                      | 2050                                          | 5300                   | 8×10.5                           | PVT102M6R3F1ETR□□□  |
|                     | 1200                            | 1000                            | 0.08                                  | 8                                      | 2180                                          | 5600                   | 8×12.2                           | PVT122M6R3F1CTR□□□  |
|                     | 1500                            | 1000                            | 0.08                                  | 8                                      | 2120                                          | 5400                   | 10×10.5                          | PVT152M6R3G1ETR□□□  |
|                     | 2200                            | 1000                            | 0.10                                  | 8                                      | 2360                                          | 6000                   | 10×12.8                          | PVT222M6R3G1DTR□□□  |
| 16                  | 100                             | 800                             | 0.10                                  | 40                                     | 564                                           | 1400                   | 6.3×4.5                          | PVT101M016E45TR□□□  |
|                     | 100                             | 320                             | 0.10                                  | 25                                     | 775                                           | 2000                   | 6.3×5.8                          | PVT101M016E58TR□□□  |
|                     | 220                             | 704                             | 0.10                                  | 15                                     | 1140                                          | 2950                   | 6.3×7.7                          | PVT221M016E77TR□□□  |
|                     | 270                             | 864                             | 0.10                                  | 15                                     | 1200                                          | 3100                   | 6.3×9                            | PVT271M016E09TR□□□  |
|                     | 330                             | 1000                            | 0.10                                  | 12                                     | 1480                                          | 3800                   | 8×9.2                            | PVT331M016F92TR□□□  |
|                     | 470                             | 1000                            | 0.10                                  | 12                                     | 1630                                          | 4200                   | 8×10.5                           | PVT471M016F1ETR□□□  |
|                     | 560                             | 1000                            | 0.10                                  | 12                                     | 1730                                          | 4400                   | 8×12.2                           | PVT561M016F1CTR□□□  |
|                     | 680                             | 1000                            | 0.10                                  | 12                                     | 1680                                          | 4300                   | 10×10.5                          | PVT681M016G1ETR□□□  |
|                     | 1000                            | 1000                            | 0.10                                  | 10                                     | 2020                                          | 5200                   | 10×12.8                          | PVT102M016G1DTR□□□  |
| 25                  | 39                              | 293                             | 0.10                                  | 45                                     | 561                                           | 1450                   | 6.3×4.5                          | PVT390M025E45TR□□□  |
|                     | 56                              | 280                             | 0.10                                  | 28                                     | 772                                           | 1990                   | 6.3×5.8                          | PVT560M025E58TR□□□  |
|                     | 82                              | 410                             | 0.10                                  | 20                                     | 1040                                          | 2690                   | 6.3×7.7                          | PVT820M025E77TR□□□  |

| W.V.<br>工作电压<br>(V) | Capacitance<br>容量<br>( $\mu\text{F}$ ) | L.C.<br>漏电流<br>( $\mu\text{A}, 2\text{min}$ ) | $\text{tg}\delta$<br>损耗角正切<br>(120Hz, 20°C) | ESR<br>等效串联电阻<br>(m $\Omega$ , 100kHz) | Rated Ripple Current<br>额定纹波电流<br>(mA, r.m.s)        |                                  | Size<br>尺寸<br>$\Phi\text{D} \times \text{L}$<br>(mm) | Part Number<br>物料编码 |
|---------------------|----------------------------------------|-----------------------------------------------|---------------------------------------------|----------------------------------------|------------------------------------------------------|----------------------------------|------------------------------------------------------|---------------------|
|                     |                                        |                                               |                                             |                                        | $105^\circ\text{C} < \text{T}_x < 125^\circ\text{C}$ | $\text{T}_x < 105^\circ\text{C}$ |                                                      |                     |
| 25                  | 100                                    | 500                                           | 0.10                                        | 20                                     | 1100                                                 | 2800                             | 6.3 × 9                                              | PVT101M025E09TR□□□  |
|                     | 220                                    | 1000                                          | 0.10                                        | 15                                     | 1400                                                 | 3600                             | 8 × 9.2                                              | PVT221M025F92TR□□□  |
|                     | 220                                    | 1000                                          | 0.10                                        | 15                                     | 1530                                                 | 3900                             | 8 × 10.5                                             | PVT221M025F1ETR□□□  |
|                     | 270                                    | 1000                                          | 0.10                                        | 15                                     | 1630                                                 | 4200                             | 8 × 12.2                                             | PVT271M025F1CTR□□□  |
|                     | 330                                    | 1000                                          | 0.10                                        | 15                                     | 1580                                                 | 4100                             | 10 × 10.5                                            | PVT331M025G1ETR□□□  |
|                     | 470                                    | 588                                           | 0.10                                        | 12                                     | 1940                                                 | 5000                             | 10 × 12.8                                            | PVT471M025G1DTR□□□  |
| 35                  | 47                                     | 100                                           | 0.10                                        | 35                                     | 696                                                  | 1790                             | 6.3 × 5.8                                            | PVT470M035E58TR□□□  |
|                     | 56                                     | 100                                           | 0.10                                        | 30                                     | 859                                                  | 2210                             | 6.3 × 7.7                                            | PVT560M035E77TR□□□  |
|                     | 82                                     | 143                                           | 0.10                                        | 30                                     | 908                                                  | 2340                             | 6.3 × 9                                              | PVT820M035E09TR□□□  |
|                     | 100                                    | 175                                           | 0.10                                        | 22                                     | 1170                                                 | 3010                             | 8 × 9.2                                              | PVT101M035F92TR□□□  |
|                     | 150                                    | 262                                           | 0.10                                        | 20                                     | 1340                                                 | 3460                             | 8 × 10.5                                             | PVT151M035F1ETR□□□  |
|                     | 180                                    | 300                                           | 0.10                                        | 20                                     | 1420                                                 | 3670                             | 8 × 12.2                                             | PVT181M035F1CTR□□□  |
|                     | 220                                    | 300                                           | 0.10                                        | 20                                     | 1380                                                 | 3570                             | 10 × 10.5                                            | PVT221M035G1ETR□□□  |
|                     | 330                                    | 300                                           | 0.10                                        | 18                                     | 1600                                                 | 4100                             | 10 × 12.8                                            | PVT331M035G1DTR□□□  |
| 50                  | 22                                     | 100                                           | 0.10                                        | 55                                     | 544                                                  | 1400                             | 6.3 × 5.8                                            | PVT220M050E58TR□□□  |
|                     | 33                                     | 100                                           | 0.10                                        | 38                                     | 747                                                  | 1930                             | 6.3 × 7.7                                            | PVT330M050E77TR□□□  |
|                     | 39                                     | 100                                           | 0.10                                        | 32                                     | 860                                                  | 2220                             | 6.3 × 9                                              | PVT390M050E09TR□□□  |
|                     | 56                                     | 140                                           | 0.10                                        | 30                                     | 980                                                  | 2530                             | 8 × 9.2                                              | PVT560M050F92TR□□□  |
|                     | 68                                     | 170                                           | 0.10                                        | 26                                     | 1150                                                 | 2970                             | 8 × 10.5                                             | PVT680M050F1ETR□□□  |
|                     | 82                                     | 250                                           | 0.10                                        | 25                                     | 1240                                                 | 3220                             | 8 × 12.2                                             | PVT820M050F1CTR□□□  |
|                     | 100                                    | 300                                           | 0.10                                        | 25                                     | 1210                                                 | 3130                             | 10 × 10.5                                            | PVT101M050G1ETR□□□  |
|                     | 150                                    | 300                                           | 0.10                                        | 22                                     | 1410                                                 | 3660                             | 10 × 12.8                                            | PVT151M050G1DTR□□□  |
| 63                  | 10                                     | 100                                           | 0.10                                        | 55                                     | 474                                                  | 1220                             | 6.3 × 5.8                                            | PVT100M063E58TR□□□  |
|                     | 22                                     | 100                                           | 0.10                                        | 38                                     | 651                                                  | 1680                             | 6.3 × 7.7                                            | PVT220M063E77TR□□□  |
|                     | 27                                     | 100                                           | 0.10                                        | 32                                     | 750                                                  | 1930                             | 6.3 × 9                                              | PVT270M063E09TR□□□  |
|                     | 47                                     | 148                                           | 0.10                                        | 30                                     | 854                                                  | 2200                             | 8 × 9.2                                              | PVT470M063F92TR□□□  |
|                     | 56                                     | 176                                           | 0.10                                        | 26                                     | 1000                                                 | 2590                             | 8 × 10.5                                             | PVT560M063F1ETR□□□  |
|                     | 68                                     | 215                                           | 0.10                                        | 25                                     | 1080                                                 | 2800                             | 8 × 12.2                                             | PVT680M063F1CTR□□□  |
|                     | 82                                     | 258                                           | 0.10                                        | 25                                     | 1060                                                 | 2730                             | 10 × 10.5                                            | PVT820M063G1ETR□□□  |
|                     | 100                                    | 315                                           | 0.10                                        | 22                                     | 1230                                                 | 3190                             | 10 × 12.8                                            | PVT101M063G1DTR□□□  |

\* For the last 4 digits of the part number, please refer to the part number system on page 178.

物料编码的最后 4 位, 请参考 178 页物料编码系统。

### Frequency Coefficient for Ripple Current 纹波电流频率系数

| Frequency 频率                                                   | 120Hz ≤ freq. < 1KHz | 1KHz ≤ freq. < 10KHz | 10KHz ≤ freq. < 50KHz | 50KHz ≤ freq. < 100KHz | 100KHz ≤ freq. < 500KHz |
|----------------------------------------------------------------|----------------------|----------------------|-----------------------|------------------------|-------------------------|
| Coefficient 系数<br>(C ≤ 47 $\mu\text{F}$ )                      | 0.05                 | 0.25                 | 0.55                  | 0.80                   | 1.00                    |
| Coefficient 系数<br>(47 $\mu\text{F}$ < C < 1000 $\mu\text{F}$ ) | 0.05                 | 0.30                 | 0.70                  | 0.85                   | 1.00                    |
| Coefficient 系数<br>(C > 1000 $\mu\text{F}$ )                    | 0.10                 | 0.33                 | 0.85                  | 1.00                   | 1.00                    |