

## TM series

Upgrade

**+105°C, High Ripple Current(高纹波), Low Impedance(低阻抗品)**

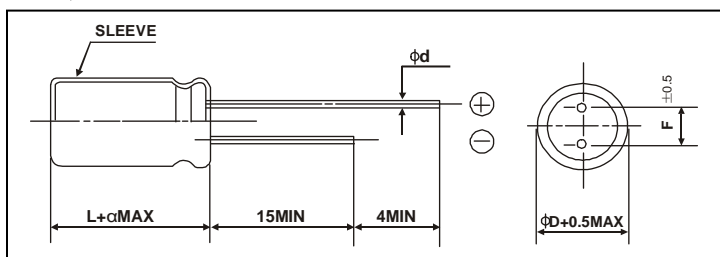
## ◆ FEATURES

- Load life:105°C 2000 ~4000hours
- Enabled high ripple current by a reduction of ESR at high frequency range
- switching power supply

## ◆ SPECIFICATIONS

| Items  | Characteristics   |   |
|--|---|---|
| Category Temperature Range   | -40°C~+105°C(6.3~100V)  | -25°C~+105°C(160~450V)  |
| Rated Voltage Range  | 6.3~450V.DC   |   |
| Nominal Capacitance Range  | 1~6800μF  |   |
| Capacitance Tolerance  | ±20%(120Hz,+20°C)   |   |
| Leakage Current(MAX, 20°C)   | I=0.01CV or 3(μA)<br>after 2 minutes with rated working voltage   | I=0.03CV+40(μA)<br>after 2 minutes with rated working voltage |
| Dissipation Factor(MAX)<br>Tanδ (20°C,120Hz)   | Rated Voltage(V)  | 6.3 10 16 25 35 50 63 100 ~250 350~                           |
|  | Tanδ  | 0.22 0.19 0.16 0.14 0.12 0.10 0.09 0.08 0.20 0.24             |
| When nominal capacitance is over 1000μF,tanδ shall be added 0.02 to the listed value with Increase of every 1000μF |   |   |
| Load Life  | After applying rated voltage with max ripple current for 2000~4000hrs at 105°C,the capacitors shall meet the following requirements |   |
|  | Capacitance Change  | Within ±25% of the initial value                              |
|  | Dissipation Factor  | Not more than 200% of the specified value                     |
|  | Leakage Current   | Not more than the specified value                             |
| Shelf Life   | Capacitance change  | Within ±25% of the initial value                              |
|  | Tanδ  | ≤200% of initial specified value                              |
|  | Leakage current   | Initial specified value or less                               |
| Low Temperature Stability<br>Impedance Rate(MAX)   | Rated Voltage(V )   | 6.3 10 16 25 35 50 63 100 ~250 350~                           |
|  | Z-25°C/Z+20°C   | 4 3 2 2 2 2 2 2 3 5   |
|  | Z-40°C/Z+20°C   | 8 6 4 3 3 3 3 3 --- ---                                       |

## ◆ CASE SIZE TABLE



|    |             |     |     |     |             |     |     |
|----|-------------|-----|-----|-----|-------------|-----|-----|
| ΦD | 5           | 6.3 | 8   | 10  | 13          | 16  | 18  |
| F  | 2.0         | 2.5 | 3.5 | 5.0 | 5.0         | 7.5 | 7.5 |
| φd | 0.5         |     | 0.6 |     | 0.8         |     |     |
| α  | L≤16:α =1.5 |     |     |     | L≥20:α =2.0 |     |     |

## ◆ RIPPLE CURRENT MULTIPLIER

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

Upgrade

## ◆ STANDARD RATINGS

size:  $\Phi D \times L$ (mm)

| Voltage(code) |      | 6.3V(0J) |        |                |           |
|---------------|------|----------|--------|----------------|-----------|
| Cap( $\mu$ F) | Code | Item     | Size   | Ripple Current | Impedance |
| 100           | 107  |          | 5×11   | 210            | 0.58      |
| 220           | 227  |          | 6.3×11 | 340            | 0.22      |
| 330           | 337  |          | 6.3×11 | 340            | 0.22      |
| 470           | 477  |          | 8×12   | 640            | 0.13      |
| 680           | 687  |          | 8×12   | 760            | 0.10      |
| 1000          | 108  |          | 8×12   | 810            | 0.08      |
|               |      |          | 10×13  | 865            | 0.08      |
| 1500          | 158  |          | 8×20   | 1050           | 0.044     |
|               |      |          | 10×16  | 1240           | 0.046     |
| 2200          | 228  |          | 10×20  | 1460           | 0.042     |
| 3300          | 338  |          | 10×25  | 2050           | 0.032     |
|               |      |          | 13×21  | 1900           | 0.035     |
| 4700          | 478  |          | 10×30  | 2250           | 0.026     |
|               |      |          | 13×21  | 2040           | 0.035     |
| 5600          | 568  |          | 13×25  | 2450           | 0.022     |
| 6800          | 688  |          | 13×25  | 2720           | 0.020     |

Maximum Allowable Ripple Current(mA rms) at 105°C 100KHz  
 Maximum Impedance( $\Omega$ ) at 20°C 100KHZ

## ◆ STANDARD RATINGS

size:  $\Phi D \times L$ (mm)

| Voltage(code) |      | 10V(1A) |        |                |           |
|---------------|------|---------|--------|----------------|-----------|
| Cap( $\mu$ F) | Code | Item    | Size   | Ripple Current | Impedance |
| 100           | 107  |         | 5×11   | 210            | 0.58      |
| 220           | 227  |         | 6.3×11 | 340            | 0.22      |
| 330           | 337  |         | 6.3×11 | 390            | 0.22      |
| 470           | 477  |         | 6.3×11 | 450            | 0.18      |
|               |      |         | 8×12   | 640            | 0.13      |
| 680           | 687  |         | 8×14   | 820            | 0.087     |
| 1000          | 108  |         | 8×20   | 1050           | 0.069     |
|               |      |         | 10×16  | 1210           | 0.06      |
| 1500          | 158  |         | 10×16  | 1380           | 0.055     |
|               |      |         | 10×20  | 1560           | 0.042     |
| 2200          | 228  |         | 10×20  | 1650           | 0.038     |
|               |      |         | 10×25  | 1840           | 0.035     |
| 3300          | 338  |         | 10×30  | 2140           | 0.026     |
|               |      |         | 13×21  | 2060           | 0.035     |
| 4700          | 478  |         | 13×25  | 2355           | 0.028     |
| 5600          | 568  |         | 16×25  | 2552           | 0.028     |
| 6800          | 688  |         | 16×25  | 2640           | 0.024     |

Maximum Allowable Ripple Current(mA rms) at 105°C 100KHz  
 Maximum Impedance( $\Omega$ ) at 20°C 100KHZ

Upgrade

## ◆ STANDARD RATINGS

size:ΦD×L(mm)

| Voltage(code) |      | 16V(1C) |        |                |           |
|---------------|------|---------|--------|----------------|-----------|
| Cap(μF)       | Code | Item    | Size   | Ripple Current | Impedance |
| 47            | 476  |         | 5×11   | 210            | 0.58      |
| 100           | 107  |         | 5×11   | 210            | 0.58      |
| 220           | 227  |         | 6.3×11 | 340            | 0.22      |
| 330           | 337  |         | 8×12   | 640            | 0.13      |
| 470           | 477  |         | 8×12   | 705            | 0.10      |
|               |      |         | 8×14   | 780            | 0.087     |
| 680           | 687  |         | 8×16   | 1020           | 0.069     |
|               |      |         | 10×13  | 1050           | 0.070     |
| 1000          | 108  |         | 8×20   | 1230           | 0.058     |
|               |      |         | 10×16  | 1305           | 0.052     |
|               |      |         | 10×20  | 1400           | 0.046     |
| 1500          | 158  |         | 10×20  | 1780           | 0.040     |
|               |      |         | 13×21  | 1900           | 0.035     |
| 2200          | 228  |         | 10×25  | 1980           | 0.035     |
|               |      |         | 13×21  | 2095           | 0.030     |
| 3300          | 338  |         | 10×32  | 2372           | 0.022     |
|               |      |         | 13×25  | 2510           | 0.030     |
| 4700          | 478  |         | 16×30  | 3029           | 0.022     |
|               |      |         | 18×25  | 2771           | 0.024     |
| 5600          | 568  |         | 16×30  | 2875           | 0.020     |
| 6800          | 688  |         | 16×35  | 3720           | 0.017     |

Maximum Allowable Ripple Current(mA rms) at 105°C 100KHz  
Maximum Impedance(Ω) at 20°C 100KHZ

## ◆ STANDARD RATINGS

size:ΦD×L(mm)

| Voltage(code) |      | 25V(1E) |        |                |           |
|---------------|------|---------|--------|----------------|-----------|
| Cap(μF)       | Code | Item    | Size   | Ripple Current | Impedance |
| 47            | 476  |         | 5×11   | 210            | 0.58      |
| 100           | 107  |         | 6.3×11 | 340            | 0.22      |
| 220           | 227  |         | 8×12   | 640            | 0.13      |
| 330           | 337  |         | 8×14   | 795            | 0.087     |
|               |      |         | 8×16   | 840            | 0.087     |
| 470           | 477  |         | 8×14   | 905            | 0.069     |
|               |      |         | 10×13  | 1120           | 0.060     |
| 680           | 687  |         | 10×20  | 1400           | 0.046     |
| 1000          | 108  |         | 10×20  | 1720           | 0.035     |
|               |      |         | 13×21  | 1900           | 0.035     |
| 1500          | 158  |         | 13×21  | 2052           | 0.030     |
| 2200          | 228  |         | 13×25  | 2560           | 0.022     |
|               |      |         | 16×20  | 2320           | 0.034     |
| 3300          | 338  |         | 16×30  | 3029           | 0.022     |
|               |      |         | 18×25  | 2771           | 0.022     |
| 4700          | 478  |         | 16×35  | 3260           | 0.019     |
| 5600          | 568  |         | 16×35  | 3482           | 0.017     |
| 6800          | 688  |         | 18×35  | 3960           | 0.015     |

Maximum Allowable Ripple Current(mA rms) at 105°C 100KHz  
Maximum Impedance(Ω) at 20°C 100KHZ

Upgrade

## ◆ STANDARD RATINGS

size:ΦD×L(mm)

| Voltage(code) |      | 35V(1V) |        |                |           |
|---------------|------|---------|--------|----------------|-----------|
| Cap(μ F)      | Code | Item    | Size   | Ripple Current | Impedance |
| 22            | 226  |         | 5×11   | 210            | 0.58      |
| 33            | 336  |         | 5×11   | 210            | 0.58      |
| 47            | 476  |         | 6.3×11 | 340            | 0.22      |
| 100           | 107  |         | 8×12   | 640            | 0.13      |
| 220           | 227  |         | 8×12   | 680            | 0.10      |
|               |      |         | 8×14   | 820            | 0.09      |
| 330           | 337  |         | 8×20   | 1050           | 0.069     |
|               |      |         | 10×13  | 980            | 0.072     |
| 470           | 477  |         | 10×16  | 1326           | 0.046     |
|               |      |         | 10×20  | 1400           | 0.046     |
| 680           | 687  |         | 10×20  | 1595           | 0.040     |
|               |      |         | 13×21  | 1780           | 0.035     |
| 1000          | 108  |         | 10×25  | 2190           | 0.030     |
|               |      |         | 13×21  | 2235           | 0.030     |
| 1500          | 158  |         | 13×25  | 2650           | 0.022     |
| 2200          | 228  |         | 16×30  | 3498           | 0.022     |
|               |      |         | 18×25  | 3201           | 0.024     |
| 3300          | 338  |         | 18×30  | 4090           | 0.018     |
| 4700          | 478  |         | 18×35  | 4367           | 0.015     |

Maximum Allowable Ripple Current(mA rms) at 105°C 100KHz  
 Maximum Impedance(Ω) at 20°C 100KHZ

## ◆ STANDARD RATINGS

size:ΦD×L(mm)

| Voltage(code) |      | 50V(1H) |        |                |           |
|---------------|------|---------|--------|----------------|-----------|
| Cap(μ F)      | Code | Item    | Size   | Ripple Current | Impedance |
| 1             | 105  |         | 5×11   | 180            | 2.4       |
| 2.2           | 225  |         | 5×11   | 180            | 1.3       |
| 3.3           | 335  |         | 5×11   | 180            | 1.3       |
| 4.7           | 475  |         | 5×11   | 180            | 1.3       |
| 10            | 106  |         | 5×11   | 180            | 1.3       |
| 22            | 226  |         | 5×11   | 180            | 1.3       |
| 33            | 336  |         | 6.3×11 | 295            | 0.30      |
| 47            | 476  |         | 6.3×11 | 295            | 0.30      |
| 100           | 107  |         | 8×12   | 680            | 0.12      |
| 220           | 227  |         | 10×16  | 1050           | 0.060     |
| 330           | 337  |         | 10×16  | 1290           | 0.055     |
|               |      |         | 10×20  | 1460           | 0.050     |
| 470           | 477  |         | 10×20  | 1560           | 0.043     |
|               |      |         | 13×21  | 1720           | 0.034     |
| 680           | 687  |         | 13×21  | 2180           | 0.030     |
| 1000          | 108  |         | 13×25  | 2640           | 0.021     |
|               |      |         | 16×25  | 2555           | 0.025     |
| 1500          | 158  |         | 16×30  | 3040           | 0.019     |
| 2200          | 228  |         | 18×30  | 3410           | 0.017     |
|               |      |         | 18×35  | 3680           | 0.017     |
| 3300          | 338  |         | 18×35  | 4200           | 0.015     |

Maximum Allowable Ripple Current(mA rms) at 105°C 100KHz  
 Maximum Impedance(Ω) at 20°C 100KHZ

Upgrade

## ◆ STANDARD RATINGS

size:ΦD×L(mm)

| Voltage(code) |      | 63V(1J) |        |                |           |
|---------------|------|---------|--------|----------------|-----------|
| Cap(μF)       | Code | Item    | Size   | Ripple Current | Impedance |
| 10            | 106  |         | 5×11   | 95             | 2.5       |
| 22            | 226  |         | 6.3×11 | 115            | 1.2       |
| 33            | 336  |         | 6.3×11 | 115            | 1.2       |
| 47            | 476  |         | 8×12   | 232            | 0.63      |
| 100           | 107  |         | 8×16   | 300            | 0.45      |
|               |      |         | 10×13  | 288            | 0.43      |
| 220           | 227  |         | 10×20  | 466            | 0.21      |
|               |      |         | 10×25  | 531            | 0.20      |
|               |      |         | 13×21  | 690            | 0.16      |
| 330           | 337  |         | 10×20  | 580            | 0.15      |
| 470           | 477  |         | 13×21  | 860            | 0.10      |
| 680           | 687  |         | 13×25  | 980            | 0.083     |
| 1000          | 108  |         | 16×25  | 1380           | 0.054     |
| 1500          | 158  |         | 18×30  | 1620           | 0.040     |
| 2200          | 228  |         | 18×35  | 1890           | 0.035     |

## ◆ STANDARD RATINGS

size:ΦD×L(mm)

| Voltage(code) |      | 100V(2A) |        |                |           |
|---------------|------|----------|--------|----------------|-----------|
| Cap(μF)       | Code | Item     | Size   | Ripple Current | Impedance |
| 6.8           | 685  |          | 5×11   | 55             | 2.3       |
| 10            | 106  |          | 6.3×11 | 105            | 2.0       |
| 22            | 226  |          | 8×12   | 165            | 1.0       |
| 33            | 336  |          | 8×14   | 210            | 0.8       |
| 47            | 476  |          | 8×16   | 288            | 0.43      |
|               |      |          | 10×13  | 288            | 0.43      |
| 68            | 686  |          | 10×16  | 357            | 0.31      |
| 100           | 107  |          | 10×20  | 490            | 0.20      |
| 220           | 227  |          | 13×25  | 810            | 0.12      |
| 330           | 337  |          | 16×25  | 1380           | 0.080     |
| 470           | 477  |          | 16×30  | 1740           | 0.045     |
| 680           | 687  |          | 18×30  | 1890           | 0.040     |
| 1000          | 108  |          | 18×40  | 1920           | 0.035     |

## ◆ STANDARD RATINGS

size:ΦD×L(mm)

| Voltage(code) |      | 160V(2C) |        |                |           |
|---------------|------|----------|--------|----------------|-----------|
| Cap(μF)       | Code | Item     | Size   | Ripple Current | Impedance |
| 1             | 105  |          | 5×11   | 25             | 19.6      |
| 2.2           | 225  |          | 5×11   | 35             | 13.0      |
| 3.3           | 335  |          | 6.3×11 | 50             | 10.7      |
| 4.7           | 475  |          | 6.3×11 | 55             | 10.4      |
| 6.8           | 685  |          | 8×12   | 70             | 7.80      |
| 10            | 106  |          | 8×12   | 80             | 6.70      |
| 22            | 226  |          | 10×13  | 180            | 3.25      |
| 33            | 336  |          | 10×20  | 210            | 2.75      |
| 47            | 476  |          | 13×21  | 320            | 2.28      |
| 68            | 686  |          | 13×21  | 375            | 1.40      |
| 100           | 107  |          | 16×25  | 500            | 1.18      |
| 220           | 227  |          | 16×35  | 820            | 0.48      |
| 330           | 337  |          | 18×35  | 950            | 0.40      |

Maximum Allowable Ripple Current(mA rms) at 105°C 100KHz  
Maximum Impedance(Ω) at 20°C 100KHZ

## ◆ STANDARD RATINGS

size:ΦD×L(mm)

| Voltage(code) |      | 200V(2D) |        |                |           |
|---------------|------|----------|--------|----------------|-----------|
| Cap(μF)       | Code | Item     | Size   | Ripple Current | Impedance |
| 1             | 105  |          | 6.3×11 | 45             | 19.4      |
| 2.2           | 225  |          | 6.3×11 | 55             | 13.0      |
| 3.3           | 335  |          | 6.3×11 | 60             | 10.6      |
| 4.7           | 475  |          | 6.3×11 | 65             | 8.88      |
| 6.8           | 685  |          | 8×12   | 85             | 6.78      |
| 10            | 106  |          | 8×12   | 95             | 5.05      |
| 22            | 226  |          | 10×16  | 195            | 3.00      |
| 33            | 336  |          | 10×20  | 265            | 1.55      |
| 47            | 476  |          | 13×21  | 360            | 1.28      |
| 68            | 686  |          | 13×21  | 405            | 1.13      |
| 100           | 107  |          | 16×25  | 700            | 0.98      |
| 220           | 227  |          | 16×30  | 900            | 0.35      |
| 330           | 337  |          | 18×40  | 1100           | 0.28      |

Maximum Allowable Ripple Current(mA rms) at 105°C 100KHz  
Maximum Impedance(Ω) at 20°C 100KHZ

Upgrade

## ◆ STANDARD RATINGS

size:ΦD×L(mm)

| Voltage(code) |      | 250V(2E) |        |                |           |
|---------------|------|----------|--------|----------------|-----------|
| Cap(μ F)      | Code | Item     | Size   | Ripple Current | Impedance |
| 1             | 105  |          | 6.3×11 | 50             | 16.4      |
| 2.2           | 225  |          | 6.3×11 | 60             | 10.3      |
| 3.3           | 335  |          | 6.3×11 | 65             | 9.63      |
| 4.7           | 475  |          | 8×12   | 70             | 7.13      |
| 6.8           | 685  |          | 10×13  | 95             | 4.65      |
| 10            | 106  |          | 10×13  | 125            | 3.5       |
| 22            | 226  |          | 10×20  | 185            | 3.25      |
| 33            | 336  |          | 13×21  | 260            | 2.25      |
| 47            | 476  |          | 13×25  | 405            | 1.13      |
| 68            | 686  |          | 13×25  | 450            | 0.95      |
| 100           | 107  |          | 16×25  | 750            | 0.75      |
| 220           | 227  |          | 18×35  | 860            | 0.33      |

## ◆ STANDARD RATINGS

size:ΦD×L(mm)

| Voltage(code) |      | 350V(2V) |        |                |           |
|---------------|------|----------|--------|----------------|-----------|
| Cap(μ F)      | Code | Item     | Size   | Ripple Current | Impedance |
| 1             | 105  |          | 6.3×11 | 55             | 15.9      |
| 2.2           | 225  |          | 6.3×11 | 65             | 10.1      |
| 3.3           | 335  |          | 6.3×11 | 70             | 8.8       |
| 4.7           | 475  |          | 8×12   | 95             | 5.68      |
| 6.8           | 685  |          | 10×13  | 105            | 4.12      |
| 10            | 106  |          | 10×13  | 145            | 3.38      |
| 22            | 226  |          | 10×20  | 200            | 3.13      |
| 33            | 336  |          | 13×21  | 290            | 2.15      |
| 47            | 476  |          | 13×25  | 415            | 1.55      |
| 68            | 686  |          | 13×25  | 465            | 1.40      |
| 100           | 107  |          | 18×32  | 500            | 1.38      |

## ◆ STANDARD RATINGS

size:ΦD×L(mm)

| Voltage(code) |      | 400V(2G) |        |                |           |
|---------------|------|----------|--------|----------------|-----------|
| Cap(μ F)      | Code | Item     | Size   | Ripple Current | Impedance |
| 1             | 105  |          | 6.3×11 | 32             | 41.3      |
| 2.2           | 225  |          | 8×12   | 45             | 24.0      |
| 3.3           | 335  |          | 8×12   | 65             | 12.5      |
| 4.7           | 475  |          | 10×13  | 75             | 12.1      |
| 6.8           | 685  |          | 10×16  | 105            | 8.88      |
| 10            | 106  |          | 10×20  | 115            | 8.30      |
| 22            | 226  |          | 13×21  | 145            | 6.55      |
| 33            | 336  |          | 16×25  | 277            | 3.03      |
| 47            | 476  |          | 18×20  | 315            | 2.30      |
| 68            | 686  |          | 18×25  | 385            | 1.88      |
| 100           | 107  |          | 18×35  | 485            | 1.30      |

## ◆ STANDARD RATINGS

size:ΦD×L(mm)

| Voltage(code) |      | 450V(2W) |        |                |           |
|---------------|------|----------|--------|----------------|-----------|
| Cap(μ F)      | Code | Item     | Size   | Ripple Current | Impedance |
| 1             | 105  |          | 6.3×11 | 28             | 43.4      |
| 2.2           | 225  |          | 8×12   | 38             | 25.6      |
| 3.3           | 335  |          | 8×12   | 55             | 14.1      |
| 4.7           | 475  |          | 10×13  | 65             | 12.5      |
| 6.8           | 685  |          | 10×16  | 90             | 10.6      |
| 10            | 106  |          | 10×20  | 100            | 9.45      |
| 22            | 226  |          | 13×25  | 125            | 7.63      |
| 33            | 336  |          | 16×25  | 205            | 5.50      |
| 47            | 476  |          | 18×25  | 325            | 2.55      |
| 68            | 686  |          | 18×30  | 405            | 1.95      |
| 100           | 107  |          | 18×40  | 495            | 1.50      |

Maximum Allowable Ripple Current(mA rms) at 105°C 100KHz  
 Maximum Impedance(Ω) at 20°C 100KHZ

Maximum Allowable Ripple Current(mA rms) at 105°C 100KHz  
 Maximum Impedance(Ω) at 20°C 100KHZ