

**TZV SERIES**

105°C Low Impedance, Lead Free Reflow Soldering.

◆FEATURES

- Load Life : 105°C 2000 hours.
- Lead free reflow soldering is available.
- Available for high density mounting.
- Low impedance at 100kHz with selected materials.
- RoHS compliance.



◆SPECIFICATIONS

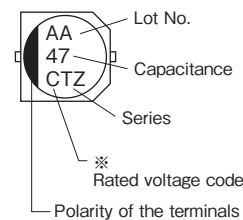
| Items                                             | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                           |      |      |      |      |      |  |                    |                                   |    |    |    |    |    |                    |                                            |      |      |      |      |      |                 |                                    |   |   |   |   |   |                |   |   |   |   |   |   |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|--|--------------------|-----------------------------------|----|----|----|----|----|--------------------|--------------------------------------------|------|------|------|------|------|-----------------|------------------------------------|---|---|---|---|---|----------------|---|---|---|---|---|---|
| Category Temperature Range                        | -55~+105℃                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |      |      |      |  |                    |                                   |    |    |    |    |    |                    |                                            |      |      |      |      |      |                 |                                    |   |   |   |   |   |                |   |   |   |   |   |   |
| Rated Voltage Range                               | 6.3~50V.DC                                                                                                                                                                                                                                                                                                                                                                                                                                |      |      |      |      |      |  |                    |                                   |    |    |    |    |    |                    |                                            |      |      |      |      |      |                 |                                    |   |   |   |   |   |                |   |   |   |   |   |   |
| Capacitance Tolerance                             | ±20% (20℃, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                         |      |      |      |      |      |  |                    |                                   |    |    |    |    |    |                    |                                            |      |      |      |      |      |                 |                                    |   |   |   |   |   |                |   |   |   |   |   |   |
| Leakage Current(MAX)                              | I=0.01CV or 3μA whichever is greater. (After 2 minutes application of rated voltage)<br>I=(μA) Leakage Current      C=(μF) Rated Capacitance      V=(V) Rated Voltage                                                                                                                                                                                                                                                                     |      |      |      |      |      |  |                    |                                   |    |    |    |    |    |                    |                                            |      |      |      |      |      |                 |                                    |   |   |   |   |   |                |   |   |   |   |   |   |
| (tanδ)<br>Dissipation Factor(MAX)                 | <table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>tanδ</td><td>0.26</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td></tr></table> (20℃, 120Hz)                                                                                                                                                                                                        |      |      |      |      |      |  | Rated Voltage      | 6.3                               | 10 | 16 | 25 | 35 | 50 | tanδ               | 0.26                                       | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 |                 |                                    |   |   |   |   |   |                |   |   |   |   |   |   |
| Rated Voltage                                     | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                       | 10   | 16   | 25   | 35   | 50   |  |                    |                                   |    |    |    |    |    |                    |                                            |      |      |      |      |      |                 |                                    |   |   |   |   |   |                |   |   |   |   |   |   |
| tanδ                                              | 0.26                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 |  |                    |                                   |    |    |    |    |    |                    |                                            |      |      |      |      |      |                 |                                    |   |   |   |   |   |                |   |   |   |   |   |   |
| Endurance                                         | After applying rated voltage with rated ripple current for 2000 hours at 105℃, the capacitors shall meet the following requirements. <table><tr><td>Capacitance Change</td><td colspan="6">Within ±30% of the initial value.</td></tr><tr><td>Dissipation Factor</td><td colspan="6">Not more than 200% of the specified value.</td></tr><tr><td>Leakage Current</td><td colspan="6">Not more than the specified value.</td></tr></table> |      |      |      |      |      |  | Capacitance Change | Within ±30% of the initial value. |    |    |    |    |    | Dissipation Factor | Not more than 200% of the specified value. |      |      |      |      |      | Leakage Current | Not more than the specified value. |   |   |   |   |   |                |   |   |   |   |   |   |
| Capacitance Change                                | Within ±30% of the initial value.                                                                                                                                                                                                                                                                                                                                                                                                         |      |      |      |      |      |  |                    |                                   |    |    |    |    |    |                    |                                            |      |      |      |      |      |                 |                                    |   |   |   |   |   |                |   |   |   |   |   |   |
| Dissipation Factor                                | Not more than 200% of the specified value.                                                                                                                                                                                                                                                                                                                                                                                                |      |      |      |      |      |  |                    |                                   |    |    |    |    |    |                    |                                            |      |      |      |      |      |                 |                                    |   |   |   |   |   |                |   |   |   |   |   |   |
| Leakage Current                                   | Not more than the specified value.                                                                                                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |  |                    |                                   |    |    |    |    |    |                    |                                            |      |      |      |      |      |                 |                                    |   |   |   |   |   |                |   |   |   |   |   |   |
| Low Temperature Stability<br>Impedance Ratio(MAX) | <table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Z(-25℃)/Z(20℃)</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-40℃)/Z(20℃)</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td></tr><tr><td>Z(-55℃)/Z(20℃)</td><td>4</td><td>4</td><td>4</td><td>3</td><td>3</td><td>3</td></tr></table> (120Hz)                             |      |      |      |      |      |  | Rated Voltage      | 6.3                               | 10 | 16 | 25 | 35 | 50 | Z(-25℃)/Z(20℃)     | 2                                          | 2    | 2    | 2    | 2    | 2    | Z(-40℃)/Z(20℃)  | 3                                  | 3 | 3 | 3 | 3 | 3 | Z(-55℃)/Z(20℃) | 4 | 4 | 4 | 3 | 3 | 3 |
| Rated Voltage                                     | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                       | 10   | 16   | 25   | 35   | 50   |  |                    |                                   |    |    |    |    |    |                    |                                            |      |      |      |      |      |                 |                                    |   |   |   |   |   |                |   |   |   |   |   |   |
| Z(-25℃)/Z(20℃)                                    | 2                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2    | 2    | 2    | 2    | 2    |  |                    |                                   |    |    |    |    |    |                    |                                            |      |      |      |      |      |                 |                                    |   |   |   |   |   |                |   |   |   |   |   |   |
| Z(-40℃)/Z(20℃)                                    | 3                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3    | 3    | 3    | 3    | 3    |  |                    |                                   |    |    |    |    |    |                    |                                            |      |      |      |      |      |                 |                                    |   |   |   |   |   |                |   |   |   |   |   |   |
| Z(-55℃)/Z(20℃)                                    | 4                                                                                                                                                                                                                                                                                                                                                                                                                                         | 4    | 4    | 3    | 3    | 3    |  |                    |                                   |    |    |    |    |    |                    |                                            |      |      |      |      |      |                 |                                    |   |   |   |   |   |                |   |   |   |   |   |   |

◆MULTIPLIER FOR RIPPLE CURRENT

Frequency Coefficient

| (Hz)<br>Frequency | 120  | 1k   | 10k  | 100k≤ |
|-------------------|------|------|------|-------|
| 4.7μF             | 0.42 | 0.60 | 0.80 | 1.00  |
| 10~33μF           | 0.45 | 0.75 | 0.90 | 1.00  |
| 47~100μF          | 0.50 | 0.80 | 0.95 | 1.00  |
| 220~1000μF        | 0.60 | 0.85 | 0.95 | 1.00  |

◆MARKING



※Voltage Code

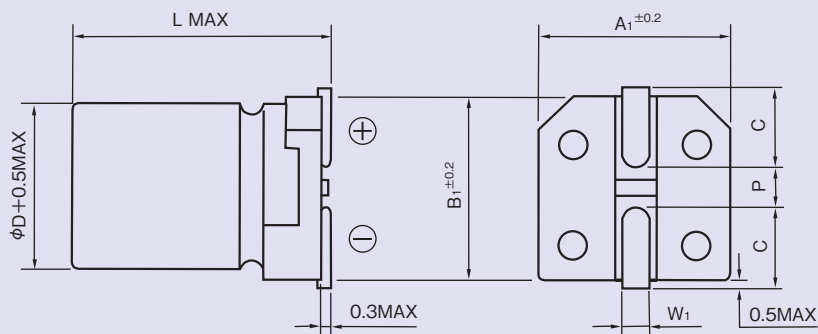
|                    |     |    |    |    |    |    |
|--------------------|-----|----|----|----|----|----|
| Rated Voltage      | 6.3 | 10 | 16 | 25 | 35 | 50 |
| Rated Voltage code | j   | A  | C  | E  | V  | H  |

◆PART NUMBER

|               |     |                       |   |           |     |
|---------------|-----|-----------------------|---|-----------|-----|
| Rated Voltage | TZV | Rated Capacitance     | M | Option    | D×L |
| Series        |     | Capacitance Tolerance |   | Case Size |     |

◆ DIMENSIONS

(mm)



| $\phi D$ | L    | A1   | B1   | C   | W1      | P   |
|----------|------|------|------|-----|---------|-----|
| 4        | 6.1  | 4.3  | 4.3  | 1.8 | 0.5~0.8 | 1.0 |
| 5        | 6.1  | 5.3  | 5.3  | 2.2 | 0.5~0.8 | 1.3 |
| 6.3      | 6.1  | 6.6  | 6.6  | 2.7 | 0.5~0.8 | 1.8 |
| 6.3      | 8    | 6.6  | 6.6  | 2.7 | 0.5~0.8 | 1.8 |
| 8        | 10.5 | 8.3  | 8.3  | 2.9 | 0.8~1.1 | 3.1 |
| 10       | 10.5 | 10.3 | 10.3 | 3.2 | 0.8~1.1 | 4.5 |

◆ STANDARD SIZE

Size  $\phi D \times L$  (mm), Ripple Current (mA r.m.s./105°C, 100kHz), Impedance ( $\Omega$  MAX/20°C, 100kHz)

| Cap ( $\mu F$ ) \ WV (V.DC) | 6.3 (0J) |        |           | 10 (1A) |        |           | 16 (1C) |        |           |
|-----------------------------|----------|--------|-----------|---------|--------|-----------|---------|--------|-----------|
|                             | Size     | Ripple | Impedance | Size    | Ripple | Impedance | Size    | Ripple | Impedance |
| 10                          |          |        |           |         |        |           | 4×6.1   | 90     | 1.35      |
| 22                          | 4×6.1    | 90     | 1.35      |         |        |           | 4×6.1   | 90     | 1.35      |
|                             |          |        |           |         |        |           | 5×6.1   | 170    | 0.70      |
| 33                          |          |        |           | 4×6.1   | 90     | 1.35      | 5×6.1   | 170    | 0.70      |
| 47                          | 4×6.1    | 90     | 1.35      |         |        |           | 5×6.1   | 170    | 0.70      |
|                             | 5×6.1    | 170    | 0.70      |         |        |           | 6.3×6.1 | 250    | 0.36      |
| 100                         | 5×6.1    | 170    | 0.70      |         |        |           | 6.3×6.1 | 250    | 0.36      |
|                             | 6.3×6.1  | 250    | 0.36      |         |        |           | 6.3×8   | 300    | 0.34      |
| 220                         | 6.3×6.1  | 250    | 0.36      | 6.3×8   | 300    | 0.34      | 6.3×8   | 300    | 0.34      |
|                             | 6.3×8    | 300    | 0.34      |         |        |           |         |        |           |
| 330                         | 6.3×8    | 300    | 0.34      |         |        |           | 8×10.5  | 600    | 0.16      |
| 470                         |          |        |           | 8×10.5  | 600    | 0.16      | 8×10.5  | 600    | 0.16      |
| 680                         |          |        |           | 8×10.5  | 600    | 0.16      | 10×10.5 | 850    | 0.08      |
| 1000                        | 8×10.5   | 600    | 0.16      | 10×10.5 | 850    | 0.08      |         |        |           |

| Cap ( $\mu F$ ) \ WV (V.DC) | 25 (1E) |        |           | 35 (1V) |        |           | 50 (1H) |        |           |
|-----------------------------|---------|--------|-----------|---------|--------|-----------|---------|--------|-----------|
|                             | Size    | Ripple | Impedance | Size    | Ripple | Impedance | Size    | Ripple | Impedance |
| 4.7                         |         |        |           | 4×6.1   | 90     | 1.45      | 4×6.1   | 60     | 2.90      |
| 10                          |         |        |           | 4×6.1   | 90     | 1.45      | 5×6.1   | 85     | 1.52      |
|                             |         |        |           | 5×6.1   | 170    | 0.70      | 6.3×6.1 | 165    | 0.88      |
| 22                          |         |        |           | 5×6.1   | 170    | 0.70      | 6.3×6.1 | 165    | 0.88      |
|                             |         |        |           | 6.3×6.1 | 250    | 0.36      |         |        |           |
| 33                          | 5×6.1   | 170    | 0.70      | 6.3×6.1 | 250    | 0.36      | 6.3×8   | 195    | 0.68      |
|                             | 6.3×6.1 | 250    | 0.36      |         |        |           |         |        |           |
| 47                          | 6.3×6.1 | 250    | 0.36      | 6.3×6.1 | 250    | 0.36      | 6.3×8   | 195    | 0.68      |
|                             |         |        |           | 6.3×8   | 300    | 0.34      |         |        |           |
| 100                         | 6.3×8   | 300    | 0.34      | 6.3×8   | 300    | 0.34      | 8×10.5  | 350    | 0.34      |
|                             |         |        |           | 8×10.5  | 600    | 0.16      |         |        |           |
| 220                         | 8×10.5  | 600    | 0.16      | 8×10.5  | 600    | 0.16      | 10×10.5 | 670    | 0.18      |
| 330                         | 8×10.5  | 600    | 0.16      | 10×10.5 | 850    | 0.09      |         |        |           |
| 470                         | 10×10.5 | 850    | 0.09      |         |        |           |         |        |           |