

## CLZ Series

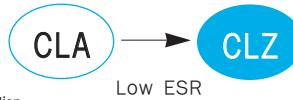
• 125°C 1,000~5,000Hrs assured.

Solvent-proof

WV ≤ 80V<sub>DC</sub>

- Vertical SMD type.
- Wide Temp., Low ESR.
- Suitable to fit for automotive equipment.
- RoHS compliant.
- Halogen-free capacitors are also available.

• AEC-Q200 compliant : Please contact us for more details, test data, information.

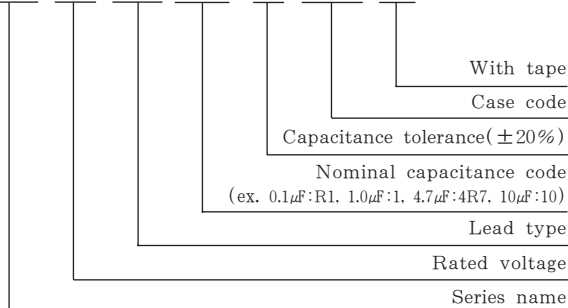


## SPECIFICATIONS

| Item                                                  | Characteristics                                                                                                                                                                                                                                                                                                                                        |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|--------|------------------------------------------|------|---------|------|-----------|--------|------|----------|---------|----------|---|---|-----|----------|---|---|-----|----------|----------|---|-----|----------|----------|----------|---------|----------|----------|
| Rated Voltage Range                                   | 10 ~ 400 V <sub>DC</sub>                                                                                                                                                                                                                                                                                                                               |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
| Operating Temperature Range                           | -40 ~ +125°C                                                                                                                                                                                                                                                                                                                                           |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
| Capacitance Tolerance                                 | ±20%(M)                                                                                                                                                                                                                                                                                                                                                |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
| Leakage Current                                       | Rated voltage(V <sub>DC</sub> )                                                                                                                                                                                                                                                                                                                        |                                       | 10~100                                                                                                                                                                                                                                                                                                                                                                                                                               |      |      |        | 160~400                                  |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
|                                                       | Max. Leakage current (μA)                                                                                                                                                                                                                                                                                                                              |                                       | I=0.01CV(μA) or 3μA, whichever is greater.<br>(at 20°C, 2 minutes)                                                                                                                                                                                                                                                                                                                                                                   |      |      |        | 0.04CV + 100(μA)<br>(at 20°C, 2 minutes) |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
|                                                       | Where, C : Nominal capacitance(μF), V : Rated voltage(V <sub>DC</sub> )                                                                                                                                                                                                                                                                                |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
| Dissipation Factor(Tanδ)                              | Rated voltage(V <sub>DC</sub> )                                                                                                                                                                                                                                                                                                                        |                                       | 10                                                                                                                                                                                                                                                                                                                                                                                                                                   | 16   | 25   | 35     | 50~80                                    | 100  | 160~250 | 400  |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
|                                                       | Tanδ(Max.)                                                                                                                                                                                                                                                                                                                                             |                                       | 0.22                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.19 | 0.16 | 0.14   | 0.12                                     | 0.10 | 0.20    | 0.24 |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
| (at 20°C, 120Hz)                                      |                                                                                                                                                                                                                                                                                                                                                        |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
| Temperature Characteristics<br>(Max. Impedance ratio) | Rated voltage(V <sub>DC</sub> )                                                                                                                                                                                                                                                                                                                        |                                       | 10                                                                                                                                                                                                                                                                                                                                                                                                                                   | 16   | 25   | 35~100 | 160~250                                  | 400  |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
|                                                       | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                                                                                      |                                       | 4                                                                                                                                                                                                                                                                                                                                                                                                                                    | 3    | 2    | 2      | 3                                        | 6    |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
|                                                       | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                                                                                      |                                       | 8                                                                                                                                                                                                                                                                                                                                                                                                                                    | 6    | 4    | 3      | 6                                        | 10   |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
| (at 120Hz)                                            |                                                                                                                                                                                                                                                                                                                                                        |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
| Load Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for the specified time at 125°C.                                                                                                                                                                                           |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
|                                                       | Capacitance change                                                                                                                                                                                                                                                                                                                                     | ≤ ±30% of the initial value           | <table><tr><td>Case Code</td><td>10~80V</td><td>100V</td><td>160~400V</td></tr><tr><td>D55~F60</td><td>1,000Hrs</td><td>-</td><td>-</td></tr><tr><td>H63</td><td>3,000Hrs</td><td>-</td><td>-</td></tr><tr><td>H10</td><td>5,000Hrs</td><td>2,000Hrs</td><td>-</td></tr><tr><td>J10</td><td>5,000Hrs</td><td>2,000Hrs</td><td>2,000Hrs</td></tr><tr><td>K14~M22</td><td>5,000Hrs</td><td>5,000Hrs</td><td>2,000Hrs</td></tr></table> |      |      |        |                                          |      |         |      | Case Code | 10~80V | 100V | 160~400V | D55~F60 | 1,000Hrs | - | - | H63 | 3,000Hrs | - | - | H10 | 5,000Hrs | 2,000Hrs | - | J10 | 5,000Hrs | 2,000Hrs | 2,000Hrs | K14~M22 | 5,000Hrs | 5,000Hrs |
| Case Code                                             | 10~80V                                                                                                                                                                                                                                                                                                                                                 | 100V                                  | 160~400V                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
| D55~F60                                               | 1,000Hrs                                                                                                                                                                                                                                                                                                                                               | -                                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
| H63                                                   | 3,000Hrs                                                                                                                                                                                                                                                                                                                                               | -                                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
| H10                                                   | 5,000Hrs                                                                                                                                                                                                                                                                                                                                               | 2,000Hrs                              | -                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
| J10                                                   | 5,000Hrs                                                                                                                                                                                                                                                                                                                                               | 2,000Hrs                              | 2,000Hrs                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
| K14~M22                                               | 5,000Hrs                                                                                                                                                                                                                                                                                                                                               | 5,000Hrs                              | 2,000Hrs                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
| Shelf Life                                            | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 125°C without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements. (Where, D55 ~ F60 is 500 hours) |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
|                                                       | Capacitance change                                                                                                                                                                                                                                                                                                                                     | ≤ ±30% of the initial value           |                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
|                                                       | Tanδ                                                                                                                                                                                                                                                                                                                                                   | ≤ 300% of the initial specified value |                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
| Others                                                | Leakage current                                                                                                                                                                                                                                                                                                                                        | ≤ The initial specified value         | (where, 500% for ≥ WV 80 V <sub>DC</sub> )                                                                                                                                                                                                                                                                                                                                                                                           |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |
|                                                       | Satisfied characteristics KS C IEC 60384-4                                                                                                                                                                                                                                                                                                             |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |        |                                          |      |         |      |           |        |      |          |         |          |   |   |     |          |   |   |     |          |          |   |     |          |          |          |         |          |          |

## PART NUMBERING SYSTEM

CLZ 16 VC 330 M J10 TP



## RATED RIPPLE CURRENT MULTIPLIERS

Frequency Multipliers

| Rated Voltage(V <sub>DC</sub> ) | Size code | Cap.(μF)      | Freq.(Hz) | 120  | 1K   | 10K  | 100K |
|---------------------------------|-----------|---------------|-----------|------|------|------|------|
| 10 ~ 100                        | D55 ~ J10 | 10            |           | 0.66 | 0.86 | 0.93 | 1.00 |
|                                 |           | 22 ~ 470      |           | 0.93 | 0.97 | 1.00 | 1.00 |
|                                 | K14 ~ M22 | 47 ~ 100      |           | 0.40 | 0.75 | 0.90 | 1.00 |
|                                 |           | 220 ~ 1,000   |           | 0.50 | 0.85 | 0.94 | 1.00 |
|                                 |           | 2,200 ~ 3,300 |           | 0.75 | 0.90 | 0.95 | 1.00 |
| 160 ~ 400                       | J10 ~ M22 | 4,700         |           | 0.85 | 0.95 | 0.98 | 1.00 |
|                                 |           | 2.2 ~ 33      |           | 1.00 | 1.50 | 1.75 | 1.80 |
|                                 |           | 47 ~ 68       |           | 1.00 | 1.30 | 1.40 | 1.50 |

## DIMENSIONS OF CLZ Series

Unit(mm)

### DIMENSIONS

● Vibration Resistance

〈Size code: D55~M22〉    〈Size code: H10~M22〉

■ : Dummy terminals

Recommended solder land on PC board

■ : Solder land on PC board

※Please inquire beforehand for 16, 18  $\phi$  size

### MARKING

〈D55~J10〉    〈K14~M22〉

Note 1 :  $L \pm 0.5$  for 8×6.3(H63)~18×21.5(M22)  
 Note 2 : 4×5.2(D55), 5×5.2(E55) is excluded symbol mark.

| Case code | $\phi D$ | L    | A    | B    | C    | W       | P   | a   | b   | c   | a   | b   | c   |
|-----------|----------|------|------|------|------|---------|-----|-----|-----|-----|-----|-----|-----|
| D55       | 4        | 5.2  | 4.3  | 4.3  | 5.1  | 0.5~0.8 | 1.0 | 1.0 | 2.6 | 1.6 |     |     |     |
| E55       | 5        | 5.2  | 5.3  | 5.3  | 5.9  | 0.5~0.8 | 1.4 | 1.4 | 3.0 | 1.6 |     |     |     |
| F55       | 6.3      | 5.2  | 6.6  | 6.6  | 7.2  | 0.5~0.8 | 1.9 | 1.9 | 3.5 | 1.6 |     |     |     |
| F60       | 6.3      | 5.7  | 6.6  | 6.6  | 7.2  | 0.5~0.8 | 1.9 | 1.9 | 3.5 | 1.6 |     |     |     |
| H63       | 8        | 6.3  | 8.3  | 8.3  | 9.0  | 0.5~0.8 | 2.3 | 2.3 | 4.5 | 1.6 |     |     |     |
| H10       | 8        | 10   | 8.3  | 8.3  | 9.0  | 0.7~1.1 | 3.1 | 3.1 | 4.2 | 2.2 | 3.1 | 4.2 | 3.5 |
| J10       | 10       | 10   | 10.3 | 10.3 | 11.0 | 0.7~1.1 | 4.5 | 4.5 | 4.4 | 2.2 | 4.5 | 4.4 | 3.5 |
| K14       | 12.5     | 13.5 | 13.0 | 13.0 | 13.7 | 1.0~1.3 | 4.2 | 4.0 | 5.7 | 2.5 | 3.4 | 6.3 | 9.3 |
| L17       | 16       | 16.5 | 17.0 | 17.0 | 18.0 | 1.0~1.3 | 6.5 | 6.0 | 6.9 | 2.5 | 4.7 | 7.8 | 9.6 |
| L22       | 16       | 21.5 | 17.0 | 17.0 | 18.0 | 1.0~1.3 | 6.5 | 6.0 | 6.9 | 2.5 |     |     |     |
| M17       | 18       | 16.5 | 19.0 | 19.0 | 20.0 | 1.0~1.3 | 6.5 | 6.0 | 7.9 | 2.5 | 4.7 | 8.8 | 9.6 |
| M22       | 18       | 21.5 | 19.0 | 19.0 | 20.0 | 1.0~1.3 | 6.5 | 6.0 | 7.9 | 2.5 |     |     |     |

● Vibration Resistance

## RATINGS OF CLZ Series

| V <sub>DC</sub><br>μF | 10                   | 16                 | 25                   | 35                 | 50                | 63                | 80                | 100               |
|-----------------------|----------------------|--------------------|----------------------|--------------------|-------------------|-------------------|-------------------|-------------------|
| 10                    |                      | D55 7.00 105 12    | E55 3.30 49.5 23     | F60 1.60 24.0 69   | F60 2.80 42.0 51  | H63 2.00 110 60   | H10 1.20 80.4 70  | H10 1.60 107.2 70 |
| 22                    | E55 3.30 49.5 23     | E55 3.30 49.5 23   | F55 2.00 30.0 40     | F60 1.60 24.0 69   | H63 1.60 30.0 83  | H10 1.00 50.0 70  | J10 0.55 35.0 115 | J10 1.00 64.0 95  |
| 33                    | E55 3.30 49.5 23     | F55 2.00 30.0 40   | F60 1.60 24.0 69     | H63 0.90 14.0 110  | H10 0.70 11.0 160 | J10 0.55 27.5 115 | J10 0.55 35.0 115 | J10 0.80 51.2 115 |
| 47                    | F55 2.00 30.0 40     | F60 1.60 24.0 69   | H63 0.90 14.0 110    | H10 0.40 6.0 220   | J10 0.50 7.5 247  | J10 0.55 27.5 115 | K14 0.33 21.1 450 | K14 0.33 19.8 450 |
| 100                   | H63 0.90 14.0 110    | H63 0.90 14.0 110  | H10 0.40 6.0 220     | H10 0.40 6.0 220   | J10 0.50 7.5 247  | K14 0.33 16.5 450 | L17 0.24 15.4 650 | K14 0.33 19.8 450 |
| 220                   | H10 0.40 6.0 220     | H10 0.40 6.0 220   | J10 0.30 4.5 296     | J10 0.30 4.5 296   | K14 0.23 3.5 550  | L17 0.24 12.0 650 | M17 0.16 10.2 950 |                   |
| 330                   | J10 0.30 4.5 296     | J10 0.30 4.5 296   | K14 0.14 2.1 750     | K14 0.14 2.1 750   | L17 0.15 2.3 850  | L17 0.24 12.0 650 |                   |                   |
| 470                   | J10 0.30 4.5 296     | K14 0.14 2.1 750   | L17 0.10 1.5 1,000   | M17 0.10 1.5 1,000 | M17 0.15 2.3 920  | L22 0.16 8.0 950  |                   |                   |
| 1,000                 | K14 0.14 2.1 750     | M17 0.10 1.5 1,200 | M22 0.058 0.87 1,550 |                    |                   |                   |                   |                   |
| 2,200                 | L17 0.10 1.5 1,000   |                    |                      |                    |                   |                   |                   |                   |
| 3,300                 | M17 0.10 1.5 1,200   |                    |                      |                    |                   |                   |                   |                   |
| 4,700                 | M22 0.058 0.87 1,550 |                    |                      |                    |                   |                   |                   |                   |

↑ Rated Ripple Current (mA<sub>rms</sub>/125°C, 100kHz)  
 ↑ ESR (Ω max./-40°C, 100kHz)  
 ↑ ESR (Ω max./20°C, 100kHz)  
 ↑ Case code

| V <sub>DC</sub><br>μF | 160     | 200     | 250     | 400     |
|-----------------------|---------|---------|---------|---------|
| 2.2                   |         |         |         | J10 26  |
| 3.3                   |         |         |         | J10 37  |
| 4.7                   |         |         |         | K14 70  |
| 10                    | K14 100 | K14 100 | L17 120 | L22 140 |
| 22                    | L17 180 | L17 180 | M17 205 |         |
| 33                    | M17 245 | M17 245 | M22 260 |         |
| 47                    | M22 315 | M22 315 |         |         |
| 68                    | M22 380 |         |         |         |

↑ Rated Ripple Current (mA<sub>rms</sub>/125°C, 120Hz)  
 ↑ Case code