

## FEATURES

- Life time: 105°C, 2,000Hrs
- Reflow soldering is available
- Available for high density surface mounting
- High stability and reliability
- Low impedance



## SPECIFICATIONS

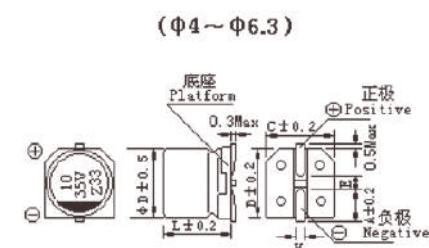
| Item                            | Performance Characteristics                                                                                                      |      |      |      |                                                                            |      |      |      |      |      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------|------|------|------|----------------------------------------------------------------------------|------|------|------|------|------|
| Operating Temperature Range     | -55 to +105°C                                                                                                                    |      |      |      |                                                                            |      |      |      |      |      |
| Rated Working Voltage Range     | 6.3 to 100V                                                                                                                      |      |      |      |                                                                            |      |      |      |      |      |
| Nominal Capacitance Range       | 1 to 1500μF                                                                                                                      |      |      |      |                                                                            |      |      |      |      |      |
| Capacitance Tolerance           | ±20% at 120Hz, +20°C                                                                                                             |      |      |      |                                                                            |      |      |      |      |      |
| Leakage Current                 | I ≤0.01CV or 3(μA)<br>whichever is greater measure after 2 minutes application of rated working voltage at +20°C                 |      |      |      |                                                                            |      |      |      |      |      |
| tanδ (120Hz, +20°C)             | Working Voltage (V)                                                                                                              | 6.3  | 10   | 16   | 25                                                                         | 35   | 50   | 63   | 80   | 100  |
|                                 | tanδ (max.)                                                                                                                      | 0.22 | 0.19 | 0.16 | 0.14                                                                       | 0.12 | 0.10 | 0.08 | 0.08 | 0.08 |
| Low Temperature Characteristics | Impedance ratio max. at 120Hz                                                                                                    |      |      |      |                                                                            |      |      |      |      |      |
|                                 | Working Voltage (V)                                                                                                              | 6.3  | 10   | 16   | 25                                                                         | 35   | 50   | 63   | 80   | 100  |
|                                 | Z-25°C / Z+20°C                                                                                                                  | 2    | 2    | 2    | 2                                                                          | 2    | 2    | 2    | 2    | 2    |
|                                 | Z-40°C / Z+20°C                                                                                                                  | 3    | 3    | 3    | 3                                                                          | 3    | 3    | 3    | 3    | 3    |
|                                 | Z-55°C / Z+20°C                                                                                                                  | 4    | 4    | 4    | 3                                                                          | 3    | 3    | 3    | 3    | 3    |
| High Temperature Loading        | Test time : 2,000 hours                                                                                                          |      |      |      | Post test requirements at +20°C                                            |      |      |      |      |      |
|                                 | Test temperature : +105°C                                                                                                        |      |      |      | Leakage current : ≤Initial specified value                                 |      |      |      |      |      |
|                                 | Test conditions : Rated DC working voltage                                                                                       |      |      |      | Cap. change : within ±20% of the initial measured value (≤16V:within ±25%) |      |      |      |      |      |
|                                 |                                                                                                                                  |      |      |      | tanδ : ≤200% of the initial specified value                                |      |      |      |      |      |
| Shelf Life                      | At +105°C no voltage applied after 1,000 hours and then being stabilized at +20°C the capacitors shall meet the following limits |      |      |      |                                                                            |      |      |      |      |      |
|                                 | Leakage current : ≤200% of initial specified value                                                                               |      |      |      |                                                                            |      |      |      |      |      |
|                                 | Cap. change : within ±20% of the initial measured value                                                                          |      |      |      |                                                                            |      |      |      |      |      |
|                                 | tanδ : ≤120% of the initial specified value                                                                                      |      |      |      |                                                                            |      |      |      |      |      |
| Industrial Standard             | JIS C – 5101-4 (IEC 60384-4)                                                                                                     |      |      |      |                                                                            |      |      |      |      |      |

## DIMENSIONS & MARKING

| Size | Φ4x5.4    | Φ5x5.4 | Φ6.3x5.4 | Φ6.3x7.7 | Φ8x6.2    | Φ8x10.2 | Φ10x10.2 |
|------|-----------|--------|----------|----------|-----------|---------|----------|
| A    | 1.8       | 2.2    | 2.6      | 2.6      | 2.9       | 2.9     | 3.3      |
| B    | 4.3       | 5.3    | 6.6      | 6.6      | 8.3       | 8.3     | 10.3     |
| C    | 4.3       | 5.3    | 6.6      | 6.6      | 8.3       | 8.3     | 10.3     |
| L    | 5.4       | 5.4    | 5.4      | 7.7      | 6.2       | 10.2    | 10.2     |
| H    | 0.5 - 0.9 |        |          |          | 0.9 - 1.1 |         |          |

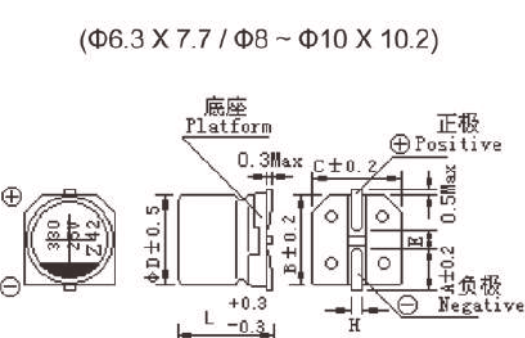
  

(Φ4 ~ Φ6.3)



(Φ6.3 X 7.7 / Φ8 ~ Φ10 X 10.2)



## PART NUMBER SYSTEM (EXAMPLE: 25V 470μF)

| 1 | 2 3 | 4 5 6 | 7 | 8 9 | 10 | 11 12 | 13 14 |
|---|-----|-------|---|-----|----|-------|-------|
| V | Z2  | 477   | M | 1E  | G  | T2    | TR    |

Type (Taping)  
 Case Length (10.2mm)  
 Diameter (10mm)  
 Voltage (25V)  
 Tolerance (±20%)  
 Capacitance (470μF)  
 Series  
 V-CHIP

## STANDARD RATINGS

| Voltage (Code) |      | 6.3V (0J) |           |                | 10V (1A)  |           |                | 16V (1C)  |           |                | 25V (1E)  |           |                | 35V (1V)  |           |                |
|----------------|------|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|
| Cap. (μF)      | Code | Case Size | Impedance | Ripple Current | Case Size | Impedance | Ripple Current | Case Size | Impedance | Ripple Current | Case Size | Impedance | Ripple Current | Case Size | Impedance | Ripple Current |
| 4.7            | 475  |           |           |                |           |           |                |           |           |                | 4 x 5.4   | 2.2       | 80             | 4 x 5.4   | 2.2       | 80             |
| 10             | 106  |           |           |                |           |           |                | 4 x 5.4   | 2.2       | 80             | 4 x 5.4   | 2.2       | 80             | 5 x 5.4   | 1.2       | 150            |
| 22             | 226  | 4 x 5.4   | 2.2       | 80             | 4 x 5.4   | 2.2       | 80             | 5 x 5.4   | 1.2       | 150            | 6.3 x 5.4 | 0.58      | 230            | 6.3 x 5.4 | 0.58      | 230            |
| 33             | 336  | 5 x 5.4   | 1.2       | 150            | 5 x 5.4   | 1.2       | 150            | 6.3 x 5.4 | 0.58      | 230            | 6.3 x 5.4 | 0.58      | 230            | 6.3 x 5.4 | 0.58      | 230            |
| 47             | 476  | 5 x 5.4   | 1.2       | 150            | 6.3 x 5.4 | 0.58      | 230            | 6.3 x 5.4 | 0.58      | 230            | 6.3 x 7.7 | 0.34      | 280            | 6.3 x 7.7 | 0.34      | 280            |
| 100            | 107  | 6.3 x 5.4 | 0.58      | 230            | 6.3 x 7.7 | 0.34      | 280            | 6.3 x 5.4 | 0.52      | 230            | 6.3 x 7.7 | 0.34      | 280            | 8 x 10.2  | 0.17      | 450            |
|                |      |           |           |                |           |           |                | 6.3 x 7.7 | 0.34      | 280            | 8 x 6.2   | 0.26      | 300            |           |           |                |
| 150            | 157  | 6.3 x 5.4 | 0.58      | 230            | 6.3 x 7.7 | 0.34      | 280            | 6.3 x 7.7 | 0.34      | 280            | 8 x 10.2  | 0.17      | 450            | 10 x 10.2 | 0.1       | 670            |
|                |      |           |           |                |           |           |                | 6.3 x 7.7 | 0.34      | 384            | 8 x 10.2  | 0.17      | 450            | 8 x 10.2  | 0.17      | 587            |
| 220            | 227  | 6.3 x 5.4 | 0.58      | 243            | 6.3 x 7.7 | 0.34      | 280            | 8 x 10.2  | 0.17      | 450            | 8 x 10.2  | 0.17      | 450            | 10 x 10.2 | 0.1       | 670            |
|                |      | 6.3 x 7.7 | 0.34      | 280            |           |           |                | 8 x 10.2  | 0.17      | 450            |           |           |                | 10 x 10.2 | 0.1       | 670            |
| 330            | 337  | 6.3 x 7.7 | 0.34      | 280            | 8 x 10.2  | 0.17      | 450            | 8 x 10.2  | 0.17      | 450            | 10 x 10.2 | 0.1       | 670            | 10 x 10.2 | 0.1       | 670            |
| 470            | 477  | 8 x 10.2  | 0.17      | 450            | 8 x 10.2  | 0.17      | 450            | 8 x 10.2  | 0.17      | 450            | 10 x 10.2 | 0.1       | 670            |           |           |                |
|                |      |           |           |                |           |           |                | 10 x 10.2 | 0.1       | 670            |           |           |                |           |           |                |
| 1000           | 108  | 8 x 10.2  | 0.17      | 450            | 10 x 10.2 | 0.1       | 670            | 10 x 10.2 | 0.1       | 670            |           |           |                |           |           |                |
|                |      | 10 x 10.2 | 0.1       | 670            |           |           |                |           |           |                |           |           |                |           |           |                |
| 1500           | 158  | 10 x 10.2 | 0.1       | 670            |           |           |                |           |           |                |           |           |                |           |           |                |

Maximum Allowable Ripple Current (mA rms) at 105°C 100kHz

Case Size  $\Phi$  D x L (mm)

Maximum ESR ( $\Omega$ ) at 20°C 100kHz

| Voltage (Code) |      | 50V (1H)  |           |                | 63V (1J)  |           |                | 80V (1K)  |           |                | 100V (2A) |           |                |
|----------------|------|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|
| Cap. (μF)      | Code | Case Size | Impedance | Ripple Current | Case Size | Impedance | Ripple Current | Case Size | Impedance | Ripple Current | Case Size | Impedance | Ripple Current |
| 1              | 105  | 4 x 5.4   | 4.5       | 60             |           |           |                |           |           |                |           |           |                |
| 2.2            | 225  | 4 x 5.4   | 4.5       | 60             |           |           |                |           |           |                |           |           |                |
| 3.3            | 335  | 4 x 5.4   | 4.5       | 60             |           |           |                | 5 x 5.4   | 5         | 25             |           |           |                |
| 4.7            | 475  | 5 x 5.4   | 3.5       | 85             | 5 x 5.4   | 3         | 50             | 6.3 x 5.4 | 3         | 40             |           |           |                |
| 10             | 106  | 6.3 x 5.4 | 1.8       | 165            | 6.3 x 5.4 | 1.5       | 80             | 6.3 x 7.7 | 2.4       | 60             |           |           |                |
|                |      |           |           |                | 6.3 x 7.7 | 1.2       | 120            |           |           |                |           |           |                |
| 22             | 226  | 6.3 x 7.7 | 1.6       | 185            | 6.3 x 7.7 | 1.2       | 120            | 8 x 10.2  | 1.3       | 130            | 8 x 10.2  | 1.3       | 130            |
|                |      |           |           |                | 8 x 6.2   | 1.2       | 120            |           |           |                |           |           |                |
| 33             | 336  | 6.3 x 7.7 | 1.6       | 185            | 8 x 10.2  | 0.65      | 250            | 8 x 10.2  | 1.3       | 130            | 10 x 10.2 | 0.7       | 200            |
| 47             | 476  | 8 x 10.2  | 0.4       | 300            | 8 x 10.2  | 0.65      | 250            | 10 x 10.2 | 0.7       | 200            |           |           |                |
|                |      | 10 x 10.2 | 0.3       | 342            |           |           |                |           |           |                |           |           |                |
| 68             | 686  | 10 x 10.2 | 0.3       | 342            | 8 x 10.2  | 0.65      | 250            |           |           |                |           |           |                |
| 100            | 107  | 10 x 10.2 | 0.22      | 670            | 10 x 10.2 | 0.35      | 400            |           |           |                |           |           |                |
| 150            | 157  | 10 x 10.2 | 0.2       | 670            |           |           |                |           |           |                |           |           |                |
| 220            | 227  | 10 x 10.2 | 0.18      | 670            |           |           |                |           |           |                |           |           |                |

Maximum Allowable Ripple Current (mA rms) at 105°C 100kHz

Case Size  $\Phi$  D x L (mm)

Maximum ESR ( $\Omega$ ) at 20°C 100kHz

Specifications are subject to change without notice. Should a safety or technical concern arise regarding the product, please be sure to contact our sales offices or agents immediately.