

## FEATURES

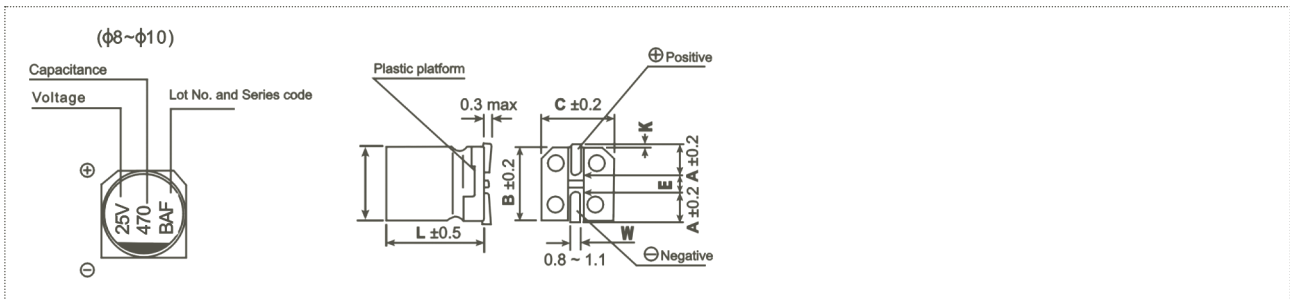
- Designed for surface mounting on high-density circuit board.
- Emboss carrier tape packing system is available for automatic insertion.



## SPECIFICATIONS

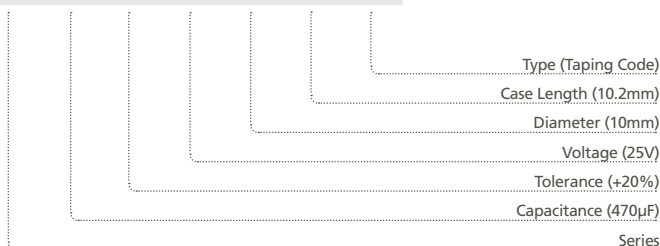
| Item                         | Performance Characteristics                                                                                                                                            |                                        |  |  |  |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--|--|--|
| Operating Temperature Range  | -55 to +105°C                                                                                                                                                          |                                        |  |  |  |
| Rated Working Voltage Range  | 6.3 to 35V                                                                                                                                                             |                                        |  |  |  |
| Nominal Capacitance Range    | 47 to 1500μF                                                                                                                                                           |                                        |  |  |  |
| Capacitance Tolerance        | ±20% at 120Hz, +20°C                                                                                                                                                   |                                        |  |  |  |
| Leakage Current              | $I \leq 0.01CV$ or 3 (μA)<br>whichever is greater measured after 2 minutes application of rated working voltage at +20°C                                               |                                        |  |  |  |
| tan δ (120Hz, +20°C)         | Working Voltage (V)                                                                                                                                                    |                                        |  |  |  |
|                              | tan δ (max.)                                                                                                                                                           |                                        |  |  |  |
| Stability at Low Temperature | Measurement frequency: 120Hz                                                                                                                                           |                                        |  |  |  |
|                              | Working Voltage (V)                                                                                                                                                    |                                        |  |  |  |
|                              | Z-25°C / Z+20°C                                                                                                                                                        |                                        |  |  |  |
|                              | Z-40°C / Z+20°C                                                                                                                                                        |                                        |  |  |  |
| Load Life                    | Z-55°C / Z+20°C                                                                                                                                                        |                                        |  |  |  |
|                              | After applying rated voltage for 3,000 hours at +105°C ±2°C and then being stabilized at +20°C, the capacitors shall meet the following limits                         |                                        |  |  |  |
|                              | Cap. change                                                                                                                                                            | : ±35% of the initial measured value   |  |  |  |
|                              | tan δ                                                                                                                                                                  | : ≤300% of the initial specified value |  |  |  |
| Shelf Life                   | DC leakage current                                                                                                                                                     | : ≤initial specified value             |  |  |  |
|                              | After 1,000 hours at +105°C ±2°C with no voltage applied and then being stabilized at +20°C, they meet the limits specified value in life characteristics listed above |                                        |  |  |  |
| Resistance to Soldering Heat | After reflow and then being stabilized at +20°C, the capacitors shall meet the following limits                                                                        |                                        |  |  |  |
|                              | Cap. change                                                                                                                                                            | : ±10% of the initial measured value   |  |  |  |
|                              | tan δ                                                                                                                                                                  | : ≤initial specified value             |  |  |  |
| Industrial Standard          | DC leakage current                                                                                                                                                     | : ≤initial specified value             |  |  |  |
|                              | JIS C - 5101-4 (IEC 60384-4)                                                                                                                                           |                                        |  |  |  |

## CHIP TYPE



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

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



**STANDARD RATINGS**

| D    | L    | B, C | A    | W          | E   | K                  |
|------|------|------|------|------------|-----|--------------------|
| 8.0  | 10.2 | 8.3  | 2.95 | 0.90 ± 0.2 | 3.1 | 0.70-0.40 to +0.20 |
| 10.0 | 10.2 | 10.3 | 3.2  | 0.90 ± 0.2 | 4.6 | 0.70-0.40 to +0.20 |

Unit: mm

| Voltage (Code) |      | 6.3V (0J) |           |                | 10V (1A)  |           |                | 16V (1C)  |           |                |
|----------------|------|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|
| Cap. (µF)      | Code | Case Size | Impedance | Ripple Current | Case Size | Impedance | Ripple Current | Case Size | Impedance | Ripple Current |
| 330            | 337  |           |           |                | 8 x 10.2  | 0.16      | 600            | 8 x 10.2  | 0.16      | 600            |
| 470            | 477  | 8 x 10.2  | 0.16      | 600            | 8 x 10.2  | 0.16      | 600            | 8 x 10.2  | 0.16      | 600            |
| 1000           | 108  | 8 x 10.2  | 0.16      | 600            | 10 x 10.2 | 0.08      | 850            |           |           |                |
| 1500           | 158  | 10 x 10.2 | 0.08      | 850            |           |           |                |           |           |                |

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

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

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

| Voltage (Code) |      | 25V (1E)  |           |                | 35V (1V)  |           |                |
|----------------|------|-----------|-----------|----------------|-----------|-----------|----------------|
| Cap. (µF)      | Code | Case Size | Impedance | Ripple Current | Case Size | Impedance | Ripple Current |
| 47             | 476  |           |           |                | 8 x 10.2  | 0.16      | 600            |
| 100            | 107  |           |           |                | 8 x 10.2  | 0.16      | 600            |
| 150            | 157  | 8 x 10.2  | 0.16      | 600            | 8 x 10.2  | 0.16      | 600            |
| 220            | 227  | 8 x 10.2  | 0.16      | 600            | 8 x 10.2  | 0.16      | 600            |
| 330            | 337  | 8 x 10.2  | 0.16      | 600            | 10 x 10.2 | 0.08      | 850            |
| 470            | 477  | 10 x 10.2 | 0.08      | 850            |           |           |                |

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

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

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

\* Other voltage, capacitance, dimension are also available upon request.

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.