

## Surface Mount Type



Series : **TC** Type : **V**

**High temperature Lead-Free reflow**



### Features

- High ripple current (50 % higher than TP series)
- Endurance: 3000 h at 125 °C (D8 size : 2000 h)
- Added ESR specification after the endurance test
- Vibration-proof product is available upon request. (φ8 mm and larger)
- RoHS compliant

### Specifications

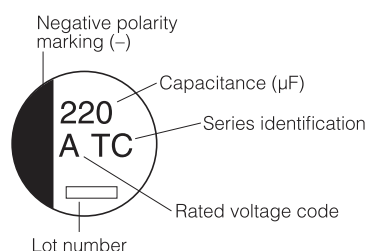
|                              |                                                                                                                                                                                            |                                   |           |     |      |  |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------|-----|------|--|
| Category temperature range   | -40 °C to +125 °C                                                                                                                                                                          |                                   |           |     |      |  |
| Rated voltage range          | 10 V.DC to 35 V.DC                                                                                                                                                                         |                                   |           |     |      |  |
| Rated capacitance range      | 47 μF to 470 μF                                                                                                                                                                            |                                   |           |     |      |  |
| Capacitance tolerance        | ±20 % (120 Hz/+20 °C)                                                                                                                                                                      |                                   |           |     |      |  |
| Leakage current              | I ≤ 0.01 CV (μA) After 2 minutes                                                                                                                                                           |                                   |           |     |      |  |
| Dissipation factor (tan δ)   | Please see the attached characteristics list                                                                                                                                               |                                   |           |     |      |  |
| Endurance                    | After applying rated working voltage for 3000 hours (D8 size : 2000 h) at +125 °C±2 °C and then being stabilized at +20 °C, Capacitors shall meet the following limits.                    |                                   |           |     |      |  |
|                              | Capacitance change                                                                                                                                                                         | Within ±30 % of the initial value |           |     |      |  |
|                              | tan δ                                                                                                                                                                                      | ≤ 300 % of the initial limit      |           |     |      |  |
|                              | DC leakage current                                                                                                                                                                         | Within the initial limit          |           |     |      |  |
|                              | ESR after endurance (Ω/100kHz)                                                                                                                                                             |                                   | Size code |     |      |  |
|                              |                                                                                                                                                                                            |                                   | D8        | F   | G    |  |
|                              |                                                                                                                                                                                            | Initial (+20 °C)                  | 0.45      | 0.2 | 0.15 |  |
|                              | After 2000 h (-40 °C)                                                                                                                                                                      | 40                                | 4.5       | 3.5 |      |  |
| Shelf life                   | After storage for 1000 hours at +125 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment) |                                   |           |     |      |  |
| Resistance to soldering heat | After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.                                                                                    |                                   |           |     |      |  |
|                              | Capacitance change                                                                                                                                                                         | Within ±10 % of the initial value |           |     |      |  |
|                              | tan δ                                                                                                                                                                                      | Within the initial limit          |           |     |      |  |
|                              | DC leakage current                                                                                                                                                                         | Within the initial limit          |           |     |      |  |
| AEC-Q200                     | AEC-Q200 compliant                                                                                                                                                                         |                                   |           |     |      |  |

### Frequency correction factor for ripple current

|                   |      |      |      |          |
|-------------------|------|------|------|----------|
| Frequency (Hz)    | 120  | 1 k  | 10 k | 100 k to |
| Correction factor | 0.65 | 0.85 | 0.95 | 1.00     |

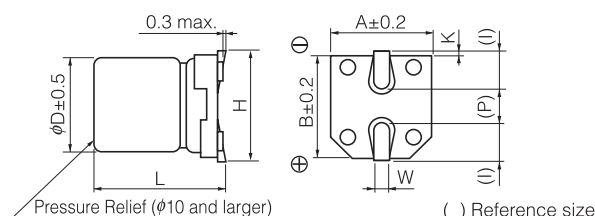
### Marking

Example : 10 V.DC 220 μF  
Marking color : BLACK



|                   |    |    |    |    |
|-------------------|----|----|----|----|
| R. Voltage (V.DC) | 10 | 16 | 25 | 35 |
| Code              | A  | C  | E  | V  |

### Dimensions



(Unit : mm)

| Size code | φD   | L        | A, B | H        | I   | W        | P   | K                                      |
|-----------|------|----------|------|----------|-----|----------|-----|----------------------------------------|
| D8        | 6.3  | 7.7±0.3  | 6.6  | 7.8 max. | 2.6 | 0.65±0.1 | 1.8 | 0.35 <sup>+0.15</sup> <sub>-0.20</sub> |
| F         | 8.0  | 10.2±0.3 | 8.3  | 10.0max. | 3.4 | 0.90±0.2 | 3.1 | 0.70±0.20                              |
| G         | 10.0 | 10.2±0.3 | 10.3 | 12.0max. | 3.5 | 0.90±0.2 | 4.6 | 0.70±0.20                              |

## Characteristics list

Endurance : 125 °C 3000 h (D8 size : 2000 h)

| Rated voltage<br>(V.DC) | Cap.<br>(±20 %)<br>(μF) | Case size (mm) |      | Size code | Specification                                           |                         |        | Part No. | Reflow       | Min. Packaging Q'ty           |                 |
|-------------------------|-------------------------|----------------|------|-----------|---------------------------------------------------------|-------------------------|--------|----------|--------------|-------------------------------|-----------------|
|                         |                         | φD             | L    |           | Ripple Current<br>(100 kHz)<br>(+125 °C)<br>(mA r.m.s.) | ESR<br>(100 kHz)<br>(Ω) |        |          |              | tan δ<br>(120 Hz)<br>(+20 °C) | Taping<br>(pcs) |
|                         |                         |                |      |           |                                                         | +20 °C                  | −40 °C |          |              |                               |                 |
| 10                      | 220                     | 8              | 10.2 | F         | 410                                                     | 0.20                    | 3      | 0.30     | EEETC1A221P  | (8)                           | 500             |
|                         | 330                     | 10             | 10.2 | G         | 750                                                     | 0.15                    | 2      | 0.30     | EEETC1A331P  | (8)                           | 500             |
|                         | 470                     | 10             | 10.2 | G         | 750                                                     | 0.15                    | 2      | 0.30     | EEETC1A471P  | (8)                           | 500             |
| 16                      | 100                     | 6.3            | 7.7  | D8        | 300                                                     | 0.45                    | 5      | 0.23     | EEETC1C101XP | (8)                           | 900             |
|                         |                         | 8              | 10.2 | F         | 410                                                     | 0.20                    | 3      | 0.23     | EEETC1C101P  | (8)                           | 500             |
|                         | 220                     | 8              | 10.2 | F         | 410                                                     | 0.20                    | 3      | 0.23     | EEETC1C221P  | (8)                           | 500             |
|                         | 330                     | 10             | 10.2 | G         | 750                                                     | 0.15                    | 2      | 0.23     | EEETC1C331P  | (8)                           | 500             |
|                         | 470                     | 10             | 10.2 | G         | 750                                                     | 0.15                    | 2      | 0.23     | EEETC1C471P  | (8)                           | 500             |
|                         |                         |                |      |           |                                                         |                         |        |          |              |                               |                 |
| 25                      | 100                     | 8              | 10.2 | F         | 410                                                     | 0.20                    | 3      | 0.18     | EEETC1E101P  | (8)                           | 500             |
|                         | 220                     | 10             | 10.2 | G         | 750                                                     | 0.15                    | 2      | 0.18     | EEETC1E221P  | (8)                           | 500             |
|                         | 330                     | 10             | 10.2 | G         | 750                                                     | 0.15                    | 2      | 0.18     | EEETC1E331P  | (8)                           | 500             |
| 35                      | 47                      | 6.3            | 7.7  | D8        | 300                                                     | 0.45                    | 5      | 0.16     | EEETC1V470XP | (8)                           | 900             |
|                         |                         | 8              | 10.2 | F         | 410                                                     | 0.20                    | 3      | 0.16     | EEETC1V470P  | (8)                           | 500             |
|                         | 100                     | 8              | 10.2 | F         | 410                                                     | 0.20                    | 3      | 0.16     | EEETC1V101P  | (8)                           | 500             |
|                         | 220                     | 10             | 10.2 | G         | 750                                                     | 0.15                    | 2      | 0.16     | EEETC1V221P  | (8)                           | 500             |

- Please refer to the page of "Reflow Profile" and "The Taping Dimensions".
- When requesting vibration-proof product, please put the last "V" instead to "P"

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### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

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