

### Surface Mount Type

Series: **Medium-size TP** Type: **V**  
**TP** High temperature Lead-Free reflow(suffix:A\*)



#### ■ Features

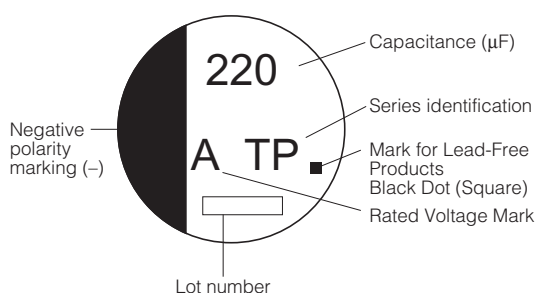
- Lower ESR at Low temperature after endurance
- Endurance: 3000 h at 125 °C(D8 size : 2000 h)
- Automotive
- Vibration-proof product is available upon request. ( $\phi 8 \leq$ )
- RoHS directive compliant

#### ■ Specifications

|                              |                                                                                                                                                                                            |                                    |           |     |      |  |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------|-----|------|--|
| Category Temp. Range         | -40 °C to +125 °C                                                                                                                                                                          |                                    |           |     |      |  |
| Rated W.V.Range              | 10 V.DC to 35 V.DC                                                                                                                                                                         |                                    |           |     |      |  |
| Nominal Cap.Range            | 47 μF to 470 μF                                                                                                                                                                            |                                    |           |     |      |  |
| Capacitance Tolerance        | ±20 % (120 Hz/+20 °C)                                                                                                                                                                      |                                    |           |     |      |  |
| DC Leakage Current           | I ≤ 0.01 CV (μA) After 2 minutes                                                                                                                                                           |                                    |           |     |      |  |
| tan δ                        | Please see the attached standard products list                                                                                                                                             |                                    |           |     |      |  |
| Endurance                    | After the life test with DC rated working voltage at +125 °C±2 °C for 3000 hours(D8 size : 2000 h). the capacitors shall meet the limits specified below.                                  |                                    |           |     |      |  |
|                              | Capacitance change                                                                                                                                                                         | ±30 % of initial measured value    |           |     |      |  |
|                              | tan δ                                                                                                                                                                                      | ≤ 300 % of initial specified value |           |     |      |  |
|                              | DC leakage current                                                                                                                                                                         | ≤ initial specified value          |           |     |      |  |
|                              | 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                                                                                                                                                                         | ±10 % of initial measured value    |           |     |      |  |
|                              | tan δ                                                                                                                                                                                      | ≤ initial specified value          |           |     |      |  |
|                              | DC leakage current                                                                                                                                                                         | ≤ initial specified value          |           |     |      |  |

#### ■ Marking

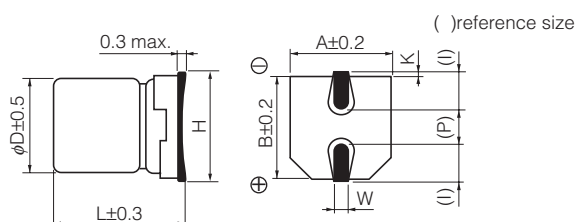
Example:10 V 220  $\mu$ F Marking color : BLACK



#### Rated Voltage Mark

|   |      |
|---|------|
| A | 10 V |
| C | 16 V |
| E | 25 V |
| V | 35 V |

#### ■ Dimensions in mm (not to scale)



| Size code | D    | L    | A, B | H max. | I   | W              | P   | K                  |
|-----------|------|------|------|--------|-----|----------------|-----|--------------------|
| D8        | 6.3  | 7.7  | 6.6  | 7.8    | 2.6 | 0.65 $\pm 0.1$ | 1.8 | 0.35 -0.20 ~ +0.15 |
| F         | 8.0  | 10.2 | 8.3  | 10.0   | 3.4 | 0.90 $\pm 0.2$ | 3.1 | 0.70 $\pm 0.20$    |
| G         | 10.0 | 10.2 | 10.3 | 12.0   | 3.5 | 0.90 $\pm 0.2$ | 4.6 | 0.70 $\pm 0.20$    |

■ Standard Products

| W.V.<br><br>(V) | Cap.<br>(±20 %)<br><br>(μF) | Case size        |                    |               | Specification                                              |                                   |        |                               | Part No.<br>(RoHS:compliant) | Reflow       | Min.<br>Packaging Q'ty |
|-----------------|-----------------------------|------------------|--------------------|---------------|------------------------------------------------------------|-----------------------------------|--------|-------------------------------|------------------------------|--------------|------------------------|
|                 |                             | Dia.<br><br>(mm) | Length<br><br>(mm) | *Size<br>Code | Ripple<br>Current<br>(100 kHz)<br>(+125 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br><br>(Ω) |        | tan δ<br>(120 Hz)<br>(+20 °C) |                              |              | Taping<br><br>(pcs)    |
|                 |                             |                  |                    |               |                                                            | +20 °C                            | -40 °C |                               |                              |              |                        |
| 10              | 220                         | 8                | 10.2               | F             | 270                                                        | 0.2                               | 3      | 0.30                          | EEETP1A221AP                 | (8)          | 500                    |
|                 | 330                         | 8                | 10.2               | (F)           | 270                                                        | 0.2                               | 3      | 0.30                          | EEETPA331UAP                 | (8)          | 500                    |
|                 |                             | 10               | 10.2               | G             | 500                                                        | 0.15                              | 2      | 0.30                          | EEETP1A331AP                 | (8)          | 500                    |
|                 |                             | 470              | 10                 | 10.2          | G                                                          | 500                               | 0.15   | 2                             | 0.30                         | EEETP1A471AP | (8)                    |
| 16              | 100                         | 6.3              | 7.7                | D8            | 197                                                        | 0.45                              | 5      | 0.23                          | EEETPC101XAP                 | (8)          | 900                    |
|                 |                             | 8                | 10.2               | F             | 270                                                        | 0.2                               | 3      | 0.23                          | EEETP1C101AP                 | (8)          | 500                    |
|                 | 220                         | 8                | 10.2               | F             | 270                                                        | 0.2                               | 3      | 0.23                          | EEETP1C221AP                 | (8)          | 500                    |
|                 | 330                         | 10               | 10.2               | G             | 500                                                        | 0.15                              | 2      | 0.23                          | EEETP1C331AP                 | (8)          | 500                    |
|                 | 470                         | 10               | 10.2               | G             | 500                                                        | 0.15                              | 2      | 0.23                          | EEETP1C471AP                 | (8)          | 500                    |
|                 |                             |                  |                    |               |                                                            |                                   |        |                               |                              |              |                        |
| 25              | 100                         | 8                | 10.2               | F             | 270                                                        | 0.2                               | 3      | 0.18                          | EEETP1E101AP                 | (8)          | 500                    |
|                 | 220                         | 10               | 10.2               | G             | 500                                                        | 0.15                              | 2      | 0.18                          | EEETP1E221AP                 | (8)          | 500                    |
|                 | 330                         | 10               | 10.2               | G             | 500                                                        | 0.15                              | 2      | 0.18                          | EEETP1E331AP                 | (8)          | 500                    |
| 35              | 47                          | 6.3              | 7.7                | D8            | 197                                                        | 0.45                              | 5      | 0.16                          | EEETPV470XAP                 | (8)          | 900                    |
|                 |                             | 8                | 10.2               | F             | 270                                                        | 0.2                               | 3      | 0.16                          | EEETP1V470AP                 | (8)          | 500                    |
|                 | 100                         | 8                | 10.2               | F             | 270                                                        | 0.2                               | 3      | 0.16                          | EEETP1V101AP                 | (8)          | 500                    |
|                 | 220                         | 10               | 10.2               | G             | 500                                                        | 0.15                              | 2      | 0.16                          | EEETP1V221AP                 | (8)          | 500                    |

\* Size code( ):Miniaturization product  
 If Part number exceeds 12 digits, voltage code is abbreviated as follows; 1A→A, 1C→C, 1E→E, 1V→V  
 The taping dimensions are explained on p.177 of our Catalog. Please use it as a reference guide.  
 Reflow Profile(Fig-1 to Fig-11) listed on p.175 of our Catalog.