



Surface Mount Type

Series: **S** Type: **V**

Features

- Endurance : 85 °C 2000 h
- Vibration-proof product is available upon request. (φ8 mm and larger)
- RoHS compliant

Specifications

| | | | | | | | | | | | |
|------------------------------------|--|-----------------------------------|----------------------|----|---------------|----|-----------|----|----|-----|--------------------------------------|
| Category temp. range | -40 °C to +85 °C | | | | | | | | | | |
| Rated voltage range | 4 V.DC to 100 V.DC | | | | | | | | | | |
| Capacitance range | 1 μF to 1500 μF | | | | | | | | | | |
| Capacitance tolerance | ±20 % (120 Hz/+20°C) | | | | | | | | | | |
| Leakage cur rent | I ≤ 0.01 CV or 3 (μA) (Bi-Polar I ≤ 0.02 CV or 6 (μA)) After 2 minutes (Whichever is greater) | | | | | | | | | | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | | | | | | | | | | |
| Characteristics at low temperature | V.DC | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | (Impedance ratio at 120 Hz) |
| | Z(-25 °C)/Z(+20 °C) | 7 | 4 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | |
| | Z(-40 °C)/Z(+20 °C) | 15 | 8 | 6 | 4 | 4 | 3 | 3 | 4 | 4 | |
| Endurance | After applying rated working voltage for 2000 h (Bi-polar:1000 h for each polarity) at +85 °C±2 °C and then being stabilized at +20 °C, Capacitors shall meet the following limits. | | | | | | | | | | |
| | Capacitance change | Within ±20 % of the initial value | | | | | | | | | 1000 hours ±30 % 1000 hours ±20 % |
| | | Size code | B(φ4) to D, D8(φ6.3) | | Rated voltage | | 4 V.DC | | | | |
| | | ≤ D(φ6.3) Miniature | | | 6.3 V.DC | | ≥ 10 V.DC | | | | |
| tan δ | ≤200 % of the initial limit | | | | | | | | | | |
| DC leakage current | Within the initial limit | | | | | | | | | | |
| Shelf life | After storage for 1000 h at +85 °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) | 50, 60 | 120 | 1 k | 10 k to |
| Correction factor | 0.70 | 1.00 | 1.30 | 1.70 |

Marking

Example : 4 V.DC 33 μF
Marking color : BLACK

Negative polarity marking (-)
(No marking for the bi-polar)

Capacitance (μF)

Series identification (S) or (A)

Mark for Lead-Free products (Black dot)

Lot number

Rated voltage (V.DC)
(6=6.3 V.DC)

Dimensions

() Reference size

Pressure Relief (φ10 and larger)

Unit : mm

| Size code | D | L | A,B | H | I | W | P | K |
|-----------|------|-------------------------------------|------|-----------|-----|----------|-----|--|
| B | 4.0 | 5.4 ^{+0.1} _{-0.2} | 4.3 | 5.5 max. | 1.8 | 0.65±0.1 | 1.0 | 0.35 ^{+0.15} _{-0.20} |
| C | 5.0 | 5.4 ^{+0.1} _{-0.2} | 5.3 | 6.5 max. | 2.2 | 0.65±0.1 | 1.5 | 0.35 ^{+0.15} _{-0.20} |
| D | 6.3 | 5.4 ^{+0.1} _{-0.2} | 6.6 | 7.8 max. | 2.6 | 0.65±0.1 | 1.8 | 0.35 ^{+0.15} _{-0.20} |
| D8 | 6.3 | 7.7±0.3 | 6.6 | 7.8 max. | 2.6 | 0.65±0.1 | 1.8 | 0.35 ^{+0.15} _{-0.20} |
| E | 8.0 | 6.2±0.3 | 8.3 | 9.5 max. | 3.4 | 0.65±0.1 | 2.2 | 0.35 ^{+0.15} _{-0.20} |
| F | 8.0 | 10.2±0.3 | 8.3 | 10.0 max. | 3.4 | 0.90±0.2 | 3.1 | 0.70±0.2 |
| G | 10.0 | 10.2±0.3 | 10.3 | 12.0 max. | 3.5 | 0.90±0.2 | 4.6 | 0.70±0.2 |

Characteristics list

| Rated voltage (V.DC) | Capacitance (±20 %) (μF) | Case size (mm) | | Size code *1 | Specification | | | Part number | Reflow | min. Packing Qty |
|----------------------|--------------------------|----------------|------|--------------|-------------------------------|----------|-------------------|-------------|--------|------------------|
| | | φD | L | | Ripple current *2 (mA r.m.s.) | tan δ *3 | Endurance (hours) | | | Taping (pcs) |
| 4 | 33 | 4.0 | 5.4 | B | 26 | 0.35 | 1000 | EEE0GA330SR | (1) | 2000 |
| | 47 | 4.0 | 5.4 | B | 34 | 0.35 | 1000 | EEE0GA470SR | (1) | 2000 |
| | 100 | 5.0 | 5.4 | C | 61 | 0.35 | 1000 | EEE0GA101SR | (1) | 1000 |
| | 220 | 6.3 | 5.4 | D | 82 | 0.35 | 1000 | EEE0GA221SP | (1) | 1000 |
| | 330 | 6.3 | 5.4 | (D) | 80 | 0.50 | 1000 | EEE0GA331WP | (1) | 1000 |
| | 470 | 6.3 | 7.7 | D8 | 200 | 0.35 | 1000 | EEE0GA471XP | (1) | 900 |
| 6.3 | 22 | 4.0 | 5.4 | B | 29 | 0.26 | 2000 | EEE0JA220SR | (1) | 2000 |
| | 33 | 4.0 | 5.4 | (B) | 22 | 0.35 | 1000 | EEE0JA330WR | (1) | 2000 |
| | | 4.0 | 5.4 | (B) | 36 | 0.35 | 1000 | EEE0JA470WR | (1) | 2000 |
| | 47 | 5.0 | 5.4 | C | 46 | 0.26 | 2000 | EEE0JA470SR | (1) | 1000 |
| | | 5.0 | 5.4 | (C) | 47 | 0.35 | 1000 | EEE0JA101WR | (1) | 1000 |
| | 100 | 6.3 | 5.4 | D | 71 | 0.26 | 2000 | EEE0JA101SP | (1) | 1000 |
| | | 6.3 | 5.4 | (D) | 74 | 0.35 | 1000 | EEE0JA221WP | (1) | 1000 |
| | 330 | 6.3 | 7.7 | D8 | 188 | 0.26 | 2000 | EEE0JA331XP | (1) | 900 |
| | | 8.0 | 6.2 | E | 300 | 0.35 | 2000 | EEE0JA331P | (2) | 1000 |
| | 470 | 8.0 | 10.2 | F | 380 | 0.35 | 2000 | EEE0JA471P | (2) | 500 |
| | 1000 | 8.0 | 10.2 | (F) | 500 | 0.35 | 2000 | EEE0JA102UP | (2) | 500 |
| | | 10.0 | 10.2 | G | 700 | 0.35 | 2000 | EEE0JA102P | (2) | 500 |
| 1500 | 10.0 | 10.2 | G | 750 | 0.35 | 2000 | EEE0JA152P | (2) | 500 | |
| 10 | 22 | 4.0 | 5.4 | (B) | 28 | 0.30 | 1000 | EEE1AA220WR | (1) | 2000 |
| | 33 | 4.0 | 5.4 | (B) | 29 | 0.30 | 1000 | EEE1AA330WR | (1) | 2000 |
| | | 5.0 | 5.4 | C | 43 | 0.20 | 2000 | EEE1AA330SR | (1) | 1000 |
| | 47 | 5.0 | 5.4 | (C) | 43 | 0.30 | 1000 | EEE1AA470WR | (1) | 1000 |
| | 100 | 5.0 | 5.4 | (C) | 50 | 0.30 | 1000 | EEE1AA101WR | (1) | 1000 |
| | | 6.3 | 5.4 | D | 70 | 0.26 | 2000 | EEE1AA101SP | (1) | 1000 |
| | 220 | 6.3 | 7.7 | D8 | 173 | 0.20 | 2000 | EEE1AA221XP | (1) | 900 |
| | | 8.0 | 6.2 | E | 250 | 0.26 | 2000 | EEE1AA221P | (2) | 1000 |
| | 330 | 8.0 | 10.2 | F | 390 | 0.26 | 2000 | EEE1AA331P | (2) | 500 |
| | 470 | 8.0 | 10.2 | (F) | 390 | 0.26 | 2000 | EEE1AA471UP | (2) | 500 |
| | | 10.0 | 10.2 | G | 400 | 0.26 | 2000 | EEE1AA471P | (2) | 500 |
| | 1000 | 10.0 | 10.2 | G | 580 | 0.26 | 2000 | EEE1AA102P | (2) | 500 |
| 16 | 10 | 4.0 | 5.4 | B | 28 | 0.16 | 2000 | EEE1CA100SR | (1) | 2000 |
| | 22 | 4.0 | 5.4 | (B) | 28 | 0.26 | 1000 | EEE1CA220WR | (1) | 2000 |
| | | 5.0 | 5.4 | C | 39 | 0.16 | 2000 | EEE1CA220SR | (1) | 1000 |
| | 33 | 5.0 | 5.4 | (C) | 35 | 0.26 | 1000 | EEE1CA330WR | (1) | 1000 |
| | | 5.0 | 5.4 | (C) | 39 | 0.26 | 1000 | EEE1CA470WR | (1) | 1000 |
| | 47 | 6.3 | 5.4 | D | 70 | 0.16 | 2000 | EEE1CA470SP | (1) | 1000 |
| | | 6.3 | 5.4 | (D) | 70 | 0.26 | 1000 | EEE1CA101WP | (1) | 1000 |
| | 100 | 8.0 | 6.2 | E | 200 | 0.20 | 2000 | EEE1CA101P | (2) | 1000 |
| | | 6.3 | 7.7 | D8 | 162 | 0.16 | 2000 | EEE1CA221XP | (1) | 900 |
| | 220 | 8.0 | 6.2 | E | 200 | 0.20 | 2000 | EEE1CA221UP | (2) | 1000 |
| | | 8.0 | 10.2 | F | 280 | 0.20 | 2000 | EEE1CA221P | (2) | 500 |
| | 330 | 8.0 | 10.2 | (F) | 320 | 0.20 | 2000 | EEE1CA331UP | (2) | 500 |
| | | 10.0 | 10.2 | G | 380 | 0.20 | 2000 | EEE1CA331P | (2) | 500 |
| | 470 | 8.0 | 10.2 | (F) | 350 | 0.20 | 2000 | EEE1CA471UP | (2) | 500 |
| | | 10.0 | 10.2 | G | 420 | 0.20 | 2000 | EEE1CA471P | (2) | 500 |

*1: Size code () : Miniaturization product

*2: Ripple current (120 Hz / +85 °C)

*3: tan δ (120 Hz / +20 °C)

• 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"

Characteristics list

| Rated voltage (V.DC) | Capacitance (±20 %) (μF) | Case size (mm) | | Size code *1 | Specification | | | Part number | Reflow | min. Packing Qty |
|----------------------|--------------------------|----------------|------|--------------|-------------------------------|----------|-------------------|-------------|--------|------------------|
| | | φD | L | | Ripple current *2 (mA r.m.s.) | tan δ *3 | Endurance (hours) | | | Taping (pcs) |
| 25 | 4.7 | 4.0 | 5.4 | B | 22 | 0.14 | 2000 | EEE1EA4R7SR | (1) | 2000 |
| | 10 | 4.0 | 5.4 | (B) | 22 | 0.20 | 1000 | EEE1EA100WR | (1) | 2000 |
| | | 5.0 | 5.4 | C | 28 | 0.14 | 2000 | EEE1EA100SR | (1) | 1000 |
| | 22 | 5.0 | 5.4 | (C) | 35 | 0.20 | 1000 | EEE1EA220WR | (1) | 1000 |
| | | 6.3 | 5.4 | D | 55 | 0.14 | 2000 | EEE1EA220SP | (1) | 1000 |
| | 33 | 5.0 | 5.4 | (C) | 42 | 0.20 | 1000 | EEE1EA330WR | (1) | 1000 |
| | | 6.3 | 5.4 | D | 65 | 0.14 | 2000 | EEE1EA330SP | (1) | 1000 |
| | 47 | 6.3 | 5.4 | (D) | 70 | 0.20 | 1000 | EEE1EA470WP | (1) | 1000 |
| | 100 | 6.3 | 7.7 | D8 | 143 | 0.14 | 2000 | EEE1EA101XP | (1) | 900 |
| | | 8.0 | 6.2 | (E) | 91 | 0.16 | 2000 | EEE1EA101UP | (2) | 1000 |
| | | 8.0 | 10.2 | F | 180 | 0.16 | 2000 | EEE1EA101P | (2) | 500 |
| | 220 | 8.0 | 10.2 | (F) | 230 | 0.16 | 2000 | EEE1EA221UP | (2) | 500 |
| | | 10.0 | 10.2 | G | 310 | 0.16 | 2000 | EEE1EA221P | (2) | 500 |
| | 330 | 8.0 | 10.2 | (F) | 270 | 0.16 | 2000 | EEE1EA331UP | (2) | 500 |
| 10.0 | | 10.2 | G | 340 | 0.16 | 2000 | EEE1EA331P | (2) | 500 | |
| 470 | 10.0 | 10.2 | G | 380 | 0.16 | 2000 | EEE1EA471P | (2) | 500 | |
| 35 | 4.7 | 4.0 | 5.4 | B | 22 | 0.12 | 2000 | EEE1VA4R7SR | (1) | 2000 |
| | 10 | 4.0 | 5.4 | (B) | 22 | 0.16 | 1000 | EEE1VA100WR | (1) | 2000 |
| | | 5.0 | 5.4 | C | 30 | 0.12 | 2000 | EEE1VA100SR | (1) | 1000 |
| | 22 | 5.0 | 5.4 | (C) | 36 | 0.16 | 1000 | EEE1VA220WR | (1) | 1000 |
| | | 6.3 | 5.4 | D | 60 | 0.12 | 2000 | EEE1VA220SP | (1) | 1000 |
| | 33 | 6.3 | 5.4 | (D) | 60 | 0.16 | 1000 | EEE1VA330WP | (1) | 1000 |
| | | 8.0 | 6.2 | E | 130 | 0.14 | 2000 | EEE1VA330P | (2) | 1000 |
| | 47 | 6.3 | 5.4 | (D) | 70 | 0.16 | 1000 | EEE1VA470WP | (1) | 1000 |
| | | 8.0 | 6.2 | E | 165 | 0.14 | 2000 | EEE1VA470P | (2) | 1000 |
| | 100 | 6.3 | 7.7 | D8 | 132 | 0.12 | 2000 | EEE1VA101XP | (1) | 900 |
| | | 8.0 | 10.2 | (F) | 140 | 0.14 | 2000 | EEE1VA101UP | (2) | 500 |
| | | 10.0 | 10.2 | G | 210 | 0.14 | 2000 | EEE1VA101P | (2) | 500 |
| | 220 | 8.0 | 10.2 | (F) | 200 | 0.14 | 2000 | EEE1VA221UP | (2) | 500 |
| | | 10.0 | 10.2 | G | 310 | 0.14 | 2000 | EEE1VA221P | (2) | 500 |
| 330 | 10.0 | 10.2 | G | 350 | 0.14 | 2000 | EEE1VA331P | (2) | 500 | |

*1: Size code () : Miniaturization product

*2: Ripple current (120 Hz / +85 °C)

*3: tanδ (120 Hz / +20 °C)

• 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"

Characteristics list

| Rated voltage (V.DC) | Capacitance (±20 %) (μF) | Case size (mm) | | Size code *1 | Specification | | | Part number | Reflow | min. Packing Qty |
|----------------------|--------------------------|----------------|------|--------------|-------------------------------|----------|-------------------|-------------|--------|------------------|
| | | φD | L | | Ripple current *2 (mA r.m.s.) | tan δ *3 | Endurance (hours) | | | Taping (pcs) |
| 50 | 1.0 | 4.0 | 5.4 | B | 10 | 0.12 | 2000 | EEE1HA010SR | (1) | 2000 |
| | 2.2 | 4.0 | 5.4 | B | 16 | 0.12 | 2000 | EEE1HA2R2SR | (1) | 2000 |
| | 3.3 | 4.0 | 5.4 | B | 16 | 0.12 | 2000 | EEE1HA3R3SR | (1) | 2000 |
| | 4.7 | 4.0 | 5.4 | (B) | 18 | 0.14 | 1000 | EEE1HA4R7WR | (1) | 2000 |
| | | 5.0 | 5.4 | C | 23 | 0.12 | 2000 | EEE1HA4R7SR | (1) | 1000 |
| | 10 | 5.0 | 5.4 | (C) | 27 | 0.14 | 1000 | EEE1HA100WR | (1) | 1000 |
| | | 6.3 | 5.4 | D | 35 | 0.12 | 2000 | EEE1HA100SP | (1) | 1000 |
| | 22 | 6.3 | 5.4 | (D) | 40 | 0.14 | 1000 | EEE1HA220WP | (1) | 1000 |
| | | 8.0 | 6.2 | E | 120 | 0.12 | 2000 | EEE1HA220P | (2) | 1000 |
| | 33 | 6.3 | 7.7 | D8 | 85 | 0.12 | 2000 | EEE1HA330XP | (1) | 900 |
| | | 8.0 | 6.2 | (E) | 65 | 0.12 | 2000 | EEE1HA330UP | (2) | 1000 |
| | | 8.0 | 10.2 | F | 110 | 0.12 | 2000 | EEE1HA330P | (2) | 500 |
| | 47 | 6.3 | 7.7 | D8 | 105 | 0.12 | 2000 | EEE1HA470XP | (1) | 900 |
| | | 8.0 | 10.2 | (F) | 110 | 0.12 | 2000 | EEE1HA470UP | (2) | 500 |
| | | 10.0 | 10.2 | G | 130 | 0.12 | 2000 | EEE1HA470P | (2) | 500 |
| 100 | 8.0 | 10.2 | (F) | 200 | 0.12 | 2000 | EEE1HA101UP | (2) | 500 | |
| | 10.0 | 10.2 | G | 250 | 0.12 | 2000 | EEE1HA101P | (2) | 500 | |
| 220 | 10.0 | 10.2 | G | 300 | 0.12 | 2000 | EEE1HA221P | (2) | 500 | |
| 63 | 22 | 8.0 | 6.2 | (E) | 40 | 0.18 | 2000 | EEE1JA220UP | (2) | 1000 |
| | | 8.0 | 10.2 | F | 40 | 0.18 | 2000 | EEE1JA220P | (2) | 500 |
| | 33 | 8.0 | 10.2 | F | 45 | 0.18 | 2000 | EEE1JA330P | (2) | 500 |
| | 47 | 8.0 | 10.2 | (F) | 45 | 0.18 | 2000 | EEE1JA470UP | (2) | 500 |
| | | 10.0 | 10.2 | G | 45 | 0.18 | 2000 | EEE1JA470P | (2) | 500 |
| 100 | 10.0 | 10.2 | G | 60 | 0.18 | 2000 | EEE1JA101P | (2) | 500 | |
| 100 | 4.7 | 8.0 | 6.2 | (E) | 50 | 0.18 | 2000 | EEE2AA4R7UP | (2) | 1000 |
| | 10 | 8.0 | 6.2 | (E) | 50 | 0.18 | 2000 | EEE2AA100UP | (2) | 1000 |
| | | 8.0 | 10.2 | F | 85 | 0.18 | 2000 | EEE2AA100P | (2) | 500 |
| | 22 | 8.0 | 10.2 | (F) | 55 | 0.18 | 2000 | EEE2AA220UP | (2) | 500 |
| | | 10.0 | 10.2 | G | 85 | 0.18 | 2000 | EEE2AA220P | (2) | 500 |
| 33 | 10.0 | 10.2 | G | 90 | 0.18 | 2000 | EEE2AA330P | (2) | 500 | |

*1: Size code () : Miniaturization product

*2: Ripple current (120 Hz / +85 °C)

*3: tanδ (120 Hz / +20 °C)

- 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"

Characteristics list

| Rated voltage (V.DC) | Capacitance ($\pm 20\%$) (μF) | Case size (mm) | | Size code | Specification | | Part number | Reflow | Min. Packing Qty |
|----------------------|--|----------------|-----|-----------|-------------------------------|------------------|-------------|--------|------------------|
| | | ϕD | L | | Ripple current *1 (mA r.m.s.) | $\tan \delta$ *2 | | | Taping (pcs) |
| 6.3 | 22 | 5.0 | 5.4 | C | 29 | 0.52 | EEE0JA220NR | (1) | 1000 |
| | 47 | 6.3 | 5.4 | D | 46 | 0.52 | EEE0JA470NP | (1) | 1000 |
| 10 | 10 | 4.0 | 5.4 | B | 25 | 0.40 | EEE1AA100NR | (1) | 2000 |
| | 33 | 6.3 | 5.4 | D | 43 | 0.40 | EEE1AA330NP | (1) | 1000 |
| 16 | 4.7 | 4.0 | 5.4 | B | 20 | 0.32 | EEE1CA4R7NR | (1) | 2000 |
| | 10 | 5.0 | 5.4 | C | 25 | 0.32 | EEE1CA100NR | (1) | 1000 |
| | 22 | 6.3 | 5.4 | D | 39 | 0.32 | EEE1CA220NP | (1) | 1000 |
| 25 | 3.3 | 4.0 | 5.4 | B | 12 | 0.28 | EEE1EA3R3NR | (1) | 2000 |
| | 4.7 | 5.0 | 5.4 | C | 21 | 0.28 | EEE1EA4R7NR | (1) | 1000 |
| | 10 | 6.3 | 5.4 | D | 28 | 0.28 | EEE1EA100NP | (1) | 1000 |
| 35 | 2.2 | 4.0 | 5.4 | B | 12 | 0.24 | EEE1VA2R2NR | (1) | 2000 |
| | 4.7 | 5.0 | 5.4 | C | 22 | 0.24 | EEE1VA4R7NR | (1) | 1000 |
| | 10 | 6.3 | 5.4 | D | 30 | 0.24 | EEE1VA100NP | (1) | 1000 |
| 50 | 1.0 | 4.0 | 5.4 | B | 10 | 0.24 | EEE1HA010NR | (1) | 2000 |
| | 2.2 | 5.0 | 5.4 | C | 16 | 0.24 | EEE1HA2R2NR | (1) | 1000 |
| | 3.3 | 5.0 | 5.4 | C | 21 | 0.24 | EEENZ1H3R3R | (1) | 1000 |
| | 4.7 | 6.3 | 5.4 | D | 31 | 0.24 | EEE1HA4R7NP | (1) | 1000 |

*1: Ripple current (120 Hz / +85 °C)

*2: $\tan \delta$ (120 Hz / +20 °C)

- 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"