

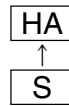
Surface Mount Type

Series: **HA** Type: **V**

■ Features

- Endurance: 105 °C 1000 h
- Vibration-proof product is available upon request.(φ8 ≤)
- RoHS directive compliant

High-temperature assurance size



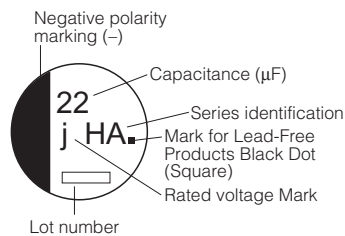
■ Specifications

| | | | | | | | | | | |
|------------------------------------|---|---|----|----|----|----|----|----|-----|-----------------------------|
| Category Temp. Range | -40 °C to +105 °C | | | | | | | | | |
| Rated W.V. Range | 6.3 V.DC to 100 V.DC | | | | | | | | | |
| Nominal Cap. Range | 0.1 μF to 1500 μF | | | | | | | | | |
| Capacitance Tolerance | ±20 % (120 Hz/+20 °C) | | | | | | | | | |
| DC Leakage Current | I ≤ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater) | | | | | | | | | |
| tan δ | Please see the attached standard products list | | | | | | | | | |
| Characteristics at Low Temperature | W.V. (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | (Impedance ratio at 120 Hz) |
| | Z(-25 °C)/Z(+20 °C) | 4 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | |
| | Z(-40 °C)/Z(+20 °C) | 8 | 6 | 4 | 4 | 3 | 3 | 4 | 4 | |
| Endurance | After applying rated working voltage for 1000 hours at +105 °C±2 °C and then being stabilized at +20 °C, capacitors shall meet the following limits. | | | | | | | | | |
| | Capacitance change | ±20 % of initial measured value (6.3 W.V. of miniature : ±30 %) | | | | | | | | |
| | tan δ | ≤ 200 % of initial specified value | | | | | | | | |
| | DC leakage current | ≤ initial specified value | | | | | | | | |
| Shelf Life | After storage for 1000 hours at +105 °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) | | | | | | | | | |
| | After reflow soldering and then being stabilized at +20 °C, capacitor shall meet the following limits. | | | | | | | | | |
| Resistance to Soldering Heat | After reflow soldering and then being stabilized at +20 °C, capacitor 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: 6.3 V 22 μF (Polarized)

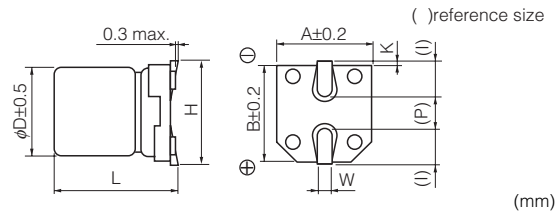
Marking color : BLACK



Rated Voltage Mark

| | |
|----|-------|
| j | 6.3 V |
| A | 10 V |
| C | 16 V |
| E | 25 V |
| V | 35 V |
| H | 50 V |
| J | 63 V |
| 2A | 100 V |

■ Dimensions in mm (not to scale)



| 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} |
| DB | 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±0.20 |
| G | 10.0 | 10.2±0.3 | 10.3 | 12.0 max. | 3.5 | 0.90±0.2 | 4.6 | 0.70±0.20 |

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

00 Sep. 2010

■ Standard Products

Endurance : 105 °C 1000 h

| W.V. | Cap. (±20 %) | Case size | | | Specification | | Part No. (RoHS:compliant) | Reflow | Min. Packaging Q'ty |
|------|-----------------|-----------|--------|---------------|--|-------------------------------|------------------------------|--------|------------------------|
| | | Dia. | Length | *Size Code | Ripple Current (120 Hz) (+105°C) (mA r.m.s.) | tan δ (120 Hz) (+20 °C) | | | Taping (pcs) |
| (V) | (μF) | (mm) | (mm) | | | | | | |
| 6.3 | 22 | 4 | 5.4 | B | 29 | 0.30 | EEEHA0J220R | (1) | 2000 |
| | 33 | 4 | 5.4 | (B) | 29 | 0.35 | EEEHA0J330WR | (1) | 2000 |
| | 47 | 4 | 5.4 | (B) | 36 | 0.35 | EEEHA0J470WR | (1) | 2000 |
| | | | 5 | C | 46 | 0.30 | EEEHA0J470R | (1) | 1000 |
| | 100 | 5 | 5.4 | (C) | 47 | 0.35 | EEEHA0J101WR | (1) | 1000 |
| | | | 6.3 | D | 71 | 0.30 | EEEHA0J101P | (1) | 1000 |
| | 220 | 6.3 | 5.4 | (D) | 74 | 0.35 | EEEHA0J221WP | (1) | 1000 |
| | 330 | 6.3 | 7.7 | D8 | 105 | 0.30 | EEEHA0J331XP | (1) | 900 |
| | | | 8 | F | 230 | 0.35 | EEEHA0J331P | (2) | 500 |
| | 470 | 8 | 10.2 | (F) | 300 | 0.35 | EEEHA0J471UP | (2) | 500 |
| | 1000 | 8 | 10.2 | (F) | 300 | 0.35 | EEEHA0J102UP | (2) | 500 |
| | | | 10 | G | 400 | 0.35 | EEEHA0J102P | (2) | 500 |
| 1500 | 10 | 10.2 | G | 480 | 0.35 | EEEHA0J152P | (2) | 500 | |
| 10 | 22 | 4 | 5.4 | (B) | 28 | 0.30 | EEEHA1A220WR | (1) | 2000 |
| | 33 | 4 | 5.4 | (B) | 29 | 0.30 | EEEHA1A330WR | (1) | 2000 |
| | | 5 | 5.4 | C | 43 | 0.22 | EEEHA1A330R | (1) | 1000 |
| | 47 | 5 | 5.4 | (C) | 43 | 0.30 | EEEHA1A470WR | (1) | 1000 |
| | 100 | 6.3 | 5.4 | (D) | 71 | 0.30 | EEEHA1A101WP | (1) | 1000 |
| | | | 8 | E | 110 | 0.26 | EEEHA1A101P | (2) | 1000 |
| | 220 | 6.3 | 7.7 | D8 | 105 | 0.22 | EEEHA1A221XP | (1) | 900 |
| | | | 8 | F | 160 | 0.26 | EEEHA1A221P | (2) | 500 |
| | 470 | 8 | 10.2 | (F) | 200 | 0.26 | EEEHA1A471UP | (2) | 500 |
| | | | 10 | G | 270 | 0.26 | EEEHA1A471P | (2) | 500 |
| 1000 | 10 | 10.2 | G | 400 | 0.26 | EEEHA1A102P | (2) | 500 | |
| 16 | 10 | 4 | 5.4 | B | 28 | 0.16 | EEEHA1C100R | (1) | 2000 |
| | 22 | 4 | 5.4 | (B) | 28 | 0.26 | EEEHA1C220WR | (1) | 2000 |
| | | 5 | 5.4 | C | 39 | 0.16 | EEEHA1C220R | (1) | 1000 |
| | 33 | 5 | 5.4 | (C) | 35 | 0.26 | EEEHA1C330WR | (1) | 1000 |
| | 47 | 5 | 5.4 | (C) | 39 | 0.26 | EEEHA1C470WR | (1) | 1000 |
| | | | 6.3 | D | 70 | 0.16 | EEEHA1C470P | (1) | 1000 |
| | 100 | 6.3 | 5.4 | (D) | 70 | 0.26 | EEEHA1C101WP | (1) | 1000 |
| | | | 7.7 | D8 | 105 | 0.16 | EEEHA1C221XP | (1) | 900 |
| | 220 | 8 | 10.2 | (F) | 150 | 0.20 | EEEHA1C221UP | (2) | 500 |
| | | | 10 | G | 210 | 0.20 | EEEHA1C221P | (2) | 500 |
| | 330 | 8 | 10.2 | (F) | 170 | 0.20 | EEEHA1C331UP | (2) | 500 |
| | | | 10 | G | 230 | 0.20 | EEEHA1C331P | (2) | 500 |
| | 470 | 8 | 10.2 | (F) | 340 | 0.20 | EEEHA1C471UP | (2) | 500 |
| | | | 10 | G | 340 | 0.20 | EEEHA1C471P | (2) | 500 |
| 680 | 10 | 10.2 | G | 380 | 0.20 | EEEHA1C681P | (2) | 500 | |

* Size code():Miniaturization product

The taping dimensions are explained on EE188 of our Catalog. Please use it as a reference guide.
Reflow Profile(Fig-1 to Fig-11) listed on EE186 of our Catalog.

■ Standard Products

Endurance : 105 °C 1000 h

| W.V. (V) | Cap. (±20 %) (μF) | Case size | | | Specification | | Part No. (RoHS:compliant) | Reflow | Min. Packaging Q'ty |
|-------------|-------------------------|--------------|----------------|---------------|--|-------------------------------|------------------------------|--------------|------------------------|
| | | Dia. (mm) | Length (mm) | *Size Code | Ripple Current (120 Hz) (+105°C) (mA r.m.s.) | tan δ (120 Hz) (+20 °C) | | | Taping (pcs) |
| 25 | 4.7 | 4 | 5.4 | B | 22 | 0.14 | EEEHA1E4R7R | (1) | 2000 |
| | 10 | 4 | 5.4 | (B) | 22 | 0.20 | EEEHA1E100WR | (1) | 2000 |
| | | 5 | 5.4 | C | 28 | 0.14 | EEEHA1E100R | (1) | 1000 |
| | 22 | 5 | 5.4 | (C) | 35 | 0.20 | EEEHA1E220WR | (1) | 1000 |
| | | 6.3 | 5.4 | D | 55 | 0.14 | EEEHA1E220P | (1) | 1000 |
| | 33 | 5 | 5.4 | (C) | 45 | 0.20 | EEEHA1E330WR | (1) | 1000 |
| | | 6.3 | 5.4 | D | 65 | 0.14 | EEEHA1E330P | (1) | 1000 |
| | 47 | 6.3 | 5.4 | (D) | 70 | 0.20 | EEEHA1E470WP | (1) | 1000 |
| | | 8 | 6.2 | E | 91 | 0.16 | EEEHA1E470P | (2) | 1000 |
| | 100 | 6.3 | 7.7 | D8 | 91 | 0.14 | EEEHA1E101XP | (1) | 900 |
| | | 8 | 6.2 | (E) | 91 | 0.16 | EEEHA1E101UP | (2) | 1000 |
| | | 8 | 10.2 | F | 130 | 0.16 | EEEHA1E101P | (2) | 500 |
| | 220 | 8 | 10.2 | (F) | 160 | 0.16 | EEEHA1E221UP | (2) | 500 |
| | | 10 | 10.2 | G | 190 | 0.16 | EEEHA1E221P | (2) | 500 |
| 330 | 8 | 10.2 | (F) | 180 | 0.16 | EEEHA1E331UP | (2) | 500 | |
| | 10 | 10.2 | G | 340 | 0.16 | EEEHA1E331P | (2) | 500 | |
| 470 | 10 | 10.2 | G | 360 | 0.16 | EEEHA1E471P | (2) | 500 | |
| 35 | 4.7 | 4 | 5.4 | B | 22 | 0.12 | EEEHA1V4R7R | (1) | 2000 |
| | 10 | 4 | 5.4 | (B) | 22 | 0.16 | EEEHA1V100WR | (1) | 2000 |
| | | 5 | 5.4 | C | 30 | 0.12 | EEEHA1V100R | (1) | 1000 |
| | 22 | 5 | 5.4 | (C) | 35 | 0.16 | EEEHA1V220WR | (1) | 1000 |
| | | 6.3 | 5.4 | D | 60 | 0.12 | EEEHA1V220P | (1) | 1000 |
| | 33 | 6.3 | 5.4 | (D) | 42 | 0.16 | EEEHA1V330WP | (1) | 1000 |
| | | 8 | 6.2 | E | 84 | 0.14 | EEEHA1V330P | (2) | 1000 |
| | 47 | 8 | 6.2 | (E) | 84 | 0.14 | EEEHA1V470UP | (2) | 1000 |
| | | 8 | 10.2 | F | 98 | 0.14 | EEEHA1V470P | (2) | 500 |
| | 100 | 6.3 | 7.7 | D8 | 84 | 0.12 | EEEHA1V101XP | (1) | 900 |
| | | 8 | 10.2 | (F) | 120 | 0.14 | EEEHA1V101UP | (2) | 500 |
| | | 10 | 10.2 | G | 160 | 0.14 | EEEHA1V101P | (2) | 500 |
| | 220 | 8 | 10.2 | (F) | 170 | 0.14 | EEEHA1V221UP | (2) | 500 |
| | | 10 | 10.2 | G | 210 | 0.14 | EEEHA1V221P | (2) | 500 |
| 330 | 10 | 10.2 | G | 250 | 0.14 | EEEHA1V331P | (2) | 500 | |
| 50 | 0.1 | 4 | 5.4 | B | 1 | 0.12 | EEEHA1HR10R | (1) | 2000 |
| | 0.22 | 4 | 5.4 | B | 2 | 0.12 | EEEHA1HR22R | (1) | 2000 |
| | 0.33 | 4 | 5.4 | B | 3 | 0.12 | EEEHA1HR33R | (1) | 2000 |
| | 0.47 | 4 | 5.4 | B | 5 | 0.12 | EEEHA1HR47R | (1) | 2000 |
| | 1 | 4 | 5.4 | B | 10 | 0.12 | EEEHA1H1R0R | (1) | 2000 |
| | 2.2 | 4 | 5.4 | B | 16 | 0.12 | EEEHA1H2R2R | (1) | 2000 |
| | 3.3 | 4 | 5.4 | B | 16 | 0.12 | EEEHA1H3R3R | (1) | 2000 |
| | 4.7 | 5 | 5.4 | C | 23 | 0.12 | EEEHA1H4R7R | (1) | 1000 |
| | 10 | 6.3 | 5.4 | D | 35 | 0.12 | EEEHA1H100P | (1) | 1000 |
| | 22 | 8 | 6.2 | E | 70 | 0.12 | EEEHA1H220P | (2) | 1000 |
| | | 33 | 6.3 | 7.7 | D8 | 70 | 0.12 | EEEHA1H330XP | (1) |
| | 8 | | 6.2 | (E) | 70 | 0.12 | EEEHA1H330UP | (2) | 1000 |
| | 8 | | 10.2 | F | 91 | 0.12 | EEEHA1H330P | (2) | 500 |
| | 47 | 6.3 | 7.7 | D8 | 63 | 0.12 | EEEHA1H470XP | (1) | 900 |
| 8 | | 10.2 | (F) | 95 | 0.12 | EEEHA1H470UP | (2) | 500 | |
| 10 | | 10.2 | G | 100 | 0.12 | EEEHA1H470P | (2) | 500 | |
| 100 | 8 | 10.2 | (F) | 110 | 0.12 | EEEHA1H101UP | (2) | 500 | |
| | 10 | 10.2 | G | 120 | 0.12 | EEEHA1H101P | (2) | 500 | |
| 220 | 10 | 10.2 | G | 150 | 0.12 | EEEHA1H221P | (2) | 500 | |

* Size code():Miniaturization product

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Reflow Profile(Fig-1 to Fig-11) listed on EE186 of our Catalog.

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Standard Products

Endurance : 105 °C 1000 h

| W.V. | Cap. (±20 %) | Case size | | | Specification | | Part No. (RoHS:compliant) | Reflow | Min. Packaging Q'ty |
|------|-----------------|-----------|--------|---------------|--|-------------------------------|------------------------------|--------|------------------------|
| | | Dia. | Length | *Size Code | Ripple Current (120 Hz) (+105°C) (mA r.m.s.) | tan δ (120 Hz) (+20 °C) | | | Taping (pcs) |
| (V) | (μF) | (mm) | (mm) | | | | | | |
| 63 | 10 | 8 | 6.2 | E | 25 | 0.18 | EEEHA1J100P | (2) | 1000 |
| | 22 | 8 | 6.2 | (E) | 25 | 0.18 | EEEHA1J220UP | (2) | 1000 |
| | | 8 | 10.2 | F | 30 | 0.18 | EEEHA1J220P | (2) | 500 |
| | 33 | 10 | 10.2 | G | 45 | 0.18 | EEEHA1J330P | (2) | 500 |
| | 47 | 8 | 10.2 | (F) | 45 | 0.18 | EEEHA1J470UP | (2) | 500 |
| | | 10 | 10.2 | G | 50 | 0.18 | EEEHA1J470P | (2) | 500 |
| 100 | 3.3 | 8 | 6.2 | E | 30 | 0.18 | EEEHA2A3R3P | (2) | 1000 |
| | 4.7 | 8 | 6.2 | (E) | 30 | 0.18 | EEEHA2A4R7UP | (2) | 1000 |
| | | 8 | 10.2 | F | 50 | 0.18 | EEEHA2A4R7P | (2) | 500 |
| | 10 | 8 | 10.2 | F | 55 | 0.18 | EEEHA2A100P | (2) | 500 |
| | 22 | 8 | 10.2 | (F) | 55 | 0.18 | EEEHA2A220UP | (2) | 500 |
| | | 10 | 10.2 | G | 60 | 0.18 | EEEHA2A220P | (2) | 500 |
| | 33 | 10 | 10.2 | G | 65 | 0.18 | EEEHA2A330P | (2) | 500 |
| 47 | 10 | 10.2 | (G) | 65 | 0.18 | EEEHA2A470UP | (2) | 500 | |

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