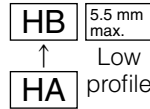


Surface Mount Type

Series: **HB** Type: **V**

Long life



Features

- Endurance: 105 °C 2000 h
- 5.8 mm height (≤φ6.3), 5.5 mm height max.
- Vibration-proof product is available upon request. (φ8 mm and larger)
- RoHS directive compliant

Specifications

| | | | | | | | | | |
|------------------------------------|--|---|-----|----|----|----|----|----|-----------------------------|
| Category Temp. Range | -40 °C to +105 °C | | | | | | | | |
| Rated W.V. Range | 4 V.DC to 50 V.DC | | | | | | | | |
| Nominal Cap. Range | 0.1 μF to 470 μF | | | | | | | | |
| Capacitance Tolerance | ±20 % (120 Hz/+20 °C) | | | | | | | | |
| DC Leakage Current | I ≤ 0.01 CV or 3 (μA) After 2 minutes (Bi-polar I=0.02 CV or 6 (μA) after 2 minutes) (Whichever is greater) | | | | | | | | |
| tan δ | Please see the attached standard products list | | | | | | | | |
| Characteristics at Low Temperature | W.V. (V) | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | (Impedance ratio at 120 Hz) |
| | Z(-25 °C)/Z(+20 °C) | 7 | 4 | 3 | 2 | 2 | 2 | 2 | |
| | Z(-40 °C)/Z(+20 °C) | 15 | 8 | 6 | 4 | 4 | 3 | 3 | |
| Endurance | After applying rated working voltage for 2000 hours (Bi-polar : 1000 hours for each polarity) at +105 °C±2 °C and then being stabilized at +20 °C, Capacitors shall meet the following limits. | | | | | | | | |
| | Capacitance change | ±20 % of inisial measured value (4 W.V. : ±35 %±6.3 W.V. : ±25 % φ4 to φ6.3), 5.5 mm max. : ±25 % | | | | | | | |
| | tan δ | ≤ 200 % of 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, capacitors shall meet the following limits. | | | | | | | | |
| | Capacitance change | ±10 % of initial measured value | | | | | | | |
| Resistance to Soldering Heat | After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits. | | | | | | | | |
| | tan δ | ≤ initial specified value | | | | | | | |
| | DC leakage current | ≤ initial specified value | | | | | | | |

Frequency correction factor for ripple current

| | | | | |
|-------------------|----------------|------|------|---------|
| Correction factor | Frequency (Hz) | | | |
| | 50, 60 | 120 | 1 k | 10 k to |
| | 0.70 | 1.00 | 1.30 | 1.70 |

Marking

Example: 4 V 47 μF
Marking color: BLACK

| | | | |
|---|-------|---|------|
| g | 4 V | E | 25 V |
| j | 6.3 V | V | 35 V |
| A | 10 V | H | 50 V |
| C | 16 V | | |

Dimensions in mm (not to scale)

(Unit : mm)

| Size code | D | L | A, B | H | I | W | P | K |
|-----------|------|----------|------|-----------|-----|----------|-----|--|
| B | 4.0 | 5.8±0.3 | 4.3 | 5.5 max. | 1.8 | 0.65±0.1 | 1.0 | 0.35 ^{+0.15} _{-0.20} |
| C | 5.0 | 5.8±0.3 | 5.3 | 6.5 max. | 2.2 | 0.65±0.1 | 1.5 | 0.35 ^{+0.15} _{-0.20} |
| D | 6.3 | 5.8±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 |

● 5.5 mm height max.

| 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} |

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.

■ Standard Products

Endurance : 105 °C 2000 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) | | | | | | |
| 4 | 47 | 4 | 5.8 | B | 34 | 0.50 | EEEHB0G470R | (1) | 2000 |
| | 100 | 5 | 5.8 | C | 61 | 0.50 | EEEHB0G101R | (1) | 1000 |
| | 150 | 6.3 | 5.8 | D | 82 | 0.50 | EEEHB0G151P | (1) | 1000 |
| | 220 | 6.3 | 5.8 | D | 82 | 0.50 | EEEHB0G221P | (1) | 1000 |
| 6.3 | 22 | 4 | 5.8 | B | 26 | 0.30 | EEEHB0J220R | (1) | 2000 |
| | 33 | 4 | 5.8 | B | 29 | 0.30 | EEEHB0J330R | (1) | 2000 |
| | 47 | 5 | 5.8 | C | 46 | 0.30 | EEEHB0J470R | (1) | 1000 |
| | 100 | 6.3 | 5.8 | D | 71 | 0.30 | EEEHB0J101P | (1) | 1000 |
| | 220 | 8 | 10.2 | F | 150 | 0.35 | EEEHB0J221P | (2) | 500 |
| | 330 | 8 | 10.2 | F | 230 | 0.35 | EEEHB0J331P | (2) | 500 |
| 10 | 33 | 5 | 5.8 | C | 43 | 0.22 | EEEHB1A330R | (1) | 1000 |
| | 100 | 8 | 6.2 | E | 110 | 0.26 | EEEHB1A101P | (2) | 1000 |
| | 220 | 8 | 10.2 | F | 160 | 0.26 | EEEHB1A221P | (2) | 500 |
| | 470 | 10 | 10.2 | G | 270 | 0.26 | EEEHB1A471P | (2) | 500 |
| 16 | 10 | 4 | 5.8 | B | 28 | 0.16 | EEEHB1C100R | (1) | 2000 |
| | 22 | 5 | 5.8 | C | 39 | 0.16 | EEEHB1C220R | (1) | 1000 |
| | 47 | 6.3 | 5.8 | D | 70 | 0.16 | EEEHB1C470P | (1) | 1000 |
| | 100 | 8 | 10.2 | F | 120 | 0.20 | EEEHB1C101P | (2) | 500 |
| | 220 | 10 | 10.2 | G | 210 | 0.20 | EEEHB1C221P | (2) | 500 |
| | 330 | 10 | 10.2 | G | 230 | 0.20 | EEEHB1C331P | (2) | 500 |
| 25 | 4.7 | 4 | 5.8 | B | 22 | 0.14 | EEEHB1E4R7R | (1) | 2000 |
| | 6.8 | 4 | 5.8 | B | 25 | 0.14 | EEEHB1E6R8R | (1) | 2000 |
| | 33 | 6.3 | 5.8 | D | 65 | 0.14 | EEEHB1E330P | (1) | 1000 |
| | 47 | 8 | 6.2 | E | 91 | 0.16 | EEEHB1E470P | (2) | 1000 |
| | 100 | 8 | 10.2 | F | 130 | 0.16 | EEEHB1E101P | (2) | 500 |
| | 220 | 10 | 10.2 | G | 190 | 0.16 | EEEHB1E221P | (2) | 500 |
| 35 | 10 | 5 | 5.8 | C | 28 | 0.12 | EEEHB1V100R | (1) | 1000 |
| | 22 | 6.3 | 5.8 | D | 55 | 0.12 | EEEHB1V220P | (1) | 1000 |
| | 33 | 8 | 6.2 | E | 84 | 0.14 | EEEHB1V330P | (2) | 1000 |
| | 47 | 8 | 10.2 | F | 98 | 0.14 | EEEHB1V470P | (2) | 500 |
| | 100 | 10 | 10.2 | G | 160 | 0.14 | EEEHB1V101P | (2) | 500 |
| 50 | 0.1 | 4 | 5.8 | B | 1 | 0.12 | EEEHB1HR10R | (1) | 2000 |
| | 0.22 | 4 | 5.8 | B | 2 | 0.12 | EEEHB1HR22R | (1) | 2000 |
| | 0.33 | 4 | 5.8 | B | 3 | 0.12 | EEEHB1HR33R | (1) | 2000 |
| | 0.47 | 4 | 5.8 | B | 5 | 0.12 | EEEHB1HR47R | (1) | 2000 |
| | 1 | 4 | 5.8 | B | 10 | 0.12 | EEEHB1H1R0R | (1) | 2000 |
| | 2.2 | 4 | 5.8 | B | 16 | 0.12 | EEEHB1H2R2R | (1) | 2000 |
| | 3.3 | 4 | 5.8 | B | 16 | 0.12 | EEEHB1H3R3R | (1) | 2000 |
| | 4.7 | 5 | 5.8 | C | 23 | 0.12 | EEEHB1H4R7R | (1) | 1000 |
| | 6.8 | 5 | 5.8 | C | 23 | 0.12 | EEEHB1H6R8R | (1) | 1000 |
| | 10 | 6.3 | 5.8 | D | 35 | 0.12 | EEEHB1H100P | (1) | 1000 |
| | 22 | 8 | 6.2 | E | 70 | 0.12 | EEEHB1H220P | (2) | 1000 |
| | 33 | 8 | 10.2 | F | 91 | 0.12 | EEEHB1H330P | (2) | 500 |
| | 47 | 10 | 10.2 | G | 100 | 0.12 | EEEHB1H470P | (2) | 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"

■ Standard Products (Bi-polar)

Endurance : 105 °C 2000 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 | |
| (V) | (μF) | (mm) | (mm) | | | | | (pcs) | | |
| 6.3 | 47 | 6.3 | 5.8 | D | 35 | 0.60 | EEEHP0J470P | (1) | 1000 | |
| 10 | 10 | 4 | 5.8 | B | 20 | 0.44 | EEEHP1A100R | (1) | 2000 | |
| | 33 | 6.3 | 5.8 | D | 26 | 0.44 | EEEHP1A330P | (1) | 1000 | |
| 16 | 10 | 5 | 5.8 | C | 25 | 0.32 | EEEHP1C100R | (1) | 1000 | |
| 25 | 3.3 | 4 | 5.8 | B | 12 | 0.28 | EEEHP1E3R3R | (1) | 2000 | |
| | 4.7 | 4 | 5.8 | B | 12 | 0.28 | EEEHP1E4R7R | (1) | 2000 | |
| | 10 | 6.3 | 5.8 | D | 28 | 0.28 | EEEHP1E100P | (1) | 1000 | |
| | 22 | 6.3 | 5.8 | D | 55 | 0.28 | EEEHP1E220P | (1) | 1000 | |
| 35 | 2.2 | 4 | 5.8 | B | 10 | 0.24 | EEEHP1V2R2R | (1) | 2000 | |
| 50 | 0.22 | 4 | 5.8 | B | 2 | 0.24 | EEEHP1HR22R | (1) | 2000 | |
| | 0.33 | 4 | 5.8 | B | 3 | 0.24 | EEEHP1HR33R | (1) | 2000 | |
| | 0.47 | 4 | 5.8 | B | 5 | 0.24 | EEEHP1HR47R | (1) | 2000 | |
| | 1 | 4 | 5.8 | B | 10 | 0.24 | EEEHP1H1R0R | (1) | 2000 | |
| | 3.3 | 6.3 | 5.8 | D | 16 | 0.24 | EEEHP1H3R3P | (1) | 1000 | |
| | 4.7 | 6.3 | 5.8 | D | 23 | 0.24 | EEEHP1H4R7P | (1) | 1000 | |

■ Standard Products (5.5 mm max.)

Endurance : 105 °C 2000 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 | |
| (V) | (μF) | (mm) | (mm) | | | | | (pcs) | | |
| 6.3 | 22 | 4 | 5.4 | B | 26 | 0.30 | EEEHB0J220SR | (1) | 2000 | |
| | 47 | 5 | 5.4 | C | 46 | 0.30 | EEEHB0J470SR | (1) | 1000 | |
| | 100 | 6.3 | 5.4 | D | 71 | 0.30 | EEEHB0J101SP | (1) | 1000 | |
| 10 | 33 | 5 | 5.4 | C | 43 | 0.22 | EEEHB1A330SR | (1) | 1000 | |
| 16 | 10 | 4 | 5.4 | B | 28 | 0.16 | EEEHB1C100SR | (1) | 2000 | |
| | 22 | 5 | 5.4 | C | 39 | 0.16 | EEEHB1C220SR | (1) | 1000 | |
| | 47 | 6.3 | 5.4 | D | 70 | 0.16 | EEEHB1C470SP | (1) | 1000 | |
| 25 | 4.7 | 4 | 5.4 | B | 22 | 0.14 | EEEHB1E4R7SR | (1) | 2000 | |
| | 6.8 | 4 | 5.4 | B | 25 | 0.14 | EEEHB1E6R8SR | (1) | 2000 | |
| | 33 | 6.3 | 5.4 | D | 65 | 0.14 | EEEHB1E330SP | (1) | 1000 | |
| 35 | 10 | 5 | 5.4 | C | 28 | 0.12 | EEEHB1V100SR | (1) | 1000 | |
| | 22 | 6.3 | 5.4 | D | 55 | 0.12 | EEEHB1V220SP | (1) | 1000 | |
| 50 | 0.1 | 4 | 5.4 | B | 1 | 0.12 | EEEHB1HR10SR | (1) | 2000 | |
| | 0.22 | 4 | 5.4 | B | 2 | 0.12 | EEEHB1HR22SR | (1) | 2000 | |
| | 0.33 | 4 | 5.4 | B | 3 | 0.12 | EEEHB1HR33SR | (1) | 2000 | |
| | 0.47 | 4 | 5.4 | B | 5 | 0.12 | EEEHB1HR47SR | (1) | 2000 | |
| | 1 | 4 | 5.4 | B | 10 | 0.12 | EEEHB1H1R0SR | (1) | 2000 | |
| | 2.2 | 4 | 5.4 | B | 16 | 0.12 | EEEHB1H2R2SR | (1) | 2000 | |
| | 3.3 | 4 | 5.4 | B | 16 | 0.12 | EEEHB1H3R3SR | (1) | 2000 | |
| | 4.7 | 5 | 5.4 | C | 23 | 0.12 | EEEHB1H4R7SR | (1) | 1000 | |
| | 6.8 | 5 | 5.4 | C | 23 | 0.12 | EEEHB1H6R8SR | (1) | 1000 | |
| 10 | 6.3 | 5.4 | D | 35 | 0.12 | EEEHB1H100SP | (1) | 1000 | | |

- 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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