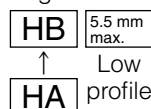


### Surface Mount Type

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

Long life



Low profile



### ■ 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<br>(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                                                                |     |    |    |    |    |    |                             |
|                                    | 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)    |                                                                                                   |     |    |    |    |    |    |                             |
| 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                                                                         |     |    |    |    |    |    |                             |

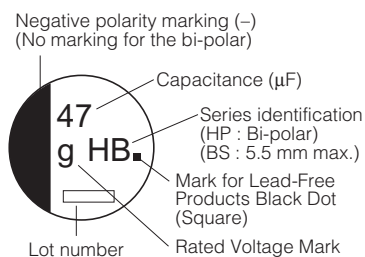
### ■ Frequency correction factor for ripple current

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

### ■ Marking

Example: 4 V 47 μF

Marking color: BLACK



#### Rated Voltage Mark

|   |       |   |      |
|---|-------|---|------|
| 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)

Pressure Relief ( $\phi 10$  and larger)

( ) Reference size

| Size code | D    | L              | A, B | H         | I   | W              | P   | K                                               |
|-----------|------|----------------|------|-----------|-----|----------------|-----|-------------------------------------------------|
| B         | 4.0  | 5.8 $\pm$ 0.3  | 4.3  | 5.5 max.  | 1.8 | 0.65 $\pm$ 0.1 | 1.0 | 0.35 $\times$ <sup>+0.15</sup> <sub>-0.20</sub> |
| C         | 5.0  | 5.8 $\pm$ 0.3  | 5.3  | 6.5 max.  | 2.2 | 0.65 $\pm$ 0.1 | 1.5 | 0.35 $\times$ <sup>+0.15</sup> <sub>-0.20</sub> |
| D         | 6.3  | 5.8 $\pm$ 0.3  | 6.6  | 7.8 max.  | 2.6 | 0.65 $\pm$ 0.1 | 1.8 | 0.35 $\times$ <sup>+0.15</sup> <sub>-0.20</sub> |
| E         | 8.0  | 6.2 $\pm$ 0.3  | 8.3  | 9.5 max.  | 3.4 | 0.65 $\pm$ 0.1 | 2.2 | 0.35 $\times$ <sup>+0.15</sup> <sub>-0.20</sub> |
| F         | 8.0  | 10.2 $\pm$ 0.3 | 8.3  | 10.0 max. | 3.4 | 0.90 $\pm$ 0.2 | 3.1 | 0.70 $\pm$ 0.20                                 |
| G         | 10.0 | 10.2 $\pm$ 0.3 | 10.3 | 12.0 max. | 3.5 | 0.90 $\pm$ 0.2 | 4.6 | 0.70 $\pm$ 0.20                                 |

● 5.5 mm height max.

| Size code | D   | L                                            | A, B | H        | I   | W              | P   | K                                               |
|-----------|-----|----------------------------------------------|------|----------|-----|----------------|-----|-------------------------------------------------|
| B         | 4.0 | 5.4 $\times$ <sup>+0.1</sup> <sub>-0.2</sub> | 4.3  | 5.5 max. | 1.8 | 0.65 $\pm$ 0.1 | 1.0 | 0.35 $\times$ <sup>+0.15</sup> <sub>-0.20</sub> |
| C         | 5.0 | 5.4 $\times$ <sup>+0.1</sup> <sub>-0.2</sub> | 5.3  | 6.5 max. | 2.2 | 0.65 $\pm$ 0.1 | 1.5 | 0.35 $\times$ <sup>+0.15</sup> <sub>-0.20</sub> |
| D         | 6.3 | 5.4 $\times$ <sup>+0.1</sup> <sub>-0.2</sub> | 6.6  | 7.8 max. | 2.6 | 0.65 $\pm$ 0.1 | 1.8 | 0.35 $\times$ <sup>+0.15</sup> <sub>-0.20</sub> |

■ Standard Products

Endurance : 105 °C 2000 h

| W.V. | Cap.<br>(±20 %) | Case size |        |              | Specification                                             |                                       | Part No.<br>(RoHS:compliant) | Reflow | Min.<br>Packaging Q'ty |
|------|-----------------|-----------|--------|--------------|-----------------------------------------------------------|---------------------------------------|------------------------------|--------|------------------------|
|      |                 | Dia.      | Length | Size<br>Code | Ripple<br>Current<br>(120 Hz)<br>(+105 °C)<br>(mA r.m.s.) | $\tan \delta$<br>(120 Hz)<br>(+20 °C) |                              |        | Taping                 |
| (V)  | (μF)            | (mm)      | (mm)   |              |                                                           |                                       |                              |        | (pcs)                  |
| 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.<br>(±20 %) | Case size |        |              | Specification                                            |                               | Part No.<br>(RoHS:compliant) | Reflow | Min.<br>Packaging Q'ty |
|------|-----------------|-----------|--------|--------------|----------------------------------------------------------|-------------------------------|------------------------------|--------|------------------------|
|      |                 | Dia.      | Length | Size<br>Code | Ripple<br>Current<br>(120 Hz)<br>(+105°C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+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.<br>(±20 %) | Case size |        |              | Specification                                            |                               | Part No.<br>(RoHS:compliant) | Reflow | Min.<br>Packaging Q'ty |
|------|-----------------|-----------|--------|--------------|----------------------------------------------------------|-------------------------------|------------------------------|--------|------------------------|
|      |                 | Dia.      | Length | Size<br>Code | Ripple<br>Current<br>(120 Hz)<br>(+105°C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+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"

## Данный компонент на территории Российской Федерации

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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