

### Surface Mount Type

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

- **Features**
  - Endurance: 105°C 2000 h
  - 5.8 mm height ( $\leq \phi 6.3$ )
  - Vibration-proof product is available upon request. ( $\phi 8 \leq$ )
  - RoHS directive compliant (Parts No.:EEE\*)



■ Specifications																									
Category temp. range	-40 to +105°C																								
Rated W.V. Range	4 to 50 V .DC																								
Nominal Cap. Range	0.1 to 220 $\mu$ F																								
Capacitance Tolerance	$\pm 20$ % (120Hz/+20°C)																								
DC Leakage Current	$I \leq 0.01 CV$ or $3(\mu A)$ after 2 minutes (Whichever is greater) (Bi-Polar $I=0.02 CV$ or $6(\mu A)$ after 2 minutes) (Whichever is greater)																								
tan $\delta$	Please see the attached standard products list																								
Characteristics at Low Temperature	<table border="1"> <thead> <tr> <th>W.V. (V)</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>-25 / +20 °C</td> <td>7</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>-40 / +20 °C</td> <td>15</td> <td>8</td> <td>6</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> </tr> </tbody> </table>	W.V. (V)	4	6.3	10	16	25	35	50	-25 / +20 °C	7	4	3	2	2	2	2	-40 / +20 °C	15	8	6	4	4	3	3
	W.V. (V)	4	6.3	10	16	25	35	50																	
	-25 / +20 °C	7	4	3	2	2	2	2																	
-40 / +20 °C	15	8	6	4	4	3	3																		
(Impedance ratio at 120 Hz)																									
Endurance	After applying rated working voltage for 2000 hours at +105 $\pm$ 2°C and then being stabilized at +20°C, capacitors shall meet the following limits.																								
	Capacitance change	$\pm 20$ % of initial measured value (4W.V.: $\pm 35$ %, 6.3W.V.: $\pm 25$ %)																							
	tan $\delta$	$\leq 200$ % of initial specified value																							
	DC leakage current	$\leq$ initial specified value																							
Shelf Life	After storage for 1000 hours at +105 $\pm$ 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 (Refer to page 86 for recommended temperature profile.) and then being stabilized at +20°C, capacitor shall meet the following limits.																								
	Capacitance change	$\pm 10$ % of initial measured value																							
	tan $\delta$	$\leq$ initial specified value																							
	DC leakage current	$\leq$ initial specified value																							

#### ■ Marking

Example: 50V 1  $\mu$ F (Polarized)

W.V. code

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

Capacitance ( $\mu$ F)

Series identification (HP:Bi-polar)

Lot number

W.V. code

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

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

Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.8	4.3	5.5MAX	1.8	0.65 $\pm$ 0.1	1.0	0.35 -0.20 to +0.15
C	5.0	5.8	5.3	6.5MAX	2.2	0.65 $\pm$ 0.1	1.5	0.35 -0.20 to +0.15
D	6.3	5.8	6.6	7.8MAX	2.6	0.65 $\pm$ 0.1	1.8	0.35 -0.20 to +0.15

#### ■ Case size

W.V.(V)	4		6.3		10		16		25		35		50	
Cap. ( $\mu$ F)	Polar-ized	Polar-ized	Bi - polar	Polar-ized	Bi - polar	Polar-ized	Bi - polar	Polar-ized	Bi - polar	Polar-ized	Bi - polar	Polar-ized	Bi - polar	Polar-ized
0.1 to 0.47													B	B
1.0													B	B
2.2												B	B	B
3.3										B			B	D
4.7									B	B			C	D
6.8									B				C	
10					B	B	C			D	C		D	
22		B				C				D	D			
33		B		C	D				D					
47	B	C	D			D								
68														
100	C	D												
150	D													
220	D													

### ■ Standard Products

W.V. (V)	Cap. (±20%) (μF)	Case size			Specification		Part No. (RoHS: not compliant)	Reflow	Part No. (RoHS: compliant)	Reflow	Min. Packaging Qty	Taping (pcs)
		Dia. (mm)	Length (mm)	Size Code	Ripple current (120Hz) (+105°C) (mA)	tan δ (120Hz) (+20°C)						
4	47	4	5.8	B	34	0.50	EEVHB0G470R	(1)	EEEHB0G470R	(4)	2000	
	100	5	5.8	C	61	0.50	EEVHB0G101R	(1)	EEEHB0G101R	(4)	1000	
	150	6.3	5.8	D	82	0.50	EEVHB0G151P	(1)	EEEHB0G151P	(4)	1000	
	220	6.3	5.8	D	82	0.50	EEVHB0G221P	(1)	EEEHB0G221P	(4)	1000	
6.3	22	4	5.8	B	26	0.30	EEVHB0J220R	(1)	EEEHB0J220R	(4)	2000	
	33	4	5.8	B	29	0.30	EEVHB0J330R	(1)	EEEHB0J330R	(4)	2000	
	47	5	5.8	C	46	0.30	EEVHB0J470R	(1)	EEEHB0J470R	(4)	1000	
	100	6.3	5.8	D	71	0.30	EEVHB0J101P	(1)	EEEHB0J101P	(4)	1000	
10	33	5	5.8	C	43	0.22	EEVHB1A330R	(1)	EEEHB1A330R	(4)	1000	
16	10	4	5.8	B	28	0.16	EEVHB1C100R	(1)	EEEHB1C100R	(4)	2000	
	22	5	5.8	C	39	0.16	EEVHB1C220R	(1)	EEEHB1C220R	(4)	1000	
	47	6.3	5.8	D	70	0.16	EEVHB1C470P	(1)	EEEHB1C470P	(4)	1000	
25	4.7	4	5.8	B	22	0.14	EEVHB1E4R7R	(1)	EEEHB1E4R7R	(4)	2000	
	6.8	4	5.8	B	25	0.14	EEVHB1E6R8R	(1)	EEEHB1E6R8R	(4)	2000	
	33	6.3	5.8	D	65	0.14	EEVHB1E330P	(1)	EEEHB1E330P	(4)	1000	
35	10	5	5.8	C	28	0.12	EEVHB1V100R	(1)	EEEHB1V100R	(4)	1000	
	22	6.3	5.8	D	55	0.12	EEVHB1V220P	(1)	EEEHB1V220P	(4)	1000	
50	0.1	4	5.8	B	1	0.12	EEVHB1HR10R	(1)	EEEHB1HR10R	(4)	2000	
	0.22	4	5.8	B	2	0.12	EEVHB1HR22R	(1)	EEEHB1HR22R	(4)	2000	
	0.33	4	5.8	B	3	0.12	EEVHB1HR33R	(1)	EEEHB1HR33R	(4)	2000	
	0.47	4	5.8	B	5	0.12	EEVHB1HR47R	(1)	EEEHB1HR47R	(4)	2000	
	1	4	5.8	B	10	0.12	EEVHB1H1R0R	(1)	EEEHB1H1R0R	(4)	2000	
	2.2	4	5.8	B	16	0.12	EEVHB1H2R2R	(1)	EEEHB1H2R2R	(4)	2000	
	3.3	4	5.8	B	16	0.12	EEVHB1H3R3R	(1)	EEEHB1H3R3R	(4)	2000	
	4.7	5	5.8	C	23	0.12	EEVHB1H4R7R	(1)	EEEHB1H4R7R	(4)	1000	
	6.8	5	5.8	C	23	0.12	EEVHB1H6R8R	(1)	EEEHB1H6R8R	(4)	1000	
10	6.3	5.8	D	35	0.12	EEVHB1H100P	(1)	EEEHB1H100P	(4)	1000		

An explanation of the taping dimensions can be found on page 84.

Reflow profiles can be found on page 86.

Endurance: 105°C 2000h

### ■ Standard Products(Bi-polar)

W.V. (V)	Cap. (±20%) (μF)	Case size			Specification		Part No. (RoHS: not compliant)	Reflow	Part No. (RoHS: compliant)	Reflow	Min. Packaging Q'ty Taping (pcs)
		Dia. (mm)	Length (mm)	Size Code	Ripple current (120Hz) (+105°C) (mA)	tan δ (120Hz) (+20°C)					
6.3	47	6.3	5.8	D	35	0.60	EEVHP0J470P	(1)	EEEHP0J470P	(4)	1000
10	10	4	5.8	B	20	0.44	EEVHP1A100R	(1)	EEEHP1A100R	(4)	2000
	33	6.3	5.8	D	26	0.44	EEVHP1A330P	(1)	EEEHP1A330P	(4)	1000
16	10	5	5.8	C	25	0.32	EEVHP1C100R	(1)	EEEHP1C100R	(4)	1000
25	3.3	4	5.8	B	12	0.28	EEVHP1E3R3R	(1)	EEEHP1E3R3R	(4)	2000
	4.7	4	5.8	B	12	0.28	EEVHP1E4R7R	(1)	EEEHP1E4R7R	(4)	2000
	10	6.3	5.8	D	28	0.28	EEVHP1E100P	(1)	EEEHP1E100P	(4)	1000
	22	6.3	5.8	D	55	0.28	EEVHP1E220P	(1)	EEEHP1E220P	(4)	1000
35	2.2	4	5.8	B	10	0.24	EEVHP1V2R2R	(1)	EEEHP1V2R2R	(4)	2000
50	0.22	4	5.8	B	2	0.24	EEVHP1HR22R	(1)	EEEHP1HR22R	(4)	2000
	0.33	4	5.8	B	3	0.24	EEVHP1HR33R	(1)	EEEHP1HR33R	(4)	2000
	0.47	4	5.8	B	5	0.24	EEVHP1HR47R	(1)	EEEHP1HR47R	(4)	2000
	1	4	5.8	B	10	0.24	EEVHP1H1R0R	(1)	EEEHP1H1R0R	(4)	2000
	3.3	6.3	5.8	D	16	0.24	EEVHP1H3R3P	(1)	EEEHP1H3R3P	(4)	1000
	4.7	6.3	5.8	D	23	0.24	EEVHP1H4R7P	(1)	EEEHP1H4R7P	(4)	1000

An explanation of the taping dimensions can be found on page 84.

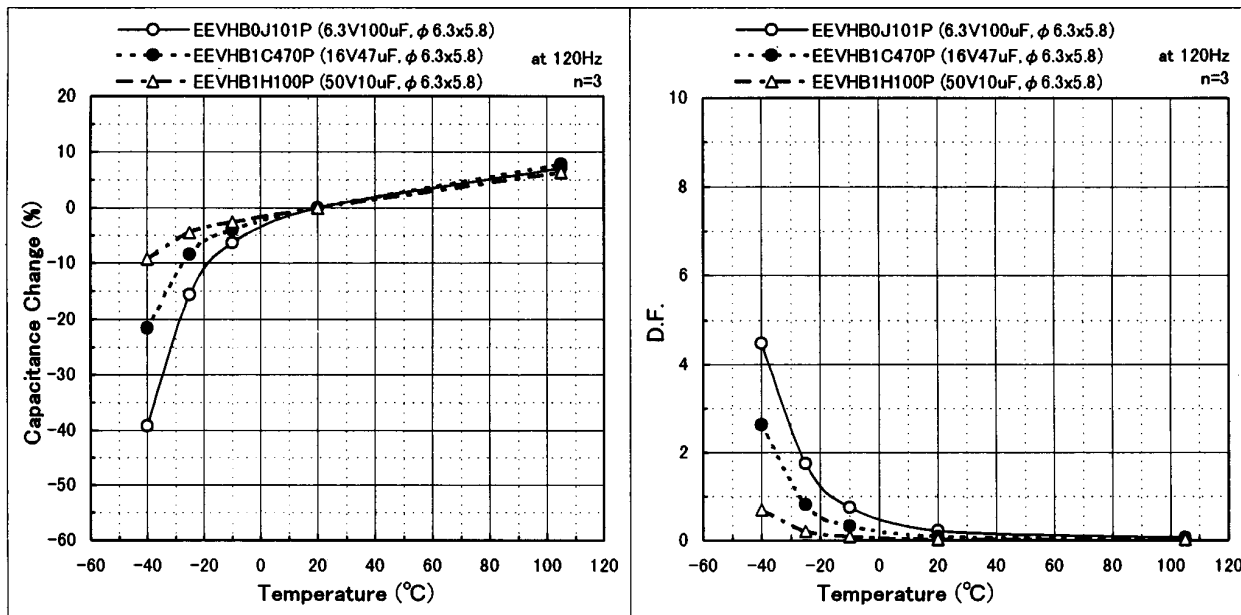
Reflow profiles can be found on page 86.

Endurance: 105°C 2000h

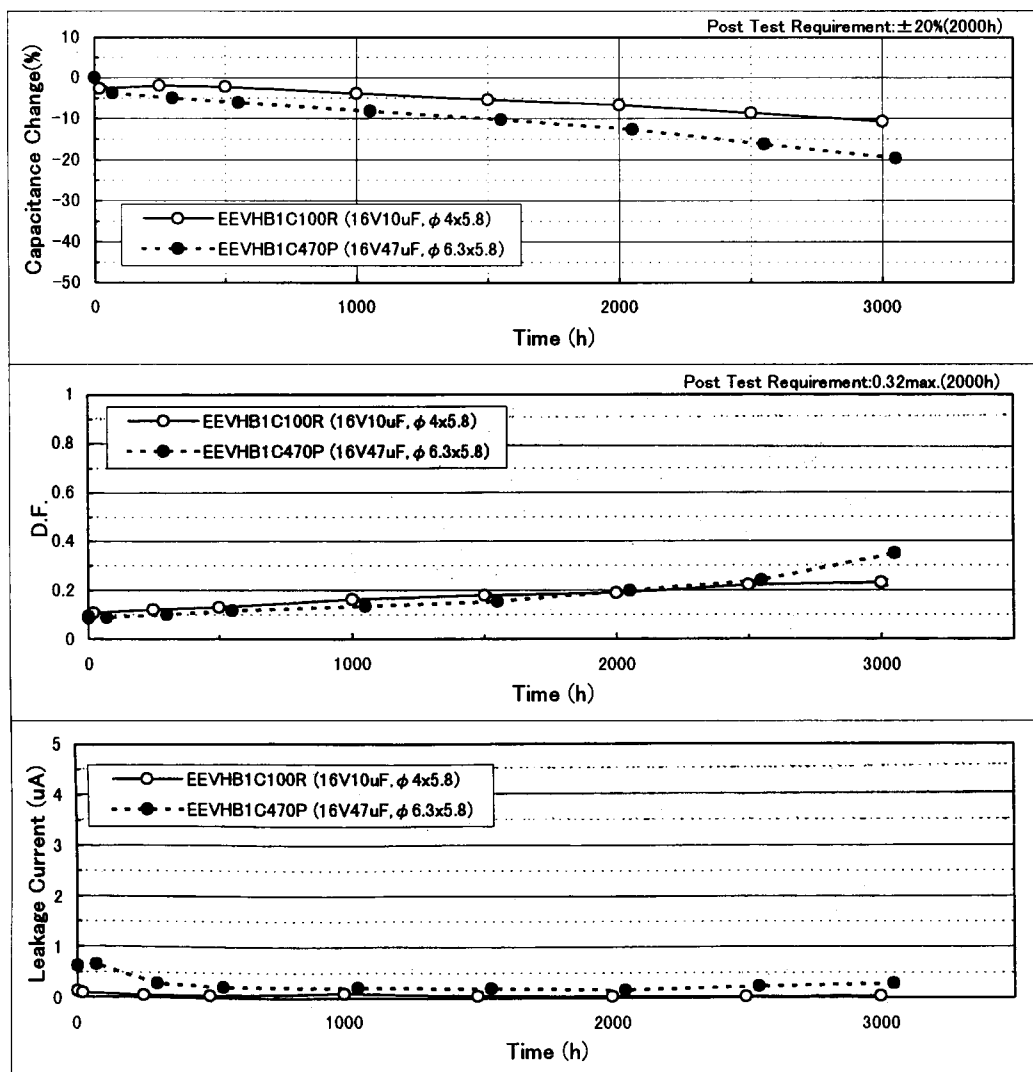
### ■ Frequency Correction Factor of Rated Ripple Current

	Frequency (Hz)			
	50,60	120	1k	10k~
coefficient	0.70	1.0	1.3	1.7

### Temperature Characteristics

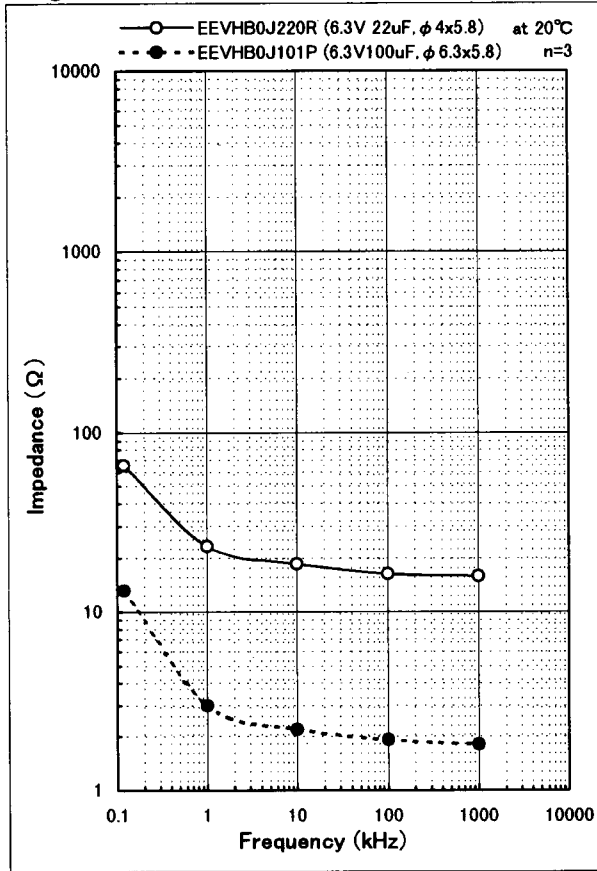


### Endurance

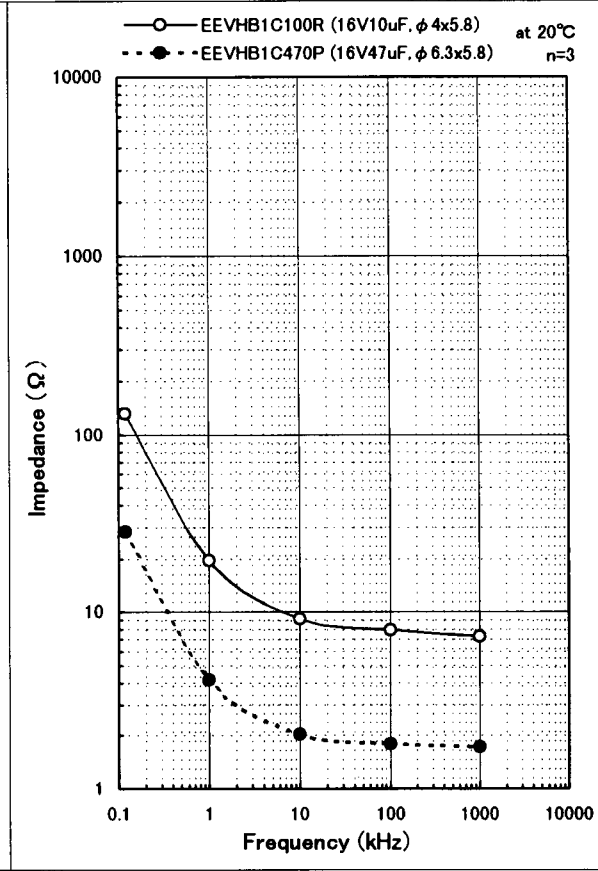


### Frequency Characteristics

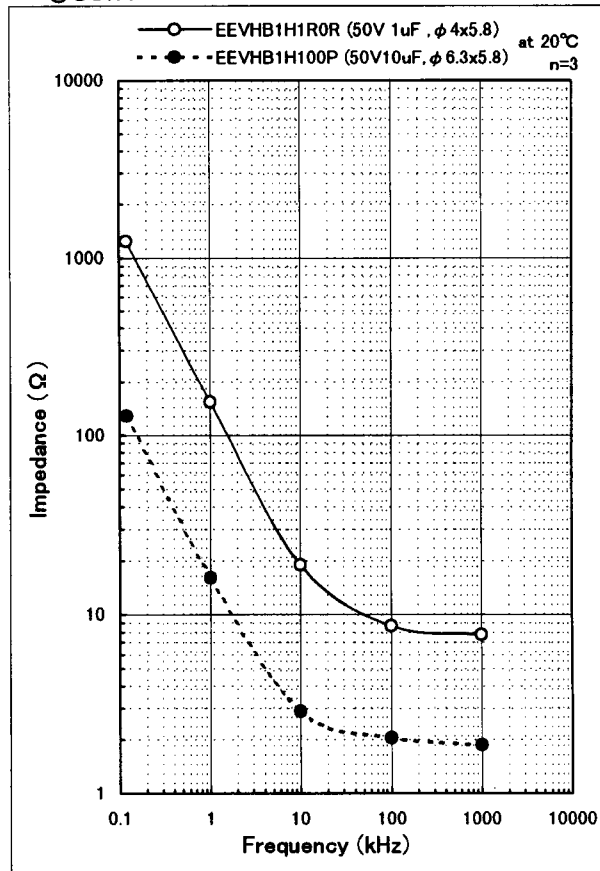
◎6.3WV



◎16WV



◎50WV



### Temperature Characteristics

