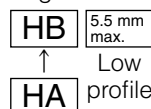


Surface Mount Type

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

Long life



■ Features

- Endurance: 105 °C 2000 h
- 5.8 mm height ($\leq \phi 6.3$), 5.5 mm height max.
- Vibration-proof product is available upon request. ($\phi 8$ 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	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							
	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 μ F
Marking color: BLACK

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

Capacitance (μ F)

Series identification
(HP : Bi-polar)
(BS : 5.5 mm max.)

Mark for Lead-Free Products Black Dot (Square)

Rated Voltage Mark

Lot number

Rated Voltage Mark	
g	4 V
j	6.3 V
A	10 V
C	16 V

E	25 V
V	35 V
H	50 V

■ Dimensions in mm (not to scale)

(Unit : mm)

0.3 max.

$\phi D \pm 0.5$

L

A ± 0.2

B ± 0.2

W

P

K

Pressure Relief ($\phi 10$ and larger)

() Reference size

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 $^{+0.15}_{-0.20}$

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01 Sep. 2013

■ 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
(V)	(μ F)	(mm)	(mm)						(pcs)
4	47	4	5.8	B	34	0.50	EEH0470R	(1)	2000
	100	5	5.8	C	61	0.50	EEH0101R	(1)	1000
	150	6.3	5.8	D	82	0.50	EEH0151P	(1)	1000
	220	6.3	5.8	D	82	0.50	EEH0221P	(1)	1000
6.3	22	4	5.8	B	26	0.30	EEH0220R	(1)	2000
	33	4	5.8	B	29	0.30	EEH0330R	(1)	2000
	47	5	5.8	C	46	0.30	EEH0470R	(1)	1000
	100	6.3	5.8	D	71	0.30	EEH0101P	(1)	1000
	220	8	10.2	F	150	0.35	EEH0221P	(2)	500
	330	8	10.2	F	230	0.35	EEH0331P	(2)	500
10	33	5	5.8	C	43	0.22	EEH10330R	(1)	1000
	100	8	6.2	E	110	0.26	EEH10101P	(2)	1000
	220	8	10.2	F	160	0.26	EEH10221P	(2)	500
	470	10	10.2	G	270	0.26	EEH10471P	(2)	500
16	10	4	5.8	B	28	0.16	EEH16100R	(1)	2000
	22	5	5.8	C	39	0.16	EEH16220R	(1)	1000
	47	6.3	5.8	D	70	0.16	EEH16470P	(1)	1000
	100	8	10.2	F	120	0.20	EEH16101P	(2)	500
	220	10	10.2	G	210	0.20	EEH16221P	(2)	500
	330	10	10.2	G	230	0.20	EEH16331P	(2)	500
25	4.7	4	5.8	B	22	0.14	EEH2547R	(1)	2000
	6.8	4	5.8	B	25	0.14	EEH2568R	(1)	2000
	33	6.3	5.8	D	65	0.14	EEH25330P	(1)	1000
	47	8	6.2	E	91	0.16	EEH25470P	(2)	1000
	100	8	10.2	F	130	0.16	EEH25101P	(2)	500
	220	10	10.2	G	190	0.16	EEH25221P	(2)	500
35	10	5	5.8	C	28	0.12	EEH35100R	(1)	1000
	22	6.3	5.8	D	55	0.12	EEH35220P	(1)	1000
	33	8	6.2	E	84	0.14	EEH35330P	(2)	1000
	47	8	10.2	F	98	0.14	EEH35470P	(2)	500
	100	10	10.2	G	160	0.14	EEH35101P	(2)	500
50	0.1	4	5.8	B	1	0.12	EEH5010R ***	(1)	2000
	0.22	4	5.8	B	2	0.12	EEH5022R ***	(1)	2000
	0.33	4	5.8	B	3	0.12	EEH5033R ***	(1)	2000
	0.47	4	5.8	B	5	0.12	EEH5047R ***	(1)	2000
	1	4	5.8	B	10	0.12	EEH5010R	(1)	2000
	2.2	4	5.8	B	16	0.12	EEH5022R	(1)	2000
	3.3	4	5.8	B	16	0.12	EEH5033R	(1)	2000
	4.7	5	5.8	C	23	0.12	EEH5047R	(1)	1000
	6.8	5	5.8	C	23	0.12	EEH5068R	(1)	1000
	10	6.3	5.8	D	35	0.12	EEH50100P	(1)	1000
	22	8	6.2	E	70	0.12	EEH50220P	(2)	1000
	33	8	10.2	F	91	0.12	EEH50330P	(2)	500
	47	10	10.2	G	100	0.12	EEH50470P	(2)	500

*** Please kindly accept last shipment : 31/Mar/2015

· 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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01 Sep. 2013

■ 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.)	$\tan \delta$ (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.)	$\tan \delta$ (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

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