



## HBV Series

## Features

- 105°C, 10,000 hours assured
- Low ESR and High ripple current
- RoHS Compliance



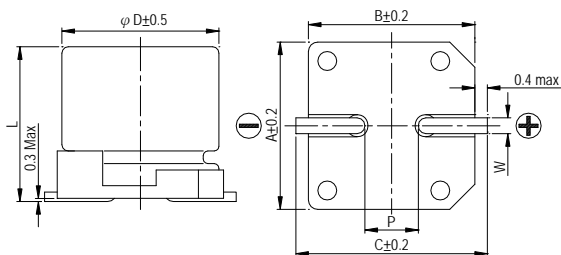
Marking color: Dark Green

## Specifications

Items	Performance										
Category Temperature Range	-55°C ~ +105°C										
Capacitance Tolerance	±20% (at 120Hz, 20°C)										
Leakage Current (at 20°C)*	Rated voltage ≤ 63V: I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Rated voltage ≥ 80V: I = 0.05CV or 100 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF    V = rated DC working voltage in V										
Tanδ (at 120Hz, 20°C)	See Standard Ratings										
Endurance	<table><tr><td>Test Time</td><td>10,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>ESR</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> <p>* The above Specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 10,000 hours at 105°C.</p>	Test Time	10,000 Hrs	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 200% of specified value	ESR	Less than 200% of specified value	Leakage Current	Within specified value
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Capacitance Change	Within ±30% of initial value										
Tanδ	Less than 200% of specified value										
ESR	Less than 200% of specified value										
Leakage Current	Within specified value										
Shelf Life	After storage for 1000 hours at 105 ± 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 *	<table><tr><td>Capacitance Change</td><td>Within ±10% of initial value</td></tr><tr><td>Tanδ</td><td>Within specified value</td></tr><tr><td>ESR</td><td>Within specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table>	Capacitance Change	Within ±10% of initial value	Tanδ	Within specified value	ESR	Within specified value	Leakage Current	Within specified value		
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Ripple Current & Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>120 ≤ f &lt; 1k</td><td>1k ≤ f &lt; 10k</td><td>10k ≤ f &lt; 100k</td><td>100k ≤ f &lt; 500k</td></tr><tr><td>Multiplier</td><td>0.10</td><td>0.3</td><td>0.6</td><td>1.0</td></tr></table>	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	Multiplier	0.10	0.3	0.6	1.0
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Multiplier	0.10	0.3	0.6	1.0							

\* For any doubt about measured values, measure the leakage current again after the following voltage treatment.  
Voltage treatment: Applying DC rated voltage to the capacitors for 2 hours at 105°C.

## Diagram of Dimensions



## Lead Spacing and Diameter

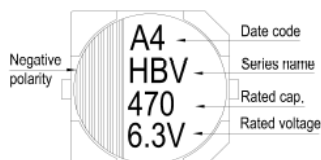
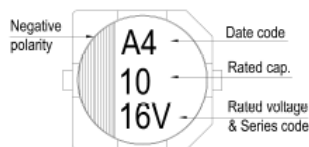
Unit: mm

φ D	L	A	B	C	W	P ± 0.2
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	10.0 ± 0.5	8.4	8.4	9.0	0.7 ~ 1.1	3.1
8	12.0 ± 0.5	8.4	8.4	9.0	0.7 ~ 1.1	3.1
10	10 ± 0.5	10.4	10.4	11.0	0.7 ~ 1.3	4.7
10	12.5 ± 0.5	10.4	10.4	11.0	0.7 ~ 1.3	4.7

## Marking

φ D = 6.3 mm

φ D = 8 ~ 10 mm



Dimension:  $\phi$  D×L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

## Standard Ratings

W. V. (V)	Surge Voltage (V)	Capacitance (μF)	Size $\phi$ D×L(mm)	Tanδ (120Hz, 20°C)	L C (μA)	E S R (mΩ/at 100kHz, 20°C Max)	Rated R. C. (mA/rms at 100k Hz, 105°C)
25V (1E)	28.8	56	6.3 × 5.8	0.14	14	50	1,300
		100	6.3 × 7.7	0.14	25	30	2,000
		220	8 × 10	0.14	55	27	2,300
		330	10 × 10	0.14	82.5	20	2,500
		330	10 × 12.5	0.16	82.5	16	2,900
35V (1V)	40.3	27	6.3 × 5.8	0.12	9.5	60	1,300
		68	6.3 × 7.7	0.12	23.8	35	2,000
		150	8 × 10	0.12	52.5	27	2,300
		270	10 × 10	0.12	82.5	20	2,500
50V(1H)	57.5	22	6.3 × 5.8	0.10	11	80	1,100
		33	6.3 × 7.7	0.10	16.5	40	1,600
		68	8 × 10	0.10	34	30	1,800
		100	10 × 10	0.10	50	28	2,000
63V(1J)	72.5	10	6.3 × 5.8	0.08	6.3	120	1,000
		22	6.3 × 7.7	0.08	13.9	80	1,500
		27	8 × 12	0.08	17	40	1,700
		33	8 × 10	0.08	20.8	40	1,700
		56	10 × 10	0.08	35.3	30	1,800
80V(1K)	92.0	22	8 × 10	0.08	88	45	1,550
		33	10 × 10	0.08	132	36	1,700
100V(2A)	115.0	12	10 × 10	0.16	60	80	1,450
		15	10 × 12.5	0.16	75	60	1,660

## Part Numbering System

HBV series	220μF	±20%	25V	Carrier Tape		8 $\phi$ × 10L	Pb-free and PET coating case
<b>HBV</b>	<b>221</b>	<b>M</b>	<b>1E</b>	<b>TR</b>	<b>-</b>	<b>0810</b>	
Series name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case size	Lead Wire and Coating Type



## HBW Series

## Features

- 125°C, 4,000 hours assured
- Low ESR and High ripple current
- RoHS Compliance



Marking color: Dark Green

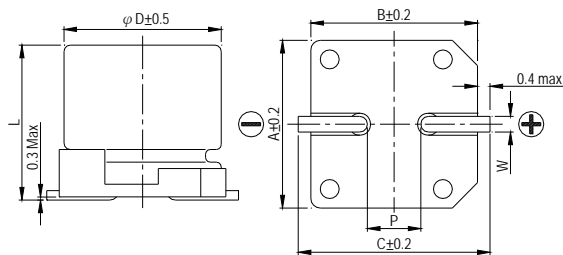
## Specifications

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Tanδ (at 120Hz, 20°C)	See Standard Ratings																							
Endurance	<table><tr><td>Test Time</td><td colspan="3">4,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="3">Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td colspan="3">Less than 200% of specified value</td></tr><tr><td>ESR</td><td colspan="3">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="3">Within specified value</td></tr></table>				Test Time	4,000 Hrs			Capacitance Change	Within ±30% of initial value			Tanδ	Less than 200% of specified value			ESR	Less than 200% of specified value			Leakage Current	Within specified value		
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Voltage treatment: Applying DC rated voltage to the capacitors for 2 hours at 105°C.

## Diagram of Dimensions



## Lead Spacing and Diameter

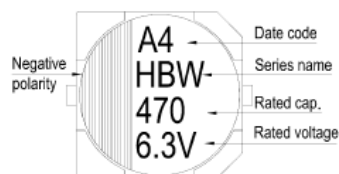
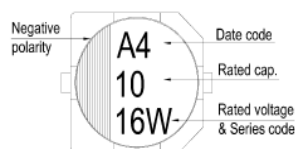
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## Marking

φD = 6.3 mm

φD = 8 ~ 10 mm



Dimension:  $\phi$  D×L(mm)

Ripple Current: mA/rms at 100k Hz, 105°C

## Standard Ratings

W. V. (V)	Surge Voltage (V)	Capacitance (μF)	Size $\phi$ D×L(mm)	Tanδ (120Hz, 20°C)	L C (μA)	E S R (mΩ/at 100kHz, 20°C Max)	Rated R. C. (mA/rms at 100k Hz, 105°C)
25V (1E)	28.8	56	6.3 × 5.8	0.14	14	50	900
		100	6.3 × 7.7	0.14	25	30	1,400
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		330	10 × 10	0.14	82.5	20	2,000
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		68	6.3 × 7.7	0.12	23.8	35	1,400
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		33	6.3 × 7.7	0.10	16.5	40	1,100
		68	8 × 10	0.10	34	30	1,250
		100	10 × 10	0.10	50	28	1,600
63V(1J)	72.5	10	6.3 × 5.8	0.08	6.3	120	700
		22	6.3 × 7.7	0.08	13.9	80	900
		27	8 × 12	0.08	17	40	1,100
		33	8 × 10	0.08	20.8	40	1,100
		56	10 × 10	0.08	35.3	30	1,400
		56	10 × 12.5	0.08	35.3	22	1,440
80V(1K)	92.0	15	10 × 10	0.16	60	70	900
		18	10 × 12.5	0.16	72	50	1,100
100V(2A)	115.0	12	10 × 10	0.16	60	80	870
		15	10 × 12.5	0.16	75	60	1,000

## Part Numbering System

HBW series

220μF

±20%

25V

Carrier  
Tape8  $\phi$  × 10LPb-free and PET  
coating case**HBW****221****M****1E****TR****-****0810**

Series name

Capacitance

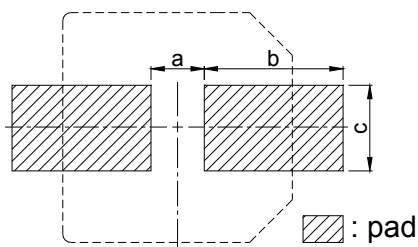
Capacitance  
ToleranceRated  
VoltagePackage  
TypeTerminal  
Type

Case size

Lead Wire and  
Coating Type

## Reflow Conditions for SMD Type

### Recommended Land Pattern and Size



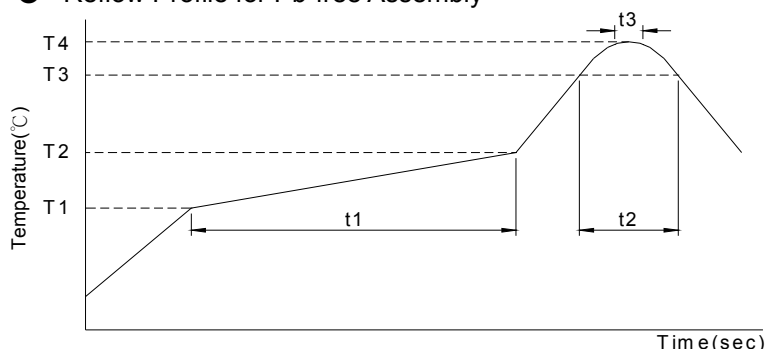
Unit: mm

Case size	Land size		
	a	b	c
6.3 $\phi$	1.9	3.5	1.6
8 $\phi$	3.0	3.5	2.5
10 $\phi$	4.0	4.0	2.5

### Recommended Soldering Methods

Method	Reflow soldering	Soldering iron	Flow soldering
Advisability	○ Recommended	○ Recommended	× Not Recommended

### Reflow Profile for Pb-free Assembly



### Test Conditions

Type		Hybrid capcitor		
W. V. (V)		---		
Case size ( ϕ )		---		
Preheat	Temp. (T1 ~ T2, °C)	150 ~ 180		
	Time(t1) (Max, secs)	120		
Duration	Temp. (T3, °C)	200	217	230
	Time(t2) (Max, secs)	70	40	30
Peak	Temp (T4, °C)	250	260	
	Time (t3, secs)	5		
Reflow cycles		2	1	

\* Please contact our representative if your condition is higher.

\* Please ensure that the capacitor became cold enough to the room temperature (5 ~ 35°C) before the second reflow.

\* Consult with us when performing reflow profile in IPC / JEDEC (J-STD-020)

### Attention for Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

Reflow soldering may reduce the capacitance of products before or after soldering even if soldering conditions stipulated in Recommendable Reflow Condition are met.

Though the actual reflow conditions are subject to change depending on the kind of reflow soldering method, please be aware that the peak temperature at the top of Al-case and electrode terminals should not exceed peak temperature.

#### (1) Method is as follows.

Reflow soldering condition.

The following temperature profile condition should be observed for soldering. (For higher temperature, please contact us after measuring the capacitor's product temperature profile at your side.

Product temperature will rise slower as the product size gets bigger. It is not necessary to adjust the reflow furnace temperature setting according to the product size, for example,  $\phi 4$  and  $\phi 10$  products can be mixed on one PCB for reflowing.

#### (2) Soldering precautions

##### 1. Elements related to the reflow soldering temperature

\* Product size: The temperature rises slower as the size gets bigger.

\* Product location: The center part of the PCB tends to have a lower temperature than the PCB edges.

\* PCB size: The PCB temperature rises slower as the area and/or thickness of the PCB gets greater.

##### 2. Repeated reflowing

\* Avoid reflowing twice if possible.

\* If repeated reflowing is unavoidable, contact us after measuring the first and the second reflow profiles and reflow interval at your side.

\* Do not attempt to reflow three times.

##### 3. Soldering with soldering iron observe the following conditions.

\* The iron tip temperature: 350±5°C

\* Soldering time: 3+1/-0 seconds.