

## HBW Series

### Features

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

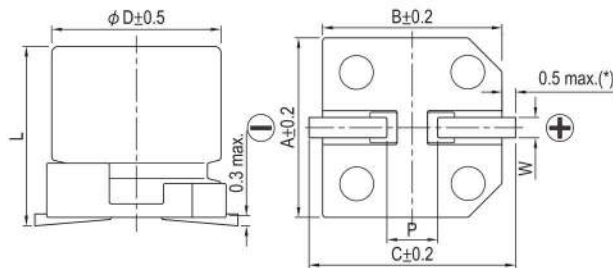


Marking color: Dark Green

### Specifications

Items	Performance										
Category Temperature Range	-55°C ~ +125°C										
Capacitance Tolerance	±20% (at 120 Hz, 20°C)										
Leakage Current (at 20°C)	I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V										
Tanδ (at 120 Hz, 20°C)	See Standard Ratings										
Endurance	<table border="1"> <tr> <td>Test Time</td> <td>4,000 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>	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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	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										
* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 4,000 hours at 125°C.											
Shelf Life Test	* After storage for 1,000 hours at 125 ± 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 (Please refer to page 26 for reflowsoldering conditions)	<table border="1"> <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 and Frequency Multipliers											
<table border="1"> <thead> <tr> <th>Frequency (Hz)</th> <th>120 ≤ f &lt; 1k</th> <th>1k ≤ f &lt; 10k</th> <th>10k ≤ f &lt; 100k</th> <th>100k ≤ f &lt; 500k</th> </tr> </thead> <tbody> <tr> <td>Multiplier</td> <td>0.10</td> <td>0.3</td> <td>0.6</td> <td>1.0</td> </tr> </tbody> </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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### Diagram of Dimensions



### Lead Spacing and Diameter

Unit: mm

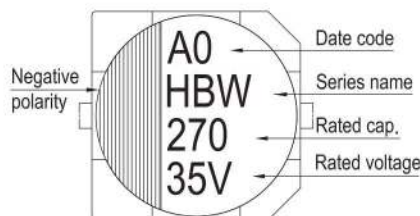
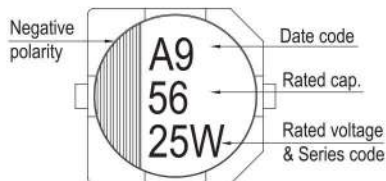
φD	L	A	B	C	W	P ± 0.2
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	10.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	10.0 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	12.5 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7

(\*): For 6.3 φ is 0.4 max.

### Marking

φD = 6.3

φD = 8 ~ 10



Dimension:  $\phi$  D×L(mm)  
 Ripple Current: mA/rms at 100k Hz, 125°C

**Standard Ratings**

Rated Volt. (V)	Surge Voltage (V)	Capacitance (μF)	Size $\phi$ D×L(mm)	Tanδ (120 Hz, 20°C)	LC (μA)	E S R (μΩ/at 100kHz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 125°C)
16V (1C)	18.4	82	6.3 × 5.8	0.16	13.1	50	900
		150	6.3 × 7.7		24	30	1,400
		270	8 × 10		43.2	27	1,600
		470	10 × 10		75.2	20	2,000
25V (1E)	28.8	47	6.3 × 5.8	0.14	11.8	50	900
		56	6.3 × 5.8		14	50	900
		68	6.3 × 7.7		17	30	1,400
		100	6.3 × 7.7		25	30	1,400
		150	8 × 10		37.5	27	1,600
		220	8 × 10		55	27	1,600
		330	10 × 10		82.5	20	2,000
35V (1V)	40.3	27	6.3 × 5.8	0.12	9.5	60	900
		33			11.6		
		47			16.5		
		68	6.3 × 7.7		23.8	35	1,400
		100	8 × 10		35	27	1,600
		150	8 × 10		52.5	27	1,600
		220	10 × 10		77	20	2,000
		270	10 × 10		94.5	20	2,000
50V(1H)	57.5	22	6.3 × 5.8	0.10	11	80	750
		33	6.3 × 7.7		16.5	40	1,100
		47	8 × 10		23.5	30	1,250
		68	8 × 10		34	30	1,250
		100	10 × 10		50	28	1,600
		120	10 × 10		60	28	1,600
63V(1J)	72.5	10	6.3 × 5.8	0.08	6.3	120	700
		22	6.3 × 7.7		13.9	80	900
		27	8 × 10		17	40	1,100
		33			20.8		
		47			29.6		
		56	10 × 10		35.3	30	1,400
			10 × 12.5		35.3	26	1,500
		68	10 × 10		42.8	30	1,400
		82	10 × 10		51.7	30	1,400
80V (1K)	92.0	22	8 × 10	0.08	17.6	45	1,050
		33	10 × 10		35.3	36	1,360
		47	10 × 10		37.6	36	1,360

Hybrid

**Part Numbering System**

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

Note: For more details, please refer to "Part Numbering System (SMD Type)" on page 15.