

## Features

- 125°C, 4,000 hours assured
- Low ESR and High ripple current
- RoHS compliance
- AEC-Q200 qualified

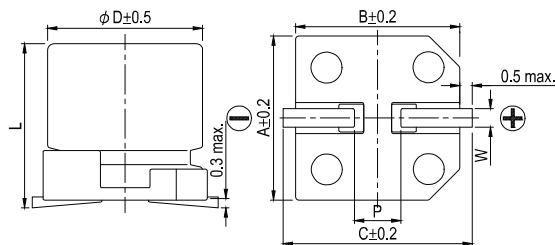


Marking color: Dark Green

## 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																				
Low Temperature Characteristics (at 100k Hz)	Impedance ratio shall not exceed the values given in the table below																				
	<table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>80</th> </tr> </thead> <tbody> <tr> <td>Impedance ratio Z (-25°C) / Z (+20°C)</td> <td>1.5</td> <td>1.5</td> <td>1.5</td> <td>1.5</td> <td>1.5</td> <td>1.5</td> </tr> <tr> <td>Impedance ratio Z (-55°C) / Z (+20°C)</td> <td>2.0</td> <td>2.0</td> <td>2.0</td> <td>2.0</td> <td>2.0</td> <td>2.0</td> </tr> </tbody> </table>	Rated Voltage	16	25	35	50	63	80	Impedance ratio Z (-25°C) / Z (+20°C)	1.5	1.5	1.5	1.5	1.5	1.5	Impedance ratio Z (-55°C) / Z (+20°C)	2.0	2.0	2.0	2.0	2.0
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Shelf Life Test	* 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.																				
Resistance to Soldering Heat (Please refer to page 15 for reflowsoldering conditions)	* 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)																				
	<table border="1"> <tbody> <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> </tbody> </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>0.1</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	0.1	0.3	0.6	1.0										
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## Diagram of Dimensions

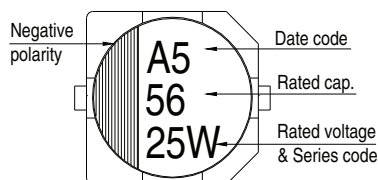


## Lead Spacing and Diameter

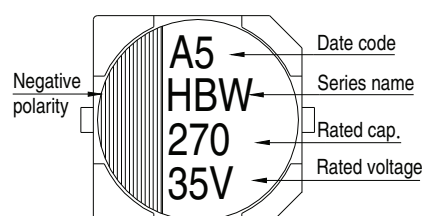
φD	L	A	B	C	W	P ± 0.2
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0
8	10.0 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1
10	10.0 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7
10	12.5 ± 0.5	10.3	10.3	11.0	0.7 ~ 1.3	4.7

## Marking

φD = 6.3



φD = 8 ~ 10



Dimension:  $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100k Hz, 125°C

### Standard Ratings

Rated Voltage (V)	Surge Voltage (V)	Capacitance ( $\mu$ F)	Size $\phi D \times L$ (mm)	Tan $\delta$ (120 Hz, 20°C)	L C ( $\mu$ A)	E S R (m $\Omega$ /at 100kHz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 125°C)
16V (1C)	18.4	82	6.3 $\times$ 5.8	0.16	13.1	50	900
		150	6.3 $\times$ 7.7		24.0	30	1,400
		270	8 $\times$ 10		43.2	27	1,600
		470	10 $\times$ 10		75.2	20	2,000
25V (1E)	28.8	47	6.3 $\times$ 5.8	0.14	11.8	50	900
		56	6.3 $\times$ 5.8		14.0	50	900
		68	6.3 $\times$ 7.7		17.0	30	1,400
		100	6.3 $\times$ 7.7		25.0	30	1,400
		150	8 $\times$ 10		37.5	27	1,600
		220	8 $\times$ 10		55.0	27	1,600
		330	10 $\times$ 10		82.5	20	2,000
35V (1V)	40.3	27	6.3 $\times$ 5.8	0.12	9.5	60	900
		33			11.6		
		47			16.5		
		68	6.3 $\times$ 7.7		23.8	35	1,400
		100	8 $\times$ 10		35.0	27	1,600
		150	8 $\times$ 10		52.5	27	1,600
		220	10 $\times$ 10		77.0	20	2,000
		270	10 $\times$ 10		94.5	20	2,000
50V(1H)	57.5	22	6.3 $\times$ 5.8	0.10	11.0	80	750
		33	6.3 $\times$ 7.7		16.5	40	1,100
		47	8 $\times$ 10		23.5	30	1,250
		68	8 $\times$ 10		34.0	30	1,250
		100	10 $\times$ 10		50.0	28	1,600
		120	10 $\times$ 10		60.0	28	1,600
63V(1J)	72.5	10	6.3 $\times$ 5.8	0.08	6.3	120	700
		22	6.3 $\times$ 7.7		13.9	80	900
		27	8 $\times$ 10		17.0	40	1,100
		33			20.8		
		47			29.6		
		56	10 $\times$ 10		35.3	30	1,400
		68	10 $\times$ 12.5		35.3	26	1,500
		68	10 $\times$ 10		42.8	30	1,400
		82	10 $\times$ 10		51.7	30	1,400
80V (1K)	92.0	22	8 $\times$ 10	0.08	17.6	45	1,050
		33	10 $\times$ 10		26.4	36	1,360
		47	10 $\times$ 10		37.6	36	1,360

### Part Numbering System

HBW Series	220 $\mu$ F	$\pm$ 20%	25V	Carrier Tape	8 $\phi$ $\times$ 10L
<b>HBW</b>	<b>221</b>	<b>M</b>	<b>1E</b>	<b>TR</b>	<b>-</b>
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type
					<b>0810</b>
					Case Size
					<b>xx</b>
					S = Standard
					KS = AEC-Q200 Qualified