

HRW Series

Features

- 135°C, 4,000 hours assured
- Low ESR and High ripple current
- RoHS compliant

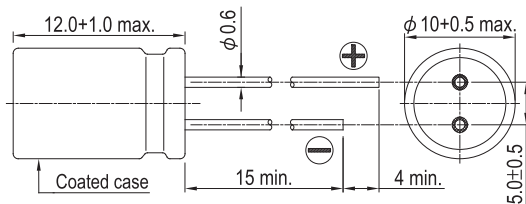


Marking color: Dark Green

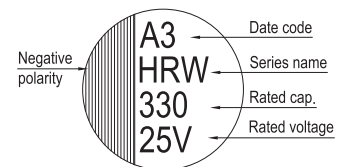
Specifications

Items	Performance																	
Category Temperature Range	-55°C ~ +135°C																	
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																	
Leakage Current (at 20°C)	$I = 0.01CV$ or $3 (\mu A)$ whichever is greater (after 2 minutes) Where, C = rated capacitance in μF , V = rated DC working voltage in V																	
Tan δ (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 colspan="2">Rated Voltage</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Impedance ratio</td> <td>Z (-25°C) / Z (+20°C)</td> <td>1.5</td> <td>1.5</td> <td>1.5</td> <td>1.5</td> </tr> <tr> <td>Z (-55°C) / Z (+20°C)</td> <td>2.0</td> <td>2.0</td> <td>2.0</td> <td>2.0</td> </tr> </tbody> </table>	Rated Voltage		25	35	50	63	Impedance ratio	Z (-25°C) / Z (+20°C)	1.5	1.5	1.5	1.5	Z (-55°C) / Z (+20°C)	2.0	2.0	2.0	2.0
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Impedance ratio	Z (-25°C) / Z (+20°C)	1.5	1.5	1.5	1.5													
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Endurance	<table border="1"> <thead> <tr> <th rowspan="2">Test Time</th> <th>125°C</th> <th>135°C</th> </tr> <tr> <th>4,000 Hrs</th> <th>4,000 Hrs</th> </tr> </thead> <tbody> <tr> <td>Capacitance Change</td> <td colspan="2">Within ±30% of initial value</td> </tr> <tr> <td>Tanδ</td> <td colspan="2">Less than 200% of specified value</td> </tr> <tr> <td>ESR</td> <td colspan="2">Less than 200% of specified value</td> </tr> <tr> <td>Leakage Current</td> <td colspan="2">Within specified value</td> </tr> </tbody> </table>	Test Time	125°C	135°C	4,000 Hrs	4,000 Hrs	Capacitance Change	Within ±30% of initial value		Tan δ	Less than 200% of specified value		ESR	Less than 200% of specified value		Leakage Current	Within specified value	
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Leakage Current	Within specified value																	
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 or 135°C.																	
Resistance to Soldering Heat	* After storage for 1,000 hours at $135 \pm 2^\circ C$ with no voltage applied and then being stabilized at 20°C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)																	
Ripple Current and Frequency Multipliers	<table border="1"> <thead> <tr> <th>Frequency (Hz)</th> <th>$120 \leq f < 1k$</th> <th>$1k \leq f < 10k$</th> <th>$10k \leq f < 100k$</th> <th>$100k \leq f < 500k$</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)	$120 \leq f < 1k$	$1k \leq f < 10k$	$10k \leq f < 100k$	$100k \leq f < 500k$	Multiplier	0.1	0.3	0.6	1.0							
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Diagram of Dimensions



Marking



Standard Ratings

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

Ripple Current: mA/rms at 100k Hz

Rated Voltage (V)	Surge Voltage (V)	Capacitance (μF)	Size $\phi D \times L$ (mm)	Tan δ (120 Hz, 20°C)	L C (μA)	E S R (m Ω /at 100kHz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz,)	
							125°C	135°C
25V (1E)	28.8	330	10 × 12.0	0.14	82.5	16	3,800	2,300
35V (1V)	40.3	270	10 × 12.0	0.12	94.5	17	3,700	2,200
50V (1H)	57.5	120	10 × 12.0	0.10	60.0	19	3,500	2,100
63V (1J)	72.5	100	10 × 12.0	0.08	63.0	20	3,400	2,000

Part Numbering System

HRW Series	330 μF	±20%	25V	Bulk Package	Gas Type	10 ϕ × 12.0L	General Purpose
HRW	331	M	1E	BK	-	1012	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Application

Note: For more details, please refer to "Part Numbering System" on page 87.