HRE Series

Features

- 145℃, 2,000 hours assured
- Low ESR and High ripple current
- RoHS compliant

Marking color: Dark Green

Specifications

Items	Performance
Category Temperature Range	-55℃ ~ +145℃
Capacitance Tolerance	±20% (at 120 Hz, 20℃)
Leakage Current (at 20℃)	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℃)	See Standard Ratings
Low Temperature Characteristics (at 100k Hz)	Impedance ratio shall not exceed the values given in the table below

Rated Voltage		25	35	50	63
Impedance ratio	Z (-25℃) / Z (+20℃)	1.5	1.5	1.5	1.5
	Z (-55℃) / Z (+20℃)	2.0	2.0	2.0	2.0

Endurance

Test Time	145℃	135℃
	2,000 Hrs	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	

* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 2,000 hours at 145℃ / 4,000 hours at 135℃.

Shelf Life Test

* After storage for 1,000 hours at 145 ± 2℃ with no voltage applied and then being stabilized at 20℃, capacitors shall meet the limits specified in Endurance. (With voltage treatment)

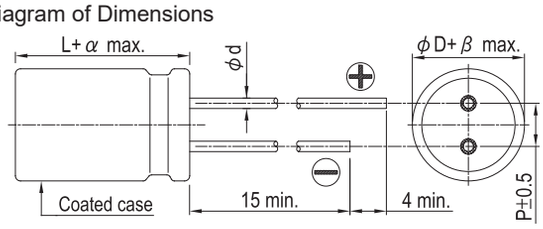
Resistance to Soldering Heat

Capacitance Change	Within ±10% of initial value
Tanδ	Within specified value
ESR	Within specified value
Leakage Current	Within specified value

Ripple Current and Frequency Multipliers

Frequency (Hz)	120 ≦ f < 1k	1k ≦ f < 10k	10k ≦ f < 100k	100k ≦ f < 500k
Multiplier	0.1	0.3	0.6	1.0

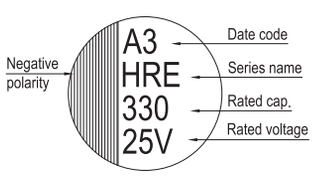
Diagram of Dimensions



Lead Spacing and Diameter Unit: mm

φD	8	10
L	10	10
P	3.5	5.0
φd	0.6	
α	1.0	
β	0.5	

Marking



Dimension: φD×L(mm)
Ripple Current: mA/rms at 100k Hz

Standard Ratings

Rated Voltage (V)	Surge Voltage (V)	Capacitance (μF)	Size φD×L(mm)	Tanδ (120 Hz, 20℃)	L C (μA)	E S R (mΩ/at 100kHz, 20℃ max.)	Rated R. C. (mA/rms at 100k Hz) 135℃	145℃
25V (1E)	28.8	220	8 × 10	0.14	55.0	27	1,600	700
		330	10 × 10		82.5	20	2,000	900
35V (1V)	40.3	150	8 × 10	0.12	52.5	27	1,600	700
		270	10 × 10		94.5	20	2,000	900
50V (1H)	57.5	68	8 × 10	0.10	34.0	30	1,250	600
		100	10 × 10		50.0	28	1,600	800
63V (1J)	72.5	33	8 × 10	0.08	20.8	40	1,100	600
		56	10 × 10		35.3	30	1,400	800
		82	10 × 10		51.7	30	1,400	800

Part Numbering System

HRE Series	220μF	±20%	25V	Bulk Package	Gas Type	8φ×10L	General Purpose
HRE	**221**	**M**	**1E**	**BK**	**-**	**0810**	
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.