

## NHA Series

• 105°C 1,000~2,000Hrs assured.

Solvent-proof

WV ≤ 100V<sub>DC</sub>

- For Digital Household Appliance.
- RoHS compliant.
- Halogen-free capacitors are also available.



## SPECIFICATIONS

Item	Characteristics																																											
Rated Voltage Range	6.3 ~ 100 V <sub>DC</sub>	160 ~ 400 V <sub>DC</sub>	450 ~ 500 V <sub>DC</sub>																																									
Operating Temperature Range	-55 ~ +105°C	-40 ~ +105°C	-25 ~ +105°C																																									
Capacitance Tolerance	±20% (M) (at 20°C, 120Hz)																																											
Leakage Current	After 1 minute: I=0.03CV(μA) or 4μA, whichever is greater.	After 1 minute																																										
	After 2 minutes: I=0.01CV(μA) or 3μA, whichever is greater.	CV ≤ 1,000	CV > 1,000																																									
		After 5 minutes																																										
		CV ≤ 1,000	CV > 1,000																																									
		0.1CV + 40	0.04CV + 100																																									
		0.03CV + 15	0.02CV + 25																																									
	Where, I: Max. Leakage current(μA), C: Nominal capacitance(μF), V: Rated voltage(V <sub>DC</sub> ) (at 20°C)																																											
Dissipation Factor (Tanδ)	<table border="1"> <thead> <tr> <th>Rated Voltage(V<sub>DC</sub>)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>160~250</th> <th>350~500</th> </tr> </thead> <tbody> <tr> <td>Tanδ(Max.)</td> <td>0.34</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.09</td> <td>0.20</td> <td>0.24</td> </tr> </tbody> </table>											Rated Voltage(V <sub>DC</sub> )	6.3	10	16	25	35	50	63	100	160~250	350~500	Tanδ(Max.)	0.34	0.24	0.20	0.16	0.14	0.12	0.10	0.09	0.20	0.24											
	Rated Voltage(V <sub>DC</sub> )	6.3	10	16	25	35	50	63	100	160~250	350~500																																	
Tanδ(Max.)	0.34	0.24	0.20	0.16	0.14	0.12	0.10	0.09	0.20	0.24																																		
	When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase. (at 20°C, 120Hz)																																											
Temperature Characteristics (Max. Impedance ratio)	<table border="1"> <thead> <tr> <th>Rated Voltage(V<sub>DC</sub>)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63~100</th> <th>160</th> <th>200~400</th> <th>450~500</th> </tr> </thead> <tbody> <tr> <td>Z(-25°C)/Z(20°C)</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>3</td> <td>3</td> <td>6</td> <td>6</td> </tr> <tr> <td>Z(-40°C)/Z(20°C)</td> <td>12</td> <td>10</td> <td>8</td> <td>5</td> <td>4</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>-</td> </tr> </tbody> </table>											Rated Voltage(V <sub>DC</sub> )	6.3	10	16	25	35	50	63~100	160	200~400	450~500	Z(-25°C)/Z(20°C)	5	4	3	2	2	2	3	3	6	6	Z(-40°C)/Z(20°C)	12	10	8	5	4	3	4	5	6	-
	Rated Voltage(V <sub>DC</sub> )	6.3	10	16	25	35	50	63~100	160	200~400	450~500																																	
Z(-25°C)/Z(20°C)	5	4	3	2	2	2	3	3	6	6																																		
Z(-40°C)/Z(20°C)	12	10	8	5	4	3	4	5	6	-																																		
	(at 120Hz)																																											
Load Life	<p>The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C.(where, 1,000 hours ≤ ∅ 8)</p> <p>Capacitance change ≤ ±20% of the initial value</p> <p>Tanδ ≤ 200% of the initial specified value</p> <p>Leakage current ≤ The initial specified value</p>																																											
Shelf Life	<p>The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.(where, 500 hours ≤ ∅ 8)</p> <p>The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements.</p> <p>Capacitance change ≤ ±20% of the initial value</p> <p>Tanδ ≤ 200% of the initial specified value</p> <p>Leakage current ≤ The initial specified value (where, 200% for ≥ WV 160 V<sub>DC</sub>)</p>																																											
Others	Satisfied characteristics KS C IEC 60384-4																																											

## DIMENSIONS OF NHA Series

Unit(mm)

Marking : BROWN SLEEVE, WHITE INK

∅D	5	6.3	8	10	12.5	16	18	22
∅d	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0
∅D'	∅D + 0.5 max.							
L'	L + 1.5 max.				L + 2.0 max.			

## RATINGS OF NHA Series

$\mu F \backslash V_{DC}$	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450	500
1						5×11 13	5×11 15	5×11 16	5×11 12 6.3×11 14	5×11 13 6.3×11 15	5×11 15 6.3×11 17	6.3×11 18	6.3×11 19	6.3×11 14	
2.2						5×11 18	5×11 19	5×11 21	5×11 17 6.3×11 20	6.3×11 24	6.3×11 27	6.3×11 28 8×11.5 29	6.3×11 28 8×11.5 30	6.3×11 22 8×11.5 25	8×11.5 22
3.3						5×11 30	5×11 33	5×11 34	6.3×11 35	6.3×11 36	6.3×11 37	6.3×11 38 8×11.5 38	8×11 39 10×12.5 41	8×11 30 10×12.5 35	10×12.5 29
4.7				5×11 25	5×11 27	5×11 37	5×11 39	5×11 40	6.3×11 41	6.3×11 43	6.3×11 44 8×11.5 45	8×11.5 45	8×11.5 46 10×12.5 48	10×12.5 38	10×12.5 36
6.8				5×11 31	5×11 33	5×11 44	5×11 48	5×11 49	8×11.5 52	8×11.5 54	8×11.5 56	10×12.5 58	10×12.5 59	10×16 54	10×16 50
10			5×11 35	5×11 37	5×11 40	5×11 54	5×11 59	5×11 59	8×11.5 60	8×11.5 62	10×12.5 67	10×16 73	10×16 79	10×16 70	12.5×16 66
22		5×11 48	5×11 53	5×11 56	5×11 67	5×11 79	5×11 87	6.3×11 100	10×12.5 101	10×12.5 102	10×16 117	12.5×16 138	10×25 157	12.5×20 125	16×20 123
33	5×11 52	5×11 56	5×11 60	5×11 75	5×11 80	5×11 97	6.3×11 122	8×11.5 144	10×16 143	10×16 145	12.5×16 169	12.5×25 189	16×20 210	12.5×30 189	16×25 165
47	5×11 61	5×11 66	5×11 77	5×11 80	5×11 101	6.3×11 133	6.3×11 146	8×11.5 171 8×15 189	10×20 202	12.5×16 206	12.5×20 218	16×20 246	16×25 280	16×25 222	18×25 188
68	5×11 69	5×11 83	5×11 92	5×11 113	5×11 122 6.3×11 138	6.3×11 156	8×11.5 207	10×12.5 239	12.5×16 252	12.5×20 265	16×20 300	16×25 322	16×31.5 376	18×31.5 338	
100	5×11 90	5×11 100	5×11 125	5×11 141 6.3×11 159	6.3×11 168	8×11.5 229	8×11.5 216 10×12.5 251	10×16 321	12.5×25 360	16×20 366	16×25 405	16×35.5 447	18×35.5 453	22×30 414	
220	5×11 153	5×11 170	6.3×11 213	6.3×11 238	8×11.5 294	10×12.5 395	10×16 474	12.5×20 572	16×25 656	16×31.5 684	18×35.5 719	22×45 780			
330	6.3×11 216	6.3×11 239	6.3×11 265	8×11.5 340	8×11 360 8×15 398	10×16 529	10×20 633	16×20 810	18×31.5 848	18×35.5 866	22×35 880				
470	6.3×11 258	6.3×11 286	8×11.5 366	8×11.5 406 8×15 447	10×16 547	10×20 690	12.5×20 886	16×25 1,072	22×35 1,130	22×40 1,156					
680	8×11.5 365	8×11.5 405	8×11.5 413 8×15 455	10×16 620	12.5×16 777	12.5×20 973	12.5×25 1,160	16×31.5 1,364	22×45 1,463						
1,000	8×11.5 443	8×15 542	10×16 680	10×16 756	12.5×16 940	12.5×25 1,287	16×25 1,565	18×35.5 1,987							
2,200	10×16 772	10×20 886	12.5×16 1,019	12.5×20 1,188	16×20 1,394	16×31.5 1,724	18×35.5 1,938								
3,300	10×20 1,032	12.5×20 1,205	12.5×20 1,275	16×20 1,535	16×31.5 1,808	18×31.5 2,190									
4,700	12.5×20 1,280	12.5×25 1,492	16×20 1,610	16×25 1,865	18×31.5 2,262										
6,800	12.5×25 1,554	16×20 1,699	16×25 1,929	18×31.5 2,374	18×40 2,642										
10,000	16×25 1,897	16×31.5 2,082	18×31.5 2,365	18×35.5 2,649											
15,000	16×31.5 2,297														

Case Size  $\phi D \times L$ (mm)  
 Rated Ripple Current(mArms/105°C, 120Hz)

## RATED RIPPLE CURRENT MULTIPLIERS

Frequency Multipliers

Cap.( $\mu F$ ) \ Freq.(Hz)	60	120	300	1k	10k~
1~6.8	0.65	1.00	1.35	1.75	2.30
10~68	0.75	1.00	1.25	1.50	1.75
100~1,000	0.80	1.00	1.15	1.30	1.40
2,200~15,000	0.85	1.00	1.03	1.05	1.08

\* SMT Products are available upon request.  
 Please check with us about individual characteristics.