

## MHA Series

• 85°C 2,000Hrs assured.

- Non-solvent proof.
- 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 ~ 500 V <sub>DC</sub>																																									
Operating Temperature Range	-40 ~ +85°C	-25 ~ +85°C																																									
Capacitance Tolerance	±20% (M) (at 20°C, 120Hz)																																										
Leakage Current	After 1 minute: I = 0.03CV(µA) or 4µA, whichever is greater.	<table border="1"> <thead> <tr> <th colspan="2">After 1 minute</th> <th colspan="2">After 5 minutes</th> </tr> <tr> <th>CV ≤ 1,000</th> <th>CV &gt; 1,000</th> <th>CV ≤ 1,000</th> <th>CV &gt; 1,000</th> </tr> </thead> <tbody> <tr> <td>0.1CV + 40</td> <td>0.04CV + 100</td> <td>0.03CV + 15</td> <td>0.02CV + 25</td> </tr> </tbody> </table>	After 1 minute		After 5 minutes		CV ≤ 1,000	CV > 1,000	CV ≤ 1,000	CV > 1,000	0.1CV + 40	0.04CV + 100	0.03CV + 15	0.02CV + 25																													
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CV ≤ 1,000	CV > 1,000	CV ≤ 1,000	CV > 1,000																																								
0.1CV + 40	0.04CV + 100	0.03CV + 15	0.02CV + 25																																								
	After 2 minutes: I = 0.01CV(µA) or 3µA, whichever is greater.																																										
	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											
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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>200~250</th> <th>350~500</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>4</td> <td>8</td> <td>16</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>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>										Rated Voltage(V <sub>DC</sub> )	6.3	10	16	25	35	50	63~100	160	200~250	350~500	Z(-25°C)/Z(20°C)	5	4	3	2	2	2	3	4	8	16	Z(-40°C)/Z(20°C)	12	10	8	5	4	3	4	-	-	-
	Rated Voltage(V <sub>DC</sub> )	6.3	10	16	25	35	50	63~100	160	200~250	350~500																																
	Z(-25°C)/Z(20°C)	5	4	3	2	2	2	3	4	8	16																																
Z(-40°C)/Z(20°C)	12	10	8	5	4	3	4	-	-	-																																	
	(at 120Hz)																																										
Load Life	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 85°C.																																										
	Capacitance change ≤ ±20% of the initial value																																										
	Tanδ ≤ 200% of the initial specified value Leakage current ≤ The initial specified value																																										
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied. 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.																																										
	Capacitance change ≤ ±20% of the initial value																																										
	Tanδ ≤ 200% of the initial specified value Leakage current ≤ The initial specified value (where, 200% for ≥ WV 160 V <sub>DC</sub> )																																										
Others	Satisfied characteristics KS C IEC 60384-4																																										

### DIMENSIONS OF MHA Series

Unit(mm)

Marking : BLACK SLEEVE, WHITE INK

	5	6.3	8	10	12.5	16	18	22
øD	5	6.3	8	10	12.5	16	18	22
ød	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
øD'	øD + 0.5 max.							
L'	L + 1.5 max.				L + 2.0 max.			

※ ø8 x 9L, øD' ≤ D + 0.5 and L ≤ L + 1.0

## RATINGS OF MHA Series

$\mu F$	$V_{DC}$	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450	500
1							5×11 22	5×11 24	5×11 24	5×11 20 6.3×11 23	5×11 20 6.3×11 23	5×11 24 6.3×11 27	6.3×11 28	6.3×11 29	6.3×11 24	
2.2							5×11 34	5×11 35	5×11 37	5×11 29 6.3×11 33	5×11 34 6.3×11 39	6.3×11 41	6.3×11 43	6.3×11 44	6.3×11 34 8×11.5 40	8×11.5 34
3.3							5×11 41	5×11 43	5×11 44	6.3×11 46	6.3×11 47	6.3×11 48	6.3×11 48 8×11.5 56	6.3×11 51 8×11.5 59	8×11 46 10×12.5 54	8×11 43 10×12.5 50
4.7						5×11 35	5×11 48	5×11 53	5×11 55	6.3×11 56	6.3×11 57	6.3×11 58 8×11.5 66	8×11.5 68	8×11 70 10×12.5 73	10×12.5 65	10×16 68
6.8						5×11 46	5×11 59	5×11 63	5×11 64	6.3×11 67 8×11.5 78	6.3×11 69 8×11.5 80	8×11.5 82	8×11 79 10×12.5 92	10×12.5 95	10×16 83	10×16 78
10			5×11 39	5×11 49	5×11 53	5×11 71	5×11 76	5×11 76	5×11 76	6.3×11 78 8×11.5 82	8×11.5 96	8×11 97 10×12.5 113	10×12.5 106	10×16 123	12.5×16 111	12.5×16 101
22		5×11 52	5×11 68	5×11 73	5×11 80	5×11 106	5×11 113	6.3×11 130	10×12.5 136	10×12.5 152	10×16 182	12.5×16 205	10×25 229	16×20 216	16×20 140	
33	5×11 41	5×11 70	5×11 80	5×11 83	5×11 100	5×11 129 8×9 98	6.3×11 159	8×11.5 187	10×16 224	10×16 226	12.5×16 262	12.5×20 275	12.5×20 294	16×20 297	16×25 204	
47	5×11 59	5×11 88	5×11 120	5×11 126	5×11 138 8×9 98	6.3×11 177 8×9 110	6.3×11 190	8×11 223 8×15 246	10×16 277	12.5×16 315	12.5×20 340	16×20 395	16×20 407	16×25 368	18×25 233	
68	5×11 90	5×11 110	5×11 130	5×11 151	5×11 168 6.3×11 191	6.3×11 213	8×11.5 269	10×12.5 311	12.5×16 377	12.5×20 441	16×20 490	16×25 500	16×25 522	16×31.5 544	18×31.5 269	
100	5×11 135	5×11 150	5×11 170	5×11 184 8×9 115	6.3×11 231	8×11.5 306	8×11.5 321	10×16 416	12.5×20 496	16×20 543	16×20 550	16×31.5 674	18×31.5 698	18×35.5 620		
220	5×11 211	5×11 229 8×9 150	5×11 256 6.3×11 290	6.3×11 318	8×11.5 405	10×12.5 506	10×16 615	12.5×20 742	16×25 906	16×31.5 1,029	18×31.5 1,040	22×35 1,074	22×45 1,150			
330	5×11 262 6.3×11 297	6.3×11 322	6.3×11 360	8×11.5 453	8×11 494 8×15 547	10×16 706	10×20 823	12.5×25 987	18×31.5 1,304	18×31.5 1,281	22×35 1,333					
470	6.3×11 355 8×9 241	6.3×11 384	8×11.5 499	8×11 540 8×15 597	10×12.5 682	10×20 918	10×20 1,039	16×20 1,299	22×30 1,421	22×35 1,459						
680	8×11.5 503	8×11.5 546	8×11 584 8×15 655	10×16 826	10×16 909	12.5×16 1,190	12.5×25 1,512	16×31.5 1,587	22×40 1,680							
1,000	8×11.5 610	8×11 679 8×15 751	10×12.5 840	10×16 1,007	10×20 1,163	12.5×25 1,715	16×20 1,724	18×31.5 1,932								
2,200	10×16 1,059	10×16 1,129	10×20 1,340	12.5×30 1,651	12.5×30 1,933	16×31.5 2,320	18×31.5 2,654									
3,300	10×20 1,350	10×25 1,657	10×30 1,804	12.5×30 2,159	16×25 2,314	18×31.5 3,118										
4,700	12.5×20 1,822	12.5×20 1,929	16×20 2,200	16×25 2,464	16×35.5 3,061											
6,800	12.5×20 2,235	12.5×30 2,545	16×25 2,690	16×31.5 2,992												
10,000	16×20 2,571	16×25 2,742	16×31.5 3,420													
15,000	16×31.5 3,453	18×31.5 3,707														

Case Size  $\phi D \times L$ (mm)  
 Rated Ripple Current(mArms/85°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

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