



MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

MHA Series

• 85°C 2,000Hrs assured

- Non-solvent proof.
- Downsized of SHL series.
- For Digital Household Appliance
- RoHS compliant.
- Halogen-free capacitors are also available.



SPECIFICATIONS

Item	Characteristics																																											
Rated Voltage Range	6.3 ~ 100 V _{DC}	160 ~ 500 V _{DC}																																										
Operating Temperature Range	-40 ~ +85°C	-25 ~ +85°C																																										
Capacitance Tolerance	±20% (M) (at 20°C, 120Hz)																																											
Leakage Current	After 1 minute: 0.03 CV(µA) or 4 µA, whichever is greater	<table border="1"> <tr> <th colspan="2">After 1 minute</th> <th colspan="2">After 5 minutes</th> </tr> <tr> <td>CV ≤ 1,000</td> <td>CV > 1,000</td> <td>CV ≤ 1,000</td> <td>CV > 1,000</td> </tr> <tr> <td>0.1CV + 40</td> <td>0.04CV + 100</td> <td>0.03CV + 15</td> <td>0.02CV + 25</td> </tr> </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																														
	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																																									
	After 2 minutes: 0.01 CV(µA) or 3 µA, whichever is greater																																											
	Where, C = Nominal capacitance(µF) V = Rated Voltage(V _{DC}) (at 20°C)																																											
Dissipation Factor (Tanδ)	<table border="1"> <tr> <th>Rated Voltage(V_{DC})</th> <td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td><td>160~250</td><td>350~500</td> </tr> <tr> <th>Tanδ(Max.)</th> <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> </table>											Rated Voltage(V _{DC})	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 _{DC})	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"> <tr> <th>Rated Voltage(V_{DC})</th> <td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63~100</td><td>160</td><td>200~250</td><td>350~500</td> </tr> <tr> <th>Z(-25°C)/Z(20°C)</th> <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> <th>Z(-40°C)/Z(20°C)</th> <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> </table>											Rated Voltage(V _{DC})	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 _{DC})	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 _{DC})																																											
Others	Satisfied characteristics KS C IEC 60384-4																																											

DIMENSIONS OF MHA Series

Unit (mm)

Marking : BLACK SLEEVE, WHITE INK

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

μF \ Vdc	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450	500
0.1						5×11 5.5	5×11 6.2	5×11 6.5							
0.22						5×11 8	5×11 9	5×11 11							
0.33						5×11 10	5×11 11	5×11 13							
0.47						5×11 15	5×11 16	5×11 17	6.3×11 18	6.3×11 18	6.3×11 19	6.3×11 20	6.3×11 20		
0.68						5×11 18	5×11 19	5×11 19	6.3×11 21	6.3×11 21	6.3×11 22	6.3×11 23	6.3×11 23		
1						5×11 22	5×11 24	5×11 24	6.3×11 23	6.3×11 23	6.3×11 27	6.3×11 28	6.3×11 29	6.3×11 24	6.3×11 20
2.2						5×11 34	5×11 35	5×11 37	6.3×11 33	6.3×11 39	6.3×11 41	6.3×11 43	6.3×11 44	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	8×11.5 56	8×11.5 59	10×12.5 54	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 55	8×11.5 66	8×11.5 68	10×12.5 73	10×16 72	10×16 68
6.8					5×11 46	5×11 59	5×11 63	5×11 64	8×11.5 78	8×11.5 80	8×11.5 82	10×12.5 92	10×16 100	10×20 90	10×20 85
10			5×11 39	5×11 49	5×11 53	5×11 71	5×11 76	5×11 76	8×11.5 82	8×11.5 96	10×12.5 113	10×16 118	10×20 134	12.5×20 120	12.5×20 110
22		5×11 52	5×11 68	5×11 73	5×11 80	5×11 106	5×11 113	6.3×11 130	10×16 150	10×16 168	10×20 198	12.5×20 233	12.5×20 229	16×20 216	16×20 140
33	5×11 41	5×11 70	5×11 76	5×11 83	5×11 100	5×11 129 8×9 98	6.3×11 159	8×11.5 187	10×20 243	10×20 245	12.5×20 286	12.5×25 300	12.5×25 321	16×20 297	16×31.5 220
47	5×11 59	5×11 88	5×11 98	5×11 126	5×11 138 8×9 98	6.3×11 177 8×9 110	6.3×11 190	8×15 246	10×20 301	12.5×20 343	12.5×25 371	16×20 395	16×25 437	16×31.5 397	18×31.5 247
68	5×11 90	5×11 110	5×11 130	5×11 151	5×11 184 8×9 115	6.3×11 231	8×11.5 306	8×11.5 321	10×16 416	12.5×25 541	16×20 543	16×25 572	16×35.5 688	18×35.5 720	18×40 630
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	12.5×25 541	16×20 543	16×25 572	16×35.5 688	18×35.5 720	18×40 630	
220	5×11 211	5×11 229 8×9 150	6.3×11 290 8×9 290	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	18×35.5 1,061	22×40 1,100	22×45 1,150		
330	6.3×11 297 8×9 170	6.3×11 322	6.3×11 360	8×11.5 453	8×15 547	10×16 706	10×20 823	12.5×25 987	18×31.5 1,304	18×35.5 1,324	22×40 1,366				
470	6.3×11 355 8×9 241	6.3×11 384	8×11.5 499	8×15 597	10×16 753	10×20 918	10×20 1,039	16×25 1,394	22×35 1,457	22×40 1,494					
680	8×11.5 503	8×11.5 546	8×15 655	10×16 826	10×20 988	12.5×20 1,296	12.5×25 1,512	16×35.5 1,620	22×40 1,680						
1,000	8×11.5 610	8×15 751	10×16 928	10×20 1,094	10×20 1,163	12.5×25 1,715	16×25 1,850	18×35.5 1,995							
2,200	10×16 1,059	10×20 1,226	10×20 1,340	12.5×25 1,800	12.5×35 2,055	16×31.5 2,320	18×35.5 2,740								
3,300	10×20 1,350	10×25 1,657	10×30 1,804	12.5×30 2,159	16×31.5 2,498	18×35.5 3,218									
4,700	12.5×20 1,822	12.5×25 2,103	16×20 2,200	16×25 2,464	16×35.5 3,061	← Case Size $\phi D \times L$ (mm) ← Rated Ripple Current (mA rms / 85°C, 120Hz)									
6,800	12.5×20 2,235	12.5×35 2,706	16×25 2,690	16×31.5 2,992											
10,000	16×25 2,760	16×31.5 2,960	16×35.5 3,490												
15,000	16×31.5 3,453	18×35.5 3,826													

RATED RIPPLE CURRENT MULTIPLIERS

Frequency Multipliers

Cap. (μF) \ Freq. (Hz)	60	120	300	1k	10k ~
~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