Data Sheet

Customer: _____

Product: Aluminum Electrolytic Capacitors – AEHP Series

AEC-Q200 version available

Size : 22x25mm ~ 40x70mm

Issued Date: 16-Oct-2023

Edition: Ver. 1

Record of change

Date	Ver.	Description	Page
16-Oct-2023	1		

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Prepared by	Checked by	Approved by	Accepted by (customer)
16-Oct-2023	16-Oct-2023	16-Oct-2023	
Andy Hsu	***Hwa Wu***	***Hwa Wu***	

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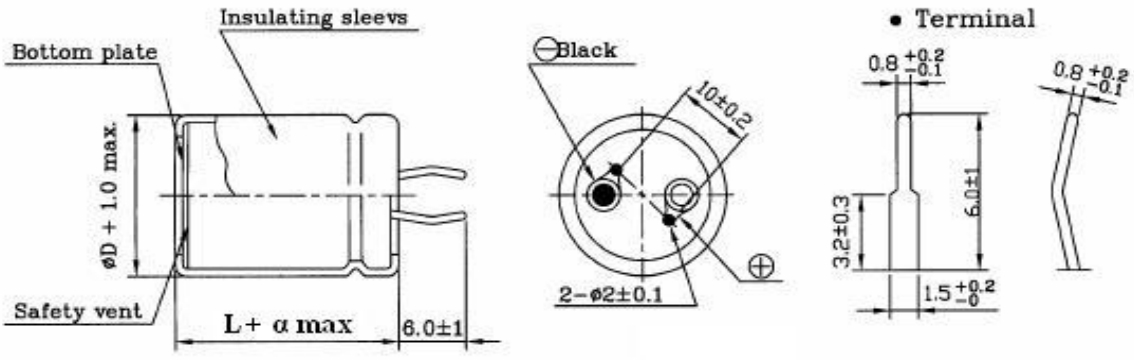
- 105℃ 2000 hours assured load life.
- Directly mountable on printed circuit board without holders.
- Rohs compliant
- Aluminum case designed explosion-proof vent.
- AEC-Q200 version available

Characteristics

Voltage Range	10 ~ 100V			160 ~ 450V				
Capacitance Range	560 ~ 47000uF			47 ~ 2200uF				
Temperature Range	-40 ~ +105℃			-25 ~ +105℃				
Capacitance Tolerance	±20% at 120Hz , 20℃(10% Tol. is available upon request)							
Leakage Current	$I = 3\sqrt{CV}$ (uA) max C: Capacitance, V:W.V. (After 5 minutes)							
Dissipation Factor (tanδ) (at 20℃, 120Hz)	Less than the value under table (%)							
	uF \\ W.V.	10 ~ 16	25～35	50～63	80～100	160～250	315～450	500
	47 ～ 390	--	--	--	15	15	20	25
	470 ～3900	25	20	20	20	15	20	25
	4700～8200	35	30	30	25	--	--	--
	10000～22000	40	35	30	--	--	--	--
	27000～47000	45	40	35	--	--	--	--
	56000～68000	50	45	--	--	--	--	--
Stability at Low Temperature	Impedance ration at 120Hz between the -25℃ or -40℃ value and 20℃ value shall not exceed :							
	RWC (V)	10～16	25	35～100	160	200～250	350～450	500
	Z-25℃/Z 20℃	5	4	4	4	4	8	10
	Z-40℃/Z 20℃	15	15	12	--	--	--	--
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20℃ after rated working voltage applied for 2,000 hours at max. operating temperature with the rated ripple current.							
	Capacitance change ≦±20% of the initial value. Dissipation factor ≦±200% of the initial specified value Leakage current ≦The initial specified value.							
Shelf Life	After storage for 1000 hours at 105℃ with no voltage applied, the capacitor shall meet the specified limit in load life. Pre-treatment for measurement shall be conducted after application of DC working voltage for 30 minutes.							

Diagram of Dimensions: unit(mm)



Multiplier for Ripple Current VS Frequency

Cap.(uF)\\ (Hz)	50(60)	120	400	1K	10K	50K-100K
10＜Cap.≦100	0.8	1	1.23	1.36	1.48	1.53
100＜Cap.≦1000	0.8	1	1.16	1.25	1.35	1.38
1000＜Cap.	0.8	1	1.11	1.17	1.25	1.28

Dia	22 ~ 25	30 ~ 40
α	2	3

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Standard Products Table

W.V.	10								16							
Dimension	A		B		C		D		A		B		C		D	
Cap. (uF)	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC
10000	22x30	2.20	25x25	2.20	30x25	2.20			22x30	2.97	25x25	2.97				
12000	22x30	2.34	22x35	2.49	25x25	2.40			22x35	3.06	25x30	3006	30x25	3.06		
15000	22x35	2.76	25x25	2.60	25x30	2.76	30x25	2.80	22x40	3.24	25x35	3.24	30x25	3.24	35x20	3.24
18000	22x35	2.94	25x30	2.94					22x50	3.51	25x45	3.51	30x35	3.51	35x30	3.54
22000	22x40	3.12	25x35	3.12	30x30	3.30	35x25	3.20	25x45	4.08	30x35	4.08	35x30	4.08		
27000	22x45	3.48	25x35	3.48	30x30	3.48	35x25	3.48	25x50	4.30	30x40	4.30	35x30	4.30		
33000	25x45	3.72	30x35	3.72	35x25	3.65	35x30	3.85	30x45	4.83	35x35	4.83				
39000	25x50	4.10	30x40	4.10	35x30	4.10			30x50	5.78	35x40	5.78				
47000	30x45	4.38	35x35	4.38					35x45	6.32						
56000	30x50	4.64	35x40	4.64					35x50	7.05						
68000	35x50	4.80														

W.V.	25								35							
Dimension	A		B		C		D		A		B		C		D	
Cap. (uF)	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC
4700	22x25	1.88							22x30	2.42	25x25	2.44				
5600	22x30	2.25							22x35	2.89	25x30	2.89	30x25	2.89		
6800	22x30	2.60	25x25	2.60					22x40	3.24	25x35	3.24	30x30	3.43	35x25	3.24
8200	22x35	3.14	25x30	3.14	30x25	3.14			22x50	3.57	25x40	3.57	30x30	3.57	35x25	3.57
10000	22x40	3.50	25x35	3.50	30x30	3.50	35x25	3.50	25x45	3.96	30x35	3.96	35x25	3.75	35x30	4.00
12000	22x45	4.02	25x40	4.02	30x30	4.02	35x25	4.02	25x50	4.21	30x40	4.21	35x30	4.21		
15000	25x45	4.58	30x35	4.58	35x30	4.58			30x45	4.69	35x35	4.69				
18000	25x50	4.82	30x40	4.82	35x35	4.82			35x40	5.07						
22000	30x45	5.12	35x35	5.12					35x50	5.50	35x45	4.95				
27000	35x40	5.30	35x45	5.47												
33000	35x50	6.09														

W.V.	50								63							
Dimension	A		B		C		D		A		B		C		D	
Cap. (uF)	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC
2200	22x30	1.65	25x25	1.65	30x25	1.65			22x35	1.65	25x30	1.65	30x25	1.65		
2700	22x35	1.97	25x30	1.98					22x40	2.07	25x35	2.07	30x25	2.07		
3300	22x35	2.24	25x30	2.24	30x25	2.24			22x45	2.46	25x35	2.40	30x30	2.48	35x25	2.48
3900	22x40	2.54	25x35	2.54	30x25	2.49	30x30	2.66	25x40	2.92	30x35	3.05	35x25	3.05		
4700	22x45	2.95	25x40	3.01	30x30	2.95	35x25	2.95	25x50	3.43	30x40	3.43	35x30	3.43		
5600	22x50	3.10	25x45	3.15	30x35	3.14	35x30	3.20	30x40	3.86	35x35	3.86				
6800	25x50	3.35	30x40	3.26	35x30	3.26	25x45	3.23	30x50	4.64	35x40	4.64				
8200	30x45	3.58	35x35	3.58					35x45	5.05						
10000	30x50	4.11	35x40	4.11					35x50	5.75						
12000	35x45	4.62														
15000	35x50	5.05														

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Standard Products Table

W.V.	80								100							
Dimension	A		B		C		D		A		B		C		D	
Cap. (uF)	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC
470	22x25	0.63							22x25	0.79						
560	22x25	0.70	22x30	0.75					22x30	0.97	25x25	0.97				
680	22x25	0.81	22x30	0.87	25x25	0.86			22x30	1.02	25x25	1.02				
820	22x30	1.02	25x25	1.02					22x30	1.26	25x25	1.26				
1000	22x35	1.16	25x30	1.16	30x25	1.16			22x35	1.38	25x25	1.38				
1200	22x35	1.46	25x30	1.46	30x25	1.46			22x40	1.65	25x35	1.65	30x30	1.65		
1500	22x40	1.74	25x35	1.74	30x25	1.74			22x45	1.83	25x40	1.83	30x30	1.83	35x25	1.83
1800	22x45	1.95	25x40	1.95	30x30	1.95	35x25	1.95	25x40	2.52	30x35	2.52	35x30	2.52		
2200	22x50	2.25	25x45	2.31	30x35	2.31	35x25	2.25	25x50	3.03	30x40	3.03	35x30	3.03		
2700	25x50	2.70	30x40	2.70	35x30	2.70	35x35	2.85	30x45	4.10	35x35	4.10				
3300	25x50	3.30	30x40	3.30	35x35	3.30			30x50	4.59	35x40	4.59				
3900	30x50	3.90	35x40	3.90					35x45	4.98						
4700	30x50	4.29	35x40	4.29					35x50	5.43						
5600	30x50	5.10	35x45	5.10												
6800	35x50	5.66														

W.V.	160								200							
Dimension	A		B		C		D		A		B		C		D	
Cap. (uF)	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC
220	22x25	0.42							22x25	0.92						
270	22x25	0.74							22x30	1.03	25x25	1.03				
330	22x30	0.98	25x25	0.98					22x35	1.21	25x30	1.21	30x25	1.21		
390	22x35	1.15	25x30	1.10	30x25	1.10			22x40	1.41	25x35	1.43	30x30	1.45		
470	22x35	1.21	25x30	1.21	30x25	1.21			22x40	1.62	25x30	1.62	35x25	1.65		
560	22x40	1.40	25x35	1.40	30x30	1.40	35x25	1.40	22x45	1.81	25x40	1.85	30x30	1.85	35x25	1.85
680	22x45	1.64	25x40	1.67	30x35	1.75	35x30	1.80	22x50	2.04	25x40	2.07	30x30	2.04		
820	25x45	1.85	30x35	1.85	35x30	1.85			22x55	2.12	25x50	2.17	30x35	2.17	35x30	2.17
1000	25x45	2.15	30x40	2.15	35x30	2.15			30x45	2.75	35x40	2.75				
1200	25x55	2.46	30x45	2.46	35x35	2.46			30x50	3.00	35x40	3.00				
1500	30x50	2.80	35x40	2.80					35x50	3.46						
1800	30x50	3.13	35x40	3.13					35x50	4.01						
2200	35x50	3.39							35x60	4.39						

W.V.	250								350							
Dimension	A		B		C		D		A		B		C		D	
Cap. (uF)	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC
100	22x30	0.44	25x25	0.44					22x30	0.69	25x30	0.69				
150	22x30	0.60	25x25	0.60					22x40	0.82	25x35	0.82				
180	22x30	0.69	25x25	0.69					25x30	0.82	30x25	0.82				
220	22x30	1.00	25x25	1.00					22x50	1.00	25x40	1.00	30X30	1.00	35X25	1.00
270	22x40	1.15	25x30	1.15	30x25	1.01			25x45	1.17	30x35	1.17	35x25	1.12		
330	22x40	1.28	25x30	1.28	30x25	1.05			30x40	1.35	35x35	1.35	25x50	1.20		
390	22x45	1.48	25x35	1.48	30x30	1.48	35x25	1.11	30x45	1.40						
470	22x50	1.76	25x40	1.76	30x30	1.76	35x25	1.17	35x40	1.70						
560	25x50	1.93	30x40	1.93	35x30	1.93			35x40	1.69						
680	25x50	2.22	30x40	2.22	35x35	2.22										
820	30x50	2.48	35x40	2.48												
1000	35x45	2.80														
1200	35x50	3.17														
1500	35x50	3.18														

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Standard Products Table

W.V.	400								450							
Dimension	A		B		C		D		A		B		C		D	
Cap. (uF)	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC	Size	RC
47	22x25	0.56							22x25	0.35						
56	22x25	0.63							22x30	0.41	25x25	0.41				
68	22x25	0.72							22x30	0.43	25x25	0.43				
82	22x30	0.77	25x30	0.82	30x25	0.85			22x35	0.45	25x25	0.45	30x25	0.45		
100	22x35	0.82	25x25	0.61	25x30	0.82	30x25	0.82	22x40	0.74	25x25	0.62	25x30	0.74		
120	22x35	0.90	25x30	0.90	30x25	0.90			22x45	0.82	25x35	0.82	30x30	0.82		
150	22x40	0.98	25x30	0.95	25x40	0.98	35x25	0.95	22x50	0.96	25x40	0.96	30x35	0.96	35x25	0.96
180	22x45	1.14	25x40	1.14	30x35	1.14	35x30	1.14	25x45	1.14	30x35	1.14	35x30	1.14		
220	22x50	1.21	25x45	1.21	30x35	1.21	35x30	1.21	25x45	1.20	30x35	1.20	30x40	1.24	35x35	1.24
270	25x50	1.40	30x45	1.40	35x35	1.40			25x50	1.21	30x50	1.48	35x40	1.48		
330	30x50	1.57	35x40	1.57					30x50	1.64	35x45	1.64	35x30	1.27		
390	30x50	1.71	35x40	1.71					30x50	1.64	35x50	1.86				
470	30x50	1.98	35x45	1.98	35x40	1.78			35x50	1.70	35x40	1.71				
560	35x50	2.23	35x40	1.86					35x45	1.96	40x40	2.02				
680	35x50	2.25	40x40	2.22					35x55	2.35	40x45	2.33				
820	35x55	2.58	40x50	2.67					40x60	2.62						
1000	35x65	2.90	40x55	2.92					40x70	3.03						
1200	35x75	3.39	40x60	3.31					40x70	3.54						

Unit : (mm)

Ripple Current (A, rms) at 105℃ 120Hz

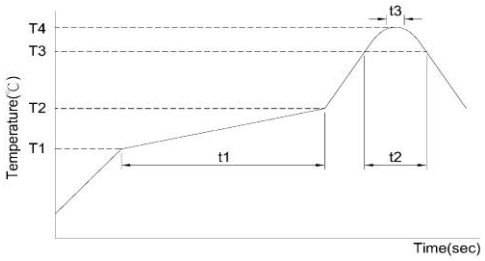
Part Numbering Designation

AEHP	101	M	2G	B	A
SERIES	CAPACITANCE	TOL.	W.V.	PACKAGE	SIZE
	IN 3DIGITS	M= ± 20%	16= 16V	B= Bulk	A= A Size
	101= 100uF	K= ± 10%	25= 25V		B= B Size
	102= 1000uF		35= 35V		C= C Size
	103= 10,000uF		50= 50V		D=D Size
			63= 63V		
			80= 80V		
			2A= 100V		
			2C= 160V		
			2D= 200V		
			2E= 250V		
			2V= 350V		
			2G= 400V		
			2W= 450V		

Reliability for Car- Tronics AEC Q-200_REV D

Endurance Characteristic:

No.	Item	Conditions	Specification		Reference
1	High Temperature Load Life Test	Capacitor is placed in the highest temperature with rated voltage for 5000+72/-0Hrs.	Capacitance change	Within ±30% of initial value	MIL-STD-202 Method 108
			Tanδ	Less than 300% of specified value	
			Leakage Current	Within specified value	
			Appearance	No abnormality	
2	High Temperature Exposure (Storage)	Capacitor is placed in the highest temperature for 1000+48/-0Hrs.	Capacitance change	Within ±30% of initial value	MIL-STD-202 Method108
			Tanδ	Less than 300% of specified value	
			Leakage Current	Within specified value	
			Appearance	No abnormality	
3	Temperature Cycling	Step1: Max. rated temperature±3/-3℃(30±3mins) Step2: Min. rated temperature±3/-3℃(30±3mins) Max.transfer time: 1min According to the step1 to step2, and do 1000cycles	Capacitance change	Within ±10% of initial value	JESD22 Method JA-104
			Tan δ	Within specified value	
			Leakage Current	Within specified value	
			Appearance	No abnormality	
4	Biased Humidity	Capacitor is placed at the temperature of 85±3℃, and humidity of 85% with rated voltage for 1000Hrs	Capacitance change	Within ±20% of initial value	MIL-STD-202 Method 103
			Tanδ	Less than 150% of specified value	
			Leakage Current	Within specified value	
			Appearance	No abnormality	
5	Physical Dimension		Appearance	No abnormality	JESD22 Method JB-100
6	Resistance To Solvent	1.The capacitor shall be immersed into the isopropyl. 2.Immersion time: 3 +0.5/-0 minutes at 25±5℃. 3.Use wool brush to brush capacitor for 10 times. Conduct the steps 1~3 for 3 cycles.	Print cannot fall off or ambiguous		MIL-STD-202 Method 215
7	Mechanical Shock	Capacitor is placed on the PCB and fixed.Conditions as below: Test items: For automobile Acceleration speed: 100g(1000 m/s²) Shocking direction: X-Y-Z three axles (6 planes) Duration(D)(ms): 6 Velocity(m/s): 3.75 Wave: Half sine Test times: 18times (3*6=18)	Capacitance change	Within ±10% of initial value	MIL-STD-202 Method 213
			Tanδ	Within specified value	
			Leakage Current	Within specified value	
			Appearance	No abnormality	
8	Vibration	Capacitor is placed in the PCB and fixed. Setting the acceleration (5g)and frequency (10-2000Hz) according to the test condition ,vibration 4Hrs from three directions (X-Y-Z).	Capacitance change	Within ±10% of initial value	MIL-STD-202 Method 204
			Tan δ	Within specified value	
			Leakage Current	Within specified value	
			Appearance	No abnormality	

<table>
<tr><th>No.</th><th>Item</th><th>Conditions</th><th colspan="2">Specification</th><th>Reference</th></tr>
<tr><td>9</td><td>Resistance to Soldering Heat</td><td>According to the Control standard operating of Jarson, test twice.
 

<table>
<tr><td colspan="2">Rated voltage (V)</td><td colspan="2">4~50</td><td>63 up</td><td colspan="2">4~100</td></tr>
<tr><td colspan="2">Case size (φ)</td><td colspan="2">4~6.3</td><td>4~6.3</td><td colspan="2">8~12.5</td></tr>
<tr><td rowspan="2">Preheat</td><td>Temp.(T1~T2,℃)</td><td colspan="5">150-180</td></tr>
<tr><td>Time (t1)(Max,secs)</td><td colspan="5">100</td></tr>
<tr><td rowspan="2">Duration</td><td>Temp.(T3,℃)</td><td>217</td><td>230</td><td>217</td><td>217</td><td>230</td></tr>
<tr><td>Time (t2)(Max,secs)</td><td>90</td><td>60</td><td>60</td><td>60</td><td>40</td></tr>
<tr><td rowspan="2">Peak</td><td>Temp.(T4,℃)</td><td colspan="2">260</td><td>250</td><td colspan="2">250</td></tr>
<tr><td>Time (t3,secs)</td><td colspan="5">5</td></tr>
<tr><td colspan="2">Reflow cycles</td><td colspan="5">2 or less</td></tr>
</table></td><td>Capacitance change</td><td>Within ±10% of initial value</td><td rowspan="4">MIL-STD- 202 Method 210</td></tr>
<tr><td></td><td></td><td>Tanδ</td><td>Within specified value</td></tr>
<tr><td></td><td></td><td>Leakage Current</td><td>Within specified value</td></tr>
<tr><td></td><td></td><td>Appearance</td><td>No abnormality</td></tr>
<tr><td>10</td><td>Solderability test (SMD)</td><td>Solderability test 1: Solder bath temperature: 235±5℃ Duration:5±0/-0.5s
Solderability test 2:Solder bath temperature:260±5℃ Duration:7±0.5s</td><td colspan="2">Sn is more than 95% in the surface of terminal</td><td>J-STD-002B</td></tr>
<tr><td>11</td><td>Electrical Characterization</td><td>Whether there is abnormality about electrical characterization in the test that under the ensurance temperature(the lowest ,the highest, atmospheric temperature).</td><td colspan="2">Appearance: No abnormality</td><td>User Spec.</td></tr>
<tr><td>12</td><td>Board Flex</td><td rowspan="4">Capacitor is placed in the PCB and pressed to deviate from Original fulcrum more than 2mm for 60（+5）s.</td><td>Capacitance change</td><td>Within ±10% of initial value</td><td rowspan="4">AEC-Q 200-005</td></tr>
<tr><td></td><td>Tanδ</td><td>Within specified value</td></tr>
<tr><td></td><td>Leakage Current</td><td>Within specified value</td></tr>
<tr><td></td><td>Appearance</td><td>No abnormality</td></tr>
<tr><td>13</td><td>Terminal Strength (SMD)</td><td rowspan="4">Test condition: Capacitor is placed in the PCB by solder paste and do high temperature test (Reflow) to endurance the power of 1.8kg for 60S,no dropping condition.</td><td>Capacitance change</td><td>Within ±10% of initial value</td><td rowspan="4">AEC-Q 200-006</td></tr>
<tr><td></td><td>Tanδ</td><td>Within specified value</td></tr>
<tr><td></td><td>Leakage Current</td><td>Within specified value</td></tr>
<tr><td></td><td>Appearance</td><td>No abnormality</td></tr>
<tr><td>14</td><td>Surge Voltage</td><td>Capacitor is placed at 15℃~35℃ with surge voltage for 30±5(charging) and 330s(discharging),do surge voltage test continuity for 1000 times.
Applying voltage:
<table>
<tr><td>W.V.</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr>
<tr><td>S. V.</td><td>7.3</td><td>11.5</td><td>18.4</td><td>28.8</td><td>40.3</td><td>57.5</td><td>72.5</td></tr>
<tr><td>W.V.</td><td>80</td><td>100</td><td>160</td><td>200</td><td>250</td><td>400</td><td>450</td></tr>
<tr><td>S. V.</td><td>92</td><td>115</td><td>184</td><td>230</td><td>288</td><td>440</td><td>495</td></tr>
</table></td><td>Capacitance change</td><td>Within ±20% of initial value</td><td rowspan="4">AEC-Q 200-007</td></tr>
<tr><td></td><td>Tanδ</td><td>Less than 175% of specified value</td></tr>
<tr><td></td><td>Leakage Current</td><td>Within specified value</td></tr>
<tr><td></td><td>Appearance</td><td>No abnormality</td></tr>
</table>