Data Sheet

Customer:

Product: Aluminum Electrolytic Capacitors – AEMRL Series

AEC-Q200 version available

Size : 4x7mm ~ 8x7mm

Issued Date: 16-Oct-2023

Edition: Ver. 1

Record of change

Date	Ver.	Description	Page
16-Oct-2023	1		

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16-Oct-2023	16-Oct-2023	16-Oct-2023	
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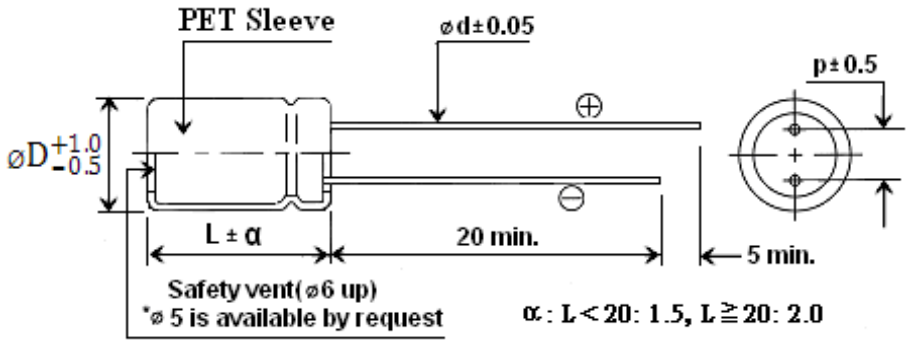
AEMRL SERIES

- Super Miniature and Low leakage current
- Designed for use in VCRs, car radios, Car stereos.
- Micro-cassette tape recorders, pocket calculators and watches.

Characteristics

Voltage Range	6.3 ~ 63V							
Capacitance Range	0.47 ~ 100uF							
Temperature Range	-40 ~ + 105℃							
Capacitance Tolerance	±20% at 120Hz , 20℃(10% Tol. is available upon request)							
Leakage Current	I≤0.002CV or 0.4uA, whichever is greater (After 3 minutes)							
Dissipation Factor	Rated Voltage (V)	6.3V	10V	16V	25V	35V	50V	63V
	Dissipation Factor(tanδ)max	0.24	0.20	0.16	0.14	0.12	0.10	0.10
	(at 20℃, 120Hz)							
Stability at Low Temperature	Impedance ration at 120Hz							
	Rated Voltage (V)	6.3V	10V	16V	25V	35V	50V	63V
	Z-25℃/Z 20℃	4	3	3	2	2	2	2
	Z-40℃/Z 20℃	10	6	6	4	4	4	3
Load Life	After the rated voltage has been applied for 1000 hours at 105℃	Capacitance change	Within ±20% of initial value					
		D.F. tanδ	200% or less of initial specified value					
		Leakage current	Less than 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



D §	4	5	6.3	8
p	1.5	2.0	2.5	3.5
d §	0.45			

Ripple Current Coefficients

Frequency (Hz)	50(60)	120	400	1K	≧10K
Cap.(uF) / Hz	Multiplier				
Cap. ≦ 10	0.65	1.0	1.20	1.30	1.50
10＜Cap.≦100	0.8	1.0	1.10	1.15	1.20

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AEMRL SERIES

Case Size of Standard Products & Maximum Ripple Current (mA rms 105℃ 120Hz)

WV / Cap.	6.3		10		16		25		35		50		63	
uF	Size	R.C.	Size	R.C.	Size	R.C.	Size	R.C.	Size	R.C.	Size	R.C.	Size	R.C.
0.47									→	→	4x7	7	4x7	7
1			ALL BLANK VOLTAGE ON SLEEVE MARKING IS SAME VOLTAGE "→" POINT TO						→	→	4x7	10	4x7	10
2.2									→	→	4x7	16	4x7	16
3.3									→	→	4x7	20	5x7	19
4.7									→	→	4x7	21	6.3x7	36
10			→	→	4x7	27	4x7	29	5x7	32	5x7	35		
22	→	→	4x7	36	4x7 5x7	36 40	5x7	44	6.3x7	49				
33	4x7	41	5x7	44	5x7	50	6.3x7	55	8x7	67				
47	5x7	44	5x7	49	6.3x7	62	8x7	74						
100	5x7	59	6.3x7	75										

Unit: mm

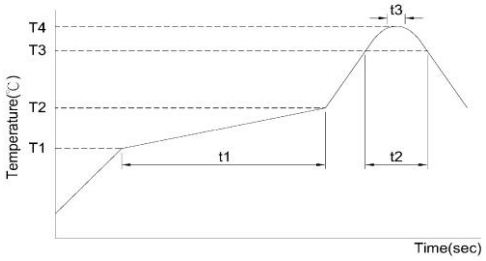
Part Numbering System

EMRL	101	M	25	A	–	T1
SERIES	CAPACITANCE	TOL.	W.V.	PACKAGE	SIZE	LEAD SPACE
	IN 3DIGITS	K= ± 10%	0J= 6.3V	B= Bulk	Omit if only	Omit if Bulk
	010= 1.0uF	M= ± 20%	10= 10V	C5= Cut 5mm	one size	T1= L/S 2.5mm Taped
	4R7= 4.7 uF		25= 25V	A= Ammo Pack	A=Smaller	TA= Lead forming space 5mm Taped
	101= 100uF		63= 63V	R= Tape&Reel	size	T35= L/S 3.5mm Taped
				F5= Lead formed & cut 5mm		T2=L/S 5mm Taped

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>Tanδ</td><td>Within specified value</td></tr>
<tr><td>Leakage Current</td><td>Within specified value</td></tr>
<tr><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-Q200-005</td></tr>
<tr><td>Tanδ</td><td>Within specified value</td></tr>
<tr><td>Leakage Current</td><td>Within specified value</td></tr>
<tr><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-Q200-006</td></tr>
<tr><td>Tanδ</td><td>Within specified value</td></tr>
<tr><td>Leakage Current</td><td>Within specified value</td></tr>
<tr><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-Q200-007</td></tr>
<tr><td>Tanδ</td><td>Less than 175% of specified value</td></tr>
<tr><td>Leakage Current</td><td>Within specified value</td></tr>
<tr><td>Appearance</td><td>No abnormality</td></tr>
</table>