Data Sheet

Customer:

Product: Aluminum Electrolytic Capacitors – AELR Series

AEC-Q200 version available

Size : 5x11mm ~ 13x26mm

Issued Date: 16-Oct-2023

Edition: Ver. 1

Record of change

Date	Ver.	Description	Page
16-Oct-2023	1		

HITANO ENTERPRISE CORP.

7F-7, No. 3, Wu Chuan 1st Road, New Taipei Industrial Park,
New Taipei City, TAIWAN, R.O.C.
Tel: +886 2 2299 1331 (Rep.)
Fax: +886 2 2298 2466, 2298 2969

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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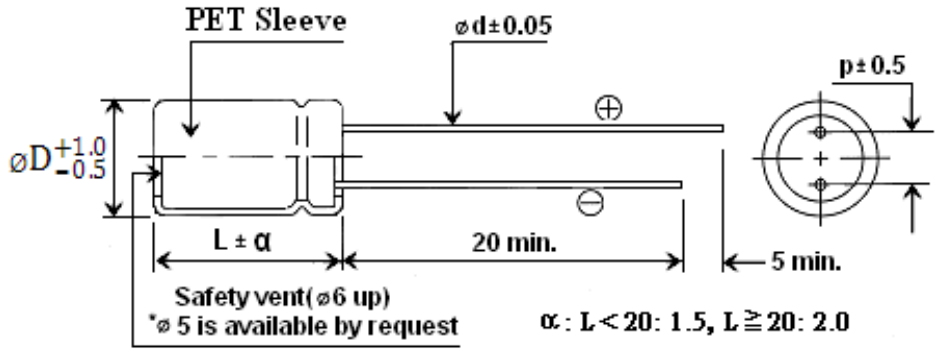
AELR SERIES

- ELR Series is developed for use where Low Leakage current is essential for as coupling of pre-amplifiers, Leakage current remains very low even after prolonged storage.
- AEC-Q200 version available

Characteristics

Voltage Range	6.3 ~ 63V							
Capacitance Range	0.47 ~ 1000uF							
Temperature Range	-40 ~ + 105℃							
Leakage Current	I = 0.002CV or 0.4uA, whichever is greater (After 3 minutes)							
Capacitance Tolerance	±20% at 120Hz , 20℃(10% Tol. is available upon request)							
Dissipation Factor (at 120Hz 20℃)	WV	6.3	10	16	25	35	50	63
	Dissipation Factor(tanδ)max	0.24	0.20	0.17	0.15	0.12	0.1	0.1
Stability at Low Temperature (Impedance ration at 120Hz)	Rated Voltage (V)	6.3	10	16	25	35	50	63
	Z-40℃/Z 20℃	4	3	3	2	2	2	2
	After rated voltage has been applied for 2000 hours at 105℃	Capacitance change	Within ±20% of initial value.					
		Dissipation factor	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



Unit: mm

D ϕ	5	6.3	8	10	13
P	2.0	2.5	3.5	5.0	5.0
d ϕ	0.5	0.5	0.5	0.6	0.6

Ripple Current Coefficients

Frequency (Hz)	50(60)	120	400	1K	10K	100K
Cap.(uF) / Hz	Multiplier					
Cap. ≦ 10	0.8	1	1.30	1.45	1.65	1.70
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

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AELR SERIES

Case Size and Maximum Ripple Current of Standard Products

§ DxL(mm) (mA, rms, 120HZ at 105℃)

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.
0.47-1	All blank voltage on sleeve marking is same as "→" point to								→		5x11	12	5x11	12
2.2									→		5x11	22	5x11	24
3.3									→		5x11	28	5x11	31
4.7									→		5x11	33	5x11	38
10					→		5x11	42	5x11	46	5x11	51	6.3x11	55
22			→		5x11	60	5x11	63	5x11	68	6.3x11	75	6.3x11	91
33			→		5x11	70	5x11	76	6.3x11	83	6.3x11	99	8x12	110
47	→		5x11	77	5x11	90	6.3x11	116	6.3x11	121	8x12	138	10x13	149
100	5x11	100	5x11	116	6.3x11	138	8x12	149	8x12	187	10x13	198	10x16	248
220	6.3x11	180	6.3x11	193	8x12	237	10x13	253	10x16	330	10x21	380	13x21	440
330	6.3x11	220	8x12	270	8x12	286	10x13	369	10x16	440	13x21	506	13x26	594
470	8x12	280	8x12	319	10x13	407	10x16	484	13x21	572	13x26	671		
1000	10x12	500	10x16	605	10x21	704	13x21	847	13x26	1012				
2200	13x21	665	13x21	860	13x26									

Unit: mm

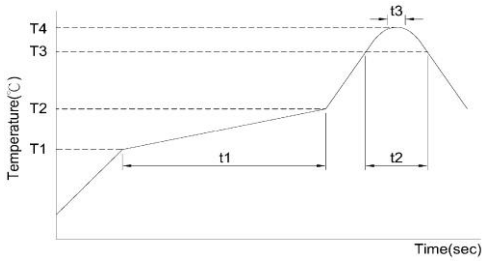
Part Numbering System

AELR	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
	102= 1000uF			F5= Lead formed & cut 5mm		T2=L/S 5mm Taped

Reliability for Car- Tronics AEC Q-200_REV D

Endurance Characteristic:

<table>
<tr><th>No.</th><th>Item</th><th>Conditions</th><th colspan="2">Specification</th><th>Reference</th></tr>
<tr><td rowspan="4">1</td><td rowspan="4">High Temperature Load Life Test</td><td rowspan="4">Capacitor is placed in the highest temperature with rated voltage for 5000+72/-0Hrs.</td><td>Capacitance change</td><td>Within ±30% of initial value</td><td rowspan="4">MIL-STD-202 Method 108</td></tr>
<tr><td>Tanδ</td><td>Less than 300% 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>
<tr><td rowspan="4">2</td><td rowspan="4">High Temperature Exposure (Storage)</td><td rowspan="4">Capacitor is placed in the highest temperature for 1000+48/-0Hrs.</td><td>Capacitance change</td><td>Within ±30% of initial value</td><td rowspan="4">MIL-STD-202 Method108</td></tr>
<tr><td>Tanδ</td><td>Less than 300% 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>
<tr><td rowspan="4">3</td><td rowspan="4">Temperature Cycling</td><td rowspan="4">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</td><td>Capacitance change</td><td>Within ±10% of initial value</td><td rowspan="4">JESD22 Method JA-104</td></tr>
<tr><td>Tan δ</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 rowspan="4">4</td><td rowspan="4">Biased Humidity</td><td rowspan="4">Capacitor is placed at the temperature of 85±3℃, and humidity of 85% with rated voltage for 1000Hrs</td><td>Capacitance change</td><td>Within ±20% of initial value</td><td rowspan="4">MIL-STD-202 Method 103</td></tr>
<tr><td>Tanδ</td><td>Less than 150% 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>
<tr><td>5</td><td>Physical Dimension</td><td></td><td>Appearance</td><td>No abnormality</td><td>JESD22 Method JB-100</td></tr>
<tr><td>6</td><td>Resistance To Solvent</td><td>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.</td><td colspan="2">Print cannot fall off or ambiguous</td><td>MIL-STD-202 Method 215</td></tr>
<tr><td rowspan="5">7</td><td rowspan="5">Mechanical Shock</td><td rowspan="5">Capacitor is placed on the PCB and fixed.Conditions as below:
<table>
<tr><td>Test items</td><td>For automobile</td></tr>
<tr><td>Acceleration speed</td><td>100g(1000 m/s²)</td></tr>
<tr><td>Shocking direction</td><td>X-Y-Z three axles (6 planes)</td></tr>
<tr><td>Duration(D)(ms)</td><td>6</td></tr>
<tr><td>Velocity(m/s)</td><td>3.75</td></tr>
<tr><td>Wave</td><td>Half sine</td></tr>
<tr><td>Test times</td><td>18times (3*6=18)</td></tr>
</table></td><td>Capacitance change</td><td>Within ±10% of initial value</td><td rowspan="5">MIL-STD-202 Method 213</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 rowspan="2">Appearance</td><td rowspan="2">No abnormality</td></tr>
<tr></tr>
<tr><td rowspan="4">8</td><td rowspan="4">Vibration</td><td rowspan="4">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).</td><td>Capacitance change</td><td>Within ±10% of initial value</td><td rowspan="4">MIL-STD-202 Method 204</td></tr>
<tr><td>Tan δ</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>
</table>

<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>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></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>13</td><td>Terminal Strength (SMD)</td><td>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></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>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></td><td></td><td>Tanδ</td><td>Less than 175% of 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>
</table>