Data Sheet

Customer:

Product: Aluminum Electrolytic Capacitors – AENR Series

AEC-Q200 version available

Size : 5x11mm ~ 16x32mm

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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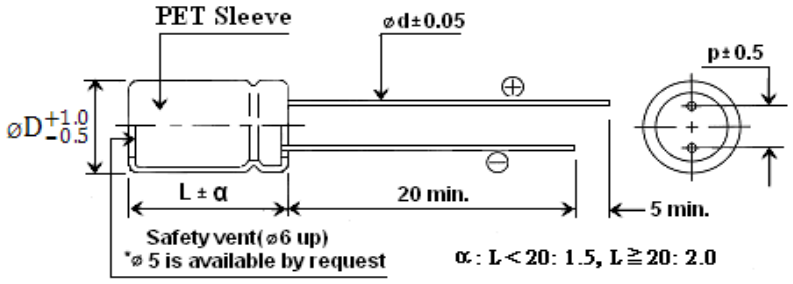
AENR SERIES

- These are non-polar capacitors designed for circuits with reversing polarity.
- Tolerance of ± 10% (K) if required can also be available on request.
- Life time 105℃ 2000 Hours
- AEC-Q200 version available

Characteristics

Voltage Range	10~100V							
Capacitance Range	0.47~3300uF							
Temperature Range	-40 ~ + 105℃							
Capacitance Tolerance	+20% -20% (at 20℃, 120Hz)							
Leakage Current	I=0.03C or 3uA max. (After 3 minutes)							
Dissipation Factor(tanδ) (at 20℃, 120Hz)	Rated voltage	10V	16V	25V	35V	50V	63V	100V
	tanδ	0.25	0.20	0.18	0.15	0.15	0.12	0.10
Stability at Low Temperature	Impedance ration at 120Hz							
	Rated Voltage (V)	10V	16V	25V	35V	50V	63V	100V
	Z-25℃/Z 20℃	3	2	2	2	2	2	2
	Z-40℃/Z 20℃	6	4	4	4	4	4	3
Load Life	After 2000hrs. application of DC rated working voltage at +105℃,with the polarity inverted every 250hrs,capacitors meet the characteristic of following requirements.		Capacitance change		≤±20% of initial measured value			
			D.F. (tanδ)		≤200% of initial specified value			
			Leakage current		≤200% of initial specified value			

Diagram of dimensions (Unit:mm)



Dϕ	4	5	6.3	8	10	13	16	18
p	1.5	2.0	2.5	3.5	5.0	5.0	7.5	7.5
dϕ	0.45	0.5	0.5	0.5	0.6	0.6	0.8	0.8

Ripple Current Coefficients

Frequency (Hz)	50(60)	120	400	1K	10K	100K
Cap.(uF) / Hz	Multiplier					
Cap. ≦ 10	0.75	1	1.30	1.55	2.0	2.0
10＜Cap.≦100	0.75	1	1.3	1.55	2.0	2.0
100＜Cap.≦1000	0.8	1	1.2	1.3	1.5	1.5
1000＜Cap.	0.85	1	1.10	1.10	1.15	1.15

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

WV / Cap.	10		16		25		35		50		63		100	
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 5x11	5 8	5x11	9	5x11	10
1									4x7 5x11	10 12	5x11	14	5x11	15
2.2							4x7	13	5x7 5x11	16 17	5x11	20	6.3x11	22
3.3					4x7	14	5x7	18	5x7 5x11	20 23	5x11	25	6.3x11	22
4.7			4x7	18	5x7	19	5x7	22	6.3x7 5x11	27 30	5x11	30	8x12	36
10			5x7 5x11	30 34	6.3x7 5x11	34 35	6.3x7 5x11	35 38	8x7 6.3x11	44 50	6.3x11	52	8x12	52
22	5x7	38	6.3x7 5x11	51 53	6.3x7 6.3x11	53 55	8x7 6.3x11	58 65	8x12	85	8x12	88	10x16	120
33	6.3x7	52	6.3x7 5x11	58 62	8x7 6.3x11	72 70	8x7 8x12	70 75	8x12	89	10x13	115	10x21	175
47	5x11	79	8x7 6.3x11	73 90	8x7 6.3x11	80 96	8x12	107	8x12	123	10x16	150	13x21	187
100	8x7 6.3x11	105 99	8x7 6.3x11	120 123	8x12	152	10x13	198	10x16	220	13x21	295	16x26	399
220	8x12	157	10x13	234	10x13	245	10x21	320	13x21	340	13x26	420	16x26	520
330	10x13	235	10x13	255	10x16	310	13x21	370	16x26	500	16x26	520		
470	10x13	290	10x16	360	13x21	420	13x26	495	16x32	590				
1000	10x21	430	13x21	511	16x26	1120	16x31	1270						
2200	16x26	830	16x32	950										
3300	16x32	1150												

Unit: mm

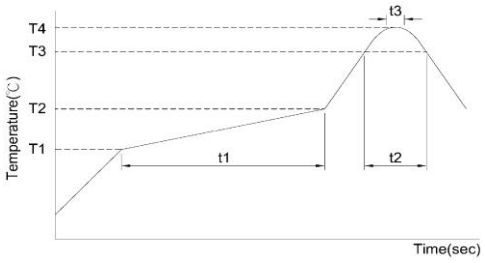
Part Numbering System

AENR	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=Size of	TA= Lead forming space 5mm Taped
	101= 100uF		63= 63V	R= Tape&Reel	7mm height	
	102= 1000uF		2A= 100V			T35= L/S 3.5mm Taped
				F5= Lead formed & cut 5mm		T2=L/S 5mm Taped
						T3= L/S 7.5mm 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>MIL-STD- 202 Method 210</td></tr>
<tr><td></td><td></td><td></td><td>Tanδ</td><td>Within specified value</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Leakage Current</td><td>Within specified value</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Appearance</td><td>No abnormality</td><td></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>AEC-Q 200-005</td></tr>
<tr><td></td><td></td><td></td><td>Tanδ</td><td>Within specified value</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Leakage Current</td><td>Within specified value</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Appearance</td><td>No abnormality</td><td></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>AEC-Q 200-006</td></tr>
<tr><td></td><td></td><td></td><td>Tanδ</td><td>Within specified value</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Leakage Current</td><td>Within specified value</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Appearance</td><td>No abnormality</td><td></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>AEC-Q 200-007</td></tr>
<tr><td></td><td></td><td></td><td>Tanδ</td><td>Less than 175% of specified value</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Leakage Current</td><td>Within specified value</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Appearance</td><td>No abnormality</td><td></td></tr>
</table>