Data Sheet

Customer:

Product: Hybrid Conductive Polymer Capacitors Radial Type
Endurance 105℃ 5,000Hours – AEHSD Series
AEC-Q200 version available
Size : 5x6mm ~ 10x20mm

Issued Date: 16-Oct-2023

Edition: Ver. 1

Record of change

Date	Ver.	Description	Page
16-Oct-2023	1	Add.	

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Prepared by	Checked by	Approved by	Accepted by (customer)
16-Oct-2023	16-Oct-2023	16-Oct-2023	
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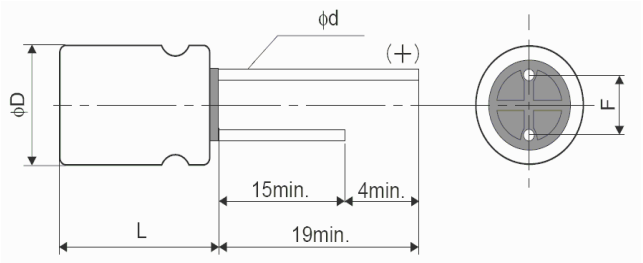
AEHSD SERIES

Features

- Hybrid Conductive Polymer Aluminum Solid Capacitor
- Ultra low ESR level and excellent performance at high frequency through low profile.
- Ideal capacitor for digital and high frequency devices.
- High heat resistance and high reliability.
- Load life 105℃ **5,000** hours assured.
- AEC-Q200 version available

Characteristics

Voltage Range	16 ~100VDC	
Capacitance Range	10uF ~ 2200uF	
Temperature Range	-55 ~ +105℃	
Capacitance Tolerance	M:±20% , (at 20℃ , 120Hz)	
Leakage Current	Capacitance(μF) x Rated Voltage(Vdc) After 2minutes, see standard rating	
Dissipation Factor (tanδ) 20℃ 120Hz	See standard rating	
ESR (at 100K~300K Hz, 20℃)	See standard rating	
Endurance (Rated Voltage at 105℃ 5000 h, restored to 20℃)	Appearance	≦No significant damage
	Capacitance Change (μF)	Within ±20% of initial measured value
	Dissipation Factor (tanδ)	≦150% of an initial specified value
	ESR (mΩ)	≦150% of an initial specified value
	Leakage Current (μA)	≦Initial specified value
Moisture Resistance (Test at 60℃, 90~95RH for 1000hrs, L.C. should be tested after voltage treatment)	Capacitance Change (μF)	Within ±20% of initial measured value
	Dissipation Factor (tanδ)	≦150% of an initial specified value
	ESR (mΩ)	≦150% of an initial specified value
	Leakage Current (μA)	≦Initial specified value
Resistance to Soldering Heat	Capacitance Change (μF)	Within ±10% of initial measured value
	Dissipation Factor (tanδ)	≦130% of an initial specified value
	ESR (mΩ)	≦130% of an initial specified value
	Leakage Current (μA)	≦Initial specified value
Low Temperature Characteristics	Impedance Ratio (at 100kHz): Z_{-25}/Z_{+20} : 1.15 , Z_{-55}/Z_{+20} : 1.25	
Surge Voltage (V)	Rated Voltage x 1.15 (at 105℃)	



Lead Spacing, diameter and size code

Case Size	A6	A8	A10	A14	B8	B10	B14	B18	C6	C8	C10	C14	C18	D8	D11	D14	D19	F10	F12	F15	F20
ϕD	5	5	5	5	5.5	5.5	5.5	5.5	6.3	6.3	6.3	6.3	6.3	8	8	8	8	10	10	10	10
L	6	8	10	14	8	10	14	18	6	8	10	14	18	8	11	14	19	10	12	15	20
F	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.5	3.5	3.5	3.5	5.0	5.0	5.0	5.0
ϕd	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

Frequency coefficient for ripple current

Frequency	120Hz≦f<1KHz	1KHz≦f<10KHz	10KHz≦f<100KHz	100KHz≦f<500KHz
Coefficient	0.05	0.3	0.7	1.0

Dimensions, Maximum Ripple Current & Impedance

W.V.(V)	Capacitance (μF)	Case Size	Size φDxL(mm)	Tanδ (120Hz,20℃)	L.C. (μA)	E.S.R. (100k-300kHz, mΩ,20℃ max)	Rated R.C 105℃ (mArms at 100kHz,)
16V	100	C6	6.3x6	0.1	16	28	2300
	100	C8	6.3x8	0.1	16	24	2300
	270	C8	6.3x8	0.1	43	18	3000
	470	C10	6.3x10	0.1	75	14	3500
	560	C10	6.3x10	0.1	90	14	3500
	680	D11	8x11	0.1	109	15	4500
	820	D11	8x11	0.1	131	12	4500
	1000	D14	8x14	0.1	160	14	4800
	1000	F12	10x12	0.1	160	12	5000
	1500	F20	10x20	0.1	240	10	6600
	1800	F15	10x15	0.1	288	10	7500
	2200	F20	10x20	0.1	352	10	8000
25V	100	A6	5x6	0.1	25	26	2000
	100	A8	5x8	0.1	25	24	2000
	220	A8	5x8	0.1	55	22	2200
	470	D11	8x11	0.1	118	16	4200
	560	D11	8x11	0.1	140	16	4500
	820	D19	8x19	0.1	205	14	6800
	820	F12	10x12	0.1	205	12	4800
	1000	F15	10x15	0.1	250	12	7500
	1500	F20	10x20	0.1	375	12	8000
35V	100	C8	6.3x8	0.1	35	30	2000
	220	C10	6.3x10	0.1	77	24	2500
	330	D11	8x11	0.1	116	18	3200
	470	F12	10x12	0.1	165	16	3500
	560	D19	8x19	0.1	196	18	3800
50V	22	C6	6.3x6	0.1	11	40	1800
	33	C8	6.3x8	0.1	17	35	2000
	47	C8	6.3x8	0.1	24	35	2200
	56	C10	6.3x10	0.1	28	25	2300
	68	C10	6.3x10	0.1	34	22	2500
	82	C14	6.3x14	0.1	41	20	3800
	100	C14	6.3x14	0.1	50	20	2900
	100	D11	8x11	0.1	50	22	3000
	150	D14	8x14	0.1	75	20	3200
	220	D19	8x19	0.1	110	18	3500
	220	F12	10x12	0.1	110	20	3200
	390	F20	10x20	0.1	195	18	3900
63V	10	C6	6.3x6	0.1	10	45	1800
	10	C8	6.3x8	0.1	10	35	2000
	22	C8	6.3x8	0.1	14	35	2200
	33	C10	6.3x10	0.1	21	25	2500
	47	C10	6.3x10	0.1	30	22	2400

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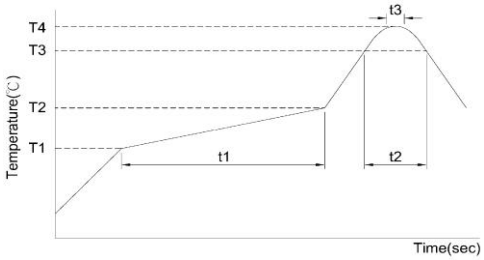
W.V.(V)	Capacitance (μF)	Case Size	Size φDxL(mm)	Tanδ (120Hz,20℃)	L.C. (μA)	E.S.R. (100k-300kHz, mΩ,20℃ max)	Rated R.C 105℃ (mArms at 100kHz,)
63V	47	D8	8x8	0.1	30	22	2500
	56	C14	6.3x14	0.1	35	20	2800
	56	D11	8x11	0.1	35	22	2700
	68	C14	6.3x14	0.1	43	20	2900
	82	C19	6.3x19	0.1	52	18	3000
	82	D14	8x14	0.1	52	18	3200
	100	D19	8x19	0.1	63	18	3500
	100	F10	10x12	0.1	63	16	3500
	150	F15	10x15	0.1	95	16	3500
	220	F20	10x20	0.1	139	18	4000
80V	22	D8	8x8	0.1	18	28	2400
	33	D11	8x11	0.1	26	25	2500
	47	D11	8x11	0.1	38	24	2800
	56	D14	8x14	0.1	45	22	3000
	56	F12	10x12	0.1	45	25	2500
	82	D19	8x19	0.1	66	20	3300
	100	F15	10x15	0.1	80	20	3300
	150	F20	10x20	0.1	120	18	3800
100V (2A)	12	C10	6.3x10	0.1	12	35	2000
	15	D8	8x8	0.1	15	32	2200
	22	D11	8x11	0.1	22	28	2300
	33	D11	8x11	0.1	33	26	2400
	39	D14	8x14	0.1	39	22	2800
	47	D19	8x19	0.1	47	20	3200
	47	F12	10x12	0.1	47	25	3000
	56	F12	10x12	0.1	56	22	3200
	68	F15	10x15	0.1	68	22	3500
	82	F20	10x20	0.1	82	20	3800
	100	F20	10x20	0.1	100	20	3800

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:	Capacitance change	Within ±10% of initial value	MIL-STD-202 Method 213
			Tanδ	Within specified value	
			Leakage Current	Within specified value	
			Appearance	No abnormality	

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)

<table>
<tr><th>No.</th><th>Item</th><th>Conditions</th><th colspan="3">Specification</th><th>Reference</th></tr>
<tr><td>8</td><td>Vibration</td><td>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 colspan="3"><table><tr><td>Capacitance change</td><td>Within ±10% of initial value</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></td><td>MIL-STD- 202 Method 204</td></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 colspan="3"><table><tr><td>Capacitance change</td><td>Within ±10% of initial value</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></table></td><td>MIL-STD- 202 Method 210</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="3">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="3">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 colspan="3"><table><tr><td>Capacitance change</td><td>Within ±10% of initial value</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></table></td><td>AEC-Q200-005</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 rowspan="4">13</td><td rowspan="4">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>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 rowspan="4">14</td><td rowspan="4">Surge Voltage</td><td rowspan="4">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>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>