THH 230ºC Hermetic Series

SMD 230ºC High Temperature Tantalum Capacitor in Hermetic Package

FEATURES

- High temperature applications
- Operational condition 230ºC / 0.5U_R / 1000hrs (2000hrs for selected codes) or 200°C / 0.5U_R / 10.000hrs
- Ceramic case hermetic packaging
- Large case sizes including CTC-21D provide high capacitance values
- Manufacturing and screening utilizing AVX patented Q-Process to effectively remove components that may experience excessive parametric shifts or instability in operation life

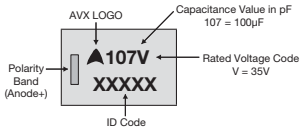
APPLICATIONS

- Oil drilling
- Extreme temperature applications

For additional information on Q-process please consult the AVX technical publication "Reaching the Highest Reliability for Tantalum Capacitors" (see the link: http://www.avx.com/docs/techinfo/Qprocess.pdf)

MARKING

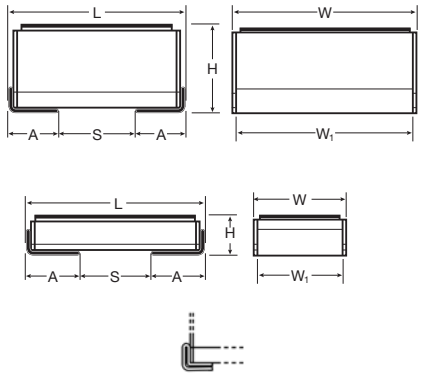
9, I CASE



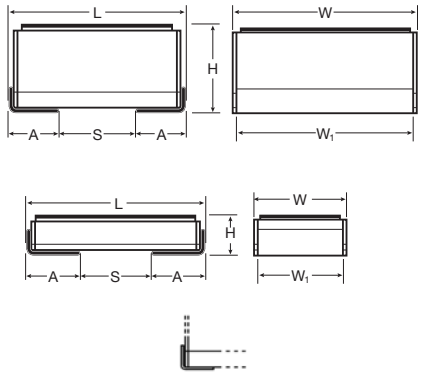
CASE DIMENSIONS: millimeters (inches)

Code	Type	L±0.50 (0.020)	W±0.50 (0.020)	H Max.	W_1±0.50 (0.020)	A±0.50 (0.020)	S Min.
9 (CTC-21D)	J-lead (L-shape)	11.50 (0.453)	12.50 (0.492)	6.15 (0.242)	12.50 (0.492)	1.90 (0.075)	7.00 (0.276)
9 (CTC-21D)	J-lead (flex)	12.10 (0.476)	12.50 (0.492)	6.50 (0.256)	12.00 (0.472)	2.00 (0.079)	7.20 (0.283)
9 (CTC-21D)	Undertab	11.00 ± 0.20 (0.433 ± 0.008)	12.50 ± 0.20 (0.492 ± 0.008)	5.95 (0.234)	10.50 ± 0.20 (0.413 ± 0.008)	1.50 ± 0.20 (0.059 ± 0.008)	7.80 (0.307)
I	J-lead (L-shape)	11.50 (0.453)	6.00 (0.236)	2.70 (0.106)	6.00 (0.236)	3.50 (0.138)	4.00 (0.157)
I	J-lead (flex)	11.90 (0.469)	6.00 (0.236)	3.00 (0.118)	5.50 (0.217)	3.60 (0.142)	4.20 (0.165)
I	Undertab	11.00 ± 0.20 (0.433 ± 0.008)	6.00 ± 0.20 (0.236 ± 0.008)	2.50 (0.098)	4.00 ± 0.20 (0.157 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	4.40 (0.173)

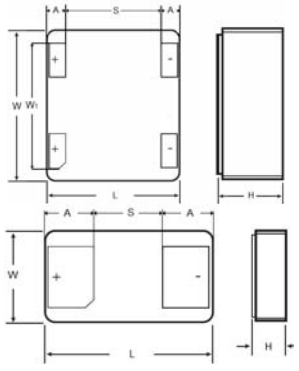
'J' Lead Termination (flex)



'J' Lead Termination (L-shape)



Undertab Termination



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CAPACITANCE AND VOLTAGE RANGE (CODE DENOTES THE CASE SIZE)

Capacitance		Rated Voltage DC (V_R) at 175ºC					
µF	Code	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)	63V (J)
4.7	475						
6.8	685				I	I	
10	106				I		
15	156						
22	226	I					
33	336						
47	476	I					9
68	686						
100	107				9		

Released ratings
Engineering samples - please contact AVX

HOW TO ORDER

AVX PART NUMBER

THH	9	107	M	035	W	0250	J
Type	**Case Size** See table above	**Capacitance Code** pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	**Tolerance** M = ±20%	**Rated DC Voltage** 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc 063 = 63Vdc	**Packaging** W = Waffle B = Bulk	**ESR in mΩ**	**Termination** J = 'J' lead (L-shape) W = 'J' lead (flex) U = Undertab

LEAD-FREE
LEAD-FREE COMPATIBLE COMPONENT

RoHS COMPLIANT

For RoHS compliant products, please select correct termination style.

TECHNICAL SPECIFICATIONS

Technical Data:		All technical data relate to an ambient temperature of +25°C						
Capacitance Range:		6.8 µF to 100 µF (for extended range under development, contact manufacturer)						
Capacitance Tolerance:		±20%						
Leakage Current DCL:		0.01CV						
Rated Voltage (V_R)	≤ +85°C:	16	20	25	35	50	63	
Category Voltage (V_C)	≤ +230°C:	8	10	12	17	25	31	
Temperature Range:		-55°C to +230°C						
Reliability:		1% per 1000 hours at 85ºC, Vr with 0.1Ω/V series impedance, 60% confidence level						
Termination Finish:		Gold Plating (Undertab), Gold Plating (J-lead L shape), Nickel Plating (J-lead flex)						

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VOLTAGE VS TEMPERATURE RATING

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (ºC)	Category Voltage (V)	DCL Max. (µA)	DF Max. (%)	ESR Max. @ 100kHz (mΩ)	100kHz RMS Current (A)			Lifetime at 230ºC (hrs)	MSL
									25ºC	85ºC	230ºC		
16 Volt @ 85°C													
THHI226M016W0500#	I	22	16	175	8	3.6	8	500	0.81	0.73	0.73	2,000	1
THHI476M016W0500#	I	47	16	175	8	7.5	8	500	0.81	0.73	0.73	1,000	1
35 Volt @ 85°C													
THHI685M035W0500#	I	6.8	35	175	17	2.4	8	500	0.81	0.73	0.73	2,000	1
THHI106M035W0500#	I	10	35	175	17	3.5	8	500	0.81	0.73	0.73	2,000	1
THH9107M035W0250#	9	100	35	175	17	35	8	250	1.26	1.13	1.13	2,000	1
50 Volt @ 85°C													
THHI685M050W0500#	I	6.8	50	175	25	3.4	8	500	0.81	0.73	0.73	1,000	1
63 Volt @ 85°C													
THH9476M063W0250#	9	47	63	175	31	29.6	8	250	1.26	1.13	1.13	1,000	1

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts.

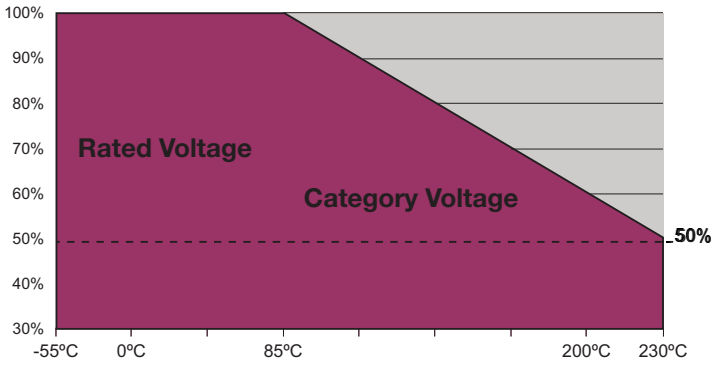
DCL is measured at rated voltage after 5 minutes.

ESR change post 1000hrs allowed up to 3 times catalog limit.

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

VOLTAGE VS TEMPERATURE RATING

THH 230°C Voltage vs Temperature Rating for 1000 (or 2000) hrs service life



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QUALIFICATION TABLE

<table>
<tr><th rowspan="2">TEST</th><th colspan="3">THH 230°C hermetic series (Temperature range -55ºC to +230ºC)</th></tr>
<tr><th colspan="2">Condition</th><th>Characteristics</th></tr>
<tr><td rowspan="5">Endurance</td><td colspan="2" rowspan="5">Apply category voltage (Uc) at 230ºC for 2000 hours through a circuit impedance of <3Ω/V. Stabilize at room temperature for min. 2 hours before measuring.</td><td>Visual examination</td><td>no visible damage</td></tr>
<tr><td>DCL</td><td>1.25 x initial limit</td></tr>
<tr><td>ΔC/C</td><td>within ±20% of initial value</td></tr>
<tr><td>DF</td><td>1.5 x initial limit</td></tr>
<tr><td>ESR</td><td>3 x initial limit</td></tr>
<tr><td rowspan="5">Endurance</td><td colspan="2" rowspan="5">Apply half rated voltage (0.5xUr) at 200ºC for 10000 hours through a circuit impedance of <3Ω/V. Stabilize at room temperature for min. 2 hours before measuring.</td><td>Visual examination</td><td>no visible damage</td></tr>
<tr><td>DCL</td><td>1.25 x initial limit</td></tr>
<tr><td>ΔC/C</td><td>within ±20% of initial value</td></tr>
<tr><td>DF</td><td>1.5 x initial limit</td></tr>
<tr><td>ESR</td><td>3 x initial limit</td></tr>
<tr><td rowspan="5">Storage Life</td><td colspan="2" rowspan="5">Store at 230ºC, no voltage applied, for 1000 hours. Stabilize at room temperature for min. 2 hours before measuring.</td><td>Visual examination</td><td>no visible damage</td></tr>
<tr><td>DCL</td><td>initial limit</td></tr>
<tr><td>ΔC/C</td><td>within ±5% of initial value</td></tr>
<tr><td>DF</td><td>initial limit</td></tr>
<tr><td>ESR</td><td>1.25 x initial limit</td></tr>
<tr><td rowspan="5">Biased Humidity</td><td colspan="2" rowspan="5">Apply rated voltage (Ur) at 85ºC, 85% relative humidity for 1000 hours. Stabilize at room temperature and humidity for min. 2 hours before measuring.</td><td>Visual examination</td><td>no visible damage</td></tr>
<tr><td>DCL</td><td>initial limit</td></tr>
<tr><td>ΔC/C</td><td>within ±10% of initial value</td></tr>
<tr><td>DF</td><td>initial limit</td></tr>
<tr><td>ESR</td><td>1.25 x initial limit</td></tr>
<tr><td>Temperature Stability</td><td colspan="2"><table><tr><th>Step</th><th>Temperature°C</th><th>Duration (min)</th></tr><tr><td>1</td><td>+20</td><td>15</td></tr><tr><td>2</td><td>-55</td><td>15</td></tr><tr><td>3</td><td>+20</td><td>15</td></tr><tr><td>4</td><td>+85</td><td>15</td></tr><tr><td>5</td><td>+125</td><td>15</td></tr><tr><td>6</td><td>+175</td><td>15</td></tr><tr><td>7</td><td>+200</td><td>15</td></tr><tr><td>8</td><td>+230</td><td>15</td></tr><tr><td>9</td><td>+20</td><td>15</td></tr></table></td><td colspan="2"><table><tr><th></th><th>+20ºC</th><th>-55ºC</th><th>+20ºC</th><th>+85ºC</th><th>+125ºC</th><th>+175ºC</th><th>+200ºC</th><th>+230ºC</th><th>+20ºC</th></tr><tr><td>DCL</td><td>IL*</td><td>n/a</td><td>IL*</td><td>10 x IL*</td><td>12.5 x IL*</td><td>n/a</td><td>n/a</td><td>n/a</td><td>IL*</td></tr><tr><td>ΔC/C</td><td>n/a</td><td>+0/-20%</td><td>±5%</td><td>+20/-0%</td><td>+30/-0%</td><td>+30/-0%</td><td>+30/-0%</td><td>+30/-0%</td><td>±5%</td></tr><tr><td>DF</td><td>IL*</td><td>1.5 x IL*</td><td>IL*</td><td>1.5 x IL*</td><td>2 x IL*</td><td>2 x IL*</td><td>2 x IL*</td><td>2 x IL*</td><td>IL*</td></tr><tr><td>ESR</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td></tr></table></td></tr>
<tr><td rowspan="5">Surge Voltage</td><td colspan="2" rowspan="5">Apply 1.3x rated voltage (Ur) at 85ºC for 1000 cycles of duration 6 min (30 sec charge, 5 min 30 sec discharge) through a charge / discharge resistance of 33Ω</td><td>Visual examination</td><td>no visible damage</td></tr>
<tr><td>DCL</td><td>initial limit</td></tr>
<tr><td>ΔC/C</td><td>within ±20% of initial value</td></tr>
<tr><td>DF</td><td>initial limit</td></tr>
<tr><td>ESR</td><td>1.25 x initial limit</td></tr>
<tr><td rowspan="5">Mechanical Shock/Vibration</td><td colspan="2" rowspan="5">MIL-STD-202, Method 213, Condition I, 100 G peak
MIL-STD-202, Method 204, Condition D,
10 Hz to 2,000 Hz, 20 G peak</td><td>Visual examination</td><td>no visible damage</td></tr>
<tr><td>DCL</td><td>initial limit</td></tr>
<tr><td>ΔC/C</td><td>within ±10% of initial value</td></tr>
<tr><td>DF</td><td>initial limit</td></tr>
<tr><td>ESR</td><td>1.25 x initial limit</td></tr>
<tr><td rowspan="5">Vibration 230ºC</td><td colspan="2" rowspan="5">Apply 230°C temperature, no voltage and vibration:
10 ~ 2000 ~ 10Hz in 20 min
Full amplitude: 3 mm/20g
Vibration directions time
X, Y Z directions: 4 hours
each direction: total 12 hrs.</td><td>Visual examination</td><td>no visible damage</td></tr>
<tr><td>DCL</td><td>initial limit</td></tr>
<tr><td>ΔC/C</td><td>within ±5% of initial value</td></tr>
<tr><td>DF</td><td>initial limit</td></tr>
<tr><td>ESR</td><td>1.25 x initial limit</td></tr>
</table>

*Initial Limit