

# THH 230°C Hermetic Series



## SMD 230°C High Temperature Tantalum Capacitor in Hermetic Package



### FEATURES

- High temperature applications
- Operational condition 230°C / 0.5U<sub>R</sub> / 1000hrs (2000hrs for selected codes) or 200°C / 0.5U<sub>R</sub> / 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



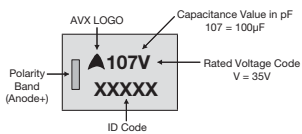
### APPLICATIONS

- 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

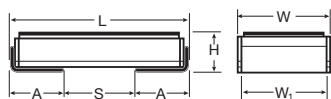
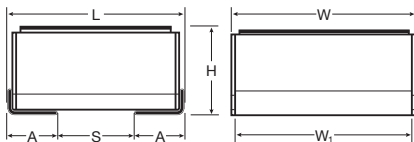
#### 9, I CASE



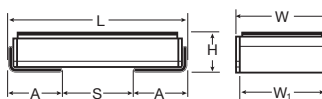
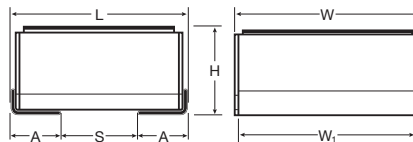
### CASE DIMENSIONS: millimeters (inches)

Code	Type	L±0.50 (0.020)	W±0.50 (0.020)	H Max.	W <sub>1</sub> ±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)

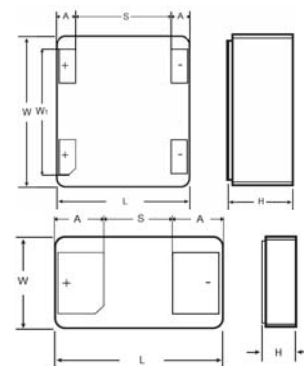
#### 'J' Lead Termination (flex)



#### 'J' Lead Termination (L-shape)



#### Undertab Termination



# THH 230°C Hermetic Series



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### CAPACITANCE AND VOLTAGE RANGE (CODE DENOTES THE CASE SIZE)

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

Released ratings

Engineering samples - please contact AVX

## HOW TO ORDER

### AVX PART NUMBER

<b>THH</b>	<b>9</b>	<b>107</b>	<b>M</b>	<b>035</b>	<b>W</b>	<b>0250</b>	<b>J</b>
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



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 <sub>R</sub> )	≤ +85°C:	16	20	25	35	50	63	
Category Voltage (V <sub>C</sub> )	≤ +230°C:	8	10	12	17	25	31	
Temperature Range:	-55°C to +230°C							
Reliability:	1% per 1000 hours at 85°C, V <sub>r</sub> 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 (°C)	Category Voltage (V)	DCL Max. (µA)	DF Max. (%)	ESR Max. @ 100kHz (mΩ)	100kHz RMS Current (A)			Lifetime at 230°C (hrs)	MSL
									25°C	85°C	230°C		
<b>16 Volt @ 85°C</b>													
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
<b>35 Volt @ 85°C</b>													
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
<b>50 Volt @ 85°C</b>													
THHI685M050W0500#	I	6.8	50	175	25	3.4	8	500	0.81	0.73	0.73	1,000	1
<b>63 Volt @ 85°C</b>													
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.

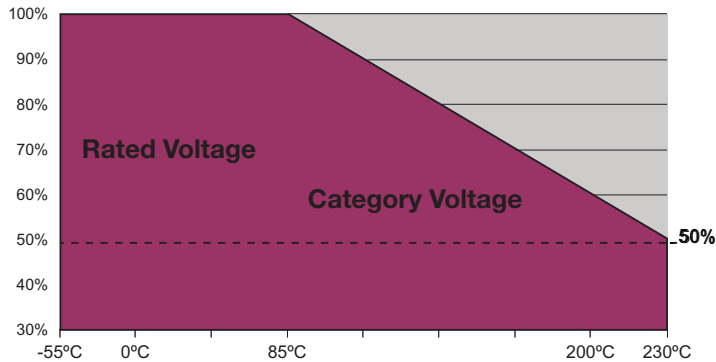
DCL is measured at rated voltage after 5 minutes.

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



# THH 230°C Hermetic Series



## SMD 230°C High Temperature Tantalum Capacitor in Hermetic Package

### QUALIFICATION TABLE

TEST	THH 230°C hermetic series (Temperature range -55°C to +230°C)												
	Condition			Characteristics									
<b>Endurance</b>	Apply category voltage (Uc) at 230°C for 2000 hours through a circuit impedance of <math><3\Omega/V</math>. Stabilize at room temperature for min. 2 hours before measuring.			Visual examination	no visible damage								
				DCL	1.25 x initial limit								
				$\Delta C/C$	within $\pm 20\%$ of initial value								
				DF	1.5 x initial limit								
				ESR	3 x initial limit								
<b>Endurance</b>	Apply half rated voltage (0.5xUr) at 200°C for 10000 hours through a circuit impedance of <math><3\Omega/V</math>. Stabilize at room temperature for min. 2 hours before measuring.			Visual examination	no visible damage								
				DCL	1.25 x initial limit								
				$\Delta C/C$	within $\pm 20\%$ of initial value								
				DF	1.5 x initial limit								
				ESR	3 x initial limit								
<b>Storage Life</b>	Store at 230°C, no voltage applied, for 1000 hours. Stabilize at room temperature for min. 2 hours before measuring.			Visual examination	no visible damage								
				DCL	initial limit								
				$\Delta C/C$	within $\pm 5\%$ of initial value								
				DF	initial limit								
				ESR	1.25 x initial limit								
<b>Biased Humidity</b>	Apply rated voltage (Ur) at 85°C, 85% relative humidity for 1000 hours. Stabilize at room temperature and humidity for min. 2 hours before measuring.			Visual examination	no visible damage								
				DCL	initial limit								
				$\Delta C/C$	within $\pm 10\%$ of initial value								
				DF	initial limit								
				ESR	1.25 x initial limit								
<b>Temperature Stability</b>	Step	Temperature°C	Duration (min)		+20°C	-55°C	+20°C	+85°C	+125°C	+175°C	+200°C	+230°C	+20°C
	1	+20	15										
	2	-55	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	n/a	n/a	n/a	IL*
	3	+20	15										
	4	+85	15	$\Delta C/C$	n/a	+0/-20%	$\pm 5\%$	+20/-0%	+30/-0%	+30/-0%	+30/-0%	+30/-0%	$\pm 5\%$
	5	+125	15										
	6	+175	15	DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	2 x IL*	2 x IL*	2 x IL*	IL*
	7	+200	15										
	8	+230	15										
	9	+20	15	ESR	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*
<b>Surge Voltage</b>	Apply 1.3x rated voltage (Ur) at 85°C for 1000 cycles of duration 6 min (30 sec charge, 5 min 30 sec discharge) through a charge / discharge resistance of 33 $\Omega$ .			Visual examination	no visible damage								
				DCL	initial limit								
				$\Delta C/C$	within $\pm 20\%$ of initial value								
				DF	initial limit								
				ESR	1.25 x initial limit								
<b>Mechanical Shock/Vibration</b>	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			Visual examination	no visible damage								
				DCL	initial limit								
				$\Delta C/C$	within $\pm 10\%$ of initial value								
				DF	initial limit								
				ESR	1.25 x initial limit								
<b>Vibration 230°C</b>	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.			Visual examination	no visible damage								
				DCL	initial limit								
				$\Delta C/C$	within $\pm 5\%$ of initial value								
				DF	initial limit								
				ESR	1.25 x initial limit								

\*Initial Limit