



## SuperTan® Wet Tantalum Capacitors With Hermetic Seal, Extended Range, Improved Vibration Capability



### LINKS TO ADDITIONAL RESOURCES



3D Models

### PERFORMANCE CHARACTERISTICS

Refer to: Typical Performance Characteristics

**Operating Temperature:** -55 °C to +85 °C  
(to +125 °C with voltage derating)

**Capacitance Tolerance:**  $\pm 10\%$ ,  $\pm 20\%$  standard

**DC Leakage Current (DCL Max.):** at +25 °C and above:  
leakage current shall not exceed the values listed in the Standard Ratings table.

### FEATURES

- Enhanced performance, high reliability design
- Terminations:
  - axial through-hole, SMD outward L-leaded and SMD inward L-leaded
  - standard tin / lead (SnPb), 100 % tin available
- Model STH tantalum-case electrolytic capacitors provide all the advantages of Vishay's SuperTan® extended series devices, while offering **improved vibration capability**
- Increased thermal shock capability of up to 300 cycles
- Designed for the avionics and aerospace applications
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS\***  
Available

**HALOGEN  
FREE**  
**GREEN**  
(5-2008)  
Available

### Note

\* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

### ORDERING INFORMATION

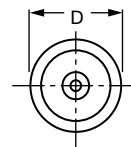
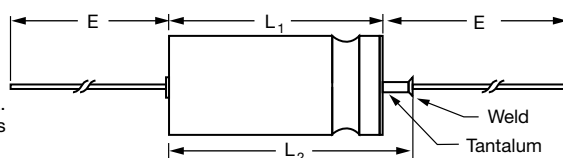
STH	D	128	M	075	E <sup>(1)</sup>	S <sup>(2)</sup>	H	S
MODEL	CASE CODE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT +85 °C	TERMINATION	INSULATING SLEEVE	RELIABILITY / SHOCK / VIBRATION LEVEL	ESR
		This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow	K = $\pm 10\%$ M = $\pm 20\%$	This is expressed in volts. To complete the three-digit block, zeros precede the voltage rating	<b>Axial through-hole</b> E = tin / lead C = 100 % tin  <b>SMD, outward L-leaded</b> J = tin / lead K = 100 % tin  <b>Low profile, SMD, outward L-leaded</b> P = tin / lead R = 100 % tin  <b>SMD, inward L-leaded</b> L = tin / lead M = 100 % tin  <b>Low profile, SMD, inward L-leaded</b> S = tin / lead T = 100 % tin	S = sleeved U = unsleeved	H = high	S = standard L = low

### Notes

- Packaging: the use of formed plastic trays for packing bulk components is standard
- (1) Low profile SMD terminations P, R, S, T are available in case D (T4)
- (2) Sleeve on capacitors with SMD terminations is high temperature film insulation only

**AXIAL PRODUCT DIMENSIONS** in inches [millimeters]

0.0253 ± 0.002 [0.64 ± 0.05] dia.  
(no. 22 AWG) tinned nickel leads  
solderable and weldable



CASE CODE		D	L <sub>1</sub>	L <sub>2</sub> (max.)	E	WEIGHT (g) (max.)
TYPE STH	ST					
A	T1	0.188 ± 0.016 [4.78 ± 0.41]	0.453 + 0.031 / - 0.016 [11.51 + 0.79 / - 0.41]	0.734 [18.64]	1.500 ± 0.250 [38.10 ± 6.35]	2.6
B	T2	0.281 ± 0.016 [7.14 ± 0.41]	0.641 + 0.031 / - 0.016 [16.28 + 0.79 / - 0.41]	0.922 [23.42]	2.250 ± 0.250 [57.15 ± 6.35]	6.2
C	T3	0.375 ± 0.016 [9.52 ± 0.41]	0.766 + 0.031 / - 0.016 [19.46 + 0.79 / - 0.41]	1.047 [26.59]	2.250 ± 0.250 [57.15 ± 6.35]	11.6
D	T4	0.375 ± 0.016 [9.52 ± 0.41]	1.062 + 0.031 / - 0.016 [26.97 + 0.79 / - 0.41]	1.343 [34.11]	2.250 ± 0.250 [57.15 ± 6.35]	17.7

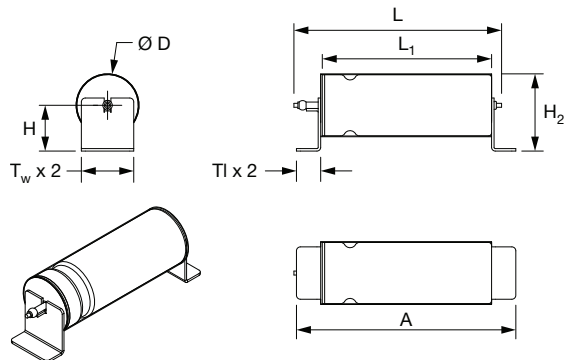
**Note**

- For insulated parts, add 0.015" [0.38 mm] to the diameter. The insulation shall lap over the ends of the capacitor body

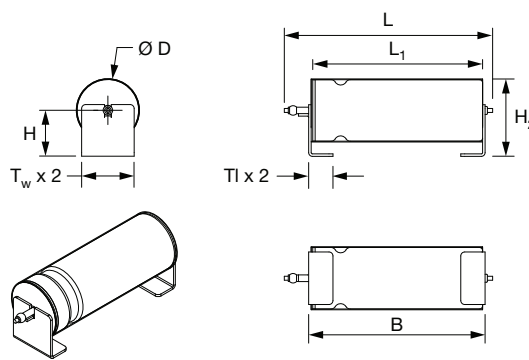
**SMD PRODUCT DIMENSIONS** in inches [millimeters]

**Outward L-Leaded Terminations**

Term. code	Solder type
J, P	SnPb
K, R	100 % tin (RoHS-compliant)


**Inward L-Leaded Terminations**

Term. code	Solder type
L, S	SnPb
M, T	100 % tin (RoHS-compliant)



TERMINATIONS		J, K, L, M, P, R, S, T							J, K, P, R	L, M, S, T	P, R, S, T	
CASE CODE		D (max.)	L (max.)	L <sub>1</sub>	H (max.)	H <sub>2</sub> (max.)	Tl (max.)	Tw ± 0.008	A (max.)	B (max.)	LP H (max.)	LP H <sub>2</sub> (max.)
TYPE STH	ST											
A	T1	0.228 [5.8]	0.705 [17.9]	0.469 + 0.031 / - 0.016 [11.91 + 0.79 / - 0.41]	0.177 [4.5]	0.296 [7.5]	0.157 [4.0]	0.158 [4.0]	0.773 [19.6]	0.513 [13.0]		
B	T2	0.316 [8.0]	0.903 [22.9]	0.668 + 0.012 / - 0.12 [16.97 + 0.30 / - 0.30]	0.212 [5.4]	0.374 [9.5]	0.157 [4.0]	0.217 [5.5]	1.001 [25.4]	0.720 [18.3]		
C	T3	0.397 [10.1]	1.051 [26.7]	0.806 + 0.012 / - 0.12 [20.47 + 0.30 / - 0.30]	0.280 [7.1]	0.492 [12.5]	0.157 [4.0]	0.331 [8.4]	1.143 [29.0]	0.858 [21.8]		
D	T4	0.397 [10.1]	1.343 [34.1]	1.062 + 0.031 / - 0.016 [26.97 + 0.79 / - 0.41]	0.295 [7.5]	0.492 [12.5]	0.157 [4.0]	0.331 [8.4]	1.432 [36.4]	1.140 [29.0]	0.225 [5.8]	0.421 [10.7]

**Note**

- Use appropriate adhesive between capacitor body and the board for improved mechanical strength



RATINGS AND CASE CODES					
μF	35 V	60 V	75 V	100 V	125 V
47		A			
150				B	
330				D	
350					D
470					D
560					D <sup>(1)</sup>
660			D		
750				D	
880				D	
1000			D		
1200			D		
1500			D		
2200		D			
2800	D				

**Note**

<sup>(1)</sup> Preliminary rating. Contact marketing for availability

STANDARD RATINGS												
CAPACITANCE AT +25 °C 120 Hz (μF)	CASE CODE	PART NUMBER	MAX. ESR AT +25 °C 120 Hz (Ω)	MAX. IMP. AT -55 °C 120 Hz (Ω)	MAX. DCL (μA) AT		MAX. CAPACITANCE CHANGE AT (%)			AC RIPPLE +85 °C 40 kHz (mA <sub>RMS</sub> )	THERMAL SHOCK NUMBER OF CYCLES	
35 V <sub>DC</sub> AT 85 °C, 22 V <sub>DC</sub> AT 125 °C												
2800	D	STHD288(1)035(2)(3)HS	0.35	4.50	25	125	-80	25	35	4000	300	
60 V <sub>DC</sub> AT 85 °C, 40 V <sub>DC</sub> AT 125 °C												
47	A	STHA476(1)060(2)(3)HS	2	44.00	1	5	-25	8	12	1050	300	
2200	D	STHD228(1)060(2)(3)HS	0.50	10.00	40	300	-80	25	30	4000	300	
75 V <sub>DC</sub> AT 85 °C, 50 V <sub>DC</sub> AT 125 °C												
660	D	STHD667(1)075(2)(3)HS	0.70	10.00	12	120	-70	30	40	4000	300	
1000	D	STHD108(1)075(2)(3)HS	0.50	6.50	20	160	-70	20	40	3500	300	
1200	D	STHD128(1)075(2)(3)HS	0.50	8.00	30	300	-70	25	30	4000	300	
1500	D	STHD158(1)075(2)(3)HS	0.50	8.00	30	300	-75	25	30	4000	300	
100 V <sub>DC</sub> AT 85 °C, 65 V <sub>DC</sub> AT 125 °C												
150	B	STHB157(1)100(2)(3)HS	1.20	20.00	6	60	-30	10	15	1750	300	
330	D	STHD337(1)100(2)(3)HS	0.80	10.00	6	60	-45	7	20	3600	300	
750	D	STHD757(1)100(2)(3)HS	0.70	10.00	30	300	-75	30	30	4000	300	
880	D	STHD887(1)100(2)(3)HS	0.60	10.00	30	300	-75	30	30	4000	300	
125 V <sub>DC</sub> AT 85 °C, 85 V <sub>DC</sub> AT 125 °C												
350	D	STHD357(1)125(2)(3)HS	1.00	15.00	25	250	-65	25	40	3500	300	
470	D	STHD477(1)125(2)(3)HS	1.00	18.00	30	300	-70	30	30	3500	300	
560	D <sup>(1)</sup>	STHD567(1)125(2)(3)HS	0.70	20.00	35	350	-75	30	30	3500	300	

**Notes**

- Part number definitions:
  - (1) Capacitance tolerance: K, M
  - (2) Terminations: C, E, J, K, L, M, P, R, S, T
  - (3) Insulating sleeve: S, U
- <sup>(1)</sup> Rating in development, contact factory for availability



## TYPICAL PERFORMANCE CHARACTERISTICS OF STH CAPACITORS

ELECTRICAL CHARACTERISTICS	
ITEM	PERFORMANCE CHARACTERISTICS
Operating temperature range	-55 °C to +85 °C (to +125 °C with voltage derating)
Capacitor tolerance	± 20 %, ± 10 % at 120 Hz, at +25 °C
Capacitor change by temperature	Limit per Standard Ratings table
ESR	Limit per Standard Ratings table, at +25 °C, 120 Hz
Impedance	Limit per Standard Ratings table, at -55 °C, 120 Hz
DCL (leakage current)	Limit per Standard Ratings table
AC ripple current	Limit per Standard Ratings table, at +85 °C and 40 kHz
Reverse voltage	There shall be no continuous reverse voltage. Transient reverse voltage surges are acceptable under the following conditions: a) The peak reverse voltage is equal to or less than 1.5 V and the product of the peak current times the duration of the reverse transient is 0.05 A or less b) The repetition rate of the reverse voltage surges is less than 10 Hz
Surge voltage	Surge voltage shall be in accordance with MIL-PRF-39006. The DC rated surge voltage is the maximum voltage to which the capacitors can be subjected under any conditions including transients and peak ripple at the highest line voltage. The DC surge voltage is 115 % of rated DC voltage, except the applicable surge voltage for 125 V ratings and ratings above 1000 µF is rated DC voltage. After the test, the capacitors shall meet the following requirements: a) DC leakage shall not exceed the specified value in catalog b) Capacitance change shall be within +5 %, -20 % (-35 % for capacitance above 1000 µF) of initial measured value

PERFORMANCE CHARACTERISTICS	
ITEM	PERFORMANCE CHARACTERISTICS
Life testing	Capacitors shall be capable of withstanding a 2000 h life test at a temperature +85 °C at rated voltage, or a 2000 h life test at 125 °C test at derated voltage. After the test, the capacitors shall meet the following requirements: a) DC leakage at 85 °C and 125 °C shall not exceed 125 % of the specified value b) DC leakage at 25 °C shall not exceed the specified value c) Capacitance shall be within +10 %, -20 % of initial value d) ESR shall not exceed 200 % of the specified value

ENVIRONMENTAL CHARACTERISTICS		
ITEM	CONDITION	COMMENTS
Seal	MIL-PRF-39006	When the capacitors are tested as specified in MIL-PRF-39006, there shall be no evidence of leakage.
Moisture resistance	MIL-PRF-39006	Moisture resistance shall be in accordance with MIL-PRF-39006. Number of cycles: 10 continuous cycles
Barometric pressure (reduced)	MIL-STD-202, method 105, condition E	Altitude 150 000 feet

**MECHANICAL CHARACTERISTICS**

ITEM	TEST METHOD	CONDITION
Shock (specified pulse)	MIL-STD-202, method 213	Test condition D (500 g)
Vibration, high frequency	MIL-STD-202, method 204	Test condition H (80 g peak)
Random vibration	MIL-STD-202, method 214	Test condition II-K (53.79 g RMS)
Thermal shock	MIL-STD-202, method 107	Test condition A, 30 cycles minimum, maximum number of cycles is according to Standard Ratings table.
Solderability	MIL-STD-202, method 208	ANSI/J-STD-002, test A Solderability shall be in accordance with MIL-PRF-39006.
Terminal strength	MIL-STD-202, method 211	Terminal strength shall be in accordance with MIL-PRF-39006.
Resistance to solder heat	MIL-STD-202, method 210, condition C	The capacitors shall meet the requirements of MIL-PRF-39006.
Terminals	MIL-STD-1276	Terminals shall be as specified in MIL-STD-1276. The length and diameter of the terminals shall be as specified in Dimensions table. All terminals shall be permanently secured internally and externally, as applicable. All external joints shall be welded.
Marking	MIL-STD-1285	Marking of capacitors conforms to method I of MIL-STD-1285 and include capacitance (in $\mu\text{F}$ ), capacitance tolerance letter, rated voltage, date code, lot symbol, and Vishay trademark.

**SELECTOR GUIDES**

Tantalum Selector Guide	<a href="http://www.vishay.com/doc?49054">www.vishay.com/doc?49054</a>
Parameter Comparison Guide	<a href="http://www.vishay.com/doc?42088">www.vishay.com/doc?42088</a>



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