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: ± 10 %, ± 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, 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

Pb-free Available

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 (1)	S (2)	H	S
MODEL	CASE CODE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT +85 °C	TERMINATION AND PACKAGING	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 = ± 10 % M = ± 20 %	This is expressed in volts. To complete the three-digit block, zeros precede the voltage rating	E = axial, tin / lead, bulk C = axial, 100 % tin, bulk J = SMD, outside bend, tin / lead K = SMD, outside bend, 100 % tin L = SMD, inside bend, tin / lead M = SMD, inside bend, 100 % tin P = LP SMD, outside bend, 100 % tin R = LP SMD, outside bend, 100 % tin S = LP SMD, inside bend, tin / lead T = LP SMD, inside bend, 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

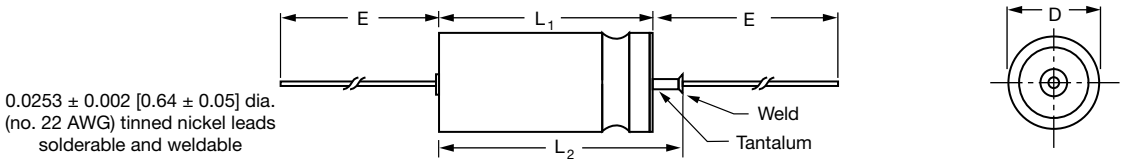
(1) J, K, L, M, P, R, S, T are available in T4. For all other case sizes, check with marketing

(2) Sleeve on J, K, L, M, P, R, S, T terminations shall be Kapton only

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AXIAL PRODUCT DIMENSIONS in inches [millimeters]



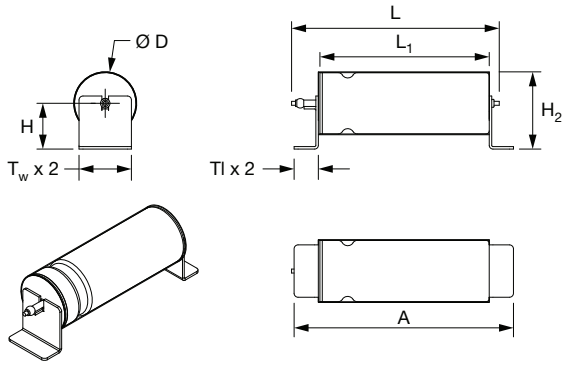
CASE CODE		D	L_1	L_2 (max.)	E	WEIGHT (g) (max.)
TYPE STH	ST					
A	T1	0.188 ± 0.016 [4.78 ± 0.41]	0.453 + 0.031 / - 0.016 [11.51 + 0.79 / - 0.41]	0.734 [18.64]	1.500 ± 0.250 [38.10 ± 6.35]	2.6
B	T2	0.281 ± 0.016 [7.14 ± 0.41]	0.641 + 0.031 / - 0.016 [16.28 + 0.79 / - 0.41]	0.922 [23.42]	2.250 ± 0.250 [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]

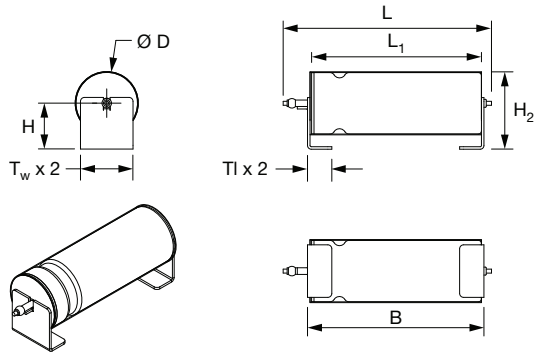
Styles J, K, P, R

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



Styles L, M, S, T

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



CASE CODE		A (max.)	B (max.)	Tl (max.)	H (max.)	LP H (max.)	T_w ± 0.008	H_2 (max.)	LP H_2 (max.)	L (max.)	L_1	D (max.)
TYPE STH	ST											
A	T1	0.773 [19.6]	0.513 [13.0]	0.157 [4.0]	0.177 [4.5]		0.158 [4.0]	0.296 [7.5]		0.705 [17.9]	0.469 + 0.031 / -0.016 [11.91 + 0.79 / -0.41]	0.228 [5.8]
B	T2	1.001 [25.4]	0.720 [18.3]	0.157 [4.0]	0.212 [5.4]		0.225 [5.7]	0.374 [9.5]		0.903 [22.9]	0.668 + 0.012 / -0.12 [16.97 + 0.30 / -0.30]	0.316 [8.0]
C	T3	1.143 [29.0]	0.858 [21.8]	0.157 [4.0]	0.280 [7.1]		0.331 [8.4]	0.492 [12.5]		1.051 [26.7]	0.806 + 0.012 / -0.12 [20.47 + 0.30 / -0.30]	0.397 [10.1]
D	T4	1.432 [36.4]	1.140 [29.0]	0.157 [4.0]	0.295 [7.5]	0.225 [5.8]	0.331 [8.4]	0.492 [12.5]	0.421 [10.7]	1.343 [34.1]	1.062 + 0.031 / - 0.016 [26.97 + 0.79 / - 0.41]	0.397 [10.1]

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

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RATINGS AND CASE CODES				
µF	60 V	75 V	100 V	125 V
47	A			
470				D
560				D (1)
750			D	
880			D	
1200		D		
1500		D (1)		

Note

(1) 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 +25 °C	MAX. DCL (µA) AT +85 °C / +125 °C	MAX. CAPACITANCE CHANGE AT (%) -55 °C	+85 °C	+125 °C	AC RIPPLE +85 °C 40 kHz (mA_{RMS})	THERMAL SHOCK NUMBER OF CYCLES
60 V_{DC} AT 85 °C, 40 V_{DC} AT 125 °C											
47	A	STHA476(1)060(2)(3)HS	2	44	1	5	-25	8	12	1050	300
75 V_{DC} AT 85 °C, 50 V_{DC} AT 125 °C											
1200	D	STHD128(1)075(2)(3)HS	0.50	8.00	30	300	-70	25	30	4000	300
1500	D (1)	STHD158(1)075(2)(3)HS	0.50	8.00	30	300	-75	25	30	4000	300
100 V_{DC} AT 85 °C, 65 V_{DC} AT 125 °C											
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_{DC} AT 85 °C, 85 V_{DC} AT 125 °C											
470	D	STHD477(1)125(2)(3)HS	1.00	18.00	30	300	-70	30	30	3500	300
560	D (1)	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) Termination / packaging: C = 100 % tin, bulk; E = standard, tin / lead, bulk; J = SMD, outside bend, tin / lead; K = SMD, outside bend, 100 % tin; L = SMD, inside bend, tin / lead; M = SMD, inside bend, 100 % tin
  (3) Insulating sleeve: S = sleeved; U = unsleeved

(1) 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

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ELECTRICAL CHARACTERISTICS	
ITEM	**PERFORMANCE CHARACTERISTICS**
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.

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MECHANICAL CHARACTERISTICS		
ITEM	**TEST METHOD**	**CONDITION**
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 µF), capacitance tolerance letter, rated voltage, date code, lot symbol, and Vishay trademark.

SELECTOR GUIDES	
Tantalum Selector Guide	www.vishay.com/doc?49054
Parameter Comparison Guide	www.vishay.com/doc?42088

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