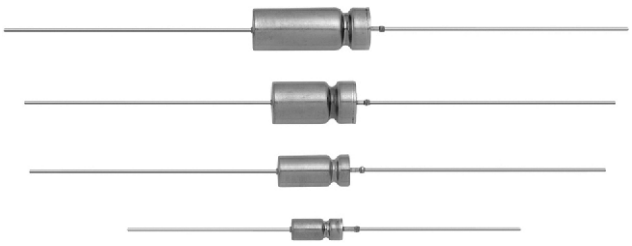
Wet Tantalum Capacitors, Extended Capacitance, Tantalum Case with Glass-to-Tantalum Hermetic Seal for -55 °C to +125 °C, DLA Approved



FEATURES

- Enhanced performance, high reliability design
- Terminations: axial, standard tin / lead (Sn / Pb) plated
- The 13017 tantalum-case electrolytic capacitors provide all the advantages of Vishay's SuperTan® series devices, while offering improved reverse voltage and vibration capabilities
- Increased thermal shock capability of 300 cycles
- Designed for the avionics and aerospace applications

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

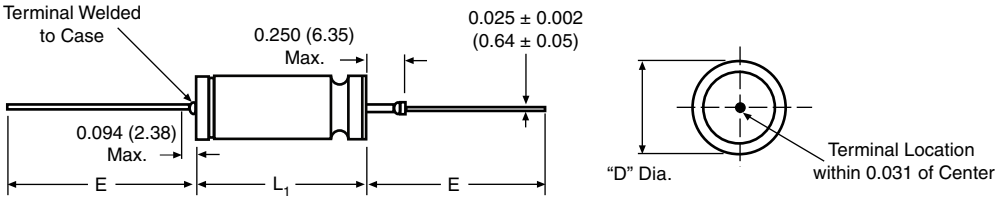
DC Leakage Current (DCL Max.): at +25 °C and above, leakage current shall not exceed the values listed in the Standard Ratings table.

ORDERING INFORMATION

13017	-01	K	S
DLA DRAWING NUMBER	DASH NUMBER	CAPACITANCE TOLERANCE	
		K = ± 10 % M = ± 20 %	S = sleeved U = unsleeved

DLA LAND AND MARITIME COLUMBUS, OHIO	Drawing no. 13017

DIMENSIONS in inches [millimeters]



CASE CODE	D ± 0.016 [0.41]	D MAX. INSULATED (DIA.)	L_1 UNINSULATED + 0.031 [0.79] - 0.016 [0.41]	E ± 0.250 [6.35] MAX.
T1	0.188 [4.78]	0.219 [5.56]	0.453 [11.51]	1.500 [38.10]
T2	0.281 [7.14]	0.312 [7.92]	0.641 [16.28]	2.250 [57.15]
T3	0.375 [9.52]	0.406 [10.31]	0.766 [19.46]	2.250 [57.15]
T4	0.375 [9.52]	0.406 [10.31]	1.062 [26.97]	2.250 [57.15]

Note

- Insulation sleeving will lap over the ends of the capacitor body.

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER	MAX. ESR AT +25 °C 120 Hz (Ω)	MAX. IMP. AT -55 °C 120 Hz (Ω)	MAX. DCL (µA)		MAX. CAPACITANCE CHANGE (%)			AC RIPPLE +85 °C 40 kHz (mA_{RMS})
					+25 °C	+85 °C AND +125 °C	-55 °C	+85 °C	+125 °C	
25 V_{DC} AT 85 °C, 15 V_{DC} AT 125 °C										
120	T1	13017-01(1)(2)	1.30	25	1	5	-42	8	12	1250
560	T2	13017-02(1)(2)	0.83	12	2	10	-65	14	18	2000
1200	T3	13017-03(1)(2)	0.65	7	5	20	-70	15	20	2400
1800	T4	13017-04(1)(2)	0.50	7	6	25	-72	15	20	3000
30 V_{DC} AT 85 °C, 20 V_{DC} AT 125 °C										
100	T1	13017-05(1)(2)	1.30	25	1	5	-38	8	12	1200
470	T2	13017-06(1)(2)	0.85	15	2	10	-65	14	18	1800
1000	T3	13017-07(1)(2)	0.70	7	7	25	-70	15	25	2200
1500	T4	13017-08(1)(2)	0.60	6	12	35	-72	15	25	2900
50 V_{DC} AT 85 °C, 30 V_{DC} AT 125 °C										
68	T1	13017-09(1)(2)	1.50	35	1	5	-25	8	15	1050
220	T2	13017-10(1)(2)	0.90	17.5	2	10	-50	8	15	1800
470	T3	13017-11(1)(2)	0.75	10	3	25	-45	8	15	2100
680	T4	13017-12(1)(2)	0.70	8	5	40	-58	10	20	2700
60 V_{DC} AT 85 °C, 40 V_{DC} AT 125 °C										
47	T1	13017-13(1)(2)	2.00	44	1	5	-25	8	12	1050
150	T2	13017-14(1)(2)	1.10	20	2	10	-40	8	15	1800
390	T3	13017-15(1)(2)	0.90	15	3	25	-45	8	15	2100
560	T4	13017-16(1)(2)	0.80	10	5	40	-58	8	15	2700
75 V_{DC} AT 85 °C, 50 V_{DC} AT 125 °C										
33	T1	13017-17(1)(2)	2.50	66	1	5	-25	5	9	1050
110	T2	13017-18(1)(2)	1.30	24	2	10	-35	6	10	1650
330	T3	13017-19(1)(2)	1.00	12	3	30	-45	6	10	2100
470	T4	13017-20(1)(2)	0.90	12	5	50	-50	6	10	2700
100 V_{DC} AT 85 °C, 65 V_{DC} AT 125 °C										
15	T1	13017-21(1)(2)	3.50	125	1	5	-18	3	10	1050
68	T2	13017-22(1)(2)	2.10	37	2	10	-30	4	12	1650
150	T3	13017-23(1)(2)	1.60	22	3	25	-35	6	12	2100
220	T4	13017-24(1)(2)	1.20	15	5	50	-40	6	12	2700
125 V_{DC} AT 85 °C, 85 V_{DC} AT 125 °C										
10	T1	13017-25(1)(2)	5.50	175	1	5	-15	3	10	1050
47	T2	13017-26(1)(2)	2.30	47	2	10	-25	5	12	1650
82	T3	13017-27(1)(2)	1.80	40	3	25	-35	5	12	1950
100	T3	13017-28(1)(2)	1.80	35	3	25	-35	5	12	2100
150	T4	13017-29(1)(2)	1.60	20	5	50	-35	6	12	2700

Note

- Part number definitions:
  (1) Capacitance tolerance: K = 10 %, M = 20 %
  (2) Case or body insulation: S = sleeved; U = unsleeved

RIPPLE CURRENT MULTIPLIERS VS. FREQUENCY, TEMPERATURE, AND APPLIES PEAK VOLTAGE

FREQUENCY OF APPLIED RIPPLE CURRENT		120 Hz				800 Hz				1 kHz				10 kHz				40 kHz				100 kHz			
AMBIENT STILL AIR TEMP. IN °C		≤ 55	85	105	125	≤ 55	85	105	125	≤ 55	85	105	125	≤ 55	85	105	125	≤ 55	85	105	125	≤ 55	85	105	125
% of 85 °C rated peak voltage	100 %	0.60	0.39	-	-	0.71	0.43	-	-	0.72	0.46	-	-	0.88	0.55	-	-	1.0	0.63	-	-	1.1	0.69	-	-
	90 %	0.60	0.46	-	-	0.71	0.55	-	-	0.72	0.55	-	-	0.88	0.67	-	-	1.0	0.77	-	-	1.1	0.85	-	-
	80 %	0.60	0.52	0.35	-	0.71	0.62	0.42	-	0.72	0.62	0.42	-	0.88	0.76	0.52	-	1.0	0.87	0.59	-	1.1	0.96	0.65	-
	70 %	0.60	0.58	0.44	-	0.71	0.69	0.52	-	0.72	0.70	0.52	-	0.88	0.85	0.64	-	1.0	0.97	0.73	-	1.1	1.07	0.80	-
	66 2/3 %	0.60	0.60	0.46	0.27	0.71	0.71	0.55	0.32	0.72	0.72	0.55	0.32	0.88	0.88	0.68	0.40	1.0	1.0	0.77	0.45	1.1	1.1	0.85	0.50

TYPICAL PERFORMANCE CHARACTERISTICS OF DLA 13017 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	Reverse voltage shall be in accordance with MIL-PRF-39006, paragraphs 3.23 and 4.8.19
Surge voltage	Surge voltage shall be in accordance with MIL-PRF-39006 and DLA13017. 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.

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 1000 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	**CONDITION**	**COMMENTS**
Shock (specified pulse)	MIL-STD-202, method 213, condition D (500 *g*)	The capacitors shall meet the requirements of MIL-PRF-39006.
Vibration, high frequency	MIL-STD-202, method 204, condition E (50 *g* peak)	The capacitors shall meet the requirements of MIL-PRF-39006.
Random vibration	MIL-STD-202, method 214, condition II-G (overall RMS 27.78 *g*)	The capacitors shall meet the requirements of MIL-PRF-39006.
Thermal shock	MIL-STD-202, method 107, condition A	Thermal shock shall be in accordance with MIL-PRF-39006 when tested for 300 cycles.
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 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

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay’s knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer’s technical experts. Product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.