

# DLA 10004 SuperTan® Extended Capacitance, Wet Tantalum Capacitors with Hermetic Seal



## FEATURES

- Ultra high capacitance
- All tantalum, hermetically sealed case
- Utilizes proven Vishay SuperTan® technology
- High and stable capacitance
- High reliability, rugged design
- Axial through-hole terminations: standard tin / lead (Sn / Pb)

## PERFORMANCE CHARACTERISTICS

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

**Capacitance Tolerance:** at 120 Hz, +25 °C. ± 20 % standard. ± 10 % available as special.

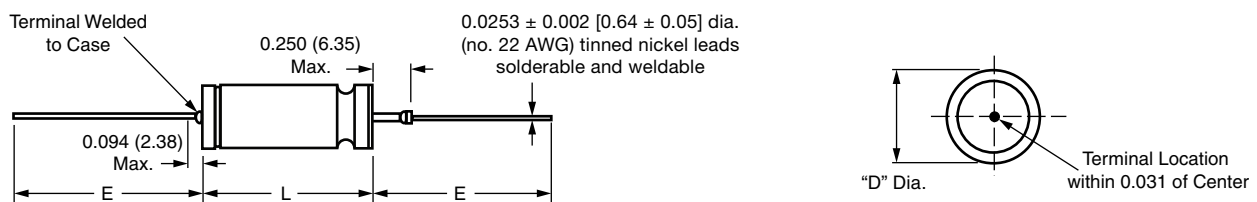
**DC Leakage Current (DCL Max.):** at +25 °C and above: leakage current shall not exceed the values listed in the Standard Ratings tables.

**Life Test:** capacitors are capable of withstanding a 2000 h life test at a temperature of +85 °C at the applicable rated DC working voltage.

ORDERING INFORMATION			
<u>10004</u>	<u>-14</u>	<u>K</u>	<u>S</u>
DLA DRAWING NUMBER	DASH NUMBER	CAPACITANCE TOLERANCE	
		K = ± 10 % M = ± 20 %	S = sleeved U = unsleeved

DLA LAND AND MARITIME COLUMBUS, OHIO	Drawing no. 10004
---	----------------------

## DIMENSIONS in inches [millimeters]



CASE CODE	D ± 0.016 [0.41]	MAX. INSULATED (DIA.)	L <sub>1</sub> + 0.031 [0.79] UNINSULATED	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]

### Notes

- Material at egress is Tantalum
- Insulation sleeving will lap over the ends of the capacitor case
- Approx. weight  
T1: 2.3 g, T2: 5.7 g  
T3: 9.4 g, T4: 14.8 g



STANDARD RATINGS												
CAPACITANCE ( $\mu$ F)	VOLTAGE	CASE CODE	MAX. ESR AT 120 Hz ( $\Omega$ )	TYP. ESR AT 1 kHz ( $\Omega$ )	MAX. DCL AT		MAX. CAPACITANCE CHANGE AT			Z -55 °C ( $\Omega$ )	AC RIPPLE 85 °C 40 kHz mA RMS	PART NUMBER
					+25 °C ( $\mu$ A)	+85 °C/ +125 °C ( $\mu$ A)	-55 °C (%)	+85 °C (%)	+125 °C (%)			
<b>10 V<sub>DC</sub> AT +85 °C, SURGE = 11.5 V<sub>DC</sub>; 7 V<sub>DC</sub> AT +125 °C</b>												
4700	10	T3	0.35	< 0.200	16	100	-80	10	20	3.50	4000	10004-01(1)(2)
10 000	10	T4	0.25	< 0.100	25	150	-85	20	35	3.00	5000	10004-02(1)(2)
<b>16 V<sub>DC</sub> AT +85 °C, SURGE = 18.4 V<sub>DC</sub>; 11 V<sub>DC</sub> AT +125 °C</b>												
3300	16	T3	0.35	< 0.200	16	100	-80	10	15	3.50	4000	10004-03(1)(2)
6000	16	T4	0.30	< 0.150	25	150	-80	15	20	3.00	4500	10004-04(1)(2)
<b>25 V<sub>DC</sub> AT +85 °C, SURGE = 28.8 V<sub>DC</sub>; 15 V<sub>DC</sub> AT +125 °C</b>												
4000	25	T4	0.35	< 0.150	25	125	-80	15	20	5.00	4250	10004-05(1)(2)
<b>30 V<sub>DC</sub> AT +85 °C, SURGE = 34.5 V<sub>DC</sub>; 20 V<sub>DC</sub> AT +125 °C</b>												
820	30	T2	1.00	< 0.600	3.5	18	-75	12	20	20.00	1650	10004-32(1)(2)
3300	30	T4	0.35	< 0.200	25	125	-80	20	25	4.00	2750	10004-06(1)(2)
<b>35 V<sub>DC</sub> AT +85 °C, SURGE = 40.3 V<sub>DC</sub>; 22 V<sub>DC</sub> AT +125 °C</b>												
2800	35	T4	0.35	< 0.200	25	125	-80	20	30	4.50	4000	10004-07(1)(2)
<b>50 V<sub>DC</sub> AT +85 °C, SURGE = 57.5 V<sub>DC</sub>; 30 V<sub>DC</sub> AT +125 °C</b>												
110	50	T1	1.60	< 1.000	2	7.5	-40	10	15	40.00	1500	10004-33(1)(2)
900	50	T3	0.90	< 0.300	15	125	-75	20	20	10.00	2500	10004-34(1)(2)
1500	50	T3	1.00	< 0.300	25	130	-85	25	30	8.00	2400	10004-35(1)(2)
1500	50	T4	0.35	< 0.215	15	110	-70	20	20	6.00	3500	10004-08(1)(2)
2200	50	T4	0.60	< 0.400	25	125	-80	25	30	4.50	3000	10004-15(1)(2)
<b>60 V<sub>DC</sub> AT +85 °C, SURGE = 69 V<sub>DC</sub>; 40 V<sub>DC</sub> AT +125 °C</b>												
68	60	T1	1.50	< 0.600	1.5	7.5	-30	10	12	40.00	1400	10004-31(1)(2)
560	60	T3	0.90	< 0.300	20	120	-70	12	15	10.00	2500	10004-36(1)(2)
1000	60	T4	0.50	< 0.300	20	120	-40	10	15	5.50	3500	10004-09(1)(2)
<b>75 V<sub>DC</sub> AT +85 °C, SURGE = 86.3 V<sub>DC</sub>; 50 V<sub>DC</sub> AT +125 °C</b>												
180	75	T2	1.50	< 0.500	5	25	-35	15	20	30.00	2000	10004-10(1)(2)
470	75	T3	0.60	< 0.325	25	100	-45	10	25	10.00	3000	10004-11(1)(2)
750	75	T4	0.50	< 0.400	20	120	-35	10	15	6.50	3500	10004-12(1)(2)
940	75	T4	0.50	< 0.350	20	200	-60	12	20	8.00	3500	10004-17(1)(2)
<b>100 V<sub>DC</sub> AT +85 °C, SURGE = 115 V<sub>DC</sub>; 65 V<sub>DC</sub> AT +125 °C</b>												
22	100	T1	3.00	< 1.500	1	5	-15	4	10	100.00	1200	10004-37(1)(2)
220	100	T3	1.40	< 0.200	5	25	-55	10	15	18.00	2500	10004-38(1)(2)
400	100	T4	0.70	< 0.400	10	120	-40	6	12	15.00	3000	10004-13(1)(2)
470	100	T4	0.70	< 0.500	25	250	-50	10	20	10	3500	10004-18(1)(2)
<b>125 V<sub>DC</sub> AT +85 °C, SURGE = 144 V<sub>DC</sub>; 85 V<sub>DC</sub> AT +125 °C</b>												
240	125	T4	0.80	< 0.600	15	150	-35	6	12	20.00	2500	10004-14(1)(2)

**Note**

- Part number definitions:
  - (1) K = 10 %
  - M = 20 %
  - (2) S = sleeved or insulated
  - 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 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 10004 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 Ripply Current	Limit per Standard Ratings table, at +85 °C and 40 kHz
Reverse Voltage	There shall be no continuous reverse voltage. Transient reverse voltages 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 ampere-second 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 and DLA10004. 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



<b>ENVIRONMENTAL CHARACTERISTICS</b>		
<b>ITEM</b>	<b>CONDITION</b>	<b>COMMENTS</b>
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

<b>MECHANICAL CHARACTERISTICS</b>		
<b>ITEM</b>	<b>CONDITION</b>	<b>COMMENTS</b>
Shock (Specified Pulse)	MIL-STD-202, method 213, condition I (100 g)	The capacitors shall meet the requirements of MIL-PRF-39006.
Vibration, High Frequency	MIL-STD-202, method 204, condition D (20 g peak)	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 30 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 $\mu\text{F}$ ), capacitance tolerance letter, rated voltage, date code, lot symbol and Vishay trademark.

<b>SELECTOR GUIDES</b>	
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>



## **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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

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.