



DLA 10004 SuperTan® Wet Tantalum Capacitors With Hermetic Seal, Extended Range



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)

LINKS TO ADDITIONAL RESOURCES



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 | | | |
|----------------------|-------------|--------------------------|------------------------------|
| 10004 | -14 | 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. 10004 |
|-----------------------------------------|----------------------|

| DIMENSIONS in inches [millimeters] | | | | |
|------------------------------------|------------------|-----------------------|-------------------------------------------|-----------------------|
| | | | | |
| CASE CODE | D ± 0.016 [0.41] | MAX. INSULATED (DIA.) | L ₁ + 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 (μ F) | VOLTAGE | CASE CODE | MAX. ESR AT | | MAX. DCL AT | | MAX. CAPACITANCE CHANGE AT | | | $Z_{-55^{\circ}\text{C}}$ (Ω) | AC RIPPLE 85 $^{\circ}$ C 40 kHz mA RMS | PART NUMBER |
| | | | 120 Hz (Ω) | 1 kHz (Ω) | +25 $^{\circ}$ C (μ A) | +85 $^{\circ}$ C/ +125 $^{\circ}$ C (μ A) | -55 $^{\circ}$ C (%) | +85 $^{\circ}$ C (%) | +125 $^{\circ}$ C (%) | | | |
| 10 V_{DC} AT +85 $^{\circ}$C, SURGE = 11.5 V_{DC}; 7 V_{DC} AT +125 $^{\circ}$C | | | | | | | | | | | | |
| 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) |
| 16 V_{DC} AT +85 $^{\circ}$C, SURGE = 18.4 V_{DC}; 11 V_{DC} AT +125 $^{\circ}$C | | | | | | | | | | | | |
| 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) |
| 25 V_{DC} AT +85 $^{\circ}$C, SURGE = 28.8 V_{DC}; 15 V_{DC} AT +125 $^{\circ}$C | | | | | | | | | | | | |
| 4000 | 25 | T4 | 0.35 | < 0.150 | 25 | 125 | -80 | 15 | 20 | 5.00 | 4250 | 10004-05(1)(2) |
| 30 V_{DC} AT +85 $^{\circ}$C, SURGE = 34.5 V_{DC}; 20 V_{DC} AT +125 $^{\circ}$C | | | | | | | | | | | | |
| 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) |
| 35 V_{DC} AT +85 $^{\circ}$C, SURGE = 40.3 V_{DC}; 22 V_{DC} AT +125 $^{\circ}$C | | | | | | | | | | | | |
| 2800 | 35 | T4 | 0.35 | < 0.200 | 25 | 125 | -80 | 20 | 30 | 4.50 | 4000 | 10004-07(1)(2) |
| 50 V_{DC} AT +85 $^{\circ}$C, SURGE = 57.5 V_{DC}; 30 V_{DC} AT +125 $^{\circ}$C | | | | | | | | | | | | |
| 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) |
| 60 V_{DC} AT +85 $^{\circ}$C, SURGE = 69 V_{DC}; 40 V_{DC} AT +125 $^{\circ}$C | | | | | | | | | | | | |
| 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) |
| 1200 | 60 | T4 | 0.50 | < 0.300 | 20 | 200 | -70 | 15 | 20 | 6.00 | 3500 | 10004-16(1)(2) |
| 1800 | 60 | T4 | 0.50 | < 0.300 | 25 | 250 | -75 | 25 | 25 | 6.00 | 3000 | 10004-28(1)(2) |
| 75 V_{DC} AT +85 $^{\circ}$C, SURGE = 86.3 V_{DC}; 50 V_{DC} AT +125 $^{\circ}$C | | | | | | | | | | | | |
| 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) |
| 1200 | 75 | T4 | 0.80 | < 0.350 | 25 | 250 | -75 | 25 | 25 | 8.00 | 2750 | 10004-30(1)(2) |
| 100 V_{DC} AT +85 $^{\circ}$C, SURGE = 115 V_{DC}; 65 V_{DC} AT +125 $^{\circ}$C | | | | | | | | | | | | |
| 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) |
| 125 V_{DC} AT +85 $^{\circ}$C, SURGE = 144 V_{DC}; 85 V_{DC} AT +125 $^{\circ}$C | | | | | | | | | | | | |
| 240 | 125 | T4 | 0.80 | < 0.600 | 15 | 150 | -35 | 6 | 12 | 20.00 | 2500 | 10004-14(1)(2) |

Note

- Part number definitions:
 - K = 10 %
M = 20 %
 - 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 |



| 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 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 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.

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.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. 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.