DLA 93026 SuperTan® Wet Tantalum Capacitors



FEATURES

- Terminations: standard tin / lead (Sn / Pb)
- Very high capacitance
- 10 µF to 1800 µF
- 25 V_{DC} to 125 V_{DC}
- -55 °C to +125 °C
- Very low ESR
- High ripple current
- All tantalum case
- Hermetically sealed
- Low DCL
- Mounting: axial

LINKS TO ADDITIONAL RESOURCES

3D Models

Vishay's DLA 93026 capacitor represents a major breakthrough in wet tantalum technology. Its unique cathode system provides the highest capacitance per unit volume. The design facilitates a doubling of capacitance, lower ESR and higher ripple current rating compared with conventional wet tantalum products. Moreover, the DLA 93026 has the capacitance stability of a solid tantalum capacitor and there are no circuit impedance restrictions.

The DLA 93026 is housed in an all tantalum, hermetically sealed case and is manufactured to withstand hazardous environments. The DLA 93026 is used widely in the defense and aerospace industries and whenever there is a space problem.

APPLICATION NOTES

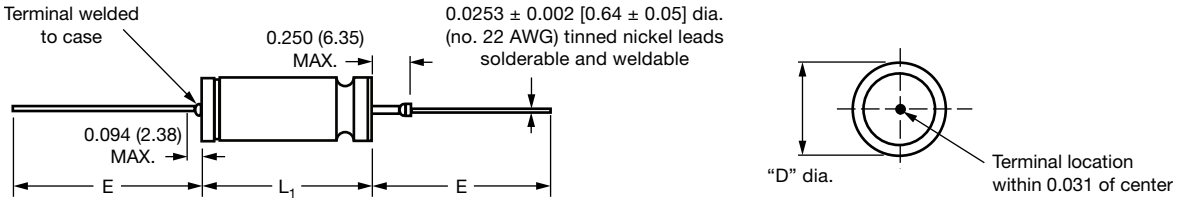
a) No continuous reverse voltage permissible.

b) The peak of the applied AC ripple and the applied DC voltage must not exceed the DC voltage rating of the capacitor.

c) Ripple current ratings by part number at 85 °C and 40 kHz are included in the table. Ripple current correction factors for other temperatures and frequencies are given on the next page.

d) Transient reverse voltage surges are acceptable under the following conditions:
the peak reverse voltage does not exceed 1.5 V and the peak current times the duration of the reverse transient does not exceed 0.05 As. In addition, the repetition frequency of the reverse voltage surge is less than 10 Hz.

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]
L2	0.281 [7.14]	0.312 [7.92]	1.008 [25.60]	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

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ORDERING INFORMATION

93026	-29	K	S
DLA LAND AND MARITIME DRAWING	DASH NUMBER	CAPACITANCE TOLERANCE	
		K = ± 10 % M = ± 20 %	S = sleeved U = unsleeved

DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	DRAWING NUMBER 93026

STANDARD RATINGS

CAPACITANCE AT 25 °C 120 Hz (µF)	CASE CODE	MAX. ESR 120 Hz (Ω)	MAX. DCL (µA)		MAX. IMP. AT -55 °C 120 Hz (Ω)	MAX. CAPACITANCE CHANGE (%)			AC RIPPLE 85 °C 40 kHz (mA) RMS	PART NUMBER
			25 °C	85 °C / 125 °C		-55 °C	85 °C	125 °C		
25 V_{DC} AT 85 °C; 15 V_{DC} AT 125 °C										
120	T1	1.3	1	5	25	-42	+8	+12	1250	93026-29(1)(2)
560	T2	0.83	2	10	12	-65	+10	+15	2100	93026-30(1)(2)
1100	L2	0.5	3	25	7	-60	+20	+45	3200	93026-57(1)(2)
1200	T3	0.65	5	20	7	-70	+12	+18	2600	93026-31(1)(2)
1800	T4	0.5	6	25	7	-75	+12	+20	3100	93026-32(1)(2)
2200	T4	0.5	10	80	10	-90	+30	+50	3200	93026-64(1)(2)
30 V_{DC} AT 85 °C; 20 V_{DC} AT 125 °C										
100	T1	1.3	1	5	25	-38	+8	+12	1200	93026-33(1)(2)
470	T2	0.85	2	10	15	-65	+10	+18	1800	93026-34(1)(2)
950	L2	0.5	5	30	7	-55	+18	+35	3200	93026-58(1)(2)
1000	T3	0.7	7	25	7	-70	+10	+18	2500	93026-35(1)(2)
1500	T4	0.6	12	35	6	-72	+10	+20	3000	93026-36(1)(2)
50 V_{DC} AT 85 °C; 30 V_{DC} AT 125 °C										
68	T1	1.5	1	5	35	-25	+8	+15	1050	93026-37(1)(2)
220	T2	0.9	2	10	17.5	-50	+8	+15	1800	93026-38(1)(2)
450	L2	0.6	3	25	7.5	-45	+12	+30	2900	93026-59(1)(2)
470	T3	0.75	3	25	10	-50	+8	+15	2100	93026-39(1)(2)
680	T4	0.7	5	40	8	-58	+10	+20	2750	93026-40(1)(2)
60 V_{DC} AT 85 °C; 40 V_{DC} AT 125 °C										
47	T1	2.0	1	5	44	-25	+8	+12	1050	93026-41(1)(2)
150	T2	1.1	2	10	20	-40	+8	+15	1650	93026-42(1)(2)
370	L2	0.6	3	25	9	-33	+9	+20	2900	93026-60(1)(2)
390	T3	0.9	3	25	15	-60	+8	+15	2100	93026-43(1)(2)
560	T4	0.8	5	40	10	-58	+8	+15	2750	93026-44(1)(2)
1000	T4	1.0	12	90	20	-90	+30	+50	3200	93026-65(1)(2)
75 V_{DC} AT 85 °C; 50 V_{DC} AT 125 °C										
33	T1	2.5	1	5	66	-25	+5	+9	1050	93026-45(1)(2)
110	T2	1.3	2	10	24	-35	+6	+10	1650	93026-46(1)(2)
250	L2	0.8	5	30	12	-30	+6	+15	2500	93026-61(1)(2)
330	T3	1.0	3	30	12	-45	+6	+10	2100	93026-47(1)(2)
470	T4	0.9	5	50	12	-55	+6	+10	2750	93026-48(1)(2)

Note

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

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STANDARD RATINGS

CAPACITANCE AT 25 °C 120 Hz (µF)	CASE CODE	MAX. ESR 120 Hz (Ω)	MAX. DCL (µA)		MAX. IMP. AT -55 °C 120 Hz (Ω)	MAX. CAPACITANCE CHANGE (%)			AC RIPPLE 85 °C 40 kHz (mA) RMS	PART NUMBER
			25 °C	85 °C / 125 °C		-55 °C	85 °C	125 °C		
100 V_{DC} AT 85 °C; 65 V_{DC} AT 125 °C										
15	T1	3.5	1	5	125	-18	+3	+10	1050	93026-49(1)(2)
68	T2	2.1	2	10	37	-30	+4	+12	1650	93026-50(1)(2)
120	L2	1.0	3	25	20.5	-30	+4	+12	2200	93026-62(1)(2)
150	T3	1.6	3	25	22	-35	+6	+12	2100	93026-51(1)(2)
220	T4	1.2	5	50	15	-40	+6	+12	2750	93026-52(1)(2)
125 V_{DC} AT 85 °C; 85 V_{DC} AT 125 °C										
10	T1	5.5	1	5	175	-15	+3	+10	1050	93026-53(1)(2)
47	T2	2.3	2	10	47	-25	+5	+12	1650	93026-54(1)(2)
90	L2	1.3	5	25	25	-22	+4	+15	2000	93026-63(1)(2)
82	T3	1.8	3	25	40	-35	+5	+12	1950	n/a
100	T3	1.8	3	25	35	-35	+5	+12	2100	93026-55(1)(2)
150	T4	1.6	5	50	20	-35	+6	+12	2750	93026-56(1)(2)

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

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TYPICAL PERFORMANCE CHARACTERISTICS OF DLA 93026 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 As 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 Table II of DLA 93026. 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 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

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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

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