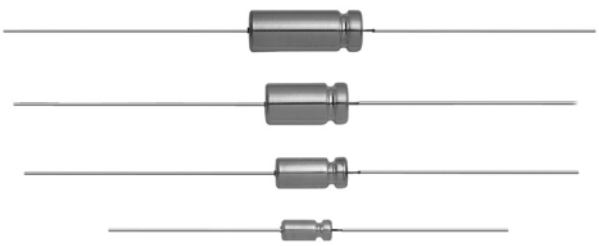
Wet Tantalum Capacitors Sintered Anode TANTALEX® Capacitors for Operation to + 125 °C, Elastomer-Sealed



FEATURES

- Axial through-hole terminations: Standard tin/lead (SnPb), 100 % tin (RoHS compliant) available
- Vishay Sprague model 109D tubular elastomer-sealed, sintered anode TANTALEX® capacitors fill the basic requirements for applications where a superior quality, reliable design for industrial, automotive and telecommunications application is desired.
- Model 109D capacitors are the commercial equivalents of Tansitor style WC, UWC, Mallory-NACC style TLS, TLH and the Military Style CL64 and CL65, designed to meet the performance requirements of Military Specification MIL-DTL-3965.
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free Available

RoHS* COMPLIANT

Note

* Lead (Pb)-containing terminations are not RoHS-compliant. Exemptions may apply.

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 %, ± 5 % available as special.

DC Leakage Current (DCL max.):
At + 25 °C, + 85 °C, + 125 °C: 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 or + 125 °C at the applicable DC working voltage.

Following the life test:

1. DCL shall not exceed the initial requirements or 1 µA, whichever is greater.
2. The ESR shall meet the initial requirement.
3. Change in capacitance shall not exceed 10 % from the initial measurement. For capacitors with voltage ratings of 15 V_{DC} and below, change in capacitance shall not exceed + 10 %, - 25 % from the initial measurement.

ORDERING INFORMATION

109D	207	X0	006	C	0	E3
MODEL	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C	CASE CODE	STYLE NUMBER	RoHS COMPLIANT
	This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow	X0 = ± 20 % X9 = ± 10 % X5 = ± 5 % special order	This is expressed in volts. To complete the three-digit block, zeros precede the voltage rating. A decimal point is indicated by an "R" (6R3 = 6.3 V)	See Ratings and Case Codes table	0 = No outer sleeve Standard 2 = Outer plastic film insulation	E3 = 100 % tin termination (RoHS compliant) Blank = SnPb termination (standard design)

Note

- Packaging: The use of formed plastic trays for packaging these axial lead components is standard. Tape and reel is not recommended due to the unit weight.

For technical questions, contact: tantalum@vishay.com

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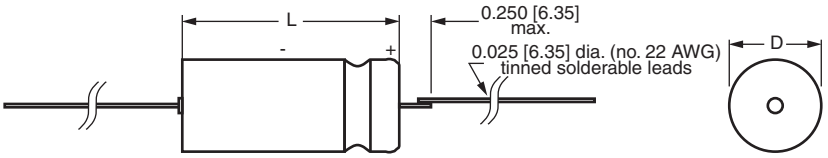
DIMENSIONS in inches [millimeters]



CASE CODE	BARE TUBE		WITH PLASTIC-FILM INSULATING SLEEVE		LEAD LENGTH
	D	L	D Max.	L Max.	
C	0.188 ± 0.016 [4.78 ± 0.41]	0.453 + 0.031/- 0.016 [11.51 + 0.79/- 0.41]	0.219 [5.56]	0.608 [15.45]	1.500 ± 0.250 [38.10 ± 6.35]
F	0.281 ± 0.016 [7.14 ± 0.41]	0.641 + 0.031/- 0.016 [16.28 + 0.79/- 0.41]	0.312 [7.92]	0.796 [20.22]	2.250 ± 0.250 [57.15 ± 6.35]
T	0.375 ± 0.016 [9.53 ± 0.41]	0.766 + 0.031/- 0.016 [19.46 + 0.79/- 0.41]	0.406 [10.31]	0.921 [23.40]	2.250 ± 0.250 [57.15 ± 6.35]
K (1)	0.375 ± 0.016 [9.53 ± 0.41]	1.062 + 0.031/- 0.016 [26.97 + 0.79/- 0.41]	0.406 [10.31]	1.217 [30.91]	2.250 ± 0.250 [57.15 ± 6.35]

Note
(1) Replaces previous W case

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER (1)	MAX. ESR AT + 25 °C 120 Hz (Ω)	MAX. IMP. AT - 55 °C 120 Hz (Ω)	MAX. DCL (µA) AT		MAX. CAPACITANCE CHANGE (%) AT			MAX. RMS RIPPLE CURRENT 120 Hz (mA)
					+ 25 °C	+ 85 °C + 125 °C	- 55 °C	+ 85 °C	+ 125 °C	
6 V_{DC} AT + 85 °C; 4 V_{DC} AT + 125 °C										
68	C	109D686X0006C0	4	60	1	2	- 40	+ 14	+ 16	160
140	F	109D147X0006F0	2	40	1	3	- 40	+ 14	+ 16	330
270	F	109D277X0006F0	4	25	1	7	- 44	+ 17.5	+ 20	270
560	T	109D567X0006T0	3	25	2	13	- 64	+ 17.5	+ 20	340
1200	K	109D128X0006K0	1.6	20	3	14	- 80	+ 25	+ 25	530
8 V_{DC} AT + 85 °C; 5 V_{DC} AT + 125 °C										
22	C	109D226X0008C0	6	115	1	2	- 40	+ 10.5	+ 12	130
220	F	109D227X0008F0	4	30	1	7	- 44	+ 17.5	+ 20	270
10 V_{DC} AT + 85 °C; 7 V_{DC} AT + 125 °C										
20	C	109D206X0010C0	5	175	1	2	- 32	+ 10.5	+ 12	140
47	C	109D476X0010C0	5	100	1	2	- 36	+ 14	+ 16	160
180	F	109D187X0010F0	4	40	1	7	- 36	+ 14	+ 16	270
390	T	109D397X0010T0	3	25	2	16	- 64	+ 17.5	+ 20	340
15 V_{DC} AT + 85 °C; 10 V_{DC} AT + 125 °C										
15	C	109D156X0015C0	6	155	1	2	- 24	+ 10.5	+ 12	130
33	C	109D336X0015C0	5	90	1	2	- 28	+ 14	+ 16	160
120	F	109D127X0015F0	4	50	1	7	- 28	+ 17.5	+ 20	270
270	T	109D277X0015T0	3	30	2	16	- 56	+ 17.5	+ 20	340
540	K	109D547X0015K0	1.2	23	6	24	- 80	+ 25	+ 25	610
25 V_{DC} AT + 85 °C; 15 V_{DC} AT + 125 °C										
10	C	109D106X0025C0	6	220	1	2	- 16	+ 8	+ 9	130
22	C	109D226X0025C0	5	140	1	3	- 20	+ 10.5	+ 12	160
50	F	109D506X0025F0	4	70	1	5	- 28	+ 13	+ 15	270
100	F	109D107X0025F0	4	50	1	10	- 28	+ 13	+ 15	270
100	T	109D107X0025T0	4	45	2	10	- 48	+ 13	+ 15	410
180	T	109D187X0025T0	4	32	2	18	- 48	+ 13	+ 15	340
350	K	109D357X0025K0	1.3	24	7	28	- 70	+ 25	+ 25	580
30 V_{DC} AT + 85 °C; 20 V_{DC} AT + 125 °C										
7	C	109D705X0030C0	8	275	1	2	- 16	+ 8	+ 12	110
8	C	109D805X0030C0	7.5	275	1	2	- 16	+ 8	+ 12	130
15	C	109D156X0030C0	8	175	1	2	- 20	+ 10.5	+ 12	160
40	F	109D406X0030F0	4	65	1	5	- 24	+ 10.5	+ 12	270
68	F	109D686X0030F0	6	60	1	8	- 24	+ 13	+ 15	270
100	T	109D107X0030T0	6	40	2	12	- 28	+ 10.5	+ 12	410
150	T	109D157X0030T0	4.1	35	2	18	- 48	+ 13	+ 15	340
300	K	109D307X0030K0	1.6	25	8	32	- 60	+ 25	+ 25	550

Note
(1) Part numbers shown are for units with ± 20 % capacitance tolerance and uninsulated capacitors. For ± 10 % units, change the digit following the letter "X" from "0" to "9". For units with outer plastic-film insulation, substitute "2" for "0" at the end of the part number. For RoHS compliant add "E3".

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STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER [1]	MAX. ESR AT + 25 °C 120 Hz (Ω)	MAX. IMP. AT - 55 °C 120 Hz (Ω)	MAX. DCL (µA) AT		MAX. CAPACITANCE CHANGE (%) AT			MAX. RMS RIPPLE CURRENT 120 Hz (mA)
					+ 25 °C	+ 85 °C + 125 °C	- 55 °C	+ 85 °C	+ 125 °C	
50 V_{DC} AT + 85 °C; 30 V_{DC} AT + 125 °C										
4.5	C	109D455X0050C0	9	400	1	2	- 16	+ 5	+ 6	110
5	C	109D505X0050C0	9	400	1	2	- 16	+ 5	+ 6	130
10	C	109D106X0050C0	8	250	1	2	- 24	+ 8	+ 9	160
22	F	109D226X0050F0	7	95	1	4	- 20	+ 10.5	+ 12	230
25	F	109D256X0050F0	6	95	1	5	- 20	+ 10.5	+ 12	270
47	F	109D476X0050F0	6	70	1	9	- 28	+ 13	+ 15	270
60	T	109D606X0050T0	3	45	2	12	- 16	+ 10.5	+ 12	410
82	T	109D826X0050T0	4	45	2	16	- 32	+ 13	+ 15	340
160	K	109D167X0050K0	2.2	27	8	32	- 50	+ 25	+ 25	460
60 V_{DC} AT + 85 °C; 40 V_{DC} AT + 125 °C										
4	C	109D405X0060C0	10	550	1	2	- 16	+ 5	+ 6	110
8.2	C	109D825X0060C0	8	275	1	2	- 24	+ 8	+ 9	140
20	F	109D206X0060F0	5	105	1	5	- 16	+ 10.5	+ 12	270
39	F	109D396X0060F0	7	90	1	9	- 28	+ 10.5	+ 12	230
50	T	109D506X0060T0	4	50	2	12	- 16	+ 10.5	+ 12	410
68	T	109D686X0060T0	6	50	2	16	- 32	+ 10.5	+ 12	340
140	K	109D147X0060K0	2.4	28	8	32	- 40	+ 20	+ 20	430
75 V_{DC} AT + 85 °C; 50 V_{DC} AT + 125 °C										
3.5	C	109D355X0075C0	10	650	1	2	- 16	+ 5	+ 6	110
6.8	C	109D685X0075C0	8	300	1	2	- 20	+ 8	+ 9	140
13	F	109D136X0075F0	6	160	1	4	- 16	+ 8	+ 9	190
15	F	109D156X0075F0	6.5	150	1	5	- 16	+ 8	+ 9	270
33	F	109D336X0075F0	7	90	1	10	- 24	+ 10.5	+ 15	230
40	T	109D406X0075T0	5	60	2	12	- 16	+ 10.5	+ 12	410
56	T	109D566X0075T0	6	60	2	17	- 28	+ 10.5	+ 15	300
110	K	109D117X0075K0	3.1	29	9	36	- 35	+ 20	+ 20	400
100 V_{DC} AT + 85 °C; 65 V_{DC} AT + 125 °C										
2.5	C	109D255X0100C0	26.5	950	1	2	- 16	+ 7	+ 8	100
3.0	C	109D305X0100C0	10	800	1	2	- 16	+ 7	+ 8	110
4.7	C	109D475X0100C0	10	500	1	2	- 16	+ 7	+ 8	130
10	F	109D106X0100F0	6	215	1	4	- 16	+ 7	+ 8	190
11	F	109D116X0100F0	6	200	1	4	- 16	+ 7	+ 8	230
22	F	109D226X0100F0	7	100	1	9	- 16	+ 7	+ 8	230
30	T	109D306X0100T0	4	80	2	12	- 16	+ 7	+ 8	340
43	T	109D436X0100T0	6	70	2	17	- 20	+ 7	+ 8	300
125 V_{DC} AT + 85 °C; 85 V_{DC} AT + 125 °C										
1.7	C	109D175X0125C0	54.6	1250	1	2	- 16	+ 7	+ 8	100
3.6	C	109D365X0125C0	15	600	1	2	- 16	+ 7	+ 8	110
9	F	109D905X0125F0	15	240	1	5	- 16	+ 7	+ 8	210
14	F	109D146X0125F0	12	167	1	7	- 16	+ 7	+ 8	190
25	T	109D256X0125T0	10	93	2	13	- 16	+ 7	+ 8	260

Note

[1] Part numbers shown are for units with ± 20 % capacitance tolerance and uninsulated capacitors. For ± 10 % units, change the digit following the letter “X” from “0” to “9”. For units with outer plastic-film insulation, substitute “2” for “0” at the end of the part number. For RoHS compliant add “E3“.

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EXTENDED RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER [1]	MAX. ESR AT + 25 °C 120 Hz (Ω)	MAX. IMP. AT - 55 °C 120 Hz (Ω)	MAX. DCL (µA) AT		MAX. CAPACITANCE CHANGE (%) AT			MAX. RMS RIPPLE CURRENT 120 Hz (mA)
					+ 25 °C	+ 85 °C + 125 °C	- 55 °C	+ 85 °C	+ 125 °C	
6 V_{DC} AT + 85 °C; 4 V_{DC} AT + 125 °C										
140	C	109D147X0006C2	3	54	2	9	- 45	+ 13	+ 16	160
820	F	109D827X0006F0	2.5	18	3	14	- 88	+ 16	+ 20	300
1500	T	109D158X0006T0	1.5	18	5	20	- 90	+ 20	+ 25	480
2200	K	109D228X0006K0	1	13	6	24	- 90	+ 25	+ 30	670
8 V_{DC} AT + 85 °C; 5 V_{DC} AT + 125 °C										
680	F	109D687X0008F0	2.5	22	3	14	- 83	+ 16	+ 20	300
10 V_{DC} AT + 85 °C; 7 V_{DC} AT + 125 °C										
120	C	109D127X0010C0	4	60	2	9	- 45	+ 13	+ 16	160
150	C	109D157X0010C0	3	54	2	9	- 55	+ 13	+ 16	180
470	F	109D477X0010F0	2.5	30	3	16	- 65	+ 16	+ 20	300
560	F	109D567X0010F0	2.5	27	3	16	- 77	+ 16	+ 20	300
1000	T	109D108X0010T0	1.5	20	5	20	- 75	+ 20	+ 25	480
1200	T	109D128X0010T0	1.5	18	5	20	- 88	+ 20	+ 25	480
1200	K	109D128X0010K0	1	18	7	25	- 75	+ 30	+ 30	670
1500	K	109D158X0010K0	1	15	7	25	- 88	+ 25	+ 30	670
15 V_{DC} AT + 85 °C; 10 V_{DC} AT + 125 °C										
82	C	109D826X0015C0	4	80	2	9	- 38	+ 13	+ 16	160
100	C	109D107X0015C0	4	72	2	9	- 44	+ 13	+ 16	160
330	F	109D337X0015F0	2.5	35	3	16	- 60	+ 16	+ 20	300
390	F	109D397X0015F0	2.5	31	3	16	- 66	+ 16	+ 20	300
510	T	109D517X0015T0	1.8	25	6	24	- 65	+ 20	+ 25	340
820	T	109D827X0015T0	1.8	22	6	24	- 77	+ 20	+ 25	440
820	K	109D827X0015K0	1.2	20	8	32	- 70	+ 30	+ 30	610
1000	K	109D108X0015K0	1.2	17	8	32	- 77	+ 25	+ 30	610
25 V_{DC} AT + 85 °C; 15 V_{DC} AT + 125 °C										
68	C	109D686X0025C0	4.3	90	2	9	- 40	+ 12	+ 15	160
270	F	109D277X0025F0	2.7	33	3	16	- 62	+ 13	+ 16	300
560	T	109D567X0025T0	1.8	24	7	28	- 72	+ 20	+ 25	440
680	K	109D687X0025K0	1.2	19	8	32	- 72	+ 25	+ 30	610
750	K	109D757X0025K2	1.0	18	8	29	- 60	+ 25	+ 25	610
30 V_{DC} AT + 85 °C; 20 V_{DC} AT + 125 °C										
39	C	109D396X0030C0	5.2	110	2	- 28	+ 10	+ 12		140
47	C	109D476X0030C0	5.2	100	2	9	- 30	+ 10	+ 12	140
56	C	109D566X0030C0	5.2	100	2	9	- 38	+ 12	+ 15	140
150	F	109D157X0030F0	2.5	40	3	9	- 40	+ 12	+ 15	300
180	F	109D187X0030F0	2.5	40	3	16	- 45	+ 13	+ 16	300
220	F	109D227X0030F0	2.5	36	3	16	- 60	+ 13	+ 16	300
330	T	109D337X0030T0	1.8	28	8	16	- 45	+ 20	+ 25	440
390	T	109D397X0030T0	1.8	28	8	32	- 50	+ 20	+ 25	440
470	T	109D477X0030T0	1.8	25	8	32	- 65	+ 20	+ 25	550
560	K	109D567X0030K0	1.3	20	9	32	- 65	+ 25	+ 30	590

Note

[1] Part numbers shown are for units with ± 20 % capacitance tolerance and uninsulated capacitors. For ± 10 % units, change the digit following the letter “X” from “0” to “9”. For units with outer plastic-film insulation, substitute “2” for “0” at the end of the part number. For RoHS compliant add “E3“.

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EXTENDED RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER [1]	MAX. ESR AT + 25 °C 120 Hz (Ω)	MAX. IMP. AT - 55 °C 120 Hz (Ω)	MAX. DCL (µA) AT		MAX. CAPACITANCE CHANGE (%) AT			MAX. RMS RIPPLE CURRENT 120 Hz (mA)
					+ 25 °C	+ 85 °C + 125 °C	- 55 °C	+ 85 °C	+ 125 °C	
50 V_{DC} AT + 85 °C; 30 V_{DC} AT + 125 °C										
33	C	109D336X0050C0	5	135	2	9	- 29	+ 10	+ 12	140
120	F	109D127X0050F0	2.5	49	4	24	- 42	+ 12	+ 15	300
270	T	109D277X0050T0	1.8	29	8	32	- 46	+ 20	+ 25	440
330	K	109D337X0050K0	1.5	22	9	36	- 46	+ 25	+ 30	550
60 V_{DC} AT + 85 °C; 40 V_{DC} AT + 125 °C										
27	C	109D276X0060C0	5	144	3	12	- 24	+ 10	+ 12	140
68	F	109D686X0060F0	3	60	3	20	- 30	+ 12	+ 15	270
100	F	109D107X0060F0	2.5	54	4	20	- 36	+ 12	+ 15	300
140	T	109D147X0060T0	2	32	8	32	- 30	+ 16	+ 20	420
220	T	109D227X0060T0	1.8	29	8	32	- 40	+ 16	+ 20	440
270	K	109D277X0060K0	1.5	23	9	36	- 45	+ 20	+ 25	550
75 V_{DC} AT + 85 °C; 50 V_{DC} AT + 125 °C										
12	C	109D126X0075C0	5	175	2	12	- 12	+ 8	+ 10	140
15	C	109D156X0075C0	5	160	2	12	- 14	+ 10	+ 12	140
22	C	109D226X0075C0	5	157	3	12	- 19	+ 10	+ 12	140
47	F	109D476X0075F0	3	75	4	24	- 18	+ 10	+ 12	270
56	F	109D566X0075F0	3	70	4	24	- 20	+ 12	+ 15	270
82	F	109D826X0075F0	2.5	63	4	24	- 30	+ 12	+ 15	300
110	T	109D117X0075T0	2	33	9	36	- 25	+ 16	+ 20	420
180	T	109D187X0075T0	1.8	30	9	36	- 35	+ 16	+ 20	440
220	K	109D227X0075K0	2.2	24	10	40	- 40	+ 20	+ 25	450
270	K	109D277X0075K2	1.3	24	10	40	- 40	+ 20	+ 25	450
100 V_{DC} AT + 85 °C; 65 V_{DC} AT + 125 °C										
8.2	C	109D825X0100C0	6	250	3	12	- 12	+ 12	+ 12	130
10	C	109D106X0100C0	6	200	3	12	- 17	+ 10	+ 12	130
33	F	109D336X0100F0	3.5	85	4	24	- 18	+ 15	+ 15	250
39	F	109D396X0100F0	3.5	80	5	24	- 20	+ 12	+ 15	250
56	T	109D566X0100T0	2.2	45	9	36	- 20	+ 15	+ 15	400
68	T	109D686X0100T0	2.2	40	10	40	- 30	+ 14	+ 16	400
86	K	109D866X0100K0	3.2	30	10	40	- 25	+ 15	+ 15	370
125 V_{DC} AT + 85 °C; 85 V_{DC} AT + 125 °C										
6.8	C	109D685X0125C0	11.7	300	3	12	- 14	+ 10	+ 12	130
27	F	109D276X0125F0	3.5	90	5	24	- 18	+ 12	+ 15	250
47	T	109D476X0125T0	2.2	50	10	40	- 26	+ 14	+ 16	400
56	K	109D566X0125K0	4.1	32	10	40	- 25	+ 15	+ 15	330

Note

[1] Part numbers shown are for units with ± 20 % capacitance tolerance and uninsulated capacitors. For ± 10 % units, change the digit following the letter “X” from “0” to “9”. For units with outer plastic-film insulation, substitute “2” for “0” at the end of the part number. For RoHS compliant add “E3“.

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