

# Solid Tantalum Chip Capacitors

## TANTAMOUNT<sup>®</sup>, Conformal Coated, Maximum CV, Low ESR


**FEATURES**

- Large capacitance rating range
- Lowest ESR for a surface mount tantalum chip capacitor
- Terminations: Tin (2) standard
- 8 mm, 12 mm tape and reel packaging available per EIA 481-1 and reeling per IEC 286-3. 7" [178 mm] standard. 13" [330 mm] available.
- Case code compatibility with EIA 535BAAC and CECC30801 molded chips
- Compliant to RoHS directive 2002/95/EC


**RoHS\***  
COMPLIANT

**PERFORMANCE/ELECTRICAL CHARACTERISTICS**
**Operating Temperature:** - 55 °C to + 85 °C  
(To + 125 °C with voltage derating)

**Note**

- Refer to Doc. 40088

**Capacitance Range:** 1.0 μF to 1500 μF

**Capacitance Tolerance:** ± 10 %, ± 20 % standard

**Voltage Rating:** 4 WVDC to 50 WVDC

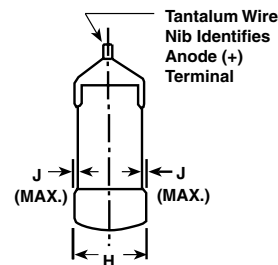
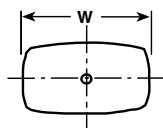
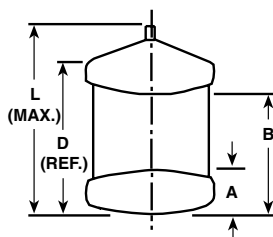
**Equivalent Series Resistance:** ESR readings measured at 100 kHz, + 25 °C from 3500 mΩ to 30 mΩ

**ORDERING INFORMATION**

594D TYPE	477 CAPACITANCE	X0 CAPACITANCE TOLERANCE	004 DC VOLTAGE RATING AT + 85 °C	R CASE CODE	2 TERMINATION	T PACKAGING
	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 %	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	2 = 100 % Tin 4 = Gold plated 8 = Solder plated (60/40) Special order	T = Tape and reel 7" [178 mm] reel W = 13" [330 mm] reel See tape and reel specifications.

**Notes**

- Preferred Tolerance and reel sizes are in bold.
- We reserve the right to supply higher voltage ratings and tighter capacitance tolerance capacitors in the same case size.
- Voltage substitutions will be marked with the higher voltage rating.

**DIMENSIONS in inches [millimeters]**


CASE CODE	L (MAX.)	W	H	A	B	D (REF.)	J (MAX.)
B	0.158 [4.0]	0.110 + 0.012 - 0.016 [2.8 + 0.3 - 0.4]	0.075 + 0.012 - 0.024 [1.9 + 0.3 - 0.6]	0.031 ± 0.012 [0.80 ± 0.30]	0.097 ± 0.016 [2.5 ± 0.4]	0.138 [3.5]	0.004 [0.1]
C	0.281 [7.1]	0.126 ± 0.012 [3.2 ± 0.3]	0.098 ± 0.012 [2.5 ± 0.3]	0.051 ± 0.012 [1.3 ± 0.30]	0.180 ± 0.024 [4.6 ± 0.6]	0.236 [6.0]	0.004 [0.1]
D	0.293 [7.5]	0.170 + 0.012/- 0.024 [4.3 + 0.3/- 0.6]	0.110 ± 0.012 [2.8 ± 0.3]	0.051 ± 0.012 [1.3 ± 0.30]	0.180 ± 0.024 [4.6 ± 0.6]	0.253 [6.4]	0.004 [0.1]
R	0.283 [7.2]	0.235 + 0.012/- 0.024 [6.0 + 0.3/- 0.6]	0.136 ± 0.012 [3.5 ± 0.3]	0.051 ± 0.012 [1.3 ± .30]	0.180 ± 0.024 [4.6 ± 0.6]	0.243 [6.2]	0.004 [0.1]

**Notes**

- The anode termination (D less B) will be a minimum of 0.012" [0.3 mm].
- \* Pb containing terminations are not RoHS compliant, exemptions may apply

RATINGS AND CASE CODES								
μF	4 V	6.3 V	10 V	16 V	20 V	25 V	35 V	50 V
1.0								B
1.5								
2.2							B	
3.3						B		
4.7					B		B	C
6.8					B		C	D
10					B	B		
15			B	B		C	C/D	R
22		B		B	B/C	C	D	
33	B		B	B/C		D	R	
47			B	B/C	C	D	R	
68			B/C	C/D		D/R		
100	B*	B	B/C	C/D	D	R		
120		C	C		R			
150	B/C		C/D	D				
180			D	R				
220		C/D	C/D	R				
270	D							
330	C*	C/D	D/R	R				
390		R						
470	C/R	D/R	R					
560								
680	D	R	R					
1000		R						
1500	R							

**Note**

\* Preliminary values, contact factory for availability

STANDARD RATINGS							
CAPACITANCE (μF)	CASE CODE	PART NUMBER	MAX. DCL AT + 25 °C (μA)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz I <sub>rms</sub> (A)	
<b>4 WVDC AT + 85 °C, 2.7 WVDC AT + 125 °C</b>							
33	B	594D336X_004B2T	1.3	6	0.38	0.47	
100*	B*	594D107X_004B2T*	4.0*	8*	0.30*	0.53*	
150	B	594D157X_004B2T	6.0	8	0.25	0.58	
150	C	594D157X_004C2T	6.0	8	0.08	1.17	
270	D	594D277X_004D2T	10.8	8	0.06	1.58	
330*	C*	594D337X_004C2T*	13.2*	8*	0.08*	1.17*	
470	C	594D477X_004C2T	18.8	10	0.075	1.21	
470	R	594D477X_004R2T	18.8	10	0.045	2.36	
680	D	594D687X_004D2T	27.2	12	0.060	1.58	
1500	R	594D158X_004R2T	60.0	20	0.030	2.89	
<b>6.3 WVDC AT + 85 °C, 4 WVDC AT + 125 °C</b>							
22	B	594D226X_6R3B2T	1.4	6	0.380	0.47	
100	B	594D107X_6R3B2T	6.3	6	0.250	0.58	
120	C	594D127X_6R3C2T	7.6	8	0.085	1.48	
220	C	594D227X_6R3C2T	13.9	8	0.080	1.37	
220	D	594D227X_6R3D2T	13.9	8	0.065	1.52	
330	C	594D337X_6R3C2T	20.8	8	0.080	1.17	
330	C	594D337X_6W3C2T	20.8	8	0.080	1.17	
330	D	594D337X_6R3D2T	20.8	8	0.060	1.58	
390	R	594D397X_6R3R2T	24.6	8	0.045	2.36	
470	D	594D477X_6R3D2T	29.6	10	0.060	1.58	
470	D	594D477X_6W3D2T	29.6	10	0.060	1.58	
470	R	594D477X_6R3R2T	29.6	10	0.050	2.24	

**Note**

\* Preliminary values, contact factory for availability. For 10 % tolerance, specify "9"; for 20 % tolerance, change to "0".



Solid Tantalum Chip Capacitors TANTAMOUNT®  
Conformal Coated, Maximum CV, Low ESR

Vishay Sprague

<b>STANDARD RATINGS</b>						
CAPACITANCE ( $\mu$ F)	CASE CODE	PART NUMBER	MAX. DCL AT + 25 °C ( $\mu$ A)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz ( $\Omega$ )	MAX. RIPPLE 100 kHz I <sub>rms</sub> (A)
<b>6.3 WVDC AT + 85 °C, 4 WVDC AT + 125 °C</b>						
680	R	594D687X_6R3R2T	42.8	12	0.045	2.36
680	R	594D687X_6W3R2T	42.8	12	0.045	2.36
1000	R	594D108X_6R3R2T	63.0	16	0.030	2.89
1000	R	594D108X_6W3R2T	63.0	16	0.030	2.89
<b>10 WVDC AT + 85 °C, 7 WVDC AT + 125 °C</b>						
15	B	594D156X_010B2T	1.5	6	0.50	0.41
33	B	594D336X_010B2T	3.3	6	0.50	0.41
47	B	594D476X_010B2T	4.7	6	0.40	0.46
68	B	594D686X_010B2T	6.8	6	0.350	0.49
68	C	594D686X_010C2T	6.8	6	0.100	1.05
100	B	594D107X_010B2T	10	12	0.250	0.57
100	C	594D107X_010C2T	10	8	0.095	1.08
120	C	594D127X_010C2T	10.2	7	0.095	1.08
150	C	594D157X_010C2T	15	8	0.090	1.11
150	D	594D157X_010D2T	15	8	0.075	1.41
180	D	594D187X_010D2T	14.4	7	0.090	1.29
220	C	594D227X_010C2T	22	8	0.100	1.05
220	D	594D227X_010D2T	22	8	0.065	1.52
330	D	594D337X_010D2T	33	8	0.065	1.52
330	R	594D337X_010R2T	33	8	0.045	2.36
470	R	594D477X_010R2T	47	10	0.045	2.36
680	R	594D687X_010R2T	68	14	0.045	2.36
<b>16 WVDC AT + 85 °C, 10 WVDC AT + 125 °C</b>						
15	B	594D156X_016B2T	2.4	6	0.55	0.39
22	B	594D226X_016B2T	3.5	6	0.500	0.41
33	B	594D336X_016B2T	5.3	6	0.500	0.41
33	C	594D336X_016C2T	5.3	6	0.150	0.86
47	B	594D476X_016B2T	7.5	6	0.72	0.34
47	C	594D476X_016C2T	7.5	6	0.110	1.00
68	C	594D686X_016C2T	10.9	6	0.123	0.95
68	D	594D686X_016D2T	10.9	6	0.095	1.26
100	C	594D107X_016C2T	16	8	0.080	1.17
100	D	594D107X_016D2T	16	8	0.075	1.41
150	D	594D157X_016D2T	24	8	0.085	1.33
180	R	594D187X_016R2T	28.8	8	0.055	2.13
220	R	594D227X_016R2T	35.2	8	0.055	2.13
330	R	594D337X_016R2T	52.8	8	0.055	2.13
<b>20 WVDC AT + 85 °C, 13 WVDC AT + 125 °C</b>						
4.7	B	594D475X_020B2T	0.9	6	0.90	0.31
6.8	B	594D685X_020B2T	1.4	6	0.90	0.31
10	B	594D106X_020B2T	2.0	6	0.85	0.32
22	B	594D226X_020B2T	4.4	6	0.60	0.38
22	C	594D226X_020C2T	4.4	6	0.150	0.86
47	C	594D476X_020C2T	9.4	6	0.140	0.89
47	D	594D476X_020D2T	9.4	6	0.095	1.26
100	D	594D107X_020D2T	20	8	0.085	1.33
120	R	594D127X_020R2T	24	8	0.080	1.77
<b>25 WVDC AT + 85 °C, 17 WVDC AT + 125 °C</b>						
3.3	B	594D335X_025B2T	0.8	6	1.50	0.24
10	B	594D106X_025B2T	2.5	6	0.900	0.31
15	C	594D156X_025C2T	3.8	6	0.220	0.70
22	C	594D226X_025C2T	5.5	6	0.200	0.74
33	D	594D336X_025D2T	8.3	6	0.130	1.05
47	D	594D476X_025D2T	11.8	6	0.130	1.07

**Note**

\* Preliminary values, contact factory for availability. For 10 % tolerance, specify "9"; for 20 % tolerance, change to "0".

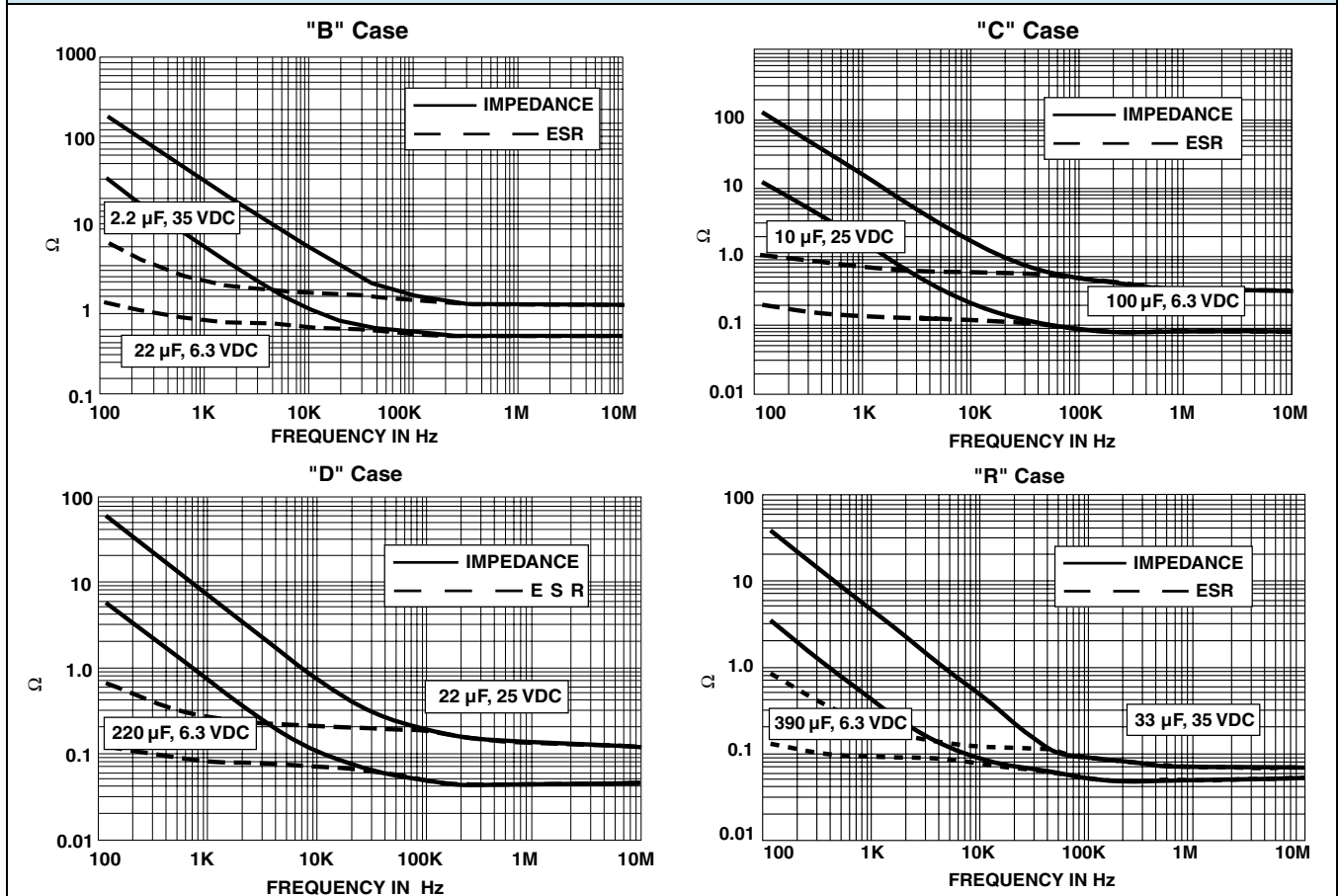


STANDARD RATINGS							
CAPACITANCE (μF)	CASE CODE	PART NUMBER	MAX. DCL AT + 25 °C (μA)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz Irms (A)	
<b>25 WVDC AT + 85 °C, 17 WVDC AT + 125 °C</b>							
68	D	594D686X_025D2T	17	8	0.200	1.00	
68	R	594D686X_025R2T	17	6	0.095	1.60	
100	R	594D107X_025R2T	25	8	0.090	1.67	
<b>35 WVDC AT + 85 °C, 23 WVDC AT + 125 °C</b>							
2.2	B	594D225X_035B2T	0.8	6	1.70	0.22	
4.7	B	594D475X_035B2T	1.6	6	1.40	0.25	
6.8	C	594D685X_035C2T	2.4	6	0.43	0.51	
15	C	594D156X_035C2T	5.3	6	0.40	0.52	
15	D	594D156X_035D2T	5.3	6	0.27	0.75	
22	D	594D226X_035D2T	7.7	6	0.27	0.75	
33	R	594D336X_035R2T	11.6	6	0.20	1.12	
47	R	594D476X_035R2T	16.6	6	0.20	1.12	
<b>50 WVDC AT + 85 °C, 33 WVDC AT + 125 °C</b>							
1.0	B	594D105X_050B2T	0.5	4	3.5	0.16	
4.7	C	594D475X_050C2T	2.4	6	0.8	0.33	
6.8	D	594D685X_050D2T	3.4	6	0.45	0.58	
15	R	594D156X_050R2T	7.5	6	0.35	0.85	

**Note**

\* Preliminary values, contact factory for availability. For 10 % tolerance, specify "9"; for 20 % tolerance, change to "0".

**TYPICAL CURVES AT + 25 °C, IMPEDANCE AND ESR VS. FREQUENCY**





## Disclaimer

All product specifications and data are subject to change without notice.

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 herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

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.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.