

# 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

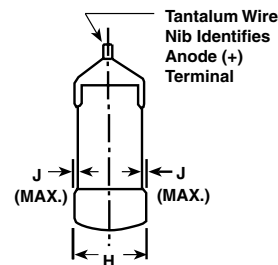
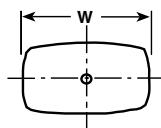
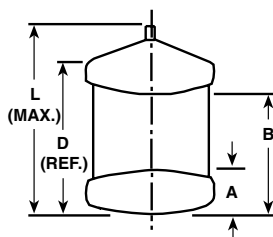
**Equivalent Series Resistance:** ESR readings measured at 100 kHz, + 25 °C from 3500 mΩ to 30 mΩ

**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**

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Vishay Sprague

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>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".

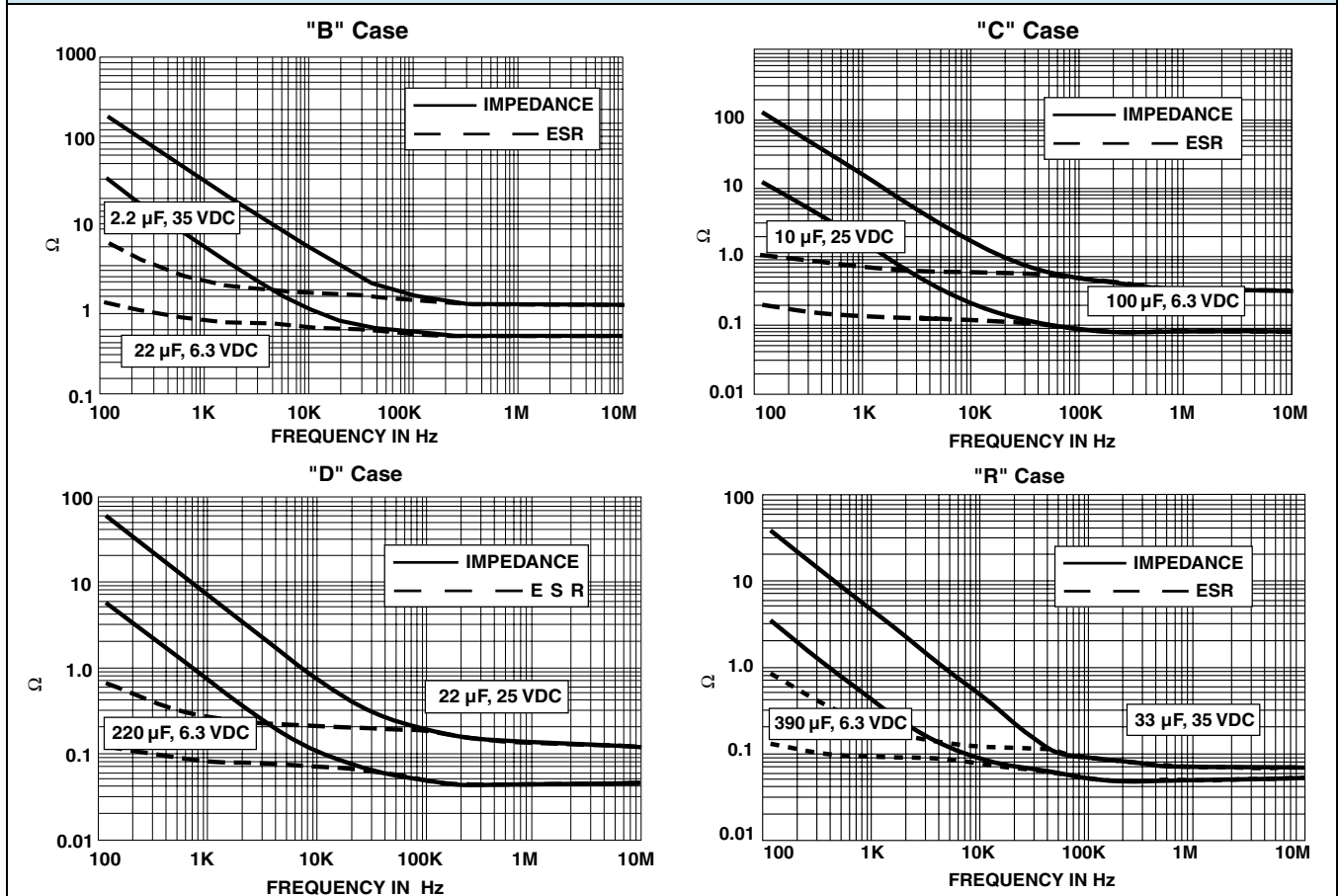


STANDARD RATINGS							
CAPACITANCE (μF)	CASE CODE	PART NUMBER	MAX. DCL AT + 25 °C (μA)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz Irms (A)	
<b>25 WVDC AT + 85 °C, 17 WVDC AT + 125 °C</b>							
68	D	594D686X_025D2T	17	8	0.200	1.00	
68	R	594D686X_025R2T	17	6	0.095	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**

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





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