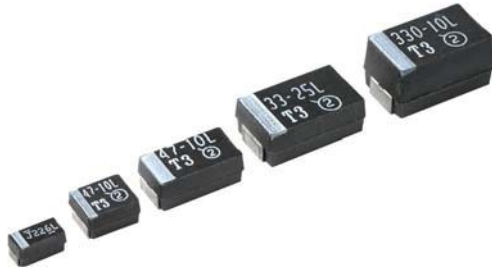


# Solid Tantalum Surface Mount Capacitors

## TANTAMOUNT<sup>®</sup>, Molded Case, Standard Industrial Grade


**FEATURES**

- Terminations: 100 % matte tin, standard, tin/lead available
- Compliant terminations
- Molded case available in six case codes
- Compatible with "High Volume" automatic pick and place equipment
- Optical character recognition qualified
- Meets IEC specification QC300801/US0001 and EIA535BAAC mechanical and performance requirements
- Compliant to RoHS Directive 2002/95/EC
- Moisture sensitivity level 1


**RoHS\***  
COMPLIANT

**Note**

\* Pb containing terminations are not RoHS compliant, exemptions may apply

**PERFORMANCE/ELECTRICAL CHARACTERISTICS**
[www.vishay.com/doc?40088](http://www.vishay.com/doc?40088)

**Operating Temperature:** - 55 °C to + 85 °C  
(to + 125 °C with voltage derating)

**Capacitance Range:** 0.10 μF to 1000 μF

**Capacitance Tolerance:** ± 5 %, ± 10 %, ± 20 %

**100 % Surge Current Tested (D and E Case Codes)**

**Voltage Rating:** 4 V<sub>DC</sub> to 63 V<sub>DC</sub>

ORDERING INFORMATION					
293D	107	X9	010	D	2WE3
TYPE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C	CASE CODE	TERMINATION AND 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 % X5 = ± 5 % (special order)	This is expressed in V. 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	2TE3: Matte tin, 7" (178 mm) reel and Case 2WE3: Matte tin, 13" (330 mm) reel 8T: Tin/lead, 7" (178 mm) reel 8W: Tin/lead, 13" (330 mm) reel

**Note**

- 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.
- Dry pack is available per request, contact regional marketing.

DIMENSIONS in inches [millimeters]							
CASE CODE	EIA SIZE	L	W	H	P	T <sub>W</sub>	T <sub>H</sub> (MIN.)
A	3216-18	0.126 ± 0.008 [3.2 ± 0.20]	0.063 ± 0.008 [1.6 ± 0.20]	0.063 ± 0.008 [1.6 ± 0.20]	0.031 ± 0.012 [0.80 ± 0.30]	0.047 ± 0.004 [1.2 ± 0.10]	0.028 [0.70]
B	3528-21	0.138 ± 0.008 [3.5 ± 0.20]	0.110 ± 0.008 [2.8 ± 0.20]	0.075 ± 0.008 [1.9 ± 0.20]	0.031 ± 0.012 [0.80 ± 0.30]	0.087 ± 0.004 [2.2 ± 0.10]	0.028 [0.70]
C	6032-28	0.236 ± 0.012 [6.0 ± 0.30]	0.126 ± 0.012 [3.2 ± 0.30]	0.098 ± 0.012 [2.5 ± 0.30]	0.051 ± 0.012 [1.3 ± 0.30]	0.087 ± 0.004 [2.2 ± 0.10]	0.039 [1.0]
D	7343-31	0.287 ± 0.012 [7.3 ± 0.30]	0.169 ± 0.012 [4.3 ± 0.30]	0.110 ± 0.012 [2.8 ± 0.30]	0.051 ± 0.012 [1.3 ± 0.30]	0.094 ± 0.004 [2.4 ± 0.10]	0.039 [1.0]
E	7343-43	0.287 ± 0.012 [7.3 ± 0.30]	0.169 ± 0.012 [4.3 ± 0.30]	0.157 ± 0.012 [4.0 ± 0.30]	0.051 ± 0.012 [1.3 ± 0.30]	0.094 ± 0.004 [2.4 ± 0.10]	0.039 [1.0]
V	7343-20	0.287 ± 0.012 [7.3 ± 0.30]	0.169 ± 0.012 [4.3 ± 0.30]	0.079 max [2.0 max]	0.051 ± 0.012 [1.3 ± 0.30]	0.094 ± 0.004 [2.4 ± 0.10]	0.039 [1.0]

RATINGS AND CASE CODES									
μF	4 V	6.3 V	10 V	16 V	20 V	25 V	35 V	50 V	63 V
0.10						A	A	A	
0.15							A	A/B	
0.22							A	A/B	
0.33						A	A	A/B	
0.47			A		A	A	A/B	A/B/C	
0.68				A	A	A	A/B	B/C	
1.0			A	A	A/B	A/B	A/B	B/C	
1.5		A	A	A/B	A/B	A/B	B/C	B/C/D	
2.2	A	A	A/B	A/B	A/B	A/B/C	B/C	B/C/D	
3.3	A	A/B	A/B	A/B	A/B/C	A/B/C	B/C/D	C/D	
4.7	A/B	A/B	A/B/C	A/B/C	A/B/C	A/B/C/D	B/C/D	C/D/E	D
6.8	A/B	A/B	A/B/C	A/B/C	A/B/C	B/C/D	C/D	D/E	
10	A/B	A/B/C	A/B/C	A/B/C/D	B/C/D	B/C/D	C/D	D/E	E
15	A/B/C	A/B/C	A/B/C	B/C	B/C/D	B/C/D	D/E	E	
22	A/B/C	A/B/C	A/B/C/D	B/C/D	B/C/D	C/D/E/V	D/E		
33	A/B/C	A/B/C	B/C/D	B/C/D	C/D	D/E			
47	A/B/C	A/B/C/D	B/C/D	C/D/E	D/E	D/E			
68	B/C/D	B/C/D	B/C/D/E/V	D/E	D/E				
100	A/B/C/D	B/C/D/E	B/C/D/E/V	D/E	D/E				
120	D	D	E						
150	B/C/D	C/D/E	C/D/E	D/E					
220	B/C/D/E	C/D/E	D/E/V	E					
330	D/E	D/E	D/E						
470	D/E	D/E	E						
680	D/E	E							
1000	E	E							

MARKING																						
<p><b>A Case</b></p>	<table border="1"> <thead> <tr> <th colspan="2">"A" CASE VOLTAGE CODE</th> </tr> <tr> <th>VOLTS</th> <th>CODE</th> </tr> </thead> <tbody> <tr><td>4.0</td><td>G</td></tr> <tr><td>6.3</td><td>J</td></tr> <tr><td>10</td><td>A</td></tr> <tr><td>16</td><td>C</td></tr> <tr><td>20</td><td>D</td></tr> <tr><td>25</td><td>E</td></tr> <tr><td>35</td><td>V</td></tr> <tr><td>50</td><td>T</td></tr> </tbody> </table>	"A" CASE VOLTAGE CODE		VOLTS	CODE	4.0	G	6.3	J	10	A	16	C	20	D	25	E	35	V	50	T	<p><b>B, C, D, E, V Cases</b></p>
"A" CASE VOLTAGE CODE																						
VOLTS	CODE																					
4.0	G																					
6.3	J																					
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20	D																					
25	E																					
35	V																					
50	T																					
<p><b>Marking</b>                  Capacitor marking includes an anode (+) polarity band, capacitance in microfarads and the voltage rating. "A" Case capacitors use a letter code for the voltage and EIA capacitance code.                  The Vishay Sprague® trademark is included if space permits. Capacitors rated at 6.3 V are marked 6 V.                  A manufacturing date code is marked on all capacitors.                  Capacitors might bear a slightly different marking than the one shown above. For example, rating 22 μF 10 V could be marked either as 22-10L or 22R10.                  Call the factory for further explanation.</p>																						



STANDARD RATINGS						
CAPACITANCE ( $\mu\text{F}$ )	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C ( $\mu\text{A}$ )	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz ( $\Omega$ )	MAX. RIPPLE 100 kHz $I_{\text{RMS}}$ (A)
<b>4 V<sub>DC</sub> AT + 85 °C; 2.7 V<sub>DC</sub> AT + 125 °C</b>						
2.2	A	293D225(1)004A(2)	0.5	6	7.60	0.10
3.3	A	293D335(1)004A(2)	0.5	6	7.60	0.10
4.7	A	293D475(1)004A(2)	0.5	6	6.30	0.11
4.7	B	293D475(1)004B(2)	0.5	6	7.00	0.11
6.8	A	293D685(1)004A(2)	0.5	6	5.50	0.12
6.8	B	293D685(1)004B(2)	0.5	6	3.40	0.16
10	A	293D106(1)004A(2)	0.5	6	5.10	0.12
10	B	293D106(1)004B(2)	0.5	6	3.50	0.16
15	A	293D156(1)004A(2)	0.6	6	3.40	0.15
15	B	293D156(1)004B(2)	0.6	6	2.90	0.17
15	C	293D156(1)004C(2)	0.6	6	2.80	0.20
22	A	293D226(1)004A(2)	0.9	6	2.90	0.16
22	B	293D226(1)004B(2)	0.9	6	2.50	0.18
22	C	293D226(1)004C(2)	0.9	6	1.80	0.25
33	A	293D336(1)004A(2)	1.3	6	2.90	0.16
33	B	293D336(1)004B(2)	1.3	6	2.00	0.21
33	C	293D336(1)004C(2)	1.3	6	1.80	0.25
47	A	293D476(1)004A(2)	1.9	14	2.50	0.17
47	B	293D476(1)004B(2)	1.9	6	1.90	0.21
47	C	293D476(1)004C(2)	1.9	6	1.80	0.25
68	B	293D686(1)004B(2)	2.7	6	1.90	0.21
68	C	293D686(1)004C(2)	2.7	6	1.40	0.28
68	D	293D686(1)004D(2)	2.7	6	0.80	0.43
100	A	293D107X0004A(2)	10.0	30	2.50	0.22
100	B	293D107(1)004B(2)	4.0	8	1.80	0.22
100	C	293D107(1)004C(2)	4.0	6	0.80	0.37
100	D	293D107(1)004D(2)	4.0	6	0.70	0.46
120	D	293D127(1)004D(2)	4.8	6	0.60	0.51
150	B	293D157(1)004B(2)	6.0	14	1.60	0.23
150	C	293D157(1)004C(2)	6.0	12	0.70	0.40
150	D	293D157(1)004D(2)	6.0	8	0.60	0.50
220	B	293D227X0004B(2)	8.8	18	1.50	0.24
220	C	293D227(1)004C(2)	8.8	8	0.70	0.40
220	D	293D227(1)004D(2)	8.8	8	0.60	0.50
220	E	293D227(1)004E(2)	8.8	8	0.50	0.57
330	D	293D337(1)004D(2)	13.2	8	0.60	0.50
330	E	293D337(1)004E(2)	13.2	8	0.50	0.57
470	D	293D477(1)004D(2)	18.8	10	0.60	0.50
470	E	293D477(1)004E(2)	18.8	10	0.50	0.57
680	D	293D687X0004D(2)	27.2	25	0.20	0.87
680	E	293D687(1)004E(2)	27.2	12	0.50	0.57
1000	E	293D108X0004E(2)	40.0	20	0.50	0.57

**Note**

- Part number definitions:
  - Tolerance: X0, X9
  - Terminations and packaging: 2TE3, 2WE3, 8T, 8W
  - Lead (Pb)-free terminations and packaging codes: 2TE3, 2WE3



STANDARD RATINGS						
CAPACITANCE ( $\mu$ F)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C ( $\mu$ A)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz ( $\Omega$ )	MAX. RIPPLE 100 kHz $I_{RMS}$ (A)
<b>6.3 V<sub>DC</sub> AT + 85 °C; 4 V<sub>DC</sub> AT 125 °C</b>						
1.5	A	293D155(1)6R3A(2)	0.5	6	2.90	0.16
2.2	A	293D225(1)6R3A(2)	0.5	6	7.60	0.10
3.3	A	293D335(1)6R3A(2)	0.5	6	6.30	0.11
3.3	B	293D335(1)6R3B(2)	0.5	6	5.50	0.12
4.7	A	293D475(1)6R3A(2)	0.5	6	5.50	0.12
4.7	B	293D475(1)6R3B(2)	0.5	6	4.40	0.14
6.8	A	293D685(1)6R3A(2)	0.5	6	5.00	0.12
6.8	B	293D685(1)6R3B(2)	0.5	6	3.40	0.16
10	A	293D106(1)6R3A(2)	0.6	6	3.40	0.15
10	B	293D106(1)6R3B(2)	0.6	6	2.90	0.17
10	C	293D106(1)6R3C(2)	0.6	6	3.00	0.19
15	A	293D156(1)6R3A(2)	0.9	6	2.90	0.16
15	B	293D156(1)6R3B(2)	0.9	6	2.50	0.18
15	C	293D156(1)6R3C(2)	0.9	6	1.80	0.25
22	A	293D226(1)6R3A(2)	1.3	6	2.90	0.16
22	B	293D226(1)6R3B(2)	1.3	6	2.00	0.21
22	C	293D226(1)6R3C(2)	1.3	6	1.80	0.25
33	A	293D336(1)6R3A(2)	2.0	14	2.50	0.17
33	B	293D336(1)6R3B(2)	2.0	6	1.90	0.21
33	C	293D336(1)6R3C(2)	2.0	6	1.50	0.27
47	A	293D476(1)6R3A(2)	2.8	12	1.60	0.22
47	B	293D476(1)6R3B(2)	2.8	6	1.90	0.21
47	C	293D476(1)6R3C(2)	2.8	6	1.40	0.28
47	D	293D476(1)6R3D(2)	2.8	6	0.80	0.43
68	B	293D686(1)6R3B(2)	4.1	6	1.80	0.22
68	C	293D686(1)6R3C(2)	4.1	6	0.80	0.37
68	D	293D686(1)6R3D(2)	4.1	6	0.70	0.46
100	B	293D107(1)6R3B(2)	6.0	15	1.70	0.22
100	C	293D107(1)6R3C(2)	6.0	6	0.80	0.37
100	D	293D107(1)6R3D(2)	6.0	6	0.70	0.46
100	E	293D107(1)6R3E(2)	6.0	8	0.70	0.49
120	D	293D127(1)6R3D(2)	6.3	8	0.70	0.46
150	C	293D157(1)6R3C(2)	9.0	8	0.70	0.40
150	D	293D157(1)6R3D(2)	9.0	8	0.60	0.50
150	E	293D157(1)6R3E(2)	9.0	8	0.50	0.57
220	C	293D227(1)6R3C(2)	13.9	14	0.70	0.39
220	D	293D227(1)6R3D(2)	13.2	8	0.60	0.50
220	E	293D227(1)6R3E(2)	13.2	8	0.50	0.57
330	D	293D337(1)6R3D(2)	19.8	8	0.60	0.50
330	E	293D337(1)6R3E(2)	19.8	8	0.50	0.57
470	D	293D477(1)6R3D(2)	28.2	14	0.50	0.55
470	E	293E477(1)6R3E(2)	28.2	10	1.50	0.57
680	E	293D687(1)6R3E(2)	42.8	20	0.50	0.57
1000	E	293D108X06R3E(2)	63.0	30	0.40	0.64

**Note**

- Part number definitions:
  - Tolerance: X0, X9
  - Terminations and packaging: 2TE3, 2WE3, 8T, 8W
  - Lead (Pb)-free terminations and packaging codes: 2TE3, 2WE3



STANDARD RATINGS						
CAPACITANCE ( $\mu$ F)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C ( $\mu$ A)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz ( $\Omega$ )	MAX. RIPPLE 100 kHz $I_{RMS}$ (A)
<b>10 V<sub>DC</sub> AT + 85 °C; 7 V<sub>DC</sub> AT 125 °C</b>						
0.47	A	293D474(1)010A(2)	0.5	4	14.00	0.07
1.0	A	293D105(1)010A(2)	0.5	4	9.60	0.09
1.5	A	293D155(1)010A(2)	0.5	6	8.00	0.10
2.2	A	293D225(1)010A(2)	0.5	6	6.30	0.11
2.2	B	293D225(1)010B(2)	0.5	6	4.60	0.14
3.3	A	293D335(1)010A(2)	0.5	6	5.50	0.12
3.3	B	293D335(1)010B(2)	0.5	6	5.50	0.12
4.7	A	293D475(1)010A(2)	0.5	6	5.00	0.12
4.7	B	293D475(1)010B(2)	0.5	6	3.40	0.16
4.7	C	293D475(1)010C(2)	0.5	6	2.30	0.22
6.8	A	293D685(1)010A(2)	0.7	6	4.20	0.13
6.8	B	293D685(1)010B(2)	0.7	6	2.90	0.17
6.8	C	293D685(1)010C(2)	0.7	6	1.90	0.24
10	A	293D106(1)010A(2)	1.0	6	3.40	0.15
10	B	293D106(1)010B(2)	1.0	6	2.50	0.18
10	C	293D106(1)010C(2)	1.0	6	1.80	0.25
15	A	293D156(1)010A(2)	1.5	6	2.90	0.16
15	B	293D156(1)010B(2)	1.5	6	2.00	0.21
15	C	293D156(1)010C(2)	1.5	6	1.80	0.25
22	A	293D226(1)010A(2)	2.2	8	2.50	0.17
22	B	293D226(1)010B(2)	2.2	6	1.90	0.21
22	C	293D226(1)010C(2)	2.2	6	1.50	0.27
22	D	293D226(1)010D(2)	2.2	6	1.50	0.32
33	B	293D336(1)010B(2)	3.3	6	1.90	0.21
33	C	293D336(1)010C(2)	3.3	6	1.40	0.28
33	D	293D336(1)010D(2)	3.3	6	0.80	0.43
47	B	293D476(1)010B(2)	4.7	6	1.80	0.22
47	C	293D476(1)010C(2)	4.7	6	1.10	0.32
47	D	293D476(1)010D(2)	4.7	6	0.70	0.46
68	B	293D686(1)010B(2)	6.8	14	1.80	0.22
68	C	293D686(1)010C(2)	6.8	6	1.00	0.33
68	D	293D686(1)010D(2)	6.8	6	0.70	0.46
68	E	293D686(1)010E(2)	6.8	6	0.80	0.45
68	V	293D686(1)010V(3)	6.8	6	0.70	0.42
100	B	293D107X0010B(2)	10.0	25	2.50	0.18
100	C	293D107(1)010C(2)	10.0	8	0.90	0.35
100	D	293D107(1)010D(2)	10.0	8	0.60	0.50
100	E	293D107(1)010E(2)	10.0	8	0.70	0.49
100	V	293D107(1)010V(3)	10.0	8	0.70	0.42
120	E	293D127(1)010E(2)	12.0	6	1.00	0.41
150	C	293D157X0010C(2)	15.0	20	0.90	0.35
150	D	293D157(1)010D(2)	15.0	8	0.60	0.50
150	E	293D157(1)010E(2)	15.0	8	0.50	0.57
220	D	293D227(1)010D(2)	22.0	8	0.60	0.50

Note

- Part number definitions:
  - (1) Tolerance: X0, X9
  - (2) Terminations and packaging: 2TE3, 2WE3, 8T, 8W
  - (3) Lead (Pb)-free terminations and packaging codes: 2TE3, 2WE3



STANDARD RATINGS						
CAPACITANCE ( $\mu$ F)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C ( $\mu$ A)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz ( $\Omega$ )	MAX. RIPPLE 100 kHz $I_{RMS}$ (A)
<b>10 V<sub>DC</sub> AT + 85 °C; 7 V<sub>DC</sub> AT 125 °C</b>						
220	E	293D227(1)010E(2)	22.0	8	0.50	0.57
220	V	293D227(1)010V(3)	30.0	12	0.50	0.50
330	D	293D337(1)010D(2)	33.0	15	0.50	0.57
330	E	293D337(1)010E(2)	33.0	10	0.50	0.57
470	E	293D477(1)010E(2)	47.0	15	0.50	0.57
<b>16 V<sub>DC</sub> AT + 85 °C; 10 V<sub>DC</sub> AT + 125 °C</b>						
0.68	A	293D684(1)016A(2)	0.5	4	10.40	0.08
1.0	A	293D105(1)016A(2)	0.5	4	9.30	0.09
1.5	A	293D155(1)016A(2)	0.5	6	6.70	0.11
1.5	B	293D155(1)016B(2)	0.5	6	6.40	0.12
2.2	A	293D225(1)016A(2)	0.5	6	5.90	0.11
2.2	B	293D225(1)016B(2)	0.5	6	4.60	0.14
3.3	A	293D335(1)016A(2)	0.5	6	5.00	0.12
3.3	B	293D335(1)016B(2)	0.5	6	3.50	0.16
4.7	A	293D475(1)016A(2)	0.8	6	5.00	0.12
4.7	B	293D475(1)016B(2)	0.8	6	2.90	0.17
4.7	C	293D475(1)016C(2)	0.8	6	2.90	0.19
6.8	A	293D685(1)016A(2)	1.1	6	4.20	0.13
6.8	B	293D685(1)016B(2)	1.1	6	2.50	0.18
6.8	C	293D685(1)016C(2)	1.1	6	1.90	0.24
10	A	293D106(1)016A(2)	1.6	6	3.00	0.16
10	B	293D106(1)016B(2)	1.6	6	2.00	0.21
10	C	293D106(1)016C(2)	1.6	6	1.80	0.25
10	D	293D106(1)016D(2)	2.5	6	1.20	0.35
15	B	293D156(1)016B(2)	2.4	6	2.00	0.21
15	C	293D156(1)016C(2)	2.4	6	1.50	0.27
22	B	293D226(1)016B(2)	3.5	6	1.90	0.21
22	C	293D226(1)016C(2)	3.5	6	1.40	0.28
22	D	293D226(1)016D(2)	3.5	6	0.80	0.43
33	B	293D336(1)016B(2)	5.3	6	1.80	0.22
33	C	293D336(1)016C(2)	5.3	6	1.10	0.32
33	D	293D336(1)016D(2)	5.3	6	0.70	0.46
47	C	293D476(1)016C(2)	7.5	6	1.00	0.33
47	D	293D476(1)016D(2)	7.5	6	0.70	0.46
47	E	293D476(1)016E(2)	7.5	6	0.80	0.45
68	D	293D686(1)016D(2)	10.9	6	0.60	0.50
68	E	293D686(1)016E(2)	10.9	6	0.80	0.45
100	D	293D107(1)016D(2)	16.0	8	0.60	0.50
100	E	293D107(1)016E(2)	16.0	8	0.60	0.52
150	D	293D157(1)016D(2)	24.0	8	0.60	0.50
150	E	293D157(1)016E(2)	24.0	8	0.50	0.57
220	E	293D227(1)016E(2)	35.2	14	0.50	0.57

**Note**

- Part number definitions:
  - Tolerance: X0, X9
  - Terminations and packaging: 2TE3, 2WE3, 8T, 8W
  - Lead (Pb)-free terminations and packaging codes: 2TE3, 2WE3



STANDARD RATINGS						
CAPACITANCE ( $\mu$ F)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C ( $\mu$ A)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz ( $\Omega$ )	MAX. RIPPLE 100 kHz $I_{RMS}$ (A)
<b>20 V<sub>DC</sub> AT + 85 °C; 13 V<sub>DC</sub> AT + 125 °C</b>						
0.47	A	293D474(1)020A(2)	0.5	4	14.00	0.07
0.68	A	293D684(1)020A(2)	0.5	4	10.00	0.09
1.0	A	293D105(1)020A(2)	0.5	4	8.40	0.09
1.0	B	293D105(1)020B(2)	0.5	4	9.00	0.10
1.5	A	293D155(1)020A(2)	0.5	6	6.30	0.11
1.5	B	293D155(1)020B(2)	0.5	4.8	5.60	0.12
2.2	A	293D225(1)020A(2)	0.5	6	5.90	0.11
2.2	B	293D225(1)020B(2)	0.5	6	3.50	0.16
3.3	A	293D335(1)020A(2)	0.7	6	5.90	0.11
3.3	B	293D335(1)020B(2)	0.7	6	3.00	0.17
3.3	C	293D335(1)020C(2)	0.8	6	2.30	0.22
4.7	A	293D475(1)020A(2)	0.9	6	5.00	0.12
4.7	B	293D475(1)020B(2)	0.9	6	2.90	0.17
4.7	C	293D475(1)020C(2)	0.9	6	2.30	0.22
6.8	A	293D685(1)020A(2)	1.4	6	4.50	0.13
6.8	B	293D685(1)020B(2)	1.4	6	2.50	0.18
6.8	C	293D685(1)020C(2)	1.4	6	1.90	0.24
10	B	293D106(1)020B(2)	2.0	6	2.10	0.20
10	C	293D106(1)020C(2)	2.0	6	1.70	0.25
10	D	293D106(1)020D(2)	2.0	6	1.00	0.38
15	B	293D156(1)020B(2)	3.0	6	2.30	0.19
15	C	293D156(1)020C(2)	3.0	6	1.50	0.27
15	D	293D156(1)020D(2)	3.0	6	0.90	0.41
22	B	293D226(1)020B(2)	4.4	6	2.10	0.20
22	C	293D226(1)020C(2)	4.4	6	1.10	0.32
22	D	293D226(1)020D(2)	4.4	6	0.70	0.46
33	C	293D336(1)020C(2)	6.6	6	1.00	0.33
33	D	293D336(1)020D(2)	6.6	6	0.70	0.46
47	D	293D476(1)020D(2)	9.4	6	0.70	0.46
47	E	293D476(1)020E(2)	9.4	6	0.60	0.52
68	D	293D686(1)020D(2)	13.6	6	0.70	0.46
68	E	293D686(1)020E(2)	13.6	6	0.60	0.52
100	D	293D107(1)020D(2)	20.0	8	0.60	0.50
100	E	293D107(1)020E(2)	20.0	8	0.50	0.57
<b>25 V<sub>DC</sub> AT + 85 °C; 17 V<sub>DC</sub> AT + 125 °C</b>						
0.10	A	293D104(1)025A(2)	0.5	4	20.00	0.06
0.33	A	293D334(1)025A(2)	0.5	4	13.00	0.08
0.47	A	293D474(1)025A(2)	0.5	4	12.00	0.08
0.68	A	293D684(1)025A(2)	0.5	4	8.40	0.09
1.0	A	293D105(1)025A(2)	0.5	4	7.60	0.10
1.0	B	293D105(1)025B(2)	0.5	4	5.00	0.13
1.5	A	293D155(1)025A(2)	0.5	6	6.70	0.11
1.5	B	293D155(1)025B(2)	0.5	6	4.60	0.14
2.2	A	293D225(1)025A(2)	0.6	6	6.30	0.11

**Note**

- Part number definitions:
  - Tolerance: X0, X9
  - Terminations and packaging: 2TE3, 2WE3, 8T, 8W
  - Lead (Pb)-free terminations and packaging codes: 2TE3, 2WE3



STANDARD RATINGS						
CAPACITANCE ( $\mu$ F)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C ( $\mu$ A)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz ( $\Omega$ )	MAX. RIPPLE 100 kHz $I_{RMS}$ (A)
<b>25 V<sub>DC</sub> AT + 85 °C; 17 V<sub>DC</sub> AT + 125 °C</b>						
2.2	B	293D225(1)025B(2)	0.6	6	3.80	0.15
2.2	C	293D225(1)025C(2)	0.6	6	3.20	0.19
3.3	A	293D335(1)025A(2)	0.8	6	6.00	0.14
3.3	B	293D335(1)025B(2)	0.8	6	3.10	0.17
3.3	C	293D335(1)025C(2)	0.8	6	2.30	0.22
4.7	A	293D475(1)025A(2)	1.2	6	5.50	0.12
4.7	B	293D475(1)025B(2)	1.2	6	2.80	0.17
4.7	C	293D475(1)025C(2)	1.2	6	2.00	0.24
4.7	D	293D475(1)025D(2)	1.2	6	1.30	0.34
6.8	B	293D685(1)025B(2)	1.7	6	2.40	0.19
6.8	C	293D685(1)025C(2)	1.7	6	1.70	0.25
6.8	D	293D685(1)025D(2)	1.7	6	1.10	0.37
10	B	293D106(1)025B(2)	2.5	6	2.30	0.19
10	C	293D106(1)025C(2)	2.5	6	1.50	0.27
10	D	293D106(1)025D(2)	2.5	6	1.00	0.39
15	B	293D156(1)025B(2)	3.8	6	2.20	0.20
15	C	293D156(1)025C(2)	3.8	6	1.20	0.30
15	D	293D156(1)025D(2)	3.8	6	0.80	0.43
22	C	293D226(1)025C(2)	5.5	6	1.20	0.30
22	D	293D226(1)025D(2)	5.5	6	0.70	0.46
22	E	293D226(1)025E(2)	5.5	6	0.80	0.45
22	V	293D226(1)025V(3)	5.5	6	0.70	0.42
33	D	293D336(1)025D(2)	8.3	6	0.70	0.46
33	E	293D336(1)025E(2)	8.3	6	0.60	0.52
47	D	293D476(1)025D(2)	11.8	8	0.70	0.46
47	E	293D476(1)025E(2)	11.8	6	0.60	0.52
<b>35 V<sub>DC</sub> AT + 85 °C; 23 V<sub>DC</sub> AT + 125 °C</b>						
0.10	A	293D104(1)035A(2)	0.5	4	20.00	0.06
0.15	A	293D154(1)035A(2)	0.5	4	18.00	0.07
0.22	A	293D224(1)035A(2)	0.5	4	15.00	0.07
0.33	A	293D334(1)035A(2)	0.5	4	13.00	0.08
0.47	A	293D474(1)035A(2)	0.5	4	10.00	0.09
0.47	B	293D474(1)035B(2)	0.5	4	8.00	0.10
0.68	A	293D684(1)035A(2)	0.5	4	7.60	0.10
0.68	B	293D684(1)035B(2)	0.5	4	6.50	0.11
1.0	A	293D105(1)035A(2)	0.5	4	7.50	0.10
1.0	B	293D105(1)035B(2)	0.5	4	5.00	0.13
1.5	B	293D155(1)035B(2)	0.5	6	4.20	0.14
1.5	C	293D155(1)035C(2)	0.5	6	3.80	0.17
2.2	B	293D225(1)035B(2)	0.8	6	3.80	0.15
2.2	C	293D225(1)035C(2)	0.8	6	2.90	0.20
3.3	B	293D335(1)035B(2)	1.2	6	3.50	0.16
3.3	C	293D335(1)035C(2)	1.2	6	2.10	0.23
3.3	D	293D335(1)035D(2)	1.2	6	1.70	0.30

**Note**

- Part number definitions:
  - (1) Tolerance: X0, X9
  - (2) Terminations and packaging: 2TE3, 2WE3, 8T, 8W
  - (3) Lead (Pb)-free terminations and packaging codes: 2TE3, 2WE3





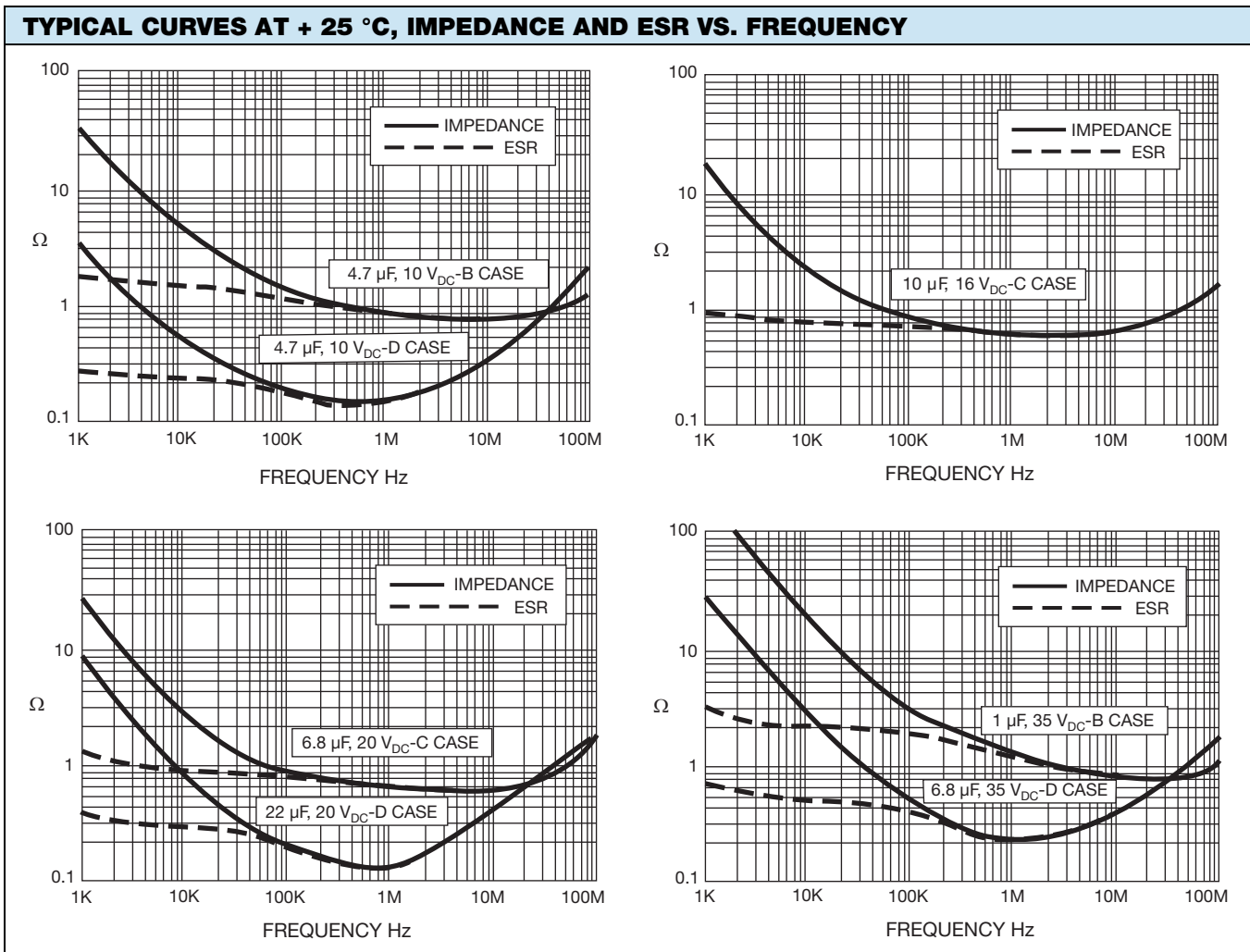
STANDARD RATINGS						
CAPACITANCE ( $\mu$ F)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C ( $\mu$ A)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz ( $\Omega$ )	MAX. RIPPLE 100 kHz $I_{RMS}$ (A)
<b>35 V<sub>DC</sub> AT + 85 °C; 23 V<sub>DC</sub> AT + 125 °C</b>						
4.7	B	293D475(1)035B(2)	1.7	6	3.10	0.17
4.7	C	293D475(1)035C(2)	1.6	6	1.90	0.24
4.7	D	293D475(1)035D(2)	1.6	6	1.30	0.34
6.8	C	293D685(1)035C(2)	2.4	6	1.80	0.25
6.8	D	293D685(1)035D(2)	2.4	6	1.10	0.37
10	C	293D106(1)035C(2)	3.5	6	1.60	0.26
10	D	293D106(1)035D(2)	3.5	6	0.80	0.43
15	D	293D156(1)035D(2)	5.3	6	0.70	0.46
15	E	293D156(1)035E(2)	5.3	6	0.70	0.49
22	D	293D226(1)035D(2)	7.7	6	0.60	0.52
22	E	293D226(1)035E(2)	7.7	6	0.60	0.52
<b>50 V<sub>DC</sub> AT + 85 °C; 33 V<sub>DC</sub> AT + 125 °C</b>						
0.10	A	293D104(1)050A(2)	0.5	4	19.00	0.06
0.15	A	293D154(1)050A(2)	0.5	4	17.00	0.07
0.15	B	293D154(1)050B(2)	0.5	4	14.00	0.08
0.22	A	293D224(1)050A(2)	0.5	4	15.00	0.07
0.22	B	293D224(1)050B(2)	0.5	4	12.00	0.08
0.33	A	293D334(1)050A(2)	0.5	4	14.00	0.07
0.33	B	293D334(1)050B(2)	0.5	4	10.00	0.09
0.47	A	293D474(1)050A(2)	0.5	4	12.00	0.08
0.47	B	293D474(1)050B(2)	0.5	4	8.40	0.10
0.47	C	293D474(1)050C(2)	0.5	4	6.70	0.13
0.68	B	293D684(1)050B(2)	0.5	4	7.60	0.11
0.68	C	293D684(1)050C(2)	0.5	4	5.90	0.14
1.0	B	293D105(1)050B(2)	0.5	4	6.70	0.11
1.0	C	293D105(1)050C(2)	0.5	4	4.60	0.16
1.5	B	293D155(1)050B(2)	0.8	6	6.00	0.12
1.5	C	293D155(1)050C(2)	0.8	6	3.40	0.18
1.5	D	293D155(1)050D(2)	0.8	6	2.90	0.23
2.2	B	293D225(1)050B(2)	1.1	6	3.50	0.16
2.2	C	293D225(1)050C(2)	1.1	6	2.90	0.20
2.2	D	293D225(1)050D(2)	1.1	6	2.10	0.27
3.3	C	293D335(1)050C(2)	1.7	6	2.50	0.21
3.3	D	293D335(1)050D(2)	1.7	6	1.70	0.30
4.7	C	293D475(1)050C(2)	2.4	6	1.50	0.27
4.7	D	293D475(1)050D(2)	2.4	6	1.20	0.37
4.7	E	293D475(1)050E(2)	2.4	6	1.40	0.34
6.8	D	293D685(1)050D(2)	3.4	6	0.90	0.41
6.8	E	293D685(1)050E(2)	3.4	6	0.90	0.43
10	D	293D106(1)050D(2)	5.0	6	0.80	0.43
10	E	293D106(1)050E(2)	5.0	6	0.80	0.45
15	E	293D156(1)050E(2)	7.5	6	0.80	0.45
<b>63 V<sub>DC</sub> AT + 85 °C; 40 V<sub>DC</sub> AT + 125 °C</b>						
4.7	D	293D475(1)063D(2)	3.0	6	1.10	0.37
10	E	293D106(1)063E(2)	6.3	6	1.00	0.41

**Note**

- Part number definitions:
  - (1) Tolerance: X0, X9
  - (2) Terminations and packaging: 2TE3, 2WE3, 8T, 8W
  - (3) Lead (Pb)-free terminations and packaging codes: 2TE3, 2WE3



<b>RECOMMENDED VOLTAGE DERATING GUIDELINES</b> (for temperatures below + 85 °C)	
<b>STANDARD CONDITIONS. FOR EXAMPLE: OUTPUT FILTERS</b>	
Capacitor Voltage Rating	Operating Voltage
4.0	2.5
6.3	3.6
10	6.0
16	10
20	12
25	15
35	24
50	28
63	36
<b>SEVERE CONDITIONS. FOR EXAMPLE: INPUT FILTERS</b>	
Capacitor Voltage Rating	Operating Voltage
4.0	2.5
6.3	3.3
10	5.0
16	8.0
20	10
25	12
35	15
50	24
63	31





POWER DISSIPATION	
CASE CODE	MAXIMUM PERMISSIBLE POWER DISSIPATION AT + 25 °C (W) IN FREE AIR
A	0.075
B	0.085
C	0.110
D	0.150
E	0.165
V	0.125

STANDARD PACKAGING QUANTITY		
CASE CODE	UNITS PER REEL	
	7" REEL	13" REEL
A	2000	9000
B	2000	8000
C	500	3000
D	500	2500
E	400	1500
V	1000	5000

PRODUCT INFORMATION	
Guide for Molded Tantalum Capacitors	<a href="http://www.vishay.com/doc?40074">www.vishay.com/doc?40074</a>
Pad Dimensions	
Packaging Dimensions	
Moisture Sensitivity	<a href="http://www.vishay.com/doc?40135">www.vishay.com/doc?40135</a>
SELECTOR GUIDES	
Solid Tantalum Selector Guide	<a href="http://www.vishay.com/doc?49053">www.vishay.com/doc?49053</a>
Solid Tantalum Chip Capacitors	<a href="http://www.vishay.com/doc?40091">www.vishay.com/doc?40091</a>
FAQ	
Frequently Asked Questions	<a href="http://www.vishay.com/doc?40110">www.vishay.com/doc?40110</a>



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