



Solid Tantalum Surface Mount Chip Capacitors TANTAMOUNT™, Molded Case, Standard Industrial Grade



LINKS TO ADDITIONAL RESOURCES



Design Tools



Related Documents



3D Models



Calculators



Application Notes



Technical Notes



Did You Know?

PERFORMANCE / ELECTRICAL CHARACTERISTICS

www.vishay.com/doc?40192

Operating Temperature: -55 °C to +125 °C
(above 85 °C, voltage derating is required)

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_{DC} to 75 V_{DC}

Note

- For recommended voltage derating guidelines see "Typical Performance Characteristics"

FEATURES

- Molded case available in five case codes
- Terminations: 100 % matte tin standard, tin / lead available
- Compatible with "high volume" automatic pick and place equipment
- Standard EIA-535-BAAC case sizes (A through E)
- Qualified to EIA-717
- Moisture sensitivity level 1
- Optical character recognition qualified
- Compliant terminations
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Note

* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

APPLICATIONS

- Industrial
- Telecom infrastructure
- General purpose



RoHS*
Available

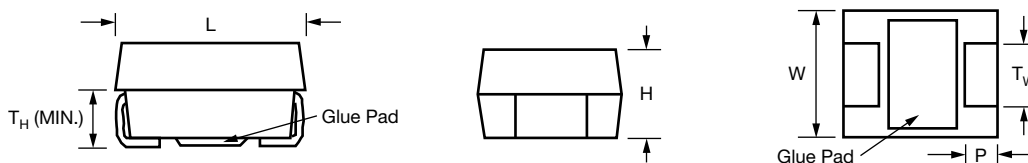
**HALOGEN
FREE
GREEN
(5-2008)
Available**

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	Matte tin 2TE3 = 7" (178 mm) reel 2WE3 = 13" (330 mm) reel 2DE3 = 7" (178 mm) reel, dry pack 2RE3 = 13" (330 mm) reel, dry pack Tin / lead 8T = 7" (178 mm) reel 8W = 13" (330 mm) reel 8D = 7" (178 mm) reel, dry pack 8R = 13" (330 mm) reel, dry pack

Notes

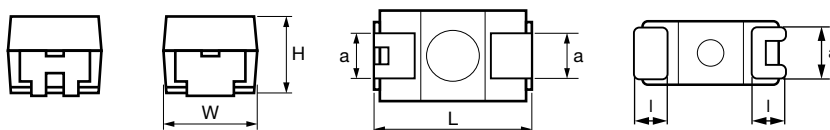
- We reserve the right to supply higher voltage ratings and tighter capacitance tolerance capacitors in the same case size. Voltage substitutions will be marked with the higher voltage rating
- We reserve the right to supply better series with more extensive screening
- Dry pack as specified in J-STD-033

**DIMENSIONS** in inches [millimeters]

CASE CODE	EIA SIZE	L	W	H	P	T _W	T _H (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]

Notes

- Glue pad (non-conductive, part of molded case) is dedicated for glue attachment (as user option)
- Mechanical variations in anode and/or cathode terminations on tantalum capacitors manufactured by various Vishay plants are normal and will not impact the capacitor's form, fit, and function. Examples of termination shapes:

**RATINGS AND CASE CODES**

μF	4 V	6.3 V	10 V	16 V	20 V	25 V	35 V	50 V	63 V	75 V
0.10						A	A	A		A
0.15							A	A / B		B
0.22							A	A / B		B
0.33						A	A	A / B		B
0.47			A		A	A	A / B	A / B / C		B
0.68				A	A	A / B	A / B	B / C		B / C
1.0			A	A	A / B	A / B	A / B	B / C		D
1.5		A	A	A / B	A / B	A / B	B / C	B / C / D		B / C / D
2.2	A	A	A / B	A / B	A / B	A / B / C	B / C	B / C / D		D
3.3	A	A / B	A / B	A / B	A / B / C	A / B / C	B / C / D	C / D	D	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	E
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	C / D / E	E		
22	A / B / C	A / B / C	A / B / C / D	B / C / D	B / C / D	C / D / E	D / E			
33	A / B / C	A / B / C	B / C / D	B / C / D	C / D	D / E	D / E			
47	A / B / C	A / B / C / D	B / C / D	C / D / E	D / E	D / E	E ⁽¹⁾			
68	B / C / D	B / C / D	B / C / D / E	D / E	D / E	E				
100	A / B / C / D	B / C / D / E	B / C / D / E	D / E	D / E	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	E						
330	D / E	D / E	D / E							
470	D / E	D / E	E							
680	D / E	E								
1000	E	E								

Note

⁽¹⁾ 125 °C life test post test limits per AEC-Q200

**MARKING**

“A” CASE VOLTAGE CODE			
VOLTS	CODE		
4.0	G		
6.3	J		
10	A		
16	C		
20	D		
25	E		
35	V		
50	T		
75	S		

Marking

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 identification marking is included if space permits. Vishay marking (“circled 2”) may show additives in the form of short lines, depicting actual manufacturing facility. For A case capacitors discontinuation in polarity bar maybe used as actual manufacturing facility designation. Capacitors rated at 6.3 V are marked 6 V.

A manufacturing date code is marked on all capacitors, for details see FAQ: www.vishay.com/doc?40110.

Capacitors may bear different marking scheme if parts are substituted with high performance Vishay Automotive Grade TP3 family or low DCL TX3 family products. Marking examples are shown below.

Call the factory for further explanation.

ADDITIONAL MARKING EXAMPLES**TP3 MARKING**

Capacitance code, pF Indicates high performance ⁽¹⁾ Date code designation V 104Z Polarity band (+) Voltage code A Case	Capacitance μF Indicates high performance ⁽¹⁾ Voltage 22 P10 Polarity band (+) XX Date code Vishay marking B, C, D, E Cases
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TX3 MARKING

Capacitance, μF Indicates low DCL product series ⁽¹⁾ Rated voltage, V 22X16 Polarity band (+) YY 2 digits date code Vishay marking B, C Cases

Note

⁽¹⁾ Capital letter indicates lead (Pb)-free



STANDARD RATINGS						
CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. ESR AT +25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz I_{RMS} (A)
4 V _{DC} AT +85 °C; 2.7 V _{DC} AT +125 °C						
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. For $\pm 5\%$ tolerance (code X5) contact factory
 - Terminations and packaging: 2TE3, 2WE3, 8T, 8W, 2DE3, 2RE3, 8D, 8R



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_{RMS} (A)
6.3 V _{DC} AT +85 °C; 4 V _{DC} AT +125 °C						
1.5	A	293D155(1)6R3A(2)	0.5	6	8.00	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	293D477(1)6R3E(2)	28.2	10	0.50	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. For $\pm 5\%$ tolerance (code X5) contact factory
 - Terminations and packaging: 2TE3, 2WE3, 8T, 8W, 2DE3, 2RE3, 8D, 8R



STANDARD RATINGS						
CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. ESR AT +25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz I_{RMS} (A)
10 V _{DC} AT +85 °C; 7 V _{DC} AT +125 °C						
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
100	B	293D107(1)010B(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
120	E	293D127(1)010E(2)	12.0	6	1.00	0.41
150	C	293D157(1)010C(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
220	E	293D227(1)010E(2)	22.0	8	0.50	0.57
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

Note

- Part number definitions:
 - (1) Tolerance: X0, X9. For ± 5 % tolerance (code X5) contact factory
 - (2) Terminations and packaging: 2TE3, 2WE3, 8T, 8W, 2DE3, 2RE3, 8D, 8R



STANDARD RATINGS						
CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. ESR AT +25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz I_{RMS} (A)
16 V _{DC} AT +85 °C; 10 V _{DC} AT +125 °C						
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:
 - (1) Tolerance: X0, X9. For ± 5 % tolerance (code X5) contact factory
 - (2) Terminations and packaging: 2TE3, 2WE3, 8T, 8W, 2DE3, 2RE3, 8D, 8R



STANDARD RATINGS						
CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. ESR AT +25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz I_{RMS} (A)
20 V _{DC} AT +85 °C; 13 V _{DC} AT +125 °C						
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

Note

- Part number definitions:
 - Tolerance: X0, X9. For $\pm 5\%$ tolerance (code X5) contact factory
 - Terminations and packaging: 2TE3, 2WE3, 8T, 8W, 2DE3, 2RE3, 8D, 8R



STANDARD RATINGS						
CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. ESR AT +25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz I_{RMS} (A)
25 V _{DC} AT +85 °C; 17 V _{DC} AT +125 °C						
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
0.68	B	293D684(1)025B(2)	0.5	4	6.50	0.11
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
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
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
68	E	293D686(1)025E(2)	17.0	8	0.60	0.52
100	E	293D107(1)025E(2)	35.0	10	0.50	0.57

Note

- Part number definitions:
 - (1) Tolerance: X0, X9. For $\pm 5\%$ tolerance (code X5) contact factory
 - (2) Terminations and packaging: 2TE3, 2WE3, 8T, 8W, 2DE3, 2RE3, 8D, 8R



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_{RMS} (A)
35 V _{DC} AT +85 °C; 23 V _{DC} AT +125 °C						
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
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	C	293D156(1)035C(2)	5.3	6	0.90	0.35
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	0.50
22	E	293D226(1)035E(2)	7.7	6	0.60	0.57
33	D	293D336(1)035D(2)	11.6	6	0.70	0.46
33	E	293D336(1)035E(2)	11.6	6	0.70	0.49
47	E	293D476(1)035E(2)	20.0	10	0.60	0.52
50 V _{DC} AT +85 °C; 33 V _{DC} AT +125 °C						
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

Note

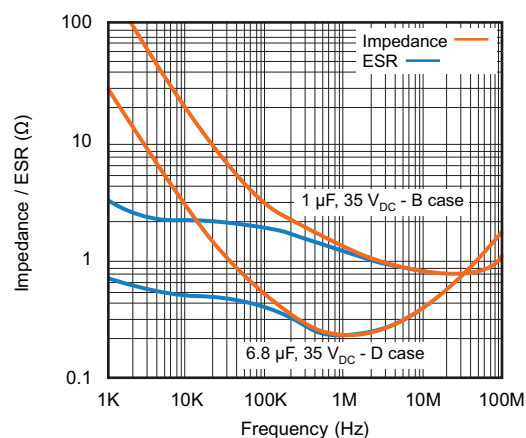
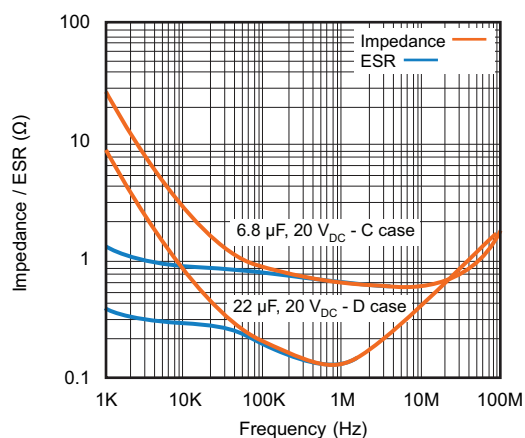
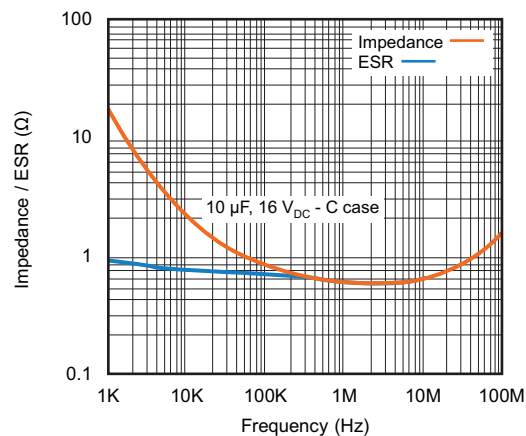
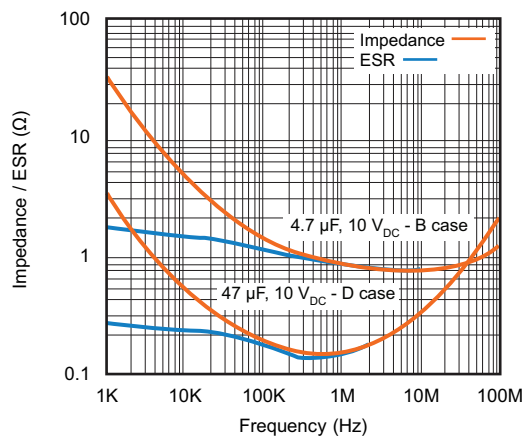
- Part number definitions:
 - Tolerance: X0, X9. For $\pm 5\%$ tolerance (code X5) contact factory
 - Terminations and packaging: 2TE3, 2WE3, 8T, 8W, 2DE3, 2RE3, 8D, 8R



STANDARD RATINGS						
CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. ESR AT +25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz I_{RMS} (A)
50 V _{DC} AT +85 °C; 33 V _{DC} AT +125 °C						
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	1.10	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
63 V _{DC} AT +85 °C; 40 V _{DC} AT +125 °C						
3.3	D	293D335(1)063D(2)	2.1	6	1.50	0.32
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
75 V _{DC} AT +85 °C; 50 V _{DC} AT +125 °C						
0.10	A	293D104(1)075A(2)	0.5	4	30.00	0.05
0.15	B	293D154(1)075B(2)	0.5	4	25.00	0.06
0.22	B	293D224(1)075B(2)	0.5	4	20.00	0.07
0.33	B	293D334(1)075B(2)	0.5	4	15.00	0.08
0.47	B	293D474(1)075B(2)	0.5	4	12.00	0.08
0.68	B	293D684(1)075B(2)	0.6	4	10.00	0.09
0.68	C	293D684(1)075C(2)	0.6	4	10.00	0.11
1.0	D	293D105(1)075D(2)	0.8	6	6.00	0.16
1.5	B	293D155(1)075B(2)	1.1	6	4.00	0.15
1.5	C	293D155(1)075C(2)	1.1	6	4.00	0.17
1.5	D	293D155(1)075D(2)	1.1	6	4.00	0.19
2.2	D	293D225(1)075D(2)	1.7	6	3.00	0.22
3.3	D	293D335(1)075D(2)	2.5	6	2.50	0.24
4.7	E	293D475(1)075E(2)	3.5	10	2.50	0.26

Note

- Part number definitions:
 - (1) Tolerance: X0, X9. For $\pm 5\%$ tolerance (code X5) contact factory
 - (2) Terminations and packaging: 2TE3, 2WE3, 8T, 8W, 2DE3, 2RE3, 8D, 8R


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

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

**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

PRODUCT INFORMATION

Guide for Molded Tantalum Capacitors	www.vishay.com/doc?40074
Pad Dimensions	
Packaging Dimensions	
Moisture Sensitivity (MSL)	www.vishay.com/doc?40135
SELECTOR GUIDES	
Solid Tantalum Selector Guide	www.vishay.com/doc?49053
Solid Tantalum Chip Capacitors	www.vishay.com/doc?40091
FAQ	
Frequently Asked Questions	www.vishay.com/doc?40110