

Solid Tantalum Chip Capacitors, TANTAMOUNT[®], Conformal Coated



FEATURES

- 8 mm, 12 mm, 16 mm tape and reel packaging available per EIA-481 and reeling per IEC 60286-3, 7" [178 mm] standard
- Mounting: Surface mount
- Material categorization:
For definitions of compliance please see www.vishay.com/doc?99912


RoHS*
COMPLIANT

Note

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

PERFORMANCE CHARACTERISTICS

www.vishay.com/doc?40088

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

Capacitance Range: 0.10 µF to 330 µF

Capacitance Tolerance: ± 10 %, ± 20 % standard

Voltage Rating: 4 V_{DC} to 50 V_{DC}

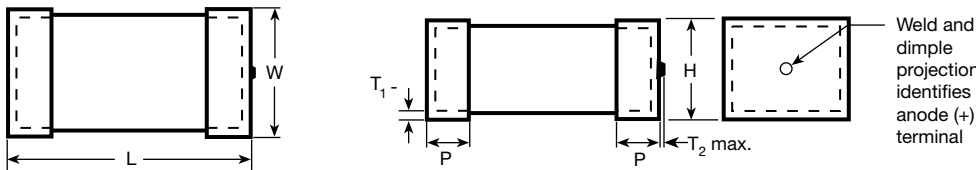
ORDERING INFORMATION

194D	225	X0	004	A	2	T
TYPE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C	CASE CODE	TERMINATION	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 volts. To complete the three-digit block, zeros precede the voltage rating	See Ratings and Case Codes table	2 = Gold plated (50 µ inch minimum) standard (RoHS compliant) 8 = 60/40 solder plated 7 = Hot solder dipped	T = T/R (full reel) 7" [178 mm] reel standard H = T/R (half reel) 7" [178 mm] B = Bulk

Note

- 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.

DIMENSIONS in inches [millimeters]

						
CASE CODE	W	L	H	P	T ₁	T ₂ MAX.
A	0.050 ± 0.015 [1.27 ± 0.38]	0.100 ± 0.015 [2.54 ± 0.38]	0.050 ± 0.015 [1.27 ± 0.38]	0.030 ± 0.005 [0.76 ± 0.13]	0.005 [0.13]	0.015 [0.38]
B	0.050 ± 0.015 [1.27 ± 0.38]	0.150 ± 0.015 [3.81 ± 0.38]	0.050 ± 0.015 [1.27 ± 0.38]	0.030 ± 0.005 [0.76 ± 0.13]	0.005 [0.13]	0.015 [0.38]
C	0.050 ± 0.015 [1.27 ± 0.38]	0.200 ± 0.015 [5.08 ± 0.38]	0.050 ± 0.015 [1.27 ± 0.38]	0.030 ± 0.005 [0.76 ± 0.13]	0.005 [0.13]	0.015 [0.38]
D	0.100 ± 0.015 [2.54 ± 0.38]	0.150 ± 0.015 [3.81 ± 0.38]	0.050 ± 0.015 [1.27 ± 0.38]	0.030 ± 0.005 [0.76 ± 0.13]	0.005 [0.13]	0.015 [0.38]
E	0.100 ± 0.015 [2.54 ± 0.38]	0.200 ± 0.015 [5.08 ± 0.38]	0.050 ± 0.015 [1.27 ± 0.38]	0.030 ± 0.005 [0.76 ± 0.13]	0.005 [0.13]	0.015 [0.38]
F	0.135 ± 0.015 [3.43 ± 0.38]	0.220 ± 0.015 [5.59 ± 0.38]	0.070 ± 0.015 [1.78 ± 0.38]	0.030 ± 0.005 [0.76 ± 0.13]	0.005 [0.13]	0.015 [0.38]
G	0.110 ± 0.015 [2.79 ± 0.38]	0.265 ± 0.015 [6.73 ± 0.38]	0.110 ± 0.015 [2.79 ± 0.38]	0.050 ± 0.005 [1.27 ± 0.13]	0.005 [0.13]	0.015 [0.38]
H	0.150 ± 0.015 [3.81 ± 0.38]	0.285 ± 0.015 [7.24 ± 0.38]	0.110 ± 0.015 [2.79 ± 0.38]	0.050 ± 0.005 [1.27 ± 0.13]	0.005 [0.13]	0.015 [0.38]

Note

- When solder coated terminations are required, add 0.015" [0.381 mm] to termination dimension tolerances

**RATINGS AND CASE CODES**

μF	4 V	6 V	10 V	15 V	20 V	25 V	35 V	50 V
0.10							A	A
0.15							A	A
0.22							A	B
0.33						A	A/B	B
0.47					A	A/B	B	C
0.68				A	A/B	B	C	D
1.0			A	A/B	A/B	A/B/C	D	E
1.5		A	A/B	A/B	B/C	D	E	F
2.2	A	A/B	A/B	A/B/C	C/D	E	F	F
3.3	A/B	A/B	A/B/C	C/D	D/E	F	F	G
4.7	B	A/B/C	B/C/D	B/D/E	E/F	F	F/G	H
6.8	B/C	C/D	D/E	E/F	F	F/G	G/H	H
10	C/D	D/E	C/E/F	E/F	E/F/G	F/G	G/H	
15	D/E	E/F	E/F	F/G	F/G	H	H	
22	E/F	F	F/G	F/G	G/H	G/H		
33	F	F/G	F/G	F/G/H	H	H		
47	F/G	F/G	G/H	G/H				
68	F/G	G/H	H	H				
100	H	H	G/H	H				
120	H	H	H					
150	H	H						
330	H	H						

STANDARD RATINGS

CAPACITANCE (μF)	CASE CODE	PART NUMBER	MAX. DCL AT + 25 °C (μA)	MAX. DF AT + 25 °C 120 Hz (%)
4 V _{DC} AT + 85 °C, SURGE = 5 V; 2.7 V _{DC} AT + 125 °C, SURGE = 3.4 V				
2.2	A	194D225(1)004A(2)(3)	0.5	6
3.3	A	194D335(1)004A(2)(3)	0.5	6
3.3	B	194D335(1)004B(2)(3)	0.5	6
4.7	B	194D475(1)004B(2)(3)	0.5	6
6.8	B	194D685(1)004B(2)(3)	0.5	6
6.8	C	194D685(1)004C(2)(3)	0.5	6
10	C	194D106(1)004C(2)(3)	0.5	6
10	D	194D106(1)004D(2)(3)	0.5	6
15	D	194D156(1)004D(2)(3)	0.6	6
15	E	194D156(1)004E(2)(3)	0.6	6
22	E	194D226(1)004E(2)(3)	0.9	6
22	F	194D226(1)004F(2)(3)	0.9	6
33	F	194D336(1)004F(2)(3)	1.3	6
47	F	194D476(1)004F(2)(3)	1.9	6
47	G	194D476(1)004G(2)(3)	1.9	6
68	F	194D686(1)004F(2)(3)	2.7	6
68	G	194D686(1)004G(2)(3)	2.7	6
100	H	194D107(1)004H(2)(3)	4.0	8
120	H	194D127(1)004H(2)(3)	4.8	8
150	H	194D157(1)004H(2)(3)	6.0	8
330	H	194D337(1)004H(2)(3)	13.2	10

Notes

- Part number definitions:
 - Tolerance: For 10 % tolerance, specify "X9"; for 20 % tolerance, change to "X0", for 5 % tolerance specify "X5" (special order)
 - Termination: For gold plated specify "2", for solder plated 60/40 specify "8", for hot solder dipped specify "7"
 - Packaging code: For 7" reels specify "T", for half of 7" reels specify "H", for bulk specify "B"
- 5 % tolerance is not available for the 0.33 μF /50 V design



STANDARD RATINGS				
CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT + 25 °C (μ A)	MAX. DF AT + 25 °C 120 Hz (%)
6 V _{DC} AT + 85 °C, SURGE = 8 V; 4 V _{DC} AT + 125 °C, SURGE = 5 V				
1.5	A	194D155(1)006A(2)(3)	0.5	6
2.2	A	194D225(1)006A(2)(3)	0.5	6
2.2	B	194D225(1)006B(2)(3)	0.5	6
3.3	A	194D335(1)006A(2)(3)	0.5	6
3.3	B	194D335(1)006B(2)(3)	0.5	6
4.7	A	194D475(1)006A(2)(3)	0.5	6
4.7	B	194D475(1)006B(2)(3)	0.5	6
4.7	C	194D475(1)006C(2)(3)	0.5	6
6.8	C	194D685(1)006C(2)(3)	0.5	6
6.8	D	194D685(1)006D(2)(3)	0.5	6
10	D	194D106(1)006D(2)(3)	0.6	6
10	E	194D106(1)006E(2)(3)	0.6	6
15	E	194D156(1)006E(2)(3)	1.0	6
15	F	194D156(1)006F(2)(3)	1.0	6
22	F	194D226(1)006F(2)(3)	1.4	6
33	F	194D336(1)006F(2)(3)	2.1	6
33	G	194D336(1)006G(2)(3)	2.1	6
47	F	194D476(1)006F(2)(3)	3.0	6
47	G	194D476(1)006G(2)(3)	3.0	6
68	G	194D686(1)006G(2)(3)	4.3	6
68	H	194D686(1)006H(2)(3)	4.3	6
100	H	194D107(1)006H(2)(3)	6.0	8
120	H	194D127(1)006H(2)(3)	7.2	8
150	H	194D157(1)006H(2)(3)	9.0	8
330	H	194D337(1)006H(2)(3)	20.0	10
10 V _{DC} AT + 85 °C, SURGE = 13 V; 7 V _{DC} AT + 125 °C, SURGE = 9 V				
1.0	A	194D105(1)010A(2)(3)	0.5	4
1.5	A	194D155(1)010A(2)(3)	0.5	6
1.5	B	194D155(1)010B(2)(3)	0.5	6
2.2	A	194D225(1)010A(2)(3)	0.5	6
2.2	B	194D225(1)010B(2)(3)	0.5	6
3.3	A	194D335(1)010A(2)(3)	0.5	6
3.3	B	194D335(1)010B(2)(3)	0.5	6
3.3	C	194D335(1)010C(2)(3)	0.5	6
4.7	B	194D475(1)010B(2)(3)	0.5	6
4.7	C	194D475(1)010C(2)(3)	0.5	6
4.7	D	194D475(1)010D(2)(3)	0.5	6
6.8	D	194D685(1)010D(2)(3)	0.7	6
6.8	E	194D685(1)010E(2)(3)	0.7	6
10	C	194D106(1)010C(2)(3)	1.0	6
10	E	194D106(1)010E(2)(3)	1.0	6
10	F	194D106(1)010F(2)(3)	1.0	6
15	E	194D156(1)010E(2)(3)	1.5	6
15	F	194D156(1)010F(2)(3)	1.5	6
22	F	194D226(1)010F(2)(3)	2.2	6
22	G	194D226(1)010G(2)(3)	2.2	6

Notes

- Part number definitions:
 - (1) Tolerance: For 10 % tolerance, specify "X9"; for 20 % tolerance, change to "X0", for 5 % tolerance specify "X5" (special order)
 - (2) Termination: For gold plated specify "2", for solder plated 60/40 specify "8", for hot solder dipped specify "7"
 - (3) Packaging code: For 7" reels specify "T", for half of 7" reels specify "H", for bulk specify "B"
- (1) 5 % tolerance is not available for the 0.33 μ F/50 V design



STANDARD RATINGS				
CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT + 25 °C (μ A)	MAX. DF AT + 25 °C 120 Hz (%)
10 V_{DC} AT + 85 °C, SURGE = 13 V; 7 V_{DC} AT + 125 °C, SURGE = 9 V				
33	F	194D336(1)010F(2)(3)	3.3	6
33	G	194D336(1)010G(2)(3)	3.3	6
47	G	194D476(1)010G(2)(3)	4.7	6
47	H	194D476(1)010H(2)(3)	4.7	6
68	H	194D686(1)010H(2)(3)	6.8	6
100	G	194D107(1)010G(2)(3)	10.0	10
100	H	194D107(1)010H(2)(3)	10.0	8
120	H	194D127(1)010H(2)(3)	12.0	8
15 V_{DC} AT + 85 °C, SURGE = 20 V; 10 V_{DC} AT + 125 °C, SURGE = 12 V				
0.68	A	194D684(1)015A(2)(3)	0.5	4
1.0	A	194D105(1)015A(2)(3)	0.5	4
1.0	B	194D105(1)015B(2)(3)	0.5	4
1.5	A	194D155(1)015A(2)(3)	0.5	6
1.5	B	194D155(1)015B(2)(3)	0.5	6
2.2	A	194D225(1)015A(2)(3)	0.5	6
2.2	B	194D225(1)015B(2)(3)	0.5	6
2.2	C	194D225(1)015C(2)(3)	0.5	6
3.3	C	194D335(1)015C(2)(3)	0.5	6
3.3	D	194D335(1)015D(2)(3)	0.5	6
4.7	B	194D475(1)015B(2)(3)	0.7	6
4.7	D	194D475(1)015D(2)(3)	0.7	6
4.7	E	194D475(1)015E(2)(3)	0.7	6
6.8	E	194D685(1)015E(2)(3)	1.1	6
6.8	F	194D685(1)015F(2)(3)	1.1	6
10	E	194D106(1)015E(2)(3)	1.6	6
10	F	194D106(1)015F(2)(3)	1.6	6
15	F	194D156(1)015F(2)(3)	2.4	6
15	G	194D156(1)015G(2)(3)	2.4	6
22	F	194D226(1)015F(2)(3)	3.5	6
22	G	194D226(1)015G(2)(3)	3.5	6
33	F	194D336(1)015F(2)(3)	5.3	6
33	G	194D336(1)015G(2)(3)	5.3	6
33	H	194D336(1)015H(2)(3)	5.3	6
47	G	194D476(1)015G(2)(3)	10.0	8
47	H	194D476(1)015H(2)(3)	7.0	6
68	H	194D686(1)015H(2)(3)	10.0	6
100	H	194D107(1)015H(2)(3)	15.0	10
20 V_{DC} AT + 85 °C, SURGE = 26 V; 13 V_{DC} AT + 125 °C, SURGE = 16 V				
0.47	A	194D474(1)020A(2)(3)	0.5	4
0.68	A	194D684(1)020A(2)(3)	0.5	4
0.68	B	194D684(1)020B(2)(3)	0.5	4
1.0	A	194D105(1)020A(2)(3)	0.5	4
1.0	B	194D105(1)020B(2)(3)	0.5	4
1.5	B	194D155(1)020B(2)(3)	0.5	6
1.5	C	194D155(1)020C(2)(3)	0.5	6
2.2	C	194D225(1)020C(2)(3)	0.5	6
2.2	D	194D225(1)020D(2)(3)	0.5	6
3.3	D	194D335(1)020D(2)(3)	0.7	6
3.3	E	194D335(1)020E(2)(3)	0.7	6

Notes

- Part number definitions:
 - Tolerance: For 10 % tolerance, specify "X9"; for 20 % tolerance, change to "X0", for 5 % tolerance specify "X5" (special order)
 - Termination: For gold plated specify "2", for solder plated 60/40 specify "8", for hot solder dipped specify "7"
 - Packaging code: For 7" reels specify "T", for half of 7" reels specify "H", for bulk specify "B"
- 5 % tolerance is not available for the 0.33 μ F/50 V design



STANDARD RATINGS				
CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT + 25 °C (μ A)	MAX. DF AT + 25 °C 120 Hz (%)
20 V_{DC} AT + 85 °C, SURGE = 26 V; 13 V_{DC} AT + 125 °C, SURGE = 16 V				
4.7	E	194D475(1)020E(2)(3)	0.9	6
4.7	F	194D475(1)020F(2)(3)	0.9	6
6.8	F	194D685(1)020F(2)(3)	1.4	6
10	E	194D106(1)020E(2)(3)	2.0	6
10	F	194D106(1)020F(2)(3)	2.0	6
10	G	194D106(1)020G(2)(3)	2.0	6
15	F	194D156(1)020F(2)(3)	3.0	6
15	G	194D156(1)020G(2)(3)	3.0	6
22	G	194D226(1)020G(2)(3)	4.0	8
22	H	194D226(1)020H(2)(3)	4.4	6
33	H	194D336(1)020H(2)(3)	6.6	6
25 V_{DC} AT + 85 °C, SURGE = 32 V; 17 V_{DC} AT + 125 °C, SURGE = 20 V				
0.33	A	194D334(1)025A(2)(3)	0.5	4
0.47	A	194D474(1)025A(2)(3)	0.5	4
0.47	B	194D474(1)025B(2)(3)	0.5	4
0.68	B	194D684(1)025B(2)(3)	0.5	4
1.0	A	194D105(1)025A(2)(3)	0.5	6
1.0	B	194D105(1)025B(2)(3)	0.5	6
1.0	C	194D105(1)025C(2)(3)	0.5	4
1.5	D	194D155(1)025D(2)(3)	0.5	6
2.2	E	194D225(1)025E(2)(3)	0.6	6
3.3	F	194D335(1)025F(2)(3)	0.8	6
4.7	F	194D475(1)025F(2)(3)	1.2	6
6.8	F	194D685(1)025F(2)(3)	1.7	6
6.8	G	194D685(1)025G(2)(3)	1.7	6
10	F	194D106(1)025F(2)(3)	2.5	6
10	G	194D106(1)025G(2)(3)	2.5	6
15	H	194D156(1)025H(2)(3)	3.8	6
22	G	194D226(1)025G(2)(3)	5.5	6
22	H	194D226(1)025H(2)(3)	5.5	6
33	H	194D336(1)025H(2)(3)	10.0	8
35 V_{DC} AT + 85 °C, SURGE = 46 V; 23 V_{DC} AT + 125 °C, SURGE = 28 V				
0.10	A	194D104(1)035A(2)(3)	0.5	4
0.15	A	194D154(1)035A(2)(3)	0.5	4
0.22	A	194D224(1)035A(2)(3)	0.5	4
0.33	A	194D334(1)035A(2)(3)	0.5	4
0.33	B	194D334(1)035B(2)(3)	0.5	4
0.47	B	194D474(1)035B(2)(3)	0.5	4
0.68	C	194D684(1)035C(2)(3)	0.5	4
1.0	D	194D105(1)035D(2)(3)	0.5	4
1.5	E	194D155(1)035E(2)(3)	0.5	6
2.2	F	194D225(1)035F(2)(3)	0.8	6
3.3	F	194D335(1)035F(2)(3)	1.2	6
4.7	F	194D475(1)035F(2)(3)	1.6	6
4.7	G	194D475(1)035G(2)(3)	1.6	6
6.8	G	194D685(1)035G(2)(3)	2.4	6
6.8	H	194D685(1)035H(2)(3)	2.4	6
10	G	194D106(1)035G(2)(3)	3.5	6
10	H	194D106(1)035H(2)(3)	3.5	6
15	H	194D156(1)035H(2)(3)	5.3	6

Notes

- Part number definitions:
 - Tolerance: For 10 % tolerance, specify "X9"; for 20 % tolerance, change to "X0", for 5 % tolerance specify "X5" (special order)
 - Termination: For gold plated specify "2", for solder plated 60/40 specify "8", for hot solder dipped specify "7"
 - Packaging code: For 7" reels specify "T", for half of 7" reels specify "H", for bulk specify "B"
- 5 % tolerance is not available for the 0.33 μ F/50 V design

**STANDARD RATINGS**

CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT + 25 °C (μ A)	MAX. DF AT + 25 °C 120 Hz (%)
50 V_{DC} AT + 85 °C, SURGE = 65 V; 33 V_{DC} AT + 125 °C, SURGE = 38 V				
0.10	A	194D104(1)050A(2)(3)	0.5	4
0.15	A	194D154(1)050A(2)(3)	0.5	4
0.22	B	194D224(1)050B(2)(3)	0.5	4
0.33 ⁽¹⁾	B	194D334(1)050B(2)(3)	0.5	4
0.47	C	194D474(1)050C(2)(3)	0.5	4
0.68	D	194D684(1)050D(2)(3)	0.5	4
1.0	E	194D105(1)050E(2)(3)	0.5	4
1.5	F	194D155(1)050F(2)(3)	0.8	6
2.2	F	194D225(1)050F(2)(3)	1.1	6
3.3	G	194D335(1)050G(2)(3)	1.7	6
4.7	H	194D475(1)050H(2)(3)	2.4	6
6.8	H	194D685(1)050H(2)(3)	3.4	6

Notes

- Part number definitions:

(1) Tolerance: For 10 % tolerance, specify "X9"; for 20 % tolerance, change to "X0", for 5 % tolerance specify "X5" (special order)

(2) Termination: For gold plated specify "2", for solder plated 60/40 specify "8", for hot solder dipped specify "7"

(3) Packaging code: For 7" reels specify "T", for half of 7" reels specify "H", for bulk specify "B"

⁽¹⁾ 5 % tolerance is not available for the 0.33 μ F/50 V design

RECOMMENDED VOLTAGE DERATING GUIDELINES (for temperatures below + 85 °C)**STANDARD CONDITIONS. FOR EXAMPLE: OUTPUT FILTERS**

Capacitor Voltage Rating	Operating Voltage
4.0	2.5
6.0	3.4
10	6.0
16	10
20	12
25	15
35	24
50	28

SEVERE CONDITIONS. FOR EXAMPLE: INPUT FILTERS

Capacitor Voltage Rating	Operating Voltage
4.0	2.5
6.0	3.3
10	5.0
16	8.0
20	10
25	12
35	15
50	24

**POWER DISSIPATION**

CASE CODE	MAXIMUM PERMISSIBLE POWER DISSIPATION AT + 25 °C (W) IN FREE AIR
A	0.060
B	0.075
C	0.075
D	0.085
E	0.095
F	0.110
G	0.120
H	0.150

STANDARD PACKAGING QUANTITY

CASE CODE	QUANTITY (pcs/reel)		BULK, PLASTIC TRAY QUANTITY
	7" FULL REEL	7" HALF REEL	
A	2500	1250	75
B	2500	1250	75
C	2500	1250	75
D	2500	1250	75
E	2500	1250	75
F	1000	500	75
G	600	300	60
H	600	300	50

PRODUCT INFORMATION

Conformal Coated Guide	www.vishay.com/doc?40150
Pad Dimensions	
Package Dimensions	
Moisture Sensitivity	www.vishay.com/doc?40135
SELECTOR GUIDES	
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