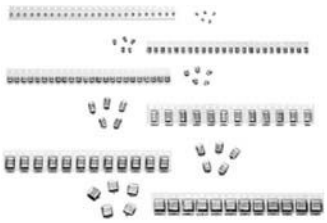
Solid Tantalum Chip Capacitors, TANTAMOUNT®, Hi-Rel COTS, Conformal Coated



FEATURES

- High reliability; Weibull grading available
- Surge current testing per MIL-PRF-55365 options available
- Standard and low ESR options
- Terminations: SnPb, standard. 100 % tin available
- Mounting: Surface mount
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free Available

RoHS* COMPLIANT

Note

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

PERFORMANCE/ELECTRICAL CHARACTERISTICS

www.vishay.com/doc?40088

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

Capacitance Range: 0.15 µF to 680 µF
Capacitance Tolerance: ± 20 %, ± 10 % standard
Voltage Rating: 4 V_{DC} to 50 V_{DC}

ORDERING INFORMATION

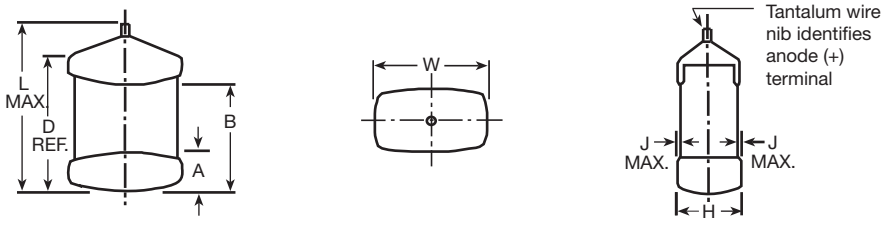
T95	D	107	K	010	E	A	A	S
TYPE	CASE CODE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C	TERMINATION AND PACKAGING	RELIABILITY LEVEL	SURGE CURRENT	ESR
	See Ratings and Case Codes table.	This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow.	**K = ± 10 %** M = ± 20 %	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).	**E: Sn/Pb solder/ 7" (178 mm) reels** L: Sn/Pb solder/ 7" (178 mm) ½ reel C: 100 % tin/ 7" (178 mm) reels H: 100 % tin/ 7" (178 mm) ½ reel	**A = 1.0 % Weibull** B = 0.1 % Weibull (1) C = 0.01 % Weibull (1) S = Hi-rel standard burn-in Z = Non-established reliability	**A = 10 cycles at + 25 °C** B = 10 cycles at - 55 °C/+ 85 °C S = 3 cycles at + 25 °C	**S = Std.** L = Low

Notes

(1) Weibull 0.1 % and 0.01 % may not be available on all ratings. See detailed notes in ratings table or contact marketing for availability.

- We reserve the right to supply higher voltage ratings and tighter capacitance tolerance capacitors in the same case size.
- Low ESR solid tantalum chip capacitors allow delta ESR of 1.25 times the datasheet limits after mounting.

DIMENSIONS in inches [millimeters]



CASE CODE	L (MAX.)	W	H	A	B	D (REF.)	J (MAX.)
A	0.146 [3.7]	0.071 ± 0.012 [1.8 ± 0.3]	0.056 ± 0.012 [1.4 ± 0.3]	0.031 ± 0.012 [0.8 ± 0.3]	0.085 ± 0.016 [2.2 ± 0.40]	0.114 [2.9]	0.004 [0.10]
B	0.157 [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 [0.8 ± 0.3]	0.098 ± 0.016 [2.5 ± 0.40]	0.138 [3.5]	0.004 [0.10]
C	0.280 [7.1]	0.126 ± 0.012 [3.2 ± 0.3]	0.098 ± 0.012 [2.5 ± 0.3]	0.051 ± 0.012 [1.3 ± 0.3]	0.181 ± 0.024 [4.6 ± 0.60]	0.236 [6.0]	0.004 [0.10]
D	0.295 [7.5]	0.169 ± 0.012 [4.3 ± 0.3]	0.110 ± 0.012 [2.8 ± 0.3]	0.051 ± 0.012 [1.3 ± 0.3]	0.181 ± 0.024 [4.6 ± 0.60]	0.252 [6.0]	0.004 [0.10]

For technical questions, contact: tantalum@vishay.com

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DIMENSIONS in inches [millimeters]							
CASE CODE	L (MAX.)	W	H	A	B	D (REF.)	J (MAX.)
R	0.283 max. [7.20 max.]	0.236 + 0.012/- 0.024 [6.0 + 0.30/- 0.60]	0.138 ± 0.012 [3.50 ± 0.30]	0.051 ± 0.012 [1.30 ± 0.30]	0.181 ± 0.024 [4.60 ± 0.60]	0.244 [6.20]	0.004 [0.10]
S	0.143 max. [3.63 max.]	0.072 ± 0.008 [1.83 ± 0.20]	0.048 ± 0.008 [1.22 ± 0.20]	0.023 ± 0.010 [0.58 ± 0.25]	0.085 ± 0.015 [2.16 ± 0.37]	0.114 [2.90]	0.004 [0.10]
V	0.143 max. [3.63 max.]	0.104 ± 0.010 [2.65 ± 0.25]	0.051 ± 0.010 [1.30 ± 0.25]	0.023 ± 0.010 [0.58 ± 0.25]	0.085 ± 0.015 [2.16 ± 0.37]	0.114 [2.90]	0.004 [0.10]
X	0.285 max. [7.24 max.]	0.104 ± 0.010 [2.65 ± 0.25]	0.051 ± 0.010 [1.30 ± 0.25]	0.039 ± 0.020 [1.00 ± 0.50]	0.200 ± 0.027 [5.08 ± 0.69]	0.244 [6.20]	0.004 [0.10]
Y	0.285 max. [7.24 max.]	0.104 ± 0.010 [2.65 ± 0.25]	0.069 ± 0.010 [1.75 ± 0.25]	0.039 ± 0.020 [1.00 ± 0.50]	0.200 ± 0.027 [5.08 ± 0.69]	0.244 [6.20]	0.004 [0.10]
Z	0.285 max. [7.24 max.]	0.104 ± 0.010 [2.65 ± 0.25]	0.104 ± 0.010 [2.65 ± 0.25]	0.039 ± 0.020 [1.00 ± 0.50]	0.200 ± 0.027 [5.08 ± 0.69]	0.244 [6.20]	0.004 [0.10]

Note

- The anode termination (D less B) will be a minimum of 0.010" (0.25 mm)

RATINGS AND CASE CODES								
µF	4 V	6.3 V	10 V	16 V	20 V	25 V	35 V	50 V
0.15							S	
0.22							S	
0.33							S	
0.47							S	
0.68						S	S	
1.0						S	S	
1.5					S	S	V	
2.2				S	S	V	X	
3.3			S	S	V	X		
4.7		S	S	V	X			C
6.8	S	S	V	A/X	X	Y	Z	C/D
10	S	V	X	X	Y	C/Y	Z	
15	V	X	B/X	B/Y	Z	Z	R	R
22	X	X	Y	B/Z	Z		R	R
33	X		Z	Z		D/R	R	
47	Y	Y	Z		R	D/R	R	
68	Y	Z		R		D/R		
100	Z		R	C/D	R	R		
120			D/R		R			
150			D/R	D	R			
180				R	R			
220			D/R	R				
270	D							
330	R	C	D/R	R				
390		R						
470		D	R					
680		R	R					

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STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C (µA)	MAX. DF AT + 25 °C 120 Hz (%)	STD. (S) MAX. ESR AT + 25 °C 100 kHz [1] (Ω)	LOW (L) MAX. ESR AT + 25 °C 100 kHz [1] (Ω)	AVAILABLE RELIABILITY LEVELS
4 V_{DC} AT + 85 °C; 2.7 V_{DC} AT + 125 °C							
6.8	S	T95S685(1)004(2)(3)(4)(5)	0.5	6	4.000	2.000	A, S, Z
10	S	T95S106(1)004(2)(3)(4)(5)	0.5	6	4.000	2.000	A, S, Z
15	V	T95V156(1)004(2)(3)(4)(5)	0.6	6	3.000	1.500	A, S, Z
22	X	T95X226(1)004(2)(3)(4)(5)	0.9	6	2.000	1.000	A, S, Z
33	X	T95X336(1)004(2)(3)(4)(5)	1.3	6	2.000	1.000	A, S, Z
47	Y	T95Y476(1)004(2)(3)(4)(5)	1.9	6	1.200	0.600	A, S, Z
68	Y	T95Y686(1)004(2)(3)(4)(5)	2.7	6	1.200	0.600	A, S, Z
100	Z	T95Z107(1)004(2)(3)(4)(5)	4.0	6	0.800	0.400	A, S, Z
270	D	T95D277(1)004(2)(3)(4)(5)	10.8	8	0.130	0.060	A, S, Z
330	R	T95R337(1)004(2)(3)(4)(5)	13.2	8	0.130	0.080	A, S, Z
6.3 V_{DC} AT + 85 °C; 4 V_{DC} AT + 125 °C							
4.7	S	T95S475(1)6R3(2)(3)(4)(5)	0.5	6	4.000	2.000	A, S, Z
6.8	S	T95S685(1)6R3(2)(3)(4)(5)	0.5	6	4.000	2.000	A, S, Z
10	V	T95V106(1)6R3(2)(3)(4)(5)	0.6	6	3.000	1.500	A, S, Z
15	X	T95X156(1)6R3(2)(3)(4)(5)	0.9	6	2.000	1.000	A, S, Z
22	X	T95X226(1)6R3(2)(3)(4)(5)	1.4	6	2.000	1.000	A, S, Z
47	Y	T95Y476(1)6R3(2)(3)(4)(5)	2.8	6	1.200	0.600	A, S, Z
100	Z	T95Z107(1)6R3(2)(3)(4)(5)	6.0	6	0.800	0.400	A, S, Z
180	R	T95R187(1)6R3(2)(3)(4)(5)	10.8	8	0.130	0.080	A, S, Z
220	D	T95R227(1)6R3(2)(6)(4)(5)	22.0	8	0.140	0.065	A, B, S, Z
220	R	T95R227(1)6R3(2)(3)(4)(5)	13.2	8	0.130	0.080	A, S, Z
330	C	T95C337(1)6R3(2)(7)(4)(5)	20.8	8	0.170	0.080	A, B, C, S, Z
390	R	T95R397(1)6R3(2)(3)(4)(5)	23.4	8	0.130	0.045	A, S, Z
470	D	T95D477(1)6R3(2)(3)(4)(5)	28.2	10	0.130	0.060	A, S, Z
680	R	T95R687(1)6R3(2)(3)(4)(5)	40.8	12	0.090	0.045	A, S, Z
10 V_{DC} AT + 85 °C; 7 V_{DC} AT + 125 °C							
3.3	S	T95S335(1)010(2)(3)(4)(5)	0.5	6	5.000	2.500	A, S, Z
4.7	S	T95S475(1)010(2)(3)(4)(5)	0.5	6	4.000	2.000	A, S, Z
6.8	V	T95V685(1)010(2)(3)(4)(5)	0.7	6	4.000	2.000	A, S, Z
10	X	T95X106(1)010(2)(3)(4)(5)	1.0	6	3.000	1.500	A, S, Z
15	B	T95B156(1)010(2)(6)(4)(5)	1.5	6	0.750	0.550	A, B, S, Z
15	X	T95X156(1)010(2)(3)(4)(5)	1.5	6	2.000	1.000	A, S, Z
22	Y	T95Y226(1)010(2)(6)(4)(5)	2.2	6	1.200	0.600	A, B, S, Z
33	Z	T95Z336(1)010(2)(6)(4)(5)	3.3	6	0.800	0.400	A, B, S, Z
47	Z	T95Z476(1)010(2)(3)(4)(5)	4.7	6	0.800	0.400	A, S, Z
100	R	T95R107(1)010(2)(3)(4)(5)	10.0	8	0.140	0.075	A, S, Z
120	D	T95D127(1)010(2)(7)(4)(5)	12.0	8	0.140	0.085	A, B, C, S, Z
120	R	T95R127(1)010(2)(6)(4)(5)	12.0	8	0.140	0.070	A, B, S, Z

Notes

- Part number definitions:
  (1) Capacitance tolerance: K, M
  (2) Termination and packaging: C, E, H, L
  (3) Reliability level: A, S, Z
  (4) Surge current: A, B, S
  (5) ESR: L, S
  (6) Reliability level: A, B, S, Z
  (7) Reliability level: A, B, C, S, Z

[1] Empty cells: Not available

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STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C (µA)	MAX. DF AT + 25 °C 120 Hz (%)	STD. (S) MAX. ESR AT + 25 °C 100 kHz [1] (Ω)	LOW (L) MAX. ESR AT + 25 °C 100 kHz [1] (Ω)	AVAILABLE RELIABILITY LEVELS
10 V_{DC} AT + 85 °C; 7 V_{DC} AT + 125 °C							
150	D	T95D157(1)010(2)(3)(4)(5)	15.0	8	0.140	0.075	A, S, Z
150	R	T95R157(1)010(2)(3)(4)(5)	15.0	8	0.130	0.065	A, S, Z
220	D	T95D227(1)010(2)(6)(4)(5)	22.0	8	0.140	0.065	A, B, S, Z
220	R	T95R227(1)010(2)(3)(4)(5)	22.0	8	0.130	0.055	A, S, Z
330	D	T95D337(1)010(2)(7)(4)(5)	33.0	8	0.140	0.065	A, B, C, S, Z
330	R	T95R337(1)010(2)(3)(4)(5)	33.0	8	0.130	0.045	A, S, Z
470	R	T95R477(1)010(2)(6)(4)(5)	47.0	8	0.130	0.045	A, B, S, Z
680	R	T95R687(1)010(2)(6)(4)S	68.0	14	0.090		A, B, S, Z
16 V_{DC} AT + 85 °C; 10 V_{DC} AT + 125 °C							
2.2	S	T95S225(1)016(2)(3)(4)(5)	0.5	6	7.000	3.500	A, S, Z
3.3	S	T95S335(1)016(2)(3)(4)(5)	0.5	6	5.000	2.500	A, S, Z
4.7	V	T95V475(1)016(2)(3)(4)(5)	0.8	6	4.000	2.000	A, S, Z
6.8	A	T95A685(1)016(2)(3)(4)(5)	1.1	6	2.800	0.800	A, S, Z
6.8	X	T95X685(1)016(2)(3)(4)(5)	1.1	6	3.000	1.500	A, S, Z
10	X	T95X106(1)016(2)(3)(4)(5)	1.6	6	3.000	1.500	A, S, Z
15	B	T95B156(1)016(2)(3)(4)(5)	2.4	6	0.750	0.550	A, S, Z
15	Y	T95Y156(1)016(2)(6)(4)(5)	2.4	6	1.200	0.600	A, B, S, Z
22	B	T95B226(1)016(2)(6)(4)(5)	3.5	6	0.750	0.500	A, B, S, Z
22	Z	T95Z226(1)016(2)(3)(4)(5)	3.5	6	0.800	0.400	A, S, Z
33	Z	T95Z336(1)016(2)(3)(4)(5)	5.3	6	0.800	0.400	A, S, Z
68	R	T95R686(1)016(2)(3)(4)(5)	10.9	6	0.600	0.095	A, S, Z
100	C	T95C107(1)016(2)(6)(4)(5)	16.0	8	0.600	0.090	A, B, S, Z
100	D	T95D107(1)016(2)(6)(4)(5)	16.0	8	0.140	0.080	A, B, S, Z
150	D	T95D157(1)016(2)(6)(4)(5)	24.0	8	0.140	0.085	A, B, S, Z
180	R	T95R187(1)016(2)(6)(4)(5)	28.8	8	0.130	0.055	A, B, S, Z
220	R	T95R227(1)016(2)(6)(4)(5)	35.2	8	0.120	0.055	A, B, S, Z
330	R	T95R337(1)016(2)(6)(4)(5)	52.8	14	0.110	0.055	A, B, S, Z
20 V_{DC} AT + 85 °C; 13 V_{DC} AT + 125 °C							
1.5	S	T95S155(1)020(2)(3)(4)(5)	0.5	6	7.000	3.500	A, S, Z
2.2	S	T95S225(1)020(2)(3)(4)(5)	0.5	6	7.000	3.500	A, S, Z
3.3	V	T95V335(1)020(2)(3)(4)(5)	0.7	6	6.000	3.000	A, S, Z
4.7	X	T95X475(1)020(2)(3)(4)(5)	0.9	6	3.000	1.500	A, S, Z
6.8	X	T95X685(1)020(2)(3)(4)(5)	1.4	6	3.000	1.500	A, S, Z
10	Y	T95Y106(1)020(2)(3)(4)(5)	2.0	6	2.000	1.000	A, S, Z
15	Z	T95Z156(1)020(2)(3)(4)(5)	3.0	6	1.200	0.600	A, S, Z
22	Z	T95Z226(1)020(2)(3)(4)(5)	4.4	6	0.800	0.400	A, S, Z
47	R	T95R476(1)020(2)(3)(4)(5)	9.4	6	0.200	0.110	A, S, Z
100	R	T95R107(1)020(2)(6)(4)S	20.0	8	0.140		A, B, S, Z
120	R	T95R127(1)020(2)(6)(4)(5)	24.0	8	0.140	0.080	A, B, S, Z
150	R	T95R157(1)020(2)(3)(4)(5)	30.0	8	0.140	0.075	A, S, Z

Notes

- Part number definitions:
  (1) Capacitance tolerance: K, M
  (2) Termination and packaging: C, E, H, L
  (3) Reliability level: A, S, Z
  (4) Surge current: A, B, S
  (5) ESR: L, S
  (6) Reliability level: A, B, S, Z
  (7) Reliability level: A, B, C, S, Z

[1] Empty cells: Not available

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25 V_{DC} AT + 85 °C; 17 V_{DC} AT + 125 °C							
0.68	S	T95S684(1)025(2)(3)(4)(5)	0.5	4	10.000	5.000	A, S, Z
1.0	S	T95S105(1)025(2)(3)(4)(5)	0.5	4	7.000	3.500	A, S, Z
1.5	S	T95S155(1)025(2)(3)(4)(5)	0.5	6	7.000	3.500	A, S, Z
2.2	V	T95V225(1)025(2)(3)(4)(5)	0.6	6	4.000	2.000	A, S, Z
4.7	X	T95X475(1)025(2)(3)(4)(5)	1.2	6	3.000	1.500	A, S, Z
6.8	Y	T95Y685(1)025(2)(3)(4)(5)	1.7	6	2.000	1.000	A, S, Z
10	C	T95C106(1)025(2)(3)(4)(5)	2.5	6	0.570	0.280	A, S, Z
10	Y	T95Y106(1)025(2)(3)(4)(5)	2.5	6	2.000	1.000	A, S, Z
15	Z	T95Z156(1)025(2)(3)(4)(5)	3.8	6	1.200	0.600	A, S, Z
33	D	T95D336(1)025(2)(3)(4)(5)	8.3	6	0.260	0.130	A, S, Z
33	R	T95R336(1)025(2)(3)(4)(5)	8.3	6	0.250	0.130	A, S, Z
47	D	T95D476(1)025(2)(6)(4)(5)	11.8	6	0.260	0.130	A, B, S, Z
47	R	T95R476(1)025(2)(3)(4)(5)	11.8	6	0.200	0.108	A, S, Z
68	D	T95D686(1)025(2)(6)(4)(5)	17.0	8	0.260	0.200	A, B, S, Z
68	R	T95R686(1)025(2)(6)(4)(5)	17.0	6	0.200	0.095	A, B, S, Z
100	R	T95R107(1)025(2)(6)(4)(5)	25.0	8	0.200	0.090	A, B, S, Z
35 V_{DC} AT + 85 °C; 23 V_{DC} AT + 125 °C							
0.15	S	T95S154(1)035(2)(3)(4)(5)	0.5	4	36.000	18.000	A, S, Z
0.22	S	T95S224(1)035(2)(3)(4)(5)	0.5	4	30.000	15.000	A, S, Z
0.33	S	T95S334(1)035(2)(3)(4)(5)	0.5	4	24.000	12.000	A, S, Z
0.47	S	T95S474(1)035(2)(3)(4)(5)	0.5	4	18.000	9.000	A, S, Z
0.68	S	T95S684(1)035(2)(3)(4)(5)	0.5	4	10.000	5.000	A, S, Z
1.0	S	T95S105(1)035(2)(3)(4)(5)	0.5	4	7.000	3.500	A, S, Z
1.5	V	T95V155(1)035(2)(3)(4)(5)	0.5	6	6.000	3.000	A, S, Z
2.2	X	T95X225(1)035(2)(3)(4)(5)	0.8	6	4.000	2.000	A, S, Z
6.8	Z	T95Z685(1)035(2)(6)(4)(5)	2.4	6	1.600	0.800	A, B, S, Z
10	Z	T95Z106(1)035(2)(3)(4)(5)	3.5	6	1.200	0.600	A, S, Z
15	D	T95D156(1)035(2)(3)(4)(5)	5.3	6	0.410	0.270	A, S, Z
15	R	T95R156(1)035(2)(3)(4)(5)	5.3	6	0.380	0.190	A, S, Z
22	R	T95R226(1)035(2)(3)(4)(5)	7.7	6	0.280	0.240	A, S, Z
33	R	T95R336(1)035(2)(3)(4)(5)	11.6	6	0.280	0.200	A, S, Z
47	R	T95R476(1)035(2)(6)(4)(5)	16.5	6	0.280	0.320	A, B, S, Z
50 V_{DC} AT + 85 °C; 33 V_{DC} AT + 125 °C							
4.7	C	T95C475(1)050(2)(6)(4)(5)	2.4	6	1.400	0.800	A, B, S, Z
6.8	C	T95C685(1)050(2)(6)(4)(5)	3.4	6	1.300	0.700	A, B, S, Z
6.8	D	T95D685(1)050(2)(3)(4)(5)	3.4	6	0.820	0.450	A, S, Z
10	R	T95R106(1)050(2)(6)(4)(5)	5.0	6	0.650	0.500	A, B, S, Z
15	R	T95R156(1)050(2)(3)(4)(5)	7.5	6	0.400	0.350	A, S, Z
22	R	T95R226(1)050(2)(3)(4)(5)	11.0	6	0.390	0.300	A, S, Z

Notes

- Part number definitions:
  (1) Capacitance tolerance: K, M
  (2) Termination and packaging: C, E, H, L
  (3) Reliability level: A, S, Z
  (4) Surge current: A, B, S
  (5) ESR: L, S
  (6) Reliability level: A, B, S, Z
  (7) Reliability level: A, B, C, S, Z

(1) Empty cells: Not available

For technical questions, contact: tantalum@vishay.com
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RECOMMENDED VOLTAGE DERATING GUIDELINES (for temperatures below + 85 °C)	
STANDARD CONDITIONS. FOR EXAMPLE: OUTPUT FILTERS	
Capacitor Voltage Rating	**Operating Voltage**
4.0	2.5
6.3	3.6
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
6.3	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	0.075
B	0.085
C	0.110
D	0.150
R	0.250
S	0.080
V	0.095
X	0.110
Y	0.120
Z	0.135

STANDARD PACKAGING QUANTITY		
CASE CODE	**UNITS PER REEL**	
	7" FULL REEL	**7" HALF REEL**
A	2000	1000
B	2000	1000
C	500	250
D	500	250
R	600	300
S	2500	1250
V	2500	1250
X	2000	1000
Y	1500	750
Z	1500	750

PRODUCT INFORMATION	
Conformal Coated Guide	www.vishay.com/doc?40150
Moisture Sensitivity	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

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