Solid Tantalum Chip Capacitors TANTAMOUNT®, Hi-Rel COTS, Ultra-Low ESR, Conformal Coated Case

FEATURES

- High reliability; Weibull failure rate grading available
- Surge current testing per MIL-PRF-55365 options available
- Ultra-low ESR
- Tin/lead (SnPb) termination 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 CHARACTERISTICS

www.vishay.com/doc?40088

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

Capacitance Range: 10 µF to 1500 µF

Capacitance Tolerance: ± 10 %, ± 20 % standard

Voltage Rating: 4 V_{DC} to 75 V_{DC}

ORDERING INFORMATION

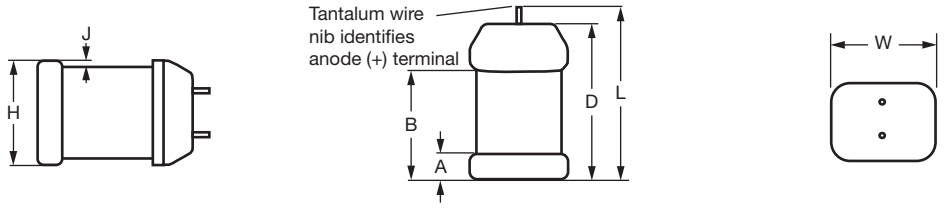
T97	R	227	K	020	E	S	A
TYPE	CASE CODE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C	TERMINATION/ PACKAGING (available options are series dependent)	RELIABILITY LEVEL	SURGE CURRENT
	See Ratings and Case Code table	This is expressed in pF. The first two digits are the significant figures. 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) reel L = Sn/Pb solder/ 7" (178 mm), 1/2 reel C = 100 % tin/ 7" (178 mm), reel H = 100 % tin/ 7" (178 mm), 1/2 reel	A = 1.0 % Weibull B = 0.1 % Weibull (1) S = 40 h 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

Notes

(1) Available on select ratings. See "Standard Ratings" table.

- 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.)
V	0.299 [7.6]	0.173 ± 0.016 [4.4 ± 0.4]	0.079 [2.0 max.]	0.051 ± 0.012 [1.3 ± 0.3]	0.181 ± 0.024 [4.6 ± 0.6]	0.252 [6.4]	0.004 [0.1]
D	0.299 [7.6]	0.173 ± 0.016 [4.4 ± 0.4]	0.138 [3.5 max.]	0.051 ± 0.012 [1.3 ± 0.3]	0.181 ± 0.024 [4.6 ± 0.6]	0.252 [6.4]	0.004 [0.1]
E	0.299 [7.6]	0.173 ± 0.016 [4.4 ± 0.4]	0.157 ± 0.016 [4.0 ± 0.4]	0.051 ± 0.012 [1.3 ± 0.3]	0.181 ± 0.024 [4.6 ± 0.6]	0.252 [6.4]	0.004 [0.1]
R	0.299 [7.6]	0.238 ± 0.016 [6.0 ± 0.4]	0.142 ± 0.016 [3.6 ± 0.4]	0.051 ± 0.012 [1.3 ± 0.3]	0.181 ± 0.024 [4.6 ± 0.6]	0.244 [6.2]	0.004 [0.1]
F	0.299 [7.6]	0.238 ± 0.016 [6.0 ± 0.4]	0.185 ± 0.016 [4.7 ± 0.4]	0.055 ± 0.016 [1.4 ± 0.4]	0.181 ± 0.024 [4.6 ± 0.6]	0.244 [6.2]	0.004 [0.1]
Z	0.299 [7.6]	0.238 ± 0.016 [6.0 ± 0.4]	0.236 ± 0.016 [6.0 ± 0.4]	0.055 ± 0.016 [1.4 ± 0.4]	0.181 ± 0.024 [4.6 ± 0.6]	0.244 [6.2]	0.004 [0.1]
M	0.315 [8.0]	0.260 + 0.016/- 0.024 [6.6 + 0.4/- 0.6]	0.142 ± 0.016 [3.6 ± 0.4]	0.051 ± 0.012 [1.3 ± 0.3]	0.197 ± 0.024 [5.0 ± 0.6]	0.260 [6.6]	0.004 [0.1]
H	0.315 [8.0]	0.260 + 0.016/- 0.024 [6.6 + 0.4/- 0.6]	0.205 ± 0.016 [5.2 ± 0.4]	0.055 ± 0.016 [1.4 ± 0.4]	0.197 ± 0.024 [5.0 ± 0.6]	0.260 [6.6]	0.004 [0.1]
N	0.315 [8.0]	0.260 + 0.016/- 0.024 [6.6 + 0.4/- 0.6]	0.252 ± 0.016 [6.4 ± 0.4]	0.056 ± 0.017 [1.4 ± 0.4]	0.196 ± 0.025 [5.0 ± 0.6]	0.259 [6.6]	0.004 [0.1]

Note

- The anode termination (D less B) will be a minimum of 0.012" [0.3 mm]

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
10									D	R
15								E/R	R	
22								R	F	
33								F		
47							R	Z/N		
68						R	F			
100						F	F			
150						F				
220				E	R	M				
330		V	E	F	H/F					
470	V	E	E	H						
680	E	E	R							
1000	E/R	R	F							
1500	R									

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER	MAX. DCL AT + 25 °C 120 Hz (µA)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz (mΩ)	MAX. RIPPLE 100 kHz I_{RMS} (A)	AVAILABLE RELIABILITY LEVELS
4 V_{DC} AT + 85 °C; 2.7 V_{DC} AT + 125 °C							
470	V	T97V477(1)004(2)(4)(5)	18.8	8	60	2.2	A, B, S, Z
680	E	T97E687(1)004(2)(4)(5)	27.2	6	25	2.9	A, B, S, Z
1000	E	T97E108(1)004(2)(4)(5)	40.0	8	20	3.3	A, B, S, Z
1000	R	T97R108(1)004(2)(4)(5)	40.0	8	18	3.7	A, B, S, Z
1500	R	T97R158(1)004(2)(4)(5)	60.0	8	24	2.9	A, B, S, Z
6.3 V_{DC} AT + 85 °C; 4 V_{DC} AT + 125 °C							
330	V	T97V337(1)6R3(2)(4)(5)	20.8	8	56	2.0	A, B, S, Z
470	E	T97E477(1)6R3(2)(4)(5)	29.6	6	30	2.7	A, B, S, Z
680	E	T97E687(1)6R3(2)(4)(5)	42.8	6	25	2.9	A, B, S, Z
1000	R	T97R108(1)6R3(2)(4)(5)	63.0	8	31	2.8	A, B, S, Z
10 V_{DC} AT + 85 °C; 7 WV_{DC} AT + 125 °C							
330	E	T97E337(1)010(2)(4)(5)	33.0	6	35	2.5	A, B, S, Z
470	E	T97E477(1)010(2)(4)(5)	47.0	6	28	2.8	A, B, S, Z
680	R	T97R687(1)010(2)(6)(5)	68.0	6	28	3.0	S, Z
1000	F	T97F108(1)010(2)(3)(5)	100.0	20	120	1.4	A, S, Z
16 WV_{DC} AT + 85 °C; 10 V_{DC} AT + 125 °C							
220	E	T97E227(1)016(2)(4)(5)	35.2	8	60	2.3	A, B, S, Z
330	F	T97F337(1)016(2)(4)(5)	52.8	10	100	1.6	A, B, S, Z
470	H	T97H477(1)016(2)(4)(5)	75.2	14	100	1.4	A, B, S, Z
20 V_{DC} AT + 85 °C; 13 V_{DC} AT + 125 °C							
220	R	T97R227(1)020(2)(4)(5)	44.0	8	80	1.8	A, B, S, Z
330	F	T97F337(1)020(2)(6)(5)	66.0	10	100	1.6	S, Z
330	H	T97H337(1)020(2)(4)(5)	66.0	10	100	1.6	A, B, S, Z
25 V_{DC} AT + 85 °C; 17 V_{DC} AT + 125 °C							
68	R	T97R686(1)025(2)(4)(5)	17.0	6	100	1.6	A, B, S, Z
100	F	T97F107(1)025(2)(4)(5)	25.0	8	100	1.6	A, B, S, Z
25 V_{DC} AT + 85 °C; 17 V_{DC} AT + 125 °C							
150	F	T97F157(1)025(2)(4)(5)	37.5	8	80	1.8	A, B, S, Z
220	M	T97M227(1)025(2)(3)(5)	55.0	8	100	1.6	A, S, Z
35 V_{DC} AT + 85 °C; 23 V_{DC} AT + 125 °C							
47	R	T97R476(1)035(2)(4)(5)	16.5	6	100	1.6	A, B, S, Z
68	F	T97F686(1)035(2)(3)(5)	23.8	6	100	1.6	A, S, Z
100	F	T97F107M035(2)(3)(5)	35.0	8	100	1.6	A, S, Z

Note

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

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 (mΩ)	MAX. RIPPLE 100 kHz I_{RMS} (A)	AVAILABLE RELIABILITY LEVELS
50 V_{DC} AT + 85 °C; 33 V_{DC} AT + 125 °C							
15	E	T97E156(1)050(2)(4)(5)	7.5	6	350	0.9	A, B, S, Z
15	R	T97R156(1)050(2)(4)(5)	7.5	6	250	1.0	A, B, S, Z
22	R	T97R226(1)050(2)(4)(5)	11.0	6	220	1.1	A, B, S, Z
33	F	T97F336(1)050(2)(3)(5)	16.5	6	150	1.3	A, S, Z
47	Z	T97Z476(1)050(2)(6)(5)	23.5	6	240	1.1	S, Z
47	N	T97N476(1)050(2)(4)(5)	23.5	6	150	1.4	A, B, S, Z
63 V_{DC} AT + 85 °C; 42 V_{DC} AT + 125 °C							
10	D	T97D106(1)063(2)(3)(5)	10.0	6	400	0.6	A, S, Z
15	R	T97R156(1)063(2)(3)(5)	9.5	6	400	0.8	A, S, Z
22	F	T97F226(1)063(2)(3)(5)	13.9	6	250	1.0	A, S, Z
75 V_{DC} AT + 85 °C; 50 V_{DC} AT + 125 °C							
10	R	T97R106(1)075(2)(6)(5)	7.5	6	500	0.7	S, Z

Note

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

RECOMMENDED VOLTAGE DERATING GUIDELINES (for temperatures below + 85 °C)

STANDARD CONDITIONS. FOR EXAMPLE: OUTPUT FILTERS

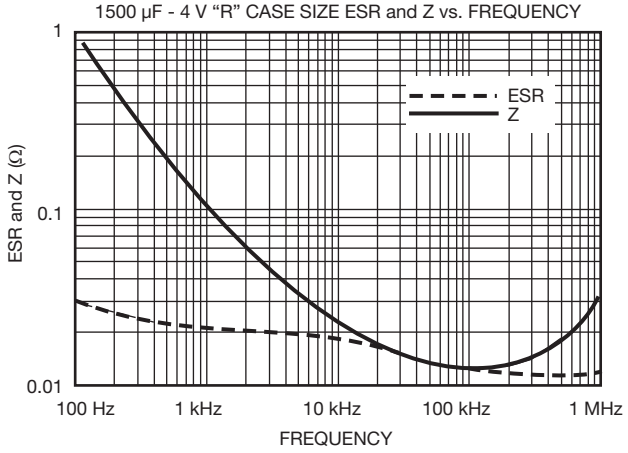
Capacitor Voltage Rating	Operating Voltage
4.0	2.5
6.3	3.6
10	6.0
16	10
20	12
25	15
35	24
50	28
63	37.8
75	45

SEVERE CONDITIONS. FOR EXAMPLE: INPUT FILTERS

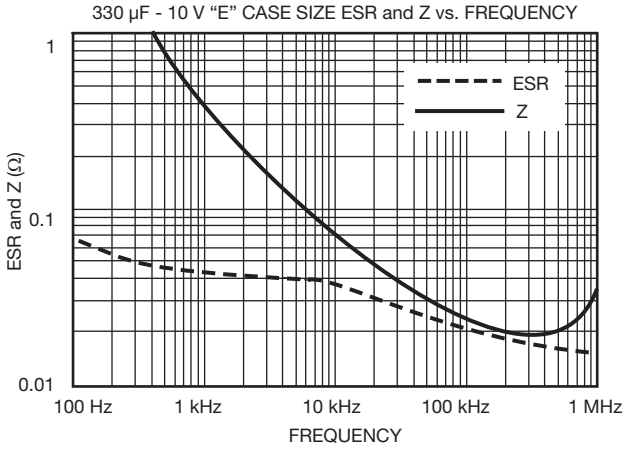
Capacitor Voltage Rating	Operating Voltage
4.0	2.5
6.3	3.3
10	5.0
16	8.0
20	10
25	12
35	15
50	24
63	32
75	37

TYPICAL CURVES

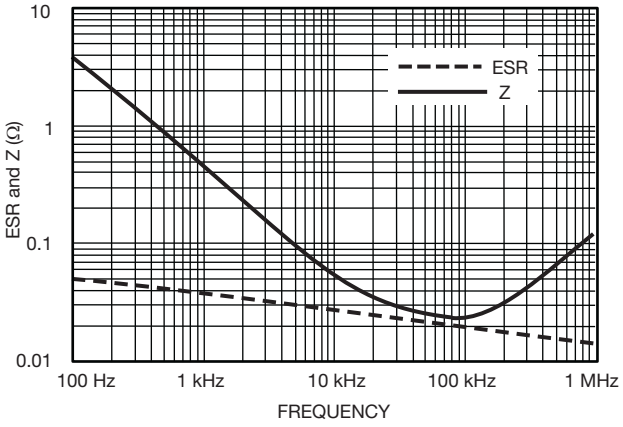
1500 µF - 4 V "R" CASE SIZE ESR and Z vs. FREQUENCY



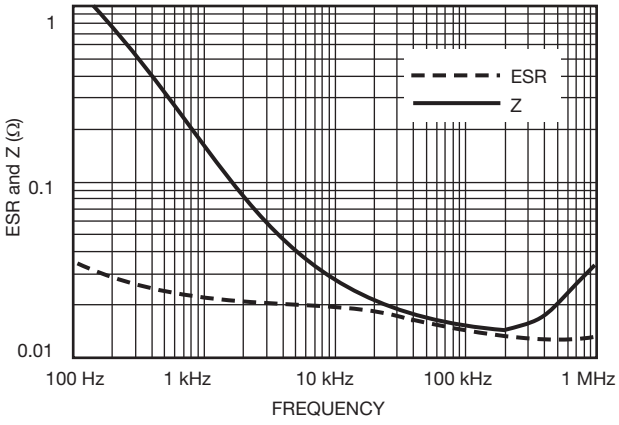
330 µF - 10 V "E" CASE SIZE ESR and Z vs. FREQUENCY



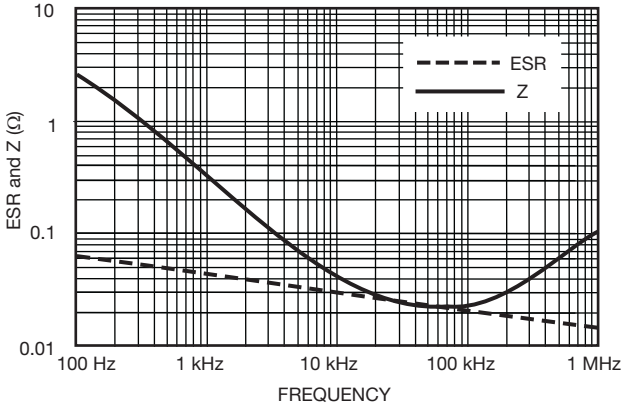
330 µF - 6.3 V "V" CASE SIZE and Z vs. FREQUENCY



1000 µF - 6.3 V "R" CASE SIZE ESR and Z vs. FREQUENCY



470 µF - 4 V "V" CASE SIZE ESR and Z vs. FREQUENCY



POWER DISSIPATION	
CASE CODE	MAXIMUM PERMISSIBLE POWER DISSIPATION AT + 25 °C (W) IN FREE AIR
V	0.141
D	0.215
E	0.240
R, F, M	0.250
Z	0.265
H	0.265
N	0.280

STANDARD PACKAGING QUANTITY		
CASE CODE	UNITS PER REEL	
	7" FULL REEL	7" HALF REEL
V	1000	500
D	400	200
E	500	250
R	300	150
F	250	125
Z	250	125
M	200	100
H	200	100
N	200	100

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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