

# Solid Tantalum Chip Capacitors TANTAMOUNT<sup>®</sup>, 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](http://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](http://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<sub>DC</sub> to 75 V<sub>DC</sub>

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 <sup>(1)</sup> 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

<sup>(1)</sup> 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 ( $\mu$ F)	CASE CODE	PART NUMBER	MAX. DCL AT + 25 °C ( $\mu$ A)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz (m $\Omega$ )	MAX. RIPPLE 100 kHz I <sub>RMS</sub> (A)	AVAILABLE RELIABILITY LEVELS
<b>4 V<sub>DC</sub> AT + 85 °C; 2.7 V<sub>DC</sub> AT + 125 °C</b>							
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
<b>6.3 V<sub>DC</sub> AT + 85 °C; 4 V<sub>DC</sub> AT + 125 °C</b>							
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
<b>10 V<sub>DC</sub> AT + 85 °C; 7 WV<sub>DC</sub> AT + 125 °C</b>							
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
<b>16 WV<sub>DC</sub> AT + 85 °C; 10 V<sub>DC</sub> AT + 125 °C</b>							
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
<b>20 V<sub>DC</sub> AT + 85 °C; 13 V<sub>DC</sub> AT + 125 °C</b>							
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
<b>25 V<sub>DC</sub> AT + 85 °C; 17 V<sub>DC</sub> AT + 125 °C</b>							
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
<b>25 V<sub>DC</sub> AT + 85 °C; 17 V<sub>DC</sub> AT + 125 °C</b>							
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
<b>35 V<sub>DC</sub> AT + 85 °C; 23 V<sub>DC</sub> AT + 125 °C</b>							
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:
  - Capacitance tolerance: K, M
  - Termination and packaging: C, E, H, L
  - Reliability level: A, S, Z
  - Reliability level: A, B, S, Z
  - Surge current: A, B, S
  - Reliability level: S, Z



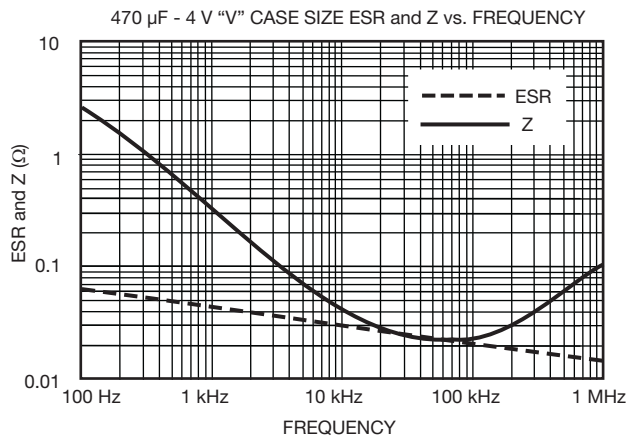
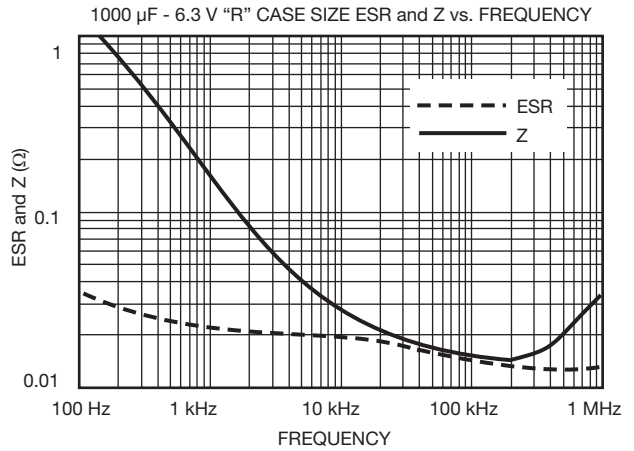
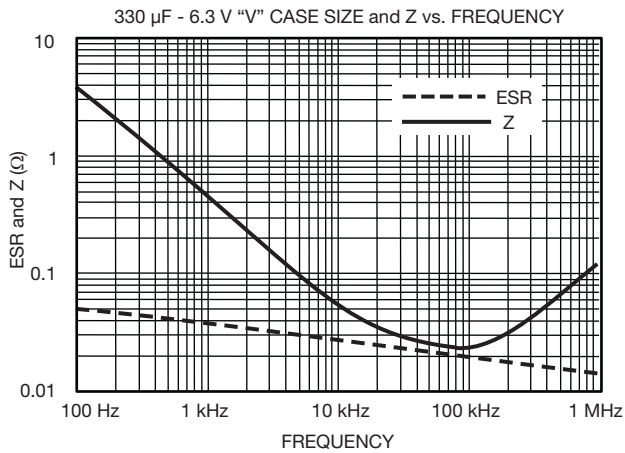
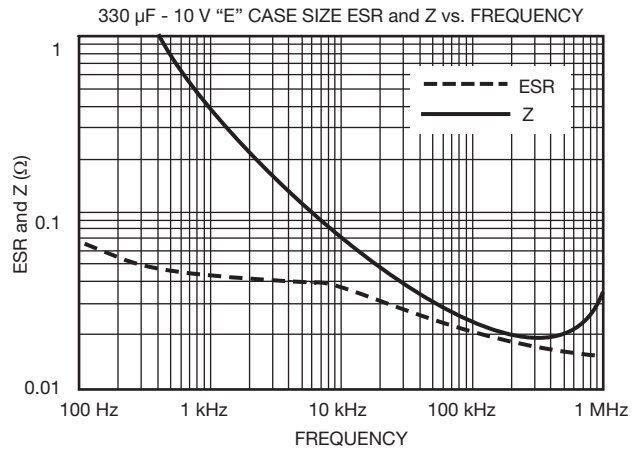
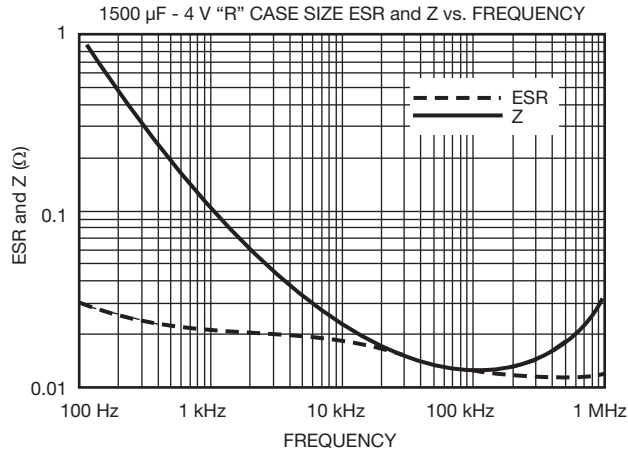
STANDARD RATINGS								
CAPACITANCE (μF)	CASE CODE	PART NUMBER	MAX. DCL AT + 25 °C (μA)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz (mΩ)	MAX. RIPPLE 100 kHz I <sub>RMS</sub> (A)	AVAILABLE RELIABILITY LEVELS	
<b>50 V<sub>DC</sub> AT + 85 °C; 33 V<sub>DC</sub> AT + 125 °C</b>								
15	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	
<b>63 V<sub>DC</sub> AT + 85 °C; 42 V<sub>DC</sub> AT + 125 °C</b>								
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	
<b>75 V<sub>DC</sub> AT + 85 °C; 50 V<sub>DC</sub> AT + 125 °C</b>								
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**





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	<a href="http://www.vishay.com/doc?40150">www.vishay.com/doc?40150</a>
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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**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

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Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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