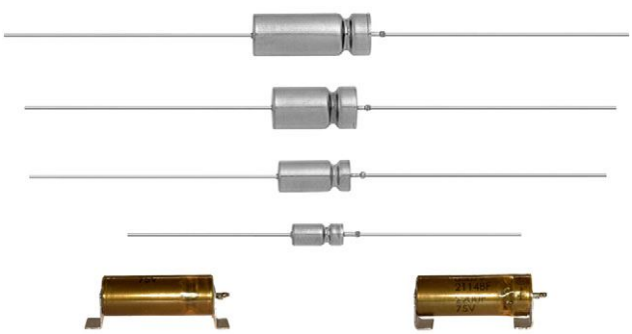
Wet Tantalum Capacitors, Extended Capacitance, Tantalum Case With Glass-to-Tantalum Hermetic Seal for -55 °C to +125 °C



LINKS TO ADDITIONAL RESOURCES

3D Models

PERFORMANCE CHARACTERISTICS

Refer to: Typical Performance Characteristics

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

Capacitance Tolerance: ± 10 %, ± 20 % standard

DC Leakage Current (DCL Max.): at +25 °C and above: leakage current shall not exceed the values listed in the Standard Ratings table.

FEATURES

- Enhanced performance, high reliability design
- Terminations: axial, standard tin / lead (Sn / Pb), 100 % tin (RoHS-compliant) available
- Model T16 tantalum-case electrolytic capacitors provide all the advantages of Vishay's SuperTan® series devices, while offering improved reverse voltage and vibration capability
- Increased thermal shock capability of 300 cycles
- Designed for the avionics and aerospace applications
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free Available

RoHS* Available

HALOGEN FREE GREEN (5-2008) Available

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

ORDERING INFORMATION

T16	D	227	M	100	E (1)	Z	S (2)	S
MODEL	CASE CODE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT +85 °C	TERMINATION AND PACKAGING	RELIABILITY / SHOCK / VIBRATION LEVEL	INSULATING SLEEVE	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.	E = axial, tin / lead, bulk C = axial, 100 % tin, bulk J = SMD, outside bend, tin / lead K = SMD, outside bend, 100 % tin L = SMD, inside bend, tin / lead M = SMD, inside bend, 100 % tin	Z = standard H = high	S = sleeved U = unsleeved	S = standard

Notes

- Packaging: the use of formed plastic trays for packaging these axial lead components is standard. Tape and reel is not available due to the unit weight

(1) J, K, L, M are available in T4. For all other case sizes, check with marketing

(2) Sleeve on J, K, L, M terminations shall be Kapton only

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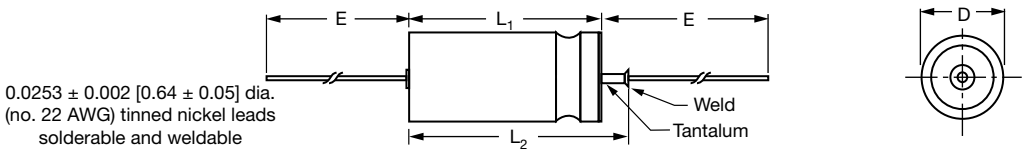
AXIAL DIMENSIONS in inches [millimeters]



CASE CODE		D	L_1	L_2 (max.)	E	WEIGHT (g) (max.)
TYPE T16	ST					
A	T1	0.188 ± 0.016 [4.78 ± 0.41]	0.453 + 0.031 / - 0.016 [11.51 + 0.79 / - 0.41]	0.734 [18.64]	1.500 ± 0.250 [38.10 ± 6.35]	2.6
B	T2	0.281 ± 0.016 [7.14 ± 0.41]	0.641 + 0.031 / - 0.016 [16.28 + 0.79 / - 0.41]	0.922 [23.42]	2.250 ± 0.250 [57.15 ± 6.35]	6.2
E	L2	0.281 ± 0.016 [7.14 ± 0.41]	1.008 + 0.031 / - 0.016 [25.60 + 0.79 / - 0.41]	1.171 [29.75]	2.250 [57.15]	7.84
C	T3	0.375 ± 0.016 [9.52 ± 0.41]	0.766 + 0.031 / - 0.016 [19.46 + 0.79 / - 0.41]	1.047 [26.59]	2.250 ± 0.250 [57.15 ± 6.35]	11.6
D	T4	0.375 ± 0.016 [9.52 ± 0.41]	1.062 + 0.031 / - 0.016 [26.97 + 0.79 / - 0.41]	1.343 [34.11]	2.250 ± 0.250 [57.15 ± 6.35]	17.7

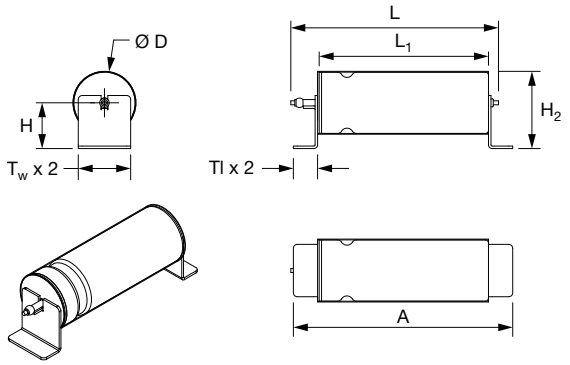
Note

- For insulated parts, add 0.015" [0.38 mm] to the diameter. The insulation shall lap over the ends of the capacitor body

SMD PRODUCT DIMENSIONS in inches [millimeters]

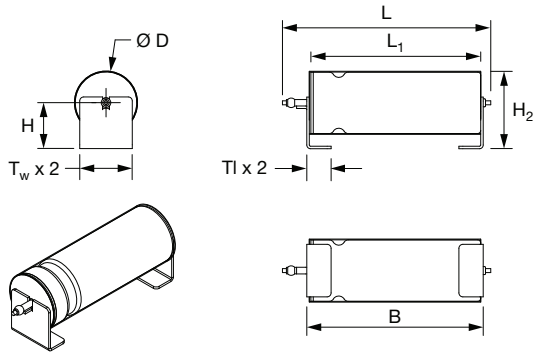
Styles J, K

Term. code	Solder type
J	100 % tin (RoHS-compliant)
K	SnPb



Styles L, M

Term. code	Solder type
L	100 % tin (RoHS-compliant)
M	SnPb



CASE CODE		A (max.)	B (max.)	Tl (max.)	H (max.)	T_w ± 0.005	H_2 (max.)	L (max.)	L_1	D (max.)
TYPE T18	ST									
D	T4	1.432 [36.4]	1.140 [29.0]	0.157 [4.0]	0.295 [7.5]	0.331 [8.4]	0.492 [12.5]	1.343 [34.1]	1.062 + 0.031 / - 0.016 [26.97 + 0.79 / - 0.41]	0.397 [10.1]

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STANDARD RATINGS

CAPACITANCE AT +25 °C 120 Hz (µF)	CASE CODE	PART NUMBER	MAX. ESR AT +25 °C 120 Hz (Ω)	MAX. IMP. AT -55 °C 120 Hz (Ω)	MAX. DCL (µA) AT		MAX. CAPACITANCE CHANGE (%)			AC RIPPLE +85 °C 40 kHz (mA_{RMS})
					+25 °C	+85 °C AND +125 °C	-55 °C	+85 °C	+125 °C	
25 V_{DC} AT 85 °C, 15 V_{DC} AT 125 °C										
120	A	T16A127(1)025(2)(3)(4)(5)	1.30	25	1	5	-42	8	12	1250
560	B	T16B567(1)025(2)(3)(4)(5)	0.83	12	2	10	-65	14	18	2000
1100	E	T16E118(1)025(2)(3)(4)(5)	0.50	7	3	25	-60	20	45	3200
1200	C	T16C128(1)025(2)(3)(4)(5)	0.65	7	5	20	-70	15	20	2400
1800	D	T16D188(1)025(2)(3)(4)(5)	0.50	7	6	25	-72	15	20	3000
30 V_{DC} AT 85 °C, 20 V_{DC} AT 125 °C										
100	A	T16A107(1)030(2)(3)(4)(5)	1.30	25	1	5	-38	8	12	1200
470	B	T16B477(1)030(2)(3)(4)(5)	0.85	15	2	10	-65	14	18	1800
950	E	T16E957(1)030(2)(3)(4)(5)	0.50	7	5	30	-55	18	35	3200
1000	C	T16C108(1)030(2)(3)(4)(5)	0.70	7	7	25	-70	15	25	2200
1500	D	T16D158(1)030(2)(3)(4)(5)	0.60	6	12	35	-72	15	25	2900
50 V_{DC} AT 85 °C, 30 V_{DC} AT 125 °C										
68	A	T16A686(1)050(2)(3)(4)(5)	1.50	35	1	5	-25	8	15	1050
220	B	T16B227(1)050(2)(3)(4)(5)	0.90	17.5	2	10	-50	8	15	1800
450	E	T16E457(1)050(2)(3)(4)(5)	0.60	9	3	25	-45	12	30	2900
470	C	T16C477(1)050(2)(3)(4)(5)	0.75	10	3	25	-45	8	15	2100
680	D	T16D687(1)050(2)(3)(4)(5)	0.70	8	5	40	-58	10	20	2700
60 V_{DC} AT 85 °C, 40 V_{DC} AT 125 °C										
47	A	T16A476(1)060(2)(3)(4)(5)	2.00	44	1	5	-25	8	12	1050
150	B	T16B157(1)060(2)(3)(4)(5)	1.10	20	2	10	-40	8	15	1800
370	E	T16E377(1)060(2)(3)(4)(5)	0.60	9	3	25	-33	9	20	2900
390	C	T16C397(1)060(2)(3)(4)(5)	0.90	15	3	25	-45	8	15	2100
560	D	T16D567(1)060(2)(3)(4)(5)	0.80	10	5	40	-58	8	15	2700
75 V_{DC} AT 85 °C, 50 V_{DC} AT 125 °C										
33	A	T16A336(1)075(2)(3)(4)(5)	2.50	66	1	5	-25	5	9	1050
110	B	T16B117(1)075(2)(3)(4)(5)	1.30	24	2	10	-35	6	10	1650
220	E	T16E227(1)075(2)(3)(4)(5)	0.80	12	5	30	-30	6	15	2500
250	E	T16E257(1)075(2)(3)(4)(5)	0.80	12	5	30	-30	6	15	2500
330	C	T16C337(1)075(2)(3)(4)(5)	1.00	12	3	30	-45	6	10	2100
470	D	T16D477(1)075(2)(3)(4)(5)	0.90	12	5	50	-50	6	10	2700
100 V_{DC} AT 85 °C, 65 V_{DC} AT 125 °C										
15	A	T16A156(1)100(2)(3)(4)(5)	3.50	125	1	5	-18	3	10	1050
68	B	T16B686(1)100(2)(3)(4)(5)	2.10	37	2	10	-30	4	12	1650
120	E	T16E127(1)100(2)(3)(4)(5)	1.00	20.5	3	25	-30	4	12	2200
150	C	T16C157(1)100(2)(3)(4)(5)	1.60	22	3	25	-35	6	12	2100
220	D	T16D227(1)100(2)(3)(4)(5)	1.20	15	5	50	-40	6	12	2700
125 V_{DC} AT 85 °C, 85 V_{DC} AT 125 °C										
10	A	T16A106(1)125(2)(3)(4)(5)	5.50	175	1	5	-15	3	10	1050
47	B	T16B476(1)125(2)(3)(4)(5)	2.30	47	2	10	-25	5	12	1650
82	C	T16C826(1)125(2)(3)(4)(5)	1.80	40	3	25	-35	5	12	1950
90	E	T16E906(1)125(2)(3)(4)(5)	1.30	25	5	25	-25	4	15	2000
100	C	T16C107(1)125(2)(3)(4)(5)	1.80	35	3	25	-35	5	12	2100
150	D	T16D157(1)125(2)(3)(4)(5)	1.60	20	5	50	-35	6	12	2700

Note

- Part number definitions:
  (1) Capacitance tolerance: K, M
  (2) Termination / packaging: C = 100 % tin, bulk; E = standard, tin / lead, bulk
  (3) Reliability level: Z = standard (non-ER / 500 *g* / 50 *g* / 53.79 *g*); H = high (non-ER / 500 *g* / 80 *g* / 53.79 *g*)
  (4) Insulating sleeve: S = sleeved; U = unsleeved
  (5) ESR: S = standard

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TYPICAL PERFORMANCE CHARACTERISTICS OF T16 CAPACITORS

ELECTRICAL CHARACTERISTICS	
ITEM	**PERFORMANCE CHARACTERISTICS**
Operating temperature range	-55 °C to +85 °C (to +125 °C with voltage derating)
Capacitor tolerance	± 20 %, ± 10 % at 120 Hz, at +25 °C
Capacitor change by temperature	Limit per Standard Ratings table
ESR	Limit per Standard Ratings table, at +25 °C, 120 Hz
Impedance	Limit per Standard Ratings table, at -55 °C, 120 Hz
DCL (leakage current)	Limit per Standard Ratings table
AC ripple current	Limit per Standard Ratings table, at +85 °C and 40 kHz
Reverse voltage	Reverse voltage shall be in accordance with MIL-PRF-39006, paragraphs 3.23 and 4.8.19.
Surge voltage	Surge voltage shall be in accordance with MIL-PRF-39006 and Table II of DLA 13017. The DC rated surge voltage is the maximum voltage to which the capacitors can be subjected under any conditions including transients and peak ripple at the highest line voltage. The DC surge voltage is 115 % of rated DC voltage. After the test, the capacitors shall meet the following requirements: a) DC leakage shall not exceed the specified value in catalog b) Capacitance shall be within +5 %, -20 % of initial value c) ESR shall not exceed the specified value in catalog

PERFORMANCE CHARACTERISTICS	
ITEM	**PERFORMANCE CHARACTERISTICS**
Life testing	Capacitors shall be capable of withstanding a 2000 h life test at a temperature +85 °C at rated voltage, or a 2000 h life test at 125 °C test at derated voltage. After the test, the capacitors shall meet the following requirements: a) DC leakage at 85 °C and 125 °C shall not exceed 125 % of the specified value b) DC leakage at 25 °C shall not exceed the specified value c) Capacitance shall be within +10 %, -20 % of initial value d) ESR shall not exceed 200 % of the specified value

ENVIRONMENTAL CHARACTERISTICS		
ITEM	**CONDITION**	**COMMENTS**
Seal	MIL-PRF-39006	When the capacitors are tested as specified in MIL-PRF-39006, there shall be no evidence of leakage.
Moisture resistance	MIL-PRF-39006	Moisture resistance shall be in accordance with MIL-PRF-39006. Number of cycles: 10 continuous cycles
Barometric pressure (reduced)	MIL-STD-202, method 105, condition E	Altitude 150 000 feet

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MECHANICAL CHARACTERISTICS		
ITEM	**CONDITION**	**COMMENTS**
Shock (specified pulse)	MIL-STD-202, method 213, codes Z and H = test condition D (500 *g*)	The capacitors shall meet the requirements of MIL-PRF-39006.
Vibration, high frequency	MIL-STD-202, method 204, code Z = test condition E (50 *g* peak) code H = test condition H (80 *g* peak)	The capacitors shall meet the requirements of MIL-PRF-39006.
Random vibration	MIL-STD-202, method 214, test condition II-K (53.79 *g* RMS)	The capacitors shall meet the requirements of MIL-PRF-39006.
Thermal shock	MIL-STD-202, method 107, condition A	Thermal shock shall be in accordance with MIL-PRF-39006 when tested for 300 cycles.
Solderability	MIL-STD-202, method 208, ANSI/J-STD-002, test A	Solderability shall be in accordance with MIL-PRF-39006.
Terminal strength	MIL-STD-202, method 211	Terminal strength shall be in accordance with MIL-PRF-39006.
Resistance to solder heat	MIL-STD-202, method 210, condition C	The capacitors shall meet the requirements of MIL-PRF-39006.
Terminals	MIL-STD-1276	Terminals shall be as specified in MIL-STD-1276. The length and diameter of the terminals shall be as specified in Dimensions table. All terminals shall be permanently secured internally and externally, as applicable. All external joints shall be welded.
Marking	MIL-STD-1285	Marking of capacitors conforms to method I of MIL-STD-1285 and include capacitance (in µF), capacitance tolerance letter, rated voltage, date code, lot symbol and Vishay trademark.

SELECTOR GUIDES	
Tantalum Selector Guide	www.vishay.com/doc?49054
Parameter Comparison Guide	www.vishay.com/doc?42088

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