

# Solid Tantalum Surface Mount Chip Capacitors TANTAMOUNT<sup>®</sup>, Molded Case, for Medical Instruments



## PERFORMANCE/ELECTRICAL CHARACTERISTICS

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

**Capacitance Range:** 1 μF to 220 μF

**Capacitance Tolerance:** ± 10 %, ± 20 % standard

**Voltage Rating:** 4 V<sub>DC</sub> to 20 V<sub>DC</sub>

## FEATURES

- **For non-life support medical applications**
- High reliability
- Weibull grading options
- 100 % surge current tested (B, C, D, E cases)
- Terminations: 100 % matte tin and tin/lead
- Standard EIA 535BAAC case sizes (A through E)
- Manufacturing location is certified to medical standard ISO 13485
- Compliant terminations
- Mounting: Surface mount
- Dry pack as per IPC/JEDEC J-STD-033 standard
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS\***  
Available  
**HALOGEN FREE**

## 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							
TM3	C	226	K	6R3	C	B	A
TYPE	CASE CODE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C	TERMINATION AND PACKAGING	RELIABILITY LEVEL	SURGE CURRENT
	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).	C: Matte tin/ 7" (178 mm) reel H: Matte tin/ 7" (178 mm) ½ reel E: Tin/lead/ 7" (178 mm) reel L: Tin/lead/ 7" (178 mm) ½ reel	B = 0.1 % Weibull FRL S = Hi-Rel std. (40 h burn-in) Z = Non-established reliability	A = 10 cycles at + 25 °C, 1.1 RV Z = No surge (for A case only)

DIMENSIONS in inches (millimeters)							
CASE CODE	EIA SIZE	L	W	H	P	Tw	TH (MIN.)
A	3216-18	0.126 ± 0.008 [3.2 ± 0.20]	0.063 ± 0.008 [1.6 ± 0.20]	0.063 ± 0.008 [1.6 ± 0.20]	0.031 ± 0.012 [0.80 ± 0.30]	0.047 ± 0.004 [1.2 ± 0.10]	0.028 [0.70]
B	3528-21	0.138 ± 0.008 [3.5 ± 0.20]	0.110 ± 0.008 [2.8 ± 0.20]	0.075 ± 0.008 [1.9 ± 0.20]	0.031 ± 0.012 [0.80 ± 0.30]	0.087 ± 0.004 [2.2 ± 0.10]	0.028 [0.70]
C	6032-28	0.236 ± 0.012 [6.0 ± 0.30]	0.126 ± 0.012 [3.2 ± 0.30]	0.098 ± 0.012 [2.5 ± 0.30]	0.051 ± 0.012 [1.3 ± 0.30]	0.087 ± 0.004 [2.2 ± 0.10]	0.039 [1.0]
D	7343-31	0.287 ± 0.012 [7.3 ± 0.30]	0.169 ± 0.012 [4.3 ± 0.30]	0.110 ± 0.012 [2.8 ± 0.30]	0.051 ± 0.012 [1.3 ± 0.30]	0.094 ± 0.004 [2.4 ± 0.10]	0.039 [1.0]
E	7343-43	0.287 ± 0.012 [7.3 ± 0.30]	0.169 ± 0.012 [4.3 ± 0.30]	0.157 ± 0.012 [4.0 ± 0.30]	0.051 ± 0.012 [1.3 ± 0.30]	0.094 ± 0.004 [2.4 ± 0.10]	0.039 [1.0]

## Note

- Glue pad (non-conductive, part of molded case) is dedicated for glue attachment (as user option).

RATINGS AND CASE CODES					
$\mu\text{F}$	4 V	6.3 V	10 V	16 V	20 V
1.0				A	
1.5			A	A	
2.2		A	A	A/B	B
3.3		A	A	A/B	B
4.7			A/B	A/B	C
6.8		B	B	B	B/C
10		A/B	A/B	B/C	C
15			B/C	B/C	
22		A/B/C	B/C	B/C/D	C/D
33		B	B/C/D	D	D
47		B/C/D	C/D	C/D	E
68	B	D	D	D	
100	D	D	D	D/E	
150	D	D			
220	D/E	D/E	E		

MARKING			
<p style="text-align: center;"><b>A Case</b></p>	<b>“A” CASE VOLTAGE CODE</b>		<p style="text-align: center;"><b>B, C, D, E Cases</b></p>
	<b>VOLTS</b>	<b>CODE</b>	
	4.0	G	
	6.3	J	
	10	A	
	16	C	
	20	D	
	25	E	
35	V		
50	T		
<p><b>Marking</b></p> <p>Capacitor marking includes an anode (+) polarity band, capacitance in microfarads and the voltage rating. “A” case capacitors use a letter code for the voltage and EIA capacitance code.</p> <p>The Vishay Sprague® trademark is included if space permits. Capacitors rated at 6.3 V are marked 6 V.</p> <p>A manufacturing date code is marked on all capacitors.</p> <p>Call the factory for further explanation.</p>			



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 ( $\Omega$ )	MAX. RIPPLE 100 kHz $I_{RMS}$ (A)
<b>4 V<sub>DC</sub> AT + 85 °C; 2.7 V<sub>DC</sub> AT + 125 °C</b>						
68	B	TM3B686(1)004(2)(3)A	2.7	6	1.90	0.21
100	D	TM3D107(1)004(2)(3)A	4.0	6	0.70	0.46
150	D	TM3D157(1)004(2)(3)A	6.0	8	0.60	0.50
220	D	TM3D227(1)004(2)(3)A	8.8	8	0.60	0.50
220	E	TM3E227(1)004(2)(3)A	8.8	8	0.50	0.57
<b>6.3 V<sub>DC</sub> AT + 85 °C; 4 V<sub>DC</sub> AT + 125 °C</b>						
2.2	A	TM3A225(1)6R3(2)(3)Z	0.5	6	7.60	0.10
3.3	A	TM3A335(1)6R3(2)(3)Z	0.5	6	6.30	0.11
6.8	B	TM3B685(1)6R3(2)(3)A	0.5	6	3.40	0.16
10	A	TM3A106(1)6R3(2)(3)Z	0.6	6	3.40	0.15
10	B	TM3B106(1)6R3(2)(3)A	0.6	6	2.90	0.17
22	A	TM3A226(1)6R3(2)(3)Z	1.3	6	2.90	0.16
22	B	TM3B226(1)6R3(2)(3)A	1.3	6	2.00	0.21
22	C	TM3C226(1)6R3(2)(3)A	1.3	6	1.80	0.25
33	B	TM3B336(1)6R3(2)(3)A	2.0	6	1.90	0.21
47	B	TM3B476(1)6R3(2)(3)A	2.8	6	1.90	0.21
47	C	TM3C476(1)6R3(2)(3)A	2.8	6	1.40	0.28
47	D	TM3D476(1)6R3(2)(3)A	2.8	6	0.80	0.43
68	D	TM3D686(1)6R3(2)(3)A	4.1	6	0.70	0.46
100	D	TM3D107(1)6R3(2)(3)A	6.0	6	0.14	1.04
150	D	TM3D157(1)6R3(2)(3)A	9.0	8	0.60	0.50
220	D	TM3D227(1)6R3(2)(3)A	13.2	8	0.60	0.50
220	E	TM3E227(1)6R3(2)(3)A	13.2	8	0.50	0.57
<b>10 V<sub>DC</sub> AT + 85 °C; 7 V<sub>DC</sub> AT + 125 °C</b>						
1.5	A	TM3A155(1)010(2)(3)Z	0.5	6	8.00	0.10
2.2	A	TM3A225(1)010(2)(3)Z	0.5	6	6.30	0.11
3.3	A	TM3A335(1)010(2)(3)Z	0.5	6	5.50	0.12
4.7	A	TM3A475(1)010(2)(3)Z	0.5	6	5.00	0.12
4.7	B	TM3B475(1)010(2)(3)A	0.5	6	3.40	0.16
6.8	B	TM3B685(1)010(2)(3)A	0.7	6	2.90	0.17
10	A	TM3A106(1)010(2)(3)Z	1.0	6	3.40	0.15
10	B	TM3B106(1)010(2)(3)A	1.0	6	2.50	0.18
15	B	TM3B156(1)010(2)(3)A	1.5	6	2.00	0.21
15	C	TM3C156(1)010(2)(3)A	1.5	6	1.80	0.25
22	B	TM3B226(1)010(2)(3)A	2.2	6	1.90	0.21
22	C	TM3C226(1)010(2)(3)A	2.2	6	0.35	0.56
33	B	TM3B336(1)010(2)(3)A	3.3	6	1.90	0.21
33	C	TM3C336(1)010(2)(3)A	3.3	6	1.40	0.28
33	D	TM3D336(1)010(2)(3)A	3.3	6	0.80	0.43
47	C	TM3C476(1)010(2)(3)A	4.7	6	1.10	0.32
47	D	TM3D476(1)010(2)(3)A	4.7	6	0.70	0.46
68	D	TM3D686(1)010(2)(3)A	6.8	6	0.70	0.46
100	D	TM3D107(1)010(2)(3)A	10.0	6	0.60	0.50
220	E	TM3E227(1)010(2)(3)A	22.0	8	0.50	0.57

**Note**

- Part number definitions:
  - Capacitance tolerance: K, M
  - Termination and packaging: C, E, H, L
  - Reliability level: B, S, Z



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 ( $\Omega$ )	MAX. RIPPLE 100 kHz $I_{RMS}$ (A)	
<b>16 V<sub>DC</sub> AT + 85 °C; 10 V<sub>DC</sub> AT + 125 °C</b>							
1.0	A	TM3A105(1)016(2)(3)Z	0.5	4	9.30	0.09	
1.5	A	TM3A155(1)016(2)(3)Z	0.5	6	6.70	0.11	
2.2	A	TM3A225(1)016(2)(3)Z	0.5	6	4.00	11.00	
2.2	B	TM3B225(1)016(2)(3)A	0.5	6	4.60	0.14	
3.3	A	TM3A335(1)016(2)(3)Z	0.5	6	3.50	0.15	
3.3	B	TM3B335(1)016(2)(3)A	0.5	6	3.50	0.16	
4.7	A	TM3A475(1)016(2)(3)Z	0.8	6	5.00	0.12	
4.7	B	TM3B475(1)016(2)(3)A	0.8	6	2.90	0.17	
6.8	B	TM3B685(1)016(2)(3)A	1.1	6	2.50	0.18	
10	B	TM3B106(1)016(2)(3)A	1.6	6	2.00	0.21	
10	C	TM3C106(1)016(2)(3)A	1.6	6	1.80	0.25	
15	B	TM3B156(1)016(2)(3)A	2.4	6	2.00	0.21	
15	C	TM3C156(1)016(2)(3)A	2.4	6	0.40	0.52	
22	B	TM3B226(1)016(2)(3)A	3.5	6	1.90	0.21	
22	C	TM3C226(1)016(2)(3)A	3.5	6	1.40	0.28	
22	D	TM3D226(1)016(2)(3)A	3.5	6	0.80	0.43	
33	D	TM3D336(1)016(2)(3)A	4.2	6	0.70	0.46	
47	C	TM3C476(1)016(2)(3)A	7.5	6	1.00	0.33	
47	D	TM3D476(1)016(2)(3)A	7.5	6	0.70	0.46	
68	D	TM3D686(1)016(2)(3)A	10.9	6	0.60	0.50	
100	D	TM3D107(1)016(2)(3)A	16.0	8	0.60	0.50	
100	E	TM3E107(1)016(2)(3)A	16.0	8	0.60	0.52	
<b>20 V<sub>DC</sub> AT + 85 °C; 13 V<sub>DC</sub> AT + 125 °C</b>							
2.2	B	TM3B225(1)020(2)(3)A	0.5	6	3.50	0.16	
3.3	B	TM3B335(1)020(2)(3)A	0.7	6	3.00	0.17	
4.7	C	TM3C475(1)020(2)(3)A	0.9	6	2.30	0.22	
6.8	B	TM3B685(1)020(2)(3)A	1.4	6	2.50	0.18	
6.8	C	TM3C685(1)020(2)(3)A	1.4	6	1.90	0.24	
10	C	TM3C106(1)020(2)(3)A	2.0	6	1.70	0.25	
22	C	TM3C226(1)020(2)(3)A	4.4	6	1.10	0.32	
22	D	TM3D226(1)020(2)(3)A	3.5	6	0.70	0.46	
33	D	TM3D336(1)020(2)(3)A	6.6	6	0.70	0.46	
47	E	TM3E476(1)020(2)(3)A	7.5	6	0.60	0.52	

**Note**

- Part number definitions:
  - Capacitance tolerance: K, M
  - Termination and packaging: C, E, H, L
  - Reliability level: B, S, Z



<b>RECOMMENDED VOLTAGE DERATING GUIDELINES</b> (for temperatures below + 85 °C)	
<b>STANDARD CONDITIONS. FOR EXAMPLE: OUTPUT FILTERS</b>	
Capacitor Voltage Rating	Operating Voltage
4.0	2.5
6.3	3.3
10	5.0
16	8.0
20	10
<b>SEVERE CONDITIONS. FOR EXAMPLE: INPUT FILTERS</b>	
Capacitor Voltage Rating	Operating Voltage
4.0	2.5
6.3	3.6
10	6.0
16	10
20	12

<b>POWER DISSIPATION</b>	
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
E	0.165

<b>STANDARD PACKAGING QUANTITY</b>		
CASE CODE	UNITS PER REEL	
	7" FULL REEL	7" HALF REEL
A	2000	1000
B	2000	1000
C	500	250
D	500	250
E	400	200

<b>PRODUCT INFORMATION</b>	
Guide for Molded Tantalum Capacitors	<a href="http://www.vishay.com/doc?40074">www.vishay.com/doc?40074</a>
Pad Dimensions	
Packaging Dimensions	
Moisture Sensitivity	<a href="http://www.vishay.com/doc?40135">www.vishay.com/doc?40135</a>
<b>SELECTOR GUIDES</b>	
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>
<b>FAQ</b>	
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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