Solid Tantalum Surface Mount TANTAMOUNT®, Molded Case, Hi-Rel COTS, Low ESR, Built-In-Fuse

FEATURES

- Terminations: 100 % matte tin, standard, tin/lead available
- Molded case available in three case sizes
- Compatible with "High Volume" automatic pick and place equipment
- High ripple current carrying capability
- Meets EIA 535BAAC case sizes
- Weibull grading and surge current test options per MIL-PRF-55365
- Standard and low ESR options
- Compliant to RoHS Directive 2002/95/EC
- Moisture sensitivity level 1

Pb-free Available

RoHS* COMPLIANT

Note

* Pb containing terminations are not RoHS compliant, exemptions may apply

PERFORMANCE CHARACTERISTICS

www.vishay.com/doc?40088

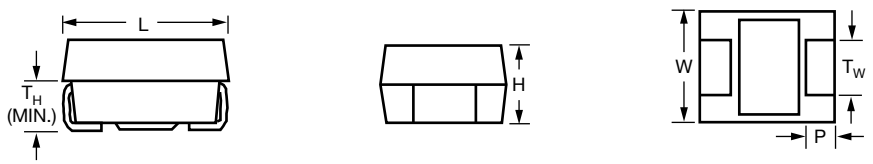
Operating Temperature: - 55 °C to + 125 °C
(Above 85 °C voltage derating is required)

Capacitance Range: 0.47 µF to 470 µF
Capacitance Tolerance: ± 10 %, ± 20 %
Voltage Rating: 4 V_{DC} to 50 V_{DC}

ORDERING INFORMATION

T86	D	107	K	010	E	A	A	S
TYPE	CASE CODE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C	TERMINATION/ 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 V. 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), 1/2 reel E = Tin/lead/ 7" (178 mm) reel L = Tin/lead/ 7" (178 mm), 1/2 reel	A = 1.0 % B = 0.1 % S = Hi-Rel standard Z = Non-ER	A = 10 cycles at + 25 °C B = 10 cycles at - 55 °C/+ 85 °C S = 3 cycles at + 25 °C	S = Std. L = Low

DIMENSIONS in inches [millimeters]

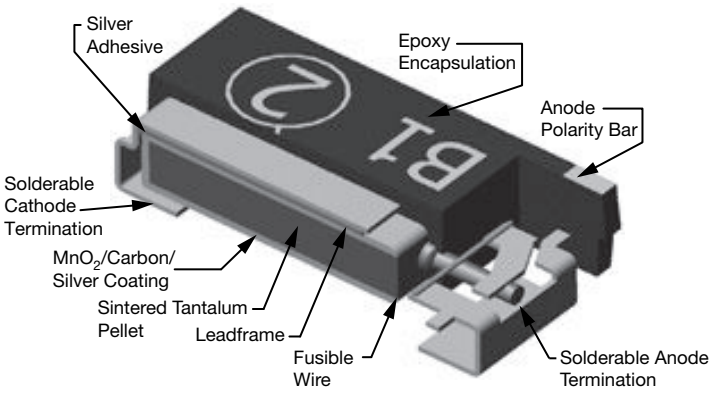


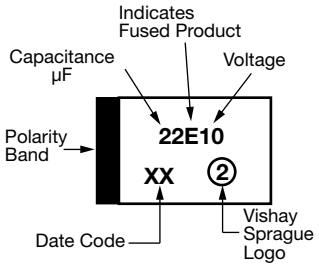
CASE CODE	EIA SIZE	L	W	H	P	T_W	T_H (MIN.)
C	6032-28	0.236 ± 0.012 [6.0 ± 0.30]	0.126 ± 0.012 [3.2 ± 0.30]	0.098 ± 0.012 [2.5 ± 0.30]	0.051 ± 0.012 [1.3 ± 0.30]	0.087 ± 0.004 [2.2 ± 0.10]	0.039 [1.0]
D	7343-31	0.287 ± 0.012 [7.3 ± 0.30]	0.169 ± 0.012 [4.3 ± 0.30]	0.110 ± 0.012 [2.8 ± 0.30]	0.051 ± 0.012 [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]

RATINGS AND CASE CODES

µF	4 V	6.3 V	10 V	16 V	20 V	25 V	35 V	50 V
0.47								C
0.68								C
1.0								C
1.5							C	C
2.2						C	C	C/D
3.3						C	C	C/D
4.7					C	C	C/D	D
6.8				C	C	C	D	D/E
10			C	C	C	C/D	D/E	
15		C	C	C	C/D	D	D/E	
22		C	C	C/D	D	D/E	E	
33		C	C/D	C/D	D/E	E		
47		C/D	C/D	D/E	E			
68	C	C/D	D/E	D	E			
100	C	D/E	D	E				
150	D	D	D/E	E				
220	D	D/E	E					
330	D/E	E						
470	E							

CONSTRUCTION AND MARKING





C, D, E, Cases

Marking:

Capacitor marking includes an anode (+) polarity band, capacitance in microfarads and the voltage rating.

The Vishay Sprague® trademark is included if space permits. Capacitors rated at 6.3 V are marked 6 V.

A manufacturing date code is marked on all capacitors.

Capital letter “E” stands for lead (Pb)-free terminations small cap letter “e” stands for SnPb

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C (µA)	MAX. DF AT + 25 °C 120 Hz (%)	STANDARD (S) MAX. ESR AT + 25 °C 100 kHz (Ω)	LOW (L) MAX. ESR AT + 25 °C 100 kHz (Ω)
4 V_{DC} AT + 85 °C; 2.7 V_{DC} AT + 125 °C						
68	C	T86C686(1)004(2)(3)(4)(5)	2.7	8	1.40	0.40
100	C	T86C107(1)004(2)(3)(4)(5)	4.0	8	0.80	0.40
150	D	T86D157(1)004(2)(3)(4)(5)	6.0	8	0.60	0.30
220	D	T86D227(1)004(2)(3)(4)(5)	8.8	8	0.60	0.40
330	D	T86D337(1)004(2)(3)(4)(5)	13.2	15	0.60	0.30
330	E	T86E337(1)004(2)(3)(4)(5)	13.2	8	0.50	0.30
470	E	T86E477(1)004(2)(3)(4)(5)	18.8	16	0.50	0.25
6.3 V_{DC} AT + 85 °C; 4 V_{DC} AT + 125 °C						
15	C	T86C156(1)6R3(2)(3)(4)(5)	0.9	6	1.80	0.60
22	C	T86C226(1)6R3(2)(3)(4)(5)	1.1	6	1.80	0.60
33	C	T86C336(1)6R3(2)(3)(4)(5)	1.6	6	1.40	0.60
47	C	T86C476(1)6R3(2)(3)(4)(5)	2.3	6	1.30	0.60
47	D	T86D476(1)6R3(2)(3)(4)(5)	2.3	6	0.90	0.45
68	C	T86C686(1)6R3(2)(3)(4)S	3.3	6	0.80	n/a
68	D	T86D686(1)6R3(2)(3)(4)(5)	3.3	6	0.70	0.35
100	D	T86D107(1)6R3(2)(3)(4)(5)	6.0	8	0.70	0.35
100	E	T86E107(1)6R3(2)(3)(4)(5)	6.0	8	0.70	0.30
150	D	T86D157(1)6R3(2)(3)(4)(5)	9.0	8	0.60	0.30
220	D	T86D227(1)6R3(2)(3)(4)(5)	13.2	8	0.60	0.30
220	E	T86E227(1)6R3(2)(3)(4)(5)	13.2	8	0.50	0.30
330	E	T86E337(1)6R3(2)(3)(4)(5)	19.8	8	0.50	0.30
10 V_{DC} AT + 85 °C; 7 V_{DC} AT + 125 °C						
10	C	T86C106(1)010(2)(3)(4)S	1.0	6	1.80	n/a
15	C	T86C156(1)010(2)(3)(4)(5)	1.5	6	1.80	0.60
22	C	T86C226(1)010(2)(3)(4)(5)	2.2	6	1.40	0.50
33	C	T86C336(1)010(2)(3)(4)(5)	3.3	6	1.30	0.40
33	D	T86D336(1)010(2)(3)(4)(5)	3.3	6	0.90	0.40
47	C	T86C476(1)010(2)(3)(4)S	4.7	6	1.00	n/a
47	D	T86D476(1)010(2)(3)(4)(5)	4.7	6	0.70	0.40
68	D	T86D686(1)010(2)(3)(4)(5)	6.8	6	0.70	0.35
68	E	T86E686(1)010(2)(3)(4)(5)	6.8	6	0.70	0.35
100	D	T86D107(1)010(2)(3)(4)(5)	10.0	8	0.60	0.30
150	D	T86D157(1)010(2)(3)(4)(5)	15.0	8	0.60	0.30
150	E	T86E157(1)010(2)(3)(4)(5)	15.0	8	0.50	0.40
220	E	T86E227(1)010(2)(3)(4)(5)	22.0	8	0.50	0.30
16 V_{DC} AT + 85 °C; 10 V_{DC} AT + 125 °C						
6.8	C	T86C685(1)016(2)(3)(4)(5)	1.1	6	2.00	0.60
10	C	T86C106(1)016(2)(3)(4)(5)	1.6	6	1.80	0.70
15	C	T86C156(1)016(2)(3)(4)S	2.4	6	1.40	n/a

Note

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

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C (µA)	MAX. DF AT + 25 °C 120 Hz (%)	STANDARD (S) MAX. ESR AT + 25 °C 100 kHz (Ω)	LOW (L) MAX. ESR AT + 25 °C 100 kHz (Ω)
16 V_{DC} AT + 85 °C; 10 V_{DC} AT + 125 °C						
22	C	T86C226(1)016(2)(3)(4)(5)	3.5	6	1.30	0.70
22	D	T86D226(1)016(2)(3)(4)(5)	3.5	6	0.90	0.45
33	C	T86C336(1)016(2)(3)(4)(5)	5.3	6	1.00	0.50
33	D	T86D336(1)016(2)(3)(4)(5)	5.3	6	0.70	0.35
47	D	T86D476(1)016(2)(3)(4)(5)	7.5	6	0.70	0.35
47	E	T86E476(1)016(2)(3)(4)(5)	7.5	6	0.70	0.35
68	D	T86D686(1)016(2)(3)(4)(5)	10.9	6	0.60	0.30
100	E	T86E107(1)016(2)(3)(4)(5)	16.0	8	0.60	0.30
150	E	T86E157(1)016(2)(3)(4)S	24.0	10	0.40	n/a
20 V_{DC} AT + 85 °C; 13 V_{DC} AT + 125 °C						
4.7	C	T86C475(1)020(2)(3)(4)(5)	0.9	6	2.00	1.00
6.8	C	T86C685(1)020(2)(3)(4)(5)	1.4	6	1.90	0.60
10	C	T86C106(1)020(2)(3)(4)(5)	2.0	6	1.60	0.80
15	C	T86C156(1)020(2)(3)(4)S	3.0	6	1.40	n/a
15	D	T86D156(1)020(2)(3)(4)(5)	3.0	6	0.90	0.45
22	D	T86D226(1)020(2)(3)(4)(5)	4.4	6	0.70	0.35
33	D	T86D336(1)020(2)(3)(4)(5)	6.6	6	0.70	0.40
33	E	T86E336(1)020(2)(3)(4)(5)	6.6	6	0.70	0.40
47	E	T86E476(1)020(2)(3)(4)(5)	9.4	6	0.60	0.30
68	E	T86E686(1)020(2)(3)(4)(5)	13.6	6	0.60	0.30
25 V_{DC} AT + 85 °C; 17 V_{DC} AT + 125 °C						
2.2	C	T86C225(1)025(2)(3)(4)S	0.6	6	2.80	n/a
3.3	C	T86C335(1)025(2)(3)(4)(5)	0.8	6	2.30	2.10
4.7	C	T86C475(1)025(2)(3)(4)(5)	1.2	6	1.90	1.00
6.8	C	T86C685(1)025(2)(3)(4)(5)	1.7	6	1.60	0.60
10	C	T86C106(1)025(2)(3)(4)(5)	2.5	6	1.40	0.60
10	D	T86D106(1)025(2)(3)(4)(5)	2.5	6	1.00	0.50
15	D	T86D156(1)025(2)(3)(4)(5)	3.8	6	0.80	0.40
22	D	T86D226(1)025(2)(3)(4)(5)	5.5	6	0.70	0.35
22	E	T86E226(1)025(2)(3)(4)(5)	5.5	6	0.70	0.35
33	E	T86E336(1)025(2)(3)(4)(5)	8.3	6	0.60	0.30
35 V_{DC} AT + 85 °C; 23 V_{DC} AT + 125 °C						
1.5	C	T86C155(1)035(2)(3)(4)(5)	0.5	6	3.80	2.60
2.2	C	T86C225(1)035(2)(3)(4)S	0.8	6	2.90	n/a
3.3	C	T86C335(1)035(2)(3)(4)S	1.2	6	2.00	n/a
4.7	C	T86C475(1)035(2)(3)(4)S	1.6	6	1.80	n/a
4.7	D	T86D475(1)035(2)(3)(4)(5)	1.6	6	1.20	0.60
6.8	D	T86D685(1)035(2)(3)(4)(5)	2.4	6	1.00	0.50
10	D	T86D106(1)035(2)(3)(4)(5)	3.5	6	0.80	0.50

Note

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

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C (µA)	MAX. DF AT + 25 °C 120 Hz (%)	STANDARD (S) MAX. ESR AT + 25 °C 100 kHz (Ω)	LOW (L) MAX. ESR AT + 25 °C 100 kHz (Ω)
35 V_{DC} AT + 85 °C; 23 V_{DC} AT + 125 °C						
10	E	T86E106(1)035(2)(3)(4)(5)	3.5	6	0.80	0.50
15	D	T86D156(1)035(2)(3)(4)(5)	5.3	6	0.70	0.50
15	E	T86E156(1)035(2)(3)(4)(5)	5.3	6	0.70	0.50
22	E	T86E226(1)035(2)(3)(4)(5)	7.7	6	0.60	0.40
50 V_{DC} AT + 85 °C; 33 V_{DC} AT + 125 °C						
0.47	C	T86C474(1)050(2)(3)(4)S	0.5	4	6.70	n/a
0.68	C	T86C684(1)050(2)(3)(4)S	0.5	4	5.90	n/a
1.0	C	T86C105(1)050(2)(3)(4)(5)	0.5	4	4.40	2.70
1.5	C	T86C155(1)050(2)(3)(4)(5)	0.8	6	5.00	3.20
2.2	C	T86C225(1)050(2)(3)(4)S	1.1	6	2.80	n/a
2.2	D	T86D225(1)050(2)(3)(4)(5)	1.1	6	2.10	0.90
3.3	C	T86C335(1)050(2)(3)(4)(5)	1.7	6	2.40	1.60
3.3	D	T86D335(1)050(2)(3)(4)S	1.7	6	2.00	n/a
4.7	D	T86D475(1)050(2)(3)(4)S	2.4	6	1.10	n/a
6.8	D	T86D685(1)050(2)(3)(4)S	3.4	6	0.90	n/a
6.8	E	T86E685(1)050(2)(3)(4)S	3.4	6	0.90	n/a

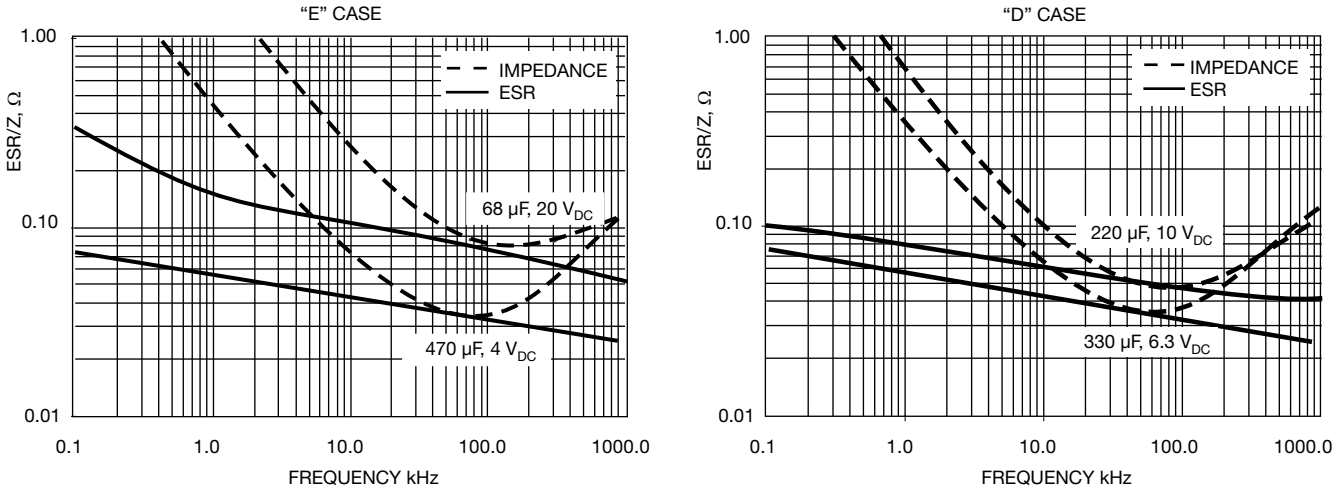
Note

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

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

TYPICAL CURVES AT + 25 °C, IMPEDANCE AND ESR VS. FREQUENCY



POWER DISSIPATION

CASE CODE	MAXIMUM PERMISSIBLE POWER DISSIPATION AT + 25 °C (W) IN FREE AIR
C	0.110
D	0.150
E	0.165

STANDARD PACKAGING QUANTITY

CASE CODE	UNITS PER REEL	
	7" REEL	½ 7" REEL
C	500	250
D	500	250
E	400	200

PRODUCT INFORMATION	
Molded Guide • Pad Dimensions • Package Dimensions	www.vishay.com/doc?40074
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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