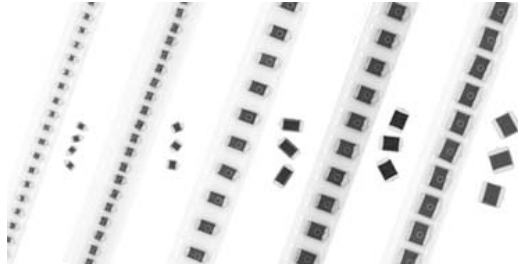


# Solid Tantalum Chip Capacitors TANTAMOUNT<sup>®</sup>, Low Profile, Low ESR, Conformal Coated, Maximum CV



## FEATURES

- New robust ratings for pulsed applications
- 1.0 mm to 2.5 mm height
- Terminations: 100 % matte tin (2) standard, tin/lead available
- Mounting: Surface mount
- 8 mm, 12 mm tape and reel packaging available per EIA 481 and reeling per IEC 60286-3  
7" [178 mm] standard  
13" [330 mm] available
- Case code compatibility with EIA 535BAAC and CECC30801 molded chips
- See also 592W for additional ratings designs for pulsed applications
- Compliant to RoHS Directive 2002/95/EC


**RoHS\***  
COMPLIANT

### Note

\* 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 + 85 °C  
(To + 125 °C with voltage derating)

**Capacitance Range:** 1 µF to 2200 µF

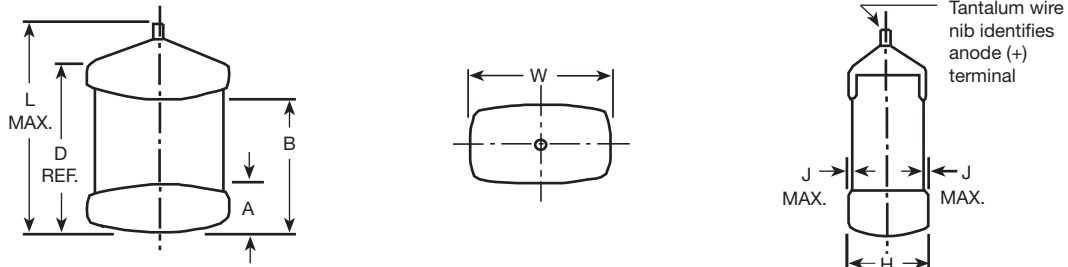
**Capacitance Tolerance:** ± 10 %, ± 20 % standard

**Voltage Rating:** 4 V<sub>DC</sub> to 50 V<sub>DC</sub>

ORDERING INFORMATION							
592D	106	X0	010	B	2	T	15H
TYPE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C	CASE CODE	TERMINATION	REEL SIZE AND PACKAGING	SUFFIX
	This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow.	<b>X0 = ± 20 %</b> X9 = ± 10 %	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).	See Ratings and Case Codes table	<b>2 = 100 % tin</b> 4 = Gold plated 8 = Solder plated 60/40 Special order	<b>T = Tape and reel</b> <b>7" [178 mm] reel</b> W = 13" [330 mm] reel	Maximum height (mm) see Standard Ratings table

### Note

- Preferred tolerance and reel sizes are in bold. We reserve the right to substitute form-fit-function replacement products with higher voltage rating, tighter capacitance tolerance or lower ESR (e.g., 591D series).

**DIMENSIONS** in inches [millimeters]


CASE CODE	L MAX.	W	A	B	D REF.	J MAX.
A	0.146 [3.7]	0.071 ± 0.012 [1.8 ± 0.3]	0.031 ± 0.012 [0.8 ± 0.3]	0.087 ± 0.016 [2.2 ± 0.4]	0.114 [2.9]	0.004 [0.1]
B	0.157 [4.0]	0.110 ± 0.012 [2.8 ± 0.3]	0.031 ± 0.012 [0.8 ± 0.3]	0.098 ± 0.016 [2.5 ± 0.4]	0.138 [3.5]	0.004 [0.1]
C	0.28 [7.1]	0.126 ± 0.012 [3.2 ± 0.3]	0.051 ± 0.012 [1.3 ± 0.3]	0.173 ± 0.024 [4.4 ± 0.6]	0.236 [6.0]	0.004 [0.1]
D	0.295 [7.5]	0.169 ± 0.012 [4.3 ± 0.3]	0.051 ± 0.012 [1.3 ± 0.3]	0.181 ± 0.024 [4.6 ± 0.6]	0.252 [6.4]	0.004 [0.1]
M	0.295 [7.5]	0.248 ± 0.012 [6.3 ± 0.3]	0.051 ± 0.012 [1.3 ± 0.3]	0.200 ± 0.024 [5.1 ± 0.6]	0.264 [6.7]	0.004 [0.1]
R	0.283 [7.2]	0.236 + 0.012/- 0.024 [6.0 + 0.3/- 0.6]	0.051 ± 0.012 [1.3 ± 0.3]	0.181 ± 0.024 [4.6 ± 0.6]	0.244 [6.2]	0.004 [0.1]
S	0.138 [3.5]	0.063 ± 0.012 [1.6 ± 0.3]	0.031 ± 0.012 [0.8 ± 0.3]	0.079 ± 0.012 [2.0 ± 0.3]	0.087 [2.2]	0.004 [0.1]
X	0.571 [14.5]	0.290 + 0.010/- 0.020 [7.37 + 0.25/- 0.5]	0.051 ± 0.016 [1.3 ± 0.4]	0.469 ± 0.024 [11.9 ± 0.6]	0.52 [13.2]	0.004 [0.1]

**Notes**

- The anode termination (D less B) will be a minimum of 0.012" [0.3 mm]
- For package height, please refer to specific rating in the "Standard Ratings" table

**RATINGS AND CASE CODES**

μF	4 V	6.3 V	10 V	16 V	20 V	25 V	35 V	50 V
1.0							A/B	B
1.5							B	
2.2					A	A/B	B/C	C
3.3						B/C	C/D	C
4.7			A	A	A/B	C	B/C/D/R	C/R
6.8			A	A/B	B/C	C/D	D/R	R
10		A	A/B	B/C	B/C/D	B/D/R	R	R
15		A/B	B	B/C/D	C/D/R	R		
22	A/B	A/B	A/B/C	B/C/D	B/D/R			
33	B	A/B/C/S	C/D	B/C/D/R	R			
47	C	A/B/C/D	B/D/R	B/C/R				
68	B/C/D	B/C/D/R	B/C/D/R	C/D		R		
100	A/B/C/D/R	B/C/D/R	B/C/D/R	C/D				
120		C						
150	B/C/D/R	C/D/R	C/D	D/R				
220	C/D/R	C/D/R	D/R	R				
330	C/D	C/D/R	D/R					
470	C/D/R	C/D/R						
680	D/R	R	X					
1000	R	R/X						
1500	X	M/R/X						
2200	X	X						



STANDARD RATINGS							
CAPACITANCE ( $\mu$ F)	CASE CODE	PART NUMBER	HEIGHT MAX. (mm)	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>							
22	A	592D226(1)004A(2)(3)15H	1.5	0.9	6	2.400	0.16
22	B	592D226(1)004B(2)(3)15H	1.5	0.9	6	1.600	0.22
33	B	592D336(1)004B(2)(3)15H	1.5	1.3	6	1.600	0.22
47	C	592D476(1)004C(2)(3)15H	1.5	1.9	6	0.400	0.50
68	B	592D686(1)004B(2)(3)15H	1.5	2.7	6	1.400	0.24
68	C	592D686(1)004C(2)(3)15H	1.5	2.7	6	0.350	0.53
68	D	592D686(1)004D(2)(3)15H	1.5	2.7	6	0.270	0.68
100	A	592D107(1)004A(2)(3)12H	1.2	4.0	24	1.000	0.23
100	B	592D107(1)004B(2)(3)20H	2.0	4.0	8	0.450	0.42
100	C	592D107(1)004C(2)(3)15H	1.5	4.0	8	0.450	0.47
100	D	592D107(1)004D(2)(3)15H	1.5	4.0	8	0.350	0.60
100	R	592D107(1)004R(2)(3)15H	1.5	4.0	8	0.260	0.76
150	B	592D157(1)004B(2)(3)20H	2.0	6.0	8	0.450	0.42
150	C	592D157(1)004C(2)(3)15H	1.5	6.0	8	0.450	0.47
150	D	592D157(1)004D(2)(3)15H	1.5	6.0	8	0.360	0.59
150	R	592D157(1)004R(2)(3)15H	1.5	6.0	8	0.250	0.77
220	C	592D227(1)004C(2)(3)20H	2.0	8.8	8	0.200	0.74
220	D	592D227(1)004D(2)(3)15H	1.5	8.8	8	0.200	0.79
220	R	592D227(1)004R(2)(3)15H	1.5	8.8	8	0.190	0.89
330	C	592D337(1)004C(2)(3)20H	2.0	13.2	8	0.120	0.96
330	D	592D337(1)004D(2)(3)20H	2.0	13.2	8	0.120	1.02
470	C	592D477(1)004C(2)(3)20H	2.0	18.8	8	0.100	1.05
470	D	592D477(1)004D(2)(3)14H	1.4	18.8	8	0.140	0.93
470	D	592D477(1)004D(2)(3)15H	1.5	18.8	8	0.140	0.94
470	D	592D477(1)004D(2)(3)20H	2.0	18.8	8	0.100	1.18
470	R	592D477(1)004R(2)(3)20H	2.0	18.8	10	0.100	1.32
680	D	592D687(1)004D(2)(3)20H	2.0	27.2	12	0.100	1.18
680	R	592D687(1)004R(2)(3)20H	2.0	27.2	12	0.100	1.32
1000	R	592D108(1)004R(2)(3)20H	2.0	40.0	14	0.200	0.94
1500	X	592D158(1)004X(2)(3)20H	2.0	60.0	20	0.040	2.09
2200	X	592D228(1)004X(2)(3)20H	2.0	88.0	25	0.055	1.78
2200	X	592D228(1)004X(2)(3)25H	2.5	88.0	25	0.040	2.12
<b>6.3 V<sub>DC</sub> AT + 85 °C; 4 V<sub>DC</sub> AT + 125 °C</b>							
10	A	592D106(1)6R3A(2)(3)15H	1.5	0.6	6	2.700	0.15
15	A	592D156(1)6R3A(2)(3)15H	1.5	0.9	6	2.500	0.15
15	B	592D156(1)6R3B(2)(3)15H	1.5	0.9	6	1.700	0.22
22	A	592D226(1)6R3A(2)(3)10H	1.0	1.4	12	4.000	0.11
22	A	592D226(1)6R3A(2)(3)13H	1.3	1.4	6	1.500	0.19
22	A	592D226(1)6R3A(2)(3)15H	1.5	1.4	6	1.500	0.20
22	B	592D226(1)6R3B(2)(3)15H	1.5	1.4	6	1.500	0.23
33	A	592D336(1)6R3A(2)(3)15H	1.5	2.1	6	1.700	0.19
33	B	592D336(1)6R3B(2)(3)15H	1.5	2.1	6	1.400	0.24
33	C	592D336(1)6R3C(2)(3)15H	1.5	2.1	6	0.400	0.50
33	S	592D336(1)6R3S(2)(3)12H	1.2	2.1	10	2.000	0.17
47	A	592D476(1)6R3A(2)(3)13H	1.3	2.7	14	2.000	0.16
47	A	592D476(1)6R3A(2)(3)15H	1.5	2.7	14	2.000	0.17
47	B	592D476(1)6R3B(2)(3)12H	1.2	3.0	8	1.400	0.23
47	B	592D476(1)6R3B(2)(3)15H	1.5	3.0	8	1.400	0.24

**Note**

- Part number definitions:
  - (1) Tolerance: For 10 % tolerance, specify "X9"; for 20 % tolerance, change to "X0"
  - (2) Termination: For 100 % tin specify "2", for gold plated specify "4", for solder plated 60/40 specify "8"
  - (3) Packaging code: For 7" reels specify "T", for 13" reels specify "W"



STANDARD RATINGS							
CAPACITANCE ( $\mu$ F)	CASE CODE	PART NUMBER	HEIGHT MAX. (mm)	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)
6.3 V <sub>DC</sub> AT + 85 °C; 4 V <sub>DC</sub> AT + 125 °C							
47	C	592D476(1)6R3C(2)(3)15H	1.5	3.0	6	0.400	0.50
47	D	592D476(1)6R3D(2)(3)15H	1.5	3.0	6	0.300	0.65
68	B	592D686(1)6R3B(2)(3)13H	1.3	4.3	8	0.600	0.35
68	B	592D686(1)6R3B(2)(3)15H	1.5	4.3	8	0.600	0.37
68	B	592D686(1)6R3B(2)(3)20H	2.0	4.3	6	0.500	0.40
68	C	592D686(1)6R3C(2)(3)14H	1.4	3.9	6	0.380	0.51
68	C	592D686(1)6R3C(2)(3)15H	1.5	4.3	6	0.380	0.51
68	D	592D686(1)6R3D(2)(3)15H	1.5	4.3	6	0.270	0.68
68	R	592D686(1)6R3R(2)(3)15H	1.5	4.3	6	0.200	0.87
100	B	592D107(1)6R3B(2)(3)15H	1.5	6.3	8	1.000	0.28
100	B	592D107(1)6R3B(2)(3)20H	2.0	6.3	8	0.450	0.42
100	C	592D107(1)6R3C(2)(3)15H	1.5	6.3	8	0.380	0.51
100	D	592D107(1)6R3D(2)(3)15H	1.5	6.3	8	0.260	0.69
100	R	592D107(1)6R3R(2)(3)15H	1.5	6.3	8	0.200	0.87
120	C	592D127(1)6R3C(2)(3)20H	2.0	7.2	8	0.200	0.74
150	C	592D157(1)6R3C(2)(3)20H	2.0	9.5	8	0.190	0.76
150	D	592D157(1)6R3D(2)(3)15H	1.5	9.5	8	0.250	0.71
150	R	592D157(1)6R3R(2)(3)15H	1.5	9.5	8	0.200	0.87
220	C	592D227(1)6R3C(2)(3)18H	1.8	13.9	8	0.150	0.86
220	C	592D227(1)6R3C(2)(3)20H	2.0	13.9	8	0.150	0.86
220	D	592D227(1)6R3D(2)(3)15H	1.5	13.9	8	0.220	0.75
220	D	592D227(1)6R3D(2)(3)20H	2.0	13.9	8	0.120	1.08
220	R	592D227(1)6R3R(2)(3)15H	1.5	13.9	8	0.180	0.91
330	C	592D337(1)6R3C(2)(3)16H	1.6	20.8	10	0.150	0.82
330	C	592D337(1)6R3C(2)(3)20H	2.0	20.8	8	0.100	1.05
330	D	592D337(1)6R3D(2)(3)15H	1.5	20.8	8	0.120	1.02
330	D	592D337(1)6R3D(2)(3)16H	1.6	20.8	8	0.120	1.04
330	D	592D337(1)6R3D(2)(3)19H	1.9	20.8	8	0.100	1.18
330	D	592D337(1)6R3D(2)(3)20H	2.0	20.8	8	0.100	1.18
330	R	592D337(1)6R3R(2)(3)12H	1.2	20.8	10	0.180	0.87
330	R	592D337(1)6R3R(2)(3)15H	1.5	20.8	8	0.180	0.91
330	R	592D337(1)6R3R(2)(3)20H	2.0	20.8	8	0.100	1.32
470	C	592D477(1)6R3C(2)(3)16H	1.6	29.6	14	0.200	0.71
470	C	592D477(1)6R3C(2)(3)20H	2.0	29.6	10	0.100	1.05
470	D	592D477(1)6R3D(2)(3)20H	2.0	29.6	10	0.100	1.18
470	R	592D477(1)6R3R(2)(3)16H	1.6	29.6	10	0.120	1.37
470	R	592D477(1)6R3R(2)(3)20H	2.0	29.6	10	0.100	1.32
680	R	592D687(1)6R3R(2)(3)16H	1.6	42.8	10	0.100	1.25
680	R	592D687(1)6R3R(2)(3)20H	2.0	42.8	10	0.100	1.32
1000	R	592D108(1)6R3R(2)(3)20H	2.0	63.0	29	0.200	0.94
1000	R	592D108(1)6R3R(2)(3)22H	2.2	63.0	29	0.200	0.96
1000	X	592D108(1)6R3X(2)(3)20H	2.0	63.0	16	0.040	2.09
1500	M	592D158X06R3M(2)(3)20H	2.0	95.0	50	0.090	1.39
1500	R	592D158X06R3R(2)(3)20H	2.0	95.0	50	0.120	1.21
1500	X	592D158(1)6R3X(2)(3)16H	1.6	95.0	25	0.045	1.94
1500	X	592D158(1)6R3X(2)(3)20H	2.0	95.0	25	0.045	1.97
1500	X	592D158(1)6R3X(2)(3)25H	2.5	95.0	20	0.035	2.27
2200	X	592D228(1)6R3X(2)(3)20H	2.0	139.0	35	0.055	1.78
2200	X	592D228(1)6R3X(2)(3)21H	2.1	139.0	35	0.055	1.79
2200	X	592D228(1)6R3X(2)(3)22H	2.2	139.0	35	0.055	1.79

Note

- Part number definitions:
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  - (2) Termination: For 100 % tin specify "2", for gold plated specify "4", for solder plated 60/40 specify "8"
  - (3) Packaging code: For 7" reels specify "T", for 13" reels specify "W"



STANDARD RATINGS							
CAPACITANCE ( $\mu$ F)	CASE CODE	PART NUMBER	HEIGHT MAX. (mm)	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>10 V<sub>DC</sub> AT + 85 °C; 7 V<sub>DC</sub> AT + 125 °C</b>							
4.7	A	592D475(1)010A(2)(3)15H	1.5	0.5	6	6.000	0.10
6.8	A	592D685(1)010A(2)(3)15H	1.5	0.7	6	6.000	0.10
10	A	592D106(1)010A(2)(3)15H	1.5	1.0	6	2.600	0.15
10	B	592D106(1)010B(2)(3)15H	1.5	1.0	6	1.700	0.22
15	B	592D156(1)010B(2)(3)15H	1.5	1.5	6	1.600	0.22
22	A	592D226(1)010A(2)(3)13H	1.3	2.2	6	1.500	0.19
22	B	592D226(1)010B(2)(3)13H	1.3	2.2	6	1.500	0.22
22	B	592D226(1)010B(2)(3)15H	1.5	2.2	6	1.500	0.23
22	C	592D226(1)010C(2)(3)15H	1.5	2.2	6	0.400	0.50
33	C	592D336(1)010C(2)(3)15H	1.5	3.3	6	0.400	0.50
33	D	592D336(1)010D(2)(3)15H	1.5	3.3	6	0.300	0.65
47	B	592D476(1)010B(2)(3)20H	2.0	4.7	6	0.500	0.40
47	D	592D476(1)010D(2)(3)15H	1.5	4.7	6	0.270	0.68
47	R	592D476(1)010R(2)(3)15H	1.5	4.7	6	0.200	0.87
68	B	592D686(1)010B(2)(3)20H	2.0	6.8	6	0.450	0.42
68	C	592D686(1)010C(2)(3)15H	1.5	6.8	6	0.240	0.65
68	D	592D686(1)010D(2)(3)15H	1.5	6.8	6	0.270	0.68
68	R	592D686(1)010R(2)(3)15H	1.5	6.8	6	0.200	0.87
100	B	592D107(1)010B(2)(3)20H	2.0	10.0	14	0.400	0.45
100	C	592D107(1)010C(2)(3)20H	2.0	10.0	8	0.190	0.76
100	D	592D107(1)010D(2)(3)13H	1.3	10.0	8	0.100	1.10
100	D	592D107(1)010D(2)(3)15H	1.5	10.0	8	0.100	1.12
100	R	592D107(1)010R(2)(3)15H	1.5	10.0	6	0.220	0.83
150	C	592D157(1)010C(2)(3)15H	1.5	15.0	8	0.170	0.77
150	C	592D157(1)010C(2)(3)20H	2.0	15.0	8	0.170	0.80
150	D	592D157(1)010D(2)(3)15H	1.5	15.0	8	0.250	0.71
150	D	592D157(1)010D(2)(3)20H	2.0	15.0	8	0.140	1.00
220	D	592D227(1)010D(2)(3)19H	1.9	22.0	8	0.120	1.08
220	D	592D227(1)010D(2)(3)20H	2.0	22.0	8	0.120	1.08
220	R	592D227(1)010R(2)(3)20H	2.0	22.0	8	0.100	1.32
330	D	592D337(1)010D(2)(3)20H	2.0	33.0	8	0.100	1.18
330	R	592D337(1)010R(2)(3)20H	2.0	33.0	8	0.100	1.32
680	X	592D687(1)010X(2)(3)20H	2.0	100.0	15	0.070	1.58
<b>16 V<sub>DC</sub> AT + 85 °C; 10 V<sub>DC</sub> AT + 125 °C</b>							
4.7	A	592D475(1)016A(2)(3)15H	1.5	0.8	6	3.500	0.13
6.8	A	592D685(1)016A(2)(3)15H	1.5	1.1	6	3.300	0.13
6.8	B	592D685(1)016B(2)(3)15H	1.5	1.1	6	1.800	0.21
10	B	592D106(1)016B(2)(3)15H	1.5	1.6	6	1.600	0.22
10	C	592D106(1)016C(2)(3)15H	1.5	1.6	6	1.000	0.32
15	B	592D156(1)016B(2)(3)15H	1.5	2.4	6	1.400	0.24
15	C	592D156(1)016C(2)(3)15H	1.5	2.4	6	1.300	0.28

**Note**

- Part number definitions:
  - Tolerance: For 10 % tolerance, specify "X9"; for 20 % tolerance, change to "X0"
  - Termination: For 100 % tin specify "2", for gold plated specify "4", for solder plated 60/40 specify "8"
  - Packaging code: For 7" reels specify "T", for 13" reels specify "W"



STANDARD RATINGS							
CAPACITANCE ( $\mu$ F)	CASE CODE	PART NUMBER	HEIGHT MAX. (mm)	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>							
15	D	592D156(1)016D(2)(3)15H	1.5	2.4	6	0.500	0.50
22	B	592D226(1)016B(2)(3)20H	2.0	3.5	6	0.600	0.37
22	C	592D226(1)016C(2)(3)15H	1.5	3.5	6	0.300	0.58
22	D	592D226(1)016D(2)(3)15H	1.5	3.5	6	0.400	0.56
33	B	592D336(1)016B(2)(3)20H	2.0	5.3	6	0.600	0.37
33	C	592D336(1)016C(2)(3)15H	1.5	5.3	6	0.250	0.63
33	D	592D336(1)016D(2)(3)15H	1.5	5.3	6	0.300	0.65
33	R	592D336(1)016R(2)(3)15H	1.5	5.3	6	0.270	0.75
47	B	592D476(1)016B(2)(3)20H	2.0	7.5	6	0.720	0.33
47	C	592D476(1)016C(2)(3)16H	1.6	7.5	6	0.250	0.63
47	C	592D476(1)016C(2)(3)20H	2.0	7.5	6	0.250	0.66
47	R	592D476(1)016R(2)(3)15H	1.5	7.5	6	0.250	0.77
68	C	592D686(1)016C(2)(3)12H	1.2	10.9	6	0.500	0.43
68	C	592D686(1)016C(2)(3)15H	1.5	10.9	6	0.500	0.45
68	C	592D686(1)016C(2)(3)20H	2.0	10.9	6	0.250	0.66
68	D	592D686(1)016D(2)(3)20H	2.0	10.9	6	0.170	0.91
100	C	592D107(1)016C(2)(3)20H	2.0	16.0	8	0.150	0.86
100	C	592D107(1)016C(2)(3)20H	2.0	16.0	8	0.150	0.86
100	D	592D107(1)016D(2)(3)15H	1.5	16.0	8	0.150	0.91
100	D	592D107(1)016D(2)(3)20H	2.0	16.0	8	0.150	0.97
150	D	592D157(1)016D(2)(3)20H	2.0	24.0	8	0.100	1.18
150	R	592D157(1)016R(2)(3)20H	2.0	24.0	8	0.100	1.32
220	R	592D227(1)016R(2)(3)20H	2.0	35.2	10	0.120	1.21
<b>20 V<sub>DC</sub> AT + 85 °C; 13 V<sub>DC</sub> AT + 125 °C</b>							
2.2	A	592D225(1)020A(2)(3)15H	1.5	0.5	6	6.000	0.10
4.7	A	592D475(1)020A(2)(3)15H	1.5	0.9	6	3.800	0.13
4.7	B	592D475(1)020B(2)(3)15H	1.5	0.9	6	3.200	0.16
6.8	B	592D685(1)020B(2)(3)15H	1.5	1.4	6	3.100	0.16
6.8	C	592D685(1)020C(2)(3)15H	1.5	1.4	6	1.100	0.30
10	B	592D106(1)020B(2)(3)15H	1.5	2.0	6	3.000	0.16
10	C	592D106(1)020C(2)(3)15H	1.5	2.0	6	1.300	0.28
10	D	592D106(1)020D(2)(3)15H	1.5	2.0	6	0.500	0.50
15	C	592D156(1)020C(2)(3)15H	1.5	3.0	6	0.600	0.41
15	D	592D156(1)020D(2)(3)15H	1.5	3.0	6	1.260	0.31
15	R	592D156(1)020R(2)(3)15H	1.5	3.0	6	0.400	0.61
22	B	592D226(1)020B(2)(3)20H	2.0	4.4	6	0.600	0.37
22	D	592D226(1)020D(2)(3)15H	1.5	4.4	6	0.400	0.56
22	R	592D226(1)020R(2)(3)15H	1.5	4.4	6	0.280	0.73
33	R	592D336(1)020R(2)(3)15H	1.5	6.6	6	0.280	0.73

**Note**

- Part number definitions:
  - Tolerance: For 10 % tolerance, specify "X9"; for 20 % tolerance, change to "X0"
  - Termination: For 100 % tin specify "2", for gold plated specify "4", for solder plated 60/40 specify "8"
  - Packaging code: For 7" reels specify "T", for 13" reels specify "W"



STANDARD RATINGS							
CAPACITANCE ( $\mu$ F)	CASE CODE	PART NUMBER	HEIGHT MAX. (mm)	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>25 V<sub>DC</sub> AT + 85 °C; 17 V<sub>DC</sub> AT + 125 °C</b>							
2.2	A	592D225(1)025A(2)(3)15H	1.5	0.6	6	8.000	0.09
2.2	B	592D225(1)025B(2)(3)15H	1.5	0.6	6	6.000	0.12
3.3	B	592D335(1)025B(2)(3)15H	1.5	0.8	6	5.600	0.12
3.3	C	592D335(1)025C(2)(3)15H	1.5	0.8	6	2.000	0.22
4.7	C	592D475(1)025C(2)(3)15H	1.5	1.2	6	1.600	0.25
6.8	C	592D685(1)025C(2)(3)15H	1.5	1.7	6	1.300	0.28
6.8	D	592D685(1)025D(2)(3)15H	1.5	1.7	6	1.300	0.31
10	B	592D106X0025B(2)(3)15H	1.5	2.5	6	2.000	0.20
10	D	592D106(1)025D(2)(3)15H	1.5	2.5	6	1.200	0.32
10	R	592D106(1)025R(2)(3)15H	1.5	2.5	6	0.480	0.56
15	R	592D156(1)025R(2)(3)15H	1.5	3.8	6	0.400	0.61
68	R	592D686(1)025R(2)(3)20H	2.0	17.0	8	0.230	0.87
<b>35 V<sub>DC</sub> AT + 85 °C; 23 V<sub>DC</sub> AT + 125 °C</b>							
1.0	A	592D105(1)035A(2)(3)15H	1.5	0.5	4	10.000	0.08
1.0	B	592D105(1)035B(2)(3)15H	1.5	0.5	4	6.500	0.11
1.5	B	592D155(1)035B(2)(3)15H	1.5	0.5	4	4.200	0.14
2.2	B	592D225(1)035B(2)(3)15H	1.5	0.8	6	6.000	0.12
2.2	C	592D225(1)035C(2)(3)15H	1.5	0.8	6	3.500	0.17
3.3	C	592D335(1)035C(2)(3)15H	1.5	1.2	6	3.200	0.18
3.3	D	592D335(1)035D(2)(3)15H	1.5	1.2	6	2.100	0.24
4.7	B	592D475(1)035B(2)(3)15H	1.5	1.6	6	1.600	0.22
4.7	C	592D475(1)035C(2)(3)15H	1.5	1.6	6	2.800	0.19
4.7	D	592D475(1)035D(2)(3)15H	1.5	1.6	6	1.800	0.26
4.7	R	592D475(1)035R(2)(3)15H	1.5	1.6	6	1.300	0.34
6.8	D	592D685(1)035D(2)(3)15H	1.5	2.4	6	1.300	0.31
6.8	R	592D685(1)035R(2)(3)15H	1.5	2.4	6	1.200	0.35
10	R	592D106(1)035R(2)(3)15H	1.5	3.5	6	1.200	0.35
<b>50 V<sub>DC</sub> AT + 85 °C; 33 V<sub>DC</sub> AT + 125 °C</b>							
1.0	B	592D105(1)050B(2)(3)15H	1.5	0.8	6	6.500	0.11
2.2	C	592D225(1)050C(2)(3)15H	1.5	1.1	6	0.800	0.35
3.3	C	592D335(1)050C(2)(3)15H	1.5	1.7	6	0.800	0.35
4.7	C	592D475(1)050C(2)(3)20H	2.0	2.4	6	0.800	0.37
4.7	R	592D475(1)050R(2)(3)15H	1.5	2.4	6	0.700	0.50
6.8	R	592D685(1)050R(2)(3)15H	1.5	3.4	6	0.700	0.50
10	R	592D106(1)050R(2)(3)20H	2.0	5.0	6	0.700	0.50

**Note**

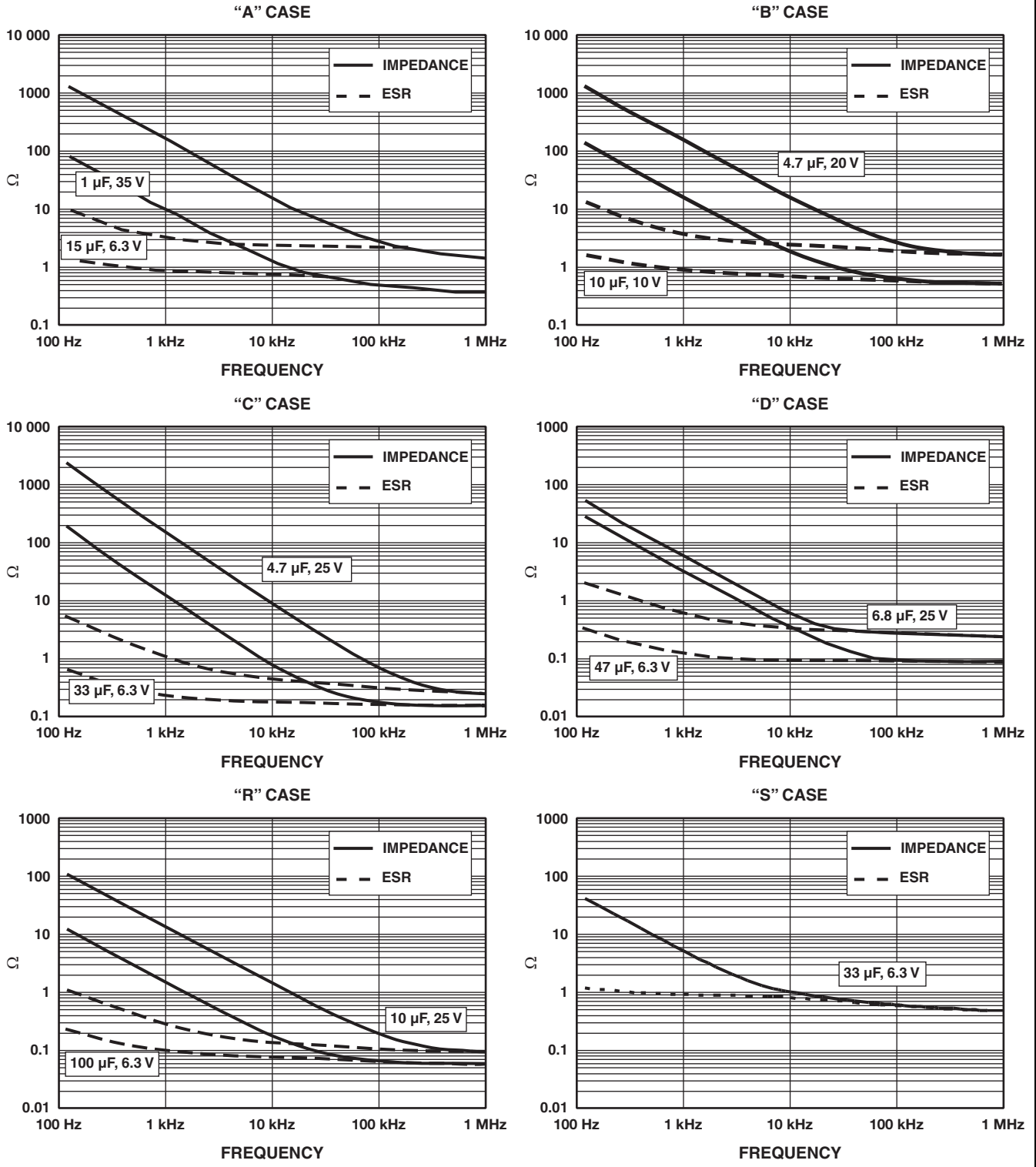
- Part number definitions:
  - Tolerance: For 10 % tolerance, specify "X9"; for 20 % tolerance, change to "X0"
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  - Packaging code: For 7" reels specify "T", for 13" reels specify "W"



<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	3.6
10	6.0
16	10
20	12
25	15
35	24
50	28
<b>SEVERE CONDITIONS. FOR EXAMPLE: INPUT FILTERS</b>	
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

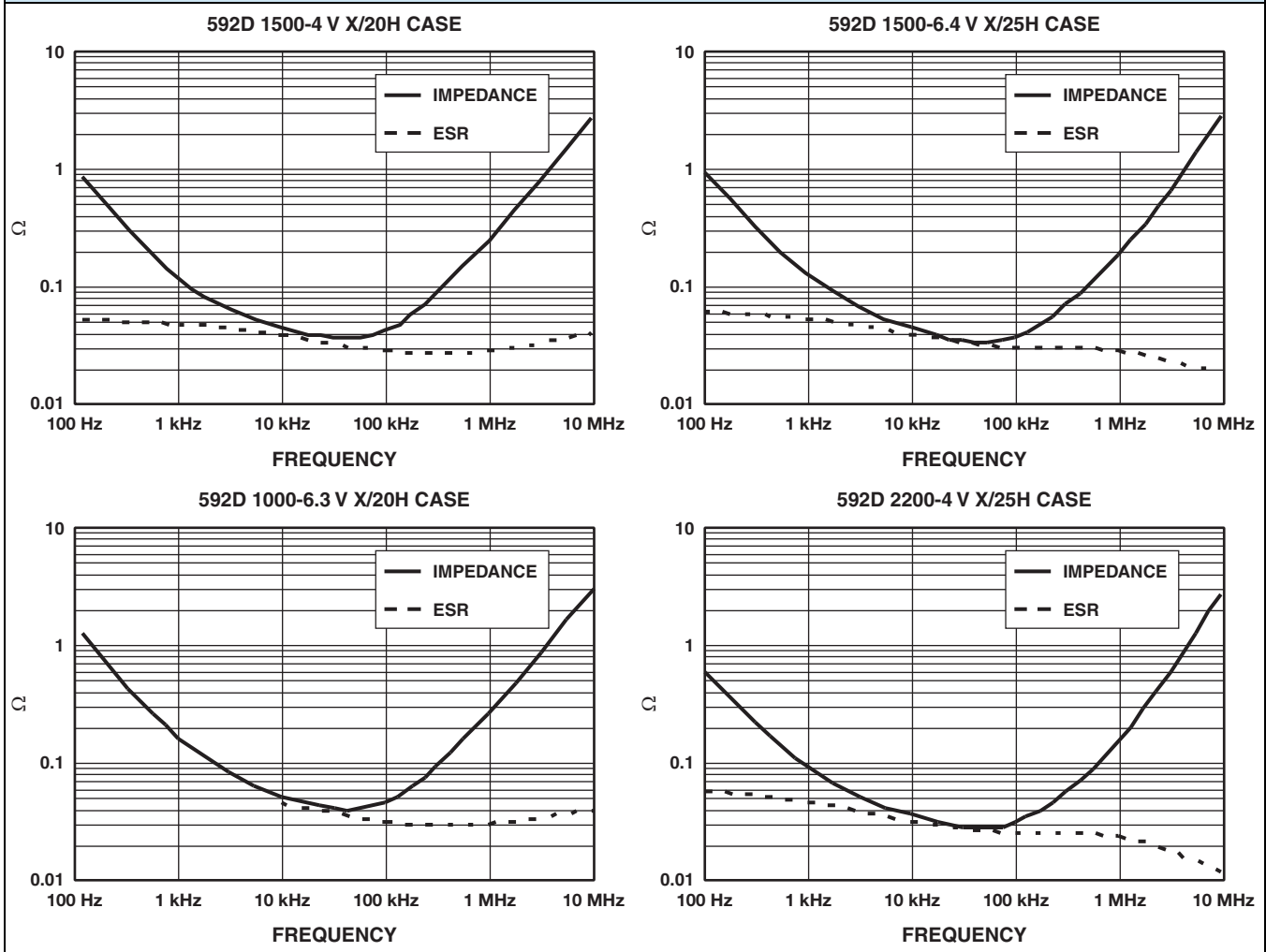
<b>CASE CODE/PART NUMBER X-REF</b>	
OLD	NEW
A2_	A2_15H
B2_	B2_15H
C2_	C2_15H
D2_	D2_15H
R2_	R2_15H
S2_	S2_13H
T2_	B2_20H
U2_	C2_20H
V2_	D2_20H
W2_	R2_20H
X2_	X2_20H
Y2_	X2_25H

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





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



**POWER DISSIPATION**

CASE CODE	HEIGHT	MAXIMUM PERMISSIBLE POWER DISSIPATION AT + 25 °C (W) IN FREE AIR
A	10H	0.050
A	12H	0.055
A	13H	0.055
A	15H	0.060
B	12H	0.075
B	13H	0.075
B	15H	0.080
B	20H	0.085
C	12H	0.095
C	14H	0.100
C	15H	0.100
C	16H	0.100
C	18H	0.110
C	20H	0.110
D	13H	0.120



POWER DISSIPATION		
CASE CODE	HEIGHT	MAXIMUM PERMISSIBLE POWER DISSIPATION AT + 25 °C (W) IN FREE AIR
D	14H	0.120
D	15H	0.125
D	16H	0.130
D	19H	0.140
D	20H	0.140
M	20H	0.175
R	12H	0.135
R	15H	0.150
R	16H	0.155
R	20H	0.175
R	22H	0.185
S	12H	0.060
X	16H	0.170
X	20H	0.175
X	21H	0.175
X	22H	0.175
X	25H	0.180

STANDARD PACKAGING QUANTITY			
CASE CODE	HEIGHT	UNITS PER REEL	
		7" REEL	13" REEL
A	Any	2500	10 000
B	Any	2000	8000
C	Any	1000	4000
D	Any	1000	4000
M	20H	1000	2500
R	15H	1000	4000
R	16H; 18H; 20H	1000	2500
S	12H	2500	10 000
X	Any	500	n/a

PRODUCT INFORMATION	
Conformal Coated Guide • Recommended Pad Layouts • Carrier Tape Information • Reflow Profiles	<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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