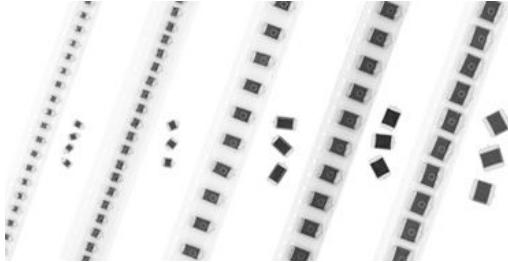


Solid Tantalum Chip Capacitors TANTAMOUNT[®], Low Profile, Low ESR, Conformal Coated, Maximum CV



FEATURES

- New robust 6.3 V ratings for battery operated wireless applications
- New case size offerings
- 1.2 mm to 2 mm height
- Terminations: Lead (Pb)-free (2) standard
- Very low ESR
- 8 mm, 12 mm tape and reel packaging available per EIA-481-1 and reeling per IEC 286-3
7" [178 mm] standard
13" [330 mm] available
- Footprint compatible with EIA 535BAAC and CECC 30801 molded chips
- Compliant to RoHS directive 2002/95/EC


RoHS*
COMPLIANT

PERFORMANCE CHARACTERISTICS

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

Note

- Refer to Doc. 40088

Capacitance Range: 1 µF to 1000 µF

Capacitance Tolerance: ± 10 %, ± 20 % standard

Voltage Rating: 4 WVDC to 35 WVDC

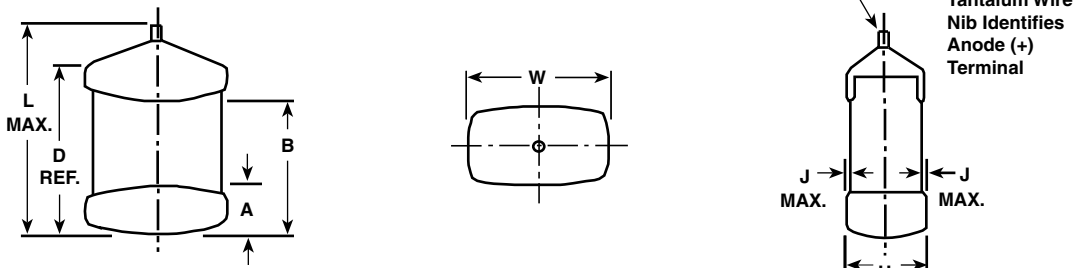
ORDERING INFORMATION							
591D	106	X0	010	B	2	T	15H
TYPE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C	CASE CODE	TERMINATION	REEL SIZE AND PACKAGING	SUFFIX
	This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow.	X0 = ± 20 % 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	2 = 100 % Tin 4 = Gold plated 8 = Solder plated 60/40 Special order	T = Tape and reel 7" [178 mm] reel W = 13" [330 mm] reel	Maximum height (mm) see dimensions

Notes

- Preferred Tolerance and reel sizes are in bold.
- We reserve the right to supply higher voltage ratings and tighter capacitance tolerance capacitors in the same case size.
- Voltage substitutions will be marked with the higher voltage rating.

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

DIMENSIONS in inches [millimeters]



CASE CODE	SUFFIX	H	L (MAX.)	W	A	B	D (REF.)	J (MAX.)
A	15H	0.047 ± 0.012 [1.2 ± 0.3]	0.146 [3.7]	0.072 ± 0.012 [1.8 ± 0.3]	0.031 ± 0.012 [0.80 ± 0.30]	0.087 ± 0.016 [2.2 ± 0.4]	0.115 [2.9]	0.004 [0.1]
B	15H	0.047 ± 0.012 [1.2 ± 0.3]	0.158 [4.0]	0.110 ± 0.012 [2.8 ± 0.3]	0.031 ± 0.012 [0.80 ± 0.30]	0.097 ± 0.016 [2.5 ± 0.4]	0.139 [3.5]	0.004 [0.1]
B	20H	0.079 [2.0] Max.						
C	15H	0.047 ± 0.012 [1.2 ± 0.3]	0.281 [7.1]	0.126 ± 0.012 [3.2 ± 0.3]	0.051 ± 0.012 [1.3 ± 0.30]	0.180 ± 0.024 [4.4 ± 0.6]	0.238 [6.0]	0.004 [0.1]
C	20H	0.079 [2.0] Max.						
D	15H	0.047 ± 0.012 [1.2 ± 0.3]	0.298 [7.5]	0.170 ± 0.012 [4.3 ± 0.3]	0.051 ± 0.012 [1.3 ± 0.30]	0.180 ± 0.024 [4.6 ± 0.6]	0.254 [6.4]	0.004 [0.1]
D	20H	0.079 [2.0] Max.						
R	15H	0.047 ± 0.012 [1.2 ± 0.3]	0.285 [7.2]	0.235 ± 0.012/- 0.024 [6.0 + 0.3/- 0.6]	0.051 ± 0.012 [1.3 ± 0.30]	0.180 ± 0.024 [4.6 ± 0.6]	0.246 [6.2]	0.004 [0.1]
R	20H	0.079 [2.0] Max.						

Note

- The anode termination (D less B) will be a minimum of 0.012" [0.3 mm]

RATINGS AND CASE CODES

F	4 V	6.3 V	10 V	16 V	20 V	25 V	35 V
1.0							A/B
2.2						A/B	B/C
3.3						B/C	B/C/D
4.7				A	A/B	C	B/R
6.8				A	B/C	C/D	D/R
10			A/B	B/C	B/D	D/R	R
15		A/B		B/D	C/R	C*/R	
22	A/B	A/B	A/B/C	C/D	C*/D/R	D*	
33		B/C	C/D	C/D/R	D*/R	D*	
47	B/C	C/D	D/R	C/R			
68	C/D	D/R	C/D/R	C/D		R	
100	D/R	B/C/D/R	B/C/D	D			
150	C/R	C/D/R	C/D	R			
220	C/D	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					
1000	R	R					

Note

- * Preliminary values, contact factory for availability



Solid Tantalum Chip Capacitors TANTAMOUNT®
 Low Profile, Low ESR, Conformal Coated, Maximum CV

Vishay Sprague

STANDARD RATINGS						
CAPACITANCE (μ F)	CASE CODE	PART NUMBER*	MAX. DCL AT + 25 °C (μ A)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz I_{rms} (A)
4 WVDC AT + 85 °C, 2.7 WVDC AT + 125 °C						
22	A	591D226X_004A2_15H	0.9	6	1.200	0.22
22	B	591D226X_004B2_15H	0.9	6	0.800	0.32
47	B	591D476X_004B2_15H	1.9	6	0.800	0.33
47	C	591D476X_004C2_15H	1.9	6	0.200	0.74
68	C	591D686X_004C2_15H	2.7	6	0.180	0.78
68	D	591D686X_004D2_15H	2.7	6	0.140	1.04
100	D	591D107X_004D2_15H	4.0	8	0.130	1.07
100	R	591D107X_004R2_15H	4.0	8	0.110	1.22
150	C	591D157X_004C2_15H	6.0	8	0.150	0.86
150	R	591D157X_004R2_15H	6.0	8	0.100	1.28
220	D	591D227X_004D2_15H	8.8	8	0.100	1.22
220	C	591D227X_004C2_20H	8.8	8	0.075	1.21
330	D	591D337X_004D2_20H	13.2	8	0.060	1.53
330	C	591D337X_004C2_20H	13.2	8	0.070	1.25
470	R	591D477X_004R2_20H	18.8	8	0.045	1.97
470	C	591D477X_004C2_20H	18.8	10	0.070	1.25
470	D	591D477X_004D2_20H	18.8	10	0.060	1.52
680	D	591D687X_004D2_20H	27.2	12	0.085	1.28
680	R	591D687X_004R2_20H	27.2	12	0.045	1.97
1000	R	591D108X_004R2_20H	40.0	14	0.050	1.67
6.3 WVDC AT + 85 °C, 4 WVDC AT + 125 °C						
15	A	591D156X_6R3A2_15H	0.9	6	1.300	0.24
15	B	591D156X_6R3B2_15H	0.9	6	0.800	0.32
22	A	591D226X_6R3A2_13H	1.4	6	0.800	0.20
22	B	591D226X_6R3B2_15H	1.4	6	0.800	0.32
33	B	591D336X_6R3B2_15H	2.1	6	0.800	0.32
33	C	591D336X_6R3C2_15H	2.1	6	0.200	0.74
47	C	591D476X_6R3C2_15H	3.0	6	0.200	0.74
47	D	591D476X_6R3D2_15H	3.0	6	0.140	1.04
68	D	591D686X_6R3D2_15H	4.0	6	0.130	1.07
68	R	591D686X_6R3R2_15H	4.0	6	0.110	1.22
100	B	591D107X_6R3B2_15H	6.0	8	0.500	0.41
100	C	591D107X_6R3C2_15H	6.0	6	0.190	0.76
100	C	591D107X_6W3C2_15H	6.0	6	0.190	0.76
100	D	591D107X_6R3D2_15H	6.0	6	0.150	0.91
100	R	591D107X_6R3R2_15H	6.0	8	0.100	1.28
100	R	591D107X_6W3R2_15H	6.0	8	0.100	1.28
150	D	591D157X_6R3D2_15H	9.5	6	0.120	0.88
150	R	591D157X_6R3R2_15H	9.5	8	0.140	1.08
150	R	591D157X_6W3R2_15H	9.5	8	0.140	1.08
150	C	591D157X_6R3C2_20H	9.5	8	0.080	1.17
220	R	591D227X_6R3R2_15H	13.9	8	0.150	1.05
220	D	591D227X_6R3D2_20H	13.9	8	0.065	1.47
220	C	591D227X_6R3C2_20H	13.9	8	0.075	1.21
220	C	591D227X_6W3C2_20H	13.9	8	0.075	1.21
330	R	591D337X_6R3R2_20H	20.8	8	0.045	1.97
330	D	591D337X_6R3D2_20H	20.8	8	0.060	1.52

Note

* Preliminary values, contact factory for availability. For 10 % tolerance, specify "9"; for 20 % tolerance, change to "0"



STANDARD RATINGS						
CAPACITANCE (μ F)	CASE CODE	PART NUMBER*	MAX. DCL AT + 25 °C (μ A)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT+ 25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz I _{rms} (A)
6.3 WVDC AT + 85 °C, 4 WVDC AT + 125 °C						
330	D	591D337X_6W3D2_20H	20.8	8	0.060	1.52
330	C	591D337X_6R3C2_20H	20.8	8	0.070	1.25
470	C	591D477X_6R3C2_20H	29.6	10	0.080	1.35
470	C	591D477X06R3C2_16H	29.6	14	0.080	1.12
470	R	591D477X_6R3R2_20H	29.6	10	0.045	1.97
470	R	591D477X_6W3R2_20H	29.6	10	0.045	1.97
470	D	591D477X_6R3D2_20H	29.6	10	0.085	1.28
680	R	591D687X_6R3R2_20H	42.8	10	0.060	1.87
680	R	591D687X_6R3R2_16H	42.8	10	0.060	1.87
1000	R	591D108X_6R3R2_20H	63	20	0.075	1.52
1500	R	591D158X06R3R2_20H	95	33	0.06	1.71
10 WVDC AT + 85 °C, 7 WVDC AT + 125 °C						
10	A	591D106X_010A2_15H	1.0	6	1.300	0.24
10	B	591D106X_010B2_15H	1.0	6	0.850	0.31
22	A	591D226X_010A2_13H	2.2	6	0.800	0.27
22	A	591D226X_010A2_15H	2.2	6	0.900	0.26
22	B	591D226X_010B2_15H	2.2	6	0.800	0.32
22	C	591D226X_010C2_15H	2.2	6	0.200	0.74
33	C	591D336X_010C2_15H	3.3	6	0.200	0.74
33	D	591D336X_010D2_15H	3.3	6	0.140	1.04
47	D	591D476X_010D2_15H	4.7	6	0.140	1.04
47	R	591D476X_010R2_15H	4.7	6	0.120	1.17
68	C	591D686X_010C2_15H	6.8	6	0.190	0.76
68	D	591D686X_010D2_15H	6.8	6	0.130	1.15
68	R	591D686X_010R2_15H	6.8	6	0.110	1.22
100	B	591D107X_010B2_20H	10.0	14	0.250	0.57
100	C	591D107X_010C2_20H	10.0	8	0.085	1.13
100	D	591D107X_010D2_15H	10.0	8	0.130	1.07
150	D	591D157X_010D2_20H	15.0	8	0.075	1.37
150	D	591D157X_010D2_15H	15.0	8	0.120	1.02
150	C	591D157X_010C2_15H	15.0	8	0.083	1.17
150	C	591D157X_010C2_20H	15.0	8	0.080	1.17
220	R	591D227X_010R2_20H	22.0	8	0.055	1.78
220	D	591D227X_010D2_20H	22.0	8	0.065	1.47
330	D	591D337X_010D2_20H	33.0	8	0.060	1.53
330	R	591D337X_010R2_20H	33.0	8	0.050	1.87
330	R	591D337X_010R2_18H	33.0	8	0.050	1.87
16 WVDC AT + 85 °C, 10 WVDC AT + 125 °C						
4.7	A	591D475X_016A2_15H	0.8	6	1.750	0.19
6.8	A	591D685X_016A2_15H	1.1	6	1.750	0.19
10	B	591D106X_016B2_15H	1.6	6	0.800	0.32
10	C	591D106X_016C2_15H	1.6	6	0.500	0.45
15	B	591D156X_016B2_15H	2.4	6	0.700	1.07
15	D	591D156X_016D2_15H	2.4	6	0.250	0.77
22	C	591D226X_016C2_15H	3.5	6	0.240	0.67
22	D	591D226X_016D2_15H	3.5	6	0.180	0.91
33	C	591D336X_016C2_15H	5.3	6	0.180	0.74
33	D	591D336X_016D2_15H	5.3	6	0.170	0.94
33	R	591D336X_016R2_15H	5.3	6	0.140	1.08
47	R	591D476X_016R2_15H	7.5	6	0.130	1.12
47	C	591D476X_016C2_20H	7.5	6	0.180	0.78

Note

* Preliminary values, contact factory for availability. For 10 % tolerance, specify "9"; for 20 % tolerance, change to "0"



Solid Tantalum Chip Capacitors TANTAMOUNT®
Low Profile, Low ESR, Conformal Coated, Maximum CV

Vishay Sprague

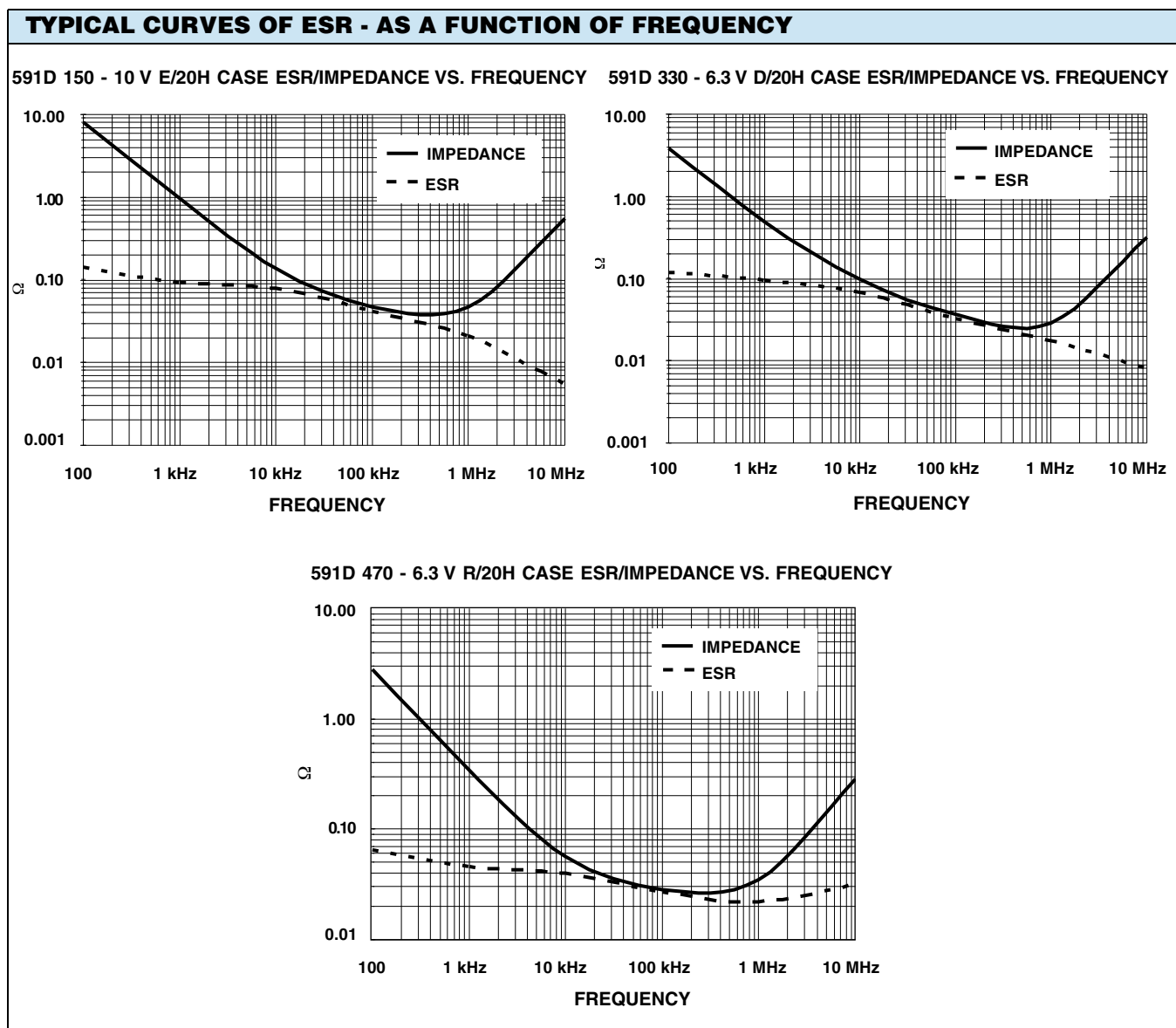
STANDARD RATINGS						
CAPACITANCE (μ F)	CASE CODE	PART NUMBER*	MAX. DCL AT + 25 °C (μ A)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz I _{rms} (A)
16 WVDC AT + 85 °C, 10 WVDC AT + 125 °C						
68	D	591D686X_016D2_20H	10.9	6	0.080	1.32
68	C	591D686X_016C2_20H	10.9	6	0.100	1.05
100	D	591D107X_016D2_20H	16.0	8	0.075	1.37
150	R	591D157X_016R2_20H	24.0	8	0.060	1.71
220	R	591D227X_016R2_20H	35.2	10	0.075	1.53
20 WVDC AT + 85 °C, 13 WVDC AT + 125 °C						
4.7	A	591D475X_020A2_15H	0.9	6	1.900	0.18
4.7	B	591D475X_020B2_15H	0.9	6	1.600	0.22
6.8	B	591D685X_020B2_15H	1.4	6	1.600	0.22
6.8	C	591D685X_020C2_15H	1.4	6	0.400	0.52
10	B	591D106X_020B2_15H	2.0	6	1.500	0.23
10	D	591D106X_020D2_15H	2.0	6	0.270	0.75
15	C	591D156X_020C2_15H	3.0	6	0.300	0.60
15	R	591D156X_020R2_15H	3.0	6	0.180	0.91
22	D	591D226X_020D2_15H	4.4	6	0.200	0.87
22	R	591D226X_020R2_15H	4.4	6	0.140	1.09
22*	D*	591D226X_020D2_20H*	4.4*	6*	0.150*	0.90*
22*	C*	591D226X_020C2_20H*	4.4*	6*	0.375*	0.54*
33	R	591D336X_020R2_15H	6.6	6	0.140	1.08
33*	D*	591D336X_020D2_20H*	6.6*	6*	0.200*	0.73*
25 WVDC AT + 85 °C, 17 WVDC AT + 125 °C						
2.2	A	591D225X_025A2_15H	0.6	6	5.000	0.11
2.2	B	591D225X_025B2_15H	0.6	6	3.800	0.15
3.3	B	591D335X_025B2_15H	0.8	6	3.700	0.15
3.3	C	591D335X_025C2_15H	0.8	6	1.000	0.32
4.7	C	591D475X_025C2_15H	1.2	6	0.800	0.37
6.8	C	591D685X_025C2_15H	1.7	6	0.750	0.38
6.8	D	591D685X_025D2_15H	1.7	6	0.650	0.48
10	D	591D106X_025D2_15H	2.5	6	0.600	0.50
10	R	591D106X_025R2_15H	2.5	6	0.240	0.83
15	R	591D156X_025R2_15H	3.8	6	0.200	0.91
15*	C*	591D156X_025C2_20H*	3.8*	6*	0.250*	0.66*
22*	D*	591D226X_025D2_20H*	5.5*	6*	0.200*	0.84*
33*	D*	591D336X_025D2_20H*	6.0*	6*	0.200*	0.84*
68	R	591D686X_025R2_20H	17	8	0.175	1.00
35 WVDC AT + 85 °C, 23 WVDC AT + 125 °C						
1.0	A	591D105X_035A2_15H	0.5	4	5.000	0.11
1.0	B	591D105X_035B2_15H	0.5	4	4.400	0.13
2.2	B	591D225X_035B2_15H	0.8	6	4.000	0.14
2.2	C	591D225X_035C2_15H	0.8	6	2.000	0.22
3.3	B	591D335X_035B2_15H	1.2	6	3.500	0.15
3.3	C	591D335X_035C2_15H	1.2	6	1.900	0.23
3.3	D	591D335X_035D2_15H	1.2	6	1.500	0.32
4.7	B	591D475X_035B2_15H	1.6	6	0.800	0.32
4.7	R	591D475X_035R2_15H	1.6	6	0.750	0.47
6.8	D	591D685X_035D2_15H	2.4	6	0.950	0.40
6.8	R	591D685X_035R2_15H	2.4	6	0.750	0.47
10	R	591D106X_035R2_15H	3.5	6	0.600	0.52

Note

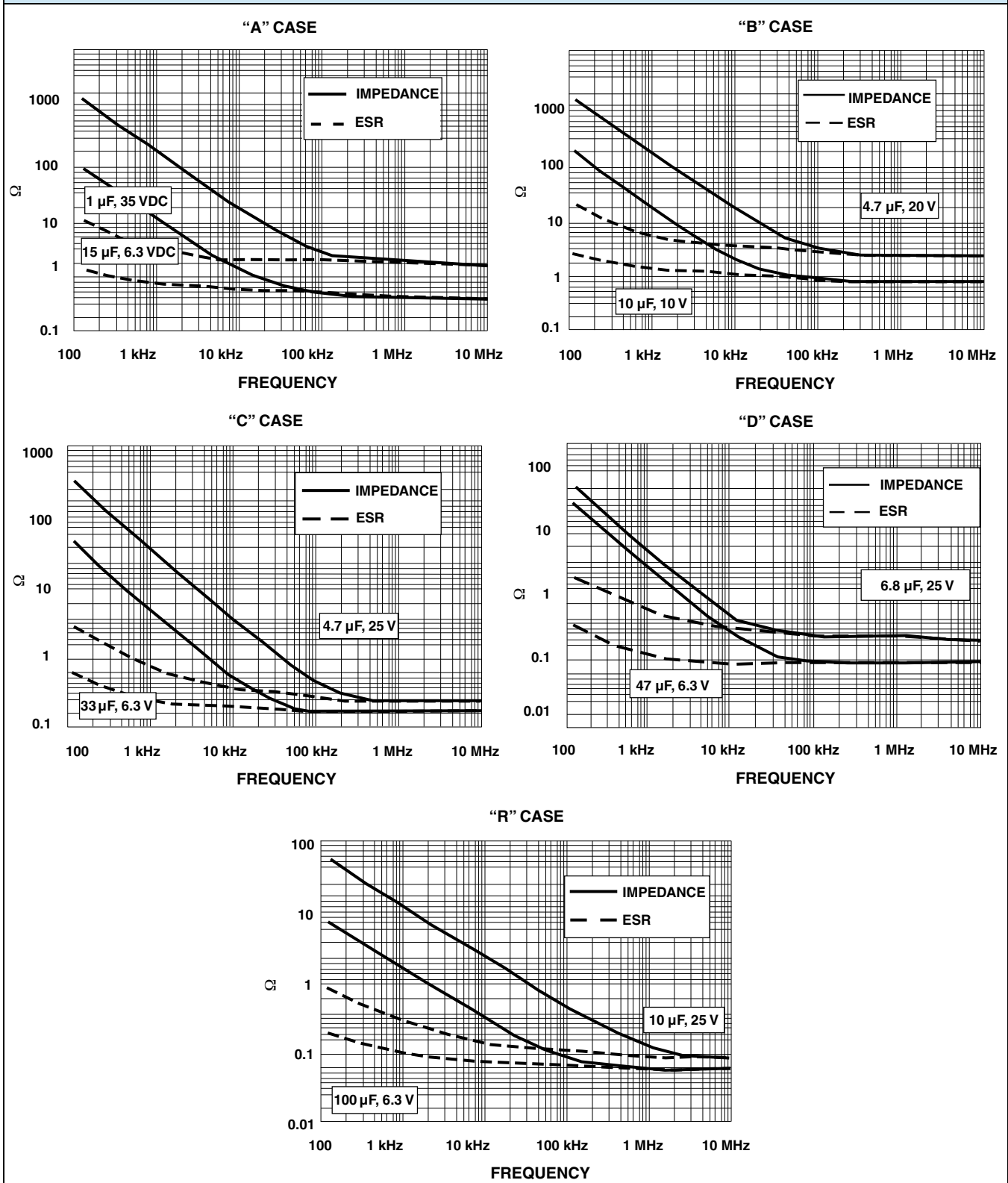
* Preliminary values, contact factory for availability. For 10 % tolerance, specify "9"; for 20 % tolerance, change to "0"



CASE CODE/PART NUMBER X-REF	
OLD	NEW
A2_	A2_15H
B2_	B2_15H
C2_	C2_15H
D2_	D2_15H
R2_	R2_15H
U2_	C2_20H
V2_	D2_20H
W2_	R2_20H



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





Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.