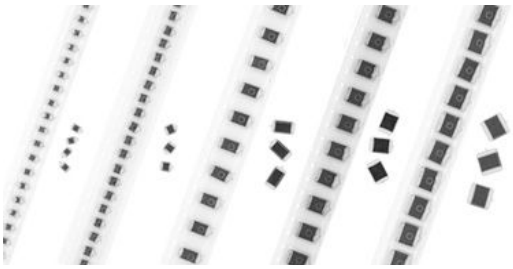
Solid Tantalum Chip Capacitors TANTAMOUNT®, Low Profile, Low ESR, Conformal Coated, Maximum CV



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

Pb-free Available

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 WV_{DC} to 35 WV_{DC}

ORDERING INFORMATION

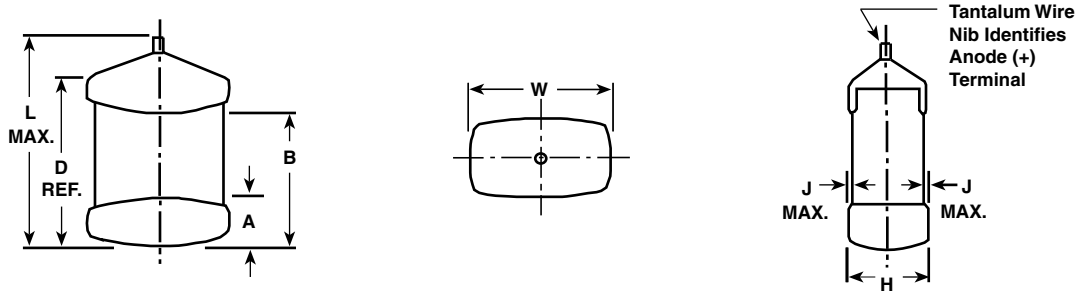
591D	106	X0	010	B	2	T	15H
TYPE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C	CASE CODE	TERMINATION	REEL SIZE AND PACKAGING	SUFFIX
	This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow.	**X0 = ± 20 %** X9 = ± 10 %	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

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	
3.3						B/C	B/C/D	
4.7			A	A	A/B	C	B	C
6.8			A	A/B	B/C	C/D	D/R	
10		A	A/B	B/C	B/D	B/D/R	R	
15		A/B	B	B/D	C	R		
22	A/B	A/B	A/B/C	C/D	D/R			
33	B	A/B/C	C/D	C/D/R	R			
47	B/C	B/C/D	D/R	C/R				
68	B/C/D	D/R	C/D/R	C/D		R		
100	D/R	B/C/D/R	B/C/D	C/D				
120		C						
150	C/R	C/D/R	C/D	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						
1500		R						

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER (1)	MAX. DCL AT + 25 °C (µA)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz I_{rms} (A)
4 WV_{DC} AT + 85 °C, 2.7 WV_{DC} 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
33	B	591D336X_004B2_15H	1.3	6	0.800	0.32
47	B	591D476X_004B2_15H	1.9	6	0.800	0.32
47	C	591D476X_004C2_15H	1.9	6	0.200	0.71
68	B	591D686X_004B2_15H	2.7	6	0.800	0.32
68	C	591D686X_004C2_15H	2.7	6	0.180	0.75
68	D	591D686X_004D2_15H	2.7	6	0.140	0.94
100	D	591D107X_004D2_15H	4.0	8	0.130	0.98
100	R	591D107X_004R2_15H	4.0	8	0.110	1.17
150	C	591D157X_004C2_15H	6.0	8	0.150	0.82
150	R	591D157X_004R2_15H	6.0	8	0.100	1.22
220	D	591D227X_004D2_15H	8.8	8	0.100	1.12
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	C	591D477X_004C2_20H	18.8	8	0.070	1.25
470	D	591D477X_004D2_20H	18.8	8	0.060	1.53
470	R	591D477X_004R2_20H	18.8	10	0.045	1.97
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	1.87
6.3 WV_{DC} AT + 85 °C, 4 WV_{DC} AT + 125 °C						
10	A	591D106X_6R3A2_15H	0.6	6	1.900	0.18
15	A	591D156X_6R3A2_15H	0.9	6	1.300	0.21
15	B	591D156X_6R3B2_15H	0.9	6	0.800	0.32
22	A	591D226X_6R3A2_13H	1.4	6	0.800	0.27
22	B	591D226X_6R3B2_15H	1.4	6	0.800	0.32
33	A	591D336X_6R3A2_15H	2.1	6	1.000	0.24
33	B	591D336X_6R3B2_15H	2.1	6	0.800	0.32
33	C	591D336X_6R3C2_15H	2.1	6	0.200	0.71
47	B	591D476X_6R3B2_15H	3.0	8	0.800	0.32
47	C	591D476X_6R3C2_15H	3.0	6	0.200	0.71
47	D	591D476X_6R3D2_15H	3.0	6	0.140	0.94
68	D	591D686X_6R3D2_15H	4.3	6	0.130	0.98
68	R	591D686X_6R3R2_15H	4.3	6	0.110	1.17
100	B	591D107X_6R3B2_15H	6.3	8	0.500	0.40
100	C	591D107X_6R3C2_15H	6.3	8	0.190	0.73
100	C	591D107X_6W3C2_15H	6.3	8	0.190	0.73
100	D	591D107X_6R3D2_15H	6.3	8	0.150	0.91
100	R	591D107X_6R3R2_15H	6.3	8	0.100	1.22
100	R	591D107X_6W3R2_15H	6.3	8	0.100	1.22
120	C	591D127X_6R3C2_20H	7.2	8	0.100	1.05
150	C	591D157X_6R3C2_20H	9.5	8	0.080	1.17
150	D	591D157X_6R3D2_15H	9.5	8	0.120	1.02
150	R	591D157X_6R3R2_15H	9.5	8	0.140	1.04
150	R	591D157X_6W3R2_15H	9.5	8	0.140	1.04
220	C	591D227X_6R3C2_20H	13.9	8	0.075	1.21
220	C	591D227X_6W3C2_20H	13.9	8	0.075	1.21
220	D	591D227X_6R3D2_20H	13.9	8	0.065	1.47
220	R	591D227X_6R3R2_15H	13.9	8	0.150	1.00
330	C	591D337X_6R3C2_20H	20.8	8	0.070	1.25
330	D	591D337X_6R3D2_20H	20.8	8	0.060	1.53

Note

(1) For 10 % tolerance, specify “9”; for 20 % tolerance, change to ”0”

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER [1]	MAX. DCL AT + 25 °C (µA)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT+ 25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz Irms (A)
6.3 WV_{DC} AT + 85 °C, 4 WV_{DC} AT + 125 °C						
330	D	591D337X_6W3D2_20H	20.8	8	0.060	1.53
330	R	591D337X_6R3R2_20H	20.8	8	0.045	1.97
470	C	591D477X_6R3C2_20H	29.6	10	0.060	1.35
470	C	591D477X06R3C2_16H	29.6	14	0.080	1.17
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	1.71
680	R	591D687X_6R3R2_16H	42.8	10	0.060	1.87
1000	R	591D108X_6R3R2_20H	63.0	20	0.075	1.53
1500	R	591D158X06R3R2_20H	95.0	33	0.060	1.71
10 WV_{DC} AT + 85 °C, 7 WV_{DC} AT + 125 °C						
4.7	A	591D475X_010A2_15H	0.5	6	4.000	0.12
6.8	A	591D685X_010A2_15H	0.7	6	4.000	0.12
10	A	591D106X_010A2_15H	1.0	6	1.300	0.21
10	B	591D106X_010B2_15H	1.0	6	0.850	0.31
15	B	591D156X_010B2_15H	1.5	6	0.800	0.32
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	0.71
33	C	591D336X_010C2_15H	3.3	6	0.200	0.71
33	D	591D336X_010D2_15H	3.3	6	0.140	0.94
47	D	591D476X_010D2_15H	4.7	6	0.140	0.94
47	R	591D476X_010R2_15H	4.7	6	0.120	1.12
68	C	591D686X_010C2_15H	6.8	6	0.190	0.73
68	D	591D686X_010D2_15H	6.8	6	0.130	0.98
68	R	591D686X0010R2_15H	6.8	6	0.110	1.17
100	B	591D107X_010B2_20H	10.0	14	0.250	0.57
100	C	591D107X_010C2_20H	10.0	8	0.085	1.14
100	D	591D107X_010D2_15H	10.0	8	0.130	0.98
150	C	591D157X_010C2_15H	15.0	8	0.083	1.10
150	C	591D157X_010C2_20H	15.0	8	0.080	1.17
150	D	591D157X_010D2_20H	15.0	8	0.075	1.37
150	D	591D157X_010D2_15H	15.0	8	0.120	1.02
220	D	591D227X_010D2_20H	22.0	8	0.065	1.47
220	R	591D227X_010R2_20H	22.0	8	0.055	1.78
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 WV_{DC} AT + 85 °C, 10 WV_{DC} 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
6.8	B	591D685X_016B2_15H	1.1	6	0.900	0.30
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	0.34
15	D	591D156X_016D2_15H	2.4	6	0.250	0.71
22	C	591D226X_016C2_15H	3.5	6	0.240	0.65
22	D	591D226X_016D2_15H	3.5	6	0.180	0.83
33	C	591D336X_016C2_15H	5.3	6	0.180	0.75
33	D	591D336X_016D2_15H	5.3	6	0.170	0.86
33	R	591D336X_016R2_15H	5.3	6	0.140	1.04
47	C	591D476X_016C2_20H	7.5	6	0.180	0.78
47	R	591D476X_016R2_15H	7.5	6	0.130	1.07

Note

[1] For 10 % tolerance, specify “9”; for 20 % tolerance, change to ”0”

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER [1]	MAX. DCL AT + 25 °C (µA)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz Irms (A)
16 WV_{DC} AT + 85 °C, 10 WV_{DC} AT + 125 °C						
68	C	591D686X_016C2_20H	10.9	6	0.100	1.05
68	D	591D686X_016D2_20H	10.9	6	0.080	1.32
100	C	591D107X_016C2_20H	16.0	8	0.100	1.05
100	D	591D107X_016D2_15H	16.0	8	0.100	1.12
100	D	591D107X_016D2_20H	16.0	8	0.075	1.37
150	D	591D157X_016D2_20H	24.0	8	0.060	1.53
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 WV_{DC} AT + 85 °C, 13 WV_{DC} AT + 125 °C						
2.2	A	591D225X_020A2_15H	0.5	6	4.000	0.12
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	0.50
10	B	591D106X_020B2_15H	2.0	6	1.500	0.23
10	D	591D106X_020D2_15H	2.0	6	0.270	0.68
15	C	591D156X_020C2_15H	3.0	6	0.300	0.58
22	D	591D226X_020D2_15H	4.4	6	0.200	0.79
22	R	591D226X_020R2_15H	4.4	6	0.140	1.04
33	R	591D336X_020R2_15H	6.6	6	0.140	1.04
25 WV_{DC} AT + 85 °C, 17 WV_{DC} 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	0.35
6.8	C	591D685X_025C2_15H	1.7	6	0.750	0.37
6.8	D	591D685X_025D2_15H	1.7	6	0.650	0.44
10	B	591D106X_025B2_15H	2.5	6	1.000	0.28
10	D	591D106X_025D2_15H	2.5	6	0.600	0.46
10	R	591D106X_025R2_15H	2.5	6	0.240	0.79
15	R	591D156X_025R2_15H	3.8	6	0.200	0.87
68	R	591D686X_025R2_20H	17.0	8	0.175	1.00
35 WV_{DC} AT + 85 °C, 23 WV_{DC} 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
1.5	B	591D155X_035B2_15H	0.5	4	3.800	0.15
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	0.29
4.7	B	591D475X_035B2_15H	1.6	6	0.800	0.32
6.8	D	591D685X_035D2_15H	2.4	6	0.950	0.36
6.8	R	591D685X0035R2_15H	2.4	6	0.750	0.45
10	R	591D106X_035R2_15H	3.5	6	0.600	0.50
50 WV_{DC} AT + 85 °C, 33 WV_{DC} AT + 125 °C						
1	B	591D155X_050B2_15H	0.8	6	6.5	0.11
4.7	C	591D475X_050C2_20H	23.5	6	6	0.14

Note

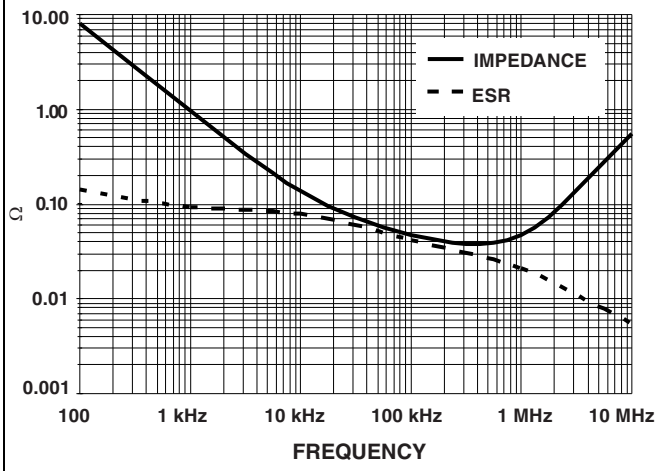
[1] For 10 % tolerance, specify “9”; for 20 % tolerance, change to ”0”

CASE CODE/PART NUMBER X-REF

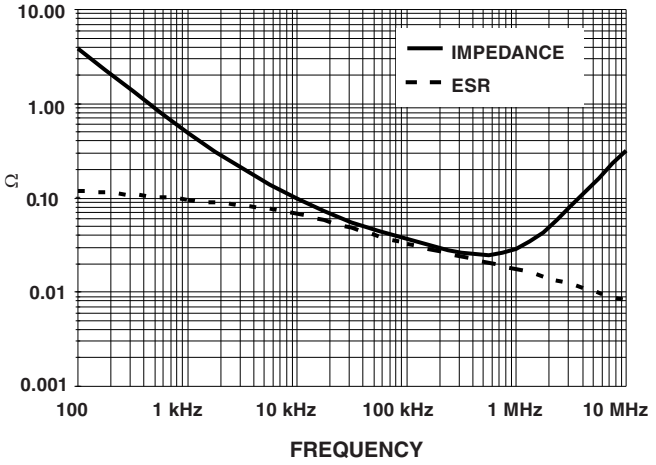
OLD	NEW
A2_	A2_15H
B2_	B2_15H
C2_	C2_15H
D2_	D2_15H
R2_	R2_15H
U2_	C2_20H
V2_	D2_20H
W2_	R2_20H

TYPICAL CURVES OF ESR - AS A FUNCTION OF FREQUENCY

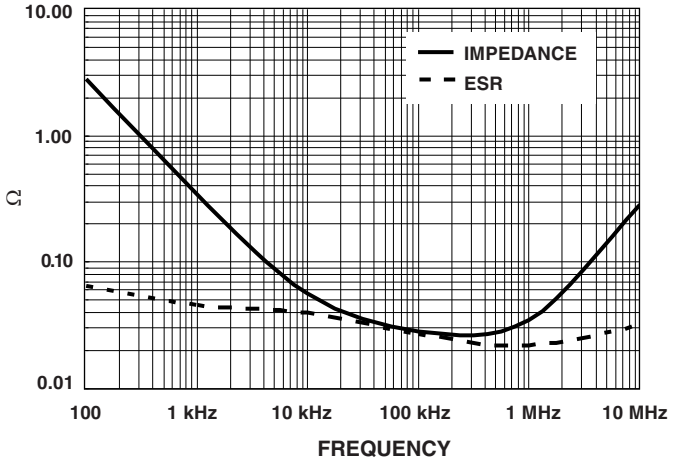
591D 150 - 10 V E/20H CASE ESR/IMPEDANCE VS. FREQUENCY



591D 330 - 6.3 V D/20H CASE ESR/IMPEDANCE VS. FREQUENCY

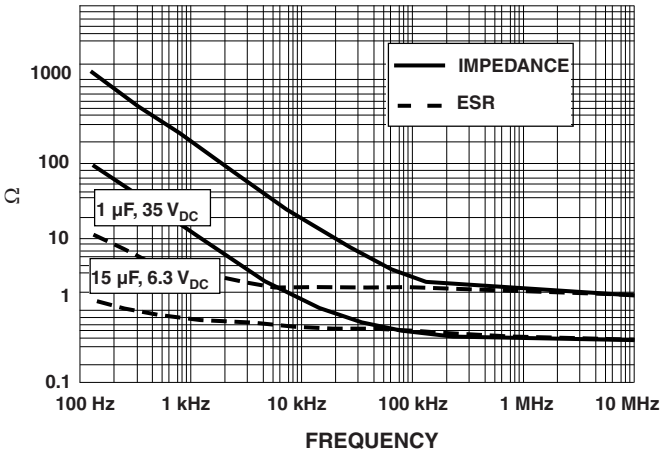


591D 470 - 6.3 V R/20H CASE ESR/IMPEDANCE VS. FREQUENCY

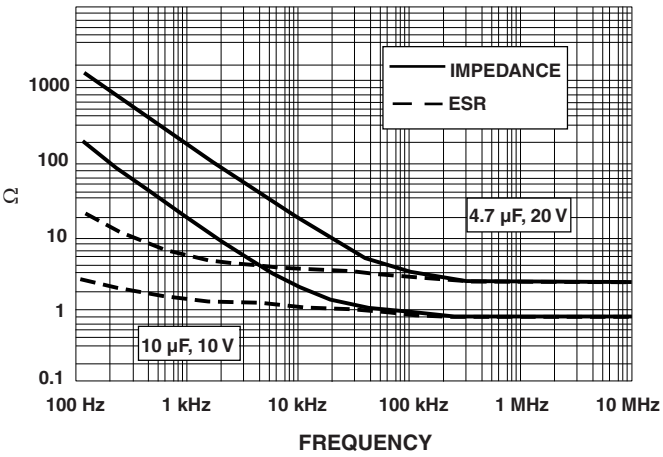


TYPICAL CURVES AT + 25 °C, IMPEDANCE AND ESR VS. FREQUENCY

"A" CASE



"B" CASE



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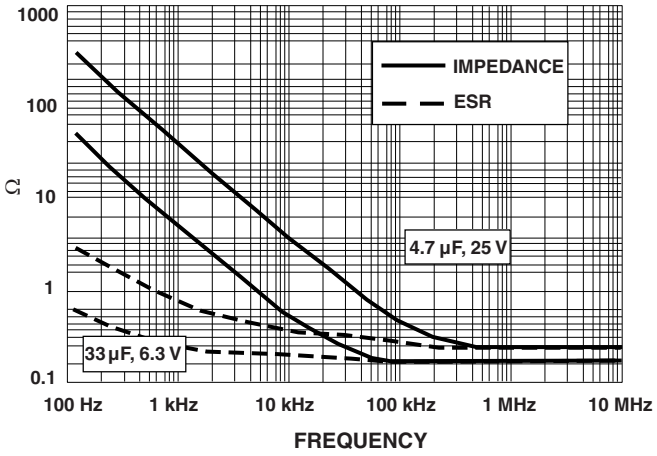

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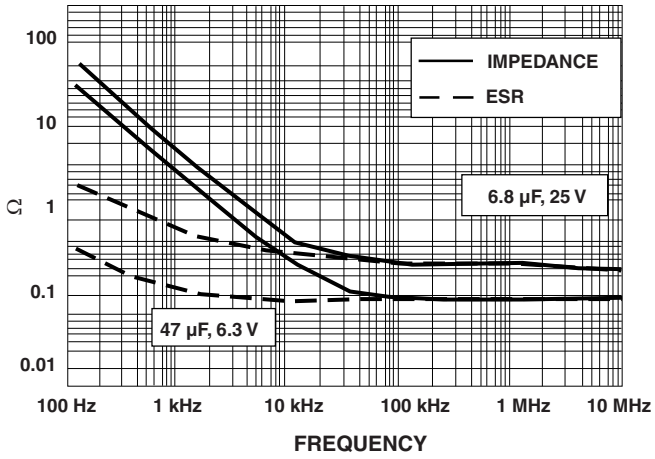

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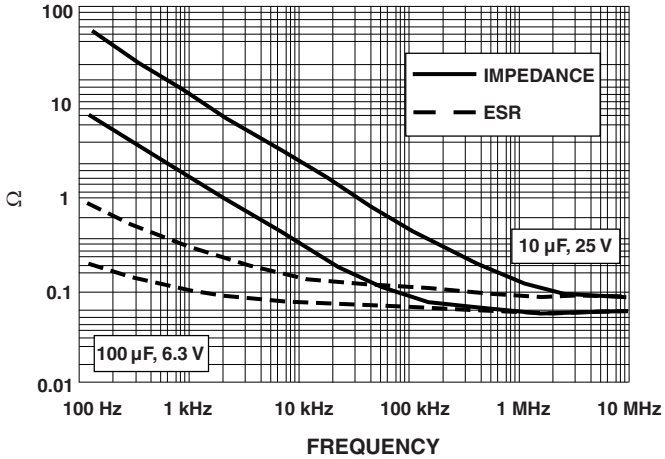

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