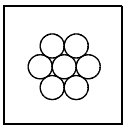
50 kHz – AE

Power rating: 1 kW$_{rms}$ @ 2% duty cycle
7x28mm (1.13") PZT/L
Active Area: 45 cm^2
Urethane Window

Array:



Beamwidth:

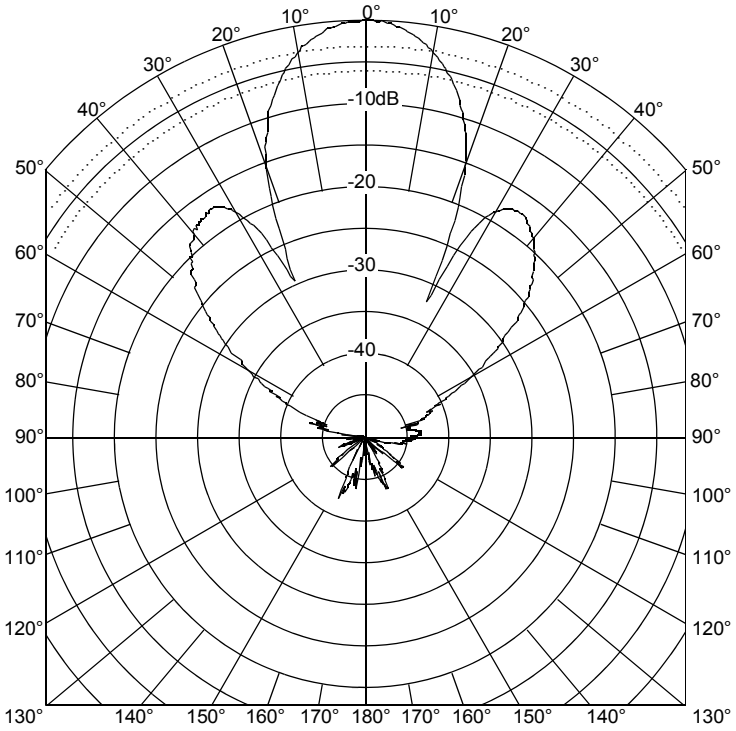
-3dB:	19°
-6dB:	27°
-10dB:	34°

Directivity Index:	18.9
Frequency Tolerance:	±2kHz
Peak TVR (1), nominal:	162dB
Peak TVR (1), minimum:	160dB
Q (transmit):	9
Peak Source Level (4):	216dB
Peak RVR (2), nominal:	-173dB
Peak Figure of Merit (3):	-14dB

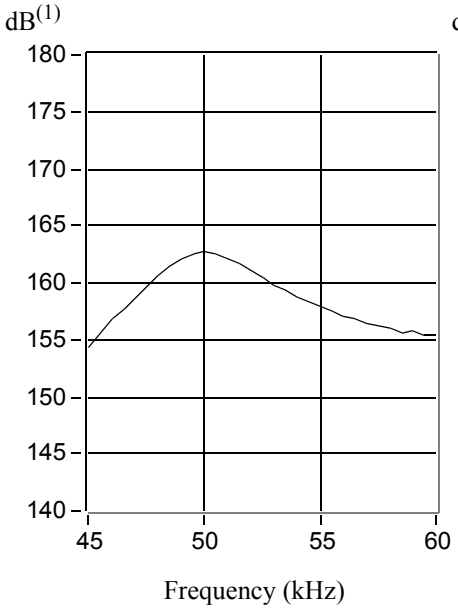
Notes:

(1) dB re 1 µPa per volt at 1 meter
(2) dB re 1 volt per µPa
(3) sum of transmitting voltage response and receiving voltage response
(4) Nominal peak TVR, rated power, and no cavitation

Transmit Radiation Pattern



TVR



RVR

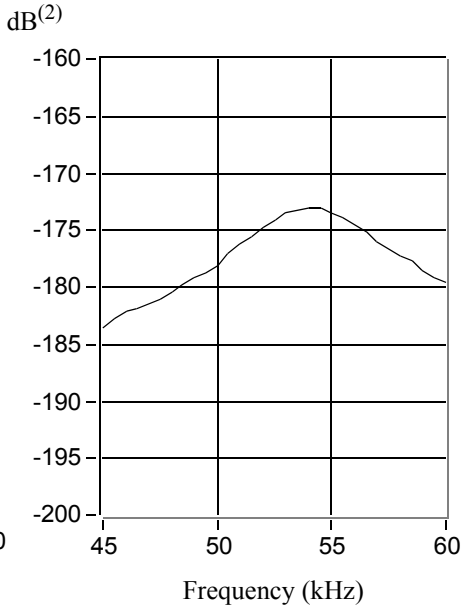
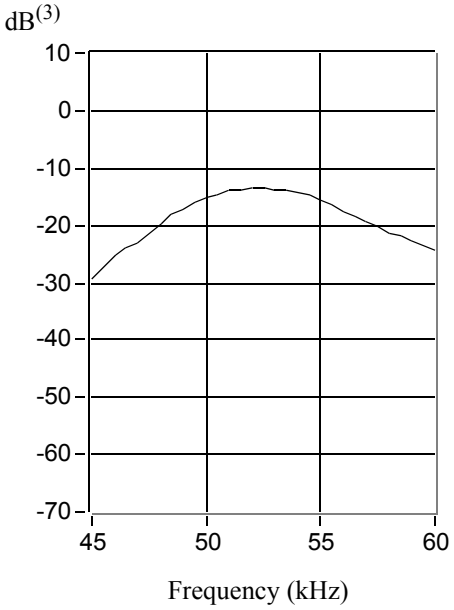


Figure of Merit



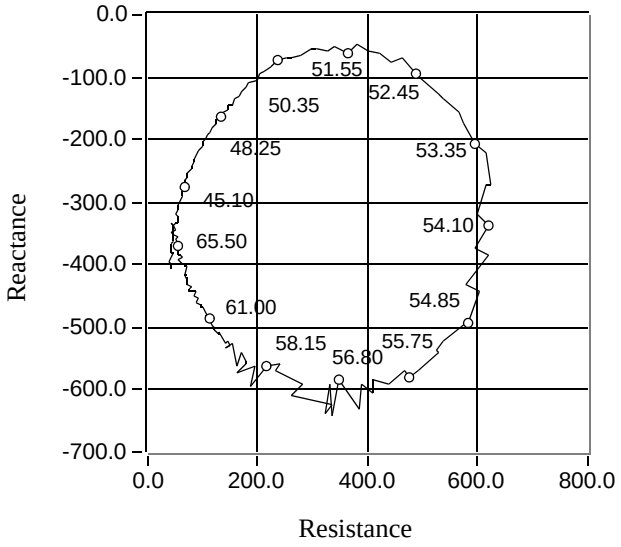
50 kHz – AE

7x28mm (1.13") PZT/L

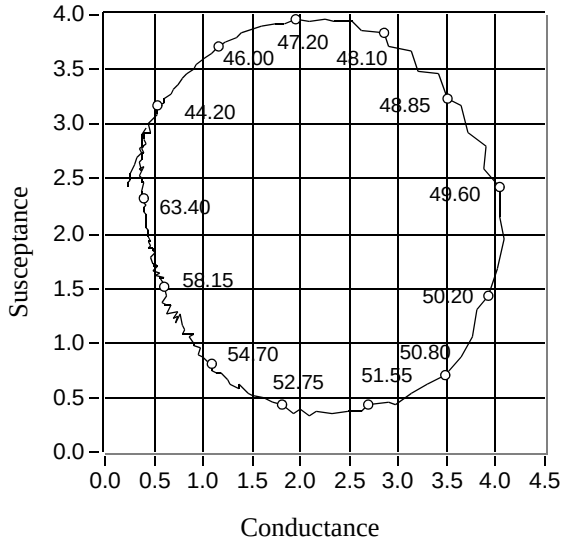
Cable Type: C32
Cable Length: 10.4m (34.0')

Impedance Data		
	Balanced	*Unbalanced*
Parallel: Rp.	250ohms-20%,+40%	250ohms-20%,+40%
Parallel: Cp. (nominal)	5000pF	6500pF
Series [R – jX] (nominal)	222 – j80 ohms	200 – j100 ohms
1 kHz Capacitance	6530pF±20%	8220pF±20%

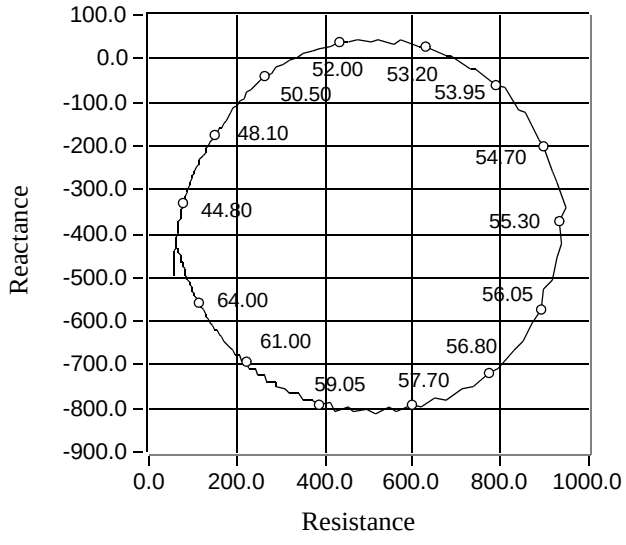
Unbalanced Impedance



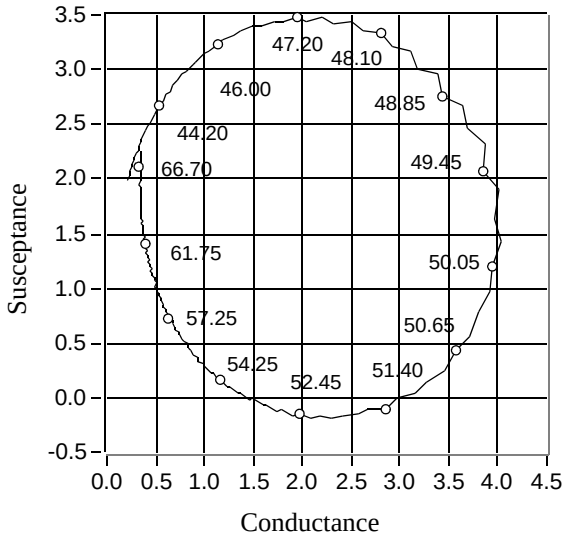
Unbalanced Admittance



Balanced Impedance



Balanced Admittance



50 kHz – AE

Transformed to 70 ohms

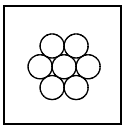
Power rating: 1 kWrms @ 2% duty cycle

7x28mm (1.13") PZT/L

Active Area: 45cm²

Urethane Window

Array:



Beamwidth:

-3dB: 19°

-6dB: 27°

-10dB: 34°

Directivity Index:	18.9
Frequency Tolerance:	±2kHz
Peak TVR(1), nominal:	168dB
Peak TVR(1), minimum:	165dB
Q (transmit):	8
Peak Source Level(4):	217dB
RVR(2), nominal:	-176dB
Peak Figure of Merit(3):	-14dB

Notes:

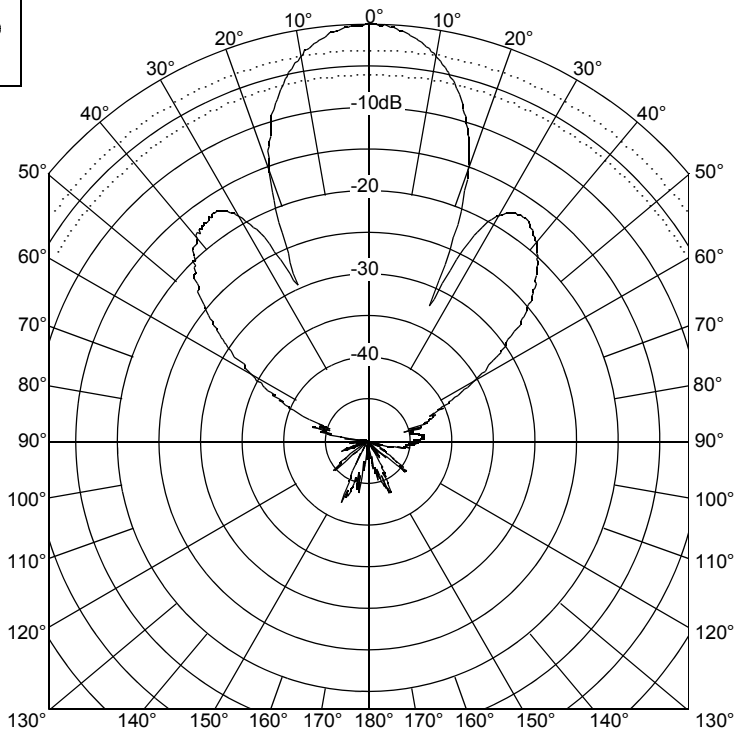
(1) dB re 1 µPa per volt at 1 meter

(2) dB re 1 volt per µPa

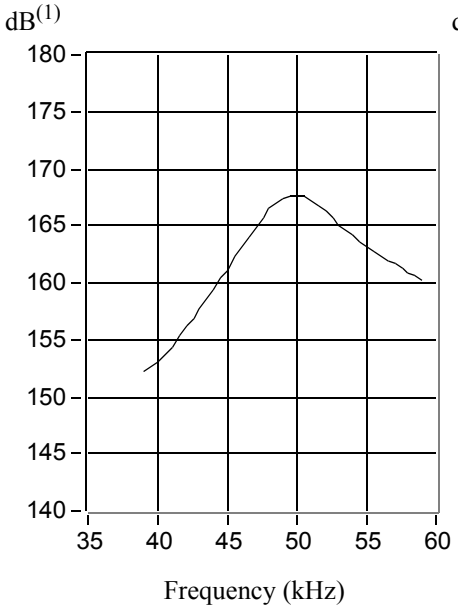
(3) sum of transmitting voltage response and receiving voltage response

(4) Nominal peak TVR, rated power, and no cavitation

Transmit Radiation Pattern



TVR



RVR

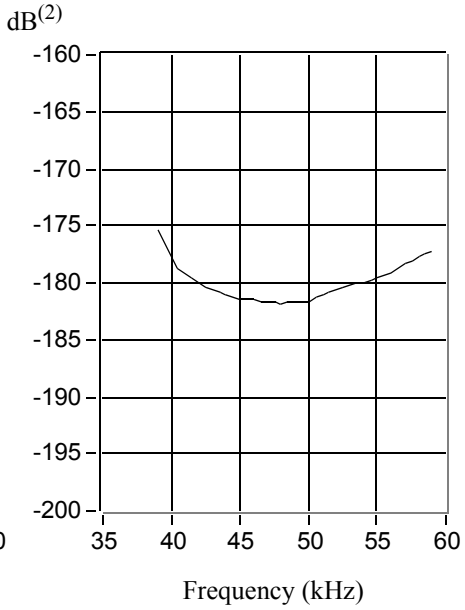
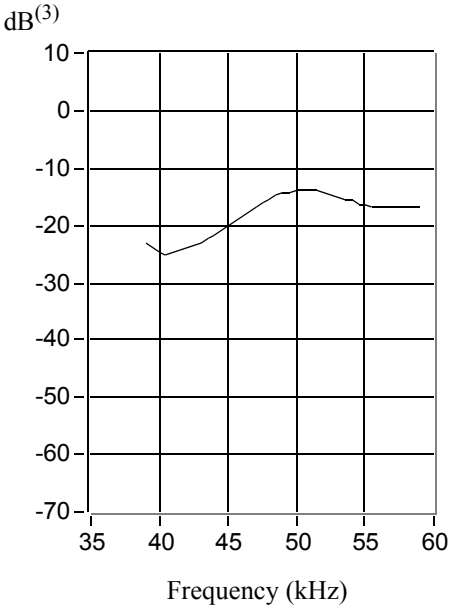


Figure of Merit



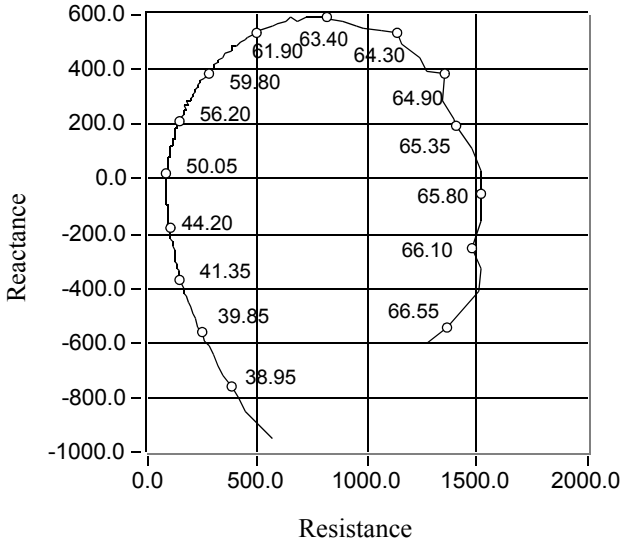
50 kHz – AE

7x28mm (1.13") PZT/L

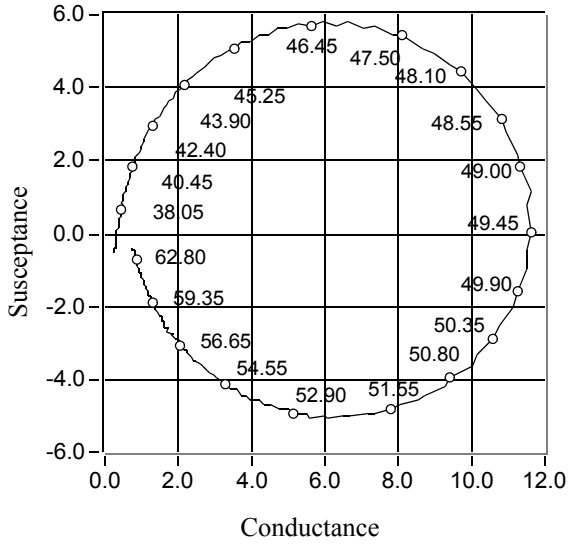
Cable Type: C35
Cable Length: 10.1m (33.0')

Impedance Data w/transformer		
	Balanced	*Unbalanced*
Parallel: Rp.	70ohms -20%,+40%	70ohms -20%,+40%
Parallel: Cp. (nominal)	0pF	0pF
Series [R – jX] (nominal)	70 – j0 ohms	70 – j0 ohms
1 kHz Capacitance	n/a	n/a

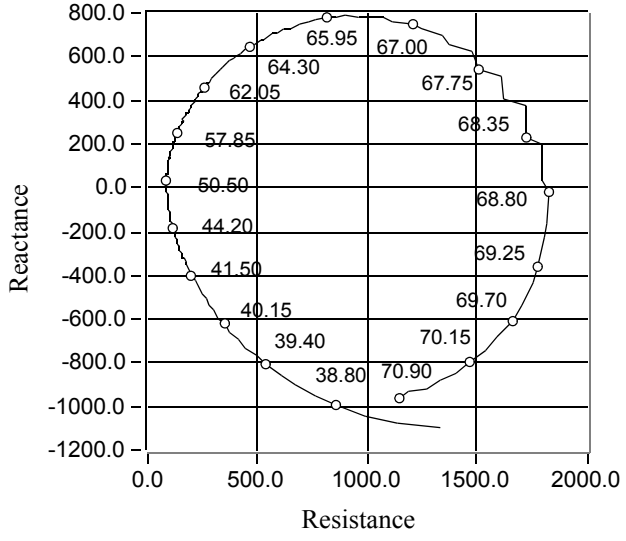
Unbalanced Impedance



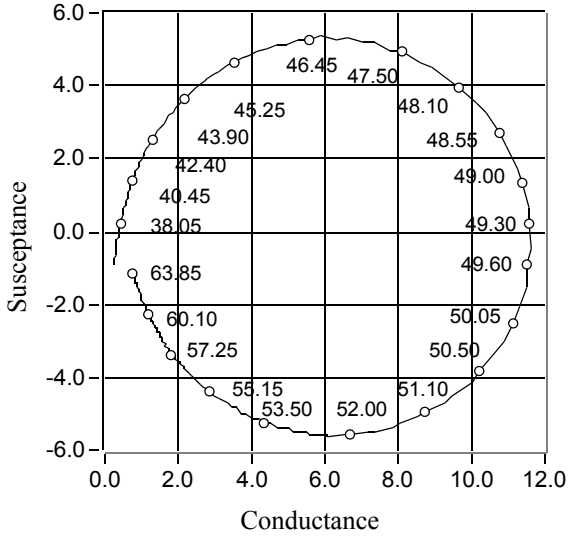
Unbalanced Admittance



Balanced Impedance



Balanced Admittance



50 kHz – AE

Transformed to 130 ohms

Power rating: 1 kW$_{rms}$ @ 2% duty cycle
7x28mm (1.13") PZT/L
Active Area: 45cm^2
Urethane Window

Beamwidth:

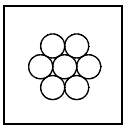
-3dB: 19°
-6dB: 27°
-10dB: 34°

Directivity Index:	18.9
Frequency Tolerance:	±1.5kHz
Peak TVR[(1)], nominal:	165dB
Peak TVR[(1)], minimum:	163dB
Q (transmit):	8
Peak Source Level[(4)]:	216dB
Peak RVR[(2)], nominal:	-169dB
Peak Figure of Merit[(3)]:	-14dB

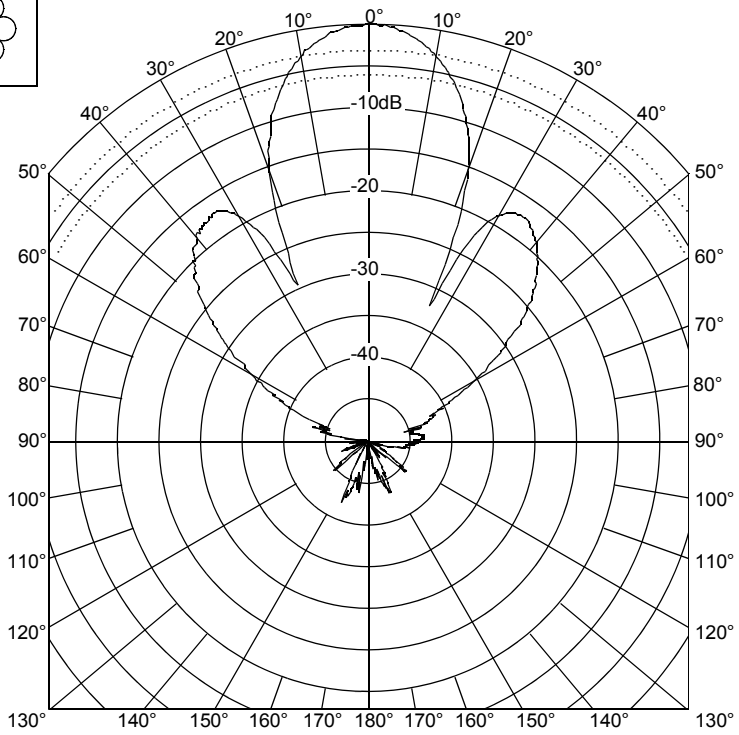
Notes:

(1) dB re 1 µPa per volt at 1 meter
(2) dB re 1 volt per µPa
(3) sum of transmitting voltage response and receiving voltage response
(4) Nominal peak TVR, rated power, and no cavitation

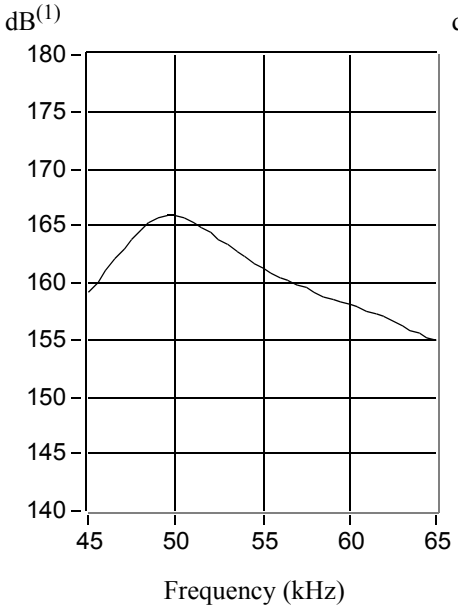
Array:



Transmit Radiation Pattern



TVR



RVR

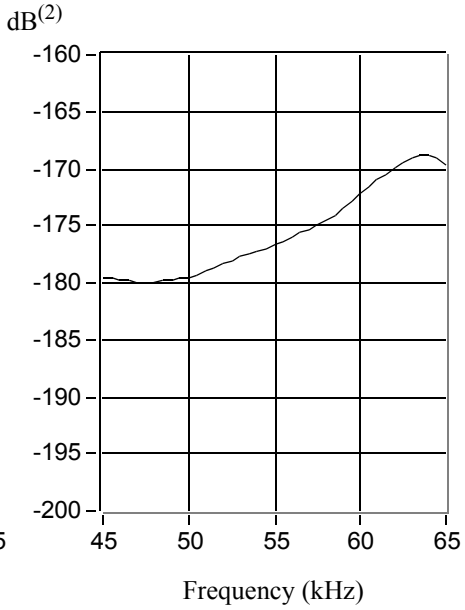
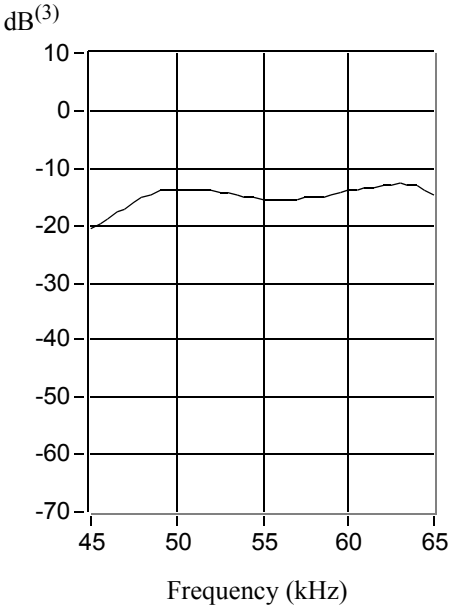


Figure of Merit



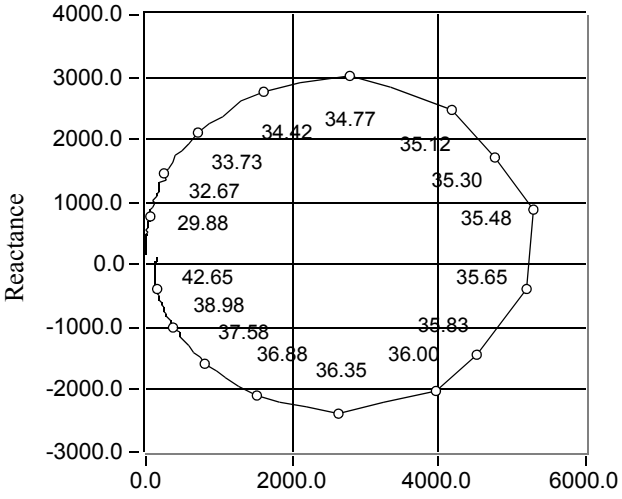
50 kHz – AE

7x28mm (1.13") PZT/L

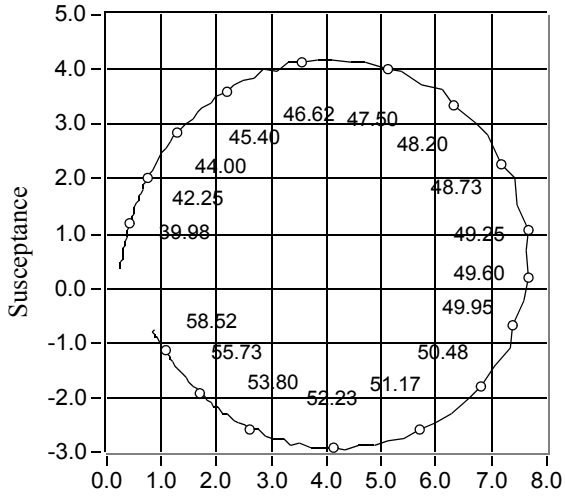
Cable Type: C44
Cable Length: 10.1m (33.0')

Impedance Data w/transformer		
	Balanced	*Unbalanced*
Parallel: Rp.	130ohms-20%,+40%	130ohms-20%,+40%
Parallel: Cp. (nominal)	0pF	0pF
Series [R – jX] (nominal)	130 – j0 ohms	130 – j0 ohms
1 kHz Capacitance	n/a	n/a

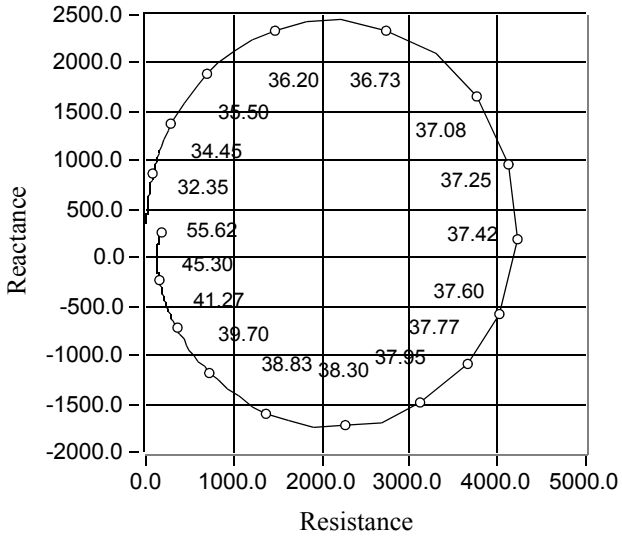
Unbalanced Impedance



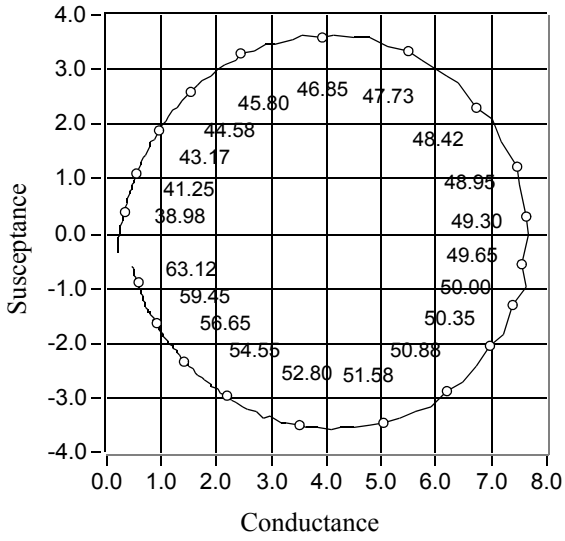
Unbalanced Admittance



Balanced Impedance



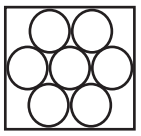
Balanced Admittance



50 kHz-AE

Ceramics Wired in Parallel with Internal Diplexer
Power Rating: 1 kW @ 1% duty cycle
7 x 28 mm (1.13") PZT/L
Active Area: 45 cm² (6.97 in²)
Radiating Surface: Urethane

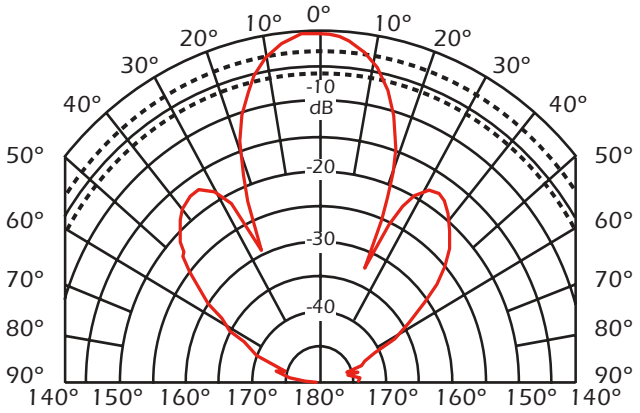
Array



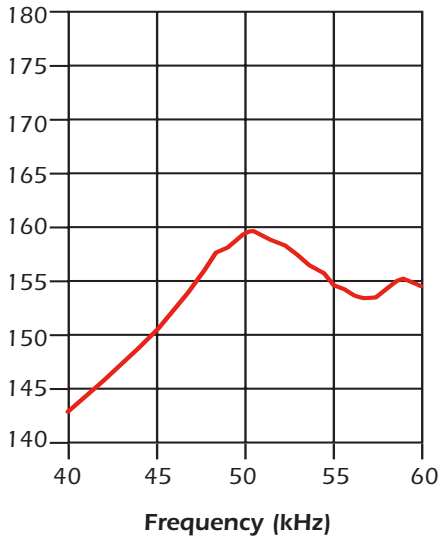
Beamwidth:
-3 dB: 19°
-6 dB: 27°
-10 dB: 34°

Directivity Index:	18.9
Frequency Tolerance:	+/-2kHz
Peak TVR(1), nominal:	160 dB
Peak TVR(1), minimum:	158 dB
Q (transmit):	9
Peak Source Level(4):	216 dB
Peak RVR(2), nominal:	-173 dB
Peak Figure of Merit(3):	-17 dB

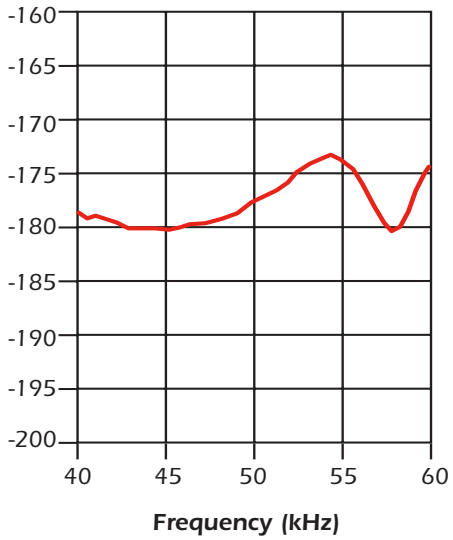
Transmit Radiation Pattern



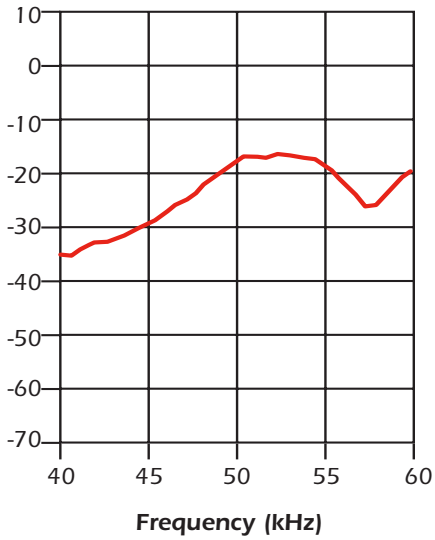
TVR



RVR



FOM



Notes:
(1) dB re 1 µPa per volt at 1 meter
(2) dB re 1 volt per µPa
(3) Sum of transmitting voltage response and receiving voltage response
(4) Nominal peak TVR, rated power, and no cavitation

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50 kHz-AE

7 x 28 mm (1.13”) PZT/L

Cable Type: C332
Cable Length: 15 m (50’)

Note:
Impedance data includes cable

Impedance Data		
	Balanced	*Unbalanced*
Parallel: Rp.	370 Ω: -20%, +40%	370 Ω: -20%, +40%
Parallel: Cp. (nominal)	3000 pF	3000 pF
Series [R - jX]: (nominal)	330-j110 Ω	330-j110 Ω
1 kHz capacitance: (nominal)	n/a	n/a

Balance Impedance Table

Test Frequency (kHz)	Impedance Magnitude (Ω)	Phase Angle (°)	Series Resistance (Ω)	Series Reactance (Ω)	Parallel Conductance (mS)	Parallel Susceptance (mS)	Parallel Resistance (Ω)	Parallel Capacitance (pF)
40.00	1711.93	-74.35	461.82	-1648.46	0.16	0.56	6346.00	2238.04
41.00	1369.74	-74.86	357.71	-1322.21	0.19	0.70	5244.97	2735.64
42.00	1120.89	-74.52	299.25	-1080.21	0.24	0.86	4198.49	3258.00
43.00	933.83	-73.68	262.44	-896.19	0.30	1.03	3322.75	3803.82
44.00	782.70	-72.03	241.54	-744.50	0.39	1.22	2536.31	4395.83
45.00	659.79	-69.58	230.18	-618.34	0.53	1.42	1891.21	5023.65
46.00	552.84	-65.81	226.56	-504.28	0.74	1.65	1349.01	5708.73
47.00	463.02	-59.94	231.95	-400.73	1.08	1.87	924.28	6329.56
48.00	389.49	-50.35	248.55	-299.87	1.64	1.98	610.33	6554.31
49.00	349.67	-36.22	282.10	-206.61	2.31	1.69	433.42	5488.65
50.00	348.03	-19.12	328.83	-113.99	2.71	0.94	368.35	2995.69
51.00	401.29	-4.23	400.20	-29.60	2.49	0.18	402.39	573.53
52.00	511.46	5.61	509.01	50.02	1.95	-0.19	513.92	-585.27
53.00	686.35	7.17	680.99	85.63	1.45	-0.18	691.76	-545.85
54.00	884.61	1.42	884.34	21.85	1.13	-0.03	884.88	-82.29
55.00	1037.19	-12.89	1011.06	-231.36	0.94	0.22	1064.00	622.35
56.00	966.45	-29.77	838.90	-479.86	0.90	0.51	1113.39	1460.13
57.00	738.19	-37.63	584.63	-450.71	1.07	0.83	932.10	2309.42
58.00	536.29	-24.26	488.92	-220.36	1.70	0.77	588.24	2102.51
59.00	639.83	3.48	638.66	38.82	1.56	-0.09	641.02	-255.81
60.00	1072.37	5.81	1066.87	108.47	0.93	-0.09	1077.90	-250.21

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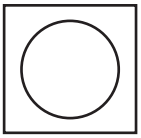
200 kHz-AWIq

Transformed to 60 ohms
Power Rating: 1 kW rms @ 1% duty cycle
67 mm (2.65") PZT
Active Area: 35.3 cm^2 (5.5 in^2)
Epoxy/Urethane Window

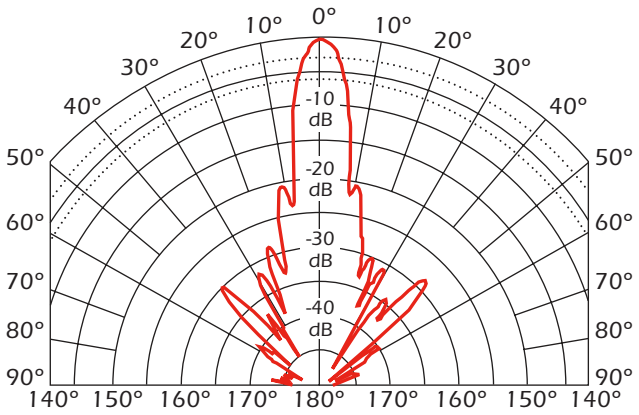
Beamwidth:
-3 dB: 7°
-6 dB: 8°
-10 dB: 9°

Directivity Index:	28 dB
Frequency Tolerance:	±5 kHz
Peak TVR(1), nominal:	177 dB
Peak TVR(1), minimum:	175 dB
Q (transmit):	5
Peak Source Level(4):	224 dB
Peak RVR(2), nominal:	-184 dB
Peak Figure of Merit(3):	-9 dB

Array

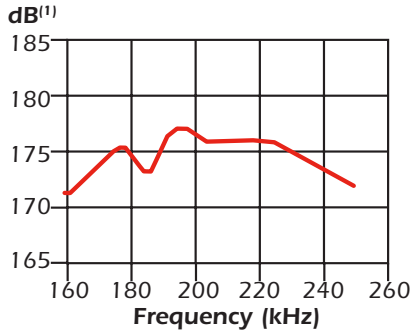


Transmit Radiation Pattern



Notes:
(1) dB re 1 µPa per volt at 1 meter
(2) dB re 1 volt per µPa
(3) Sum of transmitting voltage response and receiving voltage response
(4) Nominal peak TVR, rated power, and no cavitation

TVR



RVR

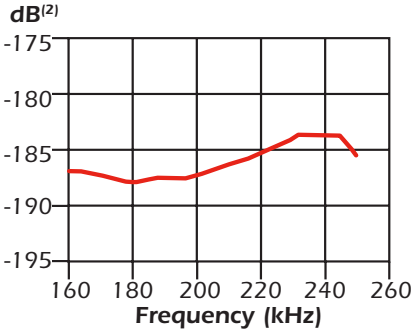
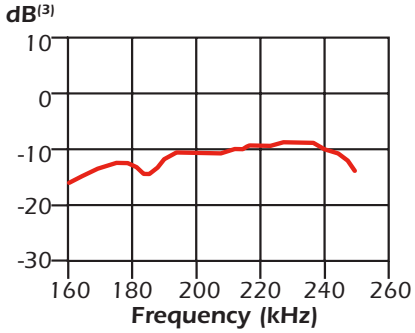


Figure of Merit



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200 kHz-AWlq

67 mm (2.65”) PZT

Cable Type: C44-02
Cable Length: 15 m (50’)

Note:
Impedance data includes cable

Impedance Data		
	Unbalanced	*Balanced*
Parallel: Rp.	60 Ω: -20%, +40%	60 Ω: -20%, +40%
Parallel: Cp. (nominal)	0	0
Series [R - jX]: (nominal)	60 - j0 Ω	60 - j0 Ω
1 kHz capacitance: (nominal)		

Balanced Impedance Table

Test Frequency (kHz)	Impedance Magnitude (Ω)	Phase Angle (°)	Series Resistance (Ω)	Series Reactance (Ω)	Parallel Conductance (mS)	Parallel Susceptance (mS)	Parallel Resistance (Ω)	Parallel Capacitance (pF)
160.00	101.60	-18.00	96.63	-31.40	9.36	3.04	106.83	3025.63
162.00	99.56	-16.66	95.39	-28.54	9.62	2.88	103.93	2828.68
166.00	88.15	-18.61	83.54	-28.13	10.75	3.62	93.01	3470.96
168.00	81.50	-17.39	77.77	-24.36	11.71	3.67	85.40	3474.41
172.00	74.86	-15.43	72.17	-19.91	12.88	3.55	77.66	3287.71
174.00	68.31	-14.04	66.27	-16.57	14.20	3.55	70.41	3248.09
178.00	62.72	-2.65	62.65	-2.90	15.93	0.74	62.79	658.05
180.00	66.42	2.91	66.34	3.38	15.04	-0.77	66.51	-676.37
184.00	81.01	1.80	80.97	2.55	12.34	-0.39	81.05	-335.70
186.00	83.45	-4.90	83.15	-7.13	11.94	1.02	83.76	876.55
190.00	66.62	-11.46	65.29	-13.23	14.71	2.98	67.97	2497.63
192.00	60.74	-7.84	60.18	-8.29	16.31	2.25	61.32	1862.08
196.00	56.53	2.68	56.47	2.64	17.67	-0.83	56.59	-671.72
198.00	57.88	8.18	57.29	8.24	17.10	-2.46	58.48	-1976.03
200.00	61.17	12.51	59.71	13.25	15.96	-3.54	62.65	-2818.20
202.00	65.75	15.03	63.50	17.05	14.69	-3.94	68.08	-3107.74
204.00	70.76	15.49	68.19	18.90	13.62	-3.78	73.42	-2945.12
208.00	76.83	14.11	74.51	18.73	12.62	-3.17	79.22	-2428.73
210.00	78.29	13.62	76.09	18.44	12.41	-3.01	80.56	-2279.82
214.00	81.46	14.70	78.80	20.67	11.87	-3.12	84.22	-2316.83
216.00	84.20	15.59	81.10	22.62	11.44	-3.19	87.41	-2351.34
220.00	91.45	16.06	87.88	25.30	10.51	-3.02	95.16	-2188.28
222.00	94.76	16.18	91.01	26.41	10.13	-2.94	98.67	-2108.67
226.00	105.01	17.62	100.08	31.78	9.08	-2.88	110.17	-2029.52
228.00	112.97	17.44	107.77	33.86	8.44	-2.65	118.41	-1852.26
232.00	131.51	14.21	127.49	32.28	7.37	-1.87	135.66	-1280.24
234.00	139.70	11.79	136.75	28.54	7.01	-1.46	142.71	-994.57
238.00	158.93	7.28	157.65	20.15	6.24	-0.80	160.22	-533.37
240.00	171.75	4.61	171.20	13.81	5.80	-0.47	172.31	-310.52
244.00	209.01	-4.90	208.24	-17.87	4.77	0.41	209.78	266.84
246.00	228.23	-12.87	222.50	-50.84	4.27	0.98	234.12	631.49
250.00	239.63	-34.05	198.54	-134.18	3.46	2.34	289.22	1487.62

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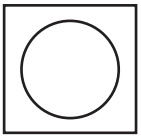
200 kHz-AWIq

Array

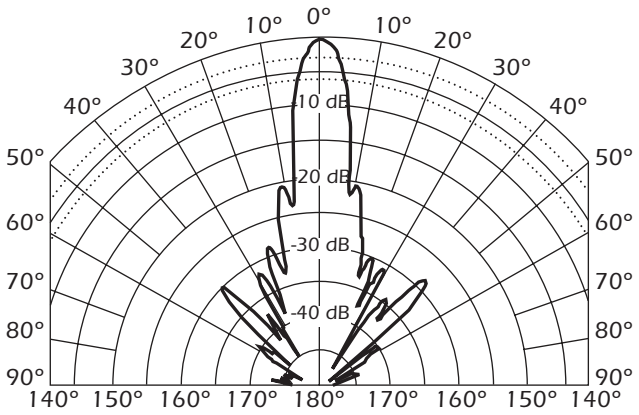


Power Rating: 1 kW rms @ 2% duty cycle
67 mm (2.65") PZT
Active Area: 35.3 cm^2
Epoxy/Urethane Window

Beamwidth:
-3 dB: 7°
-6 dB: 8°
-10 dB: 9°

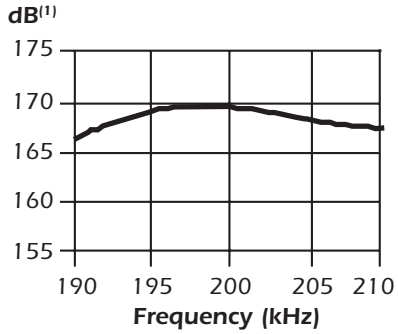
Directivity Index:	28.6 dB
Frequency Tolerance:	±5 kHz
Peak TVR(1), nominal:	170 dB
Peak TVR(1), minimum:	167 dB
Q (transmit):	10
Peak Source Level(4):	225 dB
Peak RVR(2), nominal:	-182 dB
Peak Figure of Merit(3):	-12.7 dB

Transmit Radiation Pattern



Notes:
(1) dB re 1 µPa per volt at 1 meter
(2) dB re 1 volt per µPa
(3) Sum of transmitting voltage response and receiving voltage response
(4) Nominal peak TVR, rated power, and no cavitation

TVR



RVR

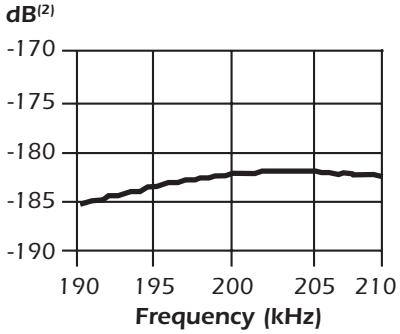
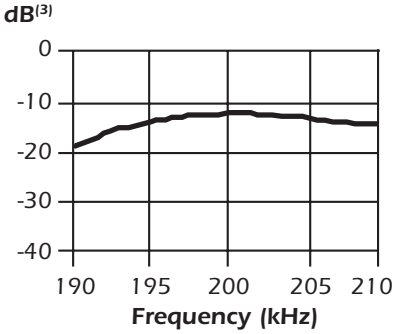


Figure of Merit



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Sensing Technology

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200 kHz-AWlq

67 mm (2.65") PZT

Cable Type: C32
Cable Length: 10.1 m (33')

Note:
Impedance data includes cable

Impedance Data		
	Balanced	*Unbalanced*
Parallel: Rp.	310 Ω: -20%, +10%	310 Ω: -20%, +10%
Parallel: Cp. (nominal)	2,100 pF	2,100 pF
Series [R - jX]: (nominal)	190 - j150 Ω	190 - j150 Ω
1 kHz capacitance: (nominal)	7,670 pF: ±20%	7,710 pF: ±20%

Unbalance Impedance

Test Frequency (kHz)	Impedance Magnitude (ohms)	Phase Angle (degree)	Series Resistance (ohms)	Series Reactance (ohms)	Parallel Conductance (mS)	Parallel Susceptance (mS)	Parallel Resistance (ohms)	Parallel Capacitance (pF)
190.00	254.56	-53.93	149.90	-205.75	2.3132	3.1751	432.30	2659.64
190.50	250.90	-53.46	149.37	-201.58	2.3730	3.2024	421.42	2675.44
191.00	245.55	-52.62	149.08	-195.12	2.4724	3.2361	404.46	2696.53
191.50	241.84	-51.81	149.51	-190.08	2.5564	3.2501	391.17	2701.14
192.00	239.75	-50.83	151.41	-185.88	2.6343	3.2339	379.61	2680.72
192.50	236.51	-49.60	153.28	-180.12	2.7402	3.2199	364.93	2662.19
193.00	235.77	-48.89	155.02	-177.64	2.7888	3.1957	358.57	2635.27
193.50	235.04	-47.31	159.38	-172.75	2.8850	3.1271	346.62	2572.03
194.00	233.47	-46.69	160.14	-169.90	2.9378	3.1169	340.39	2557.02
194.50	235.32	-45.27	165.62	-167.17	2.9908	3.0189	334.36	2470.26
195.00	233.72	-44.18	167.62	-162.87	3.0686	2.9817	325.88	2433.63
195.50	236.42	-43.39	171.79	-162.43	3.0735	2.9059	325.36	2365.66
196.00	236.76	-41.77	176.58	-157.72	3.1500	2.8136	317.46	2284.68
196.50	238.00	-41.30	178.80	-157.08	3.1567	2.7731	316.79	2246.03
197.00	241.87	-39.92	185.51	-155.20	3.1711	2.6529	315.35	2143.27
197.50	242.01	-39.01	188.05	-152.33	3.2108	2.6010	311.45	2096.01
198.00	247.12	-38.31	193.89	-153.21	3.1750	2.5088	314.96	2016.63
198.50	248.86	-37.09	198.51	-150.08	3.2054	2.4234	311.97	1943.04
199.00	253.07	-36.72	202.86	-151.30	3.1675	2.3624	315.70	1889.41
199.50	257.40	-35.63	209.22	-149.93	3.1579	2.2630	316.66	1805.33
200.00	261.05	-35.18	213.37	-150.40	3.1310	2.2070	319.39	1756.25
200.50	266.29	-34.63	219.12	-151.33	3.0900	2.1340	323.62	1693.95
201.00	272.09	-34.06	225.40	-152.40	3.0447	2.0586	328.44	1630.01
201.50	276.02	-33.79	229.40	-153.51	3.0109	2.0149	332.12	1591.45
202.00	283.64	-33.68	236.03	-157.29	2.9338	1.9552	340.85	1540.49
202.50	287.73	-33.07	241.12	-157.00	2.9125	1.8964	343.34	1490.44
203.00	293.83	-33.79	244.19	-163.42	2.8284	1.8928	353.56	1484.02
203.50	300.88	-33.15	251.91	-164.53	2.7827	1.8174	359.37	1421.38
204.00	304.01	-33.82	252.58	-169.20	2.7328	1.8307	365.92	1428.24
204.50	312.42	-33.96	259.12	-174.54	2.6547	1.7882	376.69	1391.68
205.00	315.02	-34.22	260.47	-177.18	2.6247	1.7854	381.00	1386.12
205.50	321.94	-34.98	263.80	-184.55	2.5452	1.7805	392.90	1378.97
206.00	325.95	-35.08	266.74	-187.32	2.5107	1.7632	398.29	1362.24
206.50	329.37	-35.94	266.69	-193.30	2.4583	1.7818	406.79	1373.27
207.00	334.58	-36.24	269.87	-197.78	2.4107	1.7667	414.81	1358.38
207.50	335.44	-36.85	268.43	-201.17	2.3855	1.7878	419.20	1371.29
208.00	340.44	-37.57	269.84	-207.57	2.3282	1.7909	429.51	1370.37
208.50	341.05	-37.73	269.73	-208.71	2.3190	1.7944	431.22	1369.71
209.00	343.74	-38.80	267.91	-215.36	2.2674	1.8227	441.03	1388.02
209.50	346.19	-38.70	270.18	-216.45	2.2544	1.8060	443.58	1372.02
210.00	346.06	-39.60	266.64	-220.60	2.2265	1.8420	449.14	1396.03

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