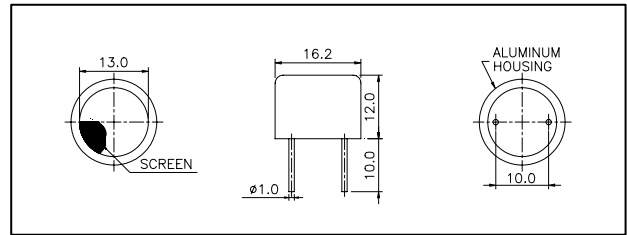




Dimensions: dimensions are in mm



Specification

250ST160	Transmitter
250SR160	Receiver
Center Frequency	25.0±1.0Khz
Bandwidth (-6dB)	250ST180: 2.0Khz 250SR180: 2.0Khz
Transmitting Sound Pressure Level	112dB min.
at 25.0Khz; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-62dB min.
at 25.0Khz 0dB = 1 volt/μbar	
Capacitance at 1Khz	±20% 2400 pF
Max. Driving Voltage (cont.)	20Vrms
Total Beam Angle	-6dB 85° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

All specification taken typical at 25°C
Closer frequency tolerance can be supplied upon request.

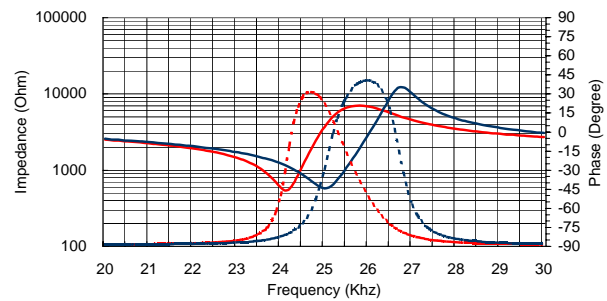
Model available:

1	250ST/R160	Aluminum Housing
2	250ST/R16B	Black Al. Housing
3	250ST/R16P	Plastic Housing

Impedance/Phase Angle vs. Frequency

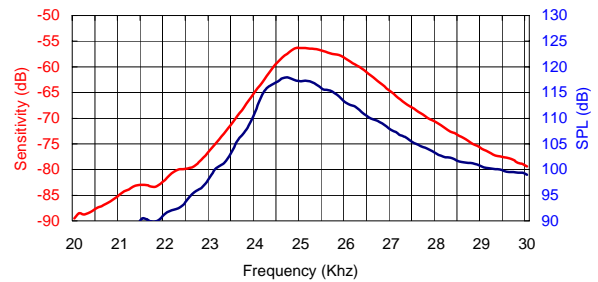
Tested under 1Vrms Oscillation Level

250SR160 Impedance ————
 250SR160 Phase
 250ST160 Impedance ————
 250ST160 Phase
 250ST160 Phase



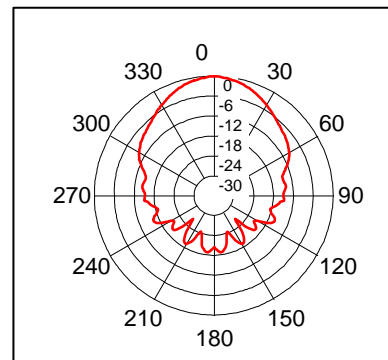
Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm



Beam Angle

Tested at 25.0Khz frequency

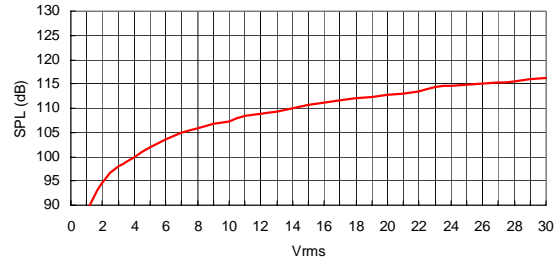
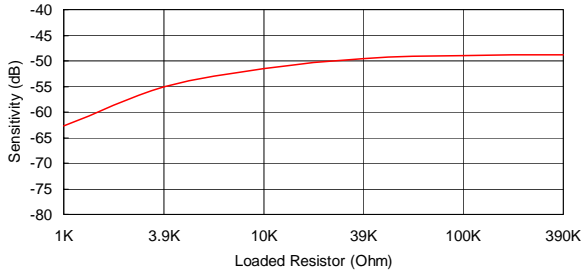


250SR160 Receiver

250ST160 Transmitter

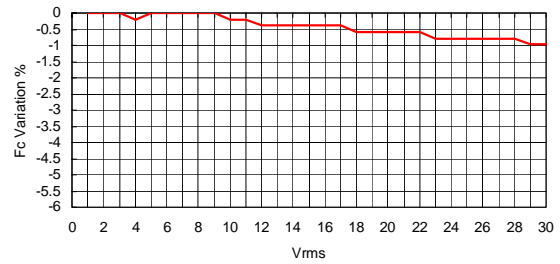
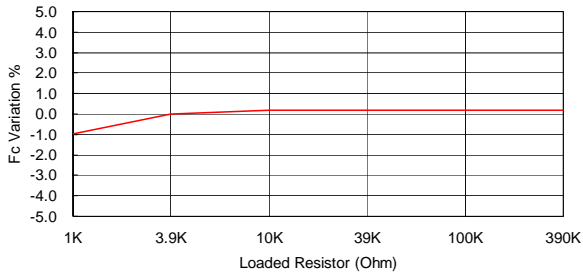
Sensitivity Variation vs. Loaded Resistor

SPL Variation vs. Driving Voltage



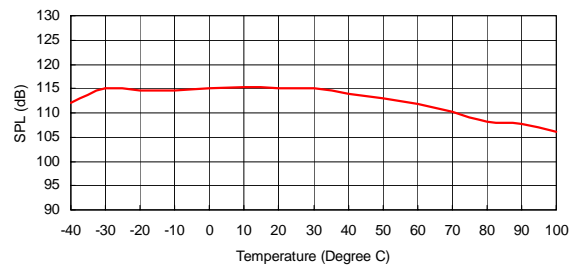
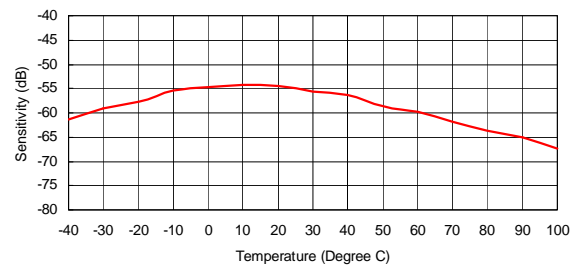
Center Frequency Shift vs. Loaded Resistor

Center Frequency Shift vs. Driving Voltage



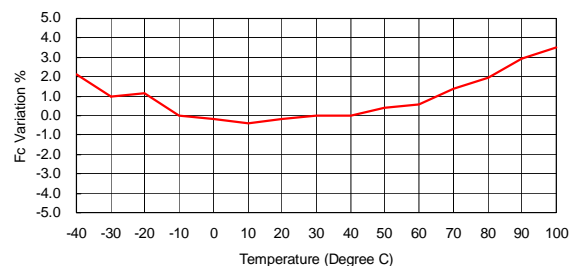
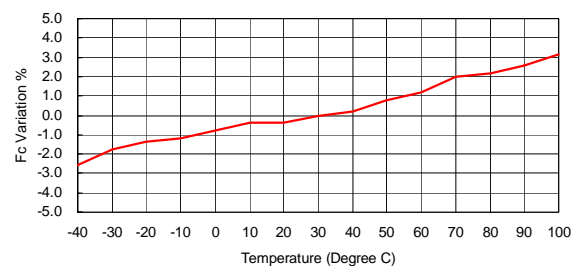
Sensitivity Variation vs. Temperature

SPL Variation vs. Temperature



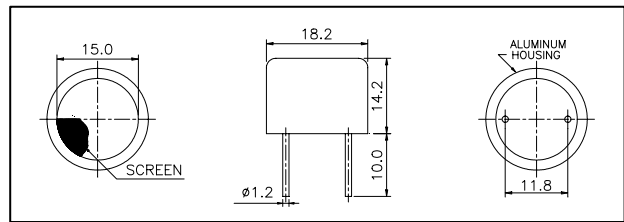
Center Frequency Shift vs. Temperature

Center Frequency Shift vs. Temperature





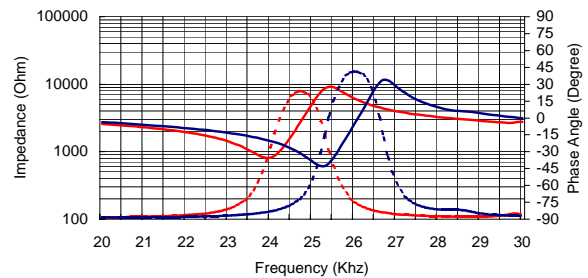
Dimensions: dimensions are in mm



Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level

250SR180 Impedance —————
 250SR180 Phase
 250ST180 Impedance —————
 250ST180 Phase
 (Note: The legend in the image uses red for SR180 and blue for ST180, with solid lines for impedance and dotted lines for phase.)

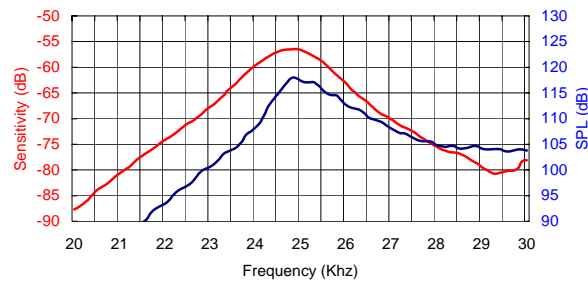


Specification

250ST180	Transmitter
250SR180	Receiver
Center Frequency	25.0±1.0Khz
Bandwidth (-6dB)	250ST180 1.5Khz 250SR180 1.8Khz
Transmitting Sound Pressure Level	112dB min.
at 25.0Khz; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-62dB min.
at 25.0Khz 0dB = 1 volt/μbar	
Capacitance at 1Khz	±20% 2400 pF
Max. Driving Voltage (cont.)	20Vrms
Total Beam Angle	-6dB 95° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

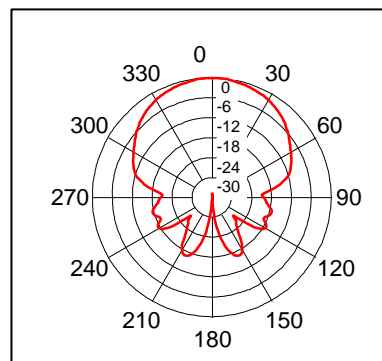
Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm



Beam Angle

Tested at 25.0Khz frequency



All specification taken typical at 25°C
 Closer frequency tolerance can be supplied upon request.

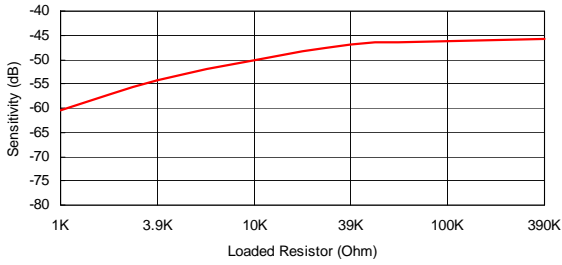
Model available:

1	250ST/R180	Aluminum Housing
2	250ST/R18B	Black Al. Housing

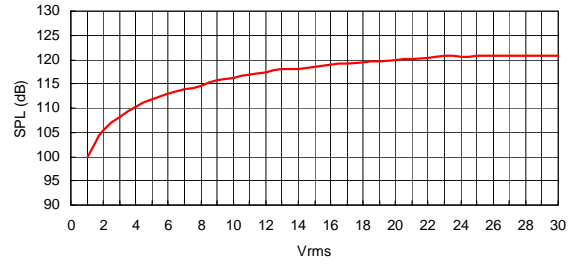
250SR180 Receiver

250ST180 Transmitter

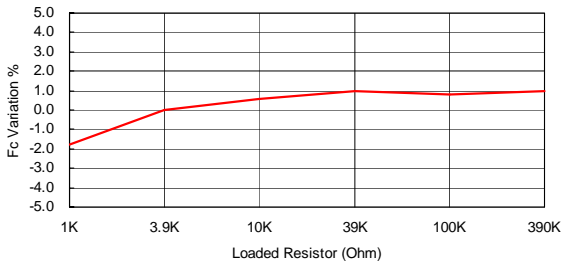
Sensitivity Variation vs. Loaded Resistor



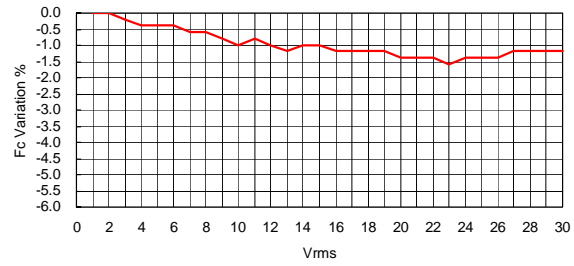
SPL Variation vs. Driving Voltage



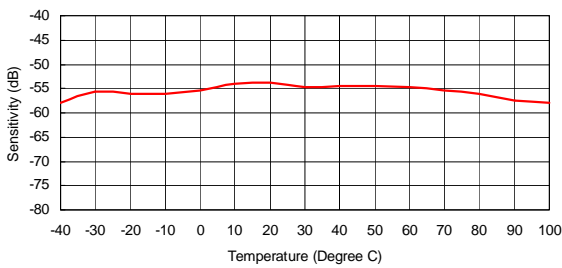
Center Frequency Shift vs. Loaded Resistor



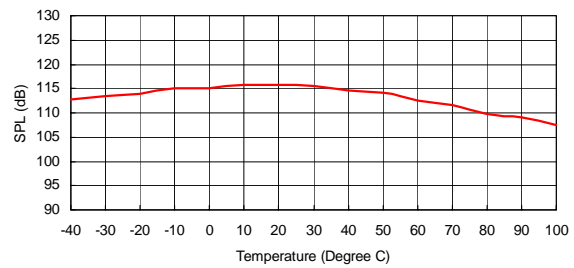
Center Frequency Shift vs. Driving Voltage



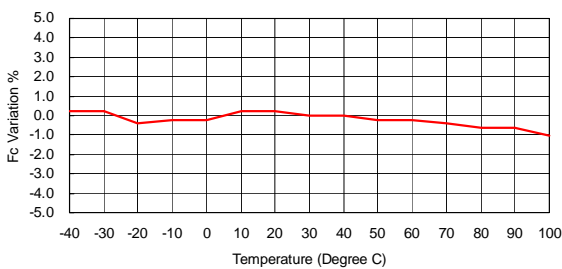
Sensitivity Variation vs. Temperature



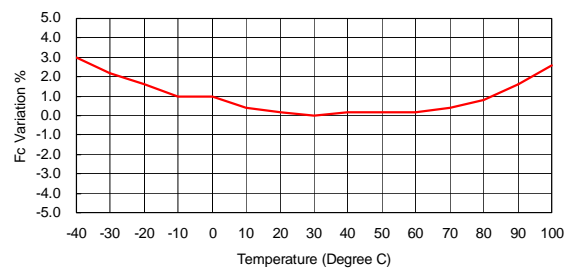
SPL Variation vs. Temperature



Center Frequency Shift vs. Temperature

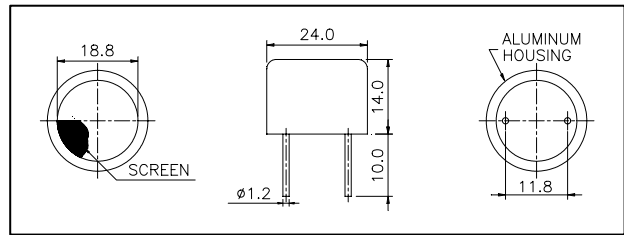


Center Frequency Shift vs. Temperature





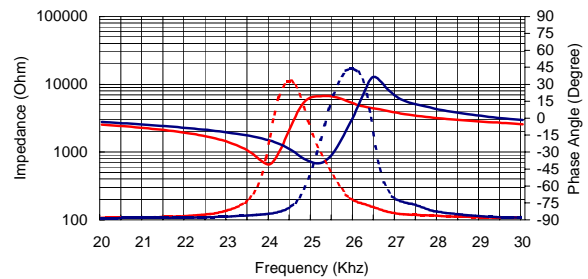
Dimensions: dimensions are in mm



Impedance/Phase Angle vs. Frequency

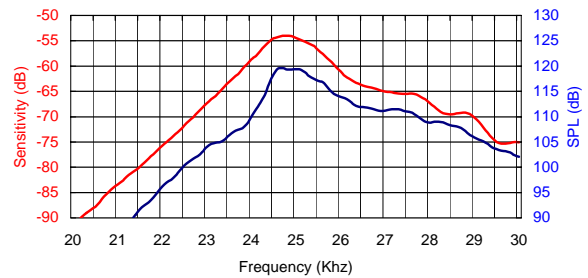
Tested under 1Vrms Oscillation Level

250SR240 Impedance —————
 250SR240 Phase
 250ST240 Impedance —————
 250ST240 Phase

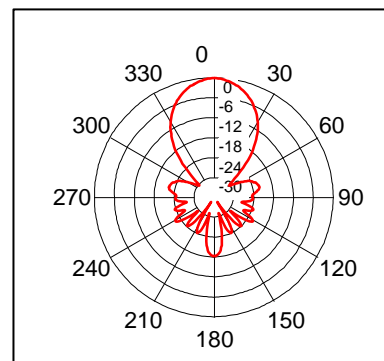


Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm



Beam Angle: Tested at 25.0KHz frequency



Specification

250ST240	Transmitter
250SR240	Receiver
Center Frequency	25.0±1.0Khz
Bandwidth (-6dB)	250ST240 1.5Khz
	250SR240 1.8Khz
Transmitting Sound Pressure Level	115dB min.
at 25.0Khz; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-60dB min.
at 25.0Khz 0dB = 1 volt/μbar	
Capacitance at 1Khz	±20% 2400 pF
Max. Driving Voltage (cont.)	20Vrms
Total Beam Angle	-6dB 45° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

All specification taken typical at 25°C
 Closer frequency tolerance can be supplied upon request.

Model available:

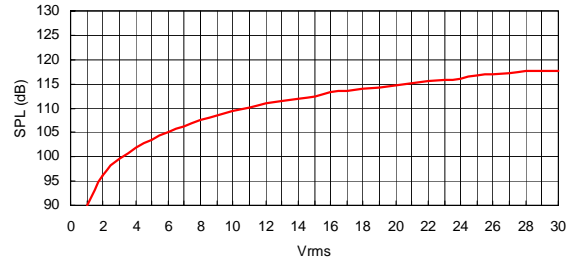
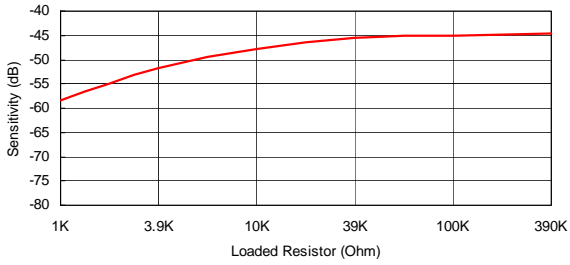
1	250ST/R240	Aluminum Housing
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250SR240 Receiver

250ST240 Transmitter

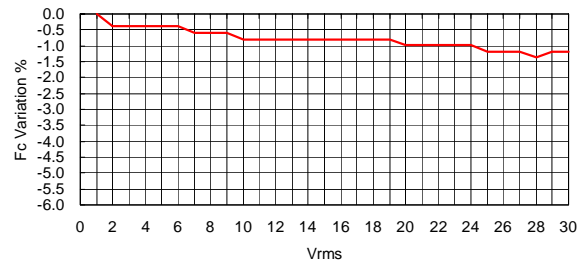
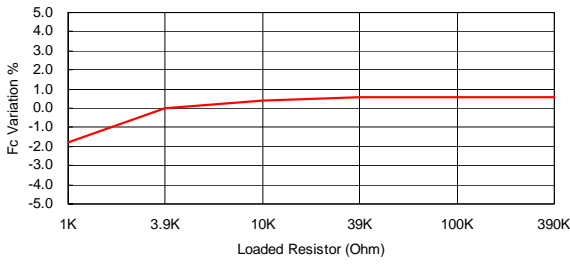
Sensitivity Variation vs. Loaded Resistor

SPL Variation vs. Driving Voltage



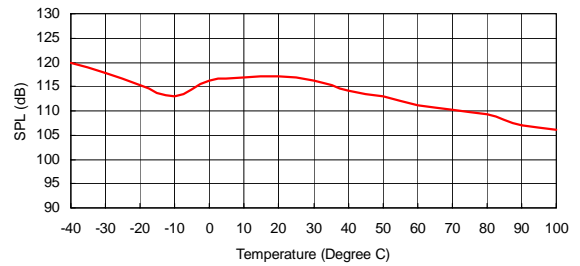
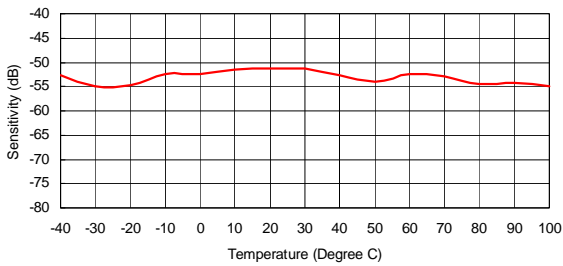
Center Frequency Shift vs. Loaded Resistor

Center Frequency Shift vs. Driving Voltage



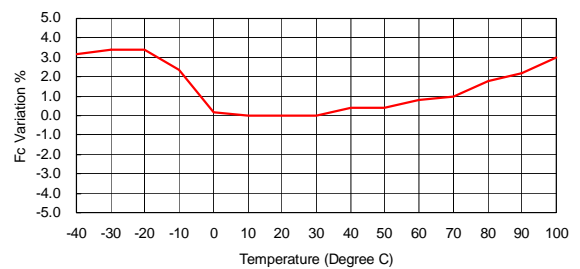
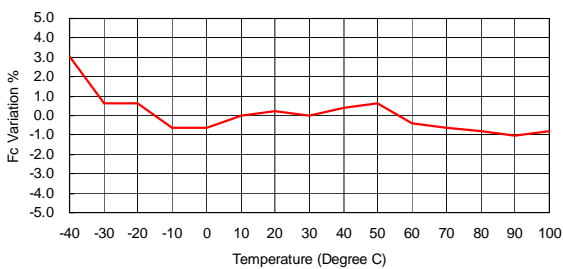
Sensitivity Variation vs. Temperature

SPL Variation vs. Temperature



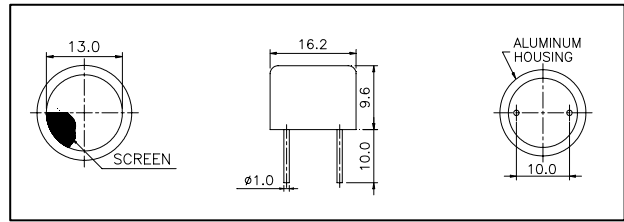
Center Frequency Shift vs. Temperature

Center Frequency Shift vs. Temperature





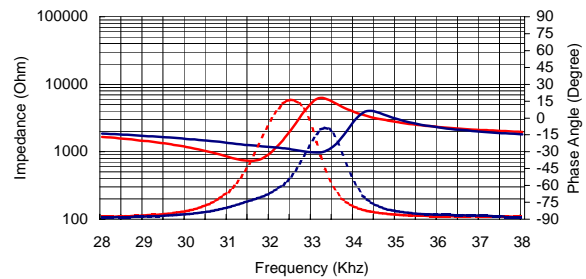
Dimensions: dimensions are in mm



Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level

328SR160 Impedance ————
 328SR160 Phase
 328ST160 Impedance ————
 328ST160 Phase
 328ST160 Phase

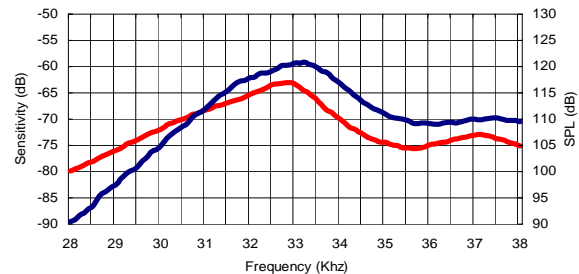


Specification

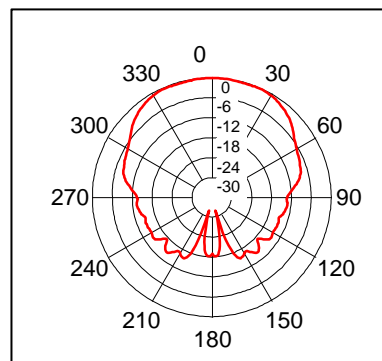
328ST160	Transmitter
328SR160	Receiver
Center Frequency	32.8±1.0Khz
Bandwidth (-6dB)	328ST160 2.5Khz
	328SR160 2.5Khz
Transmitting Sound Pressure Level	115dB min.
at 32.8Khz; 0dB re 0.0002µbar per 10Vrms at 30cm	
Receiving Sensitivity	-67dB min.
at 32.8Khz 0dB = 1 volt/µbar	
Capacitance at 1Khz	±20% 2400 pF
Max. Driving Voltage (cont.)	20Vrms
Total Beam Angle	-6dB 100° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm



Beam Angle: Tested at 32.8Khz frequency



All specification taken typical at 25°C
 Closer frequency tolerance can be supplied upon request.

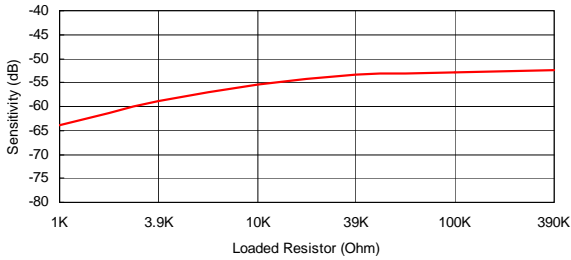
Model available:

1	328ST/R160	Aluminum Housing
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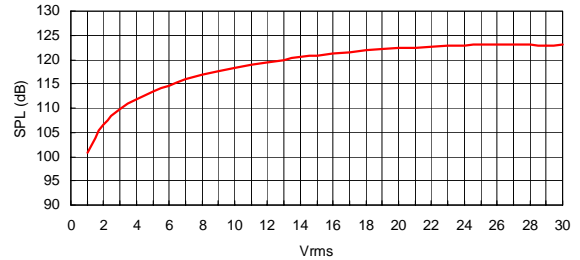
328SR160 Receiver

328ST160 Transmitter

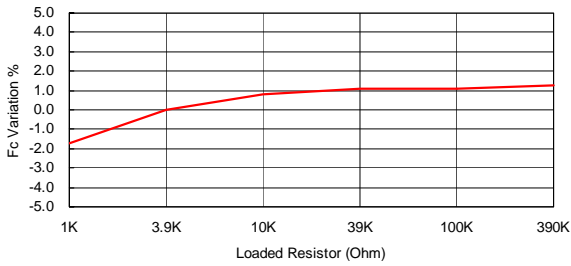
Sensitivity Variation vs. Loaded Resistor



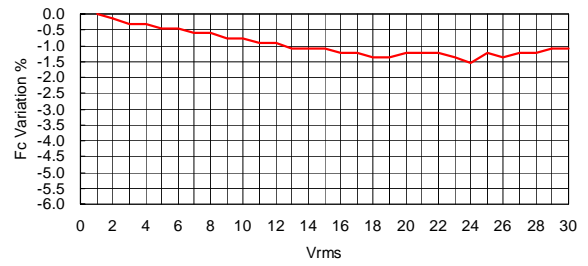
SPL Variation vs. Driving Voltage



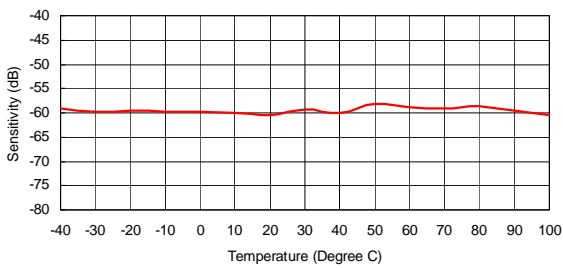
Center Frequency Shift vs. Loaded Resistor



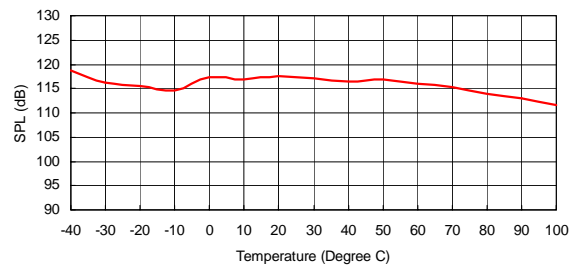
Center Frequency Shift vs. Driving Voltage



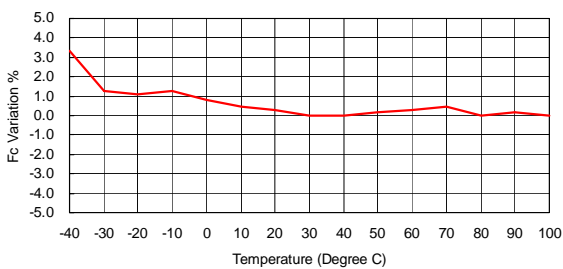
Sensitivity Variation vs. Temperature



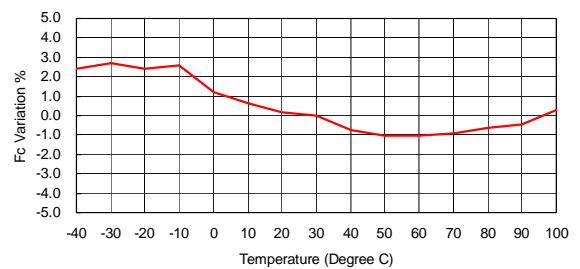
SPL Variation vs. Temperature



Center Frequency Shift vs. Temperature

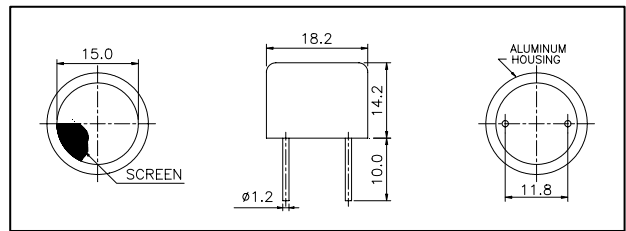


Center Frequency Shift vs. Temperature





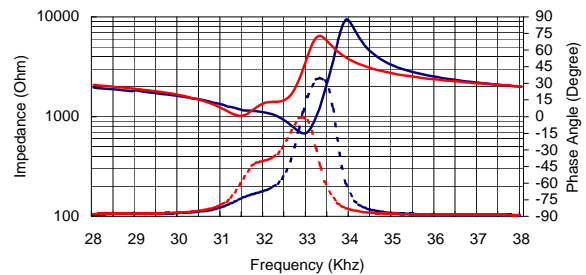
Dimensions: dimensions are in mm



Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level

328SR180 Impedance —————
 328SR180 Phase
 328ST180 Impedance —————
 328ST180 Phase

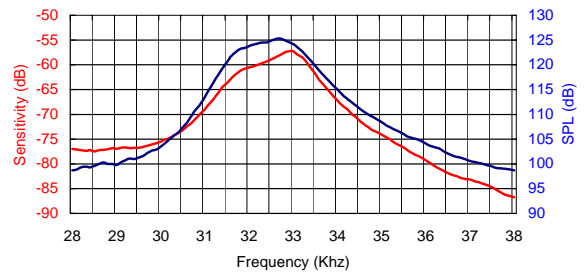


Specification

328ST180	Transmitter
328SR180	Receiver
Center Frequency	32.8±1.0Khz
Bandwidth (-6dB)	328ST180 2Khz
	328SR180 2Khz
Transmitting Sound Pressure Level	117dB min.
at 32.8Khz; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-64dB min.
at 32.8Khz 0dB = 1 volt/μbar	
Capacitance at 1Khz	±20% 2400 pF
Max. Driving Voltage (cont.)	20Vrms
Total Beam Angle	-6dB 45° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm

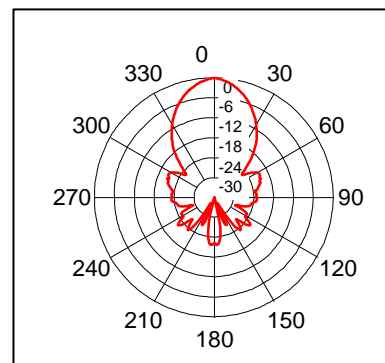


All specification taken typical at 25°C
 Closer frequency tolerance can be supplied upon request.

Model available:

1	328ST/R180	Aluminum Housing
2	328ST/R18B	Black Al. Housing

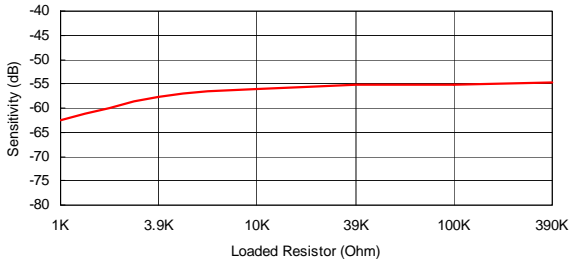
Beam Angle: Tested at 32.8Khz frequency



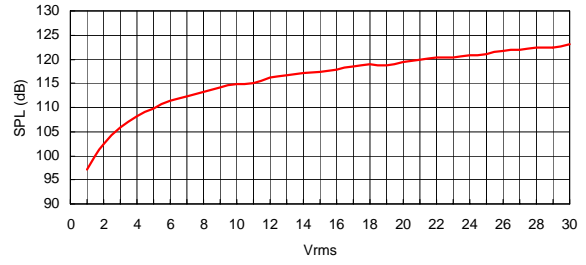
328SR180 Receiver

328ST180 Transmitter

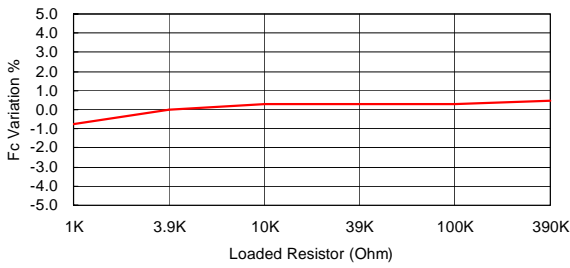
Sensitivity Variation vs. Loaded Resistor



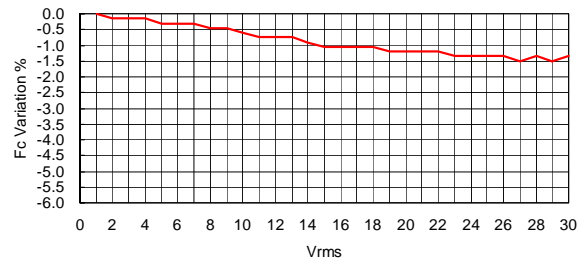
SPL Variation vs. Driving Voltage



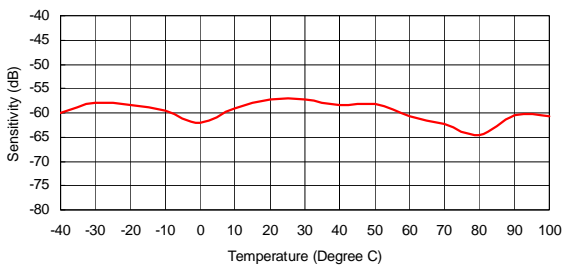
Center Frequency Shift vs. Loaded Resistor



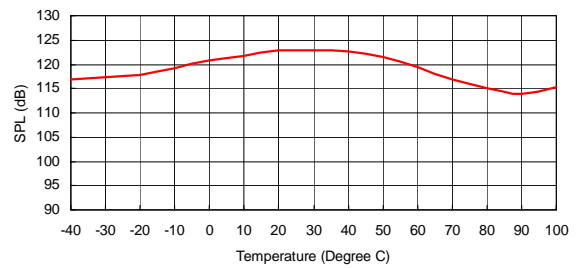
Center Frequency Shift vs. Driving Voltage



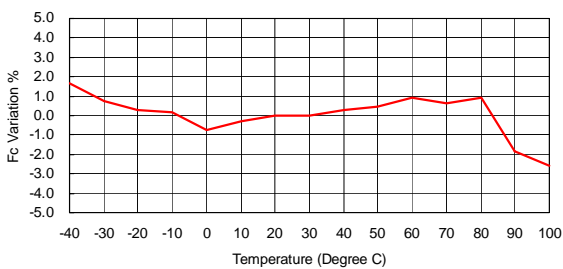
Sensitivity Variation vs. Temperature



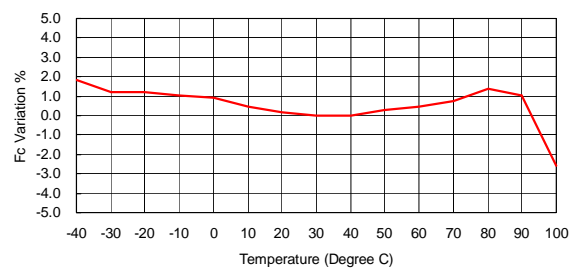
SPL Variation vs. Temperature



Center Frequency Shift vs. Temperature

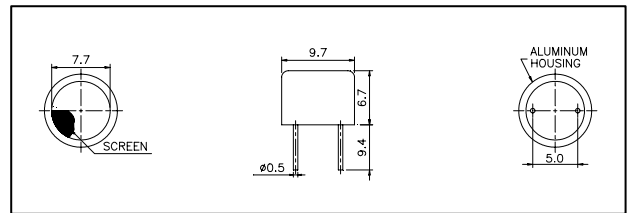


Center Frequency Shift vs. Temperature





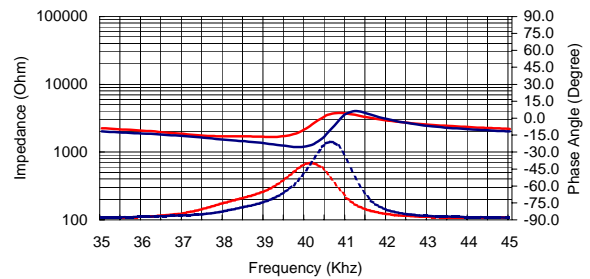
Dimensions: Dimensions are in mm



Impedance/Phase Angle vs. Frequency

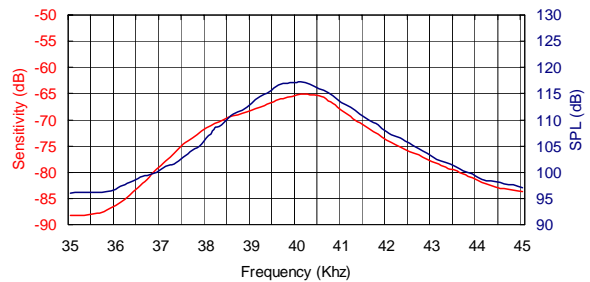
Tested under 1Vrms Oscillation Level

400SR100 Impedance ————
 400SR100 Phase
 400ST100 Impedance ————
 400ST100 Phase
 400ST100 Phase

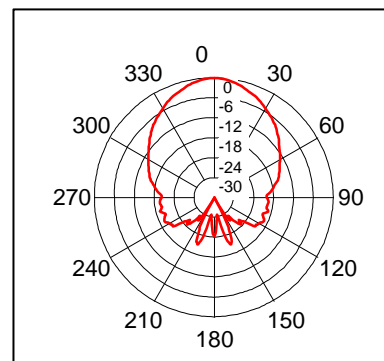


Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm



Beam Angle: Tested at 40.0Khz frequency



Specification

400ST100	Transmitter
400SR100	Receiver
Center Frequency	40.0±1.0Khz
Bandwidth (-6dB)	400ST100 2.5Khz 400SR100 3.0Khz
Transmitting Sound Pressure Level	112dB min.
at 40.0Khz; 0dB re 0.0002µbar per 10Vrms at 30cm	
Receiving Sensitivity	-70dB min.
at 40.0Khz 0dB = 1 volt/µbar	
Capacitance at 1Khz	±20% 1900 pF
Max. Driving Voltage (cont.)	10Vrms
Total Beam Angle	-6dB 72° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

All specification taken typical at 25°C
 Closer frequency tolerance can be supplied upon request.

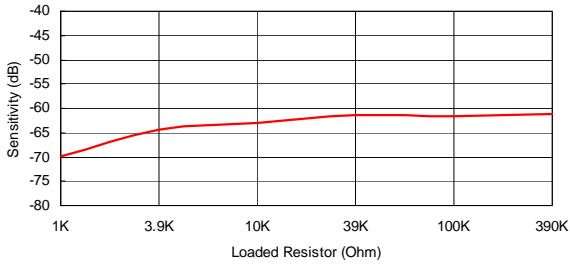
Model available:

1	400ST/R100	Aluminum Housing
2	400ST/R10B	Black Al. Housing
3	400ST/R10P	Plastic Housing

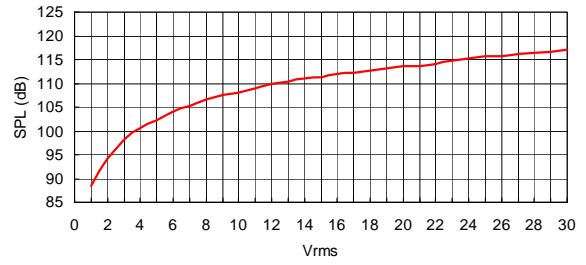
400SR100 Receiver

400ST100 Transmitter

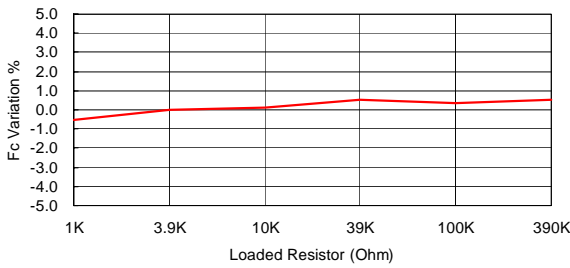
Sensitivity Variation vs. Loaded Resistor



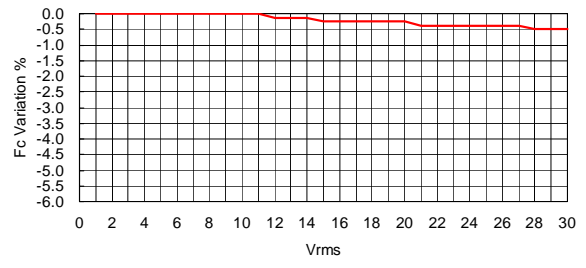
SPL Variation vs. Driving Voltage



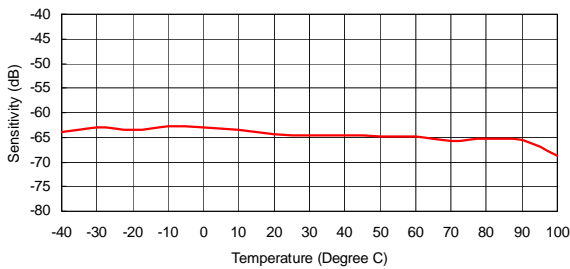
Center Frequency Shift vs. Loaded Resistor



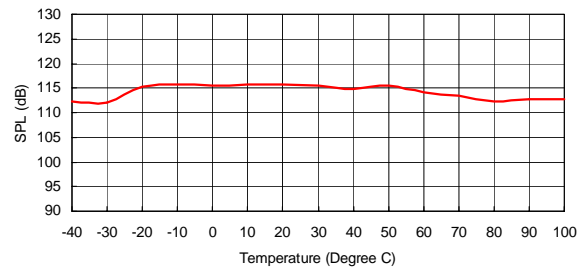
Center Frequency Shift vs. Driving Voltage



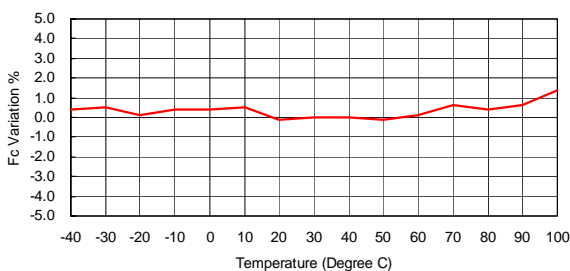
Sensitivity Variation vs. Temperature



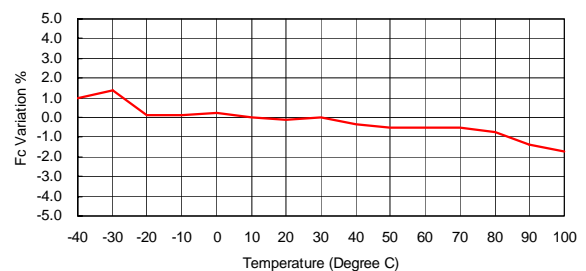
SPL Variation vs. Temperature



Center Frequency Shift vs. Temperature

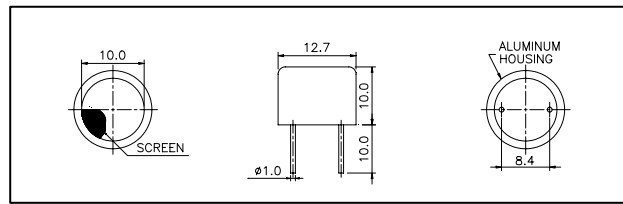


Center Frequency Shift vs. Temperature





Dimensions: dimensions are in mm



Specification

400ST120	Transmitter
400SR120	Receiver
Center Frequency	40.0±1.0Khz
Bandwidth (-6dB)	400ST120 2.0Khz 400SR120 2.0Khz
Transmitting Sound Pressure Level	115dB min.
at 40.0Khz; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-67dB min.
at 40.0Khz 0dB = 1 volt/μbar	
Capacitance at 1Khz	±20% 2400 pF
Max. Driving Voltage (cont.)	20Vrms
Total Beam Angle	-6dB 85° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

All specification taken typical at 25°C
Closer frequency tolerance can be supplied upon request.

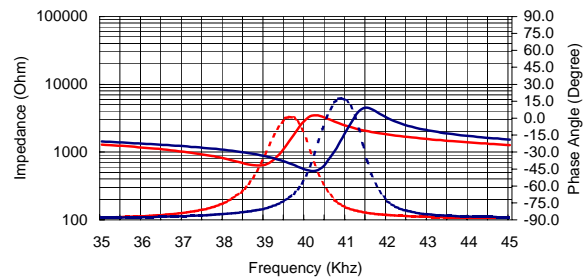
Model available:

1	400ST/R120	Aluminum Housing
2	400ST/R12B	Black Al. Housing

Impedance/Phase Angle vs. Frequency

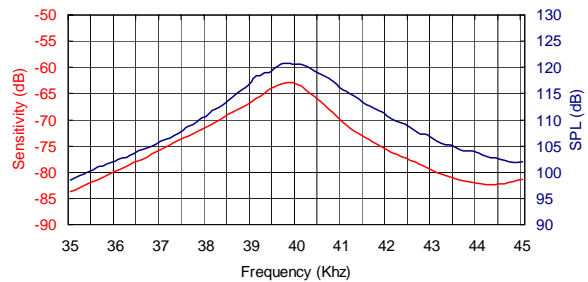
Tested under 1Vrms Oscillation Level

- 400SR120 Impedance —————
- 400SR120 Phase - - - - -
- 400ST120 Impedance —————
- 400ST120 Phase - - - - -

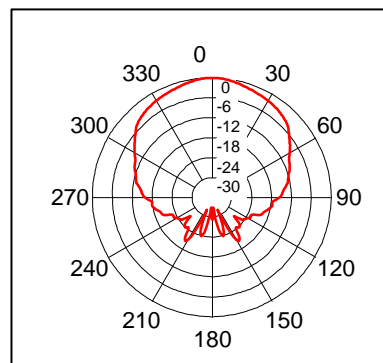


Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm



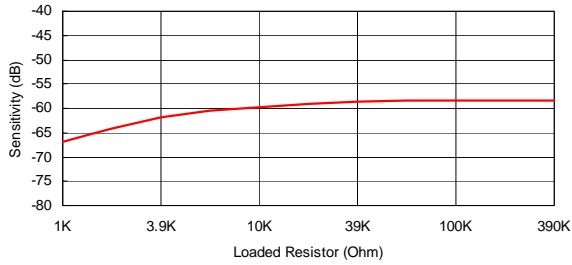
Beam Angle: Tested at 40.0Khz frequency



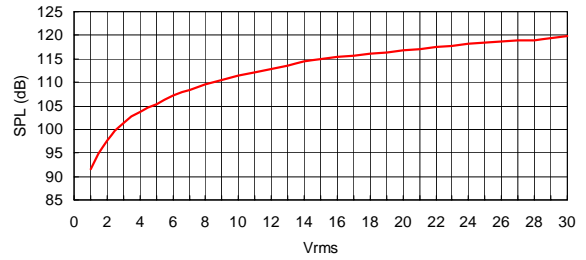
400SR120 Receiver

400ST120 Transmitter

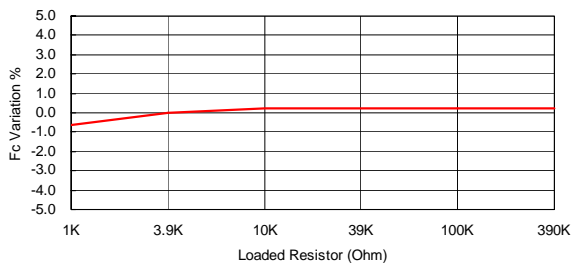
Sensitivity Variation vs. Loaded Resistor



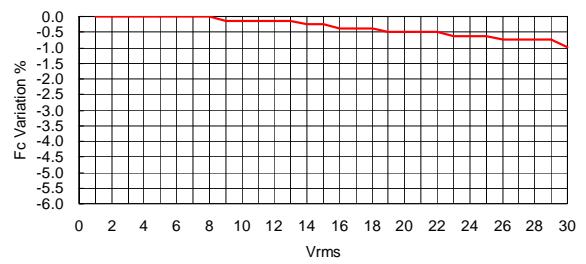
SPL Variation vs. Driving Voltage



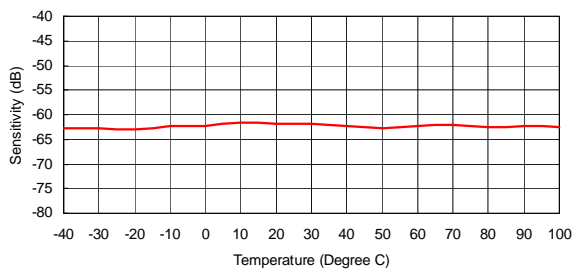
Center Frequency Shift vs. Loaded Resistor



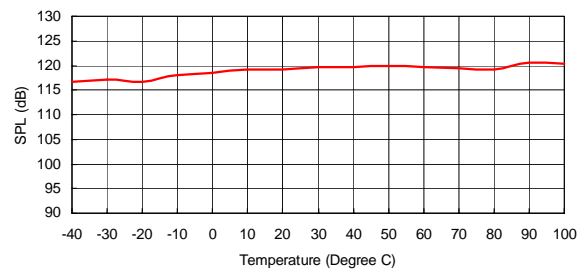
Center Frequency Shift vs. Driving Voltage



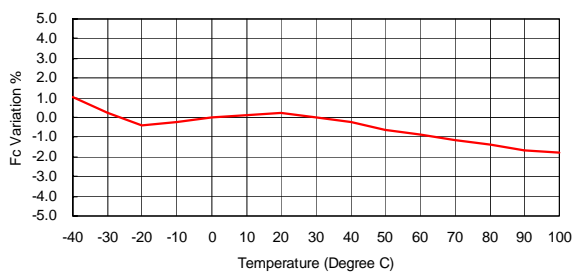
Sensitivity Variation vs. Temperature



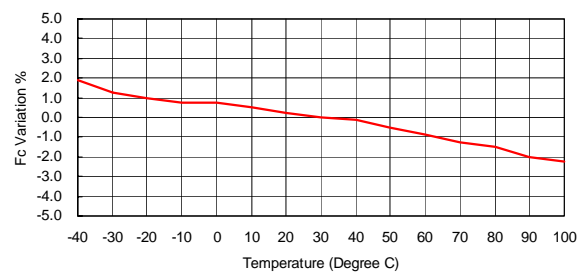
SPL Variation vs. Temperature



Center Frequency Shift vs. Temperature

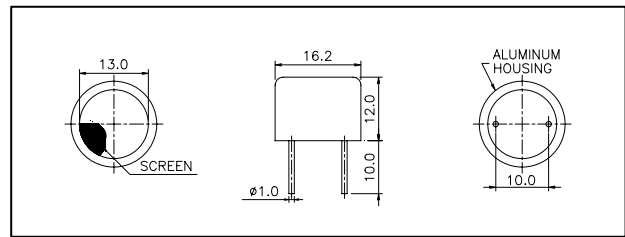


Center Frequency Shift vs. Temperature





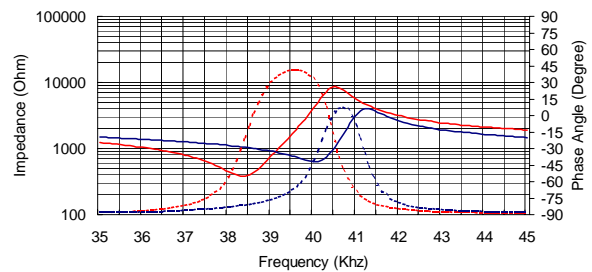
Dimensions: dimensions are in mm



Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level

- 400SR160 Impedance ————— (Red solid line)
- 400SR160 Phase ————— (Red dotted line)
- 400ST160 Impedance ————— (Blue solid line)
- 400ST160 Phase ————— (Blue dotted line)

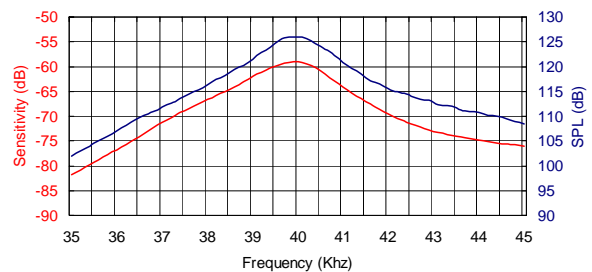


Specification

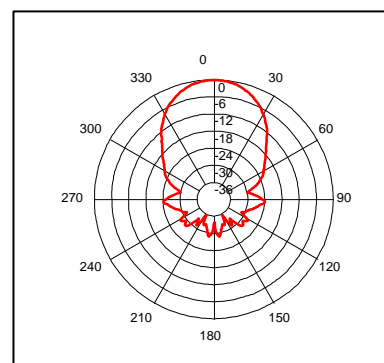
400ST160	Transmitter
400SR160	Receiver
Center Frequency	40.0±1.0Khz
Bandwidth (-6dB)	400ST160 2.0Khz 400SR160 2.5Khz
Transmitting Sound Pressure Level	120dB min.
at 40.0Khz; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-65dB min.
at 40.0Khz 0dB = 1 volt/μbar	
Capacitance at 1Khz	±20% 2400 pF
Max. Driving Voltage (cont.)	20Vrms
Total Beam Angle	-6dB 55° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

Sensitivity/Sound Pressure Level

Tested under 10Vrms @ 30cm



Beam Angle: Tested at 40.0Khz frequency



All specification taken typical at 25°C
Closer frequency tolerance can be supplied upon request.

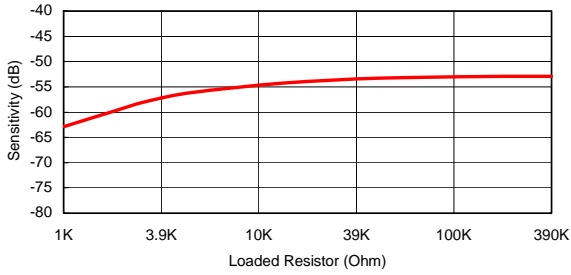
Models available:

1	400ST/R160	Aluminum Housing
2	400ST/R16B	Black Al. Housing
3	400ST/R16P	Plastic Housing

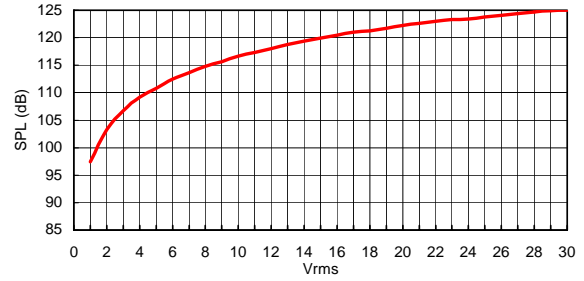
400SR160 Receiver

400ST160 Transmitter

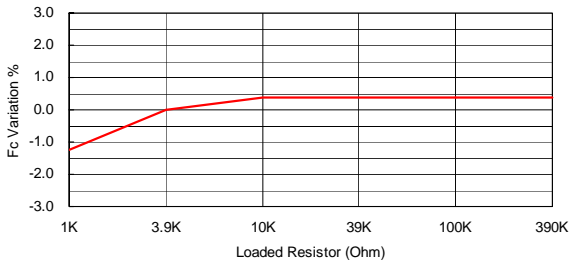
Sensitivity Variation vs. Loaded Resistor



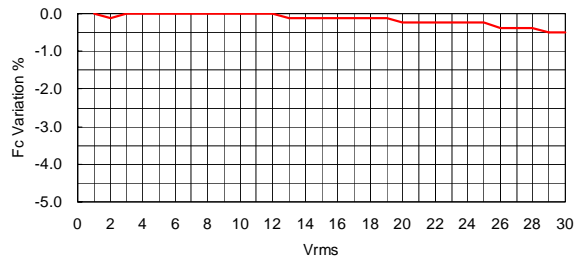
SPL Variation vs. Driving Voltage



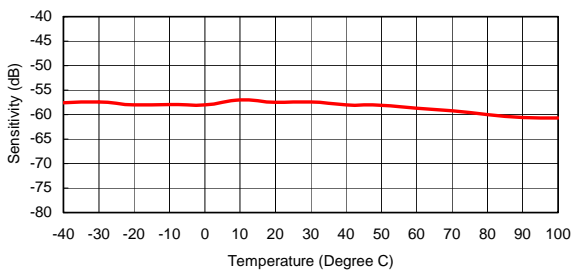
Center Frequency Shift vs. Loaded Resistor



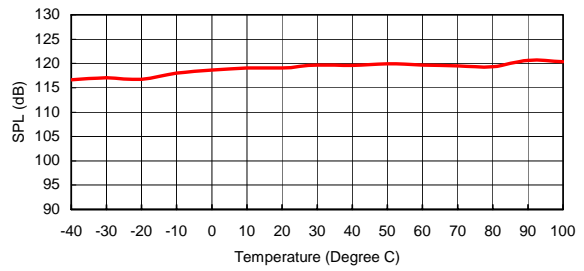
Center Frequency Shift vs. Driving Voltage



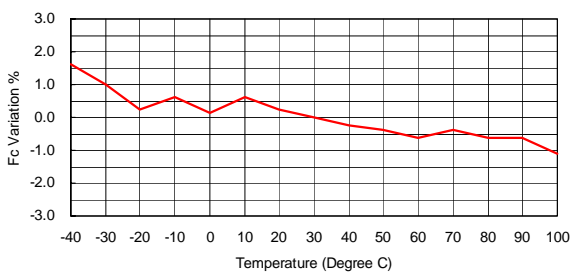
Sensitivity Variation vs. Temperature



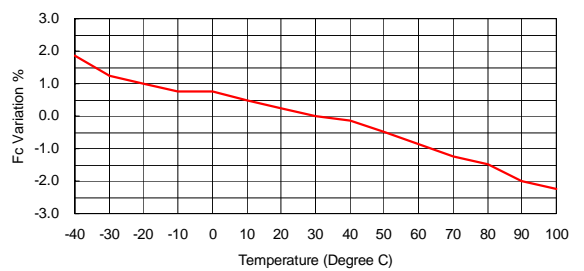
SPL Variation vs. Temperature



Center Frequency Shift vs. Temperature

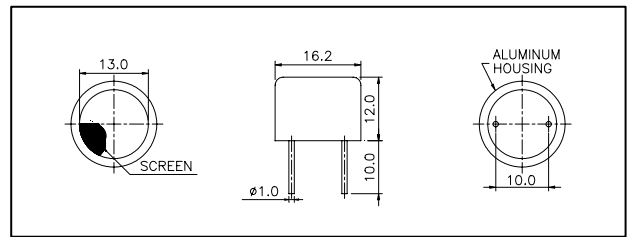


Center Frequency Shift vs. Temperature

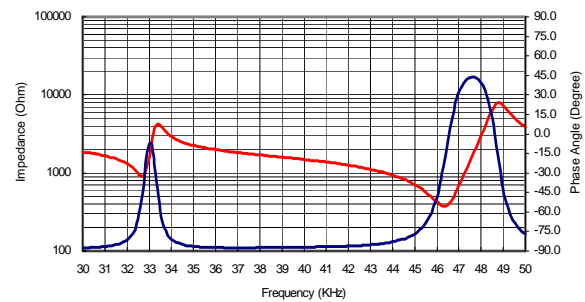




Dimensions: dimensions are in mm



Impedance/Phase Angle vs. Frequency

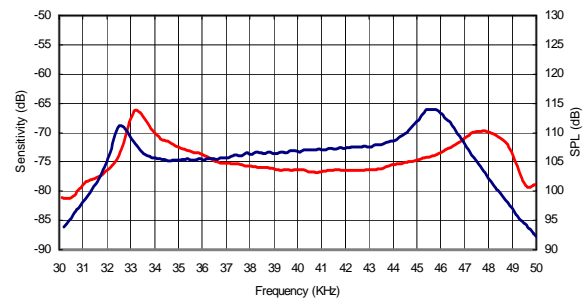


Specification

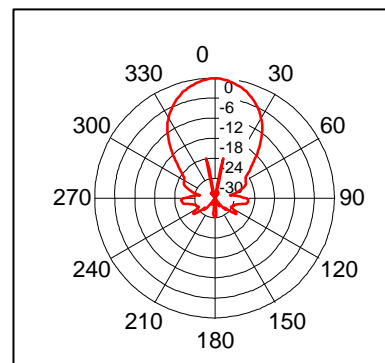
400WB160	Transceiver
Center Frequency	40.0±1.0Khz
Bandwidth (-6dB) Transmitter	10Khz
Bandwidth (-6dB) Receiver	10Khz
Transmitting Sound Pressure Level	105dB min.
at 40.0Khz; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-78dB min.
at 40.0Khz 0dB = 1 volt/μbar	
Nominal Impedance (Trans.)	800 Ohm
Capacitance at 1Khz ±20%	2500 pF
Max. Driving Voltage (cont.)	20Vrms
Total Beam Angle -6dB	50° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm



Beam Angle: Tested at 40.0Khz frequency



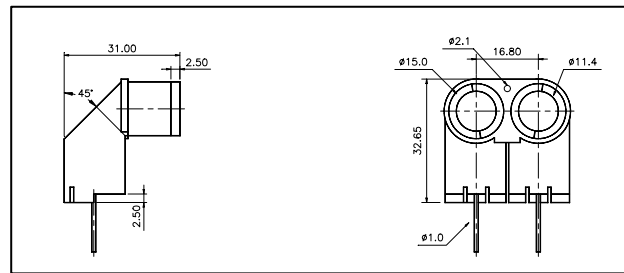
All specification taken typical at 25°C
Closer frequency tolerance can be supplied upon request.

Model available

400WB160	Aluminum Housing
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Dimensions: dimensions are in mm



Specification

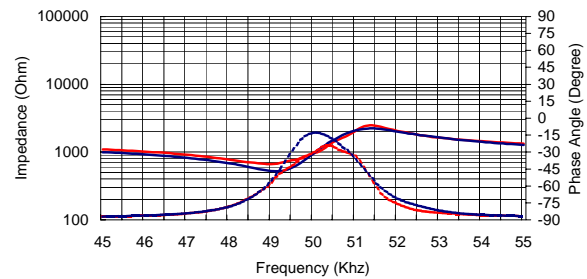
500MB120	Dual Transducer
Center Frequency	50.0±1.0Khz
Bandwidth (-6dB)	3Khz
Transmitting Sound Pressure Level at 50.0Khz; 0dB re 0.0002μbar per 10Vrms at 30cm	113dB min.
Receiving Sensitivity at 50.0Khz 0dB = 1 volt/μbar	-67dB min.
Sensitivity/Cross Talk Ratio	15 dB
Nominal Impedance (Trans.)	800 Ohm
Capacitance at 1Khz ±20%	2400 pF
Max. Driving Voltage (cont.)	20Vrms
Total Beam Angle	-6dB 30° typical
Operation Temperature	-30 to 70°C
Storage Temperature	-40 to 80°C

All specification taken typical at 25°C
Closer frequency tolerance can be supplied upon request.

Impedance/Phase Angle vs. Frequency

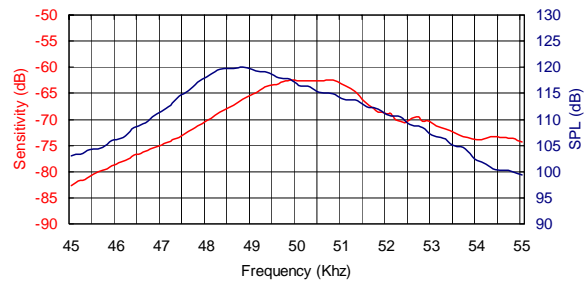
Tested under 1Vrms Oscillation Level

Receiver Impedance —————
Receiver Phase
Transmitter Impedance —————
Transmitter Phase

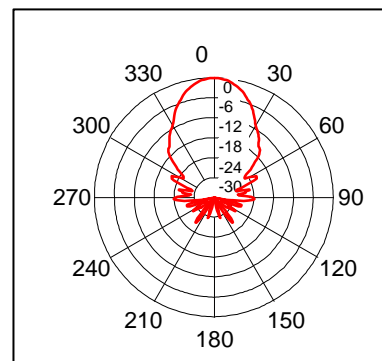


Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm

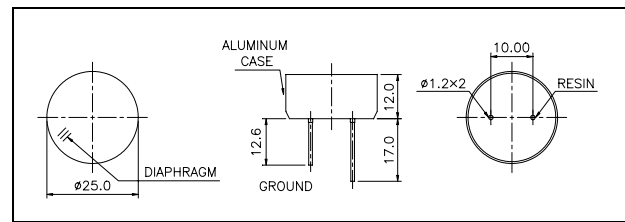


Beam Angle: Tested at 50.0Khz frequency





Dimensions: dimensions are in mm



Specification

328ET250	Transmitter
328ER250	Receiver
Center Frequency	32.8±1.0Khz
Bandwidth (-6dB)	328ET250 1.0Khz 328ER250 1.0Khz
Transmitting Sound Pressure Level	113dB min. (107dB min. SUS 316)
at 32.8Khz; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-67dB min. (-70dB min. SUS 316)
at 32.8Khz 0dB = 1 volt/μbar	
Capacitance at 1Khz	±20% 2400 pF
Max. Driving Voltage (cont.)	20Vrms
Total Beam Angle	-6dB 33° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

All specification taken typical at 25°C
Closer frequency tolerance can be supplied upon request.

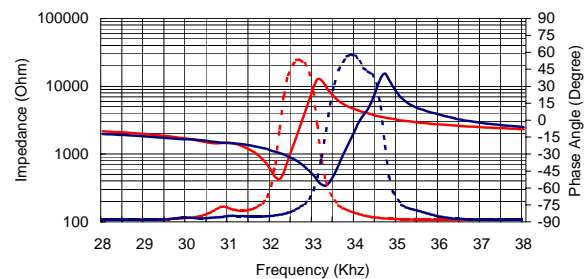
Model available:

1	328ET/R250	Aluminum Housing
2	328ET/R25B	Black Alum. Housing
3	328ET/R25S	SUS 316 Housing

Impedance/Phase Angle vs. Frequency

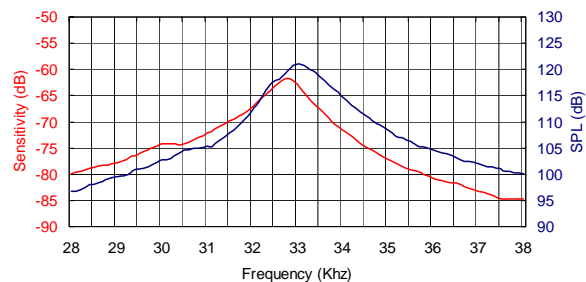
Tested under 1Vrms Oscillation Level

328ER250 Impedance ————
 328ER250 Phase
 328ET250 Impedance ————
 328ET250 Phase
 (Legend: Red solid line for 328ER250 Impedance, Red dotted line for 328ER250 Phase, Blue solid line for 328ET250 Impedance, Blue dotted line for 328ET250 Phase)

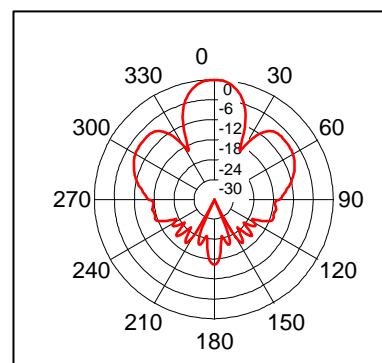


Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm



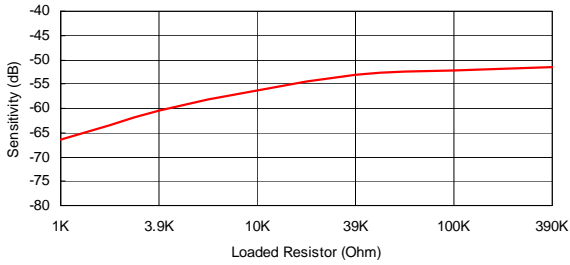
Beam Angle: Tested at 32.8Khz frequency



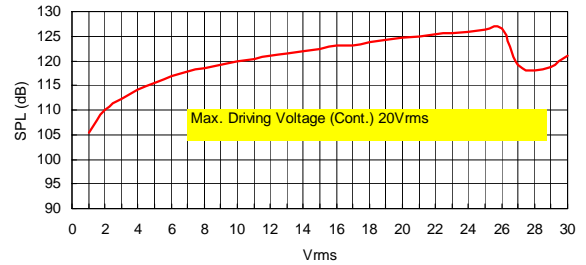
328ER250 Receiver

328ET250 Transmitter

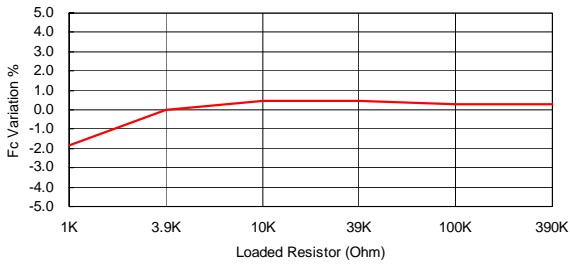
Sensitivity Variation vs. Loaded Resistor



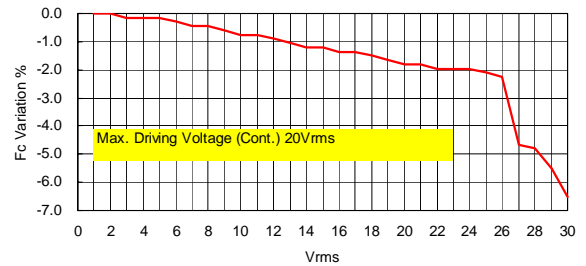
SPL Variation vs. Driving Voltage



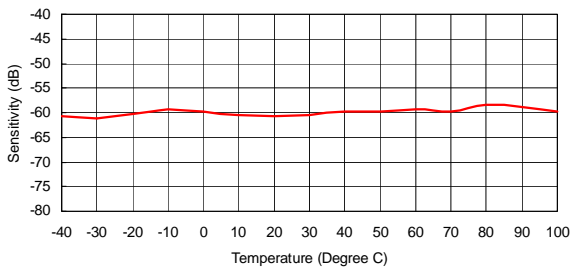
Center Frequency Shift vs. Loaded Resistor



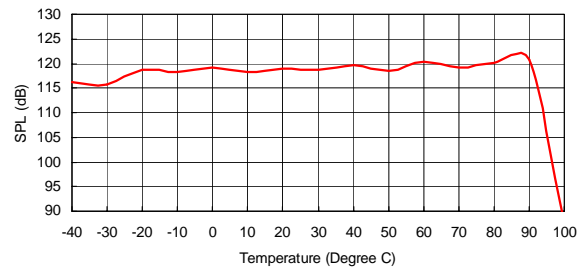
Center Frequency Shift vs. Driving Voltage



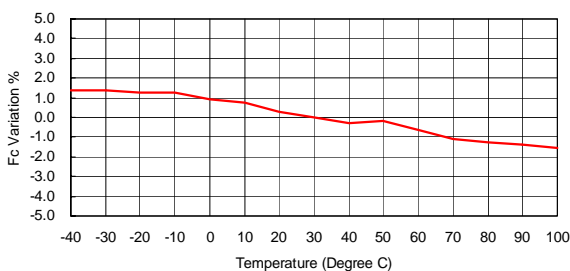
Sensitivity Variation vs. Temperature



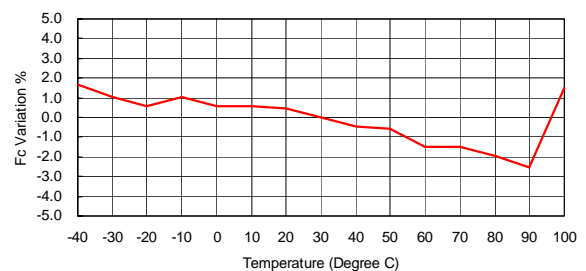
SPL Variation vs. Temperature



Center Frequency Shift vs. Temperature

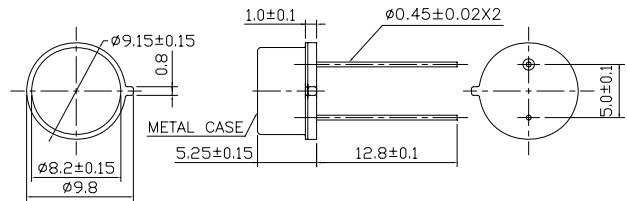


Center Frequency Shift vs. Temperature





Dimensions: dimensions are in mm



Specification

400ET080	Transmitter
400ER080	Receiver
Center Frequency	40.0±3.0Khz
Bandwidth (-6dB)	400ET080 1.5Khz 400ER080 2.0Khz
Transmitting Sound Pressure Level	100dB min.
at 40.0Khz; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-80dB min.
at 40.0Khz 0dB = 1 volt/μbar	
Capacitance at 1Khz	±20% 1700 pF
Max. Driving Voltage (cont.)	15Vrms
Total Beam Angle	-6dB 125° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

All specification taken typical at 25°C
Closer frequency tolerance can be supplied upon request.

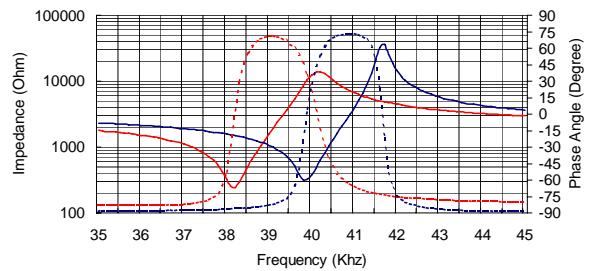
Model available:

1	400ET/R080	Plated Metal Housing
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Impedance/Phase Angle vs. Frequency

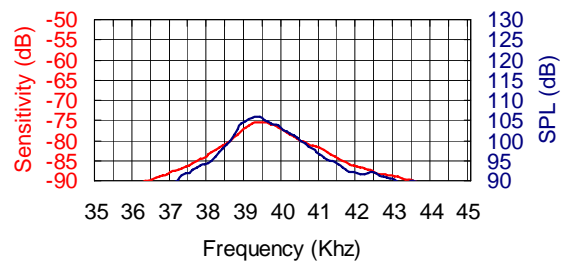
Tested under 1Vrms Oscillation Level

- 400ER080 Impedance —
- 400ER080 Phase - - - - -
- 400ET080 Impedance —
- 400ET080 Phase - - - - -

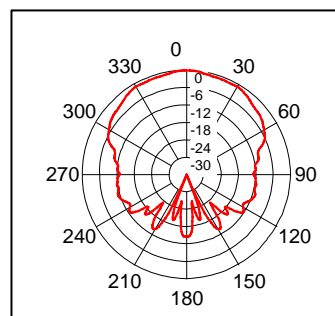


Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm



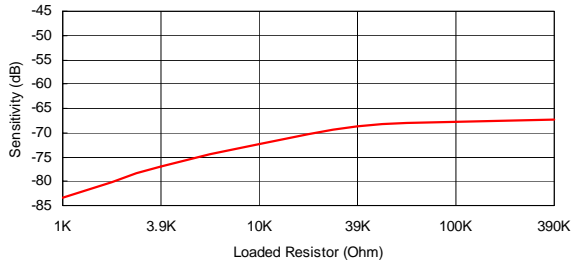
Beam Angle: Tested at 40.0Khz frequency



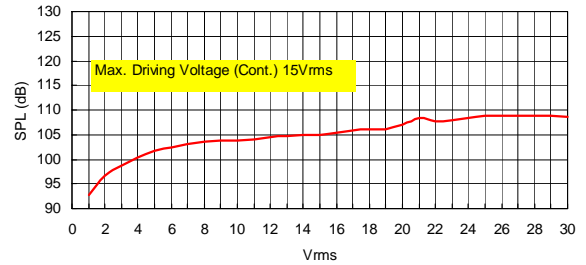
400ER080 Receiver

400ET080 Transmitter

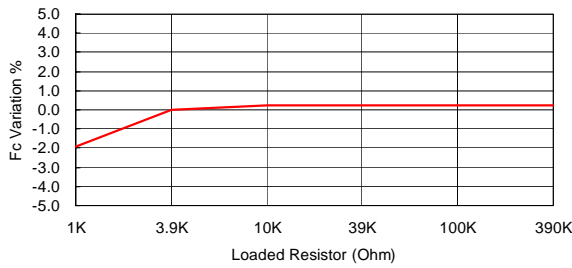
Sensitivity Variation vs. Loaded Resistor



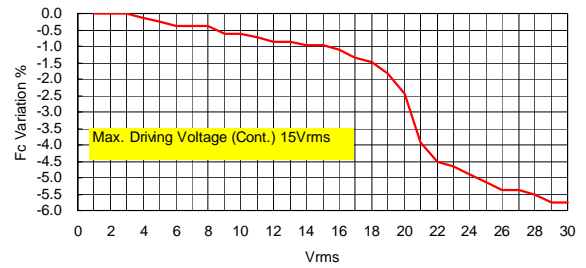
SPL Variation vs. Driving Voltage



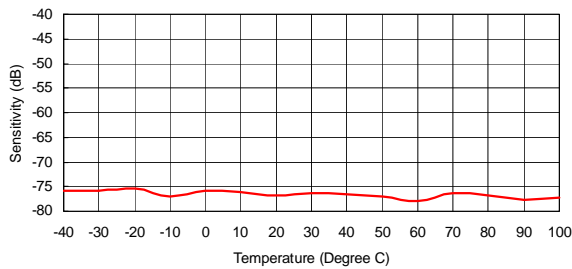
Center Frequency Shift vs. Loaded Resistor



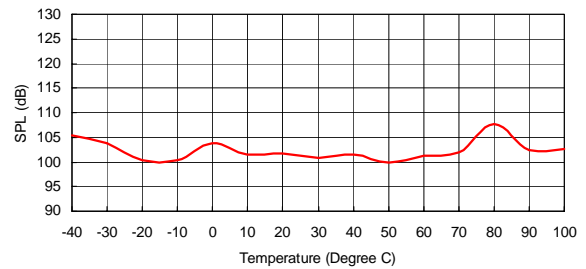
Center Frequency Shift vs. Driving Voltage



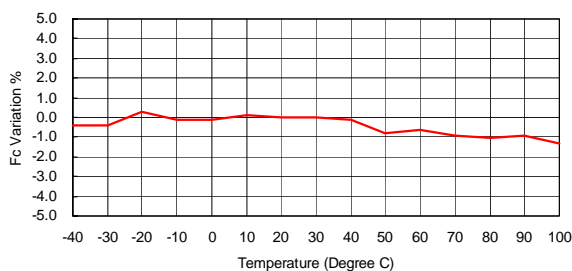
Sensitivity Variation vs. Temperature



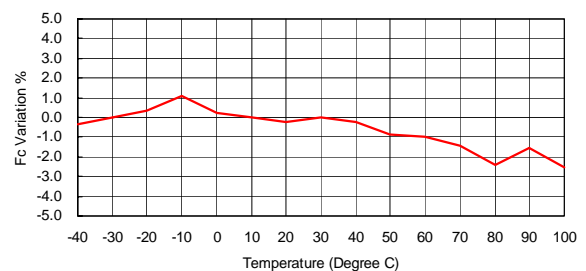
SPL Variation vs. Temperature



Center Frequency Shift vs. Temperature

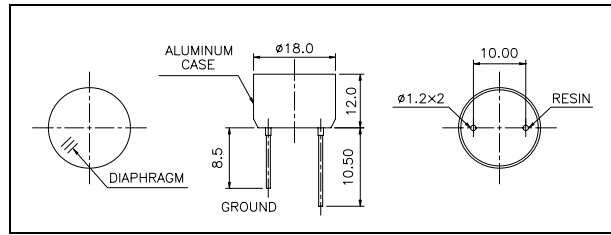


Center Frequency Shift vs. Temperature





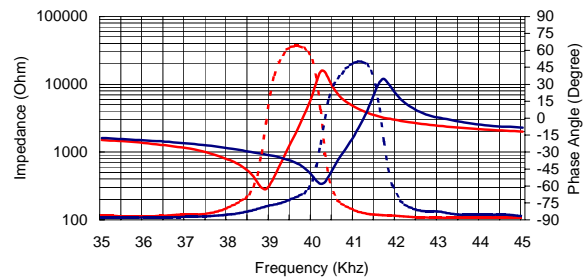
Dimensions: dimensions are in mm



Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level

400ER180 Impedance ————
 400ER180 Phase
 400ET180 Impedance ————
 400ET180 Phase
 (Note: The legend in the image uses red and blue lines for the two models, though the text labels are black.)

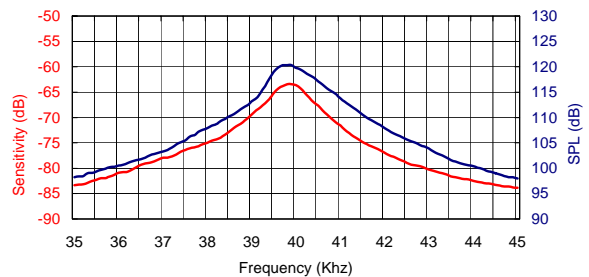


Specification

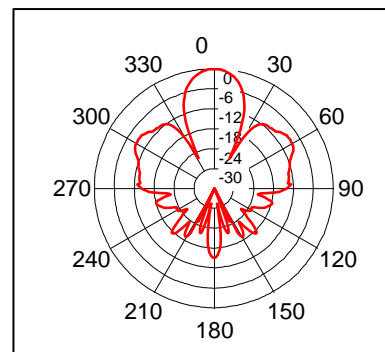
400ET180	Transmitter
400ER180	Receiver
Center Frequency	40.0±1.0Khz
Bandwidth (-6dB)	400ET180 1.5Khz 400ER180 1.5Khz
Transmitting Sound Pressure Level	115dB min.
at 40.0Khz; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-70dB min.
at 40.0Khz 0dB = 1 volt/μbar	
Capacitance at 1Khz	±20% 2400 pF
Max. Driving Voltage (cont.)	15Vrms
Total Beam Angle	-6dB 30° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm



Beam Angle: Tested at 40.0Khz frequency



All specification taken typical at 25°C
 Closer frequency tolerance can be supplied upon request.

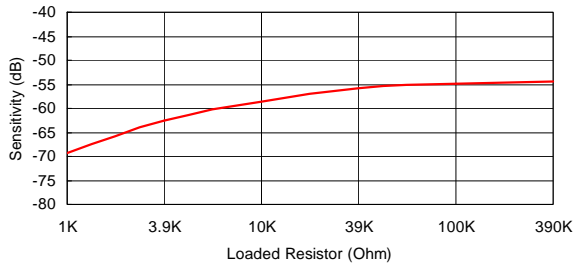
Model available:

1	400ET/R180	Aluminum Housing
2	400ET/R18B	Black Alum. Housing

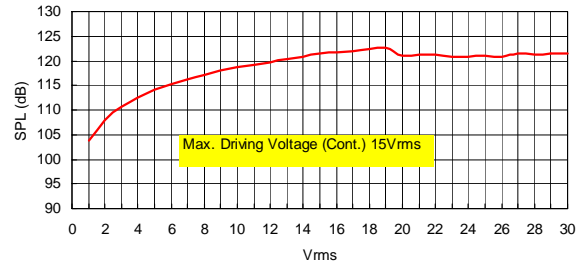
400ER180 Receiver

400ET180 Transmitter

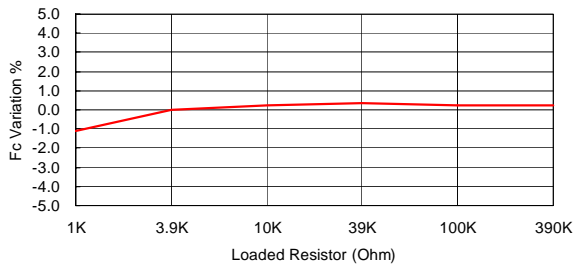
Sensitivity Variation vs. Loaded Resistor



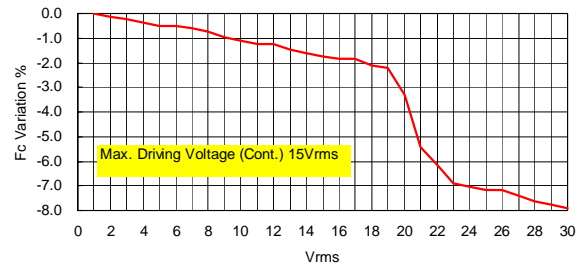
SPL Variation vs. Driving Voltage



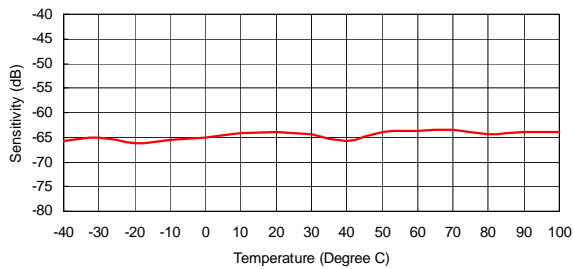
Center Frequency Shift vs. Loaded Resistor



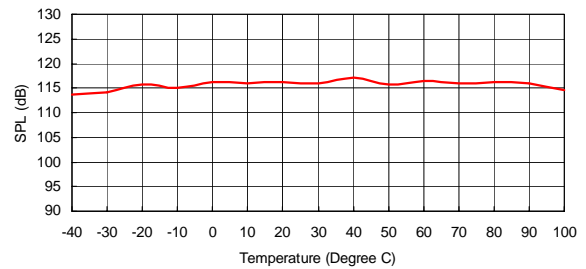
Center Frequency Shift vs. Driving Voltage



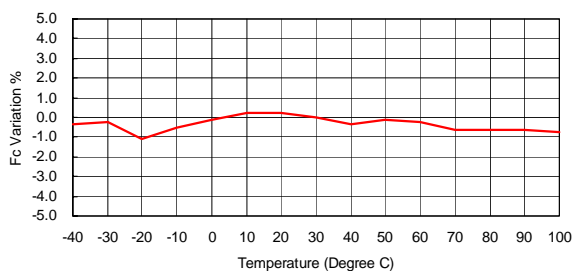
Sensitivity Variation vs. Temperature



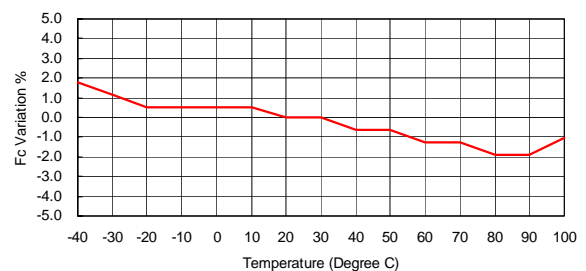
SPL Variation vs. Temperature



Center Frequency Shift vs. Temperature

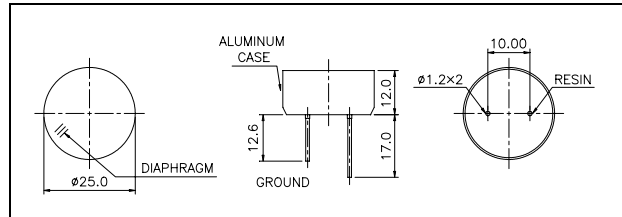


Center Frequency Shift vs. Temperature





Dimensions: dimensions are in mm



Specification

400ET250	Transmitter
400ER250	Receiver
Center Frequency	40.0±1.0Khz
Bandwidth (-6dB)	400ET250 1.0Khz 400ER250 1.0Khz
Transmitting Sound Pressure Level	115dB min. (107 dB min. for SUS316)
at 40.0Khz; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-70dB min. (-72 dB min. for SUS316)
at 40.0Khz 0dB = 1 volt/μbar	
Capacitance at 1Khz	±20% 2400 pF
Max. Driving Voltage (cont.)	20Vrms
Total Beam Angle	-6dB 30° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

All specification taken typical at 25°C
Closer frequency tolerance can be supplied upon request.

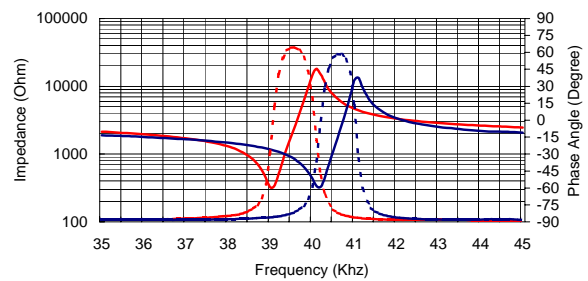
Model available:

1	400ET/R250	Aluminum Housing
2	400ET/R25B	Black Alum. Housing
3	400ET/R25S	SUS 316 Housing

Impedance/Phase Angle vs. Frequency

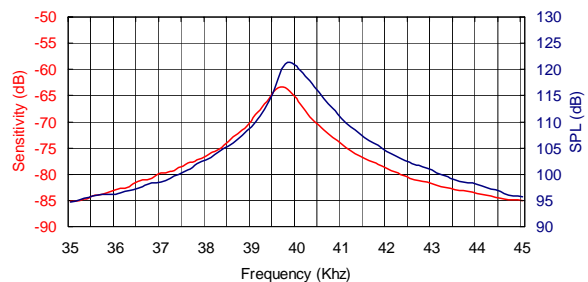
Tested under 1Vrms Oscillation Level

400ER250 Impedance —————
400ER250 Phase
400ET250 Impedance —————
400ET250 Phase



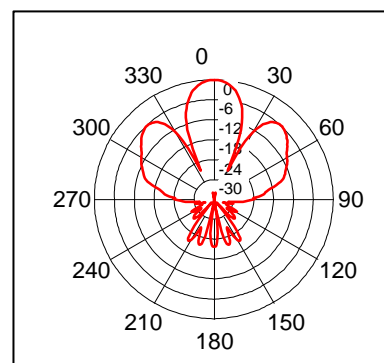
400ET250 Phase

Sensitivity/Sound Pressure Level



Tested under 10Vrms @30cm

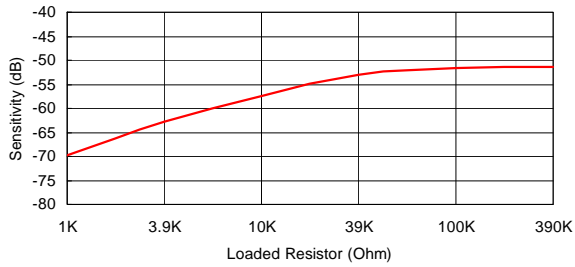
Beam Angle: Tested at 40.0Khz frequency



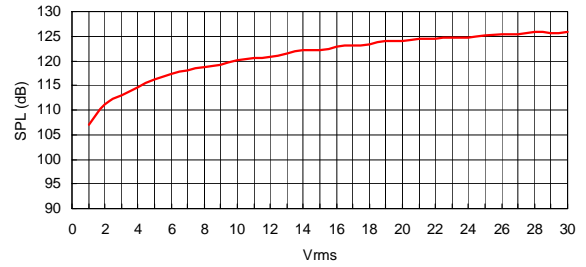
400ER250 Receiver

400ET250 Transmitter

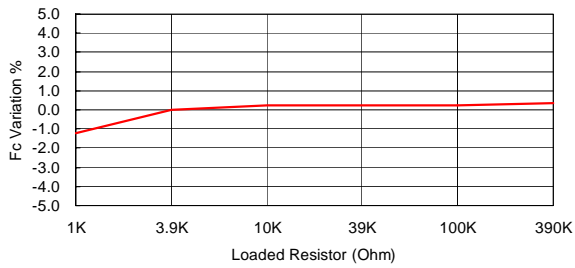
Sensitivity Variation vs. Loaded Resistor



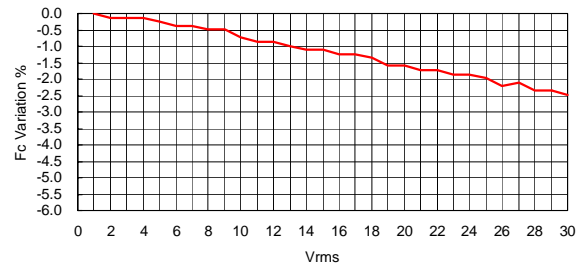
SPL Variation vs. Driving Voltage



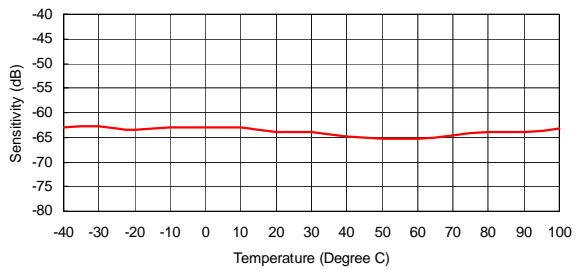
Center Frequency Shift vs. Loaded Resistor



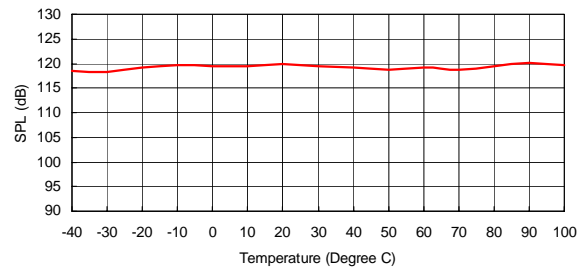
Center Frequency Shift vs. Driving Voltage



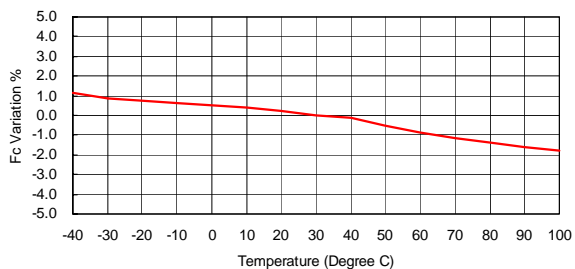
Sensitivity Variation vs. Temperature



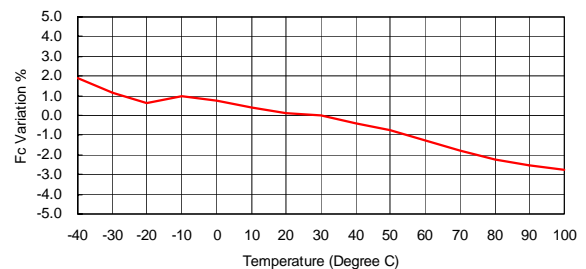
SPL Variation vs. Temperature



Center Frequency Shift vs. Temperature

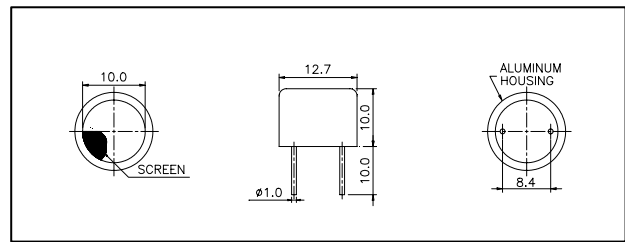


Center Frequency Shift vs. Temperature



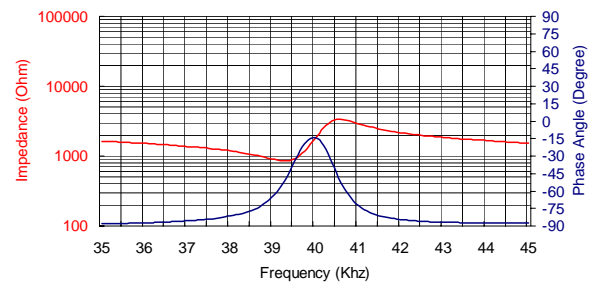


Dimensions: dimensions are in mm



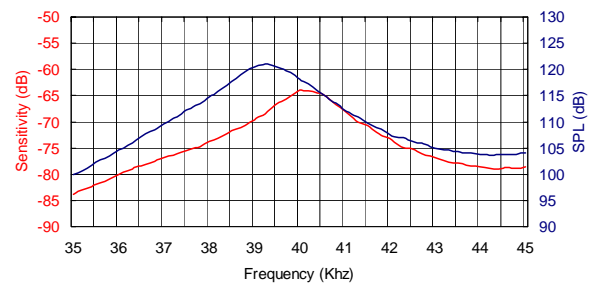
Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level

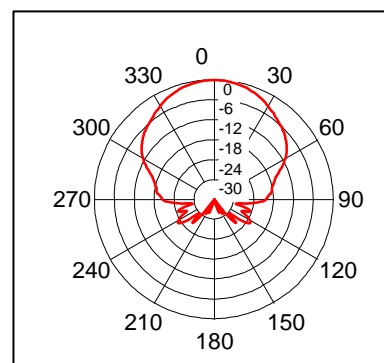


Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm



Beam Angle: Tested at 40.0Khz frequency



Specification

400PT120	Transceiver
Center Frequency	40.0±1.0Khz
Bandwidth (-6dB) 400PT120	2.0Khz
Transmitting Sound Pressure Level	115dB min.
at 40.0Khz; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-68dB min.
at 40.0Khz 0dB = 1 volt/μbar	
Nominal Impedance (Ohm)	1000
Ringig (ms)	1.2 max.
Capacitance at 1Khz ±20%	2400 pF
Max. Driving Voltage (cont.)	20Vrms
Total Beam Angle -6dB	85° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

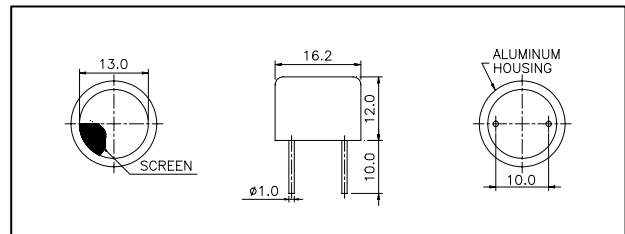
All specification taken typical at 25°C
 Closer frequency tolerance, shorter ringing and wider bandwidth models can be supplied upon request.

Model available:

1	400PT120	Aluminum Housing
2	400PT12B	Black Al. Housing
3	400PT12P	Plastic Housing

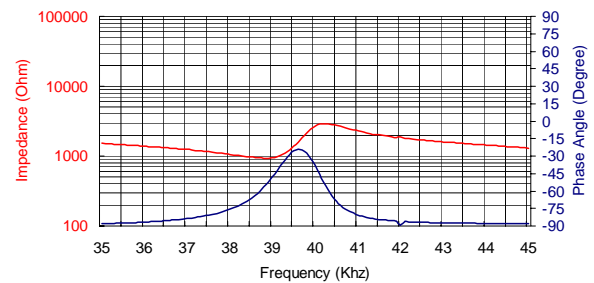


Dimensions: dimensions are in mm



Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level

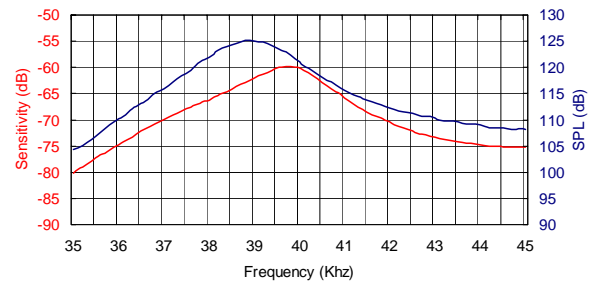


Specification

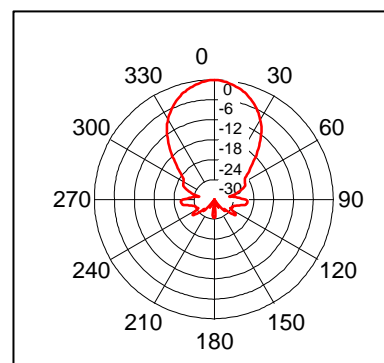
400PT160	Transceiver
Center Frequency	40.0±1.0Khz
Bandwidth (-6dB) 400PT160	2.0Khz
Transmitting Sound Pressure Level	117dB min.
at resonant frequency; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-65dB min.
at resonant frequency 0dB = 1 volt/μbar	
Nominal Impedance (Ohm)	1000
Ringing (ms) max.	1.2 – PT160 1.5 – PT16P
Capacitance at 1Khz ±20%	2400 pF
Max. Driving Voltage (cont.)	20Vrms
Total Beam Angle -6dB	55° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm



Beam Angle: Tested at 40.0Khz frequency



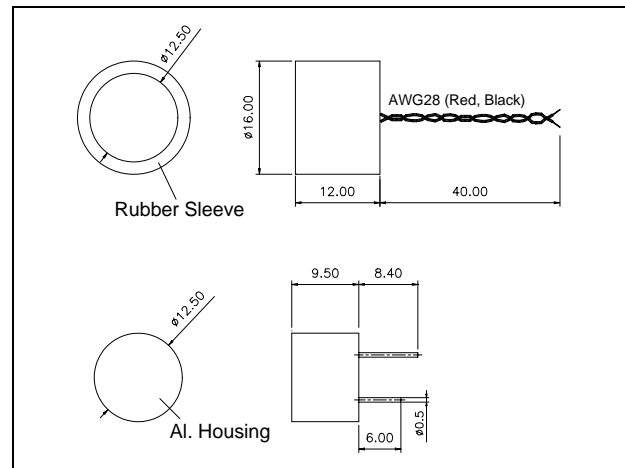
All specification taken typical at 25°C
Closer frequency tolerance, shorter ringing and wider bandwidth models can be supplied upon request.

Model available:

1	400PT160	Aluminum Housing
2	400PT16P	Plastic Housing



Dimensions: dimensions are in mm



Specification

400EP125

Transceiver

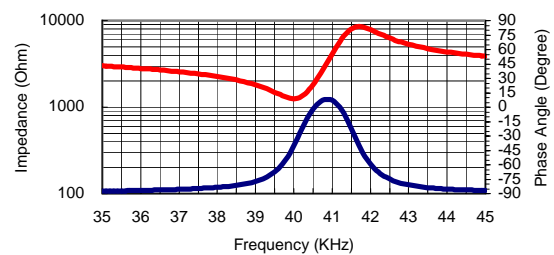
Center Frequency	40.0±1.0Khz
Bandwidth (-6dB)	400EP125 1.5Khz
Transmitting Sound Pressure Level (with rubber sleeve) at resonant frequency; 0dB re 0.0002μbar per 10Vrms at 30cm	98dB min.
Receiving Sensitivity (with rubber sleeve) at resonant frequency 0dB = 1 volt/μbar	-80dB min.
Nominal Impedance (Ohm)	1000
Ringling (ms) @25°C	1.2 max.
Capacitance at 1Khz ±20%	1400 pF
Max. Driving Voltage (Cont.)	20Vrms
20 bursts, 25ms repetition rate	100Vpp
Total Beam Angle	-6dB 125°
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

All specification taken typical at 25°C
Models of less ringling are available

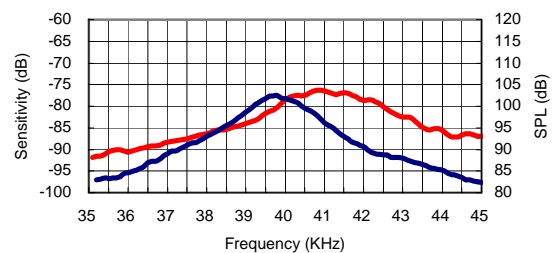
Models available:

1	400EP125	Natural Aluminum Housing
2	400EP125B	Black Painted Housing
3	400EP125BR	Black Housing+Rubber Sleeve

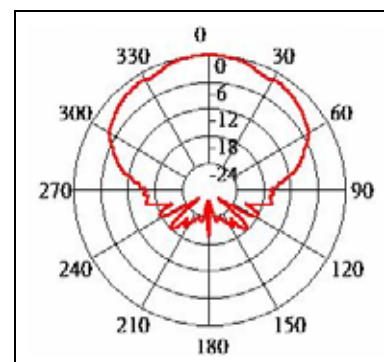
Impedance/Phase Angle vs. Frequency
Tested under 1Vrms Oscillation Level

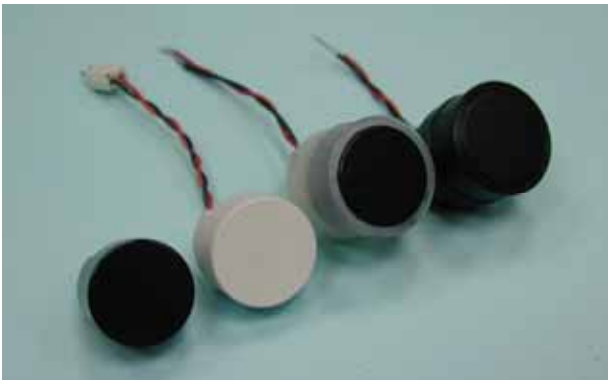


Sensitivity/Sound Pressure Level
SPL Tested under 10Vrms@30cm

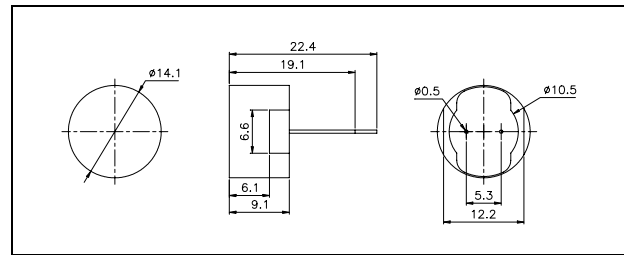


Beam Angle: Tested at 40.0Khz frequency





Dimensions: dimensions are in mm



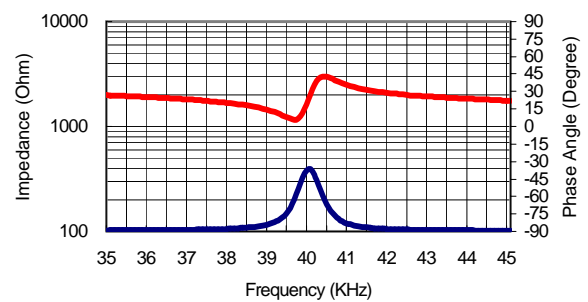
Asymmetric Beam Patterns Specification

400EP14D	Transceiver
Center Frequency	40.0±1.0Khz
Bandwidth (-6dB)	2.0Khz
Transmitting Sound Pressure Level at resonant frequency; 0dB re 0.0002μbar per 10Vrms at 30cm	103dB min. (Transducer alone)
Receiving Sensitivity at resonant frequency 0dB = 1 volt/μbar	-78dB min. (Transducer alone)
Nominal Impedance (Ohm)	1000
Ringing (ms)	1.2 max.
Capacitance at 1KHz ±20%	1600 pF
Temperature Compensated Type	3200 pF
Max. Driving Voltage (cont.) 20 bursts, 25ms repetition rate	20Vrms 100Vpp
Total Beam Angle Wide	125° typ.
-6dB Narrow	65° typ.
Operation Temperature	-40 to 80°C
Storage Temperature	-40 to 85°C

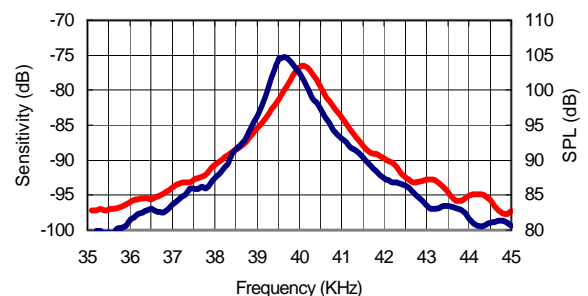
All specification taken typical at 25°C
Both lead pins and lead wires output are available
Models available:

1	400EP14D	Black Painted Housing
2	400EP14DC	Temperature compensated (TC)
3	400EP14DCR	T.C. + Rubber Sleeve

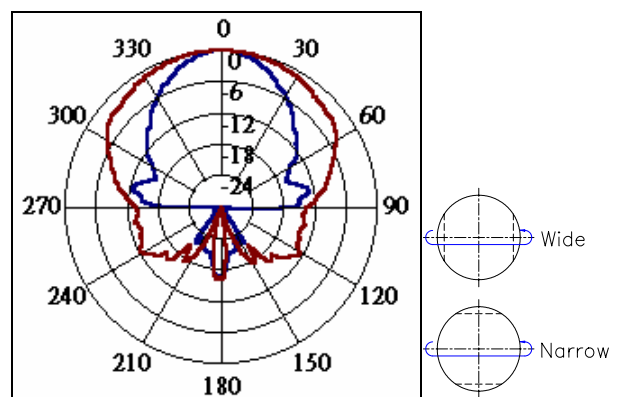
Impedance/Phase Angle vs. Frequency
Tested under 1Vrms Oscillation Level



Sensitivity/Sound Pressure Level
Tested under 10Vrms @ 30cm

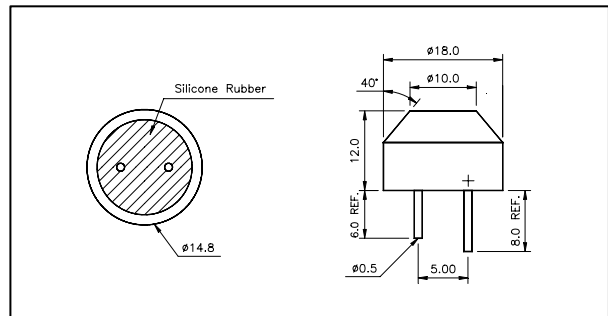


Beam Angle: Tested at 40.0Khz frequency
Wide Angle **Narrow Angle**





Dimensions: dimensions are in mm



Specification

400EP18A	Transceiver
Center Frequency	40.0±1.0Khz
Bandwidth (-6dB) 400EP18A	2.0Khz
Transmitting Sound Pressure Level	108dB min.
at resonant frequency; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-75dB min.
at resonant frequency 0dB = 1 volt/μbar	
Nominal Impedance (Ohm)	750
Ringing (ms)	1.2 max.
Capacitance at 1Khz ±20%	2000 pF
Temperature Compensated Type	4000 pF
Max. Driving Voltage (Cont.)	20Vrms
20 bursts, 25ms repetition rate	100Vpp
Total Beam Angle -6dB	85°
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

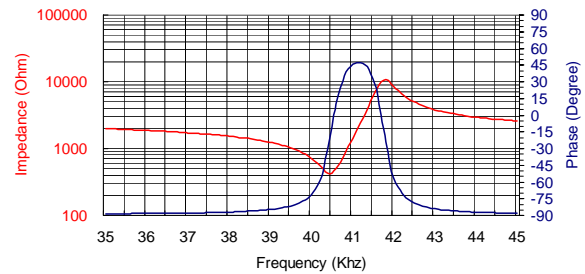
All specification taken typical at 25°C
 Both lead pins and lead wires output are available. Temperature compensated type is available upon request.

Models available:

1	400EP18A	Black Al. Housing
2	400EP18A0	Natural Al. Housing
3	400EP18AC	Temp. Compensated

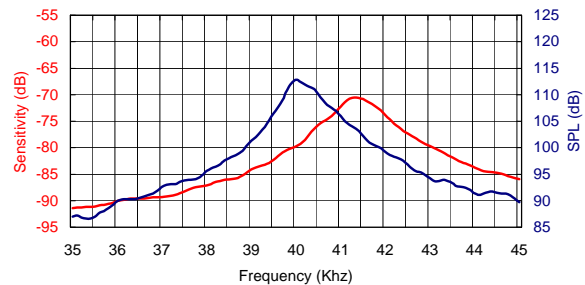
Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level

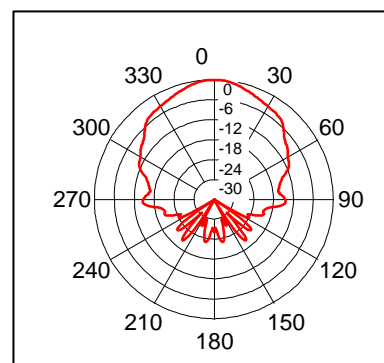


Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm

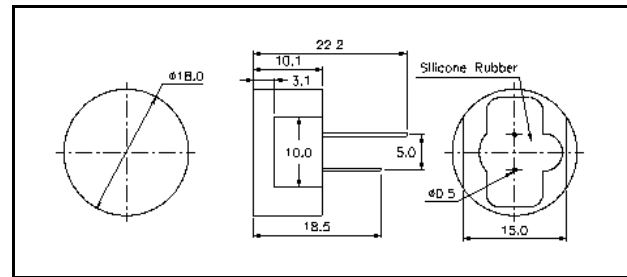


Beam Angle: Tested at 40.0Khz frequency



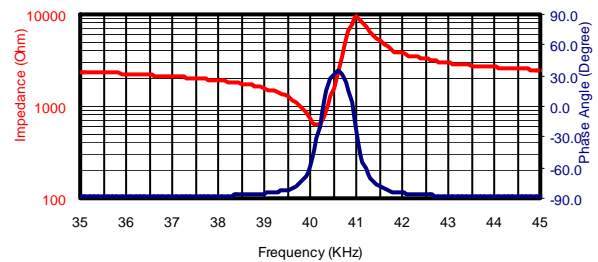


Dimensions: dimensions are in mm



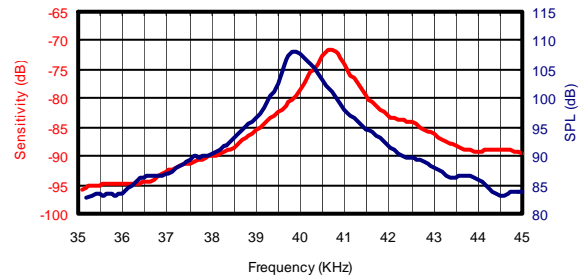
Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level



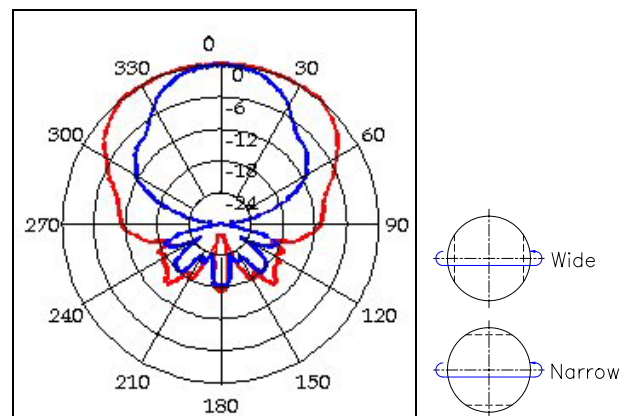
Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm



Beam Angle: Tested at 40.0Khz frequency

Wide Angle _____ Narrow Angle _____



Asymmetric Beam Patterns

Specification

400EP18D	Transceiver
Center Frequency	40.0±1.0Khz
Bandwidth (-6dB) F.O.M.	2.0Khz
Transmitting Sound Pressure Level	100dB min.
at resonant frequency; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-80dB min.
at resonant frequency 0dB = 1 volt/μbar	
Nominal Impedance (Ohm)	1000
Ringing	1.2ms max.
Capacitance at 1KHz ±20%	1800 pF
Temperature Compensated Type	3600 pF
Max. Driving Voltage (Cont.)	20Vrms
20 bursts, 25ms repetition rate	100Vpp
Total Beam Angle Wide*	135° typ.
-6dB Narrow*	75° typ.
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

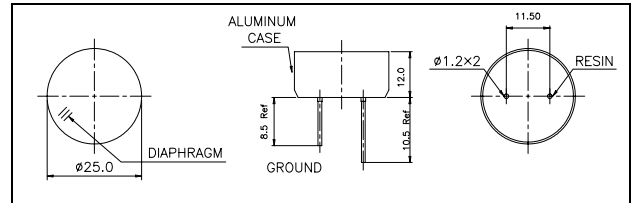
All specification taken typical at 25°C
Both lead pins and lead wires output are available

Models available:

1	400EP18D	Black Al. Housing
2	400EP18DC	Temp. Compensated
3	400EP18DCR	T.C. with Rubber Sleeve

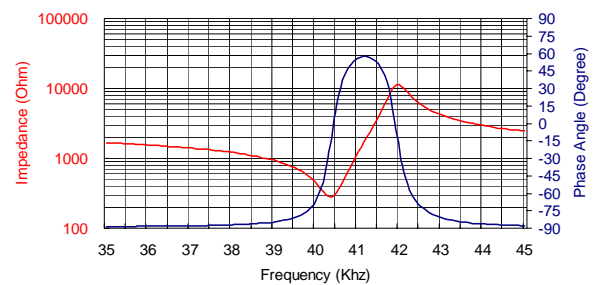


Dimensions: dimensions are in mm



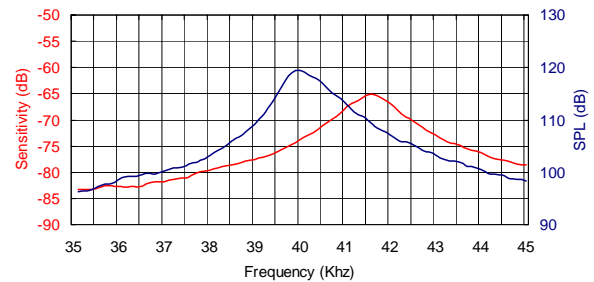
Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level

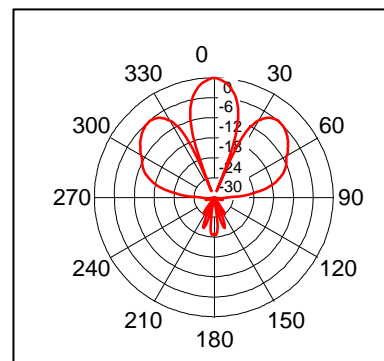


Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm



Beam Angle: Tested at 40.0Khz frequency



Specification

400EP250	Transceiver
Center Frequency	40.0±1.0Khz
Bandwidth (-6dB) 400EP250	2.0Khz(FOM)
Transmitting Sound Pressure Level	113dB min.
at resonant frequency; 0dB re 0.0002μbar per 10Vrms at 30cm	
Receiving Sensitivity	-72dB min.
at resonant frequency 0dB = 1 volt/μbar	
Nominal Impedance (Ohm)	300
Ring. (ms)	1.2 max.
Capacitance at 1Khz ±20%	2400 pF
Temperature Compensated Type	4800 pF
Max. Driving Voltage (cont.)	20Vrms
Total Beam Angle -6dB	30° typical
Operation Temperature	-30 to 80°C
Storage Temperature	-40 to 85°C

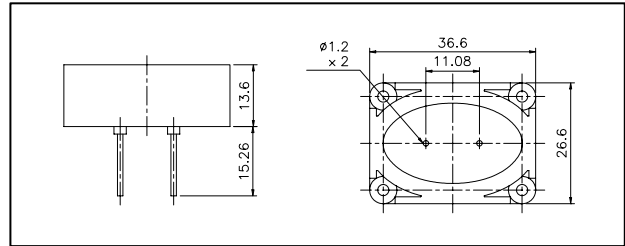
All specification taken typical at 25°C
 Closer frequency tolerance, shorter ringing, wider bandwidth and temperature compensated models can be supplied upon request.

Model available:

1	400EP250	Aluminum Housing
2	400EP25B	Black Al. Housing



Dimensions: dimensions are in mm

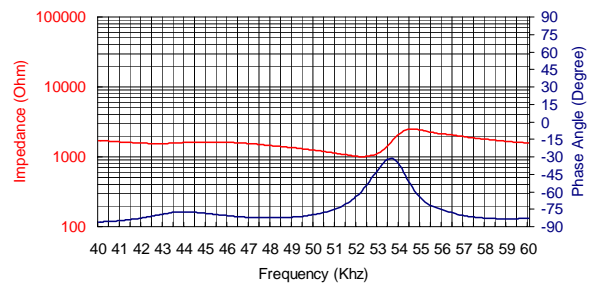


Asymmetric Beam Patterns

Specification

480EP900	Transceiver
Center Frequency	48.0±2.0Khz
Bandwidth (100dB) Transmitter	15.0Khz
(-80dB) Receiver	15.0Khz
Transmitting Sound Pressure Level	100dB min.
at 48Khz; 0dB re 0.0002µbar per 10Vrms at 30cm	
Receiving Sensitivity	-80dB min.
at 48.0Khz; 0dB = 1 volt/µbar	
Nominal Impedance (Ohm)	1000
Ringng (ms)	1.2 max.
Capacitance at 1Khz ±20%	2400 pF
Max. Driving Voltage (cont.)	20Vrms
Total Beam Angle -6dB	Typical
Long Axis (X)	43/48/53Khz
Short Axis (Y)	22/24/28°
Operation Temperature	-30 to 70°C
Storage Temperature	-40 to 80°C

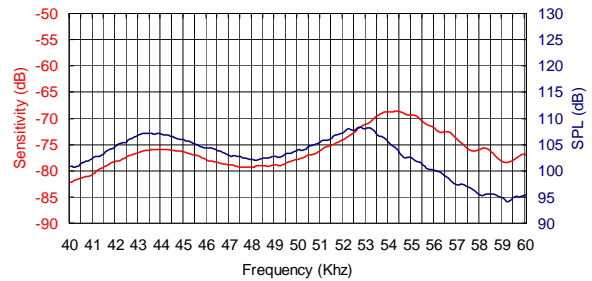
Impedance/Phase Angle vs. Frequency



Tested under 1Vrms Oscillation Level

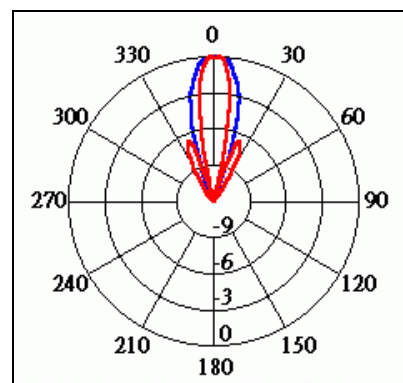
Sensitivity/Sound Pressure Level

Tested under 10Vrms @30cm



Beam Angle: @48KHz

Short Axis _____
 Long Axis _____



All specification taken typical at 25°C
 Closer frequency tolerance, shorter ringing and wider bandwidth models can be supplied upon request.



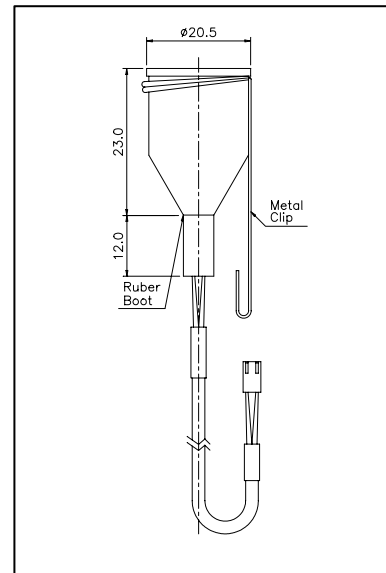
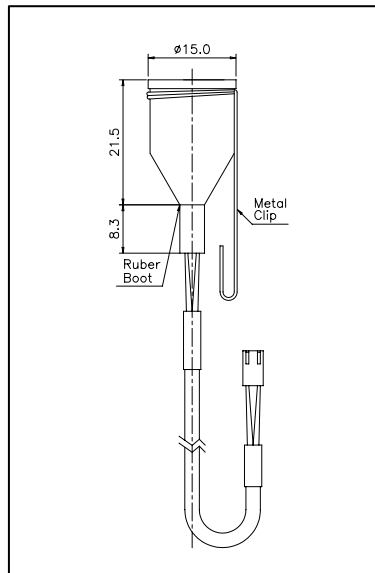
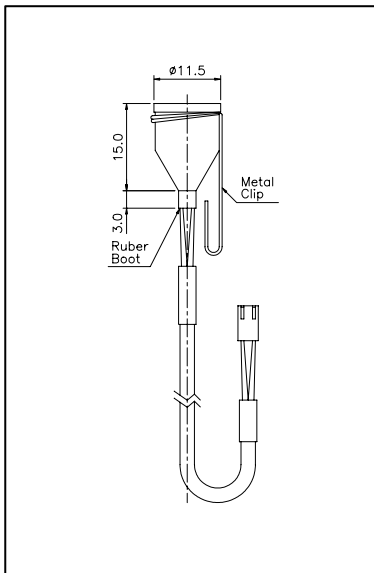
Ultrasonic Transducer Assembled Units

Transducers equip with a 2.5 meters shield cable and covered by a rubber boot with a metal clip for easy installation are very suitable for most of vehicle alarms.

RCA, Amp or Molex type connector at the other cable end is available upon request.

Specification

Model Number	SQS-04	SQS-05	SQS-06
Transducer used	400ST/R100 or 10P	400ST/R120	400ST/R160 or 16P
Cable length	2.5 meters		
Connector used	RCA/Amp/Molex type or others upon request		



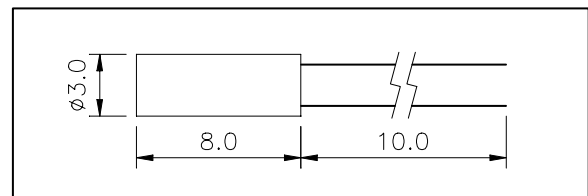
Dimensions

SQS-04



SQS-05

SQS-06



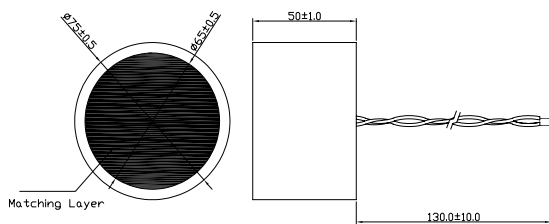
Miniature Tuning Fork Quartz Crystals

Specification

Model Number	Nominal Frequency Hz	Tolerance at 25°C PPM	Temperature Stability -10°C to +70°C PPM	Load Capacitance pF	Series Resistance Ohm	Shunt Capacitance pF	Drive Level mW
S40000	40,000	± 60	± 45	12.5	35,000	2.3	0.001
S32768	32,768	± 20	± 30	12.5	35,000	2.3	0.001



Dimensions: dimensions are in mm



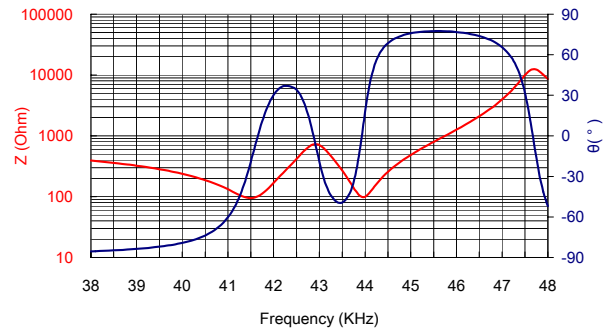
Specification

043SR750	Transceiver
Center Frequency (KHz)	43.00±5.0
Echo Sensitivity 0dB = 20Vp-p @ 90 cm	-57 dB min.
Dead Zone	70 cm
Bandwidth (Echo Sensitivity)	4 KHz
Nominal Impedance (Ohm)	700
Capacitance at 1Khz ±20%	5700 pF
Max. Driving Voltage (Pulse)	100Vpp 10% duty cycle
Total Beam Angle -3dB	8.5° typical
-6dB	12.0° typical
Matching Window	Silicone Rubber
Operation Temperature	0 to 70°C
Storage Temperature	-20 to 80°C

All specification taken typical at 25°C
Low ringing model can be arranged

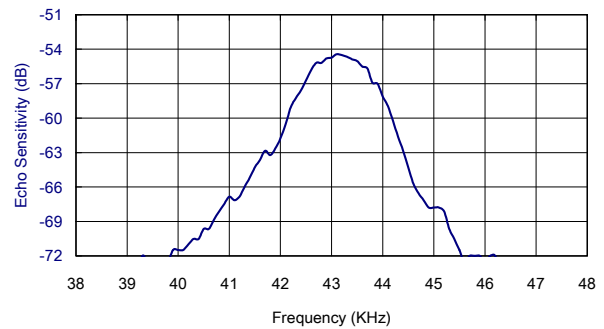
Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level



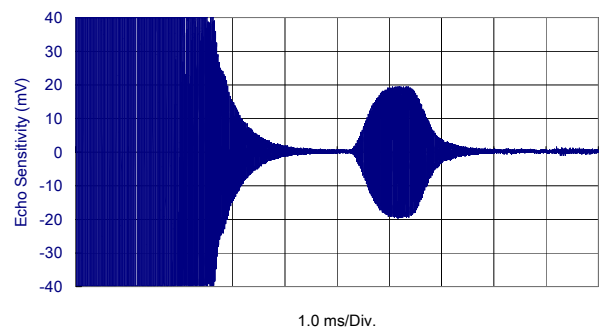
Echo Sensitivity vs. Frequency

Tested at distance of 90cm, 20Vp-p, 50 bursts

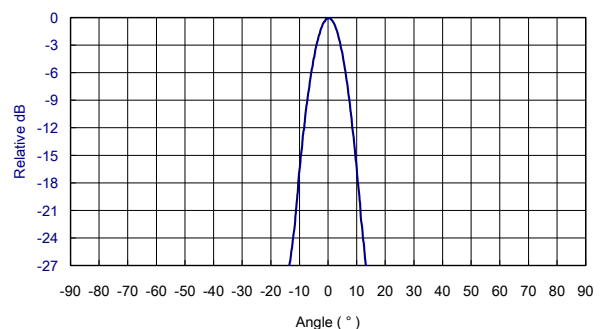


Echo Sensitivity/Ringing

Tested under 20Vp-p, 50 bursts, 90cm

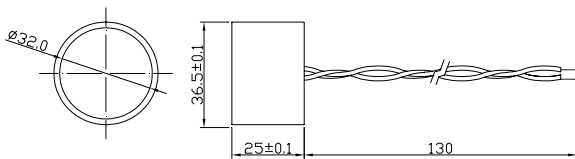


Beam Angle: Tested at 43.5Khz frequency





Dimensions: dimensions are in mm



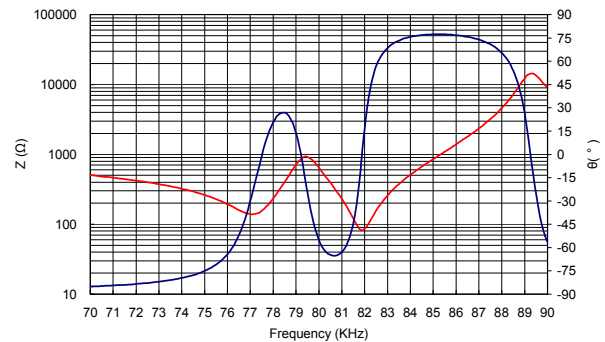
Specification

080SR365	Transceiver
Center Frequency (KHz)	80.00±5.0
Echo Sensitivity 0dB = 20Vp-p @ 50 cm	-57 dB min.
Dead Zone	35 cm
Bandwidth (Echo Sensitivity)	4.5 KHz
Nominal Impedance (Ohm)	700
Capacitance at 1Khz ±20%	2800 pF
Max. Driving Voltage (Pulse)	700Vpp 2% duty cycle
Total Beam Angle -3dB	8.0° typical
-6dB	11.0° typical
Matching Window	Silicone Rubber
Operation Temperature	-20 to 70°C
Storage Temperature	-30 to 80°C

All specification taken typical at 25°C
Low ringing model can be arranged

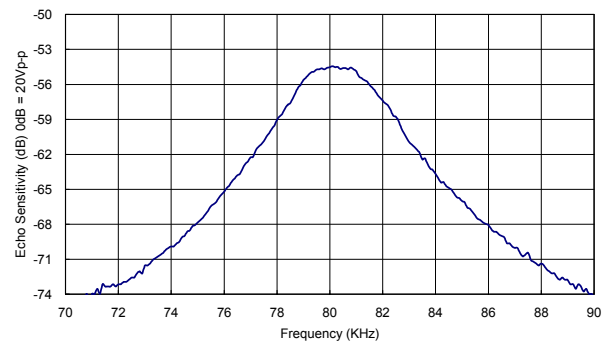
Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level



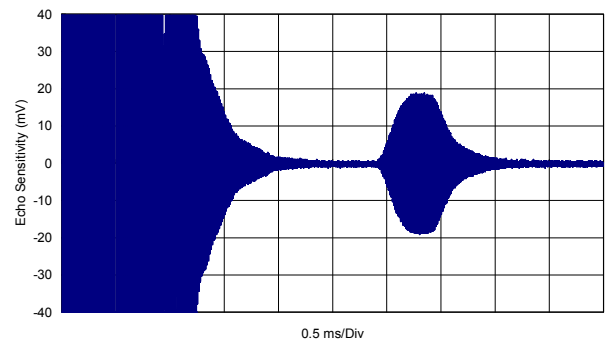
Echo Sensitivity vs. Frequency

Tested at distance of 50cm, 20Vp-p, 40 bursts

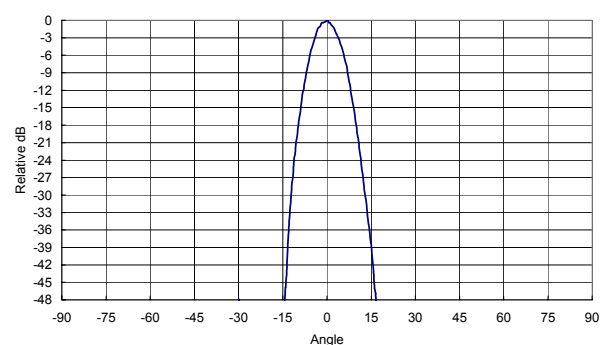


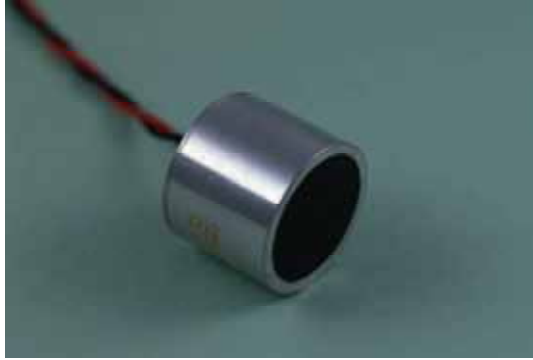
Echo Sensitivity/Ringing

Tested under 20Vp-p, 40 bursts, 50cm

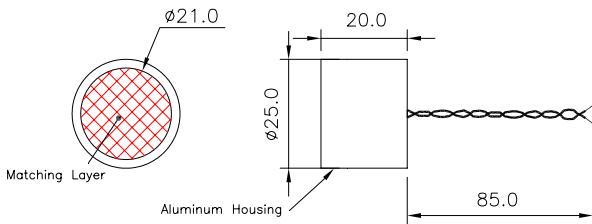


Beam Angle: Tested at 80 KHz frequency





Dimensions: dimensions are in mm



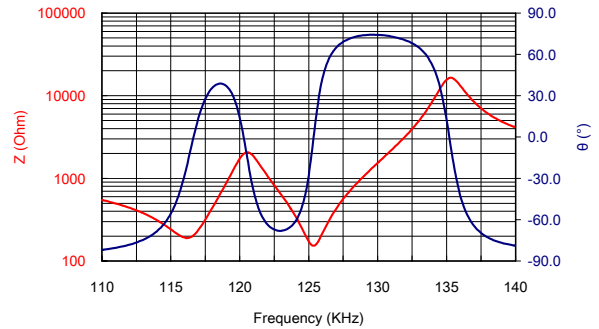
Specification

125SR250	Transceiver
Center Frequency (KHz)	125.0±10.0
Echo Sensitivity 0dB = 20Vp-p @ 25 cm	-58 dB min.
Dead Zone	20 cm
Bandwidth (Echo Sensitivity)	10KHz
Nominal Impedance (Ohm)	1200
Capacitance at 1Khz ±20%	1250 pF
Max. Driving Voltage (Pulse)	100Vpp 10% duty cycle
Total Beam Angle -3dB	10.0° typical
-6dB	14.5° typical
Matching Window	Silicone Rubber
Operation Temperature	0 to 70°C
Storage Temperature	-20 to 80°C

All specification taken typical at 25°C
Low ringing model can be arranged

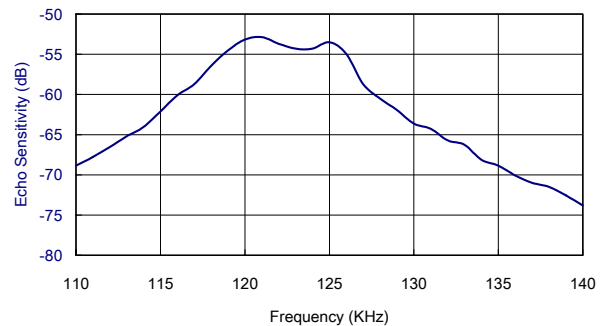
Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level



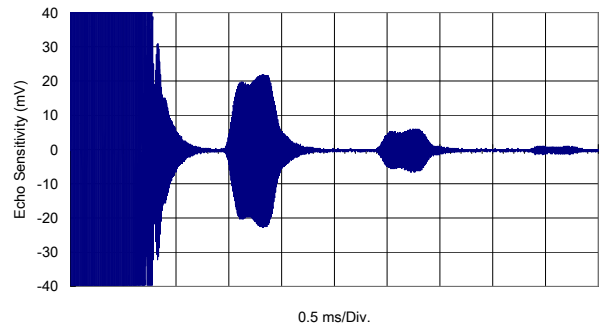
Echo Sensitivity vs. Frequency

Tested at distance of 25cm, 20Vp-p, 50 bursts

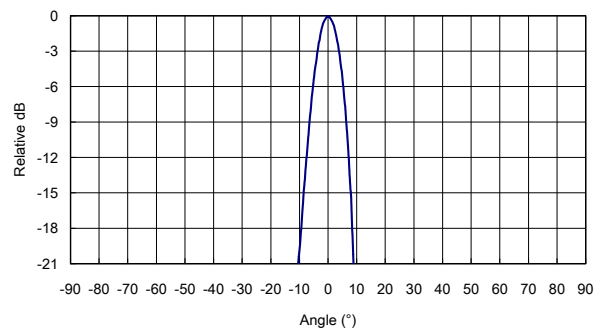


Echo Sensitivity/Ringing

Tested under 20Vp-p, 50 bursts, 25cm

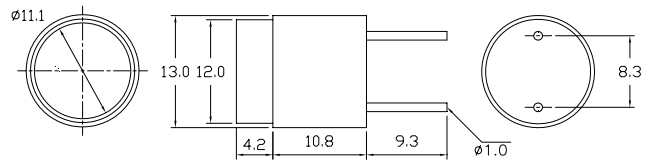


Beam Angle: Tested at 125.0Khz frequency



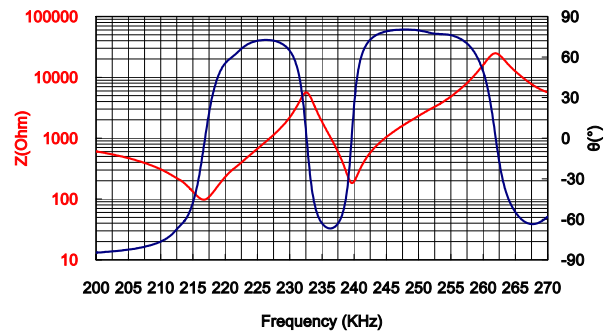


Dimensions: dimensions are in mm



Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level

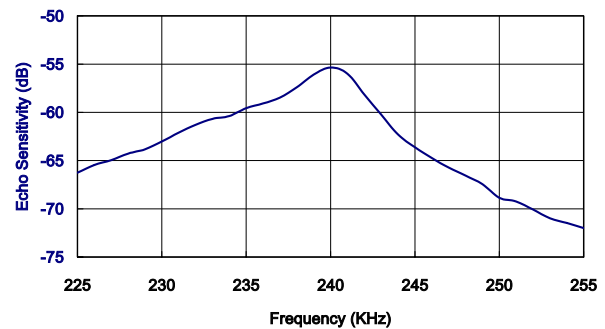


Specification

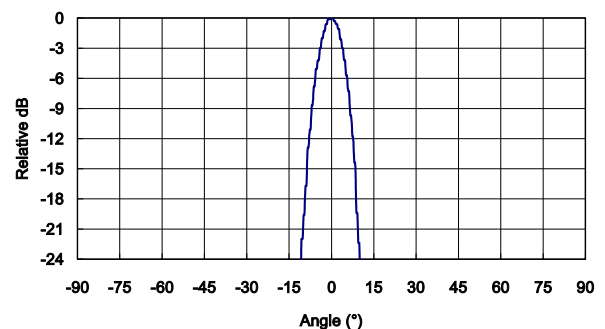
320SR130	Transceiver
Center Frequency (KHz)	320.0±10.0
Echo Sensitivity 0dB = 20Vp-p @ 25 cm	-61 dB min.
Dead Zone	15 cm
Bandwidth (Echo Sensitivity)	10KHz
Nominal Impedance (Ohm)	1200
Capacitance at 1Khz ±20%	1120 pF
Max. Driving Voltage (Pulse)	50Vpp 10% duty cycle
Total Beam Angle	-3dB 7.5° typical -6dB 10.5° typical
Matching Window	Silicone Rubber
Operation Temperature	0 to 70°C
Storage Temperature	-20 to 80°C

Echo Sensitivity

Tested under 20Vp-p @25cm; 0dB=20Vp-p



Beam Angle: Tested at 235.0Khz frequency



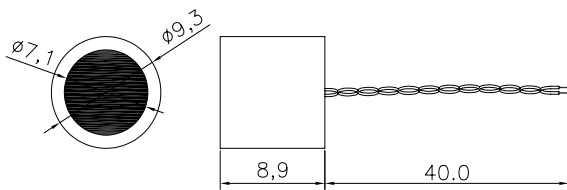
All specification taken typical at 25°C
Closer frequency tolerance, shorter ringing and wider bandwidth models can be supplied upon request.

Model available:

1	235AC013	Aluminum Housing
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Dimensions: dimensions are in mm



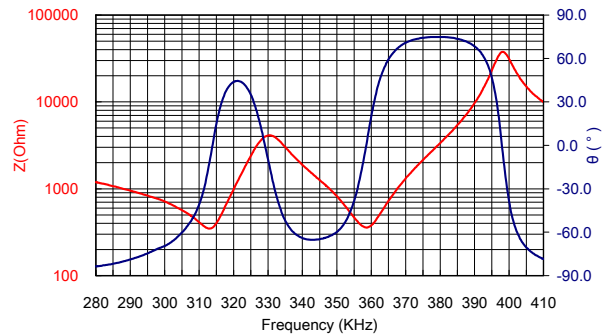
Specification

320SR093	Transceiver
Center Frequency (KHz)	320.0±10.0
Echo Sensitivity 0dB = 20Vp-p, 50 Bursts @ 10 cm	-65 dB min.
Dead Zone	8 cm
Bandwidth (Echo Sensitivity)	10KHz
Nominal Impedance (Ohm)	1200
Capacitance at 1Khz ±20%	270 pF
Max. Driving Voltage (Pulse)	50Vpp 10% duty cycle
Total Beam Angle -3dB	9.5° typical
-6dB	12.5° typical
Matching Window	Silicone Rubber
Operation Temperature	0 to 70°C
Storage Temperature	-20 to 80°C

All specification taken typical at 25°C
Low ringing model can be arranged

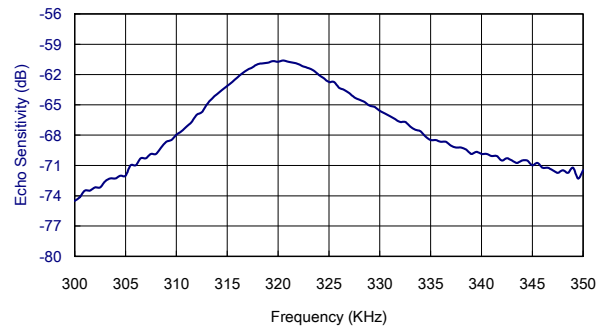
Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level



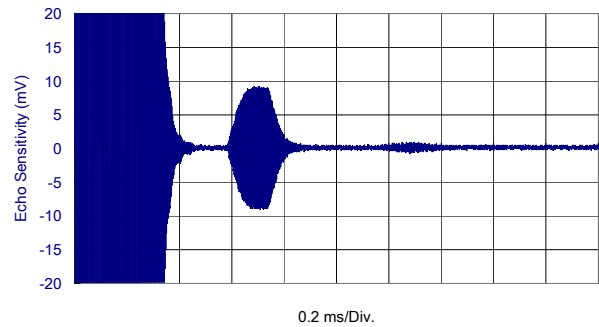
Echo Sensitivity vs. Frequency

Tested at distance of 10cm, 20Vp-p, 50 bursts

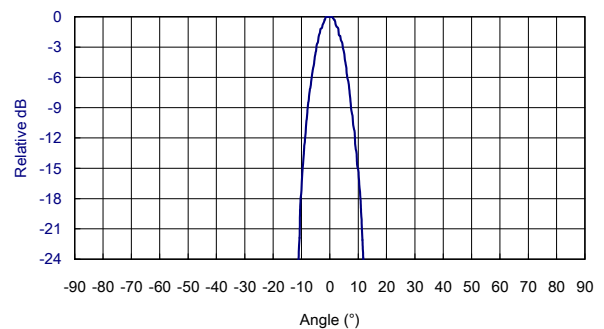


Echo Sensitivity/Ringing

Tested under 20Vp-p, 50 bursts, 10cm

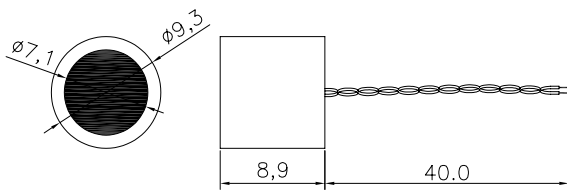


Beam Angle: Tested at 314.0 KHz frequency





Dimensions: dimensions are in mm



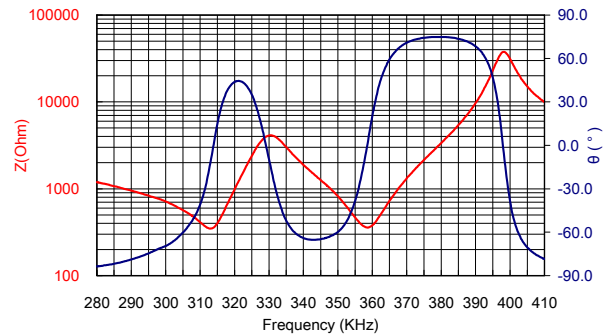
Specification

320SR093	Transceiver
Center Frequency (KHz)	320.0±10.0
Echo Sensitivity 0dB = 20Vp-p, 50 Bursts @ 10 cm	-65 dB min.
Dead Zone	8 cm
Bandwidth (Echo Sensitivity)	10KHz
Nominal Impedance (Ohm)	1200
Capacitance at 1Khz ±20%	270 pF
Max. Driving Voltage (Pulse)	50Vpp 10% duty cycle
Total Beam Angle -3dB	9.5° typical
-6dB	12.5° typical
Matching Window	Silicone Rubber
Operation Temperature	0 to 70°C
Storage Temperature	-20 to 80°C

All specification taken typical at 25°C
Low ringing model can be arranged

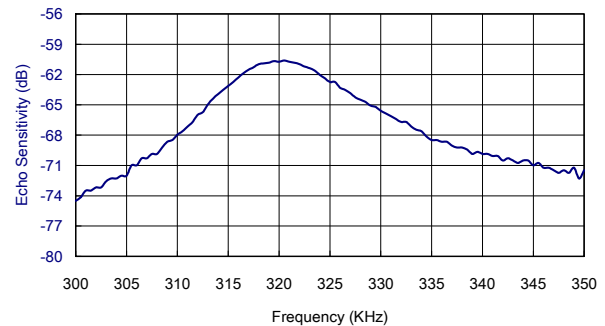
Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level



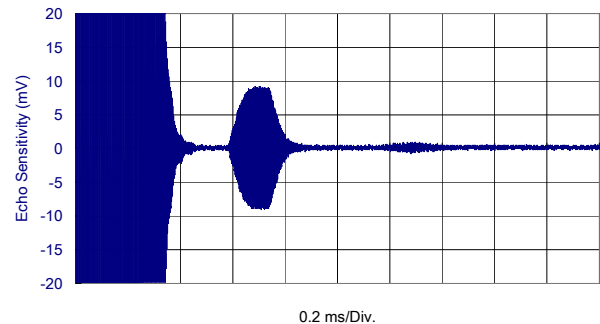
Echo Sensitivity vs. Frequency

Tested at distance of 10cm, 20Vp-p, 50 bursts

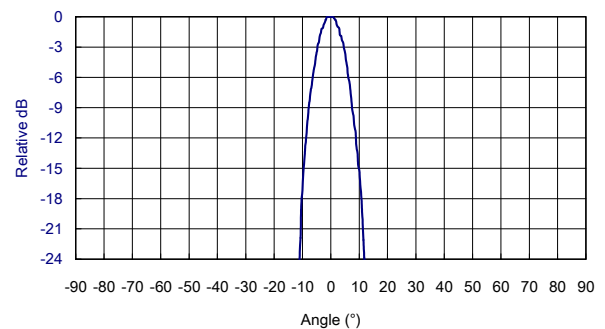


Echo Sensitivity/Ringing

Tested under 20Vp-p, 50 bursts, 10cm

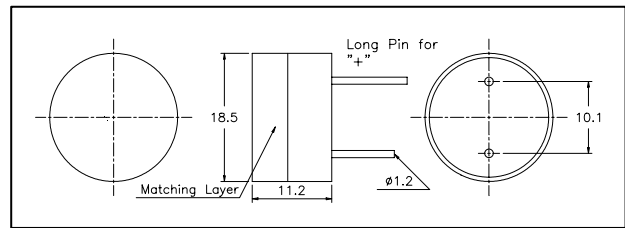


Beam Angle: Tested at 314.0 KHz frequency



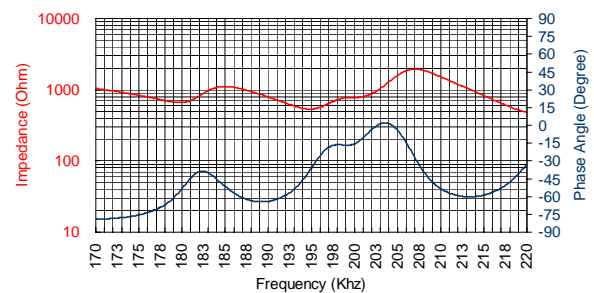


Dimensions: dimensions are in mm



Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level

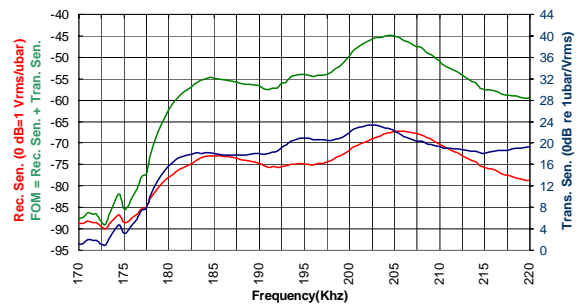


Specification

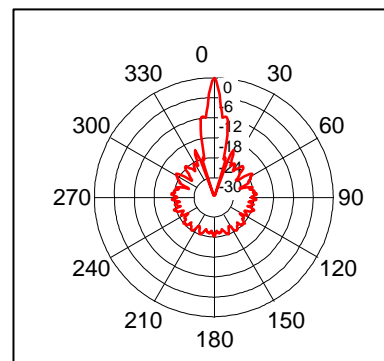
200GE180	Transceiver
Center Frequency	200.0±10Khz
Transmitting Sensitivity 0dB re 1μbar/1Vrms @ 30cm	20 dB
Receiving Sensitivity 0dB = 1Vrms/μbar	-75 dB
Figure of Merit (TS + RS)	-52 dB
Bandwidth (FOM)	10KHz
Nominal Impedance (Ohm)	700
Capacitance at 1Khz ±20%	580 pF
Max. Driving Voltage (Pulse)	50Vpp 10% duty cycle
Total Beam Angle -6dB	10° typical
Matching Window	Resin with filler
Operation Temperature	-20 to 60°C
Storage Temperature	-30 to 70°C

Receiving/Transmitting Sensitivity & Figure of Merit (RS + TS)

Tested at distance of 30cm



Beam Angle: Tested at 200.0Khz frequency



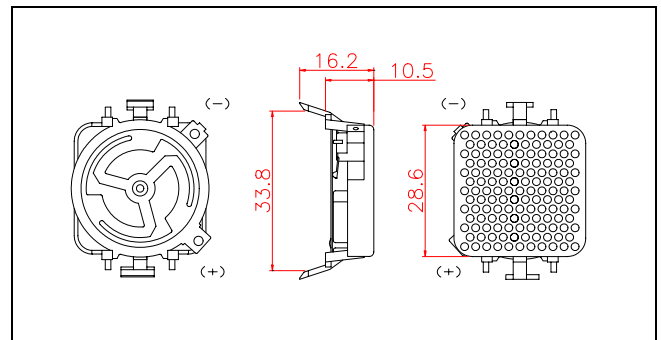
All specification taken typical at 25°C
Closer frequency tolerance, shorter ringing and wider bandwidth models can be supplied upon request.

Model available:

1	200GE180	Aluminum Housing
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Dimensions: dimensions are in mm



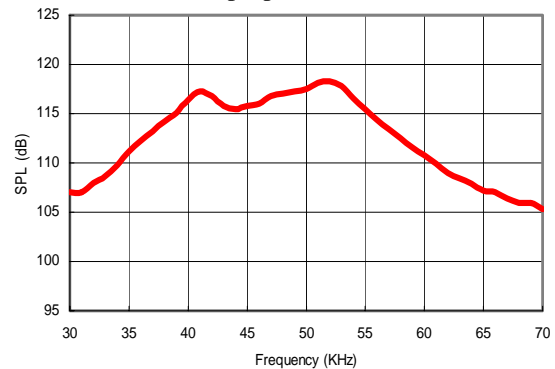
Specification

500ES290	Transceiver
Center Frequency	50.0 ± 1.0Khz
Transmitting Sound Pressure Level at 50.0Khz; 0dB re 20µPa per 300Vac pk-pk, 200Vdc bias at 50 cm	116.0 dB min.
Receiving Sensitivity at 50.0Khz, 200Vdc bias, 0dB = 1 volt/µbar (1 volt/Pa)	-63.0 dB (-43.0 dB)
Capacitance at 1Khz	600 - 700 ρF
Suggested DC Bias Voltage	200 V
Suggested AC Driving Voltage	300V pk-pk
Maximum Combined Voltage	400V
Total Beam Angle -3dB	17° typical
Operation Temperature	0 to 60°C
Standard Finish	
Foil (Diaphragm):	
1. 500ES290-G	Gold
2. 500ES290-A	Aluminum
Housing	ABS

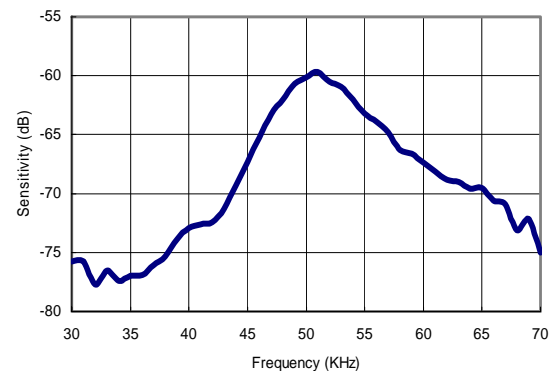
All specification taken typical at 25°C

Transmitting Sound Pressure Level

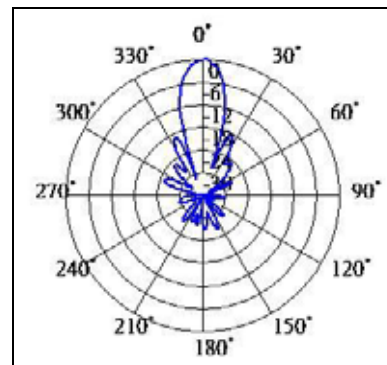
Tested under 300Vac pk-pk, 200Vdc bias @50 cm



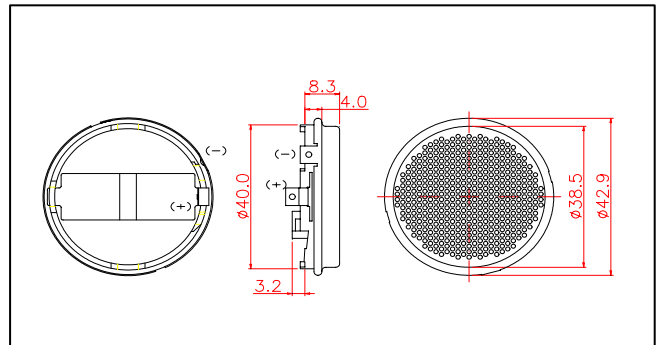
Receiving Sensitivity: Tested under 200Vdc bias



Beam Angle: Tested at 50.0Khz frequency

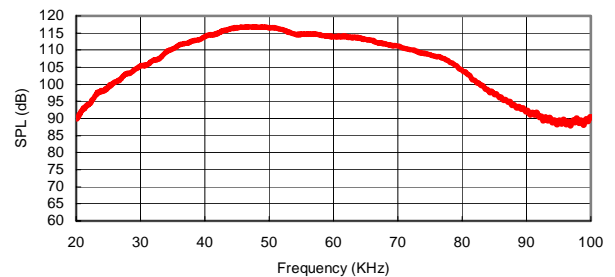


Dimensions: dimensions are in mm

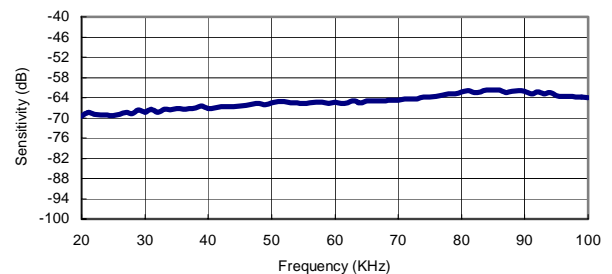


Transmitting Sound Pressure Level

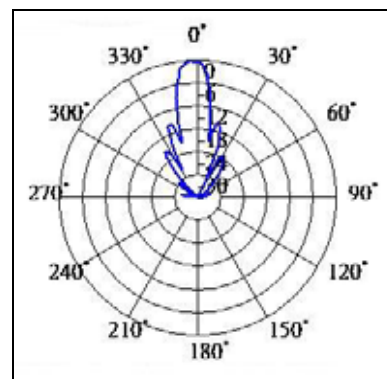
Tested under 300Vac pk-pk, 150Vdc bias @ 100 cm



Receiving Sensitivity: Tested under 200Vdc bias



Beam Angle: Tested at 50.0Khz frequency



Specification

500ES430	Transceiver
Center Frequency	50.0 ± 1.0Khz
Transmitting Sound Pressure Level	119 dB min.
at 50.0Khz; 0dB re 20µPa per 300Vac pk-pk, 200Vdc bias at 50 cm	
Receiving Sensitivity	-42 dB min.
at 50.0Khz, 200Vdc bias, 0dB = 1 volt/Pa (1 volt/µbar) (-62dB) min.	
Capacitance at 1Khz	± 20% 400 - 500 ρF
Suggested DC Bias Voltage	200 V
Suggested AC Driving Voltage	300V pk-pk
Maximum Combined Voltage	400V
Total Beam Angle	-3dB 12° typical
Operation Temperature	-30 to 70°C
Standard Finish	
Foil (Diaphragm)	See below
Housing	See below

All specification taken typical at 25°C

Models available:

Model	Foil	Housing
500ES43AB	Aluminum	Black Painted Steel
500ES43AS	Aluminum	SUS 304
500ES43GB	Gold	Black Painted Steel
500ES43GS	Gold	SUS 304

Bolt Clamped High Power Transducers



Features

- High efficiency & high output
- Large amplitude
- Low heat generation
- Durability & stability
- Easy connection

Applications

- Ultrasonic cleaners
- Ultrasonic welders
- Ultrasonic processing machines: bonding, drilling, etching, engraving and etc.

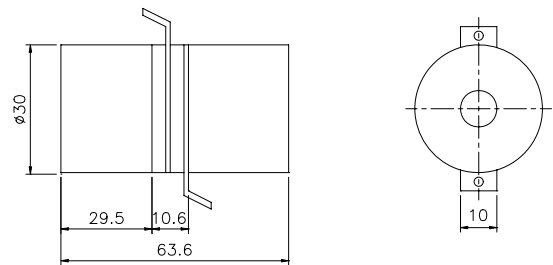
Specification

	30402S	45402H	45282H	60282H
Resonant frequency (KHz)	37.5	40.0	28.2	28
Motion Admittance (mMho)	35	15	50	40
Mechanic Q (Qm)	500	500	500	500
Capacitance (pF)	2700	4000	4000	4000
Allowable vibration rate (cm/sec.)	50	50	50	25

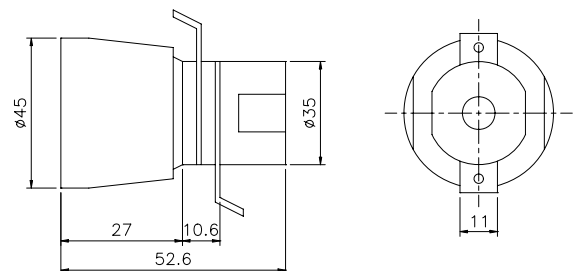
All specification taken typical at 25°C

Dimensions

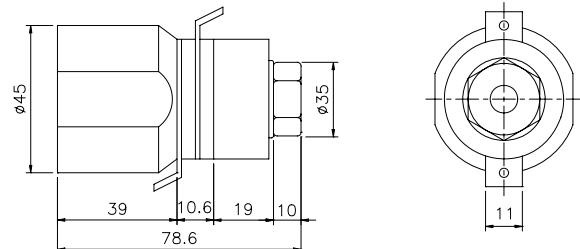
Model: 30402S



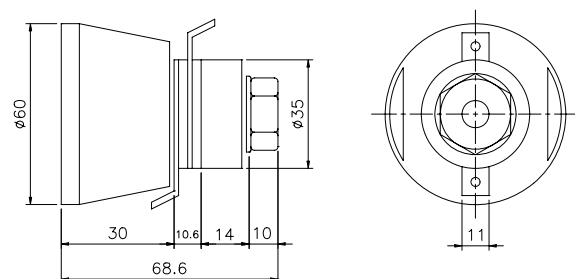
Model: 45402H



Model: 45282H



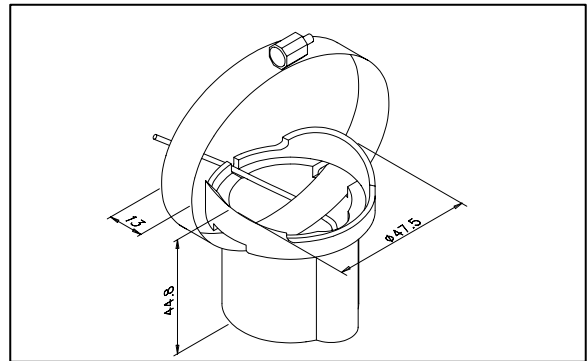
Model: 60282H



S. Square Enterprise Company Limited
Pro-Wave Electronics Corporation



Dimensions: dimensions are in mm



Specification

200LM450	Transceiver
Center Frequency	200±10.0Khz
Bandwidth (FOM -6dB)	25Khz
Transmitting Sound Pressure Level	160dB min.
0dB re 1µPa per 1Vrms at 100cm	
Receiving Sensitivity	-180dB min.
0dB = 1 volt/µPa	
Submerged Impedance (Ohm)	200
Capacitance at 1Khz	±20% 2000 pF
Input Power (Pulse Drive)	50 Watts
Total Beam Angle	-6dB 20°
Cable Length	4.5 m
Molded Connector	RCA Phono plug 90°
Housing Material	Plastic resin

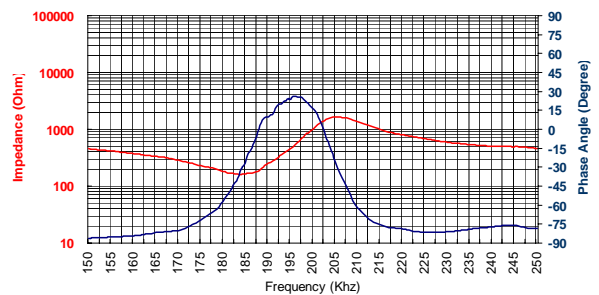
Closer frequency tolerance, shorter ringing and wider bandwidth models can be supplied upon request.

Model available:

1	200LM450	Plastic Housing
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Submerged Impedance/Phase Angle vs. Frequency

Tested under 1Vrms Oscillation Level



Receiving /Transmitting Sensitivity

Tested at distance of 100cm

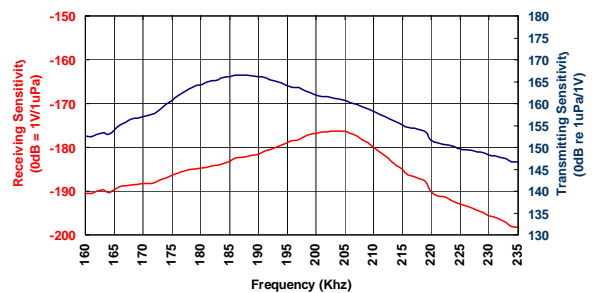
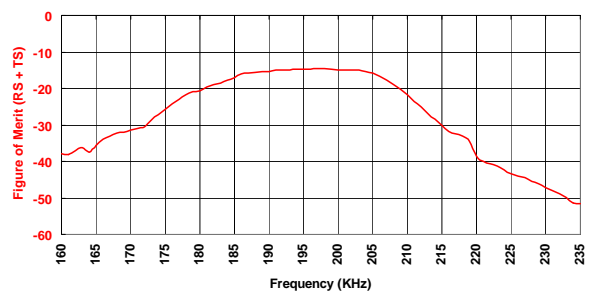
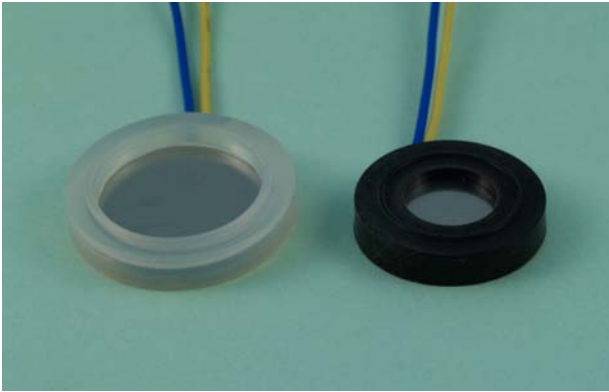


Figure of Merit

(Receiving Sensitivity + Transmitting Sensitivity)



Ultrasonic Atomizing Transducers



Pro-Wave has dedicated in ultrasonic field over 19 years since 1980 and earned a worldwide reputation for his specialty, flexibility and sincerity in the past decades.

The ultrasonic atomizing transducers using our factory made high Q hard type piezoelectric ceramic element is ideal for atomizing liquids. A very fine mist having a particle diameter of only a few microns can be generated.

We are not only supply atomizing element but also entire assembled transducer unit with silicone rubber holder.

Features

- Piezoelectric ceramic element clad with stainless steel for erosion resistance.
- Fine and consistent particle size of less than $3\mu\text{m}$
- High atomizing efficiency >400 cc/hour
- Less power consumption
- High stability and durability

Applications

- Humidification in refrigerated food displays and storage, living environments, and air conditioning plants.
- Inhalation and disinfecting equipment
- Humidification in industrial process control for lubrication, coating and etc.

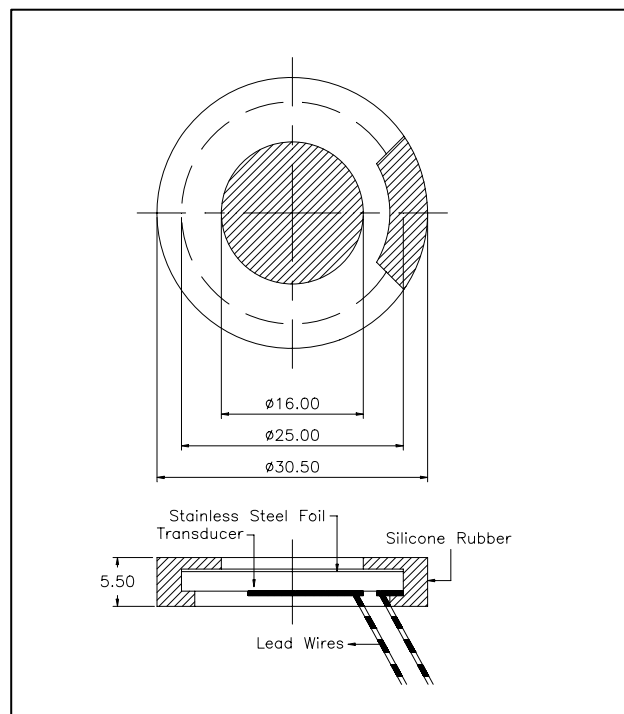
Specification

M165D25	25mm Dia.
Resonance Frequency	$1.65\pm 0.05\text{Mhz}$
Resonance Impedance	2.0Ω max.
Capacitance at 1Khz $\pm 20\%$	2,000 pF
Dissipation Factor at 1Khz	0.5% max.
Operation Duration (hour)	$>6,000$
Atomizing Quantity	400 cc/hr
Water Level	45 mm
Input Power (maximum)	30 Watt
Operation Temperature	0 to 45°C
Storage Temperature	-20 to 65°C

All specification is typical at 25°C .

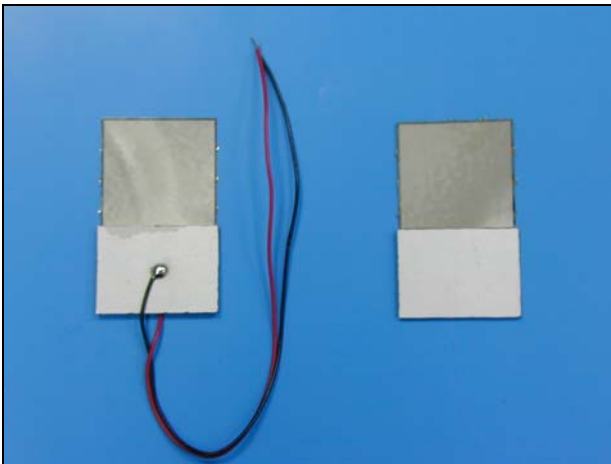
Other frequency and diameter element can be supplied upon request.

Dimensions



S. Square Enterprise Company, Limited
Pro-Wave Electronics Corporation

Ultrasonic Vibration Micro Nozzle



S. Square has dedicated in ultrasonic field over 21 years since 1980 and earned a worldwide reputation for his specialty, flexibility and sincerity in the past decades.

The ultrasonic vibration micro nozzle consists a piezoelectric ceramic and a metal foil, on which over thousands micro nozzles formed. Using the same principle as inkjet printer, this transducer atomizes water or liquids through a matrix of micro holes of around 7-10 μm .

The micro nozzles ultrasonic atomizing transducer can use siphon to draw small amount liquids to the surface of metal foil and then to atomize, which is much efficiency than the conventional ultrasonic atomizer for which a liquid tank with high level liquid has to be always loaded on the surface of ultrasonic transducers.

Features

- Fine and consistent misted particle size
- Adjustable misted particle size
- No loaded liquids require as comparing with conventional atomizers
- High atomizing efficiency
- Less power consumption
- High stability and durability

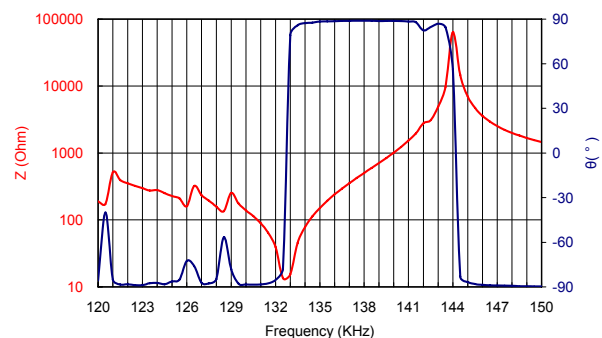
Applications

- Humidification in refrigerated food displays and storage, living environments, and air conditioning plants.
- Inhalation and disinfecting equipment
- Humidification in industrial process control for lubrication, coating and etc.
- Liquids dispensing systems

Specification:

Model Number	M2313500
Resonant Frequency	135.0 \pm 5KHz
Impedance	10 Ohm typ.
Capacitance	2450 \pm 20% pF
Dimensions	L: 29.20 mm W: 17.35 mm T: 1.0 mm (PZT Element) t: 50 μm (Metal)
Metal Material	Ni-Co Alloy
Nozzle size	7 – 10 μm

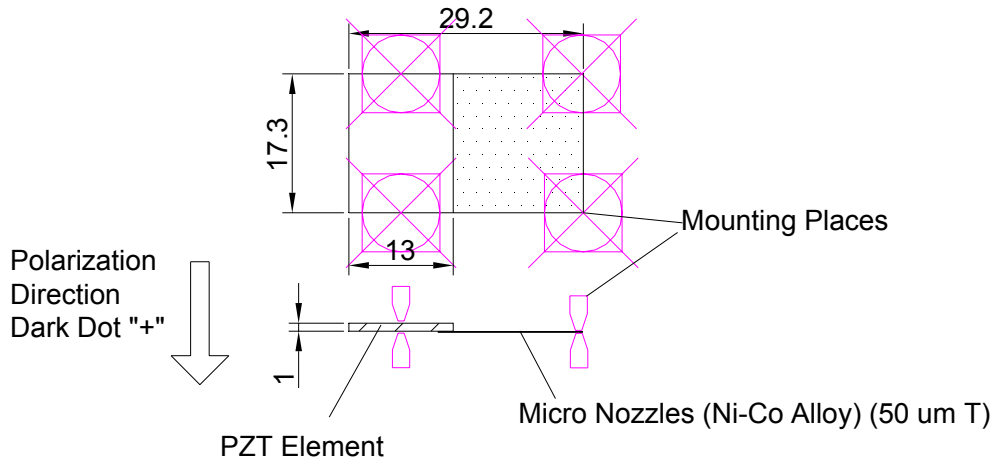
Impedance/Phase Angle:



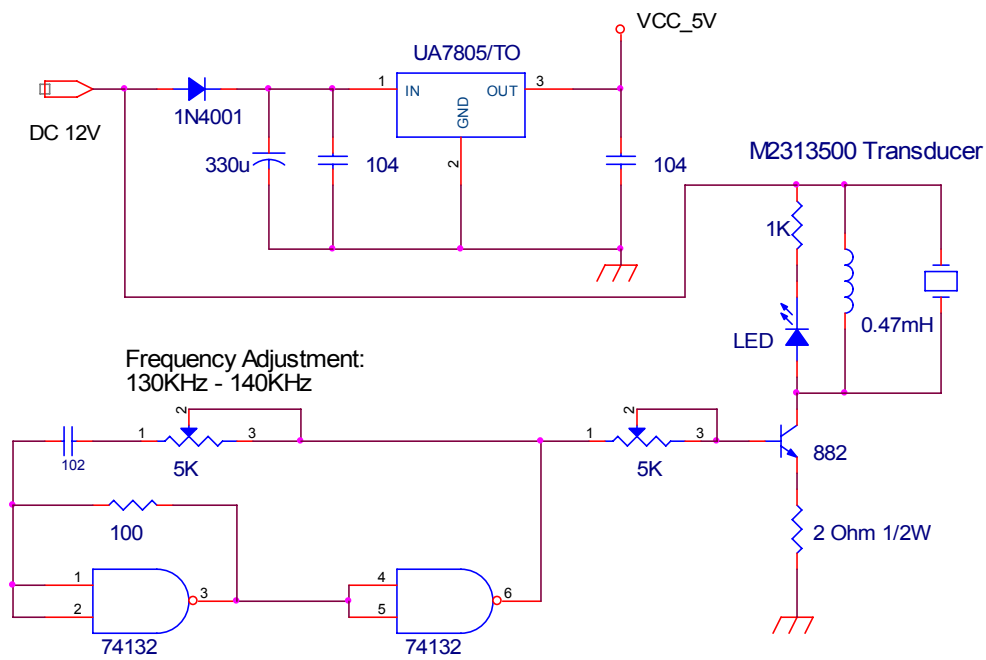
S. Square Enterprise Company, Limited
Pro-Wave Electronics Corporation

Micro Nozzles Ultrasonic Atomizing Transducers

Construction:



Driving Circuit:



Remark: The negative side faces to the opening, the positive side faces to the liquid source, if driving circuit uses NPN transistor.

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