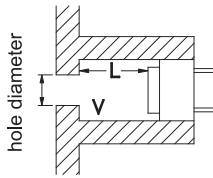


HELMHOLTZ RESONATOR:

For increasing sound pressure level and/or modifying resonant frequency. It is possible to increase the sound pressure level at a certain frequency. An appropriate resonator is provided for an acoustic transducer as illustrated below. The resonant frequency is determined by the equation given below, through a slight adjustment is necessary to add volume enclosed within the transducer.

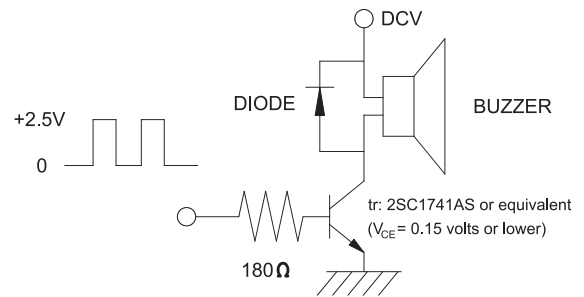


$$f = \frac{CD}{4} \sqrt{\frac{1}{\pi V(L+0.75D)}}$$

f: frequency(Hz)
 V: Resonance volume(m³)
 D: Hole diameter(m)
 L: Hole length(m)
 C: Speed of sound(334 m/sec 20°C)
 C=331.5+0.607Ø
 Ø: Temperature(°C)

MEASURING CIRCUIT:

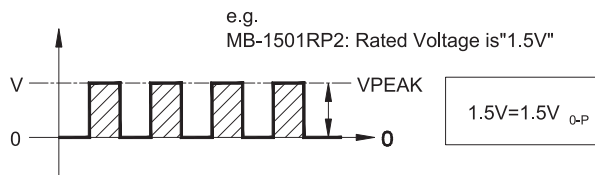
Our standard circuit for measurement is as shown below:
 (V_{CE} = 0.15 volts or lower)



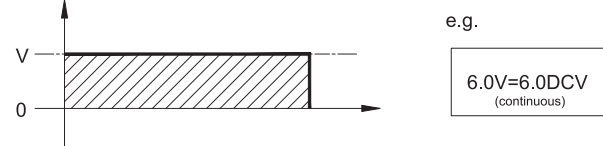
RATED VOLTAGES:

The term "Rated Voltage" in the specification of MEGA's transducers and buzzer are described as

● For Miniature Audio Transducers(External Drive Circuitry)



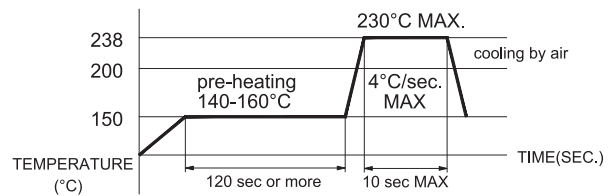
● For Miniature Audio Transducers and Low Pitched Sound Buzzers (Self-Contained Drive Circuitry)



TEMPERATURE PROFILE FOR REFLOWABLE TRANSDUCERS:

Reference standard: EIAJ ED-4702

1. Recommendable reflow soldering condition is as follow.
 (Reflow soldering is two times)
 Note: It is requested that 2nd reflow soldering should be executed after heat of product goes down to normal temperature.
2. Manual soldering
 Soldering iron temperature: °C, within 10 seconds.



RELIABILITY:

	TEST ITEM	TEST METHOD	TEST PERIOD
1	High temperature storage test	+70°C, free load	96 Hr.
2	Low temperature storage test	-30°C, free load	96 Hr.
3	Thermal shock test	-30 to +70°C, each cycle 30 min.	100 cycles
4	Standard condition life test	standard test circuit, 1.5V 1/2 DUTY, PEAK Hz.	96 Hr.
5	Anti-humidity operating test	+60°C, 90% RH, rated load	96 Hr.
6	Vibration test	10-55 Hz, 5G, X,Y,Z direction	each direction 2 Hr.
7	Drop test	1. 120cm,X,Y,Z, direction 2. with 75g case, 30cm, 6 face	1. 10 times 2. 10 times
8	Solder heat withstanding test	260 ± 5°C 10 sec. or less by manual solder	
9	Terminal force test	pulling force 10Kg	10 times

STANDARD TEST CONDITION:

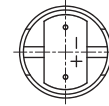
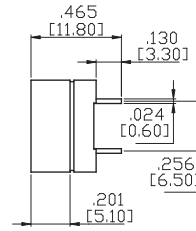
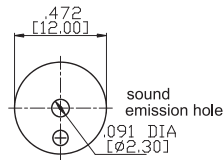
Normal temperature	+5°C to +35°C
Normal humidity	45 to 85%RH
Normal atmospheric pressure	860 to 1060 hpa

REMARK: When a doubt has arisen as to judgment, conditions must be at 20 ± 2°C, 60 to 70%RH and 860 to 1060 hpa.

REMARK:

1. No significant change shall occur both in appearance and instructure after reliability test.
2. Change in sound pressure level should be within the range of ±5dB after reliability test.
3. No abnormality both in operation and in tone quality is allowed after reliability test.
4. Specification and dimensions subject to change.

MB-11



SPECIFICATIONS

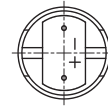
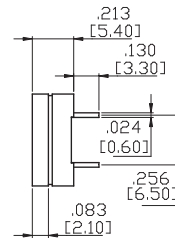
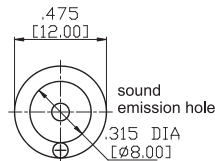
TYPE		MB-11P	MB-111P
RATED VOLTAGE (V)		1.5	1.5
#CURRENT CONSUMPTION (mA)		MAX 35	MAX 20
COIL RESISTANCE (Ohms)		16 ± 2.4	42 ± 6.3
#SOUND PRESSURE LEVEL (dB)		85	85
RESONANCE FREQUENCY (Hz)		2048	2048
OPERATING VOTAGE (V)		max. 2	max. 2
OPERATING TEMPERATURE (°C)		-20 to +60	-20 to +60
STORAGE TEMPERATURE (°C)		-30 to +70	-30 to +70
WEIGHT (g)		2	2

FEATURES:

COMPACT, RICH SOUND

#VALUE APPLYING RATED VOLTAGE.(2048Hz, 1/2 DUTY CYCLE,SQUARE WAVE)

MB-11PS



SPECIFICATIONS

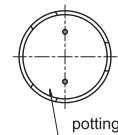
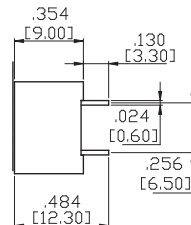
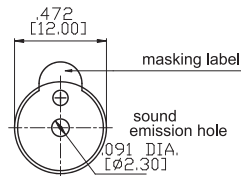
TYPE		MB-11PS
RATED VOLTAGE (V)		1.5
#CURRENT CONSUMPTION (mA)		MAX 35
COIL RESISTANCE (Ohms)		16 ± 4.5
#SOUND PRESSURE LEVEL (dB)		70
RESONANCE FREQUENCY (Hz)		2048
OPERATING VOTAGE (V)		max. 2
OPERATING TEMPERATURE (°C)		-20 to +60
STORAGE TEMPERATURE (°C)		-30 to +70
WEIGHT (g)		2

FEATURES:

COMPACT, RICH SOUND

#VALUE APPLYING RATED VOLTAGE.(2048Hz, 1/2 DUTY CYCLE,SQUARE WAVE)

MB-120



SPECIFICATIONS

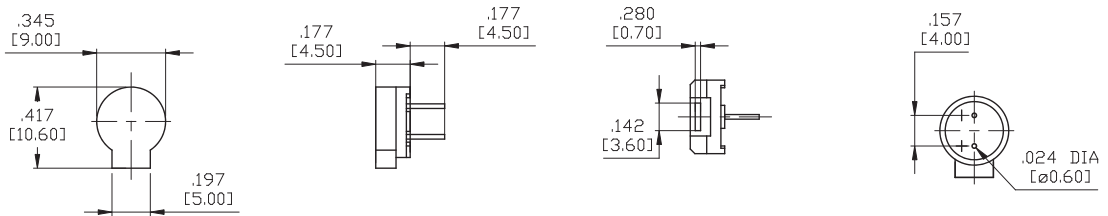
TYPE		MB-1201	MB-1205
RATED VOLTAGE (V)		1.5	1.5
#CURRENT CONSUMPTION (mA)		MAX 35	MAX 20
COIL RESISTANCE (Ohms)		16 ± 3	40 ± 6
#SOUND PRESSURE LEVEL (dB)		85	85
RESONANCE FREQUENCY (Hz)		2800	2400
OPERATING VOTAGE (V)		max. 2	max. 2
OPERATING TEMPERATURE (°C)		-30 to +70	-30 to +70
STORAGE TEMPERATURE (°C)		-40 to +85	-40 to +85
WEIGHT (g)		2	2

FEATURES:

COMPACT, RICH SOUND

#VALUE APPLYING RATED VOLTAGE.(2400Hz, 1/2 DUTY CYCLE,SQUARE WAVE)

MB-1501RP



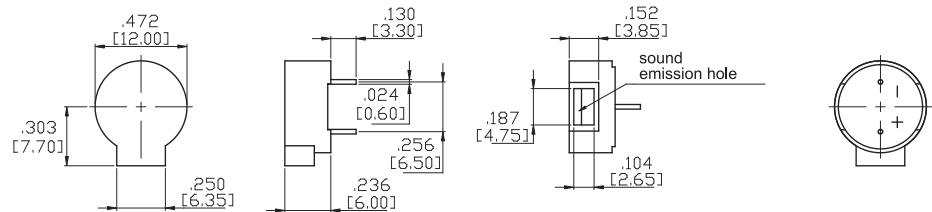
SPECIFICATIONS

TYPE	MN-1501RP	
RATED VOLTAGE (V)		1.5
#CURRENT CONSUMPTION (mA)		MAX 80
COIL RESISTANCE (Ohms)		6.0 ± 1
#SOUND PRESSURE LEVEL (dB)		85
RESONANCE FREQUENCY (Hz)		2730
OPERATING VOTAGE (V)		1.0 to 2.0
OPERATING TEMPERATURE (°C)		-20 to +60
STORAGE TEMPERATURE (°C)		-30 to +70
WEIGHT (g)		0.6

FEATURES:

Low profile, small (∅9.0*4.5) design.

MB-RP/A



SPECIFICATIONS

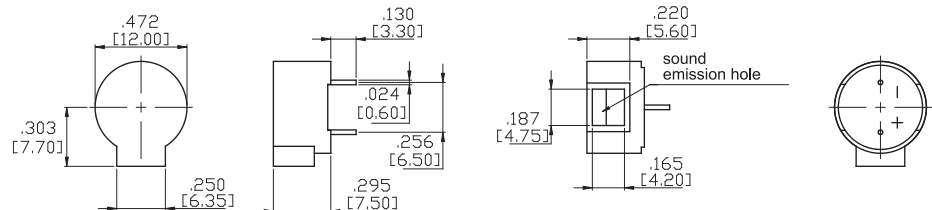
TYPE	MB-RP/A	
RATED VOLTAGE (V)		1.5
#CURRENT CONSUMPTION (mA)		MAX 80
COIL RESISTANCE (Ohms)		5.0 ± 1
#SOUND PRESSURE LEVEL (dB)		85
RESONANCE FREQUENCY (Hz)		2730
OPERATING VOTAGE (V)		max. 2
OPERATING TEMPERATURE (°C)		-20 to +60
STORAGE TEMPERATURE (°C)		-30 to +70
WEIGHT (g)		2

FEATURES:

Side sound port, high output sound pressure level, small and low profile design.

#VALUE APPLYING RATED VOLTAGE.(2731Hz,1/2 DUTY CYCLE,SQUARE WAVE)

MB-RP/B



SPECIFICATIONS

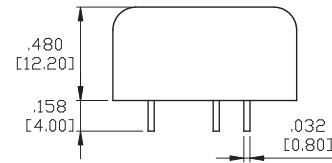
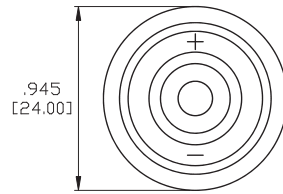
TYPE	MB-RP/B	
RATED VOLTAGE (V)		1.5
#CURRENT CONSUMPTION (mA)		MAX 70
COIL RESISTANCE (Ohms)		6.5 ± 1
#SOUND PRESSURE LEVEL (dB)		85
RESONANCE FREQUENCY (Hz)		2730
OPERATING VOTAGE (V)		max. 2
OPERATING TEMPERATURE (°C)		-20 to +60
STORAGE TEMPERATURE (°C)		-30 to +70
WEIGHT (g)		2

FEATURES:

Side sound port, high output sound pressure level, small and low profile design.

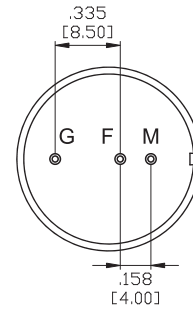
#VALUE APPLYING RATED VOLTAGE.(2731Hz,1/2 DUTY CYCLE,SQUARE WAVE)

KPE-123

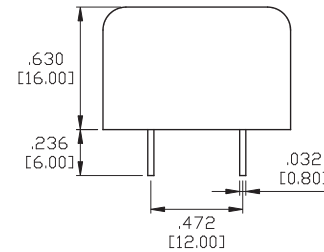
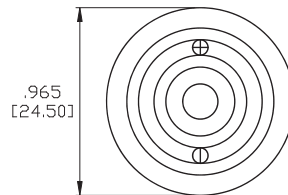


SPECIFICATIONS

TYPE		KPE-123
RATED VOLTAGE	(V)	12
#CURRENT CONSUMPTION	(mA)	MAX 8
#SOUND PRESSURE LEVEL	(dB)	82
RESONANCE FREQUENCY	(Hz)	3.0±0.5
OPERATING VOTAGE	(V)	3 to 28
OPERATING TEMPERATURE	(°C)	-30 to +85
STORAGE TEMPERATURE	(°C)	-40 to +95
WEIGHT	(g)	3.4
tone		CONTINUOUS
MATERIAL		ABS (BLACK)

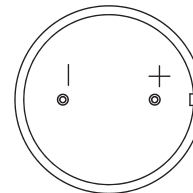


KPE-203

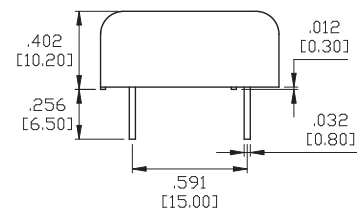
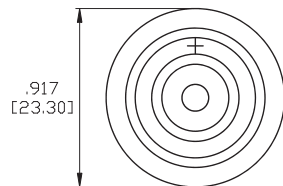


SPECIFICATIONS

TYPE		KPE-203
RATED VOLTAGE	(V)	12
CURRENT CONSUMPTION	(mA)	MAX 9
SOUND PRESSURE LEVEL	(dB)	88
RESONANCE FREQUENCY	(Hz)	3.4±0.5
OPERATING VOTAGE	(V)	3 to 20
OPERATING TEMPERATURE	(°C)	-30 to +85
STORAGE TEMPERATURE	(°C)	-40 to +95
WEIGHT	(g)	85
tone		CONTINUOUS
MATERIAL		ABS (BLACK)

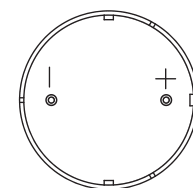


KPE-222

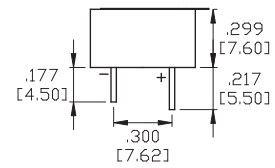
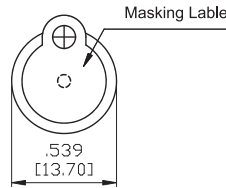


SPECIFICATIONS

TYPE		KPE-222
RATED VOLTAGE	(V)	12
CURRENT CONSUMPTION	(mA)	MAX 13
SOUND PRESSURE LEVEL	(dB)	75
RESONANCE FREQUENCY	(Hz)	3.2±0.5
OPERATING VOTAGE	(V)	3 to 20
OPERATING TEMPERATURE	(°C)	-30 to +85
STORAGE TEMPERATURE	(°C)	-40 to +95
WEIGHT	(g)	85
tone		CONTINUOUS
MATERIAL		ABS (BLACK)

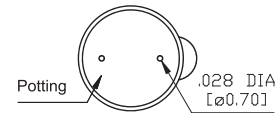


KPE-242

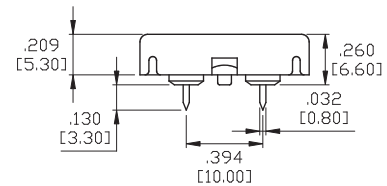
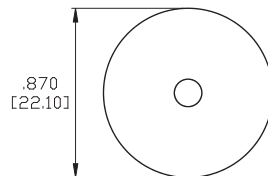


SPECIFICATIONS

TYPE		KPE-242
RATED VOLTAGE	(V)	12
CURRENT CONSUMPTION	(mA)	MAX 7
SOUND PRESSURE LEVEL	(dB)	70
RESONANCE FREQUENCY	(Hz)	4.1±0.5
OPERATING VOTAGE	(V)	3 to 16
OPERATING TEMPERATURE	(°C)	-20 to +70
STORAGE TEMPERATURE	(°C)	-30 to +80
WEIGHT	(g)	1
tone		CONTINUOUS
MATERIAL		ABS (BLACK)

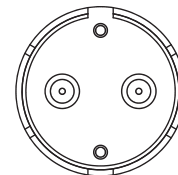


KPE-813

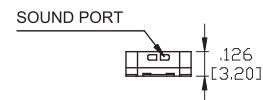
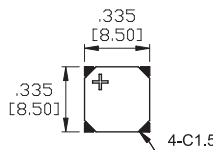


SPECIFICATIONS

TYPE		KPE-813
ELECTROSTATIC CAPACITY	(pF)	12,000±30%
CURRENT CONSUMPTION	(mA)	MAX 6
SOUND PRESSURE LEVEL	(dB)	84
OPERATING VOTAGE	(V)	MAX 30
OPERATING TEMPERATURE	(°C)	-30 to +85
STORAGE TEMPERATURE	(°C)	-40 to +95
WEIGHT	(g)	2.54
MATERIAL		ABS (BLACK)



KSS-J4B20



SPECIFICATIONS

TYPE		KSS-J4B20
RATED VOLTAGE	(V)	3.6
MEAN CURRENT	(mA)	MAX 80
SOUND OUTPUT	(dB)	90
RATED FREQUENCY	(Hz)	2730
OPERATING VOTAGE	(V)	3.0 to 5.0
COIL RESISTANCE	(Ohms)	20±3
COIL IMPEDANCE	(Ohms)	32.0
OPERATING TEMPERATURE	(°C)	-30 to +70
STORAGE TEMPERATURE	(°C)	-40 to +85
WEIGHT	(g)	0.7
MATERIAL		L.C.P (WHITE)



Toggle

Rocker

Slide

Pushbutton

AV

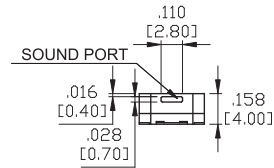
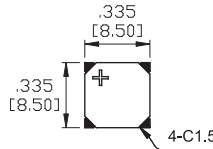
Rotary

Tact

Touch Key

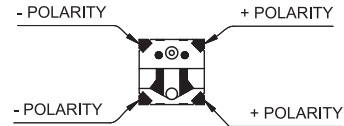
Miscellaneous

KSS-74B20-T/R

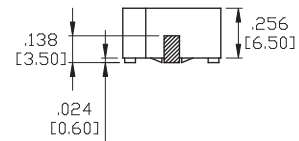
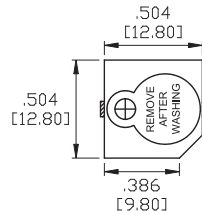


SPECIFICATIONS

TYPE	KSS-74B20-T/R	
RATED VOLTAGE (V)		3.6
MEAN CURRENT (mA)		MAX 80
SOUND OUTPUT (dB)		90
RATED FREQUENCY (Hz)		2730
OPERATING VOLTAGE (V)		3.0 to 5.0
COIL RESISTANCE (Ohms)		20±3
COIL IMPEDANCE (Ohms)		32.0
OPERATING TEMPERATURE (°C)		-30 to +70
STORAGE TEMPERATURE (°C)		-40 to +85
WEIGHT (g)		0.7
MATERIAL		L.C.P (WHITE)

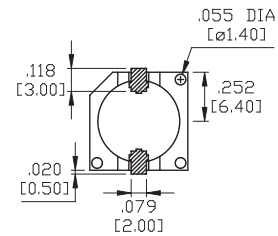


KT-1205

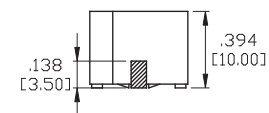
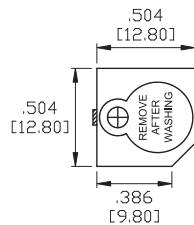


SPECIFICATIONS

TYPE	KT-1205	
RATED VOLTAGE (V)		5
MEAN CURRENT (mA)		MAX 40
SOUND OUTPUT (dB)		87
RATED FREQUENCY (Hz)		2,400
OPERATING VOLTAGE (V)		3.0 to 8.0
COIL RESISTANCE (Ohms)		45.0±6.7
COIL IMPEDANCE (Ohms)		90.0
OPERATING TEMPERATURE (°C)		-30 to +70
STORAGE TEMPERATURE (°C)		-40 to +85
WEIGHT (g)		2
MATERIAL		PPS (GRAY)

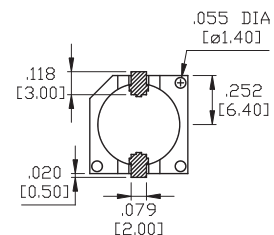


KT-1212C

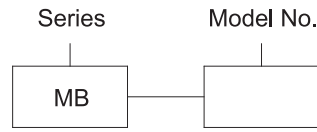


SPECIFICATIONS

TYPE	KT-1212C	
RATED VOLTAGE (V)		12
MEAN CURRENT (mA)		MAX 30
SOUND OUTPUT (dB)		85
RATED FREQUENCY (Hz)		2,400±300
OPERATING VOLTAGE (V)		8.0 to 15.0
OPERATING TEMPERATURE (°C)		-30 to +70
STORAGE TEMPERATURE (°C)		-40 to +85
WEIGHT (g)		2
MATERIAL		PPS (GRAY)



HOW TO ORDER



Toggle

Rocker

Slide

Pushbutton

AV

Rotary

Tact

Touch Key

Miscellaneous