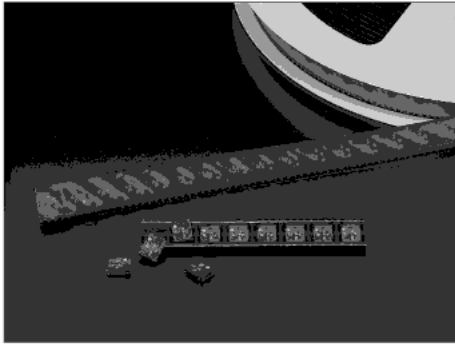


# *CITISOUND*®

CITISOUND (Citizen trademark) drivers are widely used as sound sources in mobile telephones, pagers, and other high-technology portable communication devices. The lineup includes micro-buzzers which combine clear sound with high sound pressure level, surface mount types, as well as various other compact magnetic sound emitters. Dynamic speakers with a wide frequency range suitable for reproducing electronic sounds are also available. These products are ideal for the continuing trend towards miniaturization of electronic products.

# Surface Mountable Sound Generators CHB Series



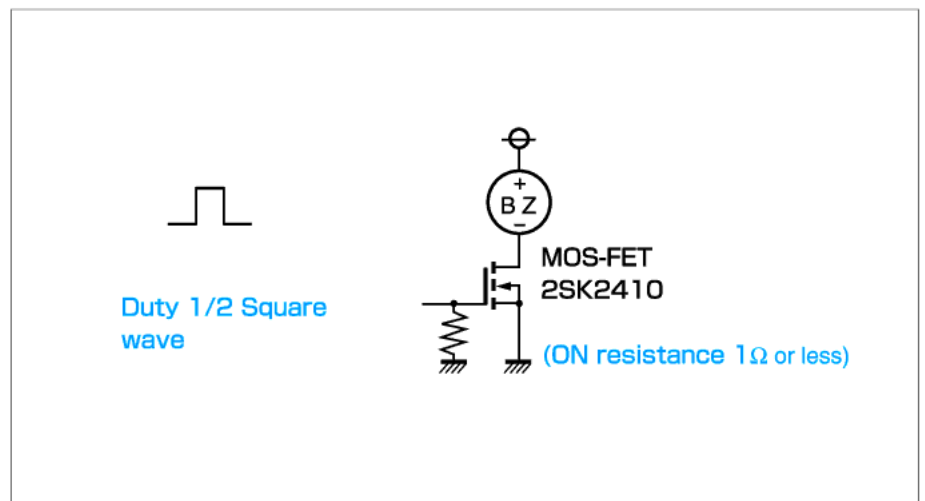
## ■ Features

1. High sound pressure can be attained with low current consumption. Minimum resonance frequency is low.
2. Automatic mounting and thermostable re-flow soldering is possible through the use of liquid crystal polymers for the housing.
3. Coil wires are all treated inside enabling handling to be easy.

## ■ Application

Mobile phones, pagers etc.

## ■ Standard inspection circuit



## ■ Precautions

Please see the individual specifications manual and applications manual for precautions.

## ■ CHB Series Selection Guide

Specifications Product code	Rated voltage*1 V	Average maximum rated current mA	Minimum sound pressure level dB(A)	Average sound pressure level dB(A)	Driving frequency Hz	Direct current resistance Ω	Dimensions mm	Net Weight grs.	Page in this catalog
CHB-02A	3.6	80	83	88	2700	20	11×10×2	0.47	74
CHB-03A	1.5	60	87	91	2700	9.5	14×11×3	0.9	74
CHB-03A-03	1.5	60	87	91	2700	9.5	14×11×3	0.9	*3
CHB-03A-04	1.5	60	87	91	2700	9.5	14×11×3	0.9	*3
CHB-03A-05	1.5	60	87	91	2700	9.5	14×11×3	0.9	*3
CHB-03B	3	70	87	93	2700	18	14×11×3	0.9	74
CHB-03B-04	3	70	90	93	3200	18	14×11×3	0.9	75
CHB-03B-05	3	70	87	93	2700	18	14×11×3	0.9	*3
CHB-03C	5	80	87	94	2700	40	14×11×3	0.9	75
CHB-03C-04	5	80	(90)	94	2700	40	14×11×3	0.9	75
CHB-03D	5	80	87	95	2730	40	14×11×3.4	1.0	75
CHB-03E	1.5	70	85	89	2700	8.5	10×10×3	0.7	76
CHB-03F	3.6	80	85	91	2700	25	10×10×3	0.7	76
CHB-03F-02	3.6	80	85	91	2700	25	10×10×3	0.7	*3
CHB-03G	5	80	85	91	2700	40	10×10×3	0.7	76
CHB-03H-03	2.3	80	85	88	2666	16	10×10×3	0.8	*3
CHB-03J	3	80	85	91	2700	20	10×10×3	0.7	77
CHB-03L	1.5	70	85	89	2700	8.5	10×10×3	0.7	*3
CHB-03M	3	80	85 *4	91 *4	2700	18	8.5×8.5×3.2	0.6	77
CHB-03N	3	80	85	89	3000	18	8.5×8.5×3.0	0.6	77
CHB-03R	3	80	85 *4	93 *4	2700	18	8.5×8.5×3.2	0.4	78
CHB-04C-05	3	80	85	89	3000	18	8.5×9.05×3.2	0.6	78
CHB-04C-08	2.5	80	87	89	3000	18	8.5×9.05×3.2	0.6	*3
CHB-04D	3	80	85	91	3000	18	8.5×8.5×4	0.6	78
CHB-04D-03	3	80	87 *4	93 *4	2700	18	8.5×8.5×4	0.6	79
CHB-04D-04	4	100	87	92	3000	18	8.5×8.5×4	0.6	*3
CHB-04F	3	80	87	92	3000	18	9×9×4	0.7	79
CHB-04F-04	3	120	92	94	2730	10	9×9×4	0.64	*3
CHB-04G	3.6	80	87	92	2700	25	10×10×4	0.8	79
CHB-04H	5	80	87 *4	93 *4	2500	32	8.5×8.5×4	0.6	80
CHB-04H-03	3	80	87	93	2700	18	8.5×8.5×4	0.6	*3
CHB-04H-05	1.5	80	85	91	2700	8.5	8.5×8.5×4	0.57	*3

\*1 Duty 50%. Square wave

\*2 Anechoic chamber (The distance between mike is 10cm with a single unit.) Single unit

\*3 Parts marked \*3 are not listed in this catalog. Please consult with us for details.

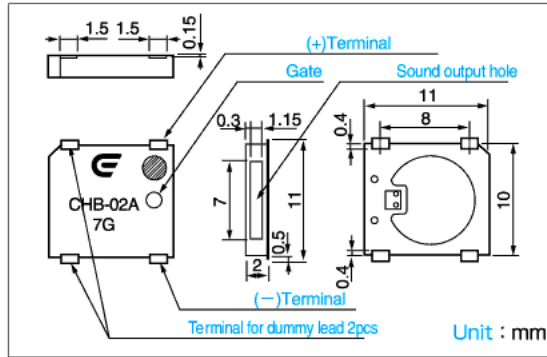
\*4 The sound pressure levels are measured with the simulated housing of which is equivalent to the portable telephone housing in actual mass-production.

# CHB-02A

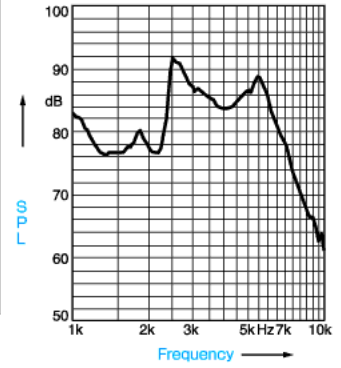


11×10×2mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	3.6	Minimum sound pressure level (dB (A))	83	Driving frequency (Hz)	2700
Average maximum rated current (mA)	80	Average sound pressure level (dB (A))	88	Direct current resistance (Ω)	20

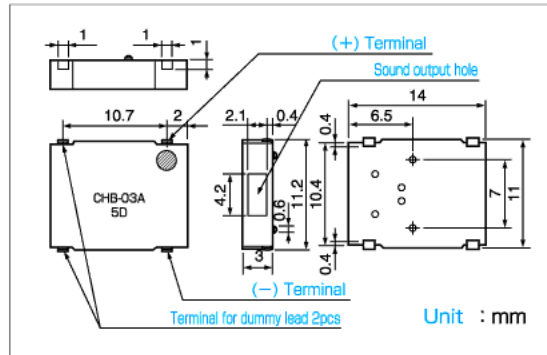
\*1 Duty 50% Square wave \*2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone and (3) with the sound generator alone.

# CHB-03A

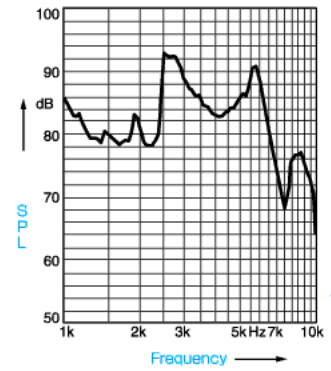


14×11×3mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	1.5	Minimum sound pressure level (dB (A))	87	Driving frequency (Hz)	2700
Average maximum rated current (mA)	60	Average sound pressure level (dB (A))	91	Direct current resistance (Ω)	9.5

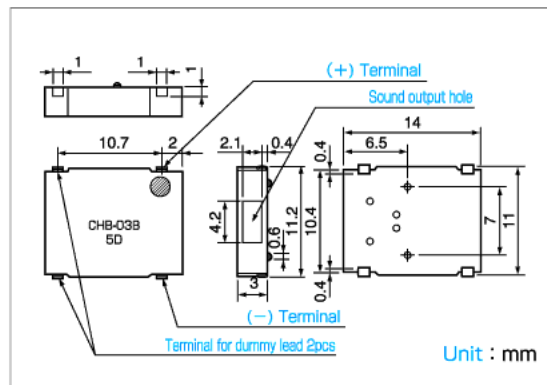
\*1 Duty 50% Square wave \*2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone and (3) with the sound generator alone.

# CHB-03B

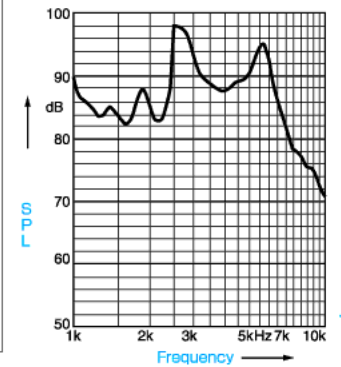


14×11×3mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	3	Minimum sound pressure level (dB (A))	87	Driving frequency (Hz)	2700
Average maximum rated current (mA)	70	Average sound pressure level (dB (A))	93	Direct current resistance (Ω)	18

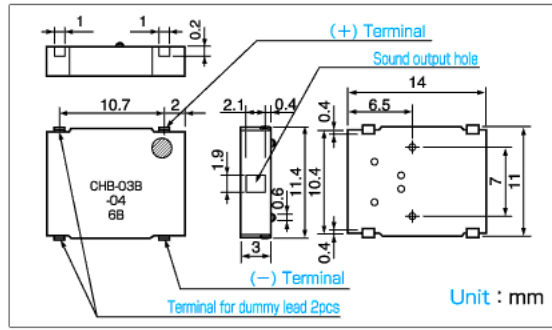
\*1 Duty 50% Square wave \*2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone and (3) with the sound generator alone.

# CHB-03B-04

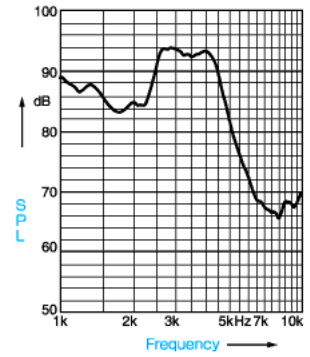


14×11×3mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	3	Minimum sound pressure level (dB (A))	90	Driving frequency (Hz)	3200
Average maximum rated current (mA)	70	Average sound pressure level (dB (A))	93	Direct current resistance (Ω)	18

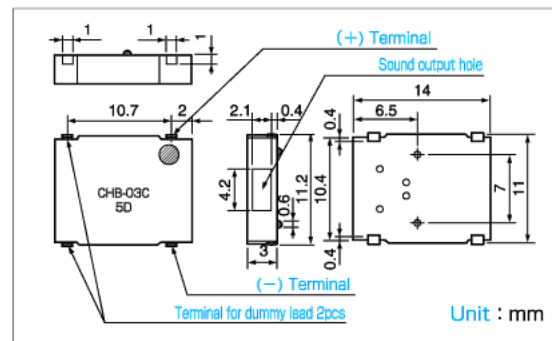
\*1 Duty 50% Square wave \*2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone and (3) with the sound generator alone.

# CHB-03C

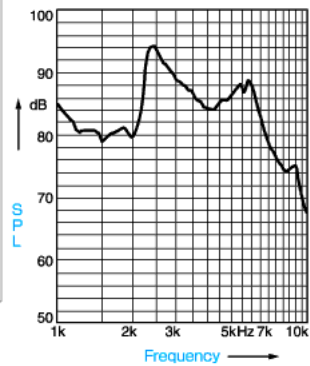


14×11×3mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	5	Minimum sound pressure level (dB (A))	87	Driving frequency (Hz)	2700
Average maximum rated current (mA)	80	Average sound pressure level (dB (A))	94	Direct current resistance (Ω)	40

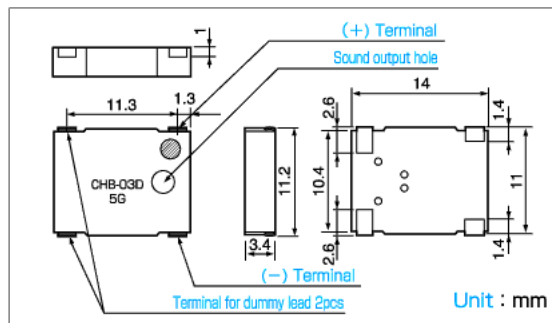
\*1 Duty 50% Square wave \*2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone and (3) with the sound generator alone.

# CHB-03D

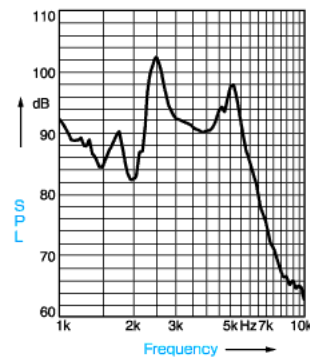


14×11×3.4mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	5	Minimum sound pressure level (dB (A))	87	Driving frequency (Hz)	2730
Average maximum rated current (mA)	80	Average sound pressure level (dB (A))	95	Direct current resistance (Ω)	40

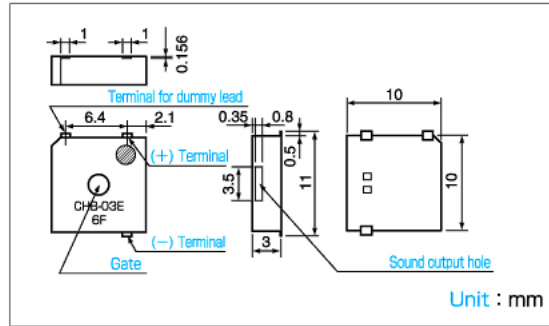
\*1 Duty 50% Square wave \*2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone and (3) with the sound generator alone.

# CHB-03E

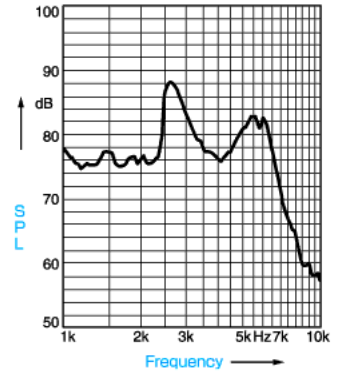


10×10×3mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	1.5	Minimum sound pressure level (dB (A))	85	Driving frequency (Hz)	2700
Average maximum rated current (mA)	70	Average sound pressure level (dB (A))	89	Direct current resistance (Ω)	8.5

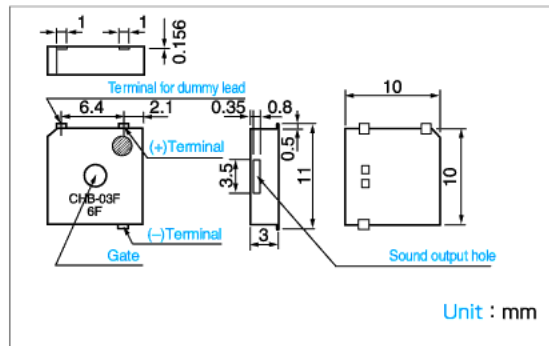
※1 Duty 50% Square wave ※2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone and (3) with the sound generator alone.

# CHB-03F

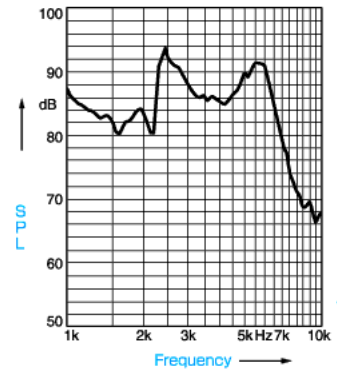


10×10×3mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	3.6	Minimum sound pressure level (dB (A))	85	Driving frequency (Hz)	2700
Average maximum rated current (mA)	80	Average sound pressure level (dB (A))	91	Direct current resistance (Ω)	25

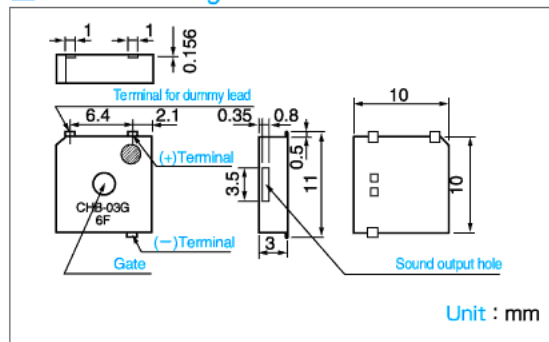
※1 Duty 50% Square wave ※2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone and (3) with the sound generator alone.

# CHB-03G

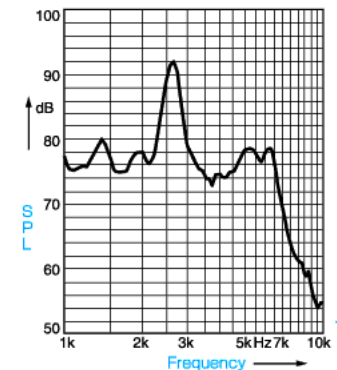


10×10×3mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	5	Minimum sound pressure level (dB (A))	85	Driving frequency (Hz)	2700
Average maximum rated current (mA)	80	Average sound pressure level (dB (A))	91	Direct current resistance (Ω)	40

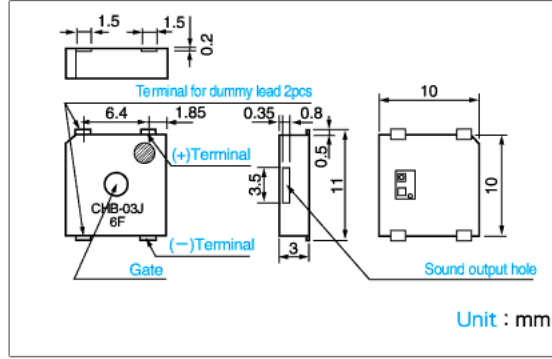
※1 Duty 50% Square wave ※2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone and (3) with the sound generator alone.

# CHB-03J

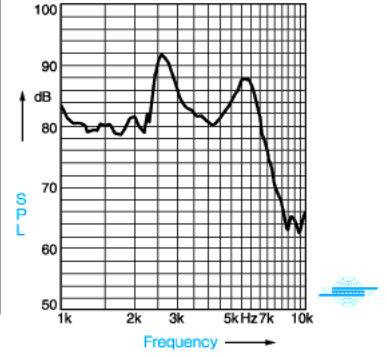


10×10×3mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	3	Minimum sound pressure level (dB (A))	85	Driving frequency (Hz)	2700
Average maximum rated current (mA)	80	Average sound pressure level (dB (A))	91	Direct current resistance (Ω)	20

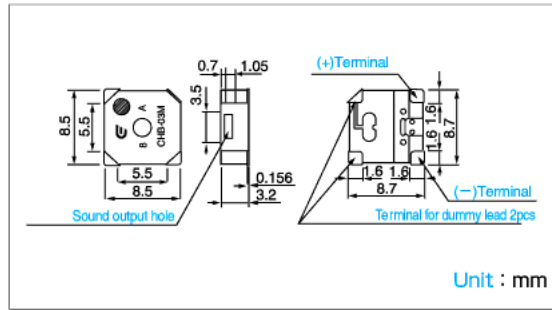
※1 Duty 50% Square wave ※2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone and (3) with the sound generator alone.

# CHB-03M

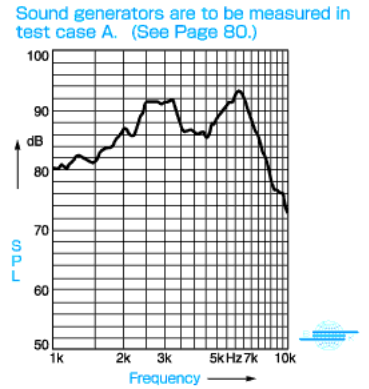


8.7×8.7×3.2mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	3	Minimum sound pressure level (dB (A))	85	Driving frequency (Hz)	2700
Average maximum rated current (mA)	80	Average sound pressure level (dB (A))	91	Direct current resistance (Ω)	18

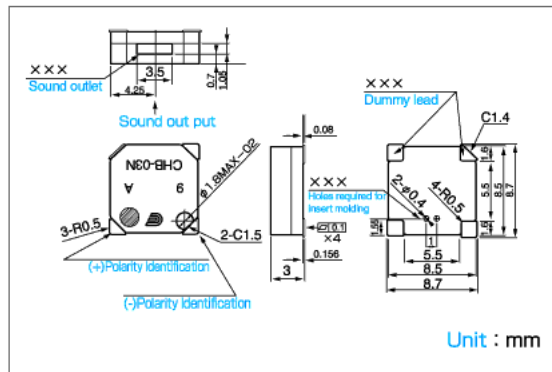
※1 Duty 50% Square wave ※2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone

# CHB-03N

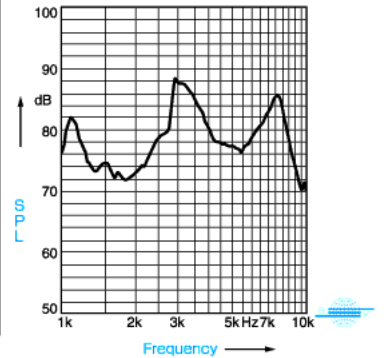


8.7×8.7×3mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	3.0	Minimum sound pressure level (dB (A))	85	Driving frequency (Hz)	3000
Average maximum rated current (mA)	80	Average sound pressure level (dB (A))	89	Direct current resistance (Ω)	18

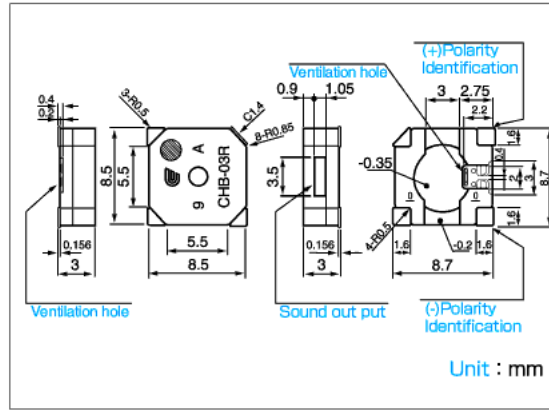
※1 Duty 50% Square wave ※2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone and (3) with the sound generator alone.

# CHB-03R

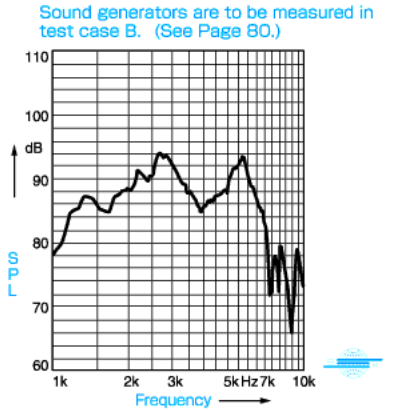


8.7×8.7×3mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	3.0	Minimum sound pressure level (dB (A))	85	Driving frequency (Hz)	2700
Average maximum rated current (mA)	80	Average sound pressure level (dB (A))	93	Direct current resistance (Ω)	18

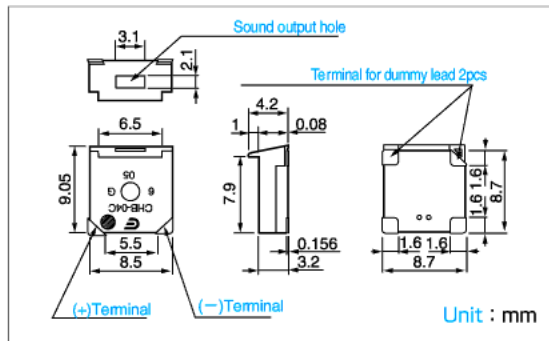
\*1 Duty 50% Square wave \*2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone

# CHB-04C-05

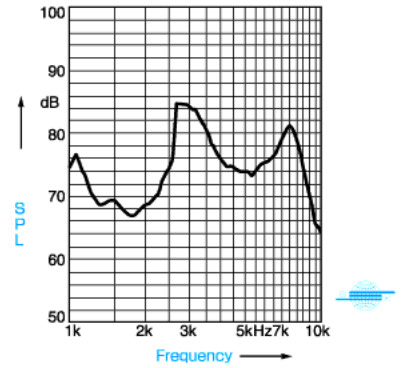


8.5×9.05×3.2mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	3	Minimum sound pressure level (dB (A))	85	Driving frequency (Hz)	3000
Average maximum rated current (mA)	80	Average sound pressure level (dB (A))	89	Direct current resistance (Ω)	18

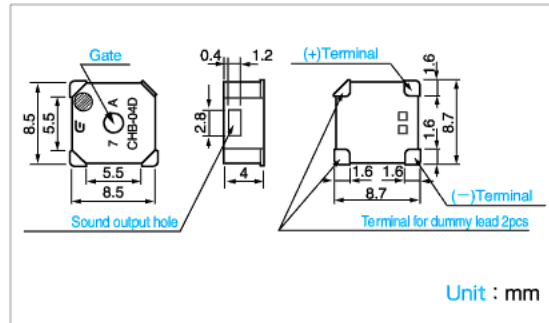
\*1 Duty 50% Square wave \*2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone and (3) with the sound generator alone.

# CHB-04D

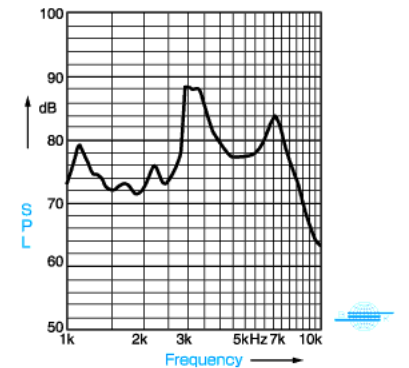


8.7×8.7×4mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	3	Minimum sound pressure level (dB (A))	85	Driving frequency (Hz)	3000
Average maximum rated current (mA)	80	Average sound pressure level (dB (A))	91	Direct current resistance (Ω)	18

\*1 Duty 50% Square wave \*2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone and (3) with the sound generator alone.

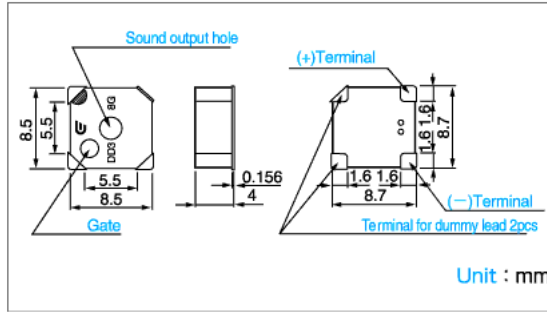


# CHB-04D-03



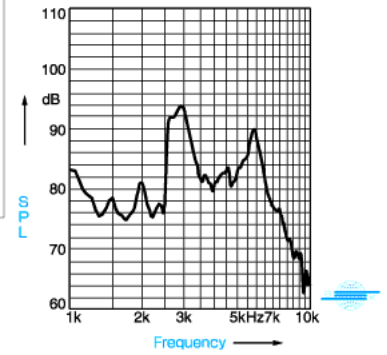
8.7×8.7×4mm

## Outline drawing



## Frequency characteristics

Sound generators are to be measured in test case A. (See Page 80.)



## Specifications

Rated voltage*1 (V)	3	Minimum sound pressure level (dB (A))	87	Driving frequency (Hz)	2700
Average maximum rated current (mA)	80	Average sound pressure level (dB (A))	93	Direct current resistance (Ω)	18

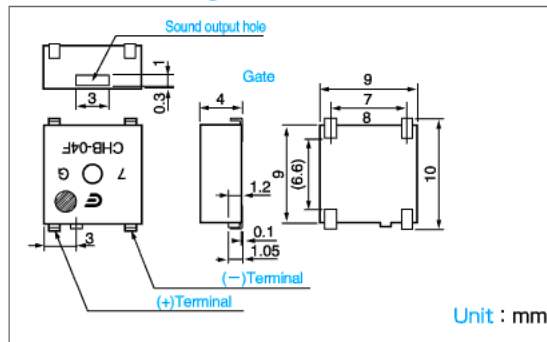
\*1 Duty 50% Square wave \*2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone

# CHB-04F

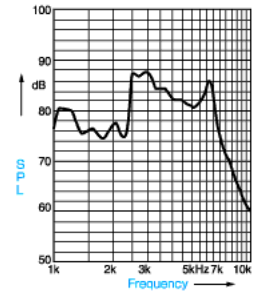


9×10×4mm

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage*1 (V)	3	Minimum sound pressure level (dB (A))	87	Driving frequency (Hz)	3000
Average maximum rated current (mA)	80	Average sound pressure level (dB (A))	92	Direct current resistance (Ω)	18

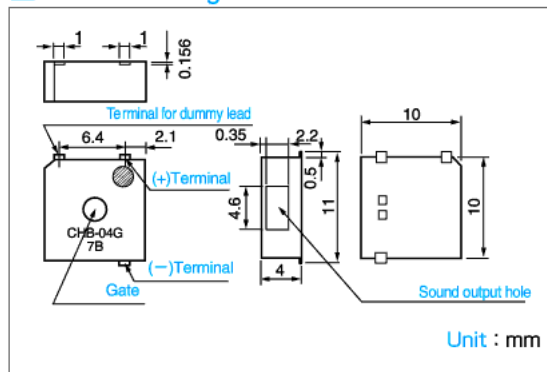
\*1 Duty 50% Square wave \*2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone and (3) with the sound generator alone.

# CHB-04G

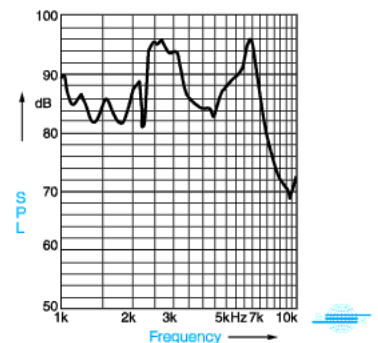


10×10×4mm

## Outline drawing



## Frequency characteristics



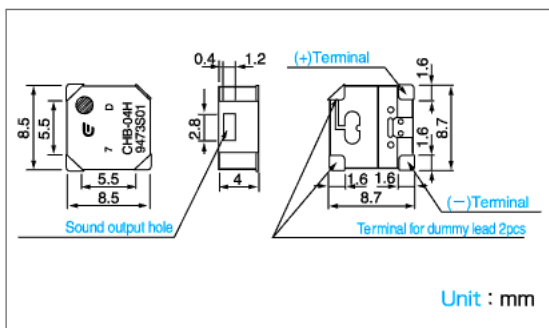
## Specifications

Rated voltage*1 (V)	3.6	Minimum sound pressure level (dB (A))	87	Driving frequency (Hz)	2700
Average maximum rated current (mA)	80	Average sound pressure level (dB (A))	92	Direct current resistance (Ω)	25

\*1 Duty 50% Square wave \*2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone and (3) with the sound generator alone.

# CHB-04H

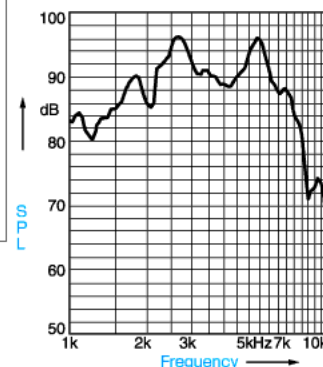
## Outline drawing



8.7×8.7×4mm

## Frequency characteristics

Sound generators are to be measured in test case C. (See Page 80.)



## Specifications

Rated voltage*1	(V)	5	Minimum sound pressure level	(dB (A))	87*	Driving frequency	(Hz)	2500
Average maximum rated current	(mA)	80	Average sound pressure level	(dB (A))	93	Direct current resistance	(Ω)	32

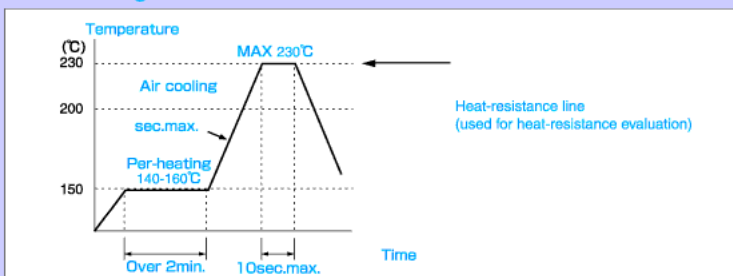
\*1 Duty 50% Square wave \*2 The condition is to take measurements (1) in the anechoic chamber, (2) at the distance of 10cm in front of sound output hole to the microphone

## CHB Series

## Precaution

1. Connect with the correct polarity.
2. Use a peak reflow temperature not higher than 230°C.
3. The sound generator is not washable.
4. The gate opening of the injection mold may be changed without notice.
5. The sound pressure is influenced by surrounding conditions (baffles, cavities, sound insulators etc.) and the drive conditions, so consider these factors and take their effects into account.

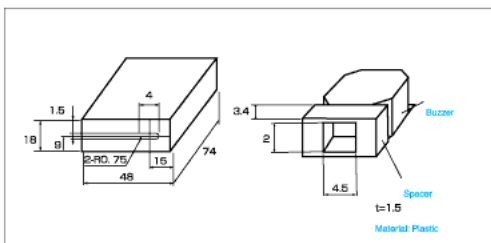
## Soldering Conditions



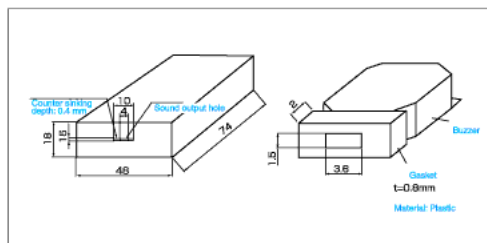
## Test Case Providing Higher Sound Pressure Effects

Installing the CHB-03M, CHB-03R, CHB-04D-03, and CHB-04H into the test cases illustrated below permits higher sound pressure effects as indicated by the values of frequency characteristics and minimum sound pressure specifications.

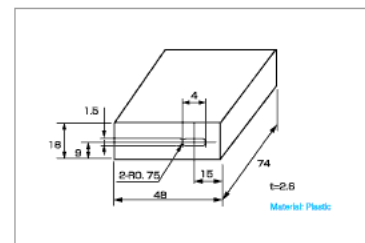
- Test Case A  
Used with CHB-03M and CHB-04D-03



- Test Case B  
Used with CHB-03R



- Test Case C  
Used with CHB-04M



# Small Magnetic Type Sound Generators CB Series

## ■ Features

1. Small size and lightweight for versatile usage
2. Non-mechanical contacts afford high reliability and long life.
3. No electrical noise
4. Low current consumption, yet high sound pressure level
5. Clear and stable sound quality is obtainable.

## ■ Application

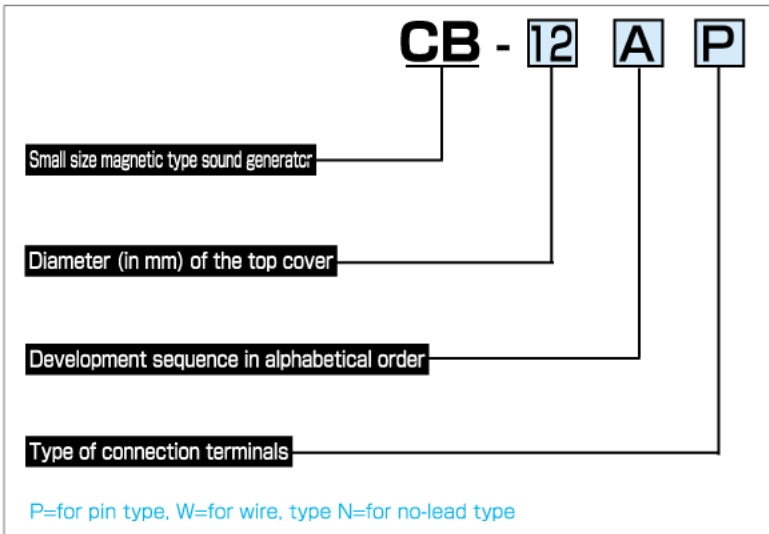
Mobile telephones, cordless telephones, pagers, electric home appliances, safety device for automobile (CB-16CP, CB-25AP), clocks, office automation equipment, timers etc.

## ■ Precaution

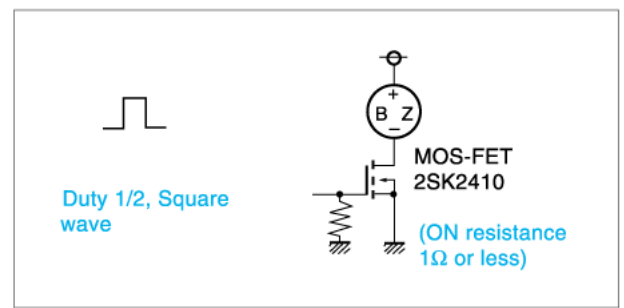
1. Washing by solvent is not allowed except the CB-12TP and the CB-16BP series.
2. Stress or force should not be added to the root portion of the lead pins.
3. As the sound pressure level is highly affected by environmental elements such as baffle, cavity and interfering objects, due care must be taken to avoid adverse reactions.
4. An outside oscillating circuit is necessary in order to drive the CB.
5. The CB should be free from dirt, dust, condensation, gas of flux and other foreign particles. This should be taken into account when designing the apparatus. Should these particles get inside CB through the sound output hole, the characteristics of the CB may be changed.
6. If current is limited, the rated sound pressure may not be produced.
7. Ensure that the circuit used is able to supply even peak current.

※ Please see the individual specifications manual and applications manual for precautions.

## Code for parts



## Standard inspection circuit



## CB Series Selection Guide

Code for parts	Specifications Rated voltage (V DC)	Rated current (mA)		MIN. sound pressure level at 10cm (dB)	Resonance frequency (Hz)	Direct current resistance (Ω)	Operating voltage range (VDC)	Net weight (grs.)	Outer dimensions (mm)		Connection leads			Page in this catalog
		Average	Peak						Diameter	Height	Pin type	Wire type	No-lead type	
CB-09F	3	100	200	85	2,700	15	1.1~4	0.7	φ9×4	○	○	○	※1	
CB-09G	5	100	200	85	2,700	25	1.1~6	0.7	φ9×5.5	○	○		83	
CB-09H	3	70	200	85	2,700	18	1.1~4	0.5	φ9×4	○	○	○	83	
CB-12A	1.5	10	30	80	2,048	42	1.1~1.7	2	φ12×8.5	○	○	○	83	
CB-12C	1.5	10	30	80	4,096	42	1.1~1.7	2	φ12×8.5	○	○	○	84	
CB-12E	1.5	10	30	70	2,048	42	1.1~1.7	1.8	φ12×5.4	○	○	○	84	
CB-12G	1.5	24	70	85	2,048	17	1.1~1.7	2	φ12×8.5	○	○	○	84	
CB-12H	1.5	70	30	85	2,700	51	1.1~1.7	1.2	φ12×5.0	○	○		※1	
CB-12HN-01	2.4	100	200	85	2,700	10	1.1~3	1.5	φ12×4.8	○	○	○	※1	
CB-12QP-01	1.5	10	30	70	2,048	42	1.0~2	2	φ12×7.5	○			85	
CB-12QP-03	1.5	70	200	85	2,731	5	1.0~2	2	φ12×7.5	○			85	
CB-12QP-09	1.5	70	200	85	2,700	5	1.0~2	2	φ12×6.0	○			85	
CB-12R	1.5	24	70	88	2,048	17	1.1~1.7	1.6	φ12×10	○			※1	
CB-12T ※2	1.5	8.5	30	85	4,096	51	1.1~1.7	1.7	φ12×10	○			86	
CB-16BP-06B※2	6	24	80	85	2,048	50	4~9	5	φ16×14	○			86	
CB-16BP-12B※2	12	24	80	85	2,048	115	6~18	5	φ16×14	○			86	
CB-16CP-12	12	24	80	85	2,048	127	6~18	5	φ16×14	○			87	
CB-25AP ※2	5	80	180	85	800	33	3~6	8.2	φ25×12.5	○			87	

※1 Parts marked ※1 are not listed in this catalog. Please consult with us for details.

※2 Epoxy resin sealant is used, which makes these models good for washing and dip soldering.

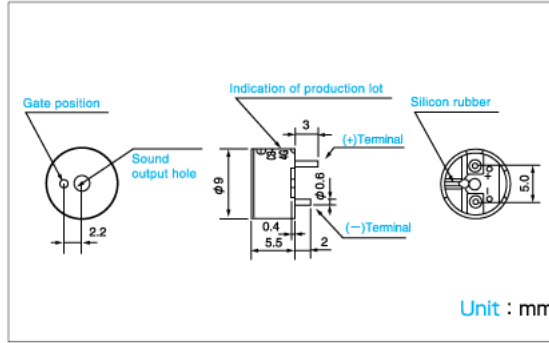
# CB-09GP



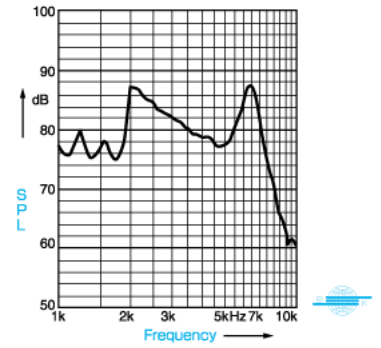
φ9×5.5mm

Connection leads : P,W,N

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage (V)	5	Sound pressure level* (dB)	min.85 (at 10cm) typ.90	DC resistance (Ω)	25
Average current consumption* (mA)	max.100	Driving frequency (Hz)	2,700	Operating voltage range (VDC)	1.1~6

★At 3V, 2,700Hz, 1/2 duty, square wave

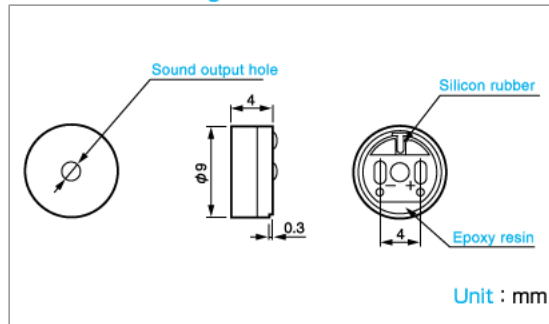
# CB-09H



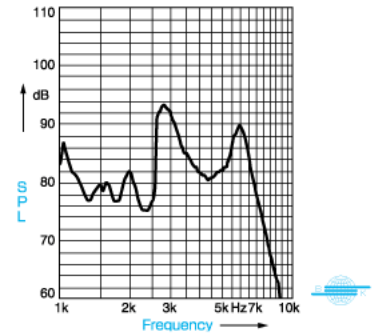
φ9×4mm

Connection leads : P,W,N

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage (V)	3	Sound pressure level* (dB)	min.85 (at 10cm) typ.90	DC resistance (Ω)	18
Average current consumption* (mA)	max.70	Driving frequency (Hz)	2,700	Operating voltage range (VDC)	1.1~1.4

★At 5V, 2,700Hz, 1/2 duty, square wave

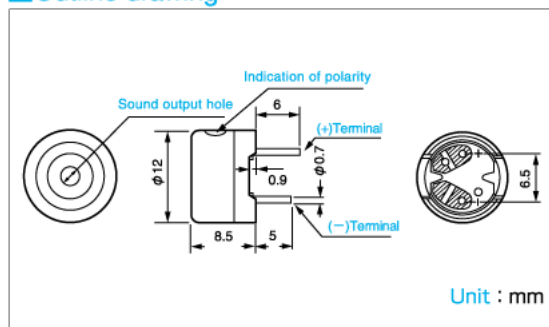
# CB-12AP-03



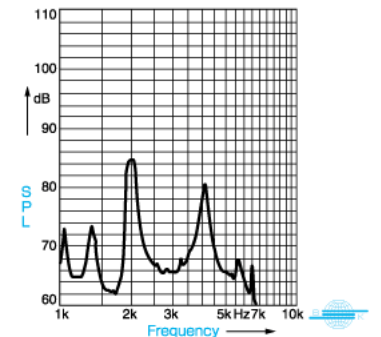
φ12×8.5mm

Connection leads : P,W,N

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage (V)	1.5	Sound pressure level* (dB)	min.80 (at 10cm) typ.88	DC resistance (Ω)	42
Average current consumption* (mA)	max10	Driving frequency (Hz)	2,048	Operating voltage range (VDC)	1.1~1.7※

★At 1.5V, 2,048Hz, 1/2 duty, square wave

※Operating voltage of up to 5V can be used. Please consult with us for details.

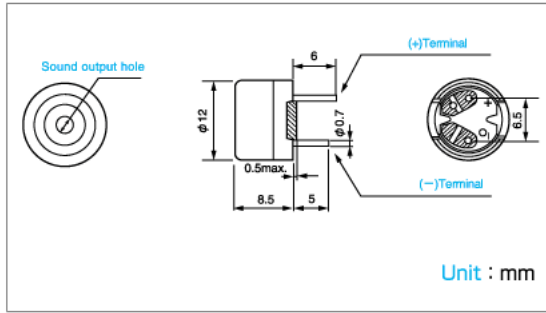
# CB-12CP



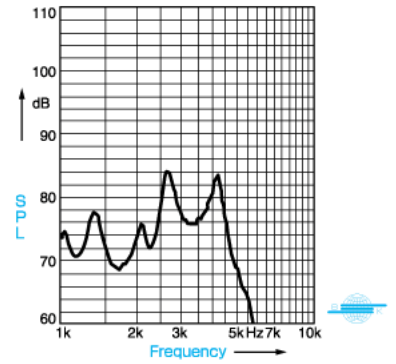
φ 12×8.5mm

Connection leads : P,W,N

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage (V)	1.5	Sound pressure level* (dB)	min.80 (at 10cm) typ.83	DC resistance (Ω)	42
Average current consumption* (mA)	max.10	Driving frequency (Hz)	4,096	Operating voltage range (VDC)	1.1~1.7*

★At 1.5V, 4,096Hz, 1/2 duty, square wave

\*Operating voltage of up to 5V can be used. Please consult with us for details.

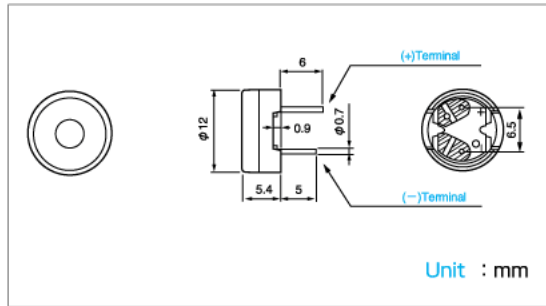
# CB-12EP



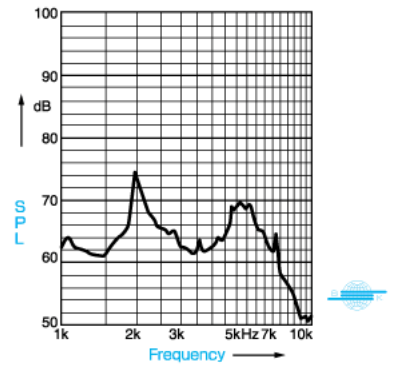
φ 12×5.4mm

Connection leads : P,W,N

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage (V)	1.5	Sound pressure level* (dB)	min.70 (at 10cm) typ.77	DC resistance (Ω)	42
Average current consumption* (mA)	max.10	Driving frequency (Hz)	2,048	Operating voltage range (VDC)	1.1~1.7*

★At 1.5V, 2,048Hz, 1/2 duty, square wave

\*Operating voltage of up to 3V can be used. Please consult with us for details.

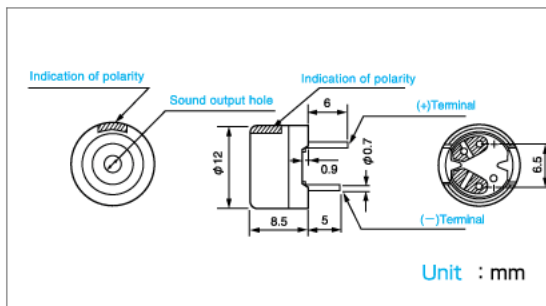
# CB-12GP-03



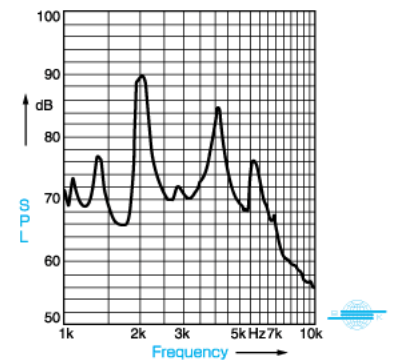
φ 12×8.5mm

Connection leads : P,W,N

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage (V)	1.5	Sound pressure level* (dB)	min.85 (at 10cm) typ.90	DC resistance (Ω)	17
Average current consumption* (mA)	max.24	Driving frequency (Hz)	2,048	Operating voltage range (VDC)	1.1~1.7

★At 1.5V, 2,048Hz, 1/2 duty, square wave

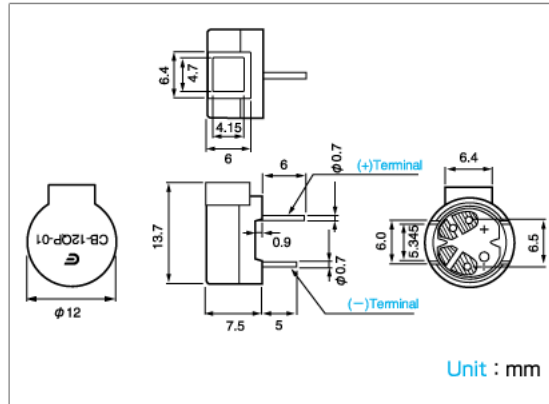
# CB-12QP-01



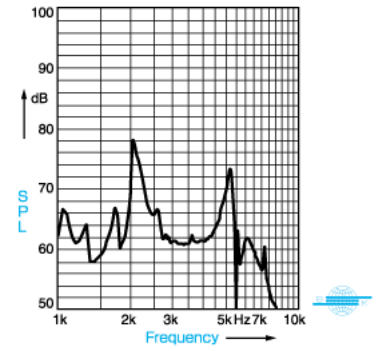
φ 13.7×7.5mm

Connection leads : P

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage (V)	1.5	Sound pressure level* (dB)	min.70 typ.77 (at 10cm)	DC resistance (Ω)	42
Average current consumption* (mA)	max.10	Driving frequency (Hz)	2,048	Operating voltage range (VDC)	1~2

★At 1.5V, 2,048Hz, 1/2 duty, square wave

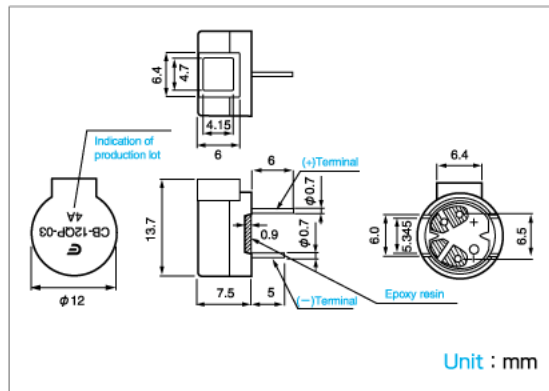
# CB-12QP-03



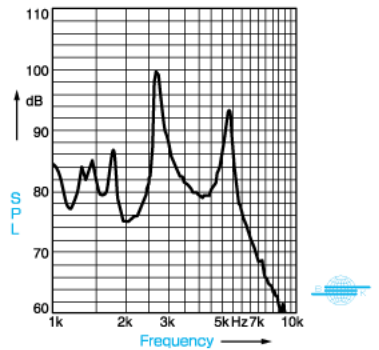
φ 13.7×7.5mm

Connection leads : P

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage (V)	1.5	Sound pressure level* (dB)	min.85 typ.90 (at 10cm)	DC resistance (Ω)	5
Average current consumption* (mA)	max.70	Driving frequency (Hz)	2,731	Operating voltage range (VDC)	1~2

★At 1.5V, 2,731Hz, 1/2 duty, square wave

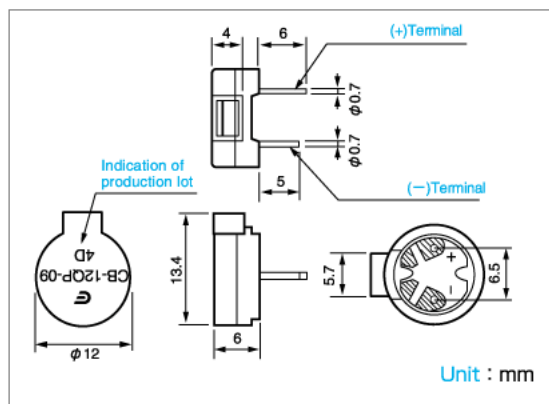
# CB-12QP-09



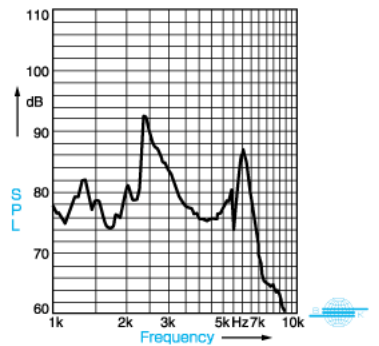
φ 13.4×6mm

Connection leads : P

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage (V)	1.5	Sound pressure level* (dB)	min.85 typ.90 (at 10cm)	DC resistance (Ω)	5
Average current consumption* (mA)	max.70	Driving frequency (Hz)	2,700	Operating voltage range (VDC)	1~2

★At 1.5V, 2,731Hz, 1/2 duty, square wave

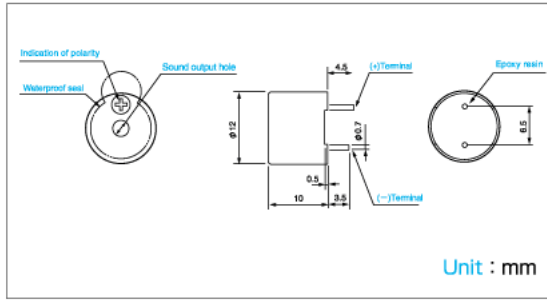
# CB-12TP



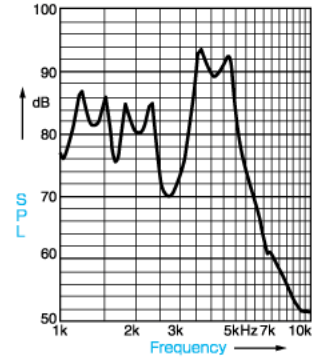
φ 12×10mm

Washable  
Connection leads : P

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage (V)	1.5	Sound pressure level* (dB)	min.85 typ.89 (at 10cm)	DC resistance (Ω)	51
Average current consumption* (mA)	max.8.5	Driving frequency (Hz)	4,096	Operating voltage range (VDC)	1.1~1.7※

★At 1.5V, 4,096Hz, 1/2 duty, square wave

※Operating voltage of up to 5V can be used. Please consult with us for details.

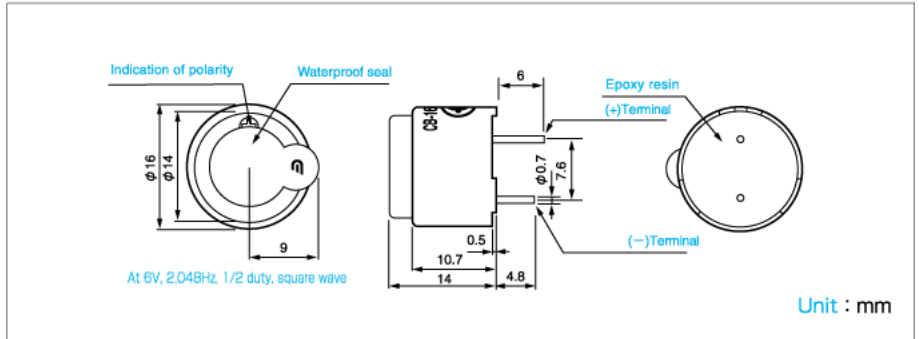
# CB-16BP-06B CB-16BP-12B



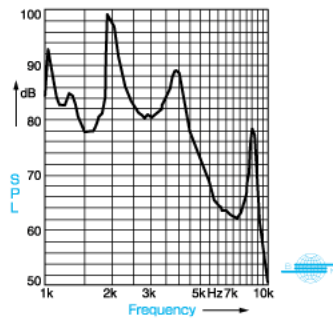
φ 16×10.7mm

Washable  
Connection leads : P

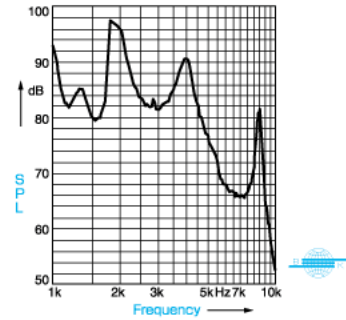
## Outline drawing (CB-16BP-06B, CB-16BP-12B)



## (CB-16BP-06B) Frequency characteristics



## (CB-16BP-12B) Frequency characteristics



## Specifications

### CB-16BP-06B

Rated voltage (V)	6	Sound pressure level* (dB)	min.85 typ.96 (at 10cm)	DC resistance (Ω)	50
Average current consumption* (mA)	max.24	Driving frequency (Hz)	2,048	Operating voltage range (VDC)	4~9

★

### CB-16BP-12B

Rated voltage (V)	12	Sound pressure level* (dB)	min.85 typ.90 (at 10cm)	DC resistance (Ω)	115
Average current consumption* (mA)	max.24	Driving frequency (Hz)	2,048	Operating voltage range (VDC)	6~18

★At 12V, 2,048Hz, 1/2 duty, square wave



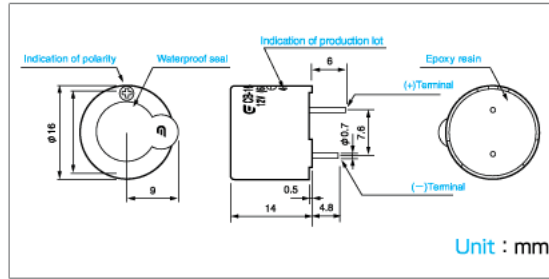
# CB-16CP-12



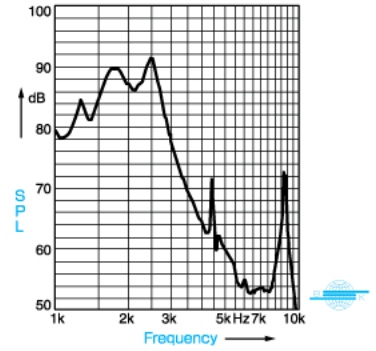
φ 16×14mm

Washable  
Connection leads : P

## Outline drawing (CB-16CP-12)



## Frequency characteristics



## Specifications

Rated voltage (V)	12	Sound pressure level* (dB)	min.85 (at 10cm) typ.96	DC resistance (Ω)	127
Average current consumption* (mA)	max.35	Driving frequency (Hz)	2,048	Operating voltage range (VDC)	6~18

★At 12V, 2,048Hz, 1/2 duty, square wave

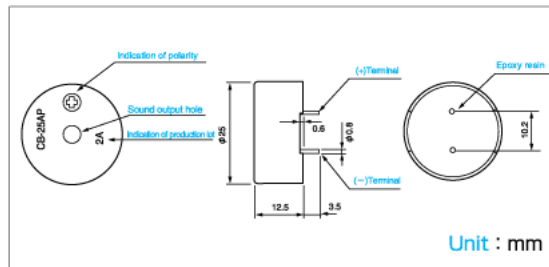
# CB-25AP



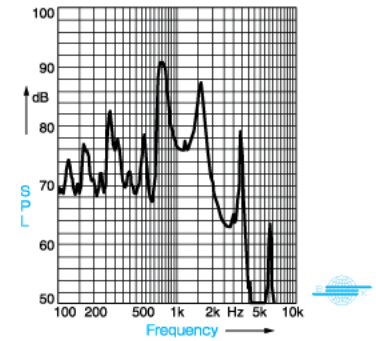
φ 25×12.5mm

Washable  
Connection leads : P

## Outline drawing



## Frequency characteristics



## Specifications

Rated voltage (V)	5	Sound pressure level* (dB)	min.85 (at 10cm) typ.90	DC resistance (Ω)	33±5
Average current consumption* (mA)	max.80	Driving frequency (Hz)	800	Operating voltage range (VDC)	3~6

★At 5V, 800Hz, 1/2 duty, square wave

# Micro Buzzers With Oscillating Circuit MEB Series

## MEB-12C-5



φ12×7.5mm

### ■ Features

1. Ultra compact, ultra thin and light weight construction
2. Oscillating circuit is built in.
3. Non-mechanical contacts afford reliability and long life.
4. No electrical noise
5. Low current consumption, yet high sound pressure level
6. As an optional part, carrier tube magazine is available for automatic insertion for some of the buzzers.

### ■ Application

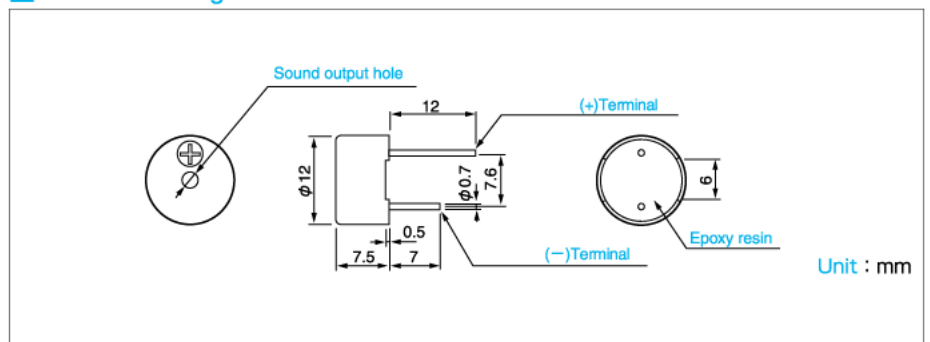
Office automation equipment, electric household equipment etc.

### ■ Precautions

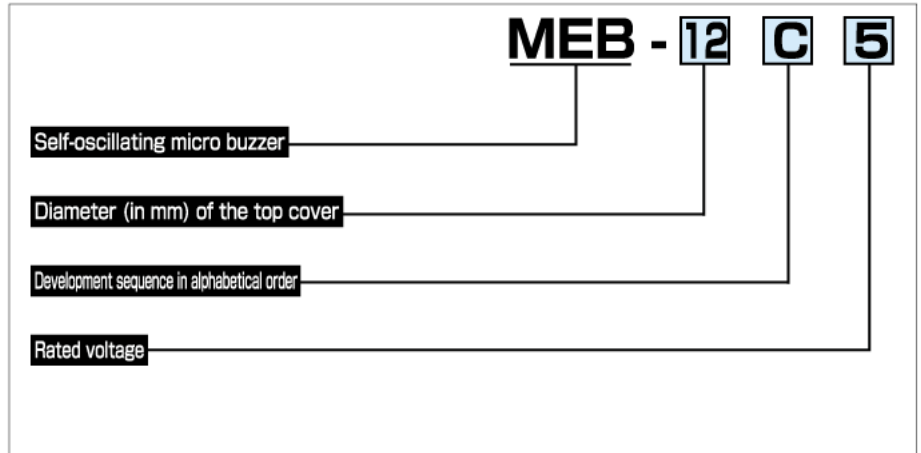
1. Stress or force should not be added to the root portion of lead pins.
2. As the sound pressure level is highly affected by environmental elements such as baffle, cavity and interfering objects, due care must be taken to avoid adverse reactions.
3. The MEB should be free from dirt, dust, condensation, gas of flux and other foreign particles. This should be taken into account when designing the apparatus. Should these particles get inside the MEB through the sound output hole, the characteristics of the MEB may be changed.
4. Use the buzzer with a power supply with a voltage which has stabilized fully within the operating voltage range.
5. If a resistance in series is used to reduce the voltage on which the buzzer operates, its operation will be unstable, so this practice should be avoided.
6. The peak current which flows is two or three times greater than the average current consumed, so ensure that the circuit used is able to supply an adequate current.
7. The response time is 50 ms; therefore, a vibration time of 100 ms or greater should be set as a guideline.

※ Please see the individual specifications manual and applications manual for precautions.

### ■ Outline drawing



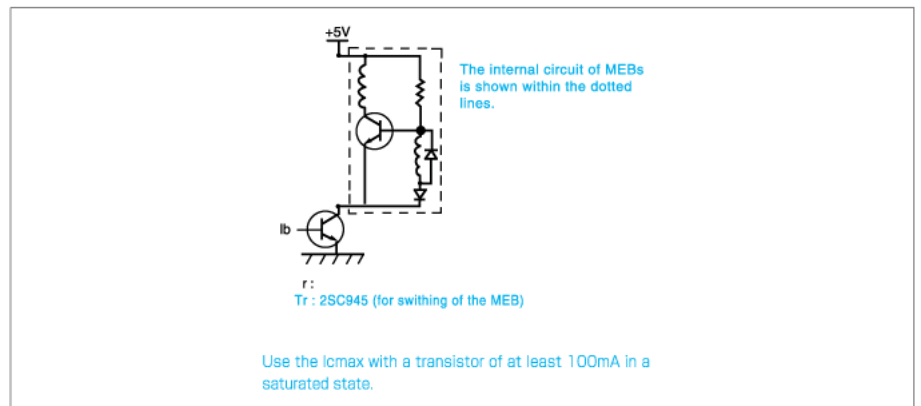
## Code for parts



## Specifications(MEB-12C-5)

Rated voltage (VDC)	5	Operating temperature	-20(°C)~+60(°C)	
Rated current (mA)	25(at 5V)	Pin polarity	(+)	Long pin
Sound pressure level (dB)	min.80(at 5V DC) typ.87(at 10cm)		(-)	Short pin
Operating voltage range (VDC)	3~6	Net weight (grs.)	1.6	

## Standard Driving Circuit (MEB-12C-5)



# Dynamic speakers CS Series

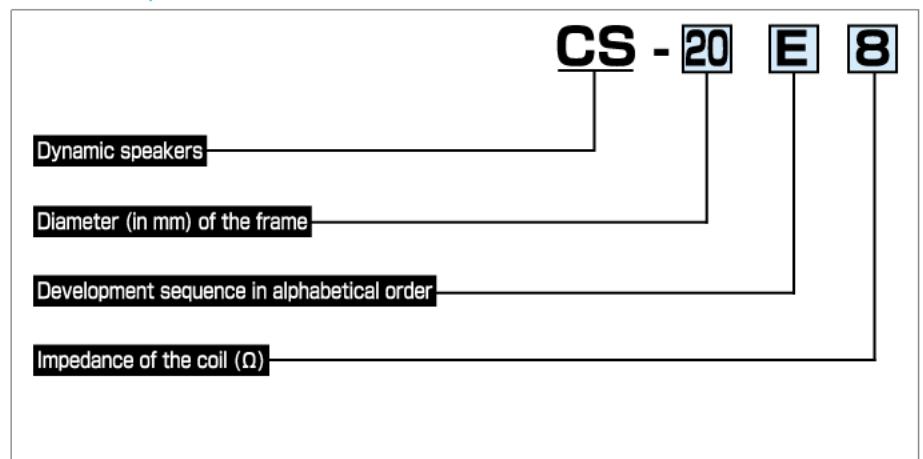
## ■ Features

1. Suitable for reproduction of electronic sound
2. Thin and compact construction
3. A wide reproduction frequency range
4. High quality sound and high sound pressure level are obtainable.
5. A special coil wire is used whereby there is least chance of wire breakage due to fatigue.

## ■ Application

Mobile telephones, cordless telephones, electronic music boxes, clocks, computer peripherals etc.

## ■ Code for parts



## ■ CS Series Selection Guide

Code for parts	Specs. Rated input (VDC)	Max. input (mA)	Impedance (Ω)	Min. sound pressure level at 1kHz (dB)	Min. resonance frequency (Hz)	Distortion factor (%)	Outer dimensions (mm)		Net weight (grs.)
							Diameter	Height	
CS-20E-8	0.1	0.15	8(±20%)	80	800(±150)	10 or less	φ20±0.1	3.3±0.1	1.5
CS-29C-8	0.1	0.15	8(±20%)	85	800(±150)	10 or less	φ29±0.1	6.8±0.2	8.7
CS-29D-8	0.1	0.15	8(±20%)	85	620(±150)	10 or less	φ29±0.1	6.8±0.2	8.7

## ■ Precautions

1. The sound generator is not washable.
2. As the sound pressure level is highly affected by environmental elements such as baffle, cavity and interfering objects, due care must be taken to avoid adverse reactions.
3. An outside oscillating circuit is necessary in order to drive the CS.
4. Do not apply stress to the diaphragm.
5. Do not seal the air through-holes in the back.

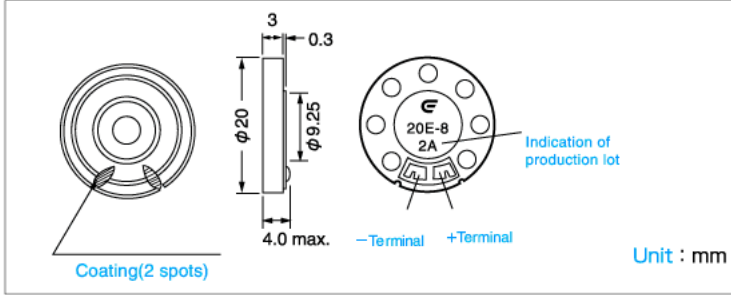
※ Please see the individual specifications manual and applications manual for precautions.

# CS-20E



φ20×3.3mm

## Outline drawing

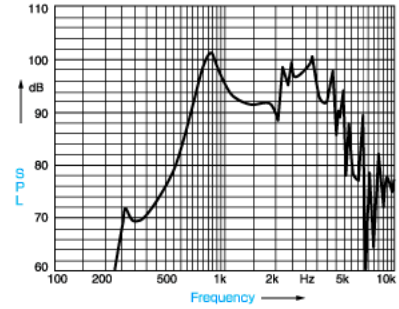


## Specifications

Item	Standard	Condition of measurement
Rated input (W)	0.1	—
Maximum input (W)	0.15	—
Impedance (Ω)	8	—
Sound pressure level (dB)	min80	Input frequency of 1kHz, 0.1W, measured at 10cm in a box of 400cm <sup>3</sup>
Minimum resonance frequency (Hz)	800	—
frequency range	No abnormal sound should exist between f <sub>s</sub> (800±150Hz) and 3kHz.	
Distortion factor (%)	10 or less	Input frequency 1.5kHz, 0.1W
Net weight (grs.)	1.5	—

The specs are only for 8Ω version. Please ask for specs for 32Ω version if you need.

## Frequency characteristics

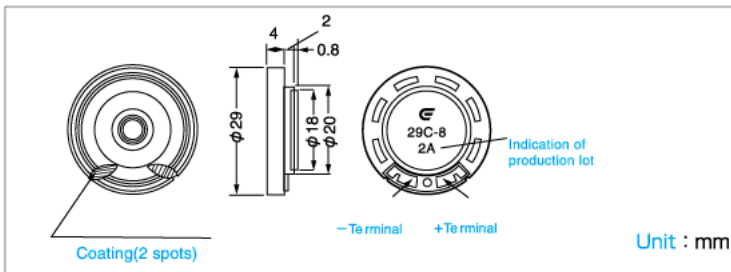


# CS-29C



φ29×4.2mm

## Outline drawing

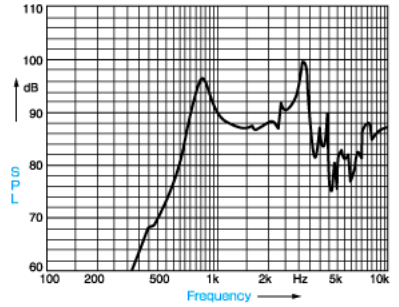


## Specifications

Item	Standard	Condition of measurement
Rated input (W)	0.1	—
Maximum input (W)	0.15	—
Impedance (Ω)	8	—
Sound pressure level (dB)	min85	Input frequency of 1kHz, 0.1W, measured at 10cm in a box of 400cm <sup>3</sup>
Minimum resonance frequency (Hz)	800	—
frequency range	No abnormal sound should exist between f <sub>s</sub> (800±150Hz) and 3kHz.	
Distortion factor (%)	10 or less	Input frequency 1.5kHz, 0.1W
Net weight (grs.)	8.7	—

The specs are only for 8Ω version. Please ask for specs for 32Ω version if you need.

## Frequency characteristics

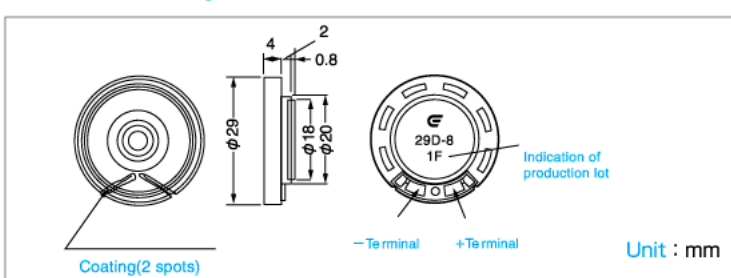


# CS-29D



φ29×4.2mm

## Outline drawing



## Specifications

Item	Standard	Condition of measurement
Rated input (W)	0.1	—
Maximum input (W)	0.15	—
Impedance (Ω)	8	—
Sound pressure level (dB)	min85	Input frequency of 1kHz, 0.1W, measured at 10cm in a box of 400cm <sup>3</sup>
Minimum resonance frequency (Hz)	620	—
frequency range	No abnormal sound should exist between f <sub>s</sub> (620±150Hz) and 3kHz.	
Distortion factor (%)	10 or less	Input frequency 1.5kHz, 0.1W
Net weight (grs.)	8.7	—

The specs are only for 8Ω version. Please ask for specs for 32Ω version if you need.

## Frequency characteristics

