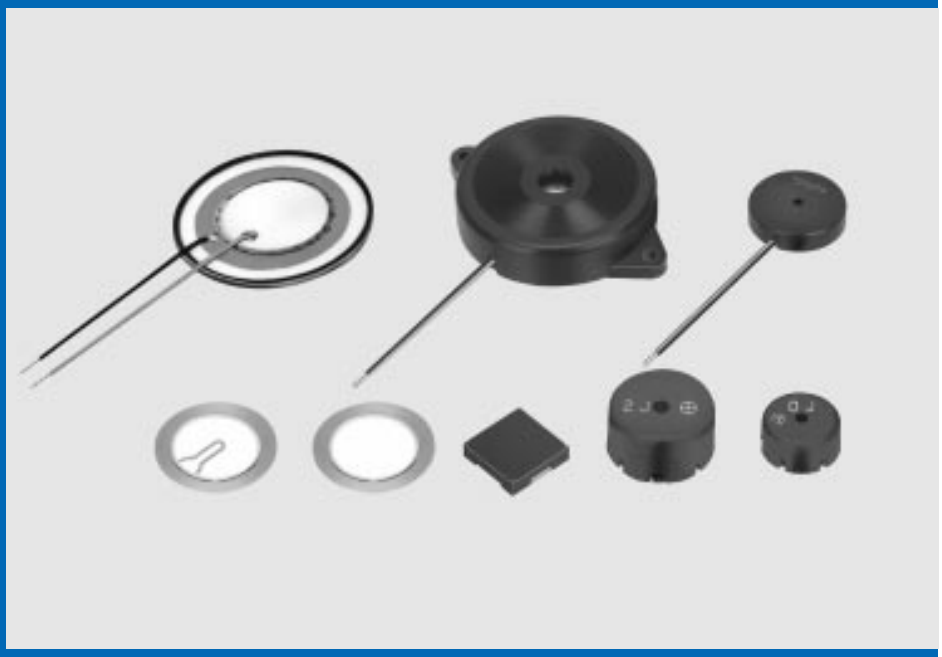
# Piezoelectric Sound Components

# PIEZOELECTRIC SOUND COMPONENTS



GLOBAL PART NUMBERS
JUNE 2001

muRata Innovator in Electronics
Murata Manufacturing Co., Ltd.

Cat.No.P37E-17

# CONTENTS

## ● Part Numbering (The structure of the "Global Part Numbers" that have been adopted since June 2001 and the meaning of each code are described herein. If you have any questions about details, inquire at your usual Murata sales office or distributor.)

### Piezoelectric Sounders/Piezoelectric Buzzers/Piezoelectric Ringers(PIEZORINGER®)

(Global Part Number) PK ❶ | M ❷ | 13 ❸ | E ❹ | P ❺ | Y ❻ | -40 ❼ | 00 ❽ | P ❾ | -A0 ❿

❶Product ID

| Product ID | |
|---|---|
| **PK** | Piezoelectric Sound Components |

❷Product

| Code | Product |
|---|---|
| **M** | Sounder, Ringer |
| **B** | Buzzer |

❸Outer Dimensions

Expressed by two figures in mm.

Ex.)

| Code | Outer Dimensions |
|---|---|
| **13** | ø12.6mm |

❹Drive

| Code | Drive |
|---|---|
| **E** | External-Drive |
| **S** | Self-Drive |

❺Outer Electrode Style

| Code | Outer Electrode Style |
|---|---|
| **P** | Pin Type |
| **W** | Lead Wire Type |

❻Structure

| Code | Structure |
|---|---|
| **T** | Standing Type |
| **P** | Flat Type Auto-assemble |
| **Y** | Flat Type/Available for Taping |
| **C** | Flat Type/Semi-auto-assemble |

❼Oscillating Frequency Type

| Code | Oscillating Frequency Type |
|---|---|
| **-40** | A hyphen (-) plus two-digit figures express Oscillating Frequency type. |

If there is no decimal point, the decimal point is omitted.

❽Individual Specification Code

| Code | Individual Specification Code |
|---|---|
| **00** | Two digits express specific specification in characteristics. |

❾Special Quality Guarantee

| Code | Special Quality Guarantee |
|---|---|
| **P** | Post Plated Terminal |
| — | Omitted |

❿Packaging

| Code | Packaging |
|---|---|
| **-B0** | Bulk |
| **-A0** | Radial Taping |
| **-M0** | Magazine |

Radial taping or magazine are not available for all types. Please contact us.

### SMD Piezoelectric Sounder

(Global Part Number) PK ❶ | LCS ❷ | 1212 ❸ | E ❹ | 40 ❺ | 01 ❻ | -R1 ❼

❶Product ID

| Product ID | |
|---|---|
| **PK** | Piezoelectric Sound Components |

❷Product

| Code | Product |
|---|---|
| **LCS** | SMD Sounder |

❸Dimensions

| Code | Outer Dimensions |
|---|---|
| **1212** | □12mm |

❹Drive

| Code | |
|---|---|
| **E** | External Drive |

❺Oscillating Frequency Type

| Code | |
|---|---|
| **40** | A hyphen (-) plus two-digit figures express Oscillating Frequency type. |

❻Individual Specification Code

| Code | Individual Specification Code |
|---|---|
| **01** | Two digit express specific specification in characteristics. |

❼Packaging

| Code | Packaging |
|---|---|
| **-R1** | Plastic taping |

## SMD Piezoelectric Receiver

(Global Part Number) **PK** **LCD** **1212** **E** **10** **00** **-R1**
❶ ❷ ❸ ❹ ❺ ❻ ❼

❶Product ID

| Product ID | |
|---|---|
| **PK** | Piezoelectric Sound Components |

❷Product

| Code | Product |
|---|---|
| **LCD** | SMD Receiver |

❸Dimensions

| Code | Outer Dimensions |
|---|---|
| **1212** | □12mm |

❹Drive

| Code | |
|---|---|
| **R** | Receiver |

❺Oscillating Frequency Type

| Code | |
|---|---|
| **10** | A hyphen (-) plus two-digit figures express Oscillating Frequency type. |

❻Individual Specification Code

| Code | Individual Specification Code |
|---|---|
| **00** | Two digit express specific specification in characteristics. |

❼Packaging

| Code | Packaging |
|---|---|
| **-R1** | Plastic taping |

## Piezoelectric Diaphragms

(Global Part Number) 7 N B -31R2 DM -1R5 A 10

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

❶Product ID(1)

| Product ID(1) | Ceramic Material |
|---|---|
| **7** | A2 |

❷Product(2)

| Product ID(2) | Metal Plate Material |
|---|---|
| **B** | Brass |
| **N** | Nickel Alloy |
| **M** | Ni Plated Iron |
| **S** | SUS |

❸Product

| Code | Product |
|---|---|
| **B** | Piezoelectric Diaphragms |

❹Metal Plate Diameter

| Code | Metal Plate Diameter |
|---|---|
| **-31R2** | A hyphen (-) plus four-digit alphanumerics express metal plate outer dimensions. A decimal point is expressed by the capital letter "**R**". |

If there is no decimal point, the decimal point code is omitted.

❺Form of Piezoelectric Style

| Code | Form of Piezoelectric Style |
|---|---|
| **DM** | Two digits express shape of ceramics. |

For an Ag electrode, this digit remains blank, the corresponding code is omitted.

❻Resonant Frequency Type

| Code | Resonant Frequency (kHz) |
|---|---|
| **-1R5** | A hyphen (-) and three-digit alphanumerics express resonant frequency. A decimal point is expressed by the capital letter "**R**". |

If there is no decimal point, the decimal point is omitted.

❼With Feedback Electrode

| Code | With Feedback Electrode |
|---|---|
| **C** | With Feedback Electrode |
| — | without Feedback Electrode |

❽Product Specification

| Code | Product Specification |
|---|---|
| **A** | With lead |
| — | No lead (omitted) |

❾Individual Specification Code

| Code | Individual Specification Code |
|---|---|
| **10** | These digits express a lead length, lead number, and presence/absence of a connector. |

If the product has no individual specification, the corresponding code is omitted.

## Piezoelectric Speakers (CERAMITONE® )

(Global Part Number) VS B 35 E W -07 01 B

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽

❶Product ID

| Product ID | |
|---|---|
| **VS** | Piezoelectric Speakers |

❷Product

| Code | Product |
|---|---|
| **B** | Piezoelectric Diaphragms |

❸Outer Dimensions

| Code | Outer Dimensions |
|---|---|
| **35** | ø35mm |
| **50** | ø50mm |

❹Drive

| Code | Drive |
|---|---|
| **E** | External Drive |

❺Outer Electrode Style

| Code | Outer Electrode Style |
|---|---|
| **W** | Lead Wire Type |

❻Resonant Frequency Type

| Code | Resonant Frequency |
|---|---|
| **-03** | 1st Resonant Freqeuncy : 300Hz |
| **-07** | 1st Resonant Freqeuncy : 700Hz |

❼Individual Specification Code

| Code | Individual Specification Code |
|---|---|
| **01** | Characteristics, Style, others |

❽Numbers of Ceramic

| Code | Numbers of Ceramic |
|---|---|
| **B** | Two Elements<br>(The code is omitted when element is one.) |

# Application Matrix

| | | Application / Part Number | Tele-phone | Watch | Clock | Medical Equip-ment | Gas Alarm | Camera | Toy | Bar Code Scanner | Type-Writer | Printer | Note-PC PDA | DVD-Player | Micro-Wave Oven | Air Condi-tioner | Fan Heater |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Piezoelectric Diaphragm | External Drive Type | 7BB-12-9 | | ● | ● | ● | | ● | ● | | | | ● | | | | |
| | | 7BB-15-6 | | | ● | ● | | ● | ● | | | | ● | | | | |
| | | 7BB-20-3 | ● | ● | ● | ● | | | ● | ● | | | | | | | |
| | | 7BB-20-4 | ● | ● | ● | ● | | ● | ● | ● | | | | | | | |
| | | 7BB-20-6 | | | ● | ● | | ● | ● | | | | ● | | | | |
| | | 7BB-20-6A0 | | | ● | ● | | | ● | | | | ● | | | | |
| | | 7BB-27-4 | ● | | ● | ● | | | ● | ● | | | | | | | |
| | | 7BB-27-4A0 | ● | | ● | ● | | | ● | ● | | | | | | | |
| | | 7BB-35-3 | ● | | ● | | | | ● | ● | | | | | | | |
| | | 7BB-35-3A0 | ● | | ● | | | | ● | ● | | | | | | | |
| | | 7BB-41-2 | ● | | | | | | | | | | | | | | |
| | | 7BB-41-2A0 | ● | | | | | | | | | | | | | | |
| | | 7BB-50M-1 | ● | | | | | | | | | | | | | | |
| | | 7SB-20-7 | | ● | ● | ● | | ● | | | | | ● | | | | |
| | Self Drive Type | 7BB-20-6C | ● | | | | | ● | ● | | | | | | | | |
| | | 7BB-20-6CA0 | ● | | | | | ● | ● | | | | | | | | |
| | | 7BB-27-3C | ● | | | | ● | | ● | | | | | | | | |
| | | 7BB-27-4C | ● | | | | ● | | ● | ● | | | | | | | |
| | | 7BB-27-4CA0 | ● | | | | ● | | ● | ● | | | | | | | |
| | | 7BB-35-3C | ● | | | | ● | | | ● | | | | | | | |
| | | 7BB-35-3CA0 | ● | | | | ● | | | ● | | | | | | | |
| | | 7BB-41-20 | ● | | | | | | | | | | | | | | |
| | | 7BB-41-2CA0 | ● | | | | | | | | | | | | | | |
| | | 7NB-27-2C | ● | | | | | | | | | | | | | | |
| | | 7NB-27-3C | ● | | | | ● | | | | | | | | | | |
| | | 7NB-27-4C | ● | | | | ● | | | | | | | | | | |
| | | 7SB-34R7-3C | | | | | ● | | | | | | | | | | |
| Piezoelectric Sounder | External Drive Type | PKM13EPY-4000-A0 | ● | | ● | ● | | ● | ● | ● | ● | ● | ● | ● | | ● | ● |
| | | PKM13EPY-4002-B0 | ● | | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | | PKM17EPP-2002-B0 | ● | | ● | ● | | | ● | ● | ● | ● | | ● | ● | ● | ● |
| | | PKM17EPP-4001-B0 | ● | | ● | ● | | | ● | ● | ● | ● | | ● | ● | ● | ● |
| | | PKM17EPT-4001-B0 | | | | | | | ● | | ● | ● | | ● | ● | ● | ● |
| | | PKM17EW-2001 | ● | | ● | ● | | ● | ● | ● | ● | ● | ● | ● | | ● | |
| | | PKM22EP-2001 | | | | | | | ● | | ● | ● | | ● | ● | ● | ● |
| | | PKM22EPP-2001-B0 | ● | | ● | ● | | | ● | | ● | ● | | ● | ● | ● | ● |
| | | PKM22EPP-4001-B0 | ● | | ● | ● | | | ● | | ● | ● | | ● | ● | ● | ● |
| | | PKM22EPP-4005-B0 | ● | | ● | ● | | | ● | | ● | ● | | ● | ● | ● | ● |
| | | PKM22EPP-4007-B0 | ● | | ● | ● | | | ● | | ● | ● | | ● | ● | ● | ● |
| | | PKM22EPT-2001-B0 | | | | | | | ● | | ● | ● | | ● | ● | ● | ● |
| | | PKM22EPT-4001-B0 | | | | | | | ● | | ● | ● | | ● | ● | ● | ● |
| | | PKM17EW-4000 | ● | | ● | ● | | ● | ● | ● | ● | ● | ● | ● | | ● | |
| | | PKLCS1212E4001-R1 | ● | | | ● | | ● | ● | ● | ● | ● | ● | | | ● | |
| | Self Drive Type | PKM24SP-3805 | ● | | | | ● | | ● | | | | | | ● | ● | ● |
| | | PKM30SPT-2001-B0 | | | | | | | ● | | | ● | ● | | ● | | |
| | | PKM30SPT-2501-B0 | | | | | | | ● | | | ● | ● | | | | |
| Piezoelectric Buzzer | | PKB24SPC-3601-B0 | ● | | | ● | | | ● | | ● | ● | ● | ● | | ● | ● |
| | | PKB24SW-3301 | ● | | ● | | | | ● | | ● | ● | ● | | ● | ● | ● |
| | | PKB30SPC-2001-B0 | ● | | | | ● | | ● | | ● | ● | ● | | ● | ● | ● |
| | | PKB30SPC-3001-B0 | ● | | | | ● | | ● | | ● | ● | ● | | ● | ● | ● |
| Piezoelectric Ringer | | PKM33EP-1201C | ● | | | | | | | | | | | | | | |
| | | PKM34EW-1101C | ● | | | | | | | | | | | | | | |
| | | PKM34EW-1201C | ● | | | | | | | | | | | | | | |
| | | PKM44EP-0901 | ● | | | | | | | | | | | | | | |
| | | PKM44EW-1001C | ● | | | | | | | | | | | | | | |
| Piezoelectric Receiver | | PKLCD1212R1000-R1 | ● | | | | | | | | | | | | | | |
| Piezoelectric Speaker | | VSB35EW-0701B | ● | | | | | | ● | | | | | | | | |
| | | VSB50EW-0301B | ● | | | | | | ● | | | | | | | | |

There are various applications besides above table.

Fire Alarm, Burglar Alarm, Laundry Machine, Bath, Interphone, Chime, Pager, Back Buzzer, ME Instruments, Measuring Instruments, Vending Machine, Calculator, Automobile, Communication Radio, Hemadynamometer, Thermometer, Running meter, Facsimile, Audio timer, Automatic Controlling Devices.

# Piezoelectric Sound Components

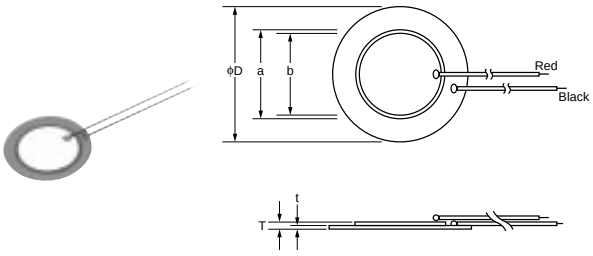
## Piezoelectric Diaphragms

### ■ Features

1. Low power consumption.
2. No contacts therefore, no noise and highly reliable.

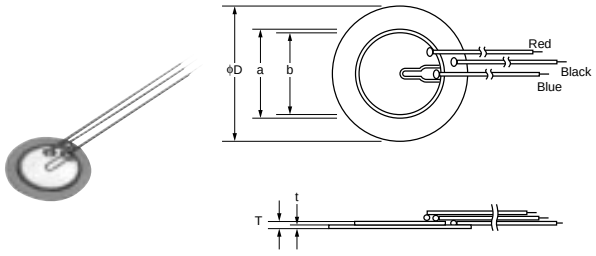
### ■ Applications

- Telephone ringers.
- Various office equipment such as PPCs, printers and keyboards.
- Various home appliances such as microwave ovens.
- Confirmation sound of various audio equipment.




### External Drive Type

| Part Number | Resonant Frequency (kHz) | Resonant Impedance (ohm) | Capacitance (nF) | Plate Size dia D (mm) (dia) | Element Size a (mm) (dia) | Electrode Size b (mm) (dia) | Thickness T (mm) | Plate Thickness t (mm) | Plate Material |
|---|---|---|---|---|---|---|---|---|---|
| **7BB-12-9** | 9.0 ±1.0kHz | 1000 max. | 8 ±30% [1kHz] | 12.0 | 9.0 | 8.0 | 0.22 | 0.10 | Brass |
| **7BB-15-6** | 6.0 ±1.0kHz | 350 max. | 10 ±30% [1kHz] | 15.0 | 10.0 | 9.0 | 0.22 | 0.10 | Brass |
| **7BB-20-3** | 3.6 ±0.6kHz | 500 max. | 20 ±30% [1kHz] | 20.0 | 14.0 | 12.8 | 0.22 | 0.10 | Brass |
| **7BB-20-6** | 6.3 ±0.6kHz | 350 max. | 10 ±30% [1kHz] | 20.0 | 14.0 | 12.8 | 0.42 | 0.20 | Brass |
| **7BB-20-6A0** | 6.3 ±0.6kHz | 1000 max. | 10 ±30% [1kHz] | 20.0 | 14.0 | 12.8 | 0.42 | 0.20 | Brass (with Lead Wire) |
| **7BB-27-4** | 4.6 ±0.5kHz | 200 max. | 20 ±30% [1kHz] | 27.0 | 19.7 | 18.2 | 0.54 | 0.30 | Brass |
| **7BB-27-4A0** | 4.6 ±0.5kHz | 300 max. | 20 ±30% [1kHz] | 27.0 | 19.7 | 18.2 | 0.54 | 0.30 | Brass (with Lead Wire) |
| **7BB-35-3** | 2.8 ±0.5kHz | 200 max. | 30 ±30% [1kHz] | 35.0 | 25.0 | 23.0 | 0.53 | 0.30 | Brass |
| **7BB-35-3A0** | 2.8 ±0.5kHz | 200 max. | 30 ±30% [1kHz] | 35.0 | 25.0 | 23.0 | 0.53 | 0.30 | Brass (with Lead Wire) |
| **7BB-41-2** | 2.2 ±0.3kHz | 250 max. | 30 ±30% [1kHz] | 41.0 | 25.0 | 23.0 | 0.63 | 0.40 | Brass |
| **7BB-41-2A0** | 2.2 ±0.3kHz | 300 max. | 30 ±30% [1kHz] | 41.0 | 25.0 | 23.0 | 0.63 | 0.40 | Brass (with Lead Wire) |
| **7BB-50M-1** | 1.0 ±0.3kHz | 1200 max. | 28 ±30% [120Hz] | 50.0 | 25.0 | 23.0 | 0.44 | 0.20 | Nickel-Plated Brass |
| **7SB-20-7** | 7.2 ±0.8kHz | 350 max. | 10 ±30% [1kHz] | 20.0 | 14.0 | 12.8 | 0.42 | 0.20 | Stainless |




## Self Drive Type

| Part Number | Resonant Frequency (kHz) | Resonant Impedance (ohm) | Capacitance (nF) | Plate Size dia D (mm) (dia) | Element Size a (mm) (dia) | Electrode Size b (mm) (dia) | Thickness T (mm) | Plate Thickness t (mm) | Plate Material |
|---|---|---|---|---|---|---|---|---|---|
| **7BB-20-6C** | 6.3 ±0.6kHz | 500 max. | 8.5 ±30% [1kHz] | 20.0 | 14.0 | 12.8 | 0.42 | 0.20 | Brass |
| **7BB-20-6CA0** | 6.3 ±0.6kHz | 800 max. | 8.5 ±30% [1kHz] | 20.0 | 14.0 | 12.8 | 0.42 | 0.20 | Brass (with Lead Wire) |
| **7BB-27-3C** | 3.0 ±0.5kHz | 300 max. | 35 ±30% [1kHz] | 27.0 | 19.7 | 18.2 | 0.27 | 0.15 | Brass |
| **7BB-27-4C** | 4.6 ±0.5kHz | 200 max. | 18 ±30% [1kHz] | 27.0 | 19.7 | 18.2 | 0.54 | 0.30 | Brass |
| **7BB-27-4CA0** | 4.6 ±0.5kHz | 350 max. | 18 ±30% [1kHz] | 27.0 | 19.7 | 18.2 | 0.54 | 0.30 | Brass (with Lead Wire) |
| **7BB-35-3C** | 2.8 ±0.5kHz | 200 max. | 26 ±30% [1kHz] | 35.0 | 25.0 | 23.0 | 0.53 | 0.30 | Brass |
| **7BB-35-3CA0** | 2.8 ±0.5kHz | 200 max. | 26 ±30% [1kHz] | 35.0 | 25.0 | 23.0 | 0.53 | 0.30 | Brass (with Lead Wire) |
| **7BB-41-2C** | 2.2 ±0.3kHz | 250 max. | 24 ±30% [1kHz] | 41.0 | 25.0 | 23.0 | 0.63 | 0.40 | Brass |
| **7BB-41-2CA0** | 2.2 ±0.3kHz | 350 max. | 24 ±30% [1kHz] | 41.0 | 25.0 | 23.0 | 0.63 | 0.40 | Brass (with Lead Wire) |
| **7NB-27-2C** | 2.2 ±0.5kHz | 300 max. | 37 ±30% [120Hz] | 27.0 | 19.7 | 18.2 | 0.22 | 0.10 | Iron Nickel Alloy |
| **7NB-27-3C** | 3.0 ±0.5kHz | 300 max. | 24 ±30% [1kHz] | 27.0 | 19.7 | 18.2 | 0.32 | 0.15 | Iron Nickel Alloy |
| **7NB-27-4C** | 3.8 ±0.5kHz | 300 max. | 19 ±30% [1kHz] | 27.0 | 19.7 | 18.2 | 0.42 | 0.20 | Iron Nickel Alloy |
| **7SB-34R7-3C** | 3.1 ±0.3kHz | 150 max. | 24 ±30% [1kHz] | 34.7 | 25.0 | 23.4 | 0.50 | 0.25 | Stainless |

### ■ Node Diameter

| Part Number | Node Diameter (mm) |
|---|---|
| **7BB-20-6C** | ϕ13.5 |
| **7BB-27-4C** | ϕ17.5 |
| **7BB-35-3C** | ϕ22.5 |
| **7BB-41-2C** | ϕ26.5 |

• Sound diaphragm without feedback electrode also have the same node diameters.

# 1 Piezoelectric Diaphragms Notice

## ■ Notice (Soldering and Mounting)

1. Applying load on the center area of the diaphragm may cause clack in the ceramic element. When the diaphragm is supported by edge, the load should be only applied around edge.
2. Please consult with Murata or Murata representative, in case of soldering on the component.

## ■ Notice (Handling)

1. Please do not touch the component with bare hand because electrode may be corroded.
2. The component may be damaged if mechanical stress over this specification is applied.
3. Please pay attention to protect operating circuit from surge voltage provided by something of force such as falling, shock and temperature changing.
4. If DC voltage is applied to the component, silver migration may occur. Please pay full attention not to subject the component to DC voltage for long periods.
5. The resistor should be used as shown in Fig. A. A suitable resistance value should be chosen, preferably 1kΩ to 2kΩ. Instead of this measure, a diode may also be applied as shown in Fig. B.

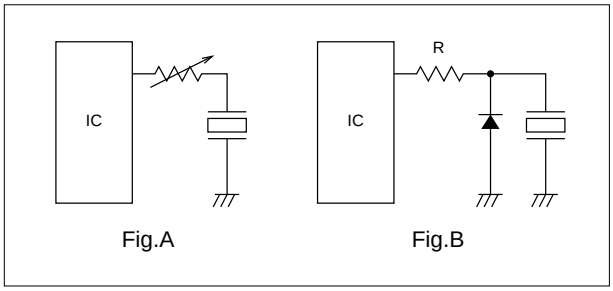



Fig.A Fig.B

6.Please pay enough attention not to pull lead wire too much because wire may be broken or soldering point may come off.

# Piezoelectric Sound Components

muRata

## Piezoelectric Sounders External Drive Pin Type



Now, microcomputers are widely used for microwave ovens, air conditioners, cars, toys, timers, and other alarm equipment. Externally driven piezoelectric sounders are used in digital watches, electronic calculators, telephones and other equipment. They are driven by a signal (ex, 2048Hz or 4096Hz) from an LSI and provide melodious sound.

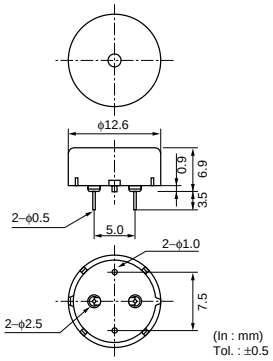
### ■ Features

1. Low power consumption.
2. No contacts therefore, no noise and highly reliable.

### ■ Applications

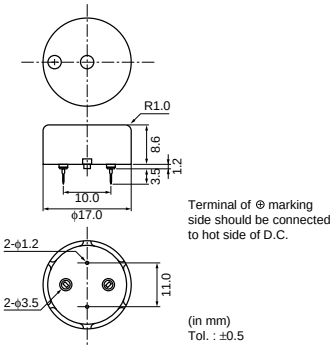
- Telephone ringers.
- Various office equipment such as PPCs, printers and keyboards.
- Various home appliances such as microwave ovens.
- Confirmation sound of various audio equipment.

PKM13EPY-4002-B0




(In : mm)
Tol. : ±0.5

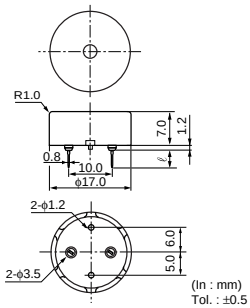
PKM17EPP-2002-B0




Terminal of ⊕ marking side should be connected to hot side of D.C.

(in mm)
Tol. : ±0.5

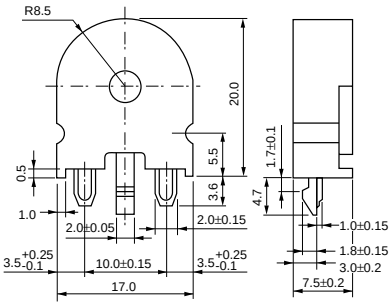
PKM17EPP-4001-B0




(In : mm)
Tol. : ±0.5

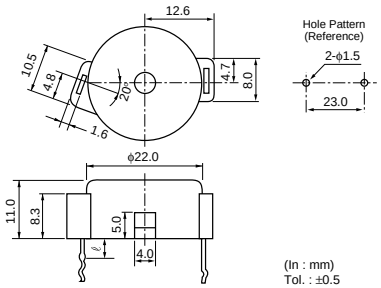
| Part Number | ℓ |
|---|---|
| PKM17EPP-4001-B0 | 6.5 |
| PKM17EPP-4002-B0 | 3.5 |

PKM17EPT-4001-B0




(In : mm)
Tol. : ±0.5

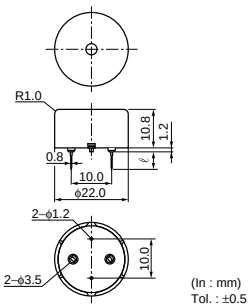
PKM22EP-2001




(In : mm)
Tol. : ±0.5

| Part Number | ℓ |
|---|---|
| PKM22EP-2001 | 4.0 |
| PKM22EP-2002 | 8.0 |
| PKM22EP-2003 | 12.0 |

PKM22EPP-2001-B0




(In : mm)
Tol. : ±0.5

| Part Number | ℓ |
|---|---|
| PKM22EPP-2001-B0 | 6.5 |
| PKM22EPP-2002-B0 | 3.5 |

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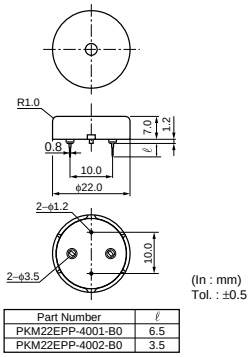
PKM22EPP-4001-B0




(In : mm)
Tol. : ±0.5

| Part Number | ℓ |
|---|---|
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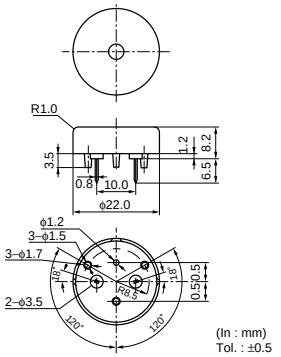
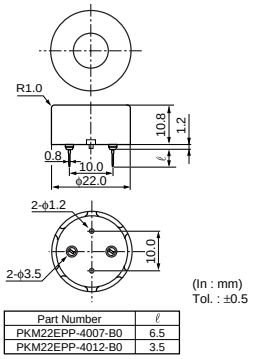
| PKM22EPP-4002-B0 | 3.5 |

PKM22EPP-4005-B0




(In : mm)
Tol. : ±0.5

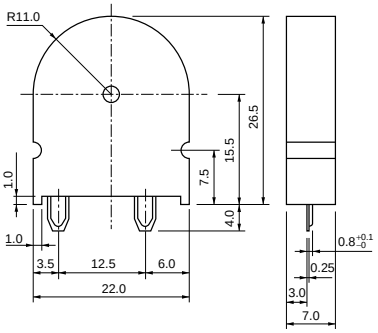
PKM22EPP-4007-B0




(In : mm)
Tol. : ±0.5

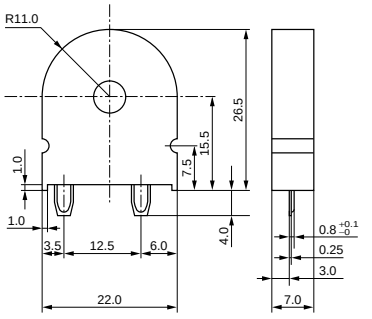
| Part Number | ℓ |
|---|---|
| PKM22EPP-4007-B0 | 6.5 |
| PKM22EPP-4012-B0 | 3.5 |

PKM22EPT-2001-B0




(in mm)
Tol.:±0.5

PKM22EPT-4001-B0




(In : mm)
Tol. : ±0.5

| Part Number | Sound Pressure Level (dB) | Sound Pressure Level(Ref. only) (dB) | Operating Voltage Range (Vp-p) | Capacitance (nF) | Operating Temp. Range | Storage Temp. Range |
|---|---|---|---|---|---|---|
| **PKM13EPY-4002-B0** | 70 min. [3Vp-p,4kHz,square wave,10cm] | 70 min. [1Vrms,4kHz,sine wave,10cm] | 25 max. | 5.5 ±30% [1kHz] | -20 to +70°C | -30 to +80°C |
| **PKM17EPP-2002-B0** | 70 min. [3Vo-p,2kHz,square wave,10cm] | 70 min. [1Vrms,2kHz,sine wave,10cm] | 25 Vo-p max. [with polarity] | 34 ±30% [120Hz] | -20 to +70°C | -30 to +80°C |
| **PKM17EPP-4001-B0** | 72 min. [3Vp-p,4kHz,square wave,10cm] | 72 min. [1Vrms,4kHz,sine wave,10cm] | 25 max. | 7 ±30% [1kHz] | -20 to +70°C | -30 to +80°C |
| **PKM17EPT-4001-B0** | 75 min. [3Vp-p,4kHz,square wave,10cm] | 75 min. [1Vrms,4kHz,sine wave,10cm] | 25 max. | 9.5 ±30% [1kHz] | -20 to +70°C | -30 to +80°C |
| **PKM22EP-2001** | 75 min. [3Vp-p,2kHz,square wave,10cm] | 75 min. [1Vrms,2kHz,sine wave,10cm] | 25 max. | 17 ±30% [120Hz] | -20 to +70°C | -30 to +80°C |
| **PKM22EPP-2001-B0** | 70 min. [3Vp-p,2kHz,square wave,10cm] | 70 min. [1Vrms,2kHz,sine wave,10cm] | 25 max. | 19 ±30% [120Hz] | -20 to +70°C | -30 to +80°C |
| **PKM22EPP-4001-B0** | 75 min. [3Vp-p,4kHz,square wave,10cm] | 75 min. [1Vrms,4kHz,sine wave,10cm] | 25 max. | 12 ±30% [1kHz] | -20 to +70°C | -30 to +80°C |
| **PKM22EPP-4005-B0** | 75 min. [3Vp-p,4kHz,square wave,10cm] | 75 min. [1Vrms,4kHz,sine wave,10cm] | 25 max. | 12 ±30% [1kHz] | -20 to +70°C | -30 to +80°C |
| **PKM22EPP-4007-B0** | 85 min. [3Vp-p,4kHz,square wave,10cm] | 85 min. [1Vrms,4kHz,sine wave,10cm] | 25 max. | 12 ±30% [1kHz] | -20 to +70°C | -30 to +80°C |

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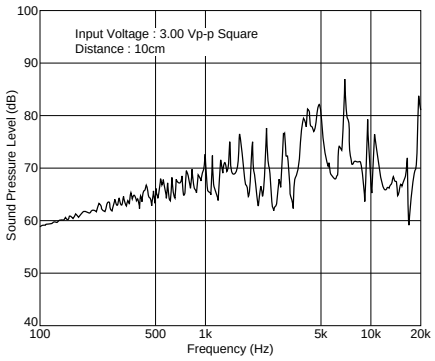
| Part Number | Sound Pressure Level (dB) | Sound Pressure Level(Ref. only) (dB) | Operating Voltage Range (Vp-p) | Capacitance (nF) | Operating Temp. Range | Storage Temp. Range |
|---|---|---|---|---|---|---|
| **PKM22EPT-2001-B0** | 70 min. [3Vp-p,2kHz,square wave,10cm] | 70 min. [1Vrms,2kHz,sine wave,10cm] | 25 max. | 19 ±30% [120Hz] | -20 to +70°C | -30 to +80°C |
| **PKM22EPT-4001-B0** | 85 min. [3Vp-p,4kHz,square wave,10cm] | 85 min. [1Vrms,4kHz,sine wave,10cm] | 25 max. | 10 ±30% [1kHz] | -20 to +70°C | -30 to +80°C |

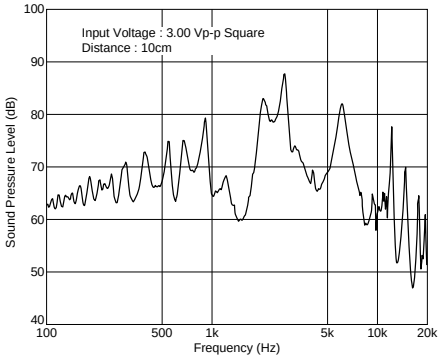


## ■ Freq. Response (Square Wave 3Vp-p, 10cm)

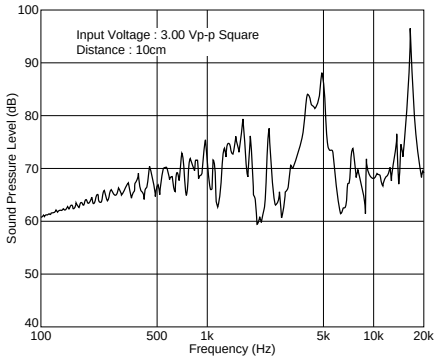
PKM13EPY-4002-B0



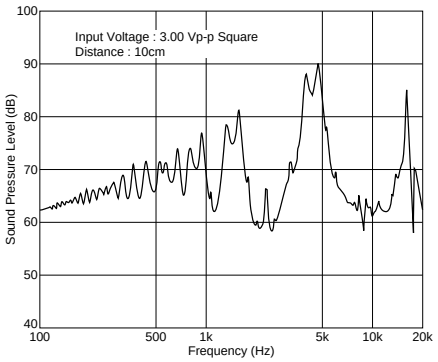

PKM17EPP-2002-B0



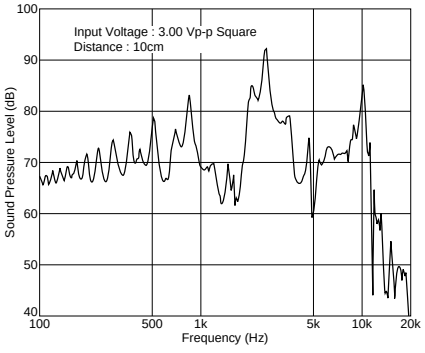

PKM17EPP-4001-B0



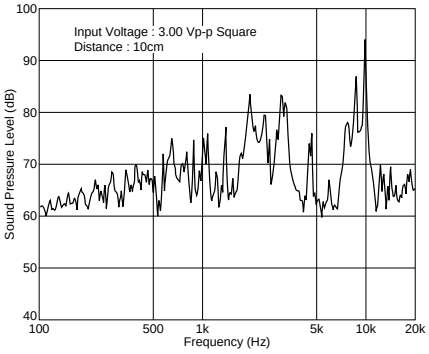

PKM17EPT-4001-B0




PKM22EP-2001




PKM22EPP-2001-B0

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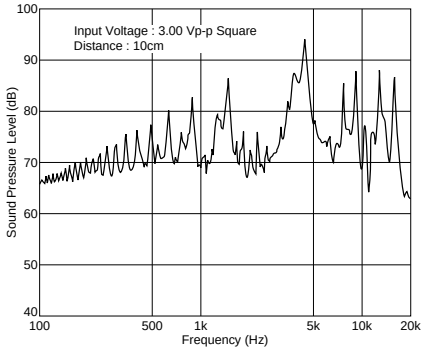
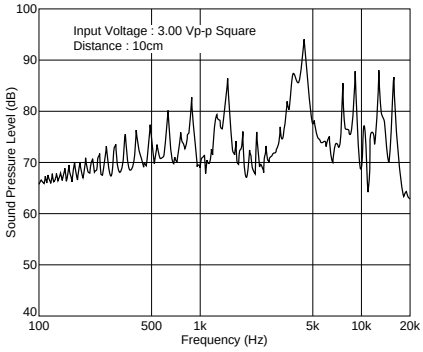
## ■ Freq. Response (Square Wave 3Vp-p, 10cm)

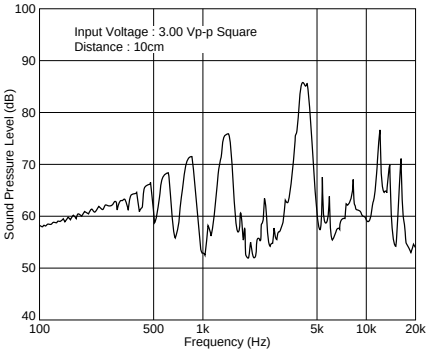
PKM22EPP-4001-B0



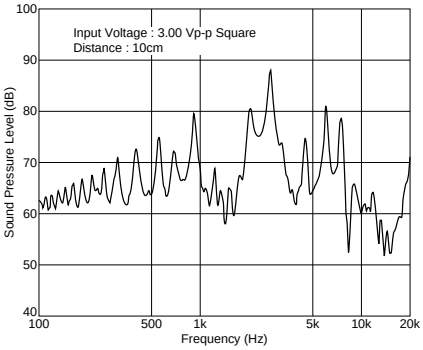

PKM22EPP-4005-B0



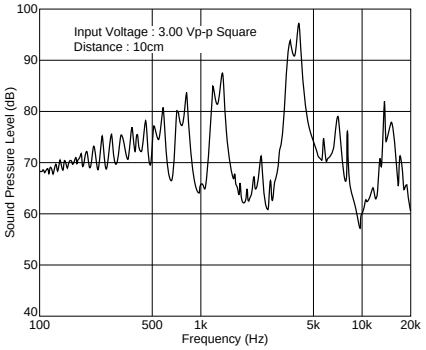

PKM22EPP-4007-B0




PKM22EPT-2001-B0

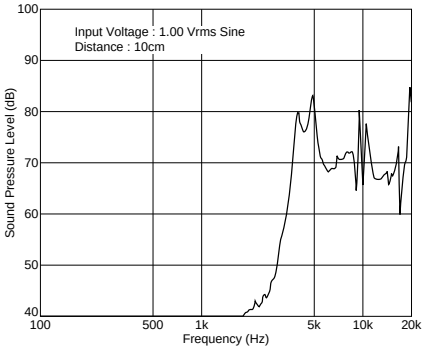



PKM22EPT-4001-B0

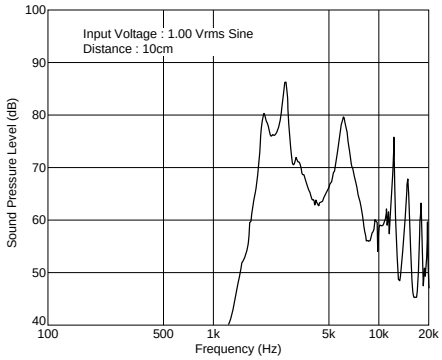



## ■ Freq. Response (Sine Wave 1Vrms, 10cm)

PKM13EPY-4002-B0




PKM17EPP-2002-B0

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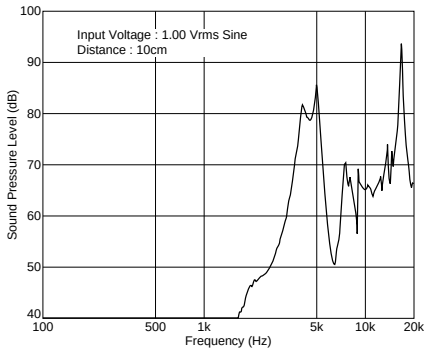
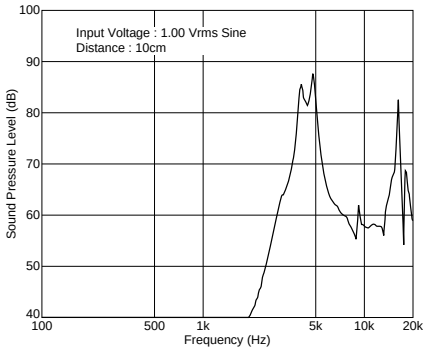
## ■ Freq. Response (Sine Wave 1Vrms, 10cm)

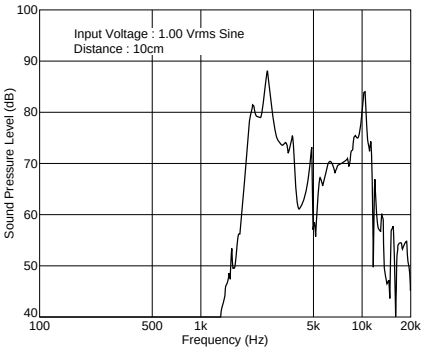
PKM17EPP-4001-B0



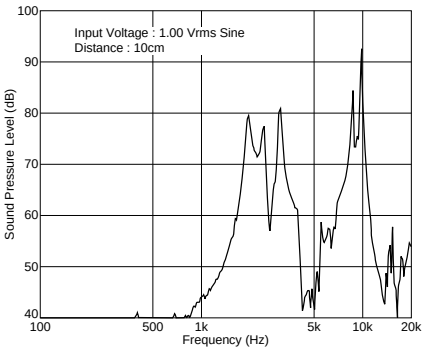

PKM17EPT-4001-B0



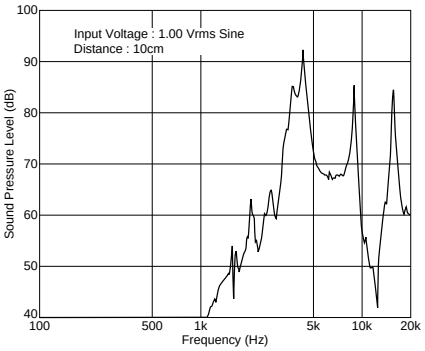

PKM22EP-2001



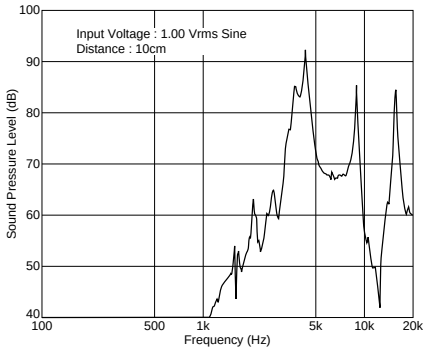

PKM22EPP-2001-B0



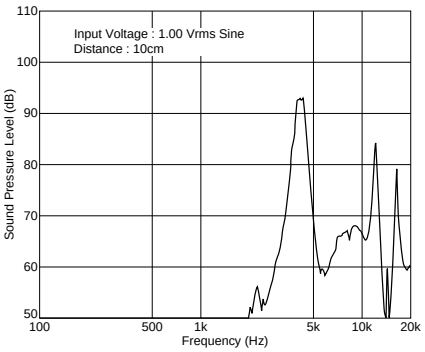

PKM22EPP-4001-B0



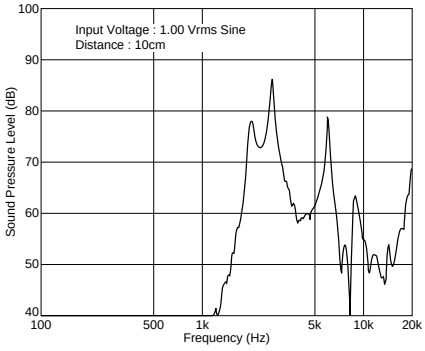

PKM22EPP-4005-B0




PKM22EPP-4007-B0




PKM22EPT-2001-B0

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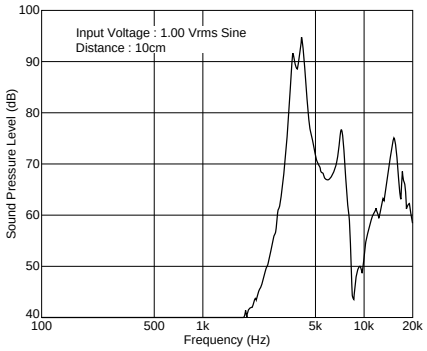
## ■ Freq. Response (Sine Wave 1Vrms, 10cm)

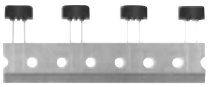
PKM22EPT-4001-B0

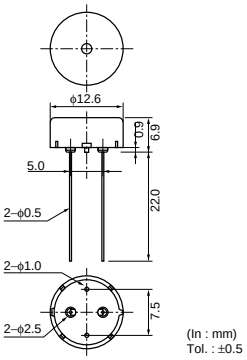


# Piezoelectric Sound Components

## Piezoelectric Sounders External Drive Pin Type Taping

Taking advantage of extensive automatic insertion designing technology and materials experience, Murata has developed standard taping type piezoelectric sounder.
This Murata technology supports labor and cost saving activities.



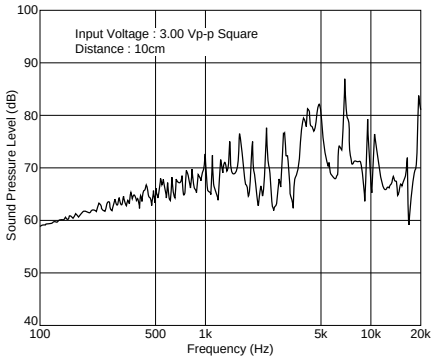



■ Features

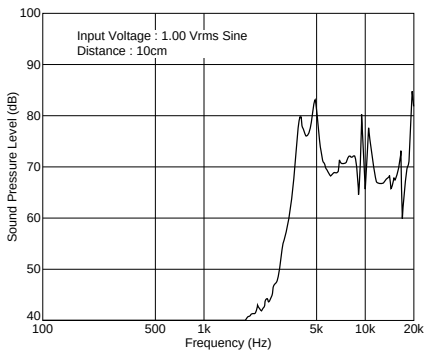
1. High and stable mountability.
2. Ammo packaging.
3. Minimum quantity (order in sets only) : 500pcs.

| Part Number | Sound Pressure Level (dB) | Sound Pressure Level(Ref. only) (dB) | Operating Voltage Range (Vp-p) | Capacitance (nF) | Operating Temp. Range | Storage Temp. Range |
|---|---|---|---|---|---|---|
| **PKM13EPY-4000-A0** | 70 min. [3Vp-p,4kHz,square wave,10cm] | 70 min. [1Vrms,4kHz,sine wave,10cm] | 25 max. | 5.5 ±30% [1kHz] | -20 to +70°C | -30 to +80°C |

■ Freq. Response (Square Wave 3Vp-p, 10cm)




■ Freq. Response (Sine Wave 1Vrms, 10cm)

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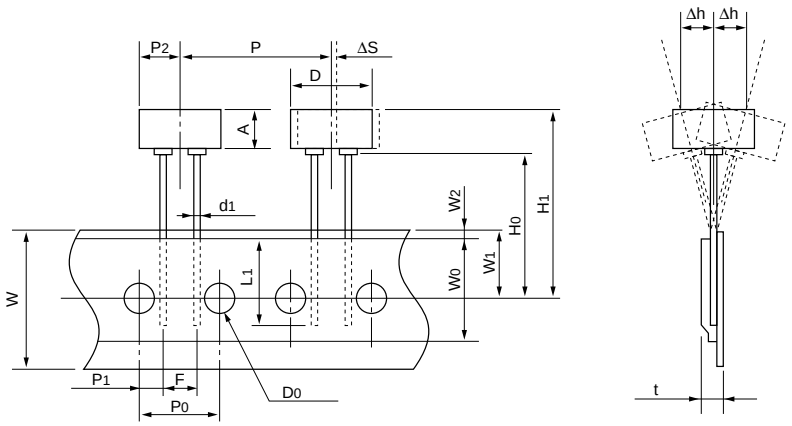
## ■ Taping Dimension




| Item | Code | Nominal value | Tol. | Remarks |
|---|---|---|---|---|
| **Width of Diameter** | D | ø12.6 | ±0.5 | |
| **Height of Component** | A | 6.9 | ±0.5 | |
| **Dimensions of Terminal** | d1 | ø0.5 | ±0.1 | |
| **Lead length under The Hold down Tape** | L1 | 8.0 min. | — | |
| **Pitch of Component** | P | 25.4 | ±0.5 | |
| **Pitch of Sprocket** | P0 | 12.7 | ±0.2 | Tolerance for Pitches 10×P0=127±2mm |
| **Length from Hole Center to Lead** | P1 | 3.85 | ±0.7 | |
| **Length from Hole Center to Component Center** | P2 | 6.35 | ±0.7 | |
| **Lead Spacing** | F | 5.0 | ±0.5 | |
| **Slant to The Forward or Backward** | Δh | 0 | ±1.0 | 360° : 1mm max. |
| **Width of Carrier Tape** | W | 18.0 | ±0.5 | |
| **Width of Hold down Tape** | W0 | 12.5 min. | — | Hold down tape does not exceed the carrier tape. |
| **Position of Sprocket Hole** | W1 | 9.0 | ±0.5 | |
| **Gap of Hold Down Tape and Carrier Tape** | W2 | 2.0 max. | — | |
| **Distance Between The Center of Sprocket Hole and Lead Stopper** | H0 | 18.0 | ±0.5 | |
| **Total Height of Component** | H1 | 26.0 max. | — | |
| **Diameter of Sprocket Hole** | D0 | ø4.0 | ±0.2 | |
| **Total Thickness of Tape** | t | 0.6 | ±0.2 | |
| **Body Tilt** | ΔS | 0 | ±1.0 | |

(in mm)

# Piezoelectric Sound Components

## Piezoelectric Sounders External Drive Lead Wire Type

Now, microcomputers are widely used for microwave ovens, air conditioners, cars, toys, timers, and other alarm equipment. Externally driven piezoelectric sounders are used in digital watches, electronic calculators, telephones and other equipment. They are driven by a signal (ex, 2048Hz or 4096Hz) from an LSI and provide melodious sound.

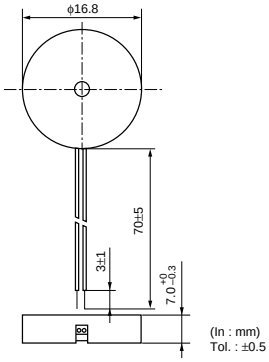
### ■ Features

1. Low power consumption.
2. No contacts therefore, no noise and highly reliable.

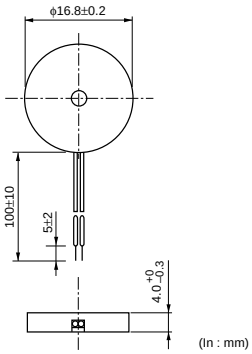
### ■ Applications

- Telephone ringers.
- Various office equipment such as PPCs, printers and keyboards.
- Various home appliances such as microwave ovens.
- Confirmation sound of various audio equipment.

PKM17EW-2001



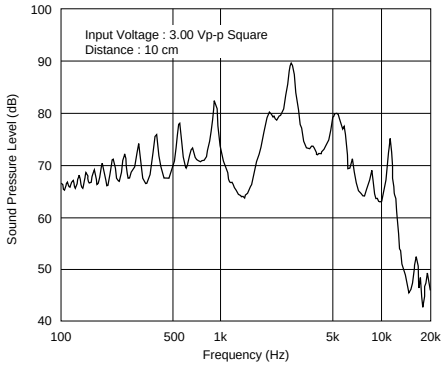

PKM17EW-4000



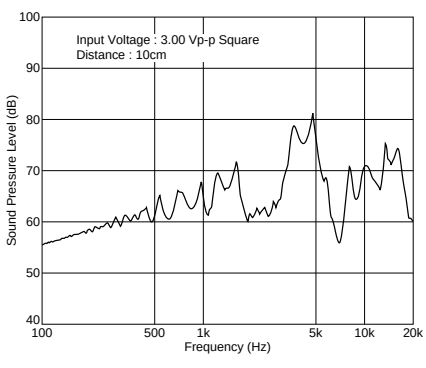

| Part Number | Sound Pressure Level (dB) | Sound Pressure Level(Ref. only) (dB) | Operating Voltage Range (Vp-p) | Capacitance (nF) | Operating Temp. Range | Storage Temp. Range |
|---|---|---|---|---|---|---|
| **PKM17EW-2001** | 72 min. [3Vp-p,2kHz,square wave,10cm] | 70 min. [1Vrms,2kHz,sine wave,10cm] | 7 max. | 40 ±30% [120Hz] | -20 to +70°C | -30 to +80°C |
| **PKM17EW-4000** | 75 min. [3Vp-p,4kHz,square wave,10cm] | 70 min. [1Vrms,4kHz,sine wave,10cm] | 25 max. | 9.5 ±30% [1kHz] | -20 to +70°C | -30 to +80°C |

### ■ Freq. Response (Square Wave 3Vp-p, 10cm)

PKM17EW-2001




PKM17EW-4000

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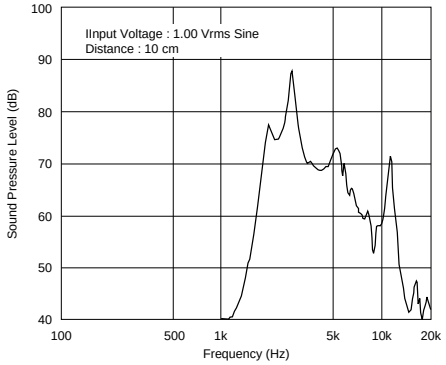
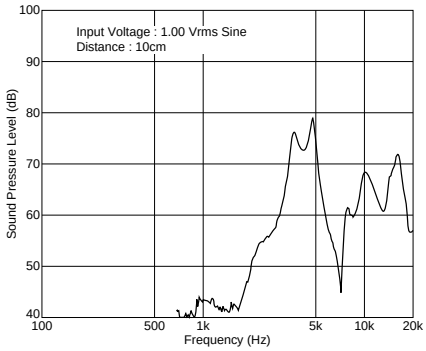
## ■ Freq. Response (Sine Wave 1Vrms, 10cm)

PKM17EW-2001




PKM17EW-4000

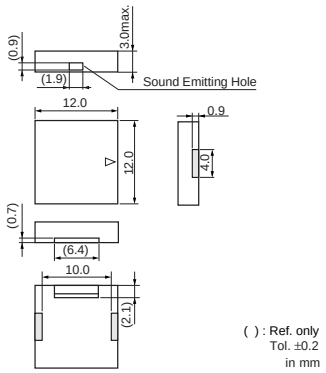



4

# Piezoelectric Sound Components

## Piezoelectric Sounders External Drive SMD Type

Taking advantage of extensive acoustic and mechanical designing technology and high performance ceramics, Murata has developed SMD piezoelectric sounder that suites thin, high-density design of electronic equipment.

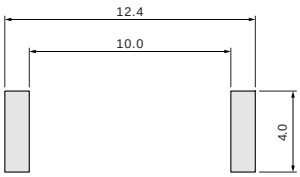



### ■ Features

1. High S.P.L. and clear sound.
2. Reflowable.
3. Tape & Reel supply.
4. Minimum quantity (order in sets only):1,000 pcs.

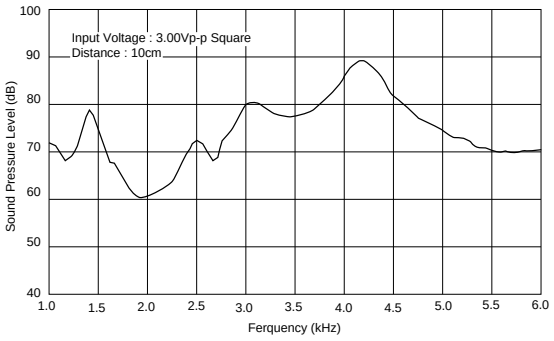
| Part Number | Sound Pressure Level (dB) | Operating Voltage Range (Vp-p) | Operating Temp. Range | Storage Temp. Range |
|---|---|---|---|---|
| **PKLCS1212E4001-R1** | 75 min. [3Vp-p,4kHz,square wave,10cm] | 25 max. | -20 to +70°C | -30 to +80°C |

### ■ Standard Land Pattern Dimensions




(in mm)

### ■ Freq. Response (Square Wave 3Vp-p, 10cm)

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5

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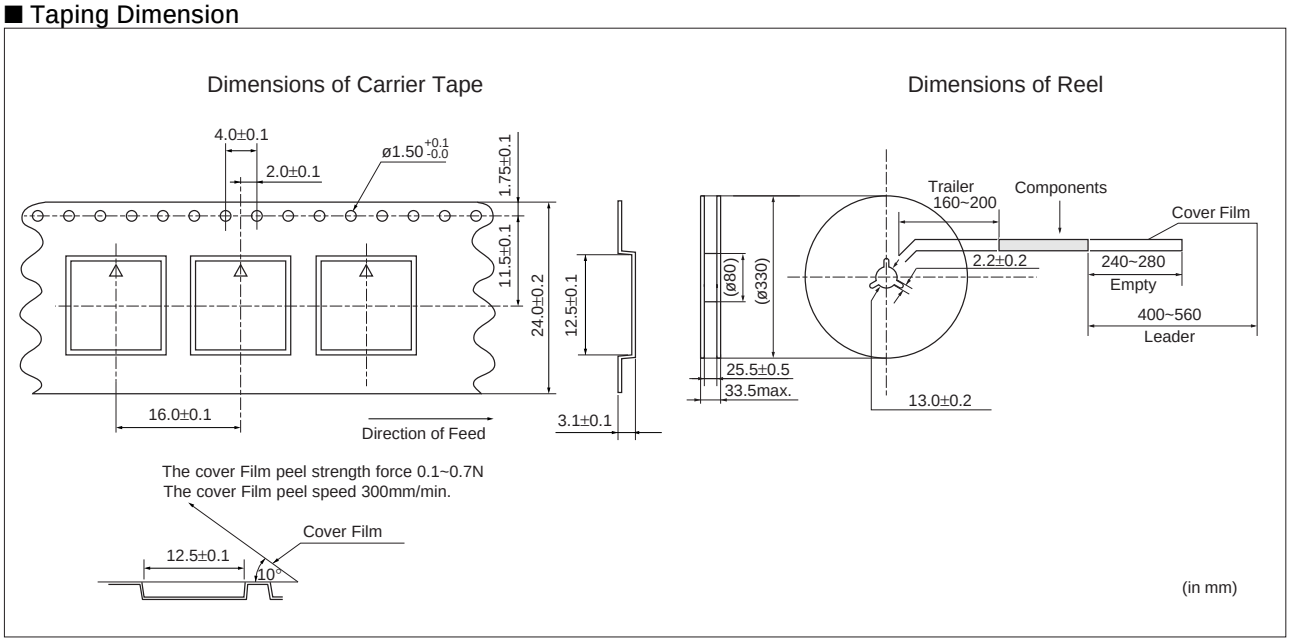
## ■ Taping Dimension



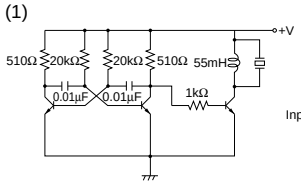

5

# Piezoelectric Sounders (External Drive) Circuit/Notice

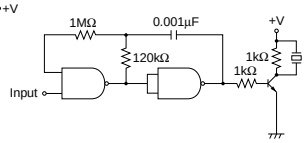
## ■ Circuit

The following are examples of externally driven circuits.
(1) Unstable multi-vibrator using Tr.
(2) Circuits using inverters or NAND gates.

(1)




(2)




## ■ Notice (Soldering and Mounting)

Washing of the component is not acceptable, because it is not sealed.

## ■ Notice (Handling)

1. The component may be damaged if mechanical stress over this specification is applied.
2. Please pay attention to protect operating circuit from surge voltage provided by something of force such as falling, shock and temperature changing.
3. If DC voltage is applied to the component, silver migration may occur. Please pay full attention not to subject the component to DC voltage for long periods.
4. The resistor should be used as shown in Fig. A. A suitable resistance value should be chosen, preferably 1kΩ to 2kΩ. Instead of this measure, a diode may also be applied as shown in Fig. B.

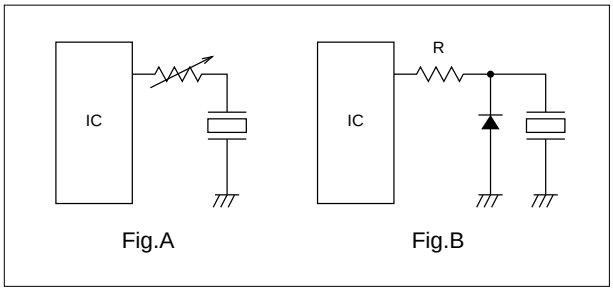



Fig.A Fig.B

5. Please pay enough attention not to pull lead wire too much because wire may be broken or soldering point may come off.

# Piezoelectric Sound Components

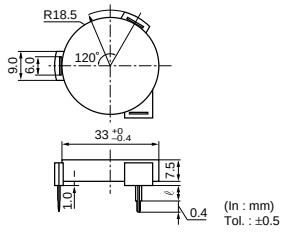
## Piezoelectric Ringers (PIEZORINGER®)

As the result of rapid development of ICs in telephones, demand for piezoelectric sounder as telephone ringers has also rapidly increased. To effectively satisfy this rising demand, Murata provides a suitable piezoelectric sounder called "PIEZORINGER", with the following features.

### ■ Features

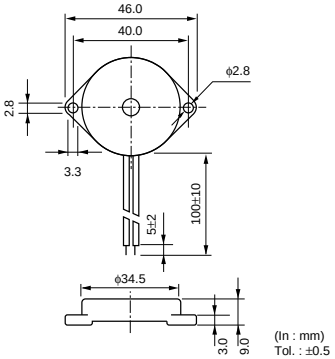
1. Extremely clear sound.
2. Since it is voltage driven, the power consumption is quite negligible.
3. It can be driven directly from ICs.
4. Extremely thin and light.

PKM33EP-1201C



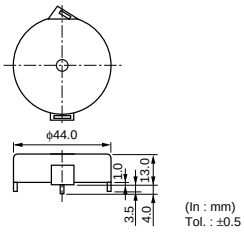

| Part Number | ℓ |
|---|---|
| PKM33EP-1201C | 5.0 |
| PKM33EP-1202C | 0 |

PKM34EW-1101C/1201C

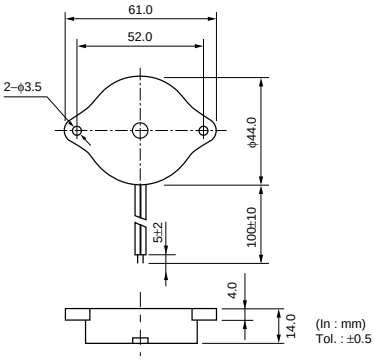





PKM44EP-0901




PKM44EW-1001C



## Pin Type

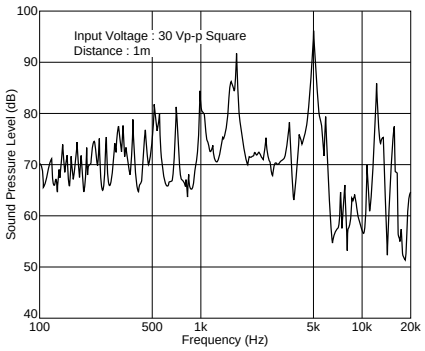
| Part Number | Sound Pressure Level (dB) | Sound Pressure Level(Ref. only) (dB) | Operating Voltage Range (Vp-p) | Capacitance (nF) | Operating Temp. Range | Storage Temp. Range |
|---|---|---|---|---|---|---|
| **PKM33EP-1201C** | 68 min. [30Vp-p,1.2kHz,square wave,1m] | 65 min. [1Vrms,1.2kHz,sine wave,10cm] | 40 max. | 40 ±30% [120Hz] | -20 to +70°C | -30 to +80°C |
| **PKM44EP-0901** | 70 min. [30Vp-p,1kHz,square wave,1m] | 60 min. [1Vrms,1kHz,sine wave,10cm] | 40 max. | 68 ±30% [120Hz] | -20 to +70°C | -30 to +80°C |

## Lead Wire Type

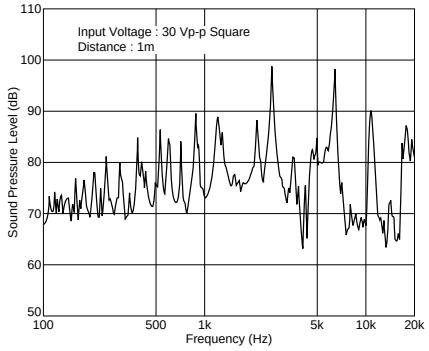
| Part Number | Sound Pressure Level (dB) | Sound Pressure Level(Ref. only) (dB) | Operating Voltage Range (Vp-p) | Capacitance (nF) | Operating Temp. Range | Storage Temp. Range |
|---|---|---|---|---|---|---|
| **PKM34EW-1101C** | 70 min. [30Vp-p,1.1kHz,square wave,1m] | 60 min. [1Vrms,1.1kHz,sine wave,10cm] | 40 max. | 40 ±30% [120Hz] | -20 to +70°C | -30 to +80°C |
| **PKM34EW-1201C** | 70 min. [30Vp-p,1.2kHz,square wave,1m] | 60 min. [1Vrms,1.2kHz,sine wave,10cm] | 60 max. | 32 ±30% [120Hz] | -20 to +70°C | -30 to +80°C |
| **PKM44EW-1001C** | 75 min. [30Vp-p,1kHz,square wave,1m] | 70 min. [1Vrms,1kHz,sine wave,10cm] | 30 max. | 68 ±30% [120Hz] | -20 to +70°C | -30 to +80°C |

■ Freq. Response (Square Wave 30Vp-p, 1m)

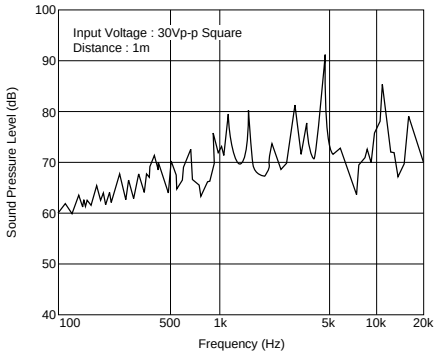
PKM33EP-1201C



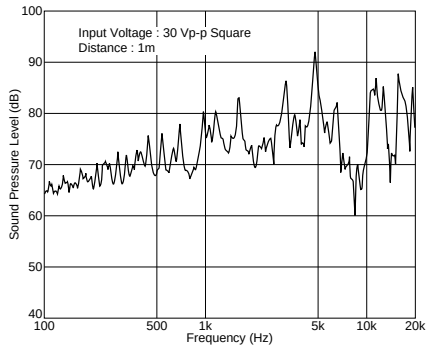

PKM44EP-0901




PKM34EW-1101C




PKM34EW-1201C

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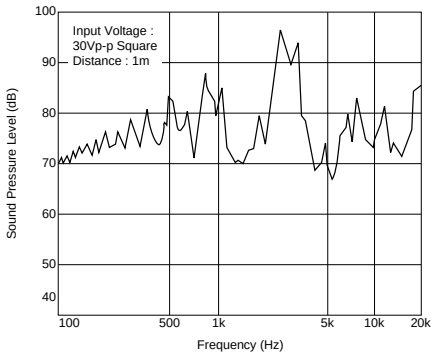
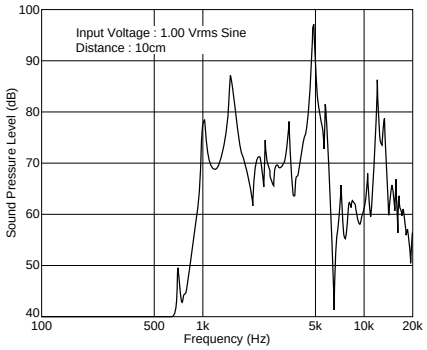
## ■ Freq. Response (Square Wave 30Vp-p, 1m)

PKM44EW-1001C

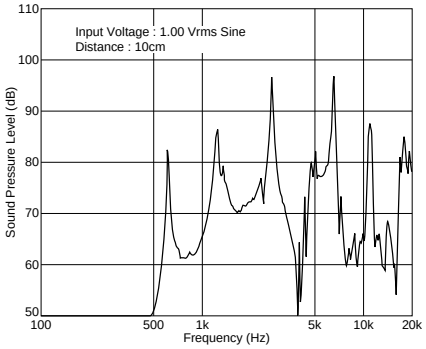



## ■ Freq. Response (Sine Wave 1Vrms, 10cm)

PKM33EP-1201C

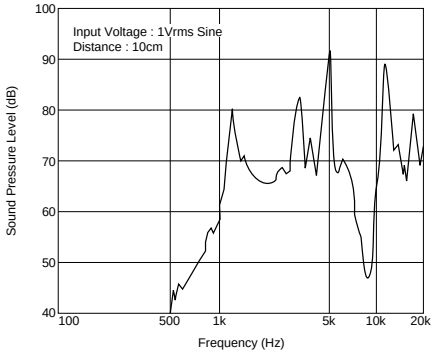



PKM44EP-0901

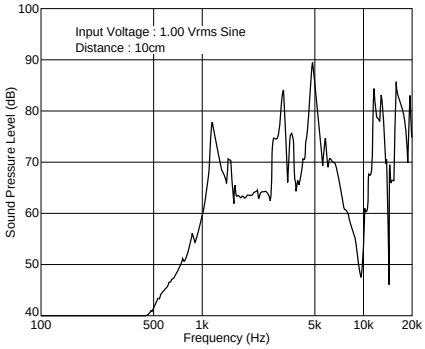



6

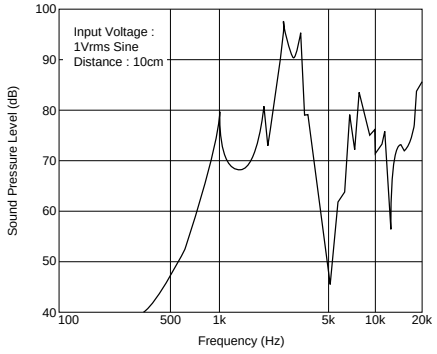
PKM34EW-1101C




PKM34EW-1201C




PKM44EW-1001C



# Piezoelectric Ringers (PIEZORINGER®) Notice

## ■ Notice (Soldering and Mounting)

Washing of the component is not acceptable, because it is not sealed.

## ■ Notice (Handling)

1. The component may be damaged if mechanical stress over this specification is applied.
2. Please pay attention to protect operating circuit from surge voltage provided by something of force such as falling, shock and temperature changing.
3. If DC voltage is applied to the component, silver migration may occur. Please pay full attention not to subject the component to DC voltage for long periods.
4. The resistor should be used as shown in Fig. A.
   A suitable resistance value should be chosen, preferably 1kΩ to 2kΩ. Instead of this measure, a diode may also be applied as shown in Fig. B.

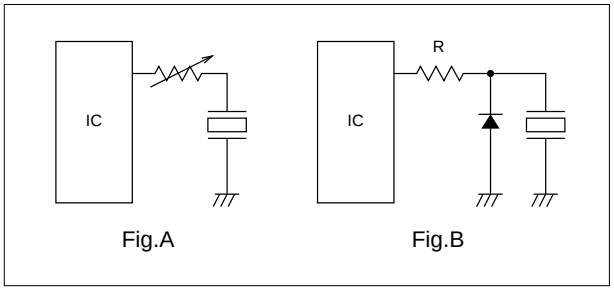



Fig.A Fig.B

5. Please pay enough attention not to pull lead wire too much because wire may be broken or soldering point may come off.

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# Piezoelectric Sound Components

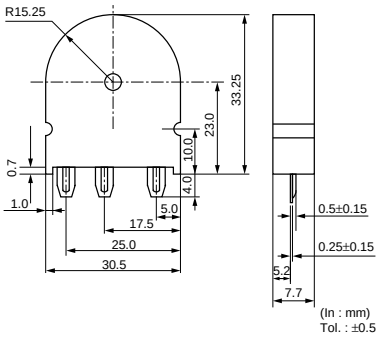
## Piezoelectric Sounders Self Drive Pin Type

Piezoelectric sounder self drive type requires only simple circuit and DC power supply. Since this type uses resonant system, it is also available for alarms which need large sound volume.

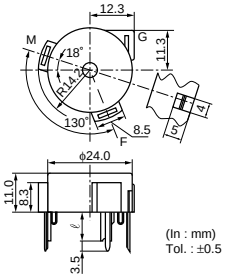
### ■ Applications

- Gas alarms, burglar alarms, smoke detectors.
- Air conditioners, Microwave ovens, washing machines and other home-electronic appliance controlled by microcomputer.
- Bicycles, toys, game machines.

PKM30SPT-2001/2501




PKM24SP-3805




| Part Number | ℓ |
|---|---|
| PKM24SP-3805 | 4.0 |
| PKM24SP-3810 | 8.0 |
| PKM24SP-3807 | 12.0 |
| PKM24SP-3801 | 14.0 |

| Part Number | Sound Pressure Level (dB) | Oscillating Frequency (kHz) | Current Consumption (mA) | Operating Voltage Range (Vdc) | Operating Temp. Range | Storage Temp. Range |
|---|---|---|---|---|---|---|
| **PKM24SP-3805** | 90 min. [12Vdc,10cm] | 3.8 ±0.4kHz [12Vdc] | 12 max. [12Vdc] | 3.0 to 20.0 | -20 to +70°C | -30 to +80°C |
| **PKM30SPT-2001-B0** | 75 min. [12Vdc,10cm] | 2.0 ±0.3kHz [12Vdc] | 20 max. [12Vdc] | 3.0 to 20.0 | -20 to +70°C | -30 to +80°C |
| **PKM30SPT-2501-B0** | 75 min. [12Vdc,10cm] | 2.5 ±0.3kHz [12Vdc] | 20 max. [12Vdc] | 3.0 to 20.0 | -20 to +70°C | -30 to +80°C |

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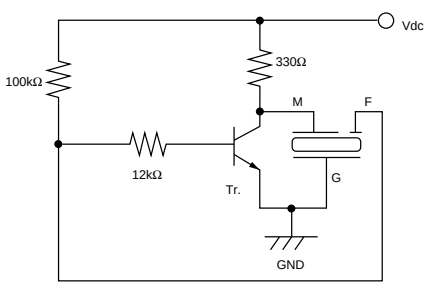
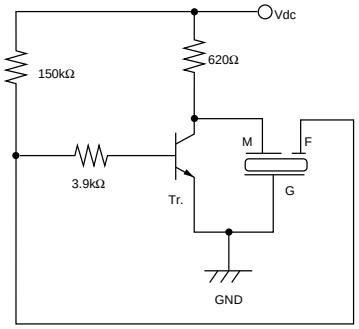
### ■ Standard Circuit Examples

PKM30SPT-2001/2501




Tr: 2SC1815Y or equivalent

PKM24SP-3805




Tr: 2SC1815Y or equivalent

# Piezoelectric Sounders (Self Drive) Notice

## ■ Notice (Soldering and Mounting)

1. Washing of the component is not acceptable, because it is not sealed.
2. Please do not cover the hole with tape or other obstacle as this will produce irregular oscillation.
3. There should not be any obstacle within 15mm from top of the component as this will produce irregular oscillation.

## ■ Notice (Handling)

1. The component may be damaged if mechanical stress over this specification is applied.
2. Please pay attention to protect operating circuit from surge voltage provided by something of force such as falling, shock and temperature changing.
3. If DC voltage is applied to the component, silver migration may occur. Please pay full attention not to subject the component to DC voltage for long periods.
4. The standard self-driven circuits utilizes transistor switching. The circuit constants shown in the table below are optimally chosen to maintain stable oscillation. So please follow it when you design a circuit.

# Piezoelectric Sound Components

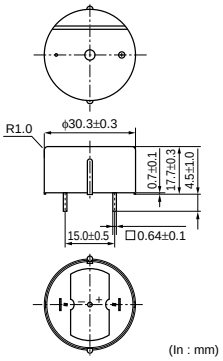
## Piezoelectric Buzzers

This is unified piezoelectric sounder which has piezoelectric diaphragm of 3 terminals connected to self drive circuit, and it easily generates sound with only a DC power supply (DC3.0-20V). Using suitably designed resonant system, this type can be used where large sound volumes are needed.

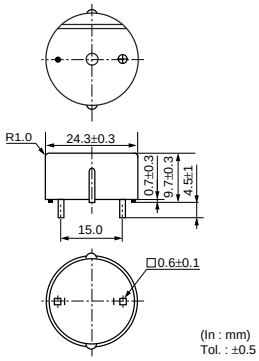
### ■ Applications

- Gas alarms, burglar alarms.
- Air conditioners, microwave ovens and various types of microcomputer controlled home-electronic appliances.
- Automobile speed alarms, navigators, car stereos and other automobile equipment.
- Toys, games, and other simple electronic devices such as teaching aids.

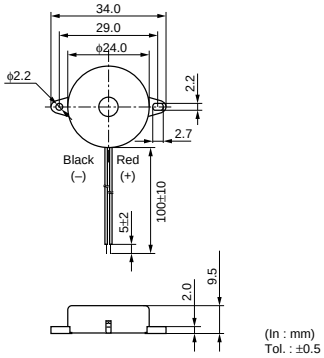
PKB30SPC-2001/3001




PKB24SPC-3601




PKB24SW-3301

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## Pin Type

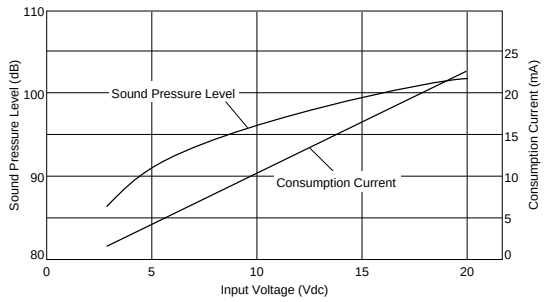
| Part Number | Sound Pressure Level (dB) | Oscillating Frequency (kHz) | Current Consumption (mA) | Operating Voltage Range (Vdc) | Operating Temp. Range | Storage Temp. Range |
|---|---|---|---|---|---|---|
| **PKB30SPC-2001-B0** | 92 min. [12Vdc,10cm] | 2.0 ±0.4kHz [12Vdc] | 15 max. [12Vdc] | 3.0 to 15.0 | -20 to +70°C | -30 to +80°C |
| **PKB30SPC-3001-B0** | 92 min. [12Vdc,10cm] | 2.7 ±0.4kHz [12Vdc] | 15 max. [12Vdc] | 3.0 to 15.0 | -20 to +70°C | -30 to +80°C |
| **PKB24SPC-3601-B0** | 90 min. [12Vdc,10cm] | 3.6 ±0.5kHz [12Vdc] | 16 max. [12Vdc] | 3.0 to 15.0 | -20 to +70°C | -30 to +80°C |

## Lead Wire Type

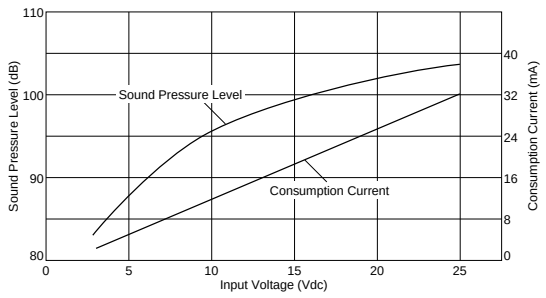
| Part Number | Sound Pressure Level (dB) | Oscillating Frequency (kHz) | Current Consumption (mA) | Operating Voltage Range (Vdc) | Operating Temp. Range | Storage Temp. Range |
|---|---|---|---|---|---|---|
| **PKB24SW-3301** | 80 min. [12Vdc,10cm] | 3.3 ±0.5kHz [12Vdc] | 12 max. [12Vdc] | 3.0 to 20.0 | -20 to +70°C | -30 to +80°C |

### ■ Voltage-Sound Pressure Level/Voltage-Consumption Current

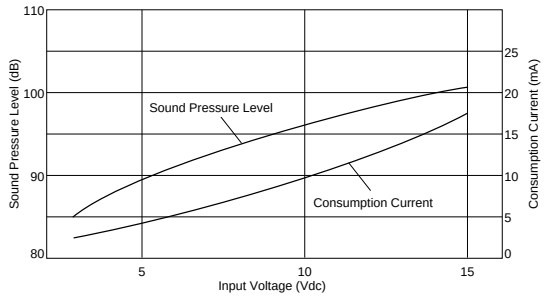
PKB30SPC-2001



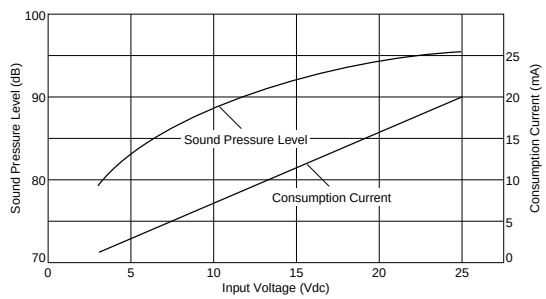

PKB30SPC-3001




PKB24SPC-3601




PKB24SW-3301




8

# Piezoelectric Buzzers Notice

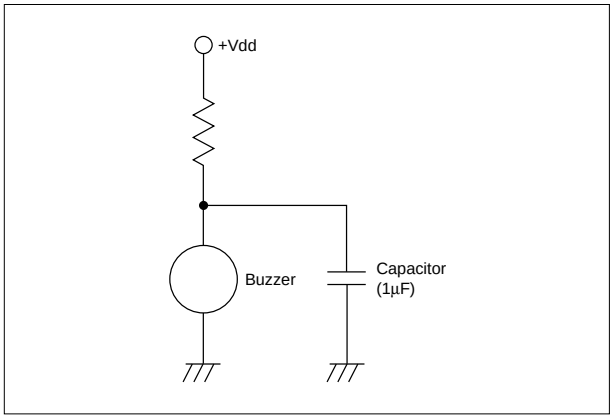
## ■ Notice (Soldering and Mounting)

1. Washing of the component is not acceptable, because it is not sealed.
2. Please do not cover the hole with tape or other obstacle as this will produce irregular oscillation.
3. There should not be any obstacle within 15mm from top of the component as this will produce irregular oscillation.

## ■ Notice (Handling)

1.The component may be damaged if mechanical stress over this specification is applied.

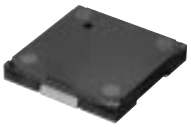
2.Resistors should not be connected in series to the power supply as this will produce irregular oscillation. When resistor is necessary to control sould volume, use capacitor (1µF) parallel with the buzzer together.

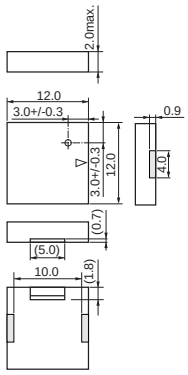


# Piezoelectric Sound Components

## Piezoelectric Receiver

Taking advantage of extensive acoustic, mechanical designing technology and high performance ceramics, Murata has developed SMD piezoelectric receiver. This Murata technology supports labor and cost saving activities.





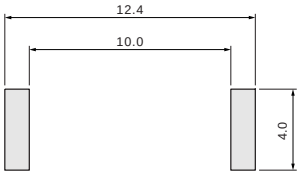

( ) : Ref. only
Tol. ±0.2
in mm

### ■ Features

1. Thin shape, light weight.
2. Low current consumption and good matching impedance for a voltage drive.
3. Reflowable.
4. Tape & Reel supply.
5. Minimum quantity (order in sets only):1,500 pcs.

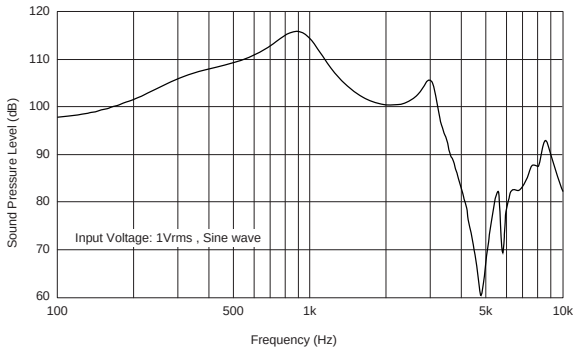
| Part Number | Sound Pressure Level(1) (dB) | Sound Pressure Level(2) (dB) | Operating Voltage Range (Vp-p) | Operating Temperature Range | Storage Temperature Range |
|---|---|---|---|---|---|
| **PKLCD1212R1000-R1** | 106.0 +4.0/-2.5 [at 300Hz] | 114.0 +2.5/-4.0 [at 1kHz] | 7 max. | -20 to +70°C | -30 to +80°C |

### ■ Standard Land Pattern Dimensions




(in mm)

### ■ Freq. Response (Sine Wave 1Vrms)

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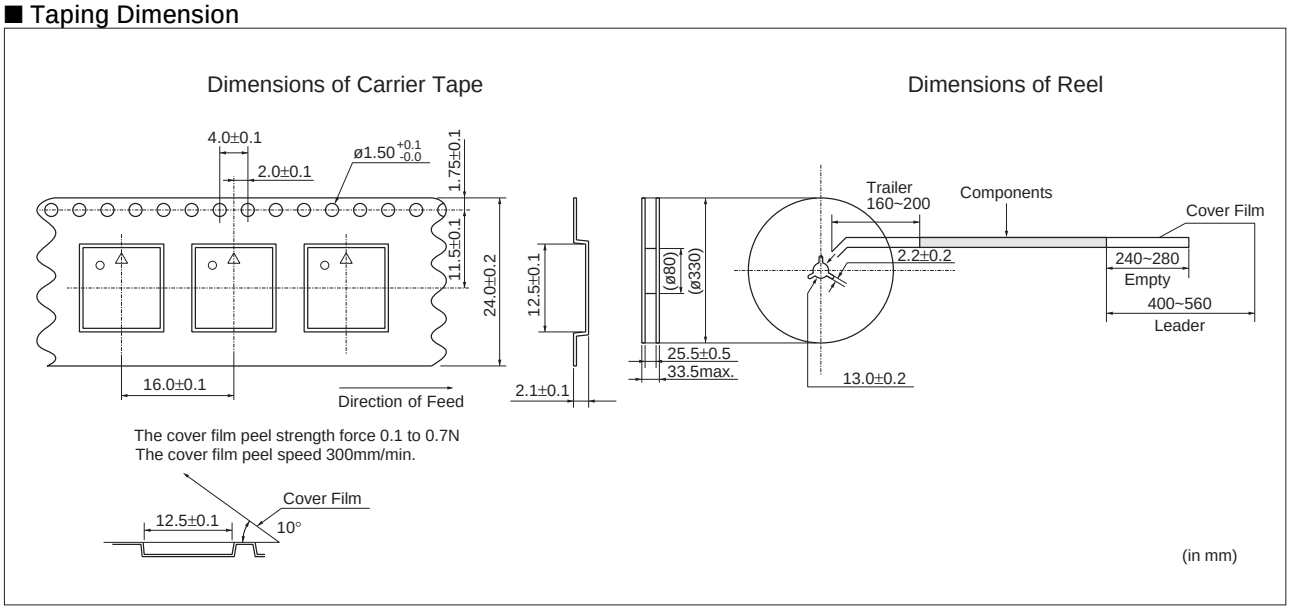
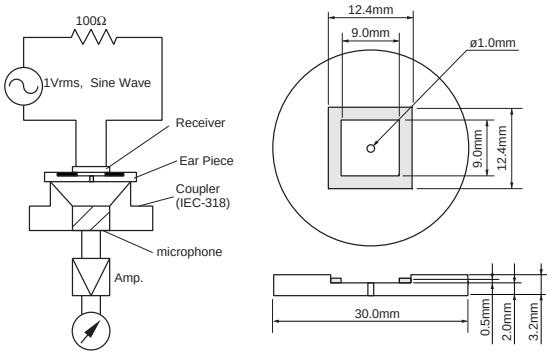
## ■ Taping Dimension




9

# Piezoelectric Receiver Circuit/Notice

## ■ Circuit




## ■ Notice (Soldering and Mounting)

Washing of the component is not acceptable, because it is not sealed.

## ■ Notice (Handling)

1. The component may be damaged if mechanical stress over this specification is applied.
2. Please pay attention to protect operating circuit from surge voltage provided by something of force such as falling, shock and temperature changing.
3. If DC voltage is applied to the component, silver migration may occur. Please pay full attention not to subject the component to DC voltage for long periods.
4. Please pay attention to the hand set design. Sound pressure level - frequency characteristics are affected by the hand set design. (Blocking the sound emitting hole or air dumping hole may degrade S.P.L. -frequency characteristics. To dispose other components or obstacle close to the holes may also affect the characteristics.)

# Piezoelectric Sound Components

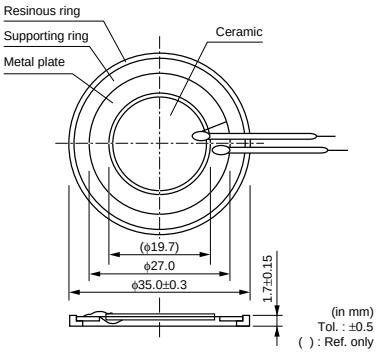
## Piezoelectric Speakers (CERAMITONE®)

As voice synthesizing techniques with ICs and LSIs are rapidly progressed, human voice synthesizing devices are put into practical use for portable calculators, clocks, vending machines, translating machines and so forth. In order to meet the demand, Murata has developed.
Piezoelectric Speaker best suited for making synthesized voice or melody.

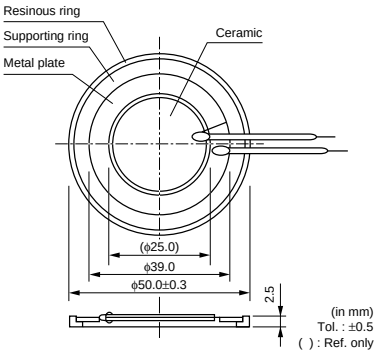
### ■ Features

1. High efficiency compared with conventional electromagnetic type speakers.
2. Ultra-thin and light-weight.
3. High impedance with less power consumption.
4. No electric noise, because they have no mechanical contacts.
5. Direct drive by IC is available.

VSB35EW-0701B



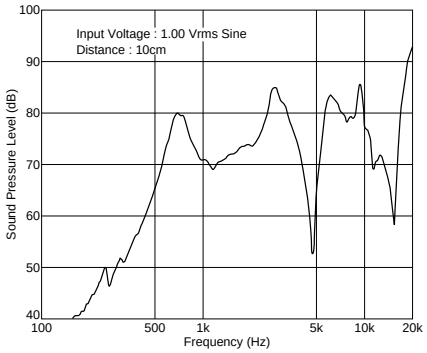

VSB50EW-0301B



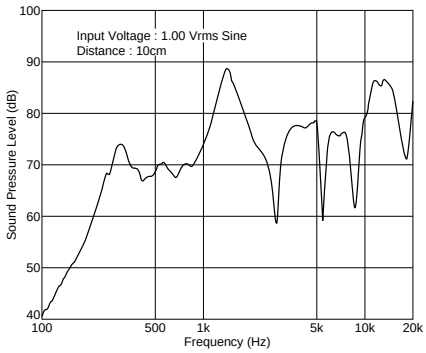

| Part Number | Oscillating Frequency Range | Resonant Frequency (Hz) | Impedance (ohm) | Capacitance (nF) | Maximum Input (mW) | Operating Temperature Range | Storage Temperature Range |
|---|---|---|---|---|---|---|---|
| **VSB35EW-0701B** | 600Hz to 20kHz | 950 ±150Hz[Lowest] | 600[1kHz] | 340 ±35%[120Hz] | 75 | -20 to +70°C | -30 to +80°C |
| **VSB50EW-0301B** | 250Hz to 20kHz | 400 ±150Hz[Lowest] | 300[1kHz] | 600 ±35%[120Hz] | 150 | -20 to +70°C | -30 to +80°C |

### ■ Freq. Response (Sine Wave 1Vrms, 10cm)

VSB35EW-0701B




VSB50EW-0301B

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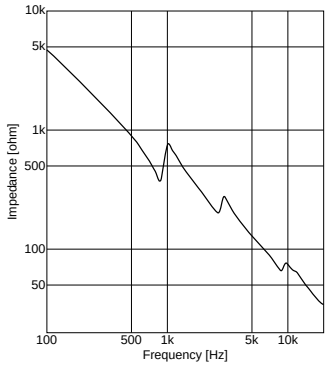
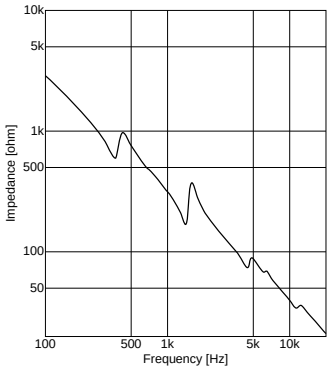
## ■ Impedance-Frequency Characteristics

VSB35EW-0701B




VSB50EW-0301B



# Piezoelectric Speakers (CERAMITONE®) Notice

## ■ Notice (Soldering and Mounting)

1. Applying load on the center area of the speaker may cause clack in the ceramic element. When the speaker is supported by edge, the load should be only applied around edge.
2. Washing of the component is not acceptable, because it is not sealed.

## ■ Notice (Handling)

1. Please do not touch the component with bare hand because electrode may be corroded.
2. The component may be damaged if mechanical stress over this specification is applied.
3. Please pay attention to protect operating circuit from surge voltage provided by something of force such as falling, shock and temperature changing.
4. If DC voltage is applied to the component, silver migration may occur. Please pay full attention not to subject the component to DC voltage for long periods.
5. The resistor should be used as shown in Fig. A. A suitable resistance value should be chosen, preferably 1kΩ to 2kΩ. Instead of this measure, a diode may also be applied as shown in Fig. B.

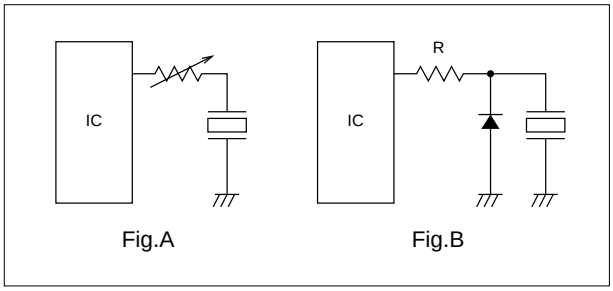



Fig.A Fig.B

6.Please pay enough attention not to pull lead wire too much because wire may be broken or soldering point may come off.

# Package

## ■ Minimum Quantity (pcs.)

| Products Name | Part Number | Minimum Quantity (pcs.) | | | |
|---|---|---|---|---|---|
| | | ø330mmReel | Bulk (Box) | Ammo Pack | Magazine |
| ● Piezoelectric Diaphragms | | | | | |
| External Drive Type | **7BB-12-9** | | 5120 | | |
| | **7BB-15-6** | | 8000 | | |
| | **7BB-20-3** | | 3000 | | |
| | **7BB-20-4** | | 2400 | | |
| | **7BB-20-6** | | 1800 | | |
| | **7BB-20-6A0** | | 600 | | |
| | **7BB-27-4** | | 1500 | | |
| | **7BB-27-4A0** | | 600 | | |
| | **7BB-35-3** | | 800 | | |
| | **7BB-35-3A0** | | 400 | | |
| | **7BB-41-2** | | 400 | | |
| | **7BB-41-2A0** | | 250 | | |
| | **7BB-50M-1** | | 600 | | |
| | **7SB-20-7** | | 1800 | | |
| Self Drive Type | **7BB-20-6C** | | 1800 | | |
| | **7BB-20-6CA0** | | 600 | | |
| | **7BB-27-3C** | | 2400 | | |
| | **7BB-27-4C** | | 1500 | | |
| | **7BB-27-4CA0** | | 600 | | |
| | **7BB-35-3C** | | 800 | | |
| | **7BB-35-3CA0** | | 400 | | |
| | **7BB-41-2C** | | 600 | | |
| | **7BB-41-2CA0** | | 250 | | |
| | **7NB-27-2C** | | 3000 | | |
| | **7NB-27-3C** | | 3000 | | |
| | **7NB-27-4C** | | 3000 | | |
| | **7SB-34R7-3C** | | 1600 | | |
| ● Piezoelectric Sounders | | | | | |
| External Drive Type | **PKM13EPY-4000-A0** | | | 500 | |
| | **PKM13EPY-4002-B0** | | 330 | | |
| | **PKM17EPP-2002-B0** | | 200 | | |
| | **PKM17EPP-4001-B0** | | 200 | | |
| | **PKM17EPT-4001-B0** | | 180 | | 70* |
| | **PKM17EW-2001** | | 250 | | |
| | **PKM22EP-2001** | | 360 | | |
| | **PKM22EPP-2001-B0** | | 750 | | |
| | **PKM22EPP-4001-B0** | | 900 | | |
| | **PKM22EPP-4005-B0** | | 750 | | |
| | **PKM22EPP-4007-B0** | | 750 | | |
| | **PKM22EPT-2001-B0** | | 300 | | 75* |
| | **PKM22EPT-4001-B0** | | 300 | | |
| | **PKM17EW-4000** | | 500 | | |
| | **PKLCS1212E4001-R1** | 1000 | | | |
| Self Drive Type | **PKM24SP-3805** | | 360 | | |
| | **PKM30SPT-2001-B0** | | 70 | | |
| | **PKM30SPT-2501-B0** | | 70 | | |
| ● Piezoelectric Buzzers | **PKB24SPC-3601-B0** | | 650 | | |
| | **PKB24SW-3301** | | 200 | | |
| | **PKB30SPC-2001-B0** | | 80 | | |
| | **PKB30SPC-3001-B0** | | 80 | | |
| ● Piezoelectric Ringers (PIEZORINGER®) | **PKM33EP-1201C** | | 300 | | |
| | **PKM34EW-1101C** | | 25 | | |
| | **PKM34EW-1201C** | | 25 | | |
| | **PKM44EP-0901** | | 160 | | |
| | **PKM44EW-1001C** | | 25 | | |
| ● Piezoelectric Receiver | **PKLCD1212R1000-R1** | 1500 | | | |
| ● Piezoelectric Speakers (CERAMITONE®) | **VSB35EW-0701B** | | 160 | | |
| | **VSB50EW-0301B** | | 80 | | |

*The last two digits are changed to M0.

## ⚠Note:

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   Murata products should not be used or sold for use in the development, production, stockpiling or utilization of any conventional weapons or mass-destructive weapons (nuclear weapons, chemical or biological weapons, or missiles), or any other weapons.
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   For products which are controlled items subject to the “Foreign Exchange and Foreign Trade Law” of Japan, the export license specified by the law is required for export.
2. Please contact our sales representatives or product engineers before using our products listed in this catalog for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property, or when intending to use one of our products for other applications than specified in this catalog.
   ① Aircraft equipment
   ② Aerospace equipment
   ③ Undersea equipment
   ④ Power plant equipment
   ⑤ Medical equipment
   ⑥ Transportation equipment (vehicles, trains, ships, etc.)
   ⑦ Traffic signal equipment
   ⑧ Disaster prevention / crime prevention equipment
   ⑨ Data-processing equipment
   ⑩ Application of similar complexity and/or reliability requirements to the applications listed in the above
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