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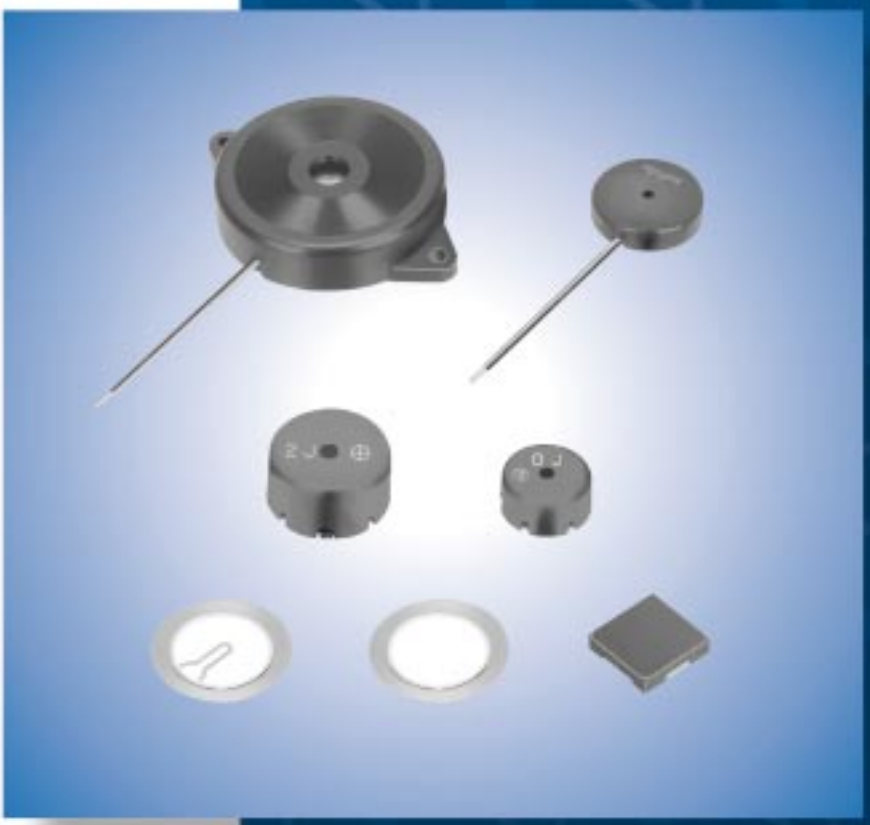
# Piezoelectric Sound Components



muRata Innovator in Electronics

Murata Manufacturing Co., Ltd.

Cat.No.P37E-23

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**for EU RoHS Compliant**

・All the products in this catalog comply with EU RoHS.
・EU RoHS is "the European Directive 2002/95/EC on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment".
・For more details, please refer to our website 'Murata's Approach for EU RoHS' (http://www.murata.com/info/rohs.html).

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## ● Part Numbering

### Piezoelectric Diaphragms

(Part Number)

| 7 | N | B | -31R2 | DM | -1R5 | | L | 10 |
|---|---|---|---|---|---|---|---|---|
| ❶ | ❷ | ❸ | ❹ | ❺ | ❻ | ❼ | ❽ | ❾ |

❶Product ID

| Product ID | |
|---|---|
| **7** | Ceramic Material |

❷Material

| Code | Metal Plate Material |
|---|---|
| **B** | Brass |
| **N** | Nickel Alloy |
| **S** | SUS |

❸Product

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

❹Metal Plate Diameter

| Code | Metal Plate Diameter |
|---|---|
| **-31R2** | A hyphen (-) plus four digits 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 digits 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 |
|---|---|
| **L** | With lead (available for RoHS) |
| — | 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 Sounders/Piezoelectric Buzzers/Piezoelectric Ringers (PIEZORINGER®)

(Part Number) **PK** **M** **13** **E** **P** **YH** **40** **00** **P** **-A0**
❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ 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 |
| ☐ | Exclude above mentioned |

☐ means specification of outer electrode.

❼Oscillating Frequency Type

| Code | Oscillating Frequency Type |
|---|---|
| **40** | Expressed resonant frequency by two-digit alphanumerics. The unit is in 100 hertz (Hz). In case of 4kHz (4000Hz), expressed as "40". |

❽Individual Specification Code

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

❾Special Quality Guarantee

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

❿Packaging

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

Radial taping or magazines are not available for all types.
Please contact us.
Packaging Code is blank in the case of types for which radial taping or magazines are not available.

## SMD Piezoelectric Sounder

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

❶Product ID

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

❷Product

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

❸Dimensions

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

❹Drive

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

❺Oscillating Frequency Type

| Code | Oscillating Frequency Type |
|---|---|
| **40** | Expressed resonant frequency by two-digit alphanumerics. The unit is in 100 hertz (Hz). In case of 4kHz (4000Hz), expressed as "40". |

❻Individual Specification Code

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

❼Packaging

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

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# Application Matrix

| | | Part Number \ Application | Tele-phone | Watch | Clock | Medical Equip-ment | Fire/ Gas Alarm | Digital Camera | Toy | Bar Code Scanner | Printer | Note-PC PDA | DVD-Player | Micro-wave Oven | Air Condi-tioner | Fan Heater | Instru-ment Cluster |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Piezoelectric Diaphragm | External Drive Type | **7BB-12-9** | | ● | ● | ● | | ● | ● | | | ● | | | | | |
| | | **7BB-15-6** | | | ● | ● | | ● | ● | | | ● | | | | | |
| | | **7BB-20-3** | ● | ● | ● | ● | ● | | ● | ● | | | | | | | |
| | | **7BB-20-6** | | | ● | ● | | ● | ● | | | ● | | | | | |
| | | **7BB-20-6L0** | | | ● | ● | | | ● | | | ● | | | | | |
| | | **7BB-27-4** | ● | | ● | ● | | | ● | ● | | | | | | | |
| | | **7BB-27-4L0** | ● | | ● | ● | | | ● | ● | | | | | | | |
| | | **7BB-35-3** | ● | | ● | | | | ● | ● | | | | | | | |
| | | **7BB-35-3L0** | ● | | ● | | ● | | ● | ● | | | | | | | |
| | | **7BB-41-2** | ● | | | | | | | | | | | | | | |
| | | **7BB-41-2L0** | ● | | | | | | | | | | | | | | |
| | | **7NB-31R2-1** | | | | ● | ● | | | | | | | | | | |
| | Self Drive Type | **7BB-20-6C** | ● | | | | | ● | ● | | | | | | | | |
| | | **7BB-20-6CL0** | ● | | | | | ● | ● | | | | | | | | |
| | | **7BB-27-4C** | ● | | | | ● | | ● | ● | | | | | | | |
| | | **7BB-27-4CL0** | ● | | | | ● | | ● | ● | | | | | | | |
| | | **7BB-35-3C** | ● | | | | ● | | | ● | | | | | | | |
| | | **7BB-35-3CL0** | ● | | | | ● | | | ● | | | | | | | |
| | | **7BB-41-2C** | ● | | | | | | | | | | | | | | |
| | | **7BB-41-2CL0** | ● | | | | | | | | | | | | | | |
| | | **7SB-34R7-3C** | | | | | ● | | | | | | | | | | |
| Piezoelectric Sounder | External Drive Type | **PKM13EPYH4000-A0** | ● | | ● | ● | | ● | ● | ● | ● | ● | ● | | ● | ● | ● |
| | | **PKM13EPYH4002-B0** | ● | | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | | **PKM17EPP-2002-B0** | ● | | ● | ● | | | ● | ● | ● | | ● | ● | ● | ● | ● |
| | | **PKM17EPPH4001-B0** | ● | | ● | ● | | | ● | ● | ● | | ● | ● | ● | ● | ● |
| | | **PKM17EWH2001** | ● | | ● | ● | | ● | ● | ● | ● | ● | ● | | ● | | |
| | | **PKM22EPH2001** | | | | | | | ● | | ● | | ● | ● | ● | ● | ● |
| | | **PKM22EPPH2001-B0** | ● | | ● | ● | | | ● | | ● | | ● | ● | ● | ● | ● |
| | | **PKM22EPPH4001-B0** | ● | | ● | ● | | | ● | | ● | | ● | ● | ● | ● | ● |
| | | **PKM22EPPH4005-B0** | ● | | ● | ● | | | ● | | ● | | ● | ● | ● | ● | |
| | | **PKM22EPPH4007-B0** | ● | | ● | ● | ● | | ● | | ● | | ● | ● | ● | ● | ● |
| | | **PKM22EPTH2001-B0** | | | | | | | ● | | ● | | ● | ● | ● | ● | |
| | | **PKM17EWH4000** | ● | | ● | ● | | ● | ● | ● | ● | ● | ● | | ● | | |
| | | **PKLCS1212E2000-R1** | ● | | | ● | | ● | ● | ● | ● | ● | | | ● | | |
| | | **PKLCS1212E20A0-R1** | | | | | | | | | | | | | | | ● |
| | | **PKLCS1212E4001-R1** | ● | | | ● | | ● | ● | ● | ● | ● | | | ● | | |
| | | **PKLCS1212E40A1-R1** | | | | | | | | | | | | | | | ● |
| | Self Drive Type | **PKM24SPH3805** | ● | | | | ● | | ● | | | | | ● | ● | ● | |
| | | **PKM30SPTH2001-B0** | | | | | | | ● | | ● | ● | | ● | | | |
| | | **PKM30SPTH2501-B0** | | | | | | | ● | | ● | ● | | | | | |
| Piezoelectric Buzzer | | **PKB24SPCH3601-B0** | ● | | | ● | | | ● | | ● | ● | ● | | ● | ● | |
| | | **PKB24SWH3301** | ● | | ● | | | | ● | | ● | ● | | ● | ● | ● | |
| Piezoelectric Ringer | | **PKM33EPH1201C** | ● | | | | | | | | | | | | | | |
| | | **PKM34EWH1101C** | ● | | | | | | | | | | | | | | |
| | | **PKM34EWH1201C** | ● | | | | | | | | | | | | | | |
| | | **PKM44EWH1001C** | ● | | | | | | | | | | | | | | |

There are various applications besides those listed in the above table, including:
Burglar Alarm, Laundry Machine, Bath, Interphone, Chime, Back Buzzer, ME Instruments, Measuring Instruments, Vending Machine, Calculator, Automobile, Communication Radio, Hemadynamometer, Thermometer, Running Meter, Facsimile, Audio Timer, Automatic Controlling Devices.

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# Piezoelectric Sound Components



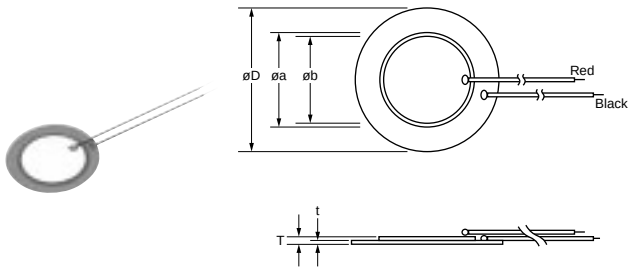
## Piezoelectric Diaphragms

■ Features

1. Clear sound
2. Ultra thin and lightweight
3. No contacts: therefore, no noise and highly reliable
4. Low power consumption for voltage type

■ Applications

Clocks/Calculators/Digital camera/Various alarms
(Burglar alarms, etc.)




### External Drive Type

| Part Number | Resonant Frequency (kHz) | Resonant Impedance (ohm) | Capacitance (nF) | Plate Size dia. D (mm) | Element Size dia. a (mm) | Electrode Size dia. b (mm) | Thickness T (mm) | Plate Thickness t (mm) | Plate Material |
|---|---|---|---|---|---|---|---|---|---|
| **7BB-12-9** | 9.0 ±1.0kHz | 1000 max. | 8.0 ±30% [1kHz] | 12.0 | 9.0 | 8.0 | 0.22 | 0.10 | Brass |
| **7BB-15-6** | 6.0 ±1.0kHz | 800 max. | 10.0 ±30% [1kHz] | 15.0 | 10.0 | 9.0 | 0.22 | 0.10 | Brass |
| **7BB-20-3** | 3.6 ±0.6kHz | 500 max. | 20.0 ±30% [1kHz] | 20.0 | 14.0 | 12.8 | 0.22 | 0.10 | Brass |
| **7BB-20-6** | 6.3 ±0.6kHz | 350 max. | 10.0 ±30% [1kHz] | 20.0 | 14.0 | 12.8 | 0.42 | 0.20 | Brass |
| **7BB-20-6L0** | 6.3 ±0.6kHz | 1000 max. | 10.0 ±30% [1kHz] | 20.0 | 14.0 | 12.8 | 0.42 | 0.20 | Brass (with Lead Wire: AWG32 Length 50mm) |
| **7BB-27-4** | 4.6 ±0.5kHz | 200 max. | 20.0 ±30% [1kHz] | 27.0 | 19.7 | 18.2 | 0.54 | 0.30 | Brass |
| **7BB-27-4L0** | 4.6 ±0.5kHz | 300 max. | 20.0 ±30% [1kHz] | 27.0 | 19.7 | 18.2 | 0.54 | 0.30 | Brass (with Lead Wire: AWG32 Length 50mm) |
| **7BB-35-3** | 2.8 ±0.5kHz | 200 max. | 30.0 ±30% [1kHz] | 35.0 | 25.0 | 23.0 | 0.53 | 0.30 | Brass |
| **7BB-35-3L0** | 2.8 ±0.5kHz | 200 max. | 30.0 ±30% [1kHz] | 35.0 | 25.0 | 23.0 | 0.53 | 0.30 | Brass (with Lead Wire: AWG32 Length 50mm) |
| **7BB-41-2** | 2.2 ±0.3kHz | 250 max. | 30.0 ±30% [1kHz] | 41.0 | 25.0 | 23.0 | 0.63 | 0.40 | Brass |
| **7BB-41-2L0** | 2.2 ±0.3kHz | 300 max. | 30.0 ±30% [1kHz] | 41.0 | 25.0 | 23.0 | 0.63 | 0.40 | Brass (with Lead Wire: AWG32 Length 50mm) |
| **7NB-31R2-1** | 1.3 ±0.5kHz | 300 max. | 40.0 ±30% [120Hz] | 31.2 | 19.7 | 18.2 | 0.22 | 0.10 | Nickel Alloy |

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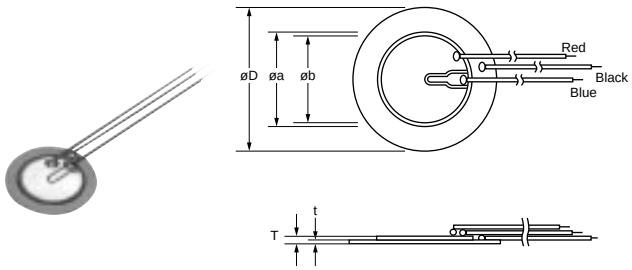


## Self Drive Type

| Part Number | Resonant Frequency (kHz) | Resonant Impedance (ohm) | Capacitance (nF) | Plate Size dia. D (mm) | Element Size dia. a (mm) | Electrode Size dia. b (mm) | 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-20-6CL0** | 6.3 ±0.6kHz | 800 max. | 8.5 ±30% [1kHz] | 20.0 | 14.0 | 12.8 | 0.42 | 0.20 | Brass (with Lead Wire: AWG32 Length 50mm) |
| **7BB-27-4C** | 4.6 ±0.5kHz | 200 max. | 18.0 ±30% [1kHz] | 27.0 | 19.7 | 18.2 | 0.54 | 0.30 | Brass |
| **7BB-27-4CL0** | 4.6 ±0.5kHz | 350 max. | 18.0 ±30% [1kHz] | 27.0 | 19.7 | 18.2 | 0.54 | 0.30 | Brass (with Lead Wire: AWG32 Length 50mm) |
| **7BB-35-3C** | 2.8 ±0.5kHz | 200 max. | 26.0 ±30% [1kHz] | 35.0 | 25.0 | 23.0 | 0.53 | 0.30 | Brass |
| **7BB-35-3CL0** | 2.8 ±0.5kHz | 200 max. | 26.0 ±30% [1kHz] | 35.0 | 25.0 | 23.0 | 0.53 | 0.30 | Brass (with Lead Wire: AWG32 Length 50mm) |
| **7BB-41-2C** | 2.2 ±0.3kHz | 250 max. | 24.0 ±30% [1kHz] | 41.0 | 25.0 | 23.0 | 0.63 | 0.40 | Brass |
| **7BB-41-2CL0** | 2.2 ±0.3kHz | 350 max. | 24.0 ±30% [1kHz] | 41.0 | 25.0 | 23.0 | 0.63 | 0.40 | Brass (with Lead Wire: AWG32 Length 50mm) |
| **7SB-34R7-3C** | 3.1 ±0.3kHz | 150 max. | 24.0 ±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 diaphragms without feedback electrode also have the same node diameters.

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## ■ Notice (Soldering and Mounting)

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

## ■ 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 exceeding specifications is applied.
3. Take care to protect operating circuit from surge voltage resulting from excessive force, falling, shock or temperature change.
4. If DC voltage is applied to the component, silver migration may occur. Please pay full attention to avoid subjecting 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.

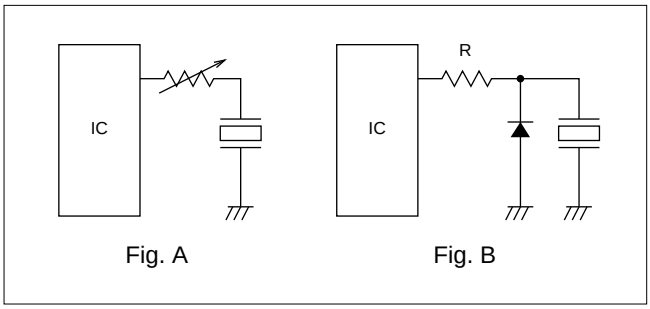


Fig. A Fig. B

6. Avoid excessive pulling of lead wire because wire may break or soldering point may come off.

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# Piezoelectric Sound Components

## Piezoelectric Sounders External Drive Pin Type

2

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.

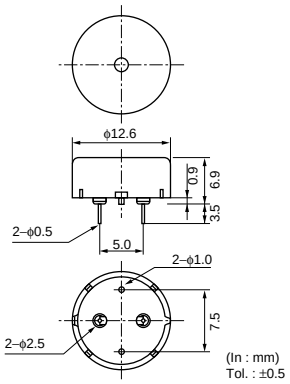
### ■ Features

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

### ■ Applications

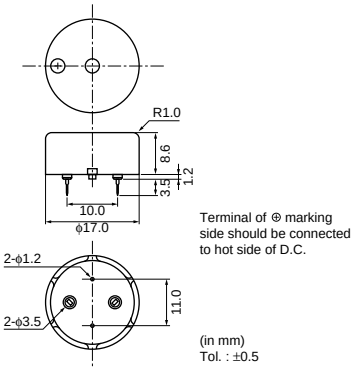
1. Various office equipment such as PPCs, printers and keyboards
2. Various home appliances such as microwave ovens
3. Confirmation sound of various audio equipment

PKM13EPYH4002-B0




(In : mm)
Tol. : ±0.5

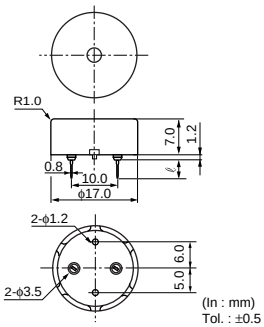
PKM17EPP-2002-B0




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

(in mm)
Tol. : ±0.5

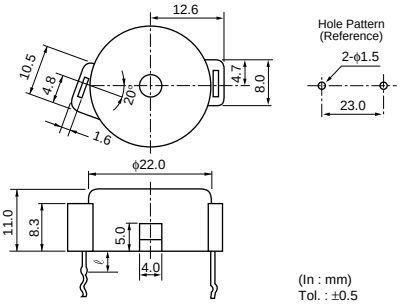
PKM17EPPH4001-B0




(In : mm)
Tol. : ±0.5

| Part Number | ℓ |
|---|---|
| PKM17EPPH4001-B0 | 6.5 |
| PKM17EPPH4002-B0 | 3.5 |

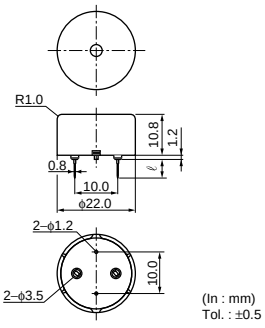
PKM22EPH2001




(In : mm)
Tol. : ±0.5

| Part Number | ℓ |
|---|---|
| PKM22EPH2001 | 4.0 |
| PKM22EPH2002 | 8.0 |
| PKM22EPH2003 | 12.0 |

PKM22EPPH2001-B0




(In : mm)
Tol. : ±0.5

| Part Number | ℓ |
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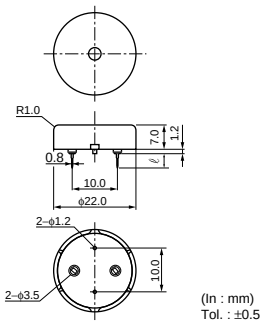
| PKM22EPPH2002-B0 | 3.5 |

PKM22EPPH4001-B0




(In : mm)
Tol. : ±0.5

| Part Number | ℓ |
|---|---|
| PKM22EPPH4001-B0 | 6.5 |
| PKM22EPPH4002-B0 | 3.5 |

Continued on the following page.

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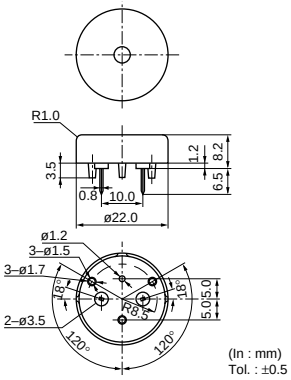
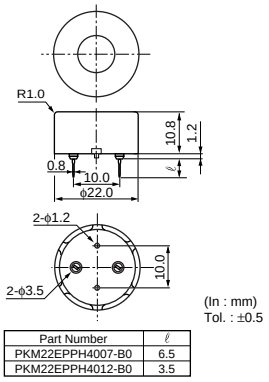
PKM22EPPH4005-B0

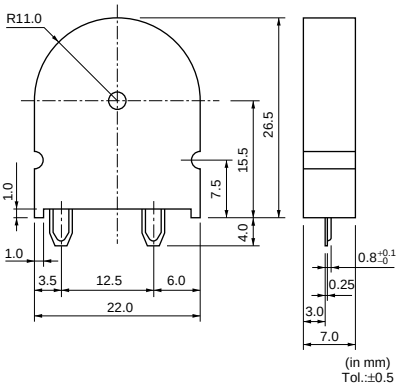


PKM22EPPH4007-B0




| Part Number | ℓ |
|---|---|
| PKM22EPPH4007-B0 | 6.5 |
| PKM22EPPH4012-B0 | 3.5 |

PKM22EPTH2001-B0




| Part Number | Sound Pressure Level (dB) | Sound Pressure Level (Ref. only) (dB) | Operating Voltage Range | Capacitance (nF) | Operating Temp. Range (°C) | Storage Temp. Range (°C) |
|---|---|---|---|---|---|---|
| **PKM13EPYH4002-B0** | 70 min. [3Vp-p,4kHz,square wave,10cm] | 70 min. [1Vrms,4kHz,sine wave,10cm] | 30.0 Vp-p max. | 5.5 ±30% [1kHz] | -40 to +85 | -40 to +85 |
| **PKM17EPP-2002-B0** | 70 min. [3Vo-p,2kHz,square wave,10cm] | 70 min. [1Vrms,2kHz,sine wave,10cm] | 25.0 Vo-p max. [with polarity] | 34.0 ±30% [120Hz] | -20 to +70 | -30 to +80 |
| **PKM17EPPH4001-B0** | 72 min. [3Vp-p,4kHz,square wave,10cm] | 72 min. [1Vrms,4kHz,sine wave,10cm] | 25.0 Vp-p max. | 7.0 ±30% [1kHz] | -20 to +70 | -30 to +80 |
| **PKM22EPH2001** | 75 min. [3Vp-p,2kHz,square wave,10cm] | 75 min. [1Vrms,2kHz,sine wave,10cm] | 25.0 Vp-p max. | 17.0 ±30% [120Hz] | -20 to +70 | -30 to +80 |
| **PKM22EPPH2001-B0** | 70 min. [3Vp-p,2kHz,square wave,10cm] | 70 min. [1Vrms,2kHz,sine wave,10cm] | 30.0 Vp-p max. | 19.0 ±30% [120Hz] | -20 to +70 | -30 to +80 |
| **PKM22EPPH4001-B0** | 75 min. [3Vp-p,4kHz,square wave,10cm] | 75 min. [1Vrms,4kHz,sine wave,10cm] | 30.0 Vp-p max. | 12.0 ±30% [1kHz] | -20 to +70 | -30 to +80 |
| **PKM22EPPH4005-B0** | 75 min. [3Vp-p,4kHz,square wave,10cm] | 75 min. [1Vrms,4kHz,sine wave,10cm] | 30.0 Vp-p max. | 12.0 ±30% [1kHz] | -20 to +70 | -30 to +80 |
| **PKM22EPPH4007-B0** | 85 min. [3Vp-p,4kHz,square wave,10cm] | 85 min. [1Vrms,4kHz,sine wave,10cm] | 30.0 Vp-p max. | 12.0 ±30% [1kHz] | -20 to +70 | -30 to +80 |
| **PKM22EPTH2001-B0** | 70 min. [3Vp-p,2kHz,square wave,10cm] | 70 min. [1Vrms,2kHz,sine wave,10cm] | 25.0 Vp-p max. | 19.0 ±30% [120Hz] | -20 to +70 | -30 to +80 |

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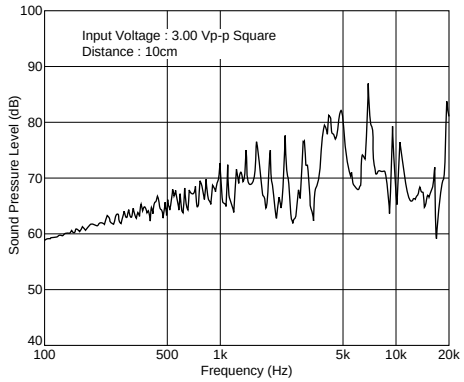
## ■ Freq. Response (Square Wave 3Vp-p, 10cm)

PKM13EPYH4002-B0

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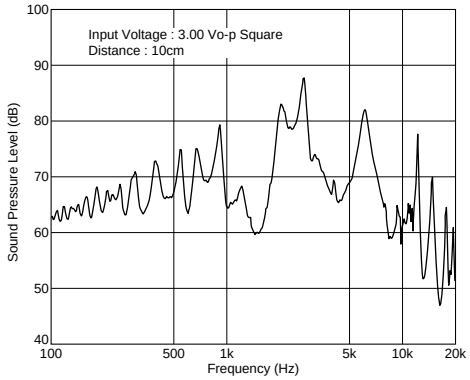
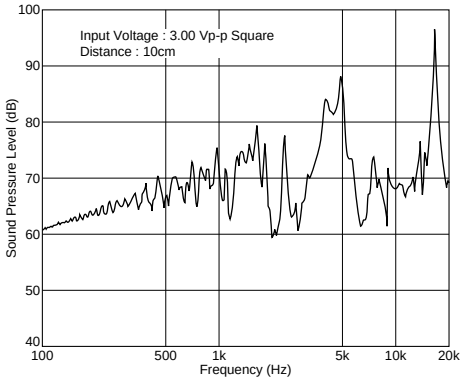



PKM17EPPH4001-B0

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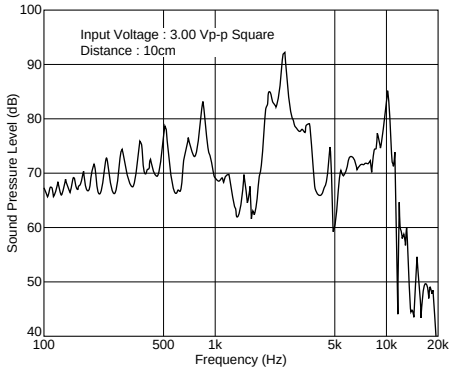
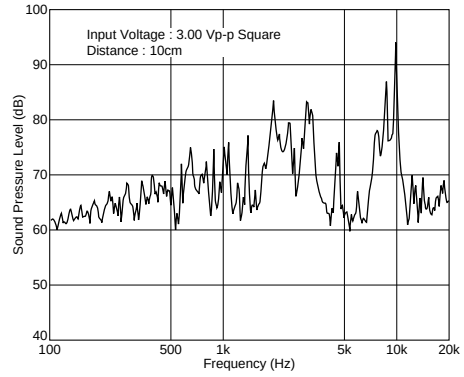



PKM22EPPH2001-B0

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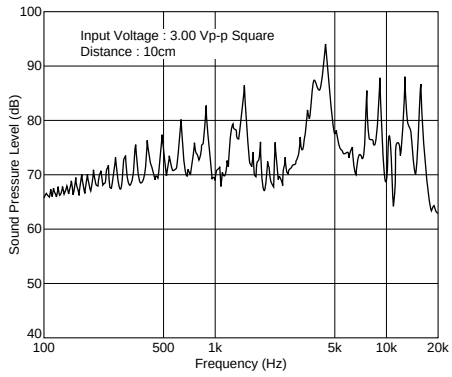


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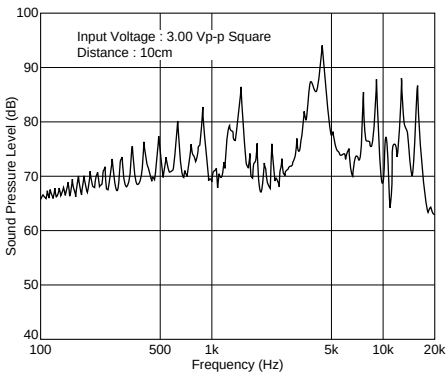


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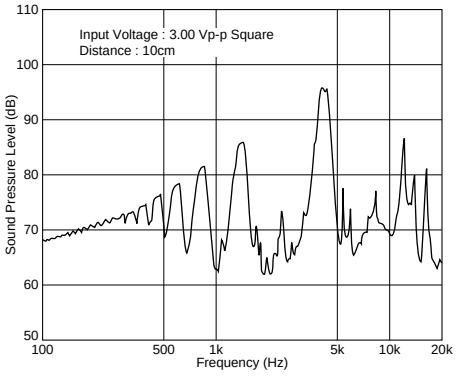


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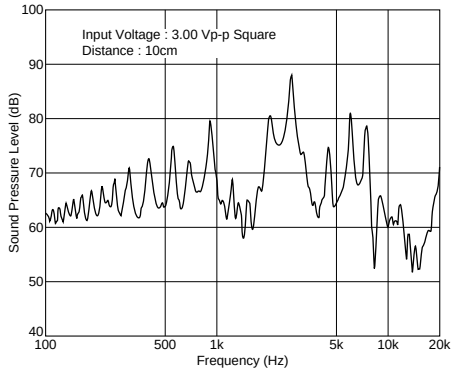
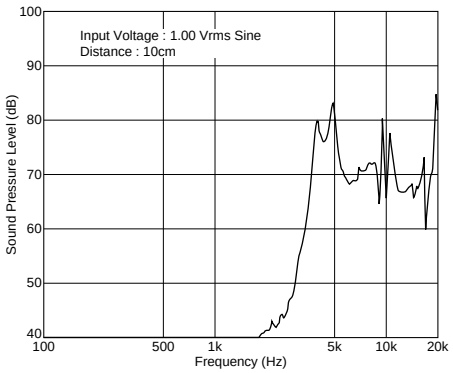
## ■ Freq. Response (Square Wave 3Vp-p, 10cm)

PKM22EPTH2001-B0

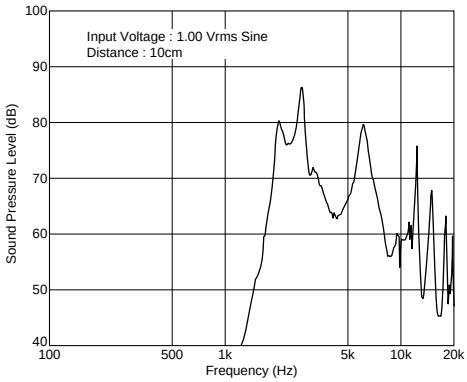



## ■ Freq. Response (Sine Wave 1Vrms, 10cm)

PKM13EPYH4002-B0




PKM17EPP-2002-B0

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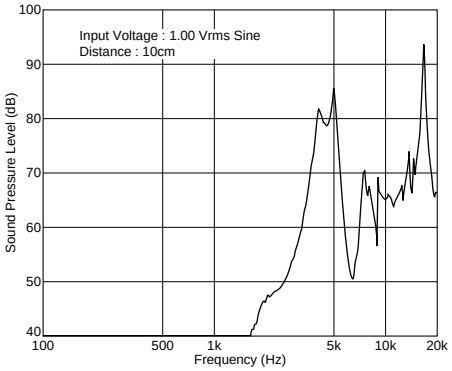


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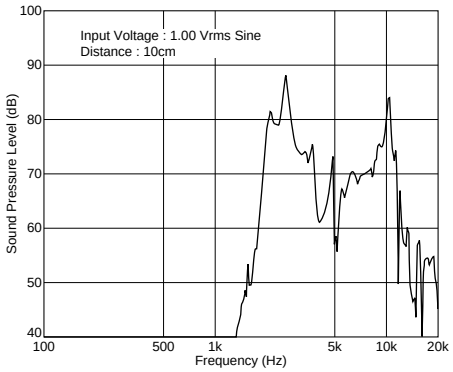


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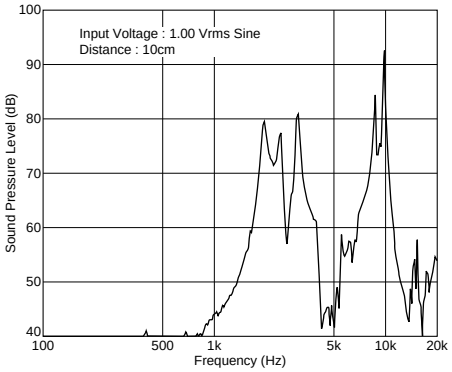


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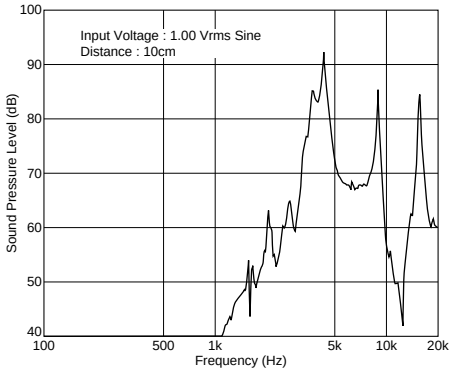


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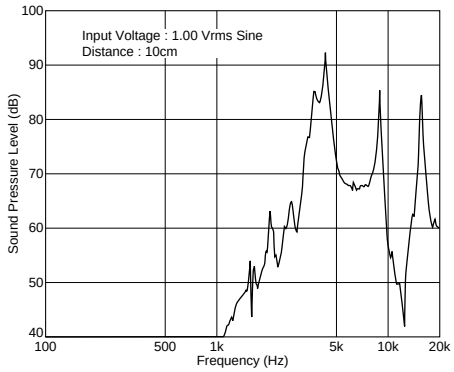
## ■ Freq. Response (Sine Wave 1Vrms, 10cm)

PKM22EPPH4005-B0

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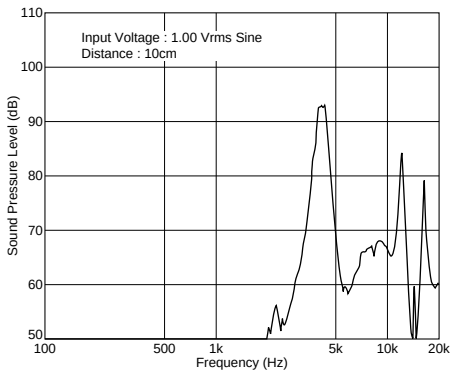
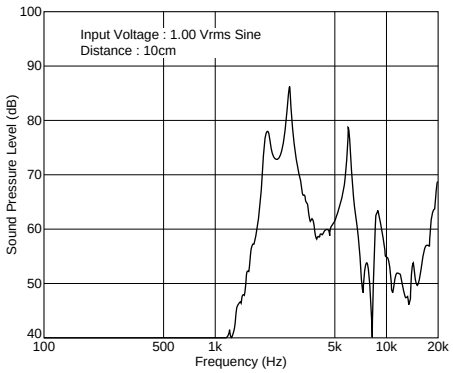



PKM22EPTH2001-B0



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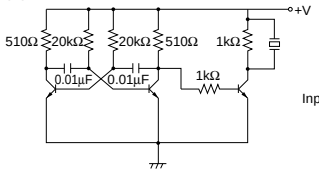
# Piezoelectric Sounders (External Drive Pin Type) Circuit/Notice



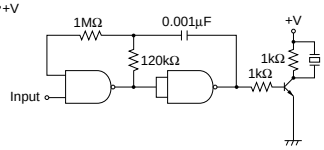
## ■ Circuit

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)

1. Notice (Soldering and Mounting)
   (1) Soldering Iron
      (a) Lead terminals are immersed up to 1.5mm from components body in soldering bath of +260+/-5 degrees C for 10+/-1.0 seconds, and then components shall be left in natural condition for 4 hours.
      (b) Lead terminal is directly contacted with the tip of soldering iron of +350+/-0.5 seconds, and then components shall be left in natural condition for 4 hours.
   (2) Reflow
      The component cannot withstand reflow soldering.
2. Washing of the component is not acceptable. Because it is not sealed.
3. For Part Numbers mentioned below, please do not insert the component on double sided PCB with plated through hole. When melted solder touches to the base of lead terminal, a part of plastic case shall be melted and it may cause electrical failure.
   • Part Number
   PKM13EPYH4002-B0/PKM17EPP-2002-B0
   PKM17EPPH4001-B0/PKM22EPPH2001-B0
   PKM22EPPH4001-B0/PKM22EPPH4007-B0

## ■ Notice (Handling)

1. The component may be damaged if mechanical stress exceeding specifications is applied.
2. Take care to protect operating circuit from surge voltage resulting from excessive force, falling, shock or temperature change.
3. If DC voltage is applied to the component, silver migration may occur. Please pay full attention to avoid subjecting 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.

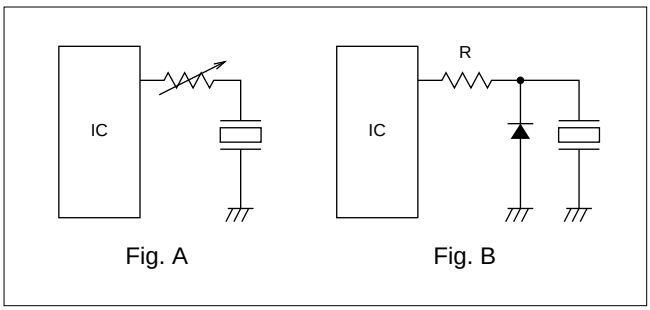



Fig. A Fig. B

5. Avoid excessive pulling of lead wire because wire may break or soldering point may come off.

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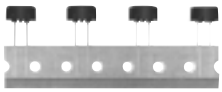
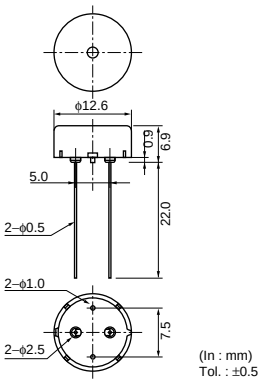
# Piezoelectric Sound Components

## Piezoelectric Sounders External Drive Pin Type Taping



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



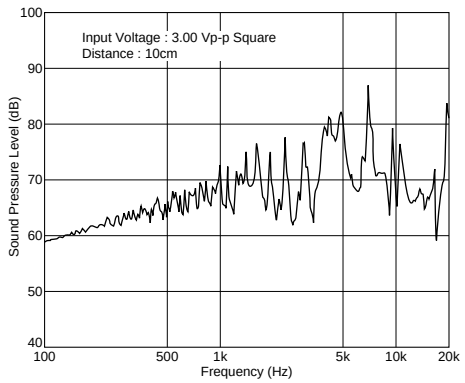



### ■ Features

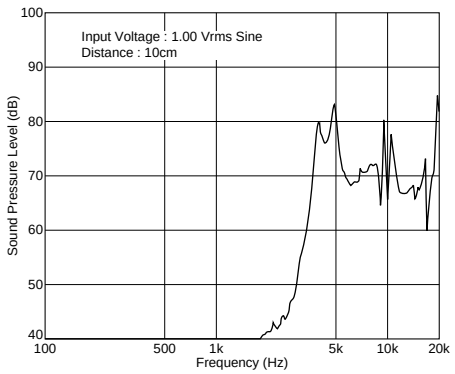
1. Lead dimension: Improved mouting reliability (cut & clinch) due to round terminal
2. High and stable mountability
3. Ammo packaging

| Part Number | Sound Pressure Level (dB) | Sound Pressure Level (Ref. only) (dB) | Operating Voltage Range | Capacitance (nF) | Operating Temp. Range (°C) | Storage Temp. Range (°C) |
|---|---|---|---|---|---|---|
| **PKM13EPYH4000-A0** | 70 min. [3Vp-p,4kHz,square wave,10cm] | 70 min. [1Vrms,4kHz,sine wave,10cm] | 30.0 Vp-p max. | 5.5 ±30% [1kHz] | -40 to +85 | -40 to +85 |

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




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

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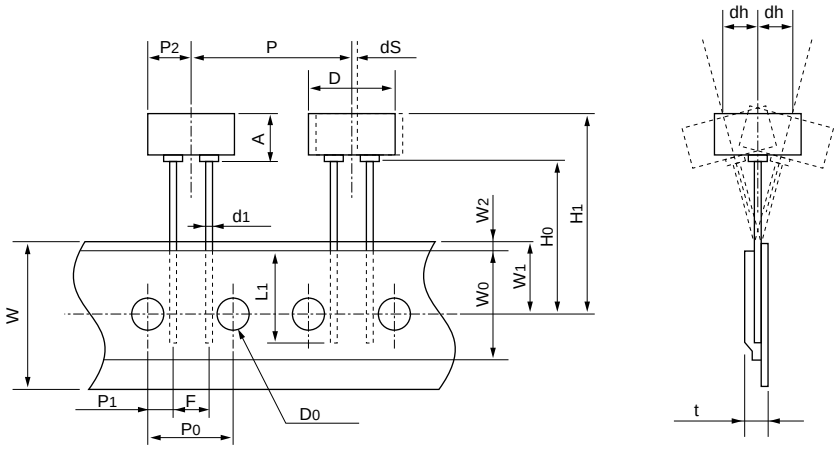
## ■ Taping Dimension




| 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 | $d_1$ | ø0.5 | ±0.1 | |
| Lead length under the hold down tape | $L_1$ | 8.0 min. | — | |
| Pitch of component | P | 25.4 | ±0.5 | |
| Pitch of sprocket | $P_0$ | 12.7 | ±0.2 | Tolerance for Pitches 10×$P_0$=127±2mm |
| Length from hole center to lead | $P_1$ | 3.85 | ±0.7 | |
| Length from hole center to component center | $P_2$ | 6.35 | ±0.7 | |
| Lead spacing | F | 5.0 | ±0.5 | |
| Slant forward or backward | dh | 0 | ±1.0 | 360° : 1mm max. |
| Width of carrier tape | W | 18.0 | ±0.5 | |
| Width of hold down tape | $W_0$ | 12.5 min. | — | Hold down tape does not exceed the carrier tape. |
| Position of sprocket hole | $W_1$ | 9.0 | ±0.5 | |
| Gap of hold down tape and carrier tape | $W_2$ | 2.0 max. | — | |
| Distance between the center of sprocket hole and lead stopper | $H_0$ | 18.0 | ±0.5 | |
| Total height of component | $H_1$ | 26.0 max. | — | |
| Diameter of sprocket hole | $D_0$ | ø4.0 | ±0.2 | |
| Total thickness of tape | t | 0.6 | ±0.2 | |
| Body tilt | dS | 0 | ±1.0 | |

(in mm)

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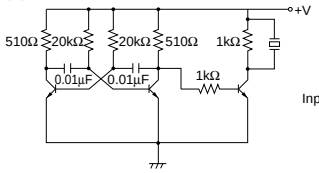
# Piezoelectric Sounders (External Drive Pin Type Taping) Circuit/Notice

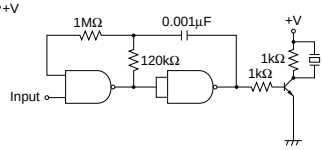
## ■ Circuit

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

(1)




(2)




3

## ■ Notice (Soldering and Mounting)

1. Notice (Soldering and Mounting)
   (1) Soldering Iron
      (a) Lead terminals are immersed up to 1.5mm from components body in soldering bath of +260+/-5 degrees C for 10+/-1.0 seconds, and then components shall be left in natural condition for 4 hours.
      (b) Lead terminal is directly contacted with the tip of soldering iron of +350+/-0.5 seconds, and then components shall be left in natural condition for 4 hours.
   (2) Reflow
      The component cannot withstand reflow soldering.
2. Please do not insert the component on double sided PCB with plated through hole. When melted solder touches to the base of lead terminal, a part of plastic case shall be melted and it may cause electrical failure.
3. Washing of the component is not acceptable. Because it is not sealed.

## ■ Notice (Handling)

1. The component may be damaged if mechanical stress exceeding specifications is applied.
2. Take care to protect operating circuit from surge voltage resulting from excessive force, falling, shock or temperature change.
3. If DC voltage is applied to the component, silver migration may occur. Please pay full attention to avoid subjecting 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.

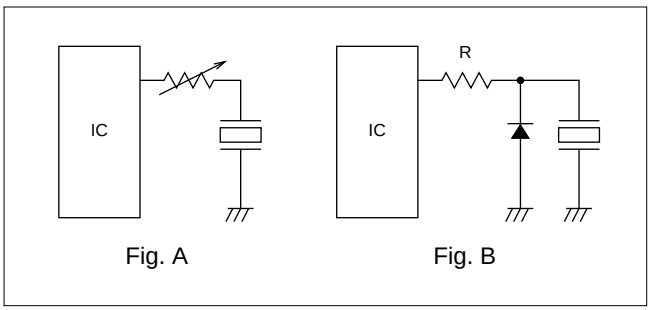



Fig. A Fig. B

5. Avoid excessive pulling of lead wire because wire may break or soldering point may come off.

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# Piezoelectric Sound Components

## Piezoelectric Sounders External Drive Lead Wire Type

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.

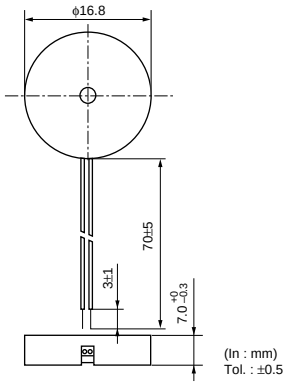
### ■ Features

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

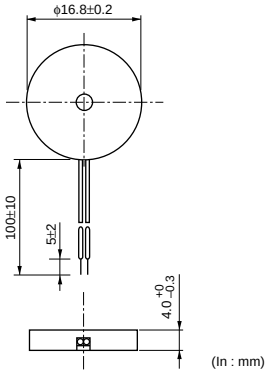
### ■ Applications

1. Various office equipment such as PPCs, printers and keyboards
2. Various home appliances such as microwave ovens
3. Confirmation sound of various audio equipment

PKM17EWH2001



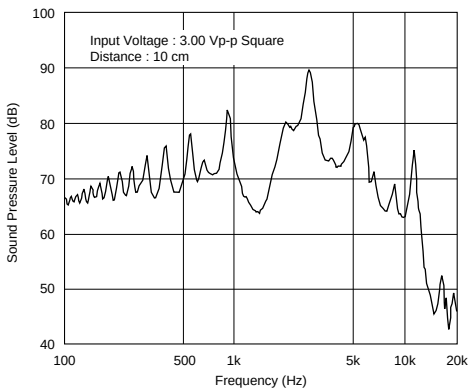
PKM17EWH4000



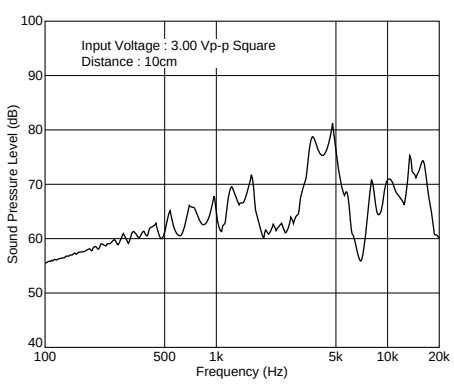

| Part Number | Sound Pressure Level (dB) | Sound Pressure Level (Ref. only) (dB) | Operating Voltage Range | Capacitance (nF) | Operating Temp. Range (°C) | Storage Temp. Range (°C) |
|---|---|---|---|---|---|---|
| **PKM17EWH2001** | 72 min. [3Vp-p,2kHz,square wave,10cm] | 70 min. [1Vrms,2kHz,sine wave,10cm] | 7.0 Vp-p max. | 40.0 ±30% [120Hz] | -20 to +70 | -30 to +80 |
| **PKM17EWH4000** | 75 min. [3Vp-p,4kHz,square wave,10cm] | 70 min. [1Vrms,4kHz,sine wave,10cm] | 25.0 Vp-p max. | 9.5 ±30% [1kHz] | -20 to +70 | -30 to +80 |

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

PKM17EWH2001




PKM17EWH4000

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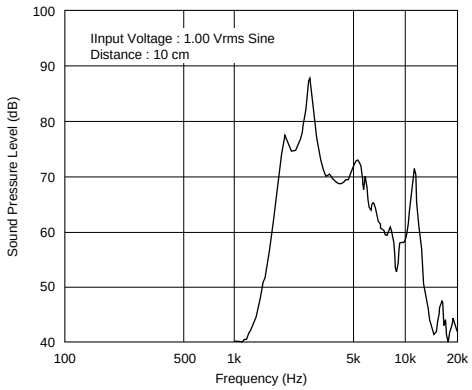
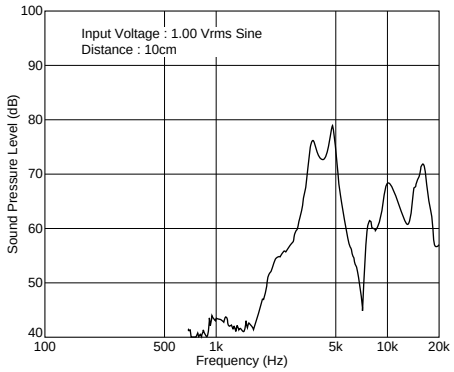
## ■ Freq. Response (Sine Wave 1Vrms, 10cm)

PKM17EWH2001




PKM17EWH4000

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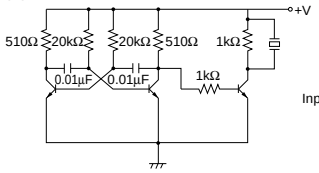
# Piezoelectric Sounders (External Drive Lead Wire Type) Circuit/Notice

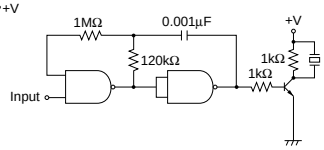
## ■ Circuit

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 exceeding specifications is applied.
2. Take care to protect operating circuit from surge voltage resulting from excessive force, falling, shock or temperature change.
3. If DC voltage is applied to the component, silver migration may occur. Please pay full attention to avoid subjecting 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.

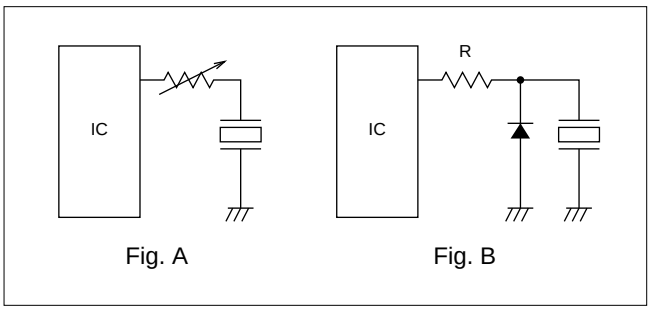



Fig. A Fig. B

5. Avoid excessive pulling of lead wire because wire may break or soldering point may come off.

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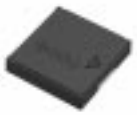
# Piezoelectric Sound Components

## Piezoelectric Sounders External Drive SMD Type

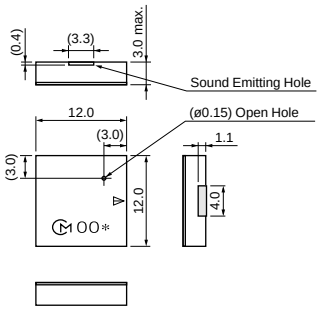
Taking advantage of extensive acoustic and mechanical design technology and high performance ceramics, Murata has developed SMD piezoelectric sounders that suit the thin, high-density design of electronic equipment.

### ■ Features

1. Small, thin and lightweight
2. High sound pressure level and clear sound
3. Reflowable
4. Tape & Reel supply

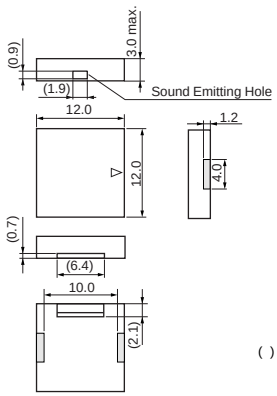


PKLCS1212E2000-R1




( ) : Ref. only
(in mm)
Tol. ±0.2

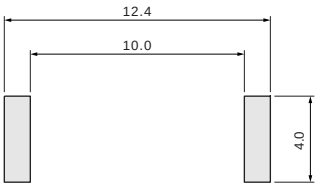
PKLCS1212E4001-R1




( ) : Ref. only
(in mm)
Tol. ±0.2

| Part Number | Sound Pressure Level (dB) | Operating Voltage Range (Vp-p) | Operating Temp. Range (°C) | Storage Temp. Range (°C) | Use |
|---|---|---|---|---|---|
| **PKLCS1212E2000-R1** | 70 min.[3Vp-p,2kHz,square wave,10cm] | 25 max. | -20 to +70 | -30 to +80 | For consumer electronics |
| **PKLCS1212E20A0-R1** | 70 min.[3Vp-p,2kHz,square wave,10cm] | 25 max. | -40 to +85 | -40 to +85 | For automotive electronics |
| **PKLCS1212E4001-R1** | 75 min.[3Vp-p,4kHz,square wave,10cm] | 25 max. | -20 to +70 | -30 to +80 | For consumer electronics |
| **PKLCS1212E40A1-R1** | 75 min.[3Vp-p,4kHz,square wave,10cm] | 25 max. | -40 to +85 | -40 to +85 | For automotive electronics |

### ■ Standard Land Pattern Dimensions




(in mm)

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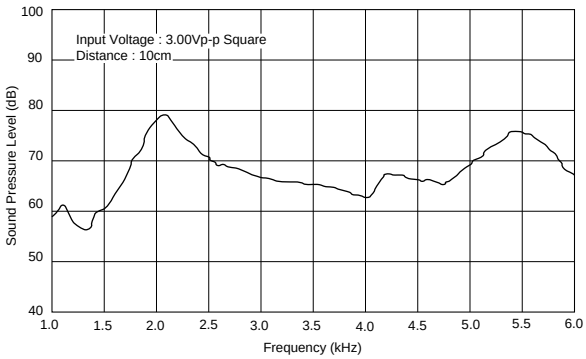
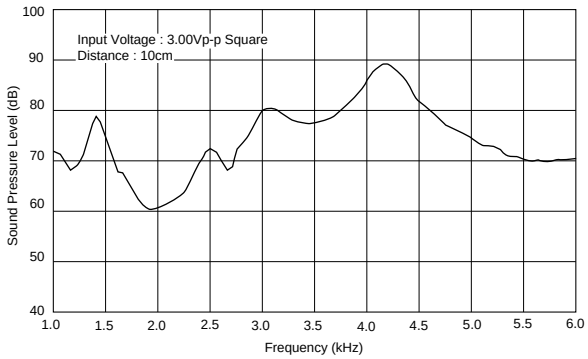
## ■ Freq. Response (Square Wave 3Vp-p, 10cm)

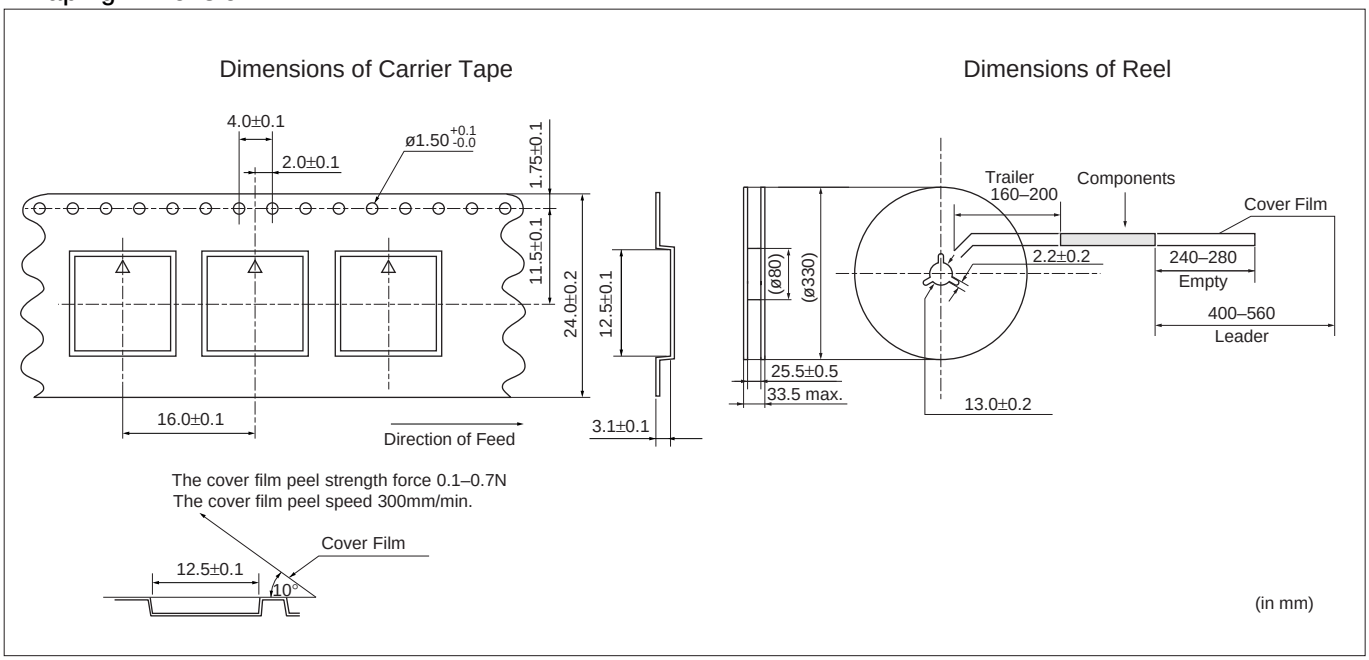
PKLCS1212E2000-R1




PKLCS1212E4001-R1




## ■ Taping Dimension

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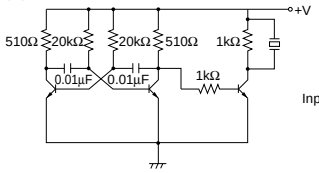
# Piezoelectric Sounders (External Drive SMD Type) Circuit/Notice

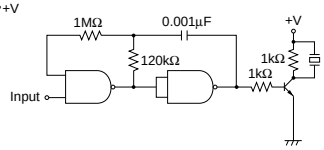
## ■ Circuit

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)

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## ■ Notice (Handling)

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2. Take care to protect operating circuit from surge voltage resulting from excessive force, falling, shock or temperature change.
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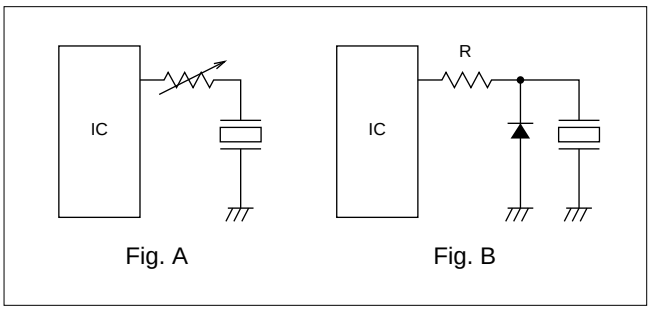


Fig. A Fig. B

5. Avoid excessive pulling of lead wire because wire may break or soldering point may come off.

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# Piezoelectric Sound Components

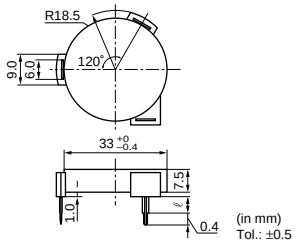
## Piezoelectric Ringers (PIEZORINGER®)

As the result of rapid development of ICs in telephones, demand for piezoelectric sounders 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

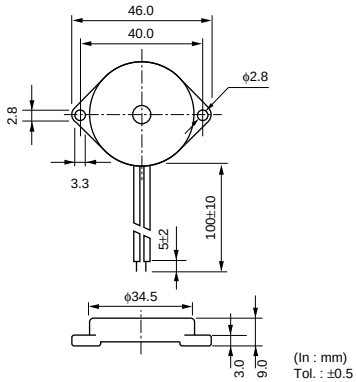
1. Extremely clear sound
2. Since it is voltage driven, the power consumption is quite negligible.
3. It can be driven directly from ICs.
4. Thin and lightweight

PKM33EPH1201C

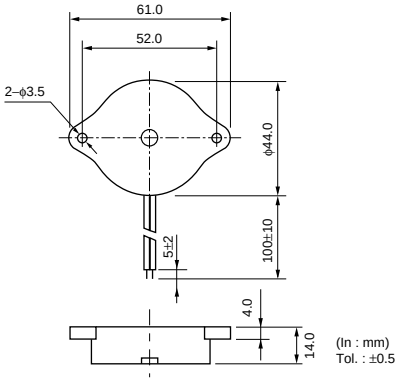



| Part Number | ℓ |
|---|---|
| PKM33EPH1201C | 5.0 |
| PKM33EPH1202C | 0 |

PKM34EWH1101C/1201C



PKM44EWH1001C




6

### Pin Type

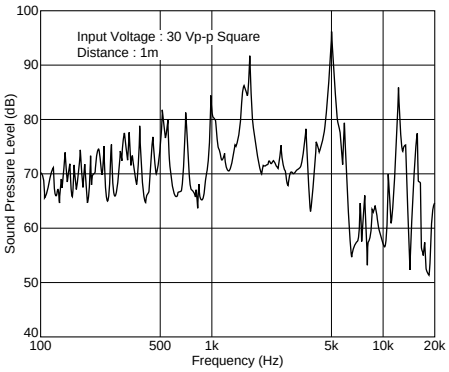
| Part Number | Sound Pressure Level (dB) | Sound Pressure Level (Ref. only) (dB) | Operating Voltage Range | Capacitance (nF) | Operating Temp. Range (°C) | Storage Temp. Range (°C) |
|---|---|---|---|---|---|---|
| **PKM33EPH1201C** | 68 min. [30Vp-p,1.2kHz,square wave,1m] | 65 min. [1Vrms,1.2kHz,sine wave,10cm] | 40.0 Vp-p max. | 40.0 ±30% [120Hz] | -20 to +70 | -30 to +80 |

### Lead Wire Type

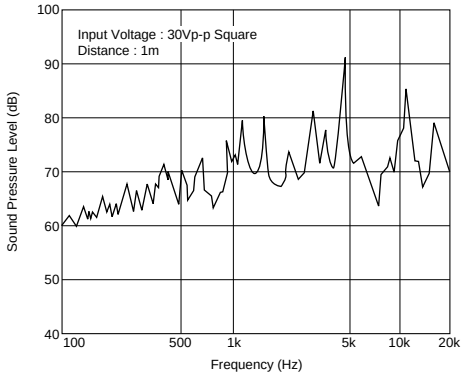
| Part Number | Sound Pressure Level (dB) | Sound Pressure Level (Ref. only) (dB) | Operating Voltage Range | Capacitance (nF) | Operating Temp. Range (°C) | Storage Temp. Range (°C) |
|---|---|---|---|---|---|---|
| **PKM34EWH1101C** | 70 min. [30Vp-p,1.1kHz,square wave,1m] | 60 min. [1Vrms,1.1kHz,sine wave,10cm] | 40.0 Vp-p max. | 40.0 ±30% [120Hz] | -20 to +70 | -30 to +80 |
| **PKM34EWH1201C** | 70 min. [30Vp-p,1.2kHz,square wave,1m] | 60 min. [1Vrms,1.2kHz,sine wave,10cm] | 60.0 Vp-p max. | 32.0 ±30% [120Hz] | -20 to +70 | -30 to +80 |
| **PKM44EWH1001C** | 75 min. [30Vp-p,1kHz,square wave,1m] | 70 min. [1Vrms,1kHz,sine wave,10cm] | 30.0 Vp-p max. | 68.0 ±30% [120Hz] | -20 to +70 | -30 to +80 |

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

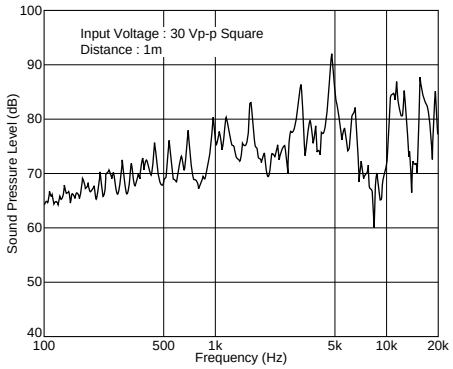
PKM33EPH1201C




PKM34EWH1101C




PKM34EWH1201C

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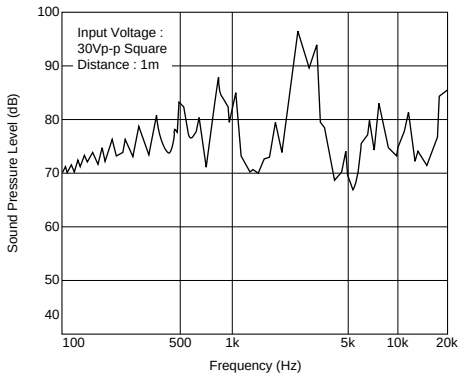


## ■ Freq. Response (Sine Wave 1Vrms, 10cm)

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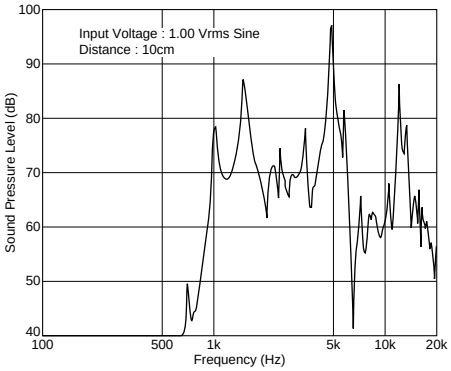


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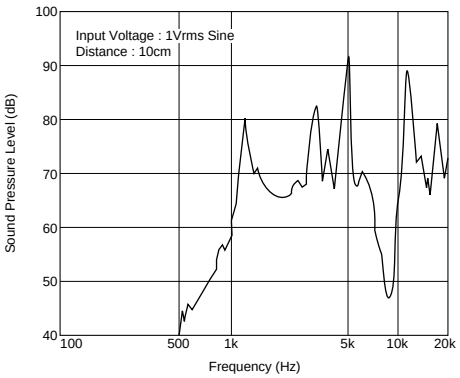


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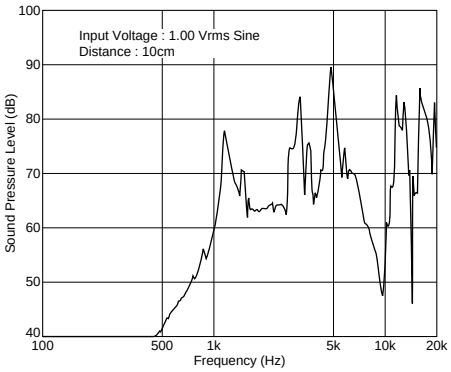


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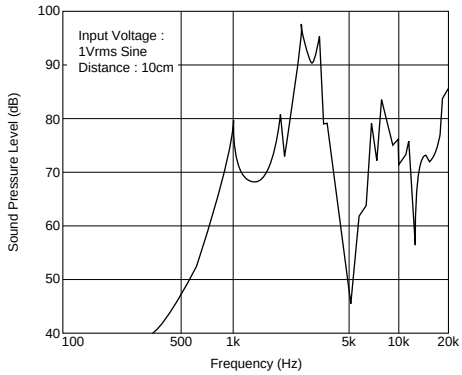


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# Piezoelectric Ringers (PIEZORINGER®) Notice

## ■ Notice (Soldering and Mounting)

1. Notice (Soldering and Mounting)
   (1) Soldering Iron
      (a) Lead terminals are immersed up to 1.5mm from components body in soldering bath of +260+/-5 degrees C for 10+/-1.0 seconds, and then components shall be left in natural condition for 4 hours.
      (b) Lead terminal is directly contacted with the tip of soldering iron of +350+/-0.5 seconds, and then components shall be left in natural condition for 4 hours.
   (2) Reflow
      The component cannot withstand reflow soldering.
2. Washing of the component is not acceptable.
   Because it is not sealed.

## ■ Notice (Handling)

1. The component may be damaged if mechanical stress exceeding specifications is applied.
2. Take care to protect operating circuit from surge voltage resulting from excessive force, falling, shock or temperature change.
3. If DC voltage is applied to the component, silver migration may occur. Please pay full attention to avoid subjecting 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.

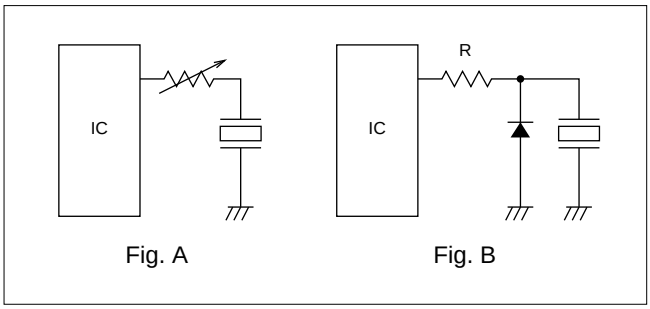


Fig. A Fig. B

5. Avoid excessive pulling of lead wire because wire may break or soldering point may come off.

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# Piezoelectric Sound Components

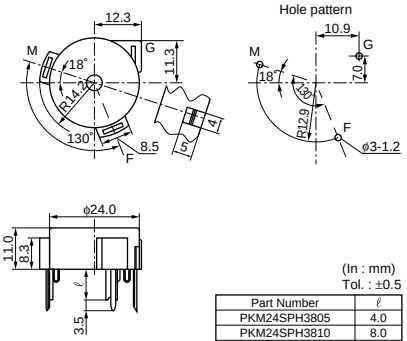
## Piezoelectric Sounders Self Drive Pin Type

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

1. Gas alarms, burglar alarms, smoke detectors
2. Air conditioners, microwave ovens, washing machines and other home-electronic appliances controlled by microcomputers
3. Toys, game machines

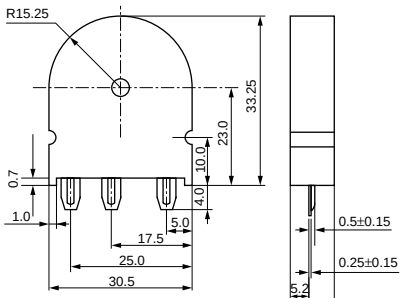
PKM24SPH3805




(In : mm)
Tol. : ±0.5

| Part Number | ℓ |
|---|---|
| PKM24SPH3805 | 4.0 |
| PKM24SPH3810 | 8.0 |
| PKM24SPH3807 | 12.0 |
| PKM24SPH3801 | 14.0 |

PKM30SPTH2001/2501-B0




(In : mm)
Tol. : ±0.5

| Part Number | Sound Pressure Level (dB) | Oscillating Frequency (kHz) | Current Consumption (mA) | Operating Voltage Range | Operating Temp. Range (°C) | Storage Temp. Range (°C) |
|---|---|---|---|---|---|---|
| **PKM24SPH3805** | 90 min. [12Vdc,10cm] | 3.8 ±0.4kHz [12Vdc] | 12 max. [12Vdc] | 3.0Vdc to 20.0 Vdc | -20 to +70 | -30 to +80 |
| **PKM30SPTH2001-B0** | 75 min. [12Vdc,10cm] | 2.0 ±0.3kHz [12Vdc] | 20 max. [12Vdc] | 3.0Vdc to 20.0 Vdc | -20 to +70 | -30 to +80 |
| **PKM30SPTH2501-B0** | 75 min. [12Vdc,10cm] | 2.5 ±0.3kHz [12Vdc] | 20 max. [12Vdc] | 3.0Vdc to 20.0 Vdc | -20 to +70 | -30 to +80 |

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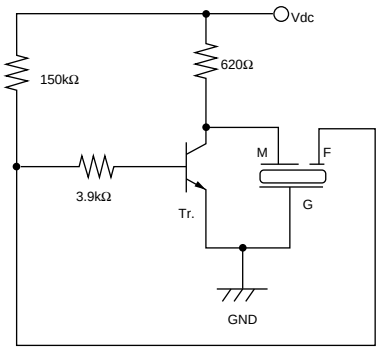
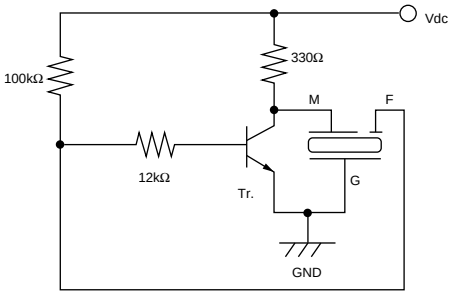
### ■ Standard Circuit Examples

PKM24SPH3805




Tr: 2SC1815Y or equivalent

PKM30SPTH2001/2501-B0




Tr: 2SC1815Y or equivalent

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# Piezoelectric Sounders (Self Drive) Notice

## ■ Notice (Soldering and Mounting)

1. Notice (Soldering and Mounting)
   (1) Soldering Iron
      (a) Lead terminals are immersed up to 1.5mm from components body in soldering bath of +260+/-5 degrees C for 10+/-1.0 seconds, and then components shall be left in natural condition for 4 hours.
      (b) Lead terminal is directly contacted with the tip of soldering iron of +350+/-0.5 seconds, and then components shall be left in natural condition for 4 hours.
   (2) Reflow
      The component cannot withstand reflow soldering.
2. Washing of the component is not acceptable. Because it is not sealed.
3. Please do not cover the hole with tape or other obstacle as this will produce irregular oscillation.
4. 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 exceeding specifications is applied.
2. Take care to protect operating circuit from surge voltage resulting from excessive force, falling, shock or temperature change.
3. If DC voltage is applied to the component, silver migration may occur. Please pay full attention to avoid subjecting the component to DC voltage for long periods.
4. The standard self-driven circuits utilizes transistor switching. Since the circuit constants for hfe of the transistor are optimally chosen to maintain stable oscillation, please design a circuit following the standard.

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# Piezoelectric Sound Components

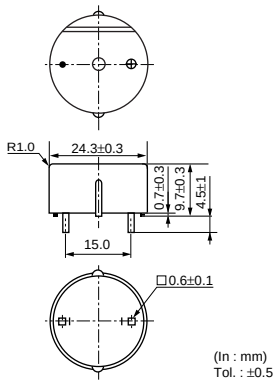
## Piezoelectric Buzzers

This is a unified piezoelectric sounder which has a piezoelectric diaphragm of 3 terminals connected to a 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.

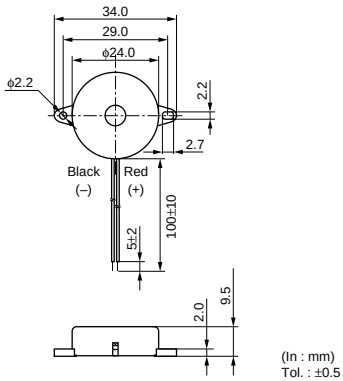
### ■ Applications

1. Gas alarms, burglar alarms
2. Air conditioners, microwave ovens and various types of microcomputer controlled home-electronic appliances
3. Toys, games, and other simple electronic devices such as teaching aids

PKB24SPCH3601-B0



PKB24SWH3301




## Pin Type

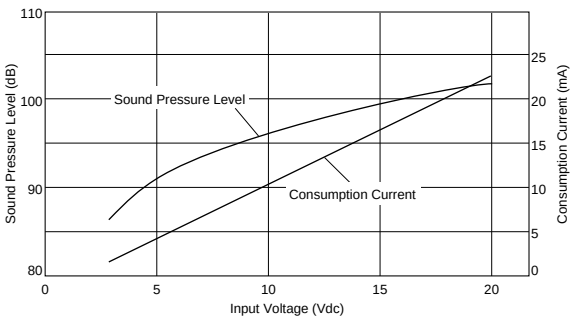
| Part Number | Sound Pressure Level (dB) | Oscillating Frequency (kHz) | Current Consumption (mA) | Operating Voltage Range | Operating Temp. Range (°C) | Storage Temp. Range (°C) |
|---|---|---|---|---|---|---|
| **PKB24SPCH3601-B0** | 90 min. [12Vdc,10cm] | 3.6 ±0.5kHz [12Vdc] | 16 max. [12Vdc] | 3.0Vdc to 15.0 Vdc | -20 to +70 | -30 to +80 |

## Lead Wire Type

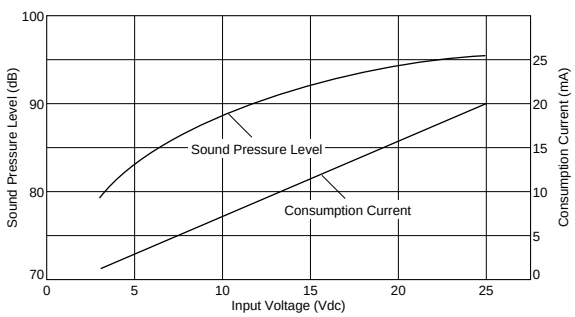
| Part Number | Sound Pressure Level (dB) | Oscillating Frequency (kHz) | Current Consumption (mA) | Operating Voltage Range | Operating Temp. Range (°C) | Storage Temp. Range (°C) |
|---|---|---|---|---|---|---|
| **PKB24SWH3301** | 80 min. [12Vdc,10cm] | 3.3 ±0.5kHz [12Vdc] | 12 max. [12Vdc] | 3.0Vdc to 20.0 Vdc | -20 to +70 | -30 to +80 |

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

PKB24SPCH3601-B0




PKB24SWH3301



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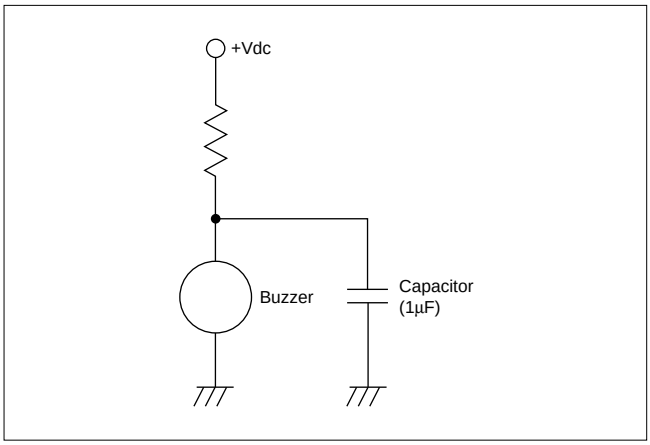
# Piezoelectric Buzzers Notice

## ■ Notice (Soldering and Mounting)

1. Notice (Soldering and Mounting)
   (1) Soldering Iron
      (a) Lead terminals are immersed up to 1.5mm from components body in soldering bath of +260+/-5 degrees C for 10+/-1.0 seconds, and then components shall be left in natural condition for 4 hours.
      (b) Lead terminal is directly contacted with the tip of soldering iron of +350+/-0.5 seconds, and then components shall be left in natural condition for 4 hours.
   (2) Reflow
      The component cannot withstand reflow soldering.
2. Washing of the component is not acceptable. Because it is not sealed.
3. Please do not cover the hole with tape or other obstacle as this will produce irregular oscillation.
4. 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 sound volume, use capacitor (1µF) parallel with the buzzer together.




3. 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 Notice

## ■ Notice (Storage and Operating Condition)

1. Product Storage Condition
   Please store the products in room where the temperature/humidity is stable. And avoid such places where there are large temperature changes. Please store the products under the following conditions:
   Temperature: -10 to + 40 degree C
   Humidity: 15 to 85% R.H.
2. Expiration Date on Storage
   Expire date (Shelf life) of the products is six months after delivery under the conditions of a sealed and an unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because the products may be degraded in solderability due to storage under poor conditions.
   Please confirm solderability and characteristics for the products regularly.
3. Notice on Product Storage
   (1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because the characteristics may be reduced in quality, may be degraded in solderability due to the storage in a chemical atmosphere.
   (2) Please do not put the products directly on the floor without anything under them to avoid damp places and/or dusty places.
   (3) Please do not store the products in the places such as: in a damp heated place, in any place exposed to direct sunlight or excessive vibration.
   (4) Please use the products immediately after the package is opened, because the characteristics may be reduced in quality, and/or be degraded in the solderability due to storage under the poor condition.
   (5) Please do not drop the products to avoid cracking of ceramic element.
4. Others
   Please be sure to consult with our sales representative or engineer whenever the products are to be used in conditions not listed above.

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# Package

## ■ Minimum Quantity (pcs.)

| Product Names | Part Number | Minimum Quantity | | | |
|---|---|---|---|---|---|
| | | Ø330mm Reel | Bulk (Box) | Ammo Pack | Magazine |
| ● Piezoelectric Diaphragms* | | | | | |
| External Drive Types | **7BB-12-9** | | 5120 | | |
| | **7BB-15-6** | | 8000 | | |
| | **7BB-20-3** | | 3000 | | |
| | **7BB-20-6** | | 1800 | | |
| | **7BB-20-6L0** | | 600 | | |
| | **7BB-27-4** | | 1500 | | |
| | **7BB-27-4L0** | | 600 | | |
| | **7BB-35-3** | | 800 | | |
| | **7BB-35-3L0** | | 400 | | |
| | **7BB-41-2** | | 400 | | |
| | **7BB-41-2L0** | | 250 | | |
| | **7NB-31R2-1** | | 3000 | | |
| Self Drive Types | **7BB-20-6C** | | 1800 | | |
| | **7BB-20-6CL0** | | 600 | | |
| | **7BB-27-4C** | | 1500 | | |
| | **7BB-27-4CL0** | | 600 | | |
| | **7BB-35-3C** | | 800 | | |
| | **7BB-35-3CL0** | | 400 | | |
| | **7BB-41-2C** | | 600 | | |
| | **7BB-41-2CL0** | | 250 | | |
| | **7SB-34R7-3C** | | 1600 | | |
| ● Piezoelectric Sounders* | | | | | |
| External Drive Types | **PKLCS1212E2000-R1** | 1000 | | | |
| | **PKLCS1212E20A0-R1** | 1000 | | | |
| | **PKLCS1212E4001-R1** | 1000 | | | |
| | **PKLCS1212E40A1-R1** | 1000 | | | |
| | **PKM13EPYH4000-A0** | | | 500 | |
| | **PKM13EPYH4002-B0** | | 330 | | |
| | **PKM17EPP-2002-B0** | | 200 | | |
| | **PKM17EPPH4001-B0** | | 200 | | |
| | **PKM17EPPH4002-B0** | | 200 | | |
| | **PKM17EWH2001** | | 250 | | |
| | **PKM17EWH4000** | | 500 | | |
| | **PKM22EPH2001** | | 360 | | |
| | **PKM22EPH2002** | | 270 | | |
| | **PKM22EPH2003** | | 270 | | |
| | **PKM22EPPH2001-B0** | | 750 | | |
| | **PKM22EPPH2002-B0** | | 750 | | |
| | **PKM22EPPH4001-B0** | | 900 | | |
| | **PKM22EPPH4002-B0** | | 900 | | |
| | **PKM22EPPH4005-B0** | | 750 | | |
| | **PKM22EPPH4007-B0** | | 750 | | |
| | **PKM22EPPH4012-B0** | | 750 | | |
| | **PKM22EPTH2001-B0** | | 300 | | 75 [1)] |

1) The last two digits are changed to M0.

Continued on the following page.

"Minimum Quantity" means the number of units of each delivery or order. The quantity should be an integral multiple of the "Minimum Quantity". (As for products series with ★mark, bulk (bag) quantities shown here differ from actual delivery quantities in a package. )
Please contact nearest sales office for details and for any other products not listed above.

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## Package

Continued from the preceding page.

| Product Names | Part Number | Minimum Quantity | | | |
|---|---|---|---|---|---|
| | | Ø330mm Reel | Bulk (Box) | Ammo Pack | Magazine |
| Self Drive Types | **PKM24SPH3801** | | 270 | | |
| | **PKM24SPH3805** | | 360 | | |
| | **PKM24SPH3807** | | 270 | | |
| | **PKM24SPH3810** | | 270 | | |
| | **PKM30SPTH2001-B0** | | 70 | | |
| | **PKM30SPTH2501-B0** | | 70 | | |
| ● Piezoelectric Buzzers* | **PKB24SPCH3601-B0** | | 650 | | |
| | **PKB24SWH3301** | | 200 | | |
| ● Piezoelectric Ringers (PIEZORINGER®)* | **PKM33EPH1201C** | | 300 | | |
| | **PKM33EPH1202C** | | 60 | | |
| | **PKM34EWH1101C** | | 25 | | |
| | **PKM34EWH1201C** | | 25 | | |
| | **PKM44EWH1001C** | | 25 | | |

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   No Murata products should be used or sold, through any channels, for use in the design, development, production, utilization, maintenance or operation of, or otherwise contribution to (1) any weapons (Weapons of Mass Destruction [nuclear, chemical or biological weapons or missiles] or conventional weapons) or (2) goods or systems specially designed or intended for military end-use or utilization by military end-users.
   <For customers in Japan>
   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 the products in this catalog for the applications listed below, which require especially high reliability for the prevention of defects which might directly damage a third party's life, body or property, or when one of our products is intended for use in applications other than those 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 above
3. Product specifications in this catalog are as of November 2009. They are subject to change or our products in it may be discontinued without advance notice. Please check with our sales representatives or product engineers before ordering. If there are any questions, please contact our sales representatives or product engineers.
4. Please read rating and ⚠CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
5. This catalog has only typical specifications because there is no space for detailed specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.
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*ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703*

*Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.*

*С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров*

*Мы предлагаем:*

- *Конкурентоспособные цены и скидки постоянным клиентам.*
- *Специальные условия для постоянных клиентов.*
- *Подбор аналогов.*
- *Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.*

- *Приемлемые сроки поставки, возможна ускоренная поставка.*
- *Доставку товара в любую точку России и стран СНГ.*
- *Комплексную поставку.*
- *Работу по проектам и поставку образцов.*
- *Формирование склада под заказчика.*

- *Сертификаты соответствия на поставляемую продукцию (по желанию клиента).*
- *Тестирование поставляемой продукции.*
- *Поставку компонентов, требующих военную и космическую приемку.*
- *Входной контроль качества.*
- *Наличие сертификата ISO.*

*В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.*

*Конструкторский отдел помогает осуществить:*

- *Регистрацию проекта у производителя компонентов.*
- *Техническую поддержку проекта.*
- *Защиту от снятия компонента с производства.*
- *Оценку стоимости проекта по компонентам.*
- *Изготовление тестовой платы монтаж и пусконаладочные работы.*

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