

## ■ Piezoelectric sounders (External-drive type)

### ● How sounders are named

EE 24 OO K — 37 F 110 — 3V

①      ②      ③      ④                      ⑤      ⑥      ⑦                      ⑧

- ①EE : External-drive type  
 ②Outer diameter : Outer diameter of casing in mm  
 ③Height : Approx. height in mm when mounted  
 ④Shape code  
 ⑤Oscillating frequency : Oscillating frequency in 0.1 kHz  
 ⑥Terminal code  
 ⑦Lead wire length : Length in mm from external surface of casing (omitted when lead pins)  
 ⑧Rated input voltage : Voltage for measuring of output sound pressure  
 (Describes the voltage applied to the piezoelectric element.)

### ● Outline specifications

Measurement condition 25°C±2°C

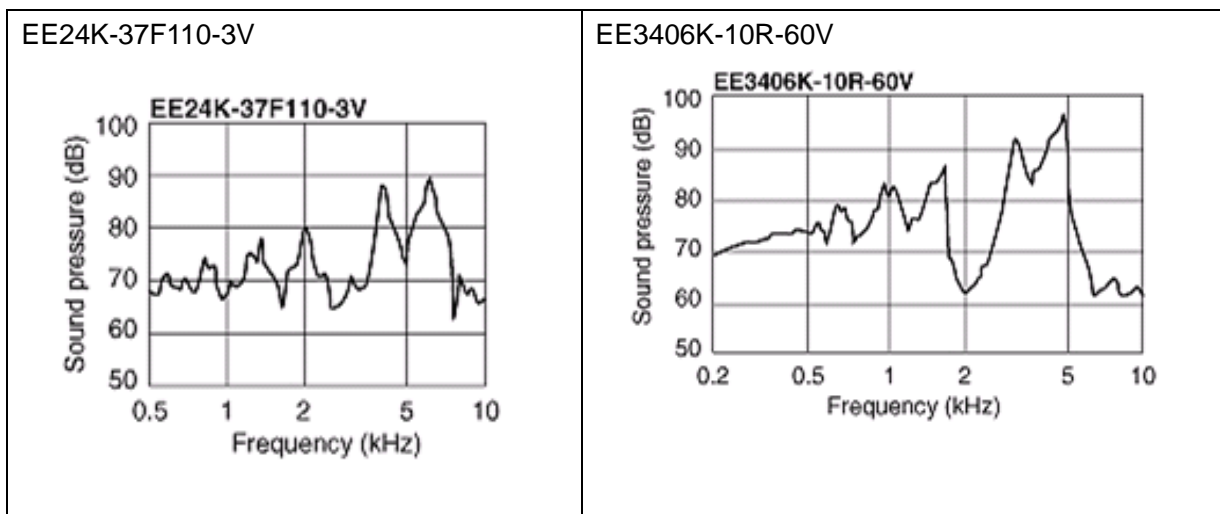
Part number	Electrical characteristics (※)				Shapes and structures				Weight (g)
	Output sound pressure (dB min.)	Capacitance (pF)	Max. input voltage (Vp-p Max.)	Operating temperature range (°C)	Dimensions (mm)		Terminal	Casing color	
					Outer diameter	Height			
EE24K-37F110-3V	75dB/10cm 【Condition】 4,096Hz Square wave 3Vp-p	10,000 ±30% (1kHz)	30	-20~+60	φ24	4.5	Lead wire	Black	2.4
EE3406K-10R-60V	80dB/1m 【Condition】 Specification circuit at 24V input.	38,000 ±30% (120Hz)	60	-20~+70	φ34	6.3	Lead pin	Black	3.3

※Described electrical characteristics are guaranteed values when a rated circuit is input under rated measurement conditions using a test circuit specified by our company.

## ●Shapes

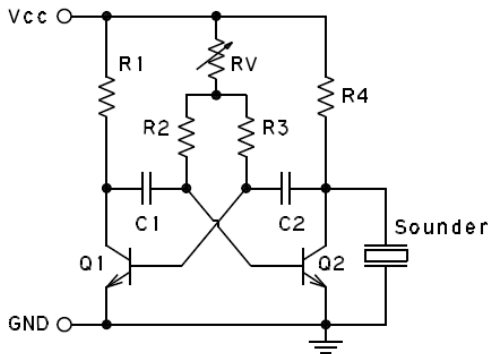
<p><b>EE24K-37F110-3V</b></p>	<p><b>備考 Notes</b></p> <ul style="list-style-type: none"> <li>・リード線 Lead wire UL3610、AWG26</li> <li>・極性 Polarity 赤 (Red) : + 黒 (Black) : -</li> <li>・締付けトルク Tightening torque  &lt;0.196N・m (ワッシャー入りM2のネジ使用) (at M2 volt and the washer used.)</li> </ul>
<p><b>EE3406K-10R-60V</b></p> <p>端子詳細 Terminal details</p> <p>推奨実装穴位置 Recommended hole positions</p>	

## ●Frequency characteristics



## ● Example of recommended circuits for external-drive type sounders

1) Example of using a bipolar transistor



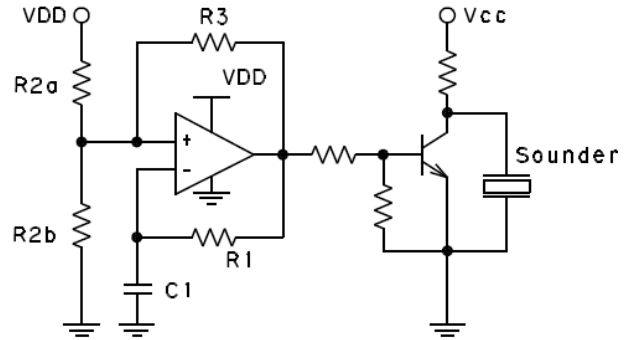
### Frequency calculation formula

$$f_0 = 1 / (1.4 \times C_1 \times R_2), C_1 = C_2, R_2 = R_3 > R_1 = R_3$$

### Example

$$C_1 = 0.01 \mu\text{F}, R_2 = 33 \text{k}\Omega \rightarrow f_0 = 2.2 \text{KHz}$$

2) Example of using a general-purpose IC



Ex.) NJU77230, NJU77250

(New Japan Radio Co.,Ltd.) etc.

### Frequency calculation formula

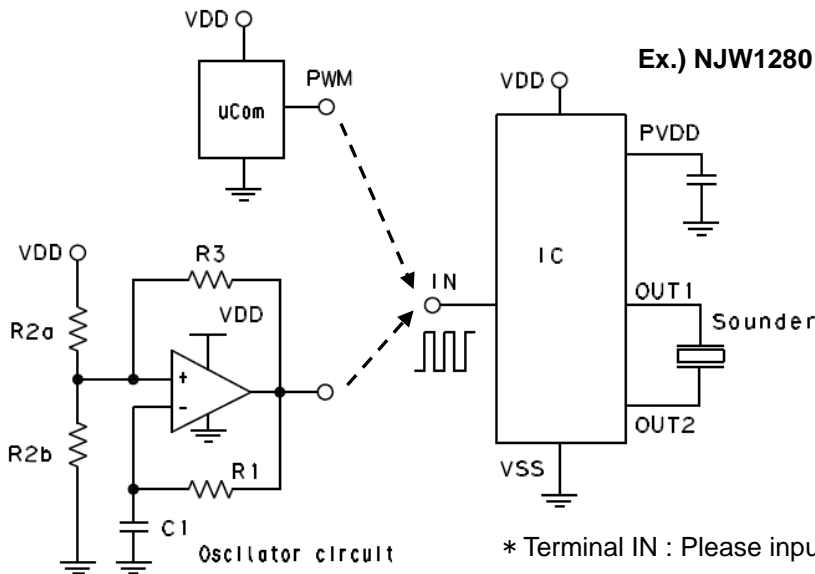
$$f_0 = 1 / (2 \times C_1 \times R_1 \times \ln(1 + 2 \times R_2 / R_3))$$

$$R_2 = (R_{2a} \times R_{2b}) / (R_{2a} + R_{2b})$$

### Example

$$R_{2a} = R_{2b} = 47 \text{k}\Omega, R_1 = R_3 = 22 \text{k}\Omega, C_1 = 0.01 \mu\text{F} \rightarrow f_0 = 2 \text{KHz}$$

3) Example of using a custom IC



Ex.) NJW1280 (New Japan Radio Co.,Ltd.) etc.

\* Terminal IN : Please input a square wave signal with the oscillating frequency.

## ● About RoHS

This product complies with the revised RoHS Directive (2011/65 / EU) and the revised Directive (EU) 2015/863 of Appendix Annex II.

However, lead is contained in the glass in the piezoelectric ceramic plate and Ag electrode (Exemption No. 7 (C)-I).

☆ Please read the notes "Precautions for use of piezoelectric buzzers" . ☆