

# Ultrasonic Transducer

## 1. General Description

The TR40 and R40 are matched pair ultrasonic transmitter and receiver respectively operated at 40kHz center frequency with  $\varnothing 16\text{mm}$  diameter. This transducer utilizes the piezoelectric properties of engineering ceramic that provides high sound pressure and high sensitivity.

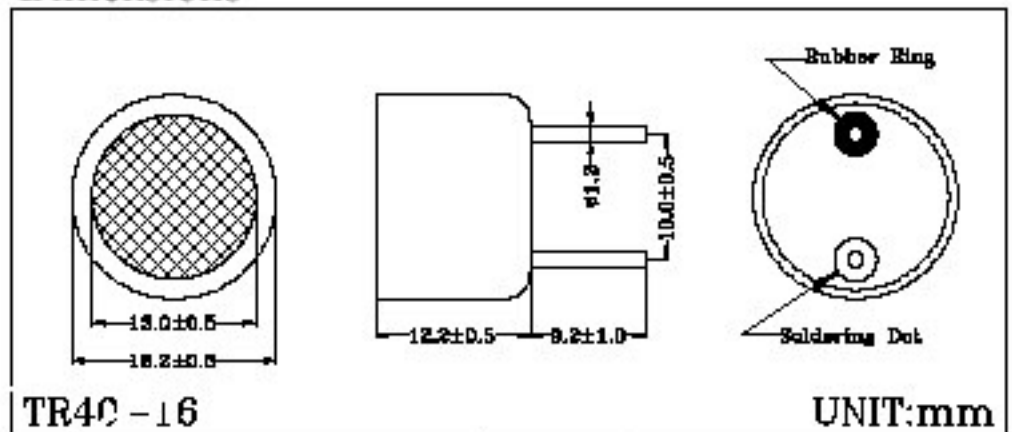
## 2. Features

- High sound pressure
- High sensitivity
- Air medium
- Metal housing

## 3. Applications

- Auto switching
- Car obstacle avoidance
- Range finder
- Fluid level control
- burglar alarm

## Dimensions



## 4. Absolute Maximum Ratings

( $T_a = 25^\circ\text{C}$ )

| Parameter                      | Symbol    | Rating    | Unit             |
|--------------------------------|-----------|-----------|------------------|
| Maximum Input Voltage          | $V_{MAX}$ | 20        | Vrms             |
| Shock Impact                   | Si        | 50        | G                |
| Operating Relative Humidity *1 | RHopr     | 10 ~ +90  | %                |
| Operating Temperature          | Topr      | -30 ~ +80 | $^\circ\text{C}$ |
| Storage Temperature *2         | Tstg      | -40 ~ +90 | $^\circ\text{C}$ |
| Soldering Temperature *3       | Tsol      | 240       | $^\circ\text{C}$ |

\*1 - Ambient temperature  $T_a = 25^\circ\text{C}$ .

\*2 - Within 24 hours.

\*3 - At the position of 2mm from the bottom face within 5 second.

## 5. Electro-Sonic Characteristics

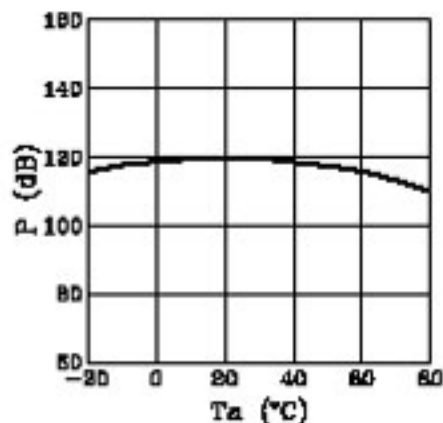
( $T_a = 25^\circ\text{C}$ )

| Parameter             | Symbol                              | Conditions   | Min.           | Typ. | Max. | Unit                  |
|-----------------------|-------------------------------------|--|----------------|------|------|-----------------------|
| Transmitter<br>T40-16 | Center Frequency                    | Still Air  | $40.0 \pm 1.0$ |      |      | kHz                   |
|                       | Sound Pressure Level *4             | $f = 40\text{kHz}$   | 120            |      |      | dB                    |
|                       | Attenuation of Sound Pressure Level | $T = -30^\circ\text{C} \sim +80^\circ\text{C}$ ,<br>$\text{RH} = 30\%$ |                |      | -10  | dB                    |
|                       | Bandwidth                           | $P = 120\text{dB}$ , $f = 40\text{kHz}$                                | 5.0            |      |      | kHz                   |
| Receiver<br>R40-16    | Center Frequency                    | Still Air  | $40.0 \pm 1.0$ |      |      | kHz                   |
|                       | Sensitivity                         | $f = 40\text{kHz}$   | -59            |      |      | dB/v/ $\mu\text{bar}$ |
|                       | -6dB Directivity                    | $f = 40\text{kHz}$   |                | 55   |      | deg.                  |
|                       | Bandwidth                           | $f = 40\text{kHz}$   | 5.0            |      |      | kHz                   |
|                       | Capacitance                         |  |                | 2100 |      | pF                    |

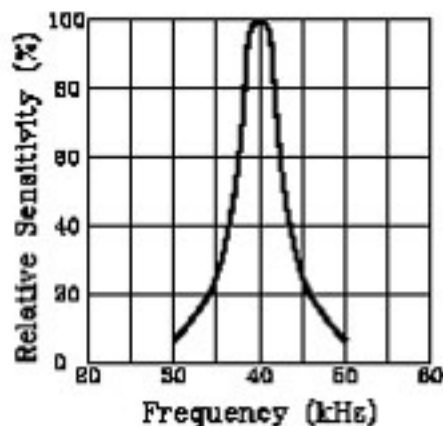
\*4 -  $0\text{dB} = 0.0002\mu\text{bar}$  (1 atm = 1.01325 bar)

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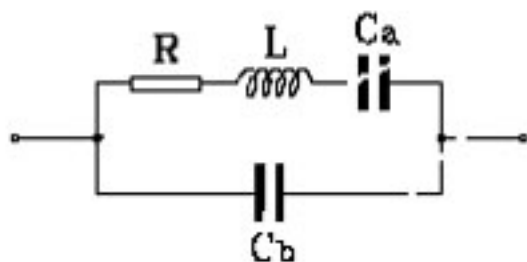
Sound Pressure Level vs Ambient Temperature



Relative Sensitivity vs Frequency



Equivalent Circuit



Directivity Diagram

