



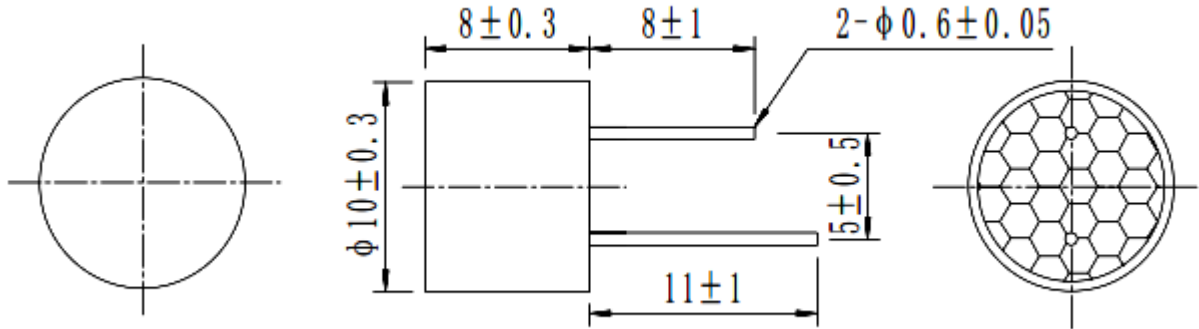
Part Number: TC0065-006

Model Number: T/R60-10H0Z-02

Overview

The water proof type ultrasonic sensors were used widely for parking sensors, proximity sensors and level sensors, etc. With the perfect seal these sensors can be used in a relatively poor environment such as dust and humidity.

Appearance and Dimensions, Unit: mm



Electrical Specifications

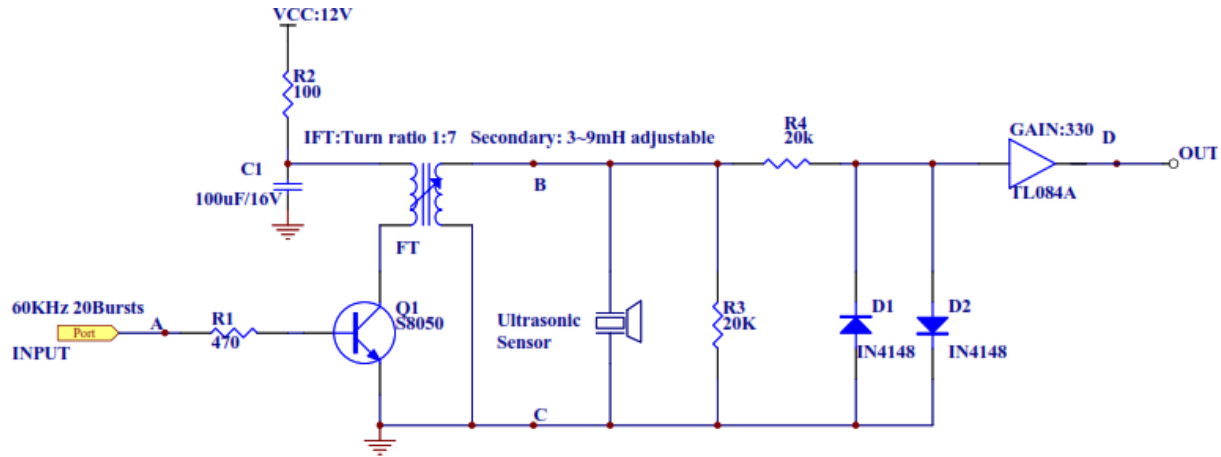
1	Center frequency (KHz)	60 ± 1.0
2	Echo Sensitivity	$\geq 100\text{mV}$ (Fig 1 simulation test circuit)
3	Decay Time (mS)	$\leq 1.0\text{ms}$ (Fig 1 & Fig 6 simulation test circuit)
4	Directivity (deg) X-axis	80 ± 15
5	Directivity (deg) Y-axis	80 ± 15
6	Capacitance (pF)	$1600 \pm 15\%$
7	Allowable Maximum Input Voltage (Vp-p)	140 (60KHz) Pulse width 0.333ms, interval 20ms
8	Mean Time to Failure (h)	50000
9	Operating Temperature ($^{\circ}\text{C}$)	$-40 \sim +80$
10	Storage Temperature ($^{\circ}\text{C}$)	$-40 \sim +85$

TENTATIVE RELEASE:

This specification is based on design objectives and is strictly Preliminary and subject to change. Test data may exist, but this specification is subject to change based on the results of additional testing and evaluation. Application specific specifications will be produced for approval prior to production product being released.

<u>Part No.</u>	<u>Rev</u>	<u>Title</u>	<u>Sheet No.</u>
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Simulation Test Circuit



Transmit pulse test point: A Maximum voltage Vp-p test point: B-C
Echo residual vibration test point: B IFT: Pulse transformer (middle week)

Fig. 1

Directivity Test

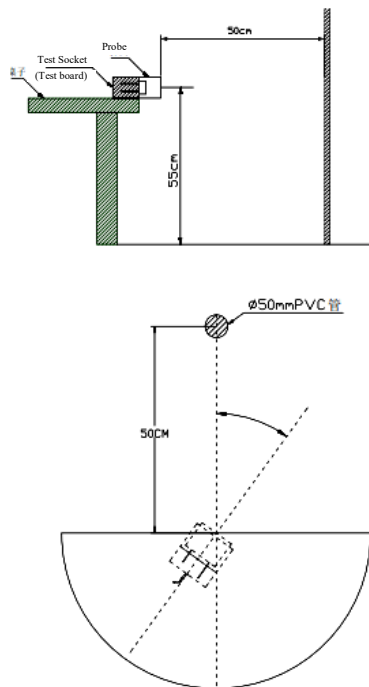


Fig. 2

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Environment Characteristics

Testing Items	Testing Equipment/Methods/Conditions	Criteria
Shock Test	Acceleration: 980m/s ² (100G); Direction: 3 directions; Shock time: 3 times/direction	The variation of the echo sensitivity at 40kHz within 30% compared with initial figures at 25degC
Drop Test	Height: 1 meter onto concrete floor; Times: 10 times	
Vibration Test	Vibration frequency: 10Hz to 55Hz; Amplitude 1.5mm; Sweep Period: 1 minute; Direction: 3 directions; Time: 3 hours/direction	
High-temp storage	Temperature: +85±3°C; Time: 96h & followed normaliza- tion period at 25°C for 24h	
Low-temp storage	Temperature: -40±3°C; Time: 96h & followed normaliza- tion period at 25°C for 24h	
Humidity Resistance	Temperature: +85±3°C, Humidity: 85% R.H.; Time: 96h & followed by a normalization period at 25°C for 24h	
Temp. Shock	Temperature: -40±3°C for 0.5h, within 5 min up to +85±3° C for 0.5h, cycles: 200 cycles & followed by a normaliza- tion period at 25°C for 24h	
NOTES: Standard Test Condition: T=25±3°C, H=45 ~ 65% R.H. And every test must be more than 5 pcs for test.		

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Testing Instrument and Condition List

No.	Testing Items	Testing Equipment/Methods	Testing Conditions
1	Resonant Frequency	Piezoelectric Transducer Resistance Testing System II	Testing temperature: 25±3°C
2	Echo Sensitivity	According to Fig. 1 Test Circuit	Distance to obstacle: 1 meter, Obstacle: organic glass board with 20cm*20cm*1.0cm. 1. The inductance: 4mH, Qm Value: 60-80, Pulse: 20 2. The minimum detect distance ≥35cm 3. The acoustic system without coupling
3	Ring Time	According to Fig. 1 Test Circuit	The sensor surface is covered by 100mm thickness of sponge 1. The inductance: 4mH, Qm Value: 60-80, Pulse: 20 2. The minimum detect distance ≥35cm 3. The acoustic system without coupling
4	Directivity	According to Fig. 1 & Fig. 2 Test Circuit	In normal room temperature, the distance to the ground: 55cm the distance to the obstacle: 50cm the obstacle: diameter of 50mm PVC pipe, the obstacle height: 1 meter NOTE: there is no other obstacle in the circumference of 1 meter
5	Capacitance	Digital LC	Testing temperature: 25±3°C
6	Maximum Input Voltage (Vp-p)	According to Fig. 1 Test Circuit Oscilloscope: Tektronix TDS1002	Pulse width: 0.333mS, Interval: 20mS
7	Mean Time to Failure	Aging Equipment AWHY001	Testing temperature: 25±2°C
8	Operating Temperature (°C)	High-Low alternating temperature cabinet	In normal room temperature, according to the Fig. 1 test circuit
9	Storage Temperature (°C)	High-Low alternating temperature cabinet	In normal room temperature, according to Fig. 1 test circuit

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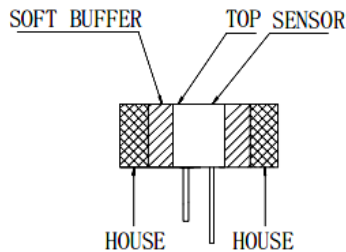
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Notes:

1. Design Restriction/Precautions

- This sensor is designed for use in air environment. Do not use it in liquid.
- In the case where secondary accidents due to operation failure or malfunctions can be anticipated, add a fail safe function to the design.
- In the case where this sensor is to be held in a housing, use soft buffer between sensor and housing. The front convex part of this sensor vibrates in large extension. If this part is held, its characteristics will vary. The top must be free to vibrate.



2. Usage Restriction/Precautions

- To prevent sensor malfunctions, operational failure or any deterioration of its characteristics, do not use this sensor in the following or similar conditions:
 - a. In strong shock or vibration
 - b. In high temperature and humidity for a long time.
 - c. In corrosive gases or sea breeze.
 - d. In an atmosphere of organic solvents
 - e. In dirty and dusty environments that may contaminate the sensor front.
 - f. Over specified allowable input voltage (Vp-p)
- Do not solder adding stress on outer lead, also do not apply stress like spin or pressure just after soldering.
- In case you form the leads, support the root firmly.

Revision History:

Version	Date (MM/DD/YY)	DWN	Statement
A1	4/9/2016		Initial Release

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