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# SPECIFICATION

Customer : QUARTZ

Applied To :

Product Name : Piezoelectric Ultrasonic Sensors

Model Name : KPUS-40FS-14TR-651


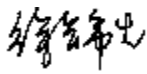

Drawing No. : KCC651

Compliance with RoHS

Signature of Approval

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Signature of KEPO

Approved by	Checked by	Issued by	Date
			

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Specification for Piezoelectric Ultrasonic Sensors	Page	2/11
	Revision No.	1.0
	Drawing No.	KCC651

Model No. : KPUS-40FS-14TR-651

## CONTENTS

1. 目的和范围	Purpose and Scope
2. 特征	Features
3. 应用	Application
4. 特性要求	Component Requirement
4.1. 一般要求	General Requirement
4.2. 电性能	Electrical Requirement
4.3. 测试环境	Measuring Condition
4.4. 测试方法	Measuring Method
5. 可靠性测试	Reliability Test
6. 尺寸图	Dimensions
7. 包装标准	Packaging Standard
8. 注意	Note
9. 警告	Cautions
10. 注意事项	Cautions for Use
11. 履历表	Revision

Specification for Piezoelectric Ultrasonic Sensors Model No. : KPUS-40FS-14TR-651	Page	3/11
	Revision No.	1.0
	Drawing No.	KCC651

## 1. 目的和范围 Purpose and Scope

This document contains both general requirements, qualification requirements, and those specific electrical, mechanical requirements for this part.

本规格书包括了产品的一般要求、特性要求，以及具体的电气、机械性能要求。

## 2. 特征 Features

- piezo ultra-sonic sound generator ( transmitter & receiver ), RoHS compliant.  
压电陶瓷超声传感发声器（发生器 & 接收器），产品符合 RoHS 指标。
- water proof type symmetric directivity.  
单角度防水型结构。

## 3. 应用 Application

Bark sonar of automobiles, Parking meters, Water level meters, etc.

用于汽车倒车雷达、停车咪表、水位计等。

## 4. 特性要求 Component Requirement

### 4.1. 一般要求 General Requirement

	项目 Item	规格 Specification
4.1	壳体材料 Housing Material	Aluminum
4.2	工作温度范围 Operating Temperature Range	-30 ~ +85°C
4.3	储存温度范围 Storage Temperature Range	-30 ~ +95°C

Specification for Piezoelectric Ultrasonic Sensors	Page	4/11
	Revision No.	1.0
	Drawing No.	KCC651

Model No. : KPUS-40FS-14TR-651

#### 4.2. 电性能 Electrical Requirement

	项目 Item	规格 Specification
4.2.1	中心频率 Frequency	40 KHz
4.2.2	容量 Capacitance at 1KHz	1800± 20% pF
4.2.3	声压 Sound Pressure Level at 40KHz, 30cm,10Vrms(0dB=0.02mPa)	≥106dB
4.2.4	灵敏度 Sensitivity at 40KHz, 30cm,0dB=10V/Pa	≥-85dB
4.2.5	波束角度 Directivity	75° (typ.)
4.2.6	输入电压 Maximum Input Voltage (40kHz ,Square wave)	160Vp-p/Max
4.2.7	绝缘电阻 Insulation Resistance (at 50V D.C.)	100 MΩ min
4.2.8	探测范围 Detectable Range	0.2~1.5m

#### 4.3. 测试环境 Measuring Condition

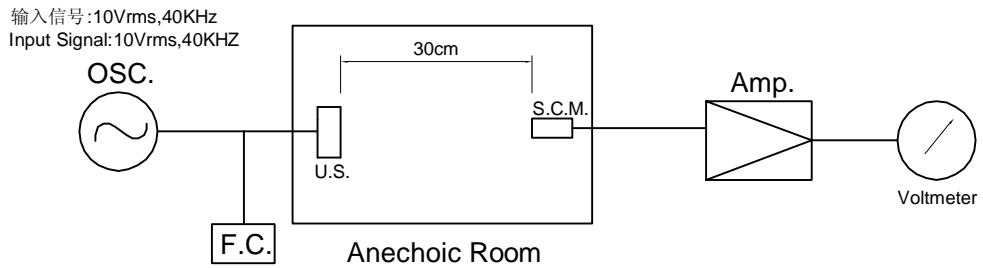
温度+25± 3℃，湿度45--60R.H.标准测试状态下进行测试。

Part shall be measured under a condition (Temperature :+25 ±3℃,Humidity :45 to 60 R.H.) is regulated measure.

Specification for Piezoelectric Ultrasonic Sensors Model No. : KPUS-40FS-14TR-651	Page	5/11
	Revision No.	1.0
	Drawing No.	KCC651

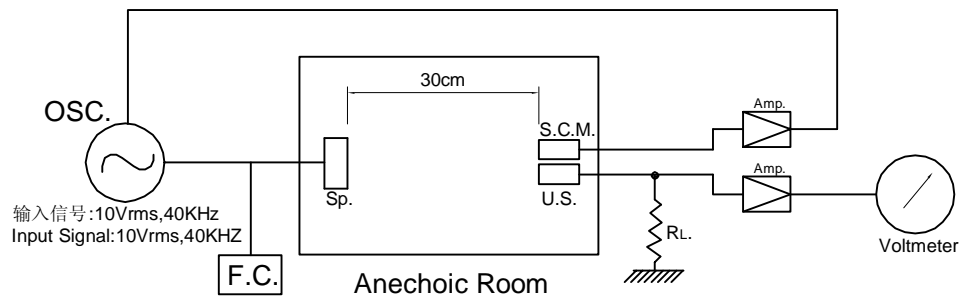
4.4. 测试方法 Measuring Method

声压测试线路 S.P.L. Measuring Circuit



- U.S. : Ultrasonic Sensor
- S.C.M. : Standard Capacitor Microphone
- Amp. : Amplifier
- Input Voltage : 10Vrms
- F.C. : Frequency Counter

灵敏度测试线路 Sensitivity Measuring Circuit



- RL. : 3.9k  $\Omega$
- U.S. : Ultrasonic Sensor
- S.C.M. : Standard Capacitor Microphone
- Amp. : Amplifier
- Osc. : Oscillator
- Sp. : Tweeter
- F.C. : Frequency Counter

Specification for Piezoelectric Ultrasonic Sensors	Page	6/11
	Revision No.	1.0
	Drawing No.	KCC651

Model No. : KPUS-40FS-14TR-651

## 5. 可靠性测试 Reliability Test

	实验项目 Item	实验条件 Test Condition	实验后规格 Specification
5.1	拉力测试 Pull Strength	在9.8N的拉力下不应该有任何重大损坏。 There should be no substantial damage after 9.8 N of force.	/
5.2	高温放置 Dry Heat Test (Storage)	放置于温度+85±2℃的烘箱内96小时，然后取出，在常温下放置4小时后，测试样品。 After being placed in a chamber with +85±2℃ for 96 hours and then being placed in natural condition for 4 hours, Subject samples shall be measured.	符合表1的要求  The measured value shall meet Table 1.
5.3	低温放置 Cold Test (Storage)	放置于温度-30±2℃的制冷箱内96小时，然后取出，在常温下放置4小时后，测试样品。 After being placed in a chamber with -30±2℃ for 96 hours and then being placed in natural condition for 4 hours, Subject samples shall be measured.	
5.4	耐湿性 Humidity	放置于湿度90%~95% R.H.,温度+60±2℃的环境试验箱内96小时，然后取出，在常温下放置4小时后，测试样品。 After being placed in a chamber with 90 to 95%R.H. at +60±2℃ for 72 hours and then being placed in natural condition for 4 hours, Subject samples shall be measured.	
5.5	温度循环 Temperature Cycle	先放置于温度-30±2℃的制冷箱内96小时，然后放置于室温(+20℃)2小时后，放置于+85±2℃的烘箱内96小时，再放置于室温(+20℃)2小时。 经过以上循环5次,在常温下放置4小时后，测试样品。 After being placed in a chamber at -30±2℃ for 96 hours, subject samples shall be placed at room temperature(+20℃).After 2 hours at this temperature ,subject samples shall be placed in a chamber at +85±2℃. After 96 hours at this temperature, subject samples shall be returned to room temperature (+20℃) for 2 hours. After 5 above cycles, subject samples shall be measured after being placed in natural condition for 4 hours.	

(Standard Test Condition :25 ± 3 °C, 45 to 60 % R.H)

(标准测试条件: 25± 3 °C, 45~60%湿度)

Specification for Piezoelectric Ultrasonic Sensors	Page	7/11
	Revision No.	1.0
	Drawing No.	KCC651

Model No. : KPUS-40FS-14TR-651

	实验项目 Item	实验条件 Test Condition	实验后规格 Specification
5.6	耐冲击性 Shock Test	在加速度 $980\text{m/s}^2$ 下,三个轴向,每个轴向半正弦波碰撞三次后,测试样品。 Diaphragm shall be measured after being applied shock( $980\text{m/s}^2$ ) for each three mutually perpendicular directions to each of 3 times by half sine wave.	符合表1的要求 The measured value shall meet Table 1.
5.7	耐振动性 Vibration Resistant	振动频率 10~55 Hz,1.5mm 全振幅,XYZ 三个方向各3小时试验后,测试样品。 Subject samples shall be measured after being applied vibration of amplitude of 1.5mm with 10 to55Hz band of vibration frequency to each of 3 perpendicular directions for 3 hours.	
5.8	可焊性试验 Resistance to Soldering Heat	将产品浸入 $260 \pm 5^\circ\text{C}$ 的锡炉中10秒后,常温下( $25^\circ\text{C}$ )放置4小时后检测产品。 Initial figures at $25^\circ\text{C}$ in 4 hours after Immersing terminal up to 1 mm below base in soldering bath at $260 \pm 5 \text{ degC}$ for 10 seconds.	
5.9	跌落试验 Drop Test	将样品从两个方向自然的从0.7m的高度落下到10mm厚的木板上。 Drop samples naturally from the height of 0.7m onto a 10mm thickness wooden board in 2 directions.	

(Standard Test Condition : $25 \pm 3^\circ\text{C}$ , 45 to 60 % R.H)

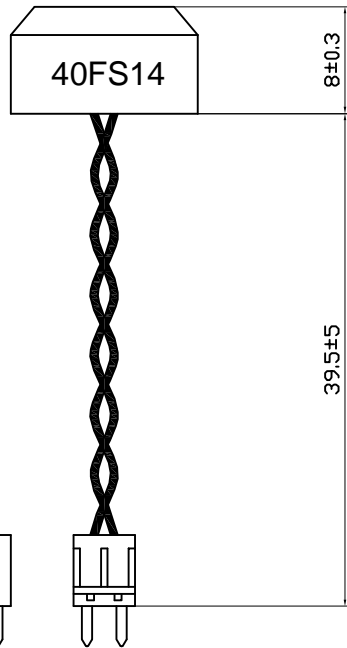
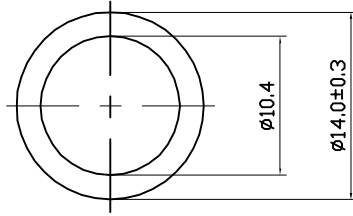
(标准测试条件:  $25 \pm 3^\circ\text{C}$ , 45~60%湿度)

表 1 Table 1

项 目 Item	试验后变化量 Specification after test
声压级 Sound Pressure Level	初始值 $\pm 6\text{dB}$ Initial Value $\pm 6\text{dB}$
灵敏度 Sensitivity	初始值 $\pm 6\text{dB}$ Initial Value $\pm 6\text{dB}$

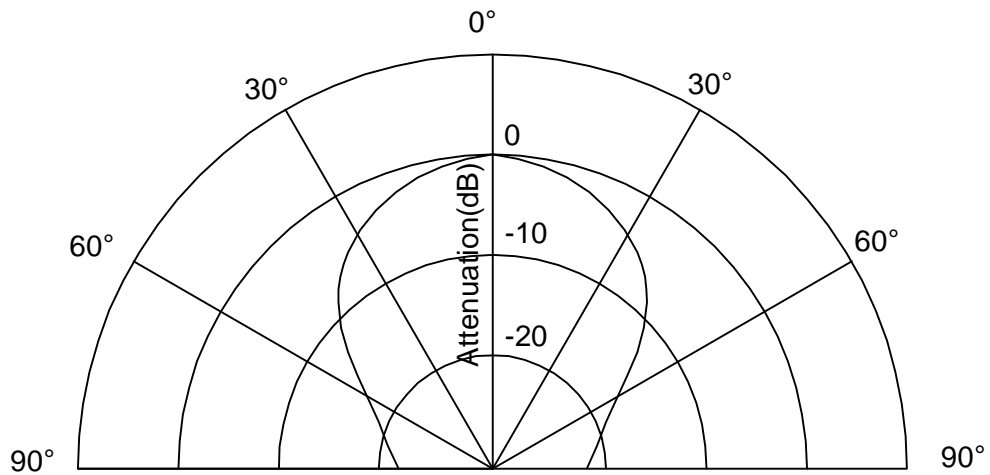
Specification for Piezoelectric Ultrasonic Sensors	Page	8/11
	Revision No.	1.0
	Drawing No.	KCC651
Model No. : KPUS-40FS-14TR-651		

## 6. 尺寸图&择向性 Dimensions&Directivity



EIAJ Code

Directivity in overall sensitivity



UNIT : mm



Specification for Piezoelectric Ultrasonic Sensors	Page	9/11
	Revision No.	1.0
	Drawing No.	KCC651
Model No. : KPUS-40FS-14TR-651		

## 7. 包装标准 Packaging Standard

产品的外包装是纸箱,它应该清楚的标明型号,数量,出厂检验批号.  
在运输及储存的过程中,产品必须不会受到机械损伤.

Each minimum package unit of products shall be in a carton box and it shall be clearly marked with Part Number, quantity and outgoing inspection number.  
There shall be no mechanical damage on products during transportation and/or in storage.

## 8. 注意 Note

- 1) 请确认在安装我们的产品时,你们产品的参数已经评估过.

Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.

- 2) 与所列参数不同的情况下,请勿使用此产品.

You are requested not to use our product deviating from the agreed specifications.

- 3) 我们认为产品参数、图纸或者其他技术资料中不适合包含商业交易中的任何条款.

所以,如果你的技术文件中含有保证条款、产品责任条款或知识产权条款,这些都是无效的.  
We consider it not to appropriate to include any terms and conditions with regard to the business transaction in the product specifications, drawings or other technical documents.  
Therefore, if your technical documents as above include such terms and conditions such as warranty clause, product liability clause, or intellectual property infringement liability clause, they will be deemed to be invalid.

## 9. 警告 Cautions

如果产品使用于下列高可靠性的装置时,请与我们联系,以免对人的生命,财产和身体造成损害.

Please contact us before using our products for the undermentioned applications requiring especially high reliability in order to prevent defects which might directly cause damage to other party's life, body or property(listed below).

- (1) Aircraft equipment 飞行设备
- (2) Aerospace equipment 航天设备
- (3) Undersea equipment 潜水设备
- (4) Medical equipment 医疗设备
- (5) Transportation equipment (automobiles, trains, ships) 交通设施
- (6) Traffic signal equipment 交通信号设备
- (7) Disaster prevention/crime prevention equipment 防灾害/防犯罪设备
- (8) Data-processing equipment 数据处理设备
- (9) Applications of similar complexity or reliability requirements comparable to the applications listed in the above 以及与上述相类似或可靠性要求更高的设备

Specification for Piezoelectric Ultrasonic Sensors	Page	10/11
	Revision No.	1.0
	Drawing No.	KCC651
Model No. : KPUS-40FS-14TR-651		

## 10. 注意事项 Caution in use

### 10.1 (项目设计注意 Notice in design)

- 1) 机械冲击或热冲击可能使传感器产生浪涌电压。  
The transducer may generate surge voltage by mechanical or thermal shock.
- 2) 请不要给超声波传感器施加直流电压。  
Please do not apply D.C.voltage for ultrasonic transducer to avoid migration.

### 10.2 (操作和储存注意事项 Notice in handling and storage)

- 1) 请不要在传感器上施加过度的机械冲击。  
Please do not apply an excessive mechanical shock for this ultrasonic transducer.
- 2) 请不要在多灰尘和高湿度环境下使用或储存此产品。  
Please do not use and storage this ultrasonic sensor in heavy dust and high humidity condition.
- 3) 请不要在传感器表面施加过大压力。  
Please do not excessive force on the top of this ultrasonic transducer.
- 4) 请不要在传感器中加入任何特殊物质。  
Please do not infuse any strange material into the ultrasonic transducer.

### 10.3 (安装注意事项 Notice in mounting)

- 1) 焊接时请不要对接插处施加过度压力。  
Please do not apply excessive force for terminals, when soldering.
- 2) 在使用烙铁的情况下,应注意烙铁头的温度应该保持在 +350℃ 以下,并且焊接时间控制在 3秒内。  
In case of using solder iron for soldering, the top of soldering iron's temperature should be kept less than +350 ℃.Moreover the soldering time should be also kept with in 3seconds.
- 3) 请不要用溶剂洗涤。  
Please do not clean by dissolvent.

