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Sensor&Transducer Catalog

IoT World, Sensing Leads the Way!

→ 压电陶瓷的应用范围

利用我们早已熟知的压电现象和超声波原理在我们日常生活中及从医疗到工业等广阔领域里得到广泛的应用。

例如：	
家电及钟表的电子音源	金属、混凝土等固体探测的超声源
气体打火机的着火源	鱼群探测机或声呐的探测仪源
加湿器及吸入器的雾化源	汽车倒车传感器超声源
医疗诊断装置及按摩器的超声波源	PDA 机械的话筒或传声器
喷码打印机的泵源	步行计的计数源
各种洗涤机的超声波源	



→ APPLICATIONS OF THE PIEZOCERAMICS

The piezoelectric ceramics have been widely applied in our medical, industrial and other fields by utilizing the piezoelectric effect and the ultrasonic theory.

For instance:

Electronic sound for home electric appliance and clock	Ultrasonic source for the detection of solid objects such as metal and concrete
Ignition for the gas lighter	Hydrophone for fish detectors and sonar
Atomization source for the humidifier and nebulizer	Parking sensors for automobile
Ultrasonic source for diagnosis device of medical treatment and massage device	Speaker or microphone for the PDA application
Pump for ink jet printer	Step counter for pedometer
Ultrasonic source for cleaning applications	

如此多应用的压电陶瓷就是通过压力和电气进行转化，由于应变而得到电输出，又由于电输入得以收缩，它就是利用相互转换的性质。

All these applications use the piezo elements' so called direct piezoelectric effect, a piezo element converts mechanical forces into a measurable voltage, or the inverse piezoelectric effect, a piezo element is deformed when a voltage is applied to it, thus generating mechanical motion or oscillation.

电气→机械→ 电气相互转换方面

The Mutual Conversion of Electrical Energy= Mechanical Energy

电路元件

谐振器
滤波器
延迟线

Electric circuit elements

Resonators
Filters
Delay lines

空气中超声波

超声波测距
汽车倒车雷达
超声波开关
烟雾传感器
风速风向仪
液位计
接近开关

Air ultrasonics

Distance detectors
Parking sensors
Ultrasonic switches
Smoke sensors
Anemometers
Liquid level meters
Proximity switches

水中超声波

流量检测传感器
鱼群探测传感器
声呐

Hydrospace ultrasonics

Flow detection sensors
Fish detection sensors
Sonars

医用超声波

层析诊断装置
胎儿心率计
血流计
内窥镜
分娩监视装置

Medical ultrasonic equipments

Tomography diagnosis equipments
Fetal Doppler monitors
Blood flow meters
Fiber scopes
Child-birth monitoring equipments

一般超声波

探伤机
厚度计
骨密度计
浓度粘度计
流量流速计
弹性力测定器
触摸屏

General ultrasonic equipments

Flaw detectors
Thickness gauges
Bone density meters
Concentration and viscosity meters
Flow and speed meters
Elasticity rate measurements
Touch panels

压电转换

高压电源
臭氧发生器
电离器
液晶倒向器
照相机防抖
汽车导航仪
移动、姿势、方位控制

Piezoelectric transformers

High voltage power supply
Ozonators
Ionizers
LCD backlight inverters
Anti-blurring of cameras
Automobile navigators
Control for position, posture and direction of the movable objects

电能转换为机械能

Electrical Energy → Mechanical Energy

大功率超声波

清洗机
加湿器
按摩器
喷雾器
超声波焊接机
便携式洗衣机
美容仪
结石碎石机
牙齿除垢器
超声手术刀

音响

蜂鸣器
扬声器
收音机
骨传导

执行元件

打印机
马达
风扇
粉体送料器
振动筛
先导阀
经编机贾卡梳
圆针机选针器
触觉除振
振动盘
位置控制器
光调制盘
摄像机快门
气阀
微泵
盲人阅读器



High power ultrasonics

Cleaners
Humidifiers
Massagers
Nebulizers
Ultrasonic welding machines
Portable washing machines
Cosmetic instruments
Calculus smashing equipments
Dental descaler equipments
Ultrasonic scalpels

Audio devices

Electronic buzzers
Loudspeakers
Radio receivers
Bone conduction

Actuators

Printers
Rotation or Linear motors
Fans
Powder feeders
Vibration sieves
Pilot valves
Jacquard comb for warp knitting machines
Needle selectors for circular knitting machines
Sense of touch displays
Vibration plates
Positioning devices
Optical choppers
Camera shutters
Air valves
Micropumps
Blind braille

Ultrasonic transducer for smart flow meter
智能表计流量检测用超声波传感器



机械能转换为电能

Mechanical Energy → Electrical Energy

传感器

冲击传感器
压力传感器
震动传感器
拾音器
电位传感器
震动开关
血压计微音器
旋转平衡器
调色传感器
卡路里检测
漏水传感器

高电压发生

香烟打火机
煤气炉
压电变压器

Sensors

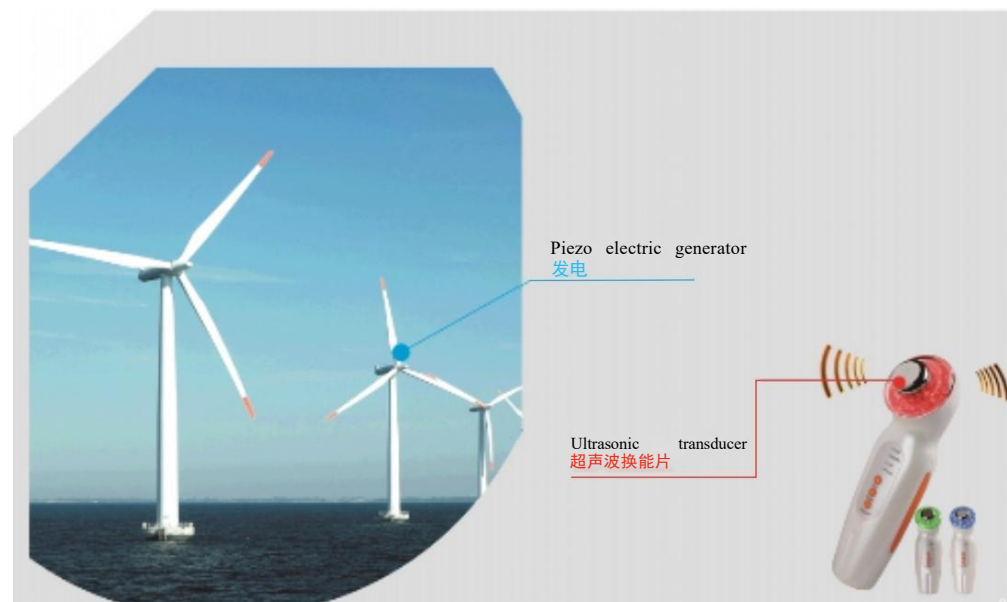
Shock sensors
Pressure sensors
Vibration sensors
Sound pick-up
Potentiometric sensors
Vibration switches
Sphygmomanometer' microphones
Rotation balancers
Color modulation sensors
Calorie monitors
Water leaking sensors

High voltage generation applications

Cigarette lighters

Gas stoves

Piezoelectric transformers



提供丰富的压电陶瓷材料

Plentiful Piezoelectric Ceramic Materials

锆钛酸铅 $\text{Pb}(\text{Ti} \cdot \text{Zr})\text{O}_3$ / 软性系

PZT 软性材料，是指材料机械Q 值低、介电常数高，压电应变常数大、电压输出系数大的材料。

锆钛酸铅 $\text{Pb}(\text{Ti} \cdot \text{Zr})\text{O}_3$ / 硬性系

PZT 硬性材料，是指材料机械Q 值高、损耗小，大功率使用条件下发热小的材料。

钛酸铅系 PbTiO_3

是具有高居里温度、高抗电力的材料，由于在特定结晶轴方向有很强的各向异性，可以得到单一振动模式的材料。

钛酸铋锶 $\text{SrBi}_2\text{TiO}_3$

高居里温度，无铅材料。

LEAD ZIRCONATE TITANATE CERAMICS /SOFT MATERIALS $[\text{Pb}(\text{Ti} \cdot \text{Zr})\text{O}_3]$

The PZT soft material possesses low mechanical quality factor, high permittivity, high piezoelectric strain constant and high output voltage constant.

LEAD ZIRCONATE TITANATE CERAMICS /HARD MATERIALS $[\text{Pb}(\text{Ti} \cdot \text{Zr})\text{O}_3]$

The PZT hard material has a high mechanical quality factor, low loss, and small loss to fever when it works under the high power.

LEAD TITANATE CERAMICS $[\text{PbTiO}_3]$

The material has high resistance to the voltage and high Curie temperature. Because it has a great anisotropy in the specific axis, it can vibrate in the single mode.

STRONTIUM BISMUTH TITANATE $\text{SrBi}_2\text{TiO}_3$

It is a lead-free material with high Curie temperature.



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

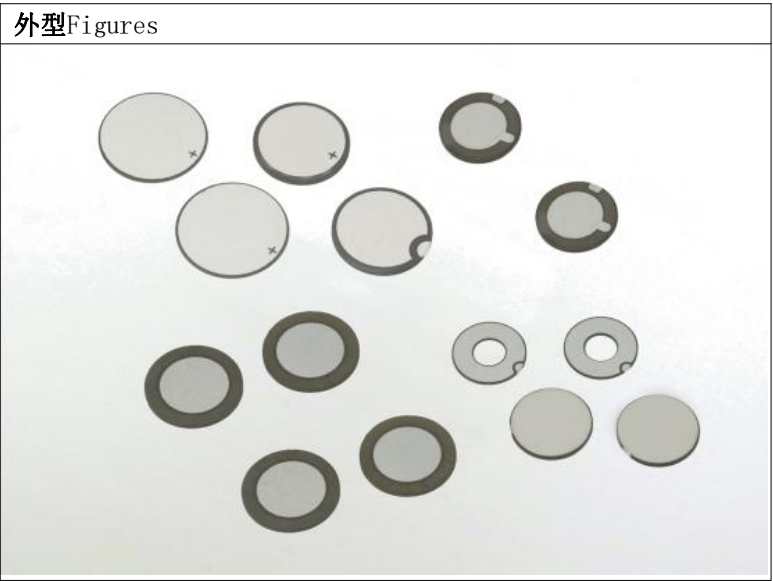
超声波按摩雾化通用元件 Piezo Components for Ultrasonic Massage

超声波振动对身体的按摩效果广泛应用于医疗和美容，可提供适应这种效果的高可靠性，高能量转换率的振动元件。
The massage effect of the ultrasonic vibration on the body is widely used in the medical treatment and cosmetology. We offer vibration components with high reliability and energy

conversion rate.

主要种类和规格 Main Applications and Parameters
√ 超声波医疗器械 Ultrasonic Medical Treatment Equipments
美容护理机器 Beauty Care Equipments

型号Part Number	STHTCY	
外径External Diameter	φ 10 ~ φ 50 mm	
介电损耗Dielectric Loss tgo	≤0.4%	
机电耦合系数Electromechanical Coupling Coefficient(Kp)	0.62	0.65
相对介电常数Relative Dielectric ConstantE33/ε o	1200	1500
压电应变常数Piezoelectric Strain Constant(d33) (C/N)	250X10 ⁻¹²	320X10 ⁻¹²
谐振频率Resonant Frequency	1MHz、2MHz、3MHz	
推荐材料Recommended Material	P-669	P-679



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

螺栓紧固型换能器用元件 Components Used in Screw Fastener Sensors

将压电元件用螺栓紧固在金属杆上，使压电元件机械振动的质点位移或速度放大，超声能量集中在较小的面积上使用，即超声聚能器。可提供谐振阻抗低、介电损耗小、热稳定性好，可大功率驱动的各种环状元件。

The piezoelectric components is fastened to the metal rod with bolts, which enable the particle displacement or velocity of the mechanical vibration of the piezoelectric components to be amplified, and the ultrasonic energy is concentrated on the smaller area, that is, the ultrasonic concentrator. We can provide a variety of ring-shaped components with low resonant impedance, low dielectric loss, good thermal stability, and high power drive

主要种类和规格 Main Applications and Parameters

型号Part Number	STHTCH		
外径External Diameter (mm)	φ 10 ~ φ 70 (典型typ: φ 10 φ 20 φ 35、φ 38、φ 50、φ 60)		
内径Internal Diameter (mm)	φ 5 ~ φ 35 (典型typ: φ 5、φ 8、φ 15、φ 17、φ 20、φ 23、φ 30)		
厚度Thickness (mm)	2.5、3.0、4.0、5.5、6.0、6.5		
机电耦合系数Electromechanical Coupling Coefficient Kp	0.62	0.65	0.58
谐振阻抗Resonant Impedance	≤50 Ω		
谐振频率Resonant Frequency	15kHz~200kHz		
推荐材料Recommended Material	P-669	P-679	P-689



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

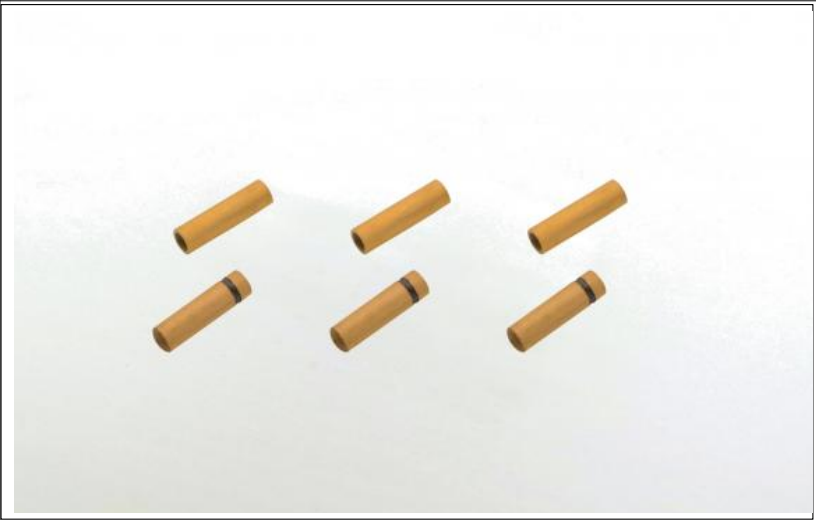
医疗用陶瓷元件压电小圆管
Tube Type Ceramics Components for Medical Application

利用压电陶瓷的逆压电效应，压电陶瓷高频振动后消融病变区或破碎脂肪颗粒，血栓等，或压电陶瓷产生形变带动微小仪器转向。
With inverse piezoelectric effect of piezoceramic, piezoelectric ceramics, after high-frequency vibration, can ablate lesions, break fat particles, thrombus and so on. The deform caused by piezoceramic will drive the tiny instrument to turn.

主要种类和规格 Main Applications and Parameters
内窥镜用转向执行器件 Steering Actuator for Fiber Scopes
超声消融用 Ultrasonic Ablation

型号Part Number	STHTCG
外径External Diameter	φ 1.5~φ 3mm
内径Inside Diameter	φ 0.8~φ 2mm
长度Length	3~5mm
电极材料Electrode Material	银silver, 金gold
推荐材料Material	P-669、P-679

外型 Figures



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

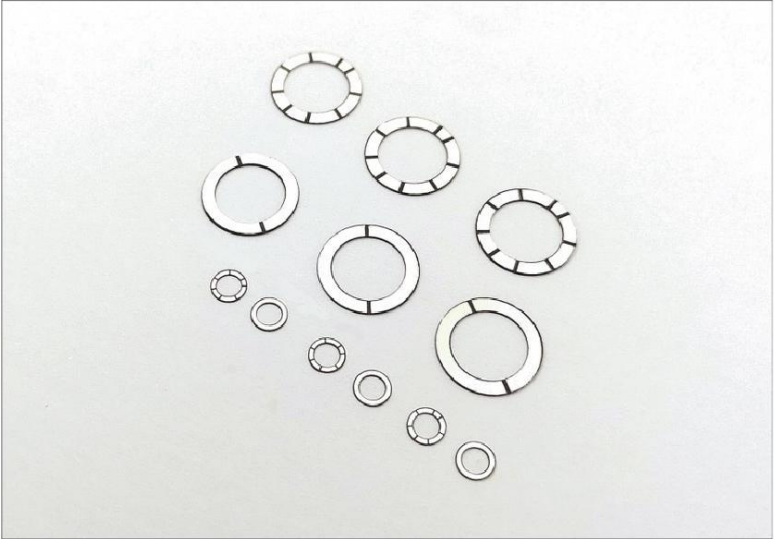
超声波电机用元件
Piezo Components for Ultrasonic Electromotor

压电陶瓷是超声波电动机定子振动发生的核心元件，其性能的优劣将直接影响超声波电动机的输出性能。可提供介电温度稳定性好，低介电损耗，分区d33、静电容一致性好的高质量元件。
Piezoelectric ceramic is the core element of the vibration of ultrasonic electromotor's stator. Its performance will directly affect the output performance of ultrasonic electromotor. We can supply a wide selection of high-quality ceramic elements with good dielectric temperature stability, low dielectric loss, and good consistency among divided electrodes in terms of dss as well as static capacitance.

主要种类和规格 Main Parameters

型号Part Number	STHTCH		
外径External Diameter	φ 10~φ 50mm		
内径Internal Diameter	φ 5~φ 40mm		
介电损耗Dielectric Loss tgo	≤0.3%	≤0.3%	≤0.4%
相对介电常数Relative Dielectric Constant E ₃ 3T/ Eo	1100	1250	1400
压电应变常数Piezoelectric Strain Constant(d ₃₃) (C/N)	220x10	250x10	320x10
推荐材料Recommended Material	P-689	P-669	P-679

外型 Figures



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

超声波流量检测用元件 Ultrasonic Element for Flow Measurement

超声波流量检测用传感器由于其体积小、功耗低、寿命长、无压损等特点被广泛应用于各类气体、液体等介质的流量检测。可提供灵敏度高、热稳定性好、输出线性度好的超声波元件。

Due to its traits, such as small size, low power consumption, long life, no pressure loss and other characteristics, ultrasonic flow detection sensor is widely used in various types of gases, liquids and other media flow detection. We can provide the ultrasonic element with high sensitivity, good thermal stability, and excellent output linearity.

主要种类和规格 Main Parameters

型号Part Number	STHTCY		
外径External Diameter	φ 8` φ 50mm		
介电损耗Dielectric Loss tgo	≤2.0%		
相对介电常数Relative Dielectric Constant ε 33T/ Eo	2300	2750	3400
压电应变常数Piezoelectric Strain Constant (d33) (C/N)	450x10-12	540x10-12	600x10-12
谐振频率Resonant Frequency	40kHz~4MHz		
电极形状Electrode Type	A/B/C		
电极材料Electrode Material	银silver, 金gold		
推荐材料Recommended Material	P-668	P-678	P-672

外型Figures



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

压电陶瓷双晶片 Piezoelectric Bimorph

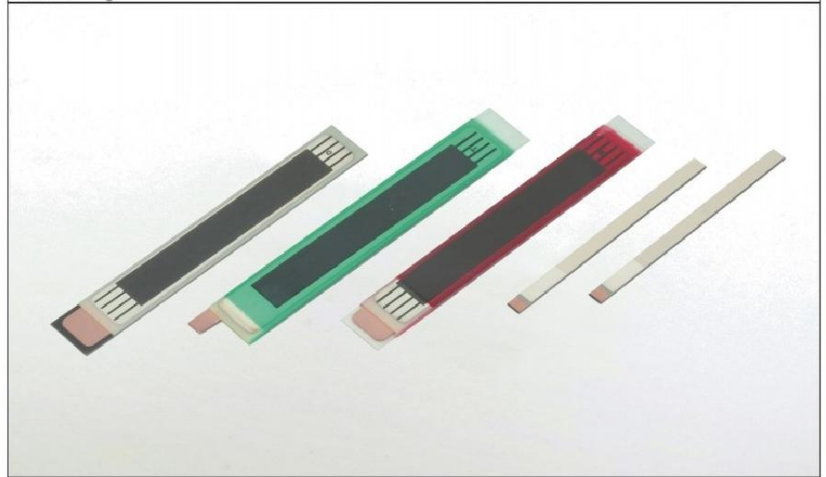
压电双晶片是两片单晶片及一片基板材料所构成，利用压电双晶片加电产生位移，或形变产生电信号的特性，可应用于许多领域。纺织机械的贾卡梳，选针器等； 汽车用压电流体阀门； 医疗器械，胰岛素泵，胶原蛋白增生器等；小型压电水泵、 能量收集发电装置； 盲人阅读器 等。

Made up of two single-chips and one plate, the piezoelectric bimorph, when applied electrical signal, will bring about displacement, or deform which can produce electrical signal. In light of this, it can be applied to many areas, Jacquard comb, needle-selector for textile machines; piezoelectric flow valves for automobile; medical equipment, such as insulin pump, collagen enhancer; small-scale piezoelectric water pump, generation device which can harvest energy; blind braille etc.

主要种类和规格 Main Parameters

型号Part Number	STHTZ	
尺寸Size	10`60 (L) x2~20 (W) x0.5~0.9 (T) mm	
介电损耗Dielectric Loss tgo	≤3.0%	
相对介电常数 Relative Dielectric Constant ε 33T/ Eo	4200	6000
压电应变常数 Piezoelectric Strain Constant (d33) (C/N)	780x10-12	850×1012
推荐材料Recommended Material	P-666	P-676

外型 Figures



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

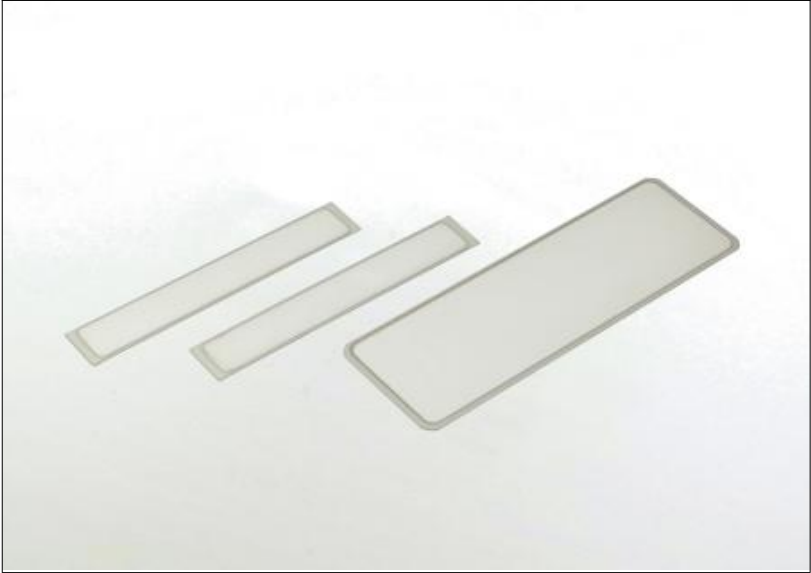
压电单晶片 Piezoelectric Single Chip

压电单晶片用于经编机贾卡梳、圆针机选针器用组装双晶片使用，也可以提供压电发电等元件使用。
Piezoelectric single-chip is used to assemble bimorph for Jacquard comb of warp knitting machine or needle selector of circular knitting machine. Besides, it can also be used in piezoelectric power generating component.

主要种类和规格 Main Parameters

型号Part Number	STHTZJ	
尺寸Size	10~60 (L) x2~20 (W) x0.1~0.9 (T) mm	
介电损耗Dielectric Loss tgo	≤3.0%	
相对介电常数 Relative Dielectric Constant ε 33T/ Eo	4200	6000
压电应变常数 Piezoelectric Strain Constant(d33) (C/N)	780x10:12	850×1012
推荐材料Recommended Material	P-666	P-676

外型 Figures



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

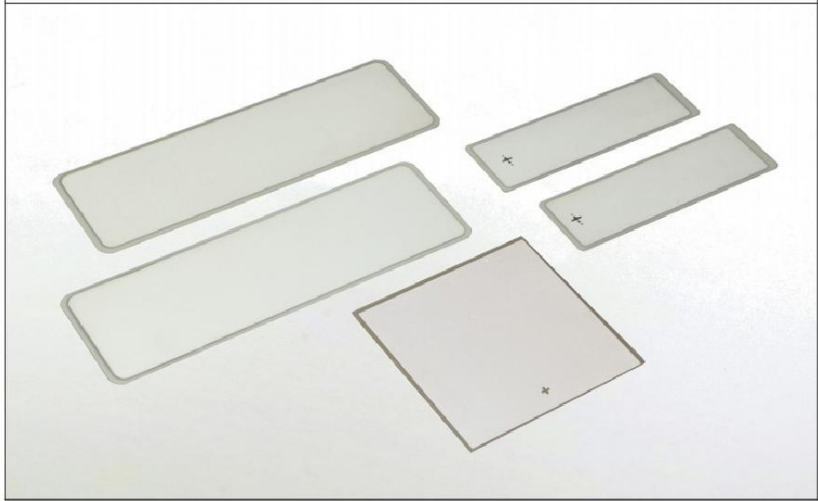
发电用压电陶瓷元件
Piezoelectric Ceramic Components for the Power Generation

利用压电陶瓷的正压电效应，将环境中的机械能转换为电能，可应用于生物发电、人体能量采集、海浪发电和各类自供电设备。其持久、清洁、免维护的新型发电模式被广泛应用。可定制加工能量转化效率高、电压信号强的各类压电陶瓷发电元件。
Direct piezoelectric effect, that is transforming mechanical energy to electrical energy, can be applied in bioelectric power generation, human energy harvesting, wave power generation and other self-powered units. The long-lasting, clean, maintenance-free new power generation mode is widely promoted and used. A wide range of piezo elements with high energy conversion efficiency and strong voltage signal can be customized.

主要种类和规格 Main Parameters

型号Part Number	STHTRJXA		
尺寸Size	可定制Customized		
厚度Thickness	0.1~0.6mm		
机电耦合系数Electromechanical Coupling Coefficient (Kp)	0.74	0.78	0.82
相对介电常数Relative Dielectric Constant ≤33' /Eo	3800	4200	6000
压电应变常数Piezoelectric Strain Constant(d33) (C/N)	710 x10-12	780x10:12	850x10:12
推荐材料Recommended Material	P-690	P-666	P-676

外型 Figures



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

复合材料元件 Composite Piezoelectric Ceramics

由于压电陶瓷的声阻抗与空气、水或生物体等的声阻抗差异很大而使声波入射困难，为了解决这一难题而采用将各种树脂与压电陶瓷复合化。复合后的压电陶瓷声阻抗低，入射特性好，而且可通过陶瓷的体积比来调整压电特性。

Since the acoustic impedance of the piezoelectric ceramic is greatly different from that of the air, water, or organism, the acoustic wave is difficult to be incident. In order to solve this

problem, various resins are compounded with the piezoelectric ceramic. After the composite, piezoceramic acoustic impedance is low, with good incident characteristics, and piezoelectric properties can be adjusted by the volume ratio of ceramic.

主要种类和规格 Main Applications and Parameters

无损检测用探伤 Non-destructive Inspection

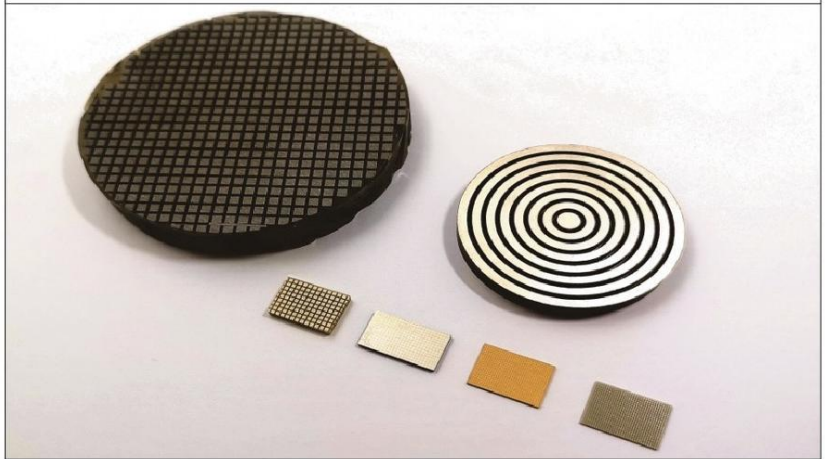
▽医用超声波探测器 Medical Ultrasonic Detector

▽远距离的固体内超声波的发射与接收

Long Distance Ultrasonic Transmitting and Receiving in Solid

型号Part Number	STHTCT
外径External Diameter	Φ6~Φ70mm
长度Length	10~80mm
宽度Width	10~30mm
厚度Thickness	1~15mm
电极材料Electrode Material	银silver, 铜copper, 金gold
推荐材料Recommended Material	P-679, P-672, P-666, P-690

外型 Figures



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

夹心式超声波换能器 Sandwiched Transducer

主要应用在功率超声和水声领域，采用一种在压电陶瓷圆片的两端面夹以金属块而组成的夹心式压电换能器。由于这种结构的换能器是由法国物理学家朗之万所提出，因此它有时也被称为朗之万换能器。这种换能器结构的优点在于既利用了压电陶瓷振子的纵向效应，又得到了较低的共振频率，另一方面，由于压电陶瓷本身的特点，即抗张强度差，在大功率工作状态下容易发生破裂，通过采用金属块以及预应力螺栓给压电陶瓷圆片施加预应力，使得压电陶瓷圆片在激烈的振动时始终处于压缩状态，从而避免了压电陶瓷片的破裂。

The sandwiched transducer is one type of the ultrasonic transducers with metal plates clamping at both ends of the piezoceramic discs. It is mainly used in power and underwater

ultrasound applications.

Because this structure is first proposed by Paul Langevin, the French physicist, it is also called Langevin transducer.

One of the advantages of this structure is that it makes full use of the longitudinal mode of piezoceramics and gets the lower resonant frequency as well. Also, because the piezoceramics has the characteristic of low tensile strength itself, it is much easier to be cracked under the high power. However, by the application of the metal plates and prestressed bolt the piezoceramics remain in the compressed state under the violent vibration so that the cracks of piezoceramics could be avoided.

主要种类和规格 Main Applications and Parameters

型号Part Number	STPTC15K、STPTC20K
谐振频率Resonant Frequency	15KHz、20KHz
谐振阻抗Resonant Impedance	≤25 Ω
输入功率Input Power	1500W、2600W

外型 Figures



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

接触式超声波流量传感器 Built-in Ultrasonic Flow Transducer

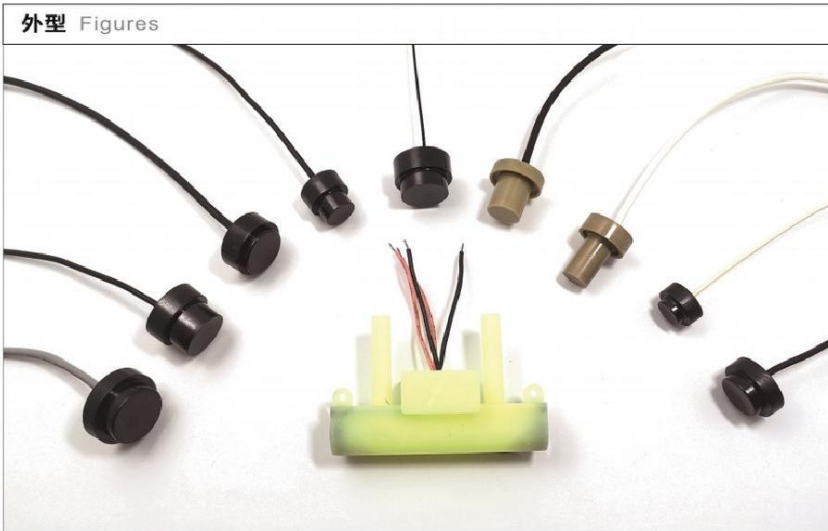
接触式超声波流量传感器是超声波流量计的核心部件，是一种测量液体介质的超声波传感器，产品采用了PPS、PEEK等工程塑料设计，可以直接与液体接触，产品具有抗腐蚀、耐酸耐碱、耐压及耐热性，在各种环境下产品性能稳定的特点。降低环境因素对产品输出和接收信号的干扰，有效提高了产品的响应灵敏度。用于流量计量，主要用于超声波水表，超声波热量表，微流量计量，水下液位、距离探测，液体浓度检测及多普勒流速计。

Built-in ultrasonic flow transducer is the core component of ultrasonic flowmeter, which is a kind of liquid medium ultrasonic transducer. Transducers are designed with PPS or PEEK

engineering plastic and can contact with liquid directly. They could resist high pressure, high temperature, acid and alkalis. The performance is stable in a variety of environments. By reducing the environmental influence towards emitting and receiving of signals, the response sensitivity is improved. These are used for ultrasonic flowmeters, mainly for ultrasonic water/heat meters micro-flow measurement, underwater liquid level & distance detection, liquid concentration detection and Doppler velocimeter.

主要种类和规格 Main Parameters

型号Part Number	STPSC
频率Frequency	1MHz/2MHz/4MHz
带宽Bandwidth	标称频率Nominal Frequency 10%-15%
阻抗Impedance	10-1500 Ω
静电容Capacitance	500-3000 pF
可根据客户要求，进行定制开发 Customized available	



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

非接触式计量换能器 Clamp-on Ultrasonic Transducer

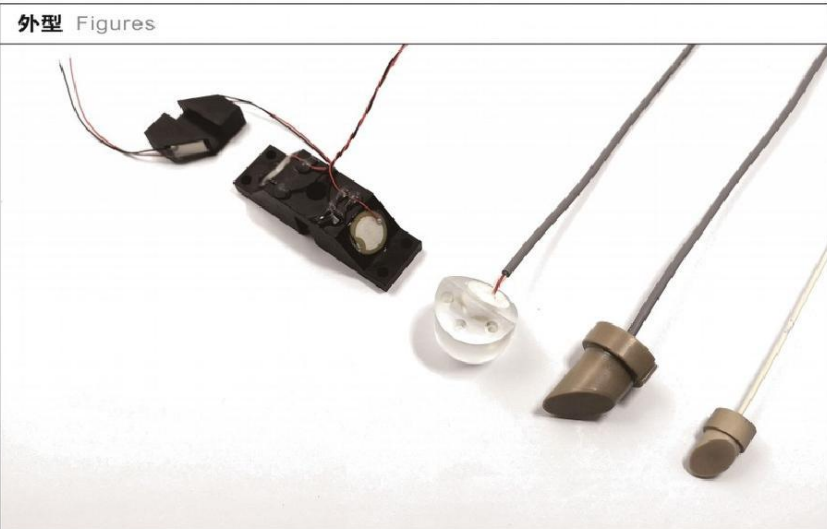
非接触式计量换能器是超声波流量计的核心部件，是一种液体介质的超声波传感器，可用于液体流量的计量。产品采用了PPS、PEEK、亚克力等工程塑料设计，降低环境因素对产品输出和接收信号的干扰，有效提高了产品的响应灵敏度。主要用于非破坏性安装要求及非接触液体要求，例如农业灌溉计量、血液流量计量、输液微流量计量。

Clamp-on ultrasonic transducer is the core component of ultrasonic flow meter. It is a kind of ultrasonic transducer for liquid flow measurement. The product is designed with PPS,

PEEK, acrylic and other engineering plastics, which can reduce the influence of environmental factors on the emitting and receiving signals of the product and effectively improve the response sensitivity of the product. They are mainly used for non-destructive installation requirements and non-contact liquid requirements, such as agricultural irrigation metering, blood flow metering, infusion microflow metering.

主要种类和规格 Main Parameters

型号Part Number	STPSC
频率Frequency	1MHz/2MHz
带宽Bandwidth	标称频率Nominal Frequency 10%-15%
阻抗Impedance	50-500 Ω
静电容Capacitance	800-2000 pF
可根据客户要求，进行定制开发 Customized available	



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

超声波传感器（气体流量） Ultrasonic Transducer (gas flow)

气体流量超声波传感器是超声波气表的核心部件，是一种适用于气体介质的超声波传感器。产品采用新型的声匹配层材料提高了超声波在气体介质中的发射能力，主要适用于天然气、煤气计量等领域。

Gas flow ultrasonic transducer is the core component of ultrasonic gas meter, which is an ultrasonic transducer suitable for gas medium. We upgrade the ultrasonic's emission power in gas medium by adopting the new acoustic matching material. Our transducers are mainly applied in natural gas, coal gas measurement etc.

主要种类和规格 Main Parameters

型号Part Number	STPSC
频率Frequency	200-500kHz
带宽Bandwidth	标称频率Nominal Frequency 10%-15%
阻抗Impedance	150-300Ω
静电容Capacitance	500-2000 pF
波束角Beamwidth	13±2°
可根据客户要求，进行定制开发 Customized available	

外型 Figures



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

超声波传感器（距离检测和避障）

Ultrasonic Transducer(distance detection and obstacle avoidance)

超声传感器发出超声波在气体介质沿一定方向传播，部分会被被测面反射回来并被传感器接收，通过计算超声波从发射到接收的时间间隔，并结合超声波在介质中传播的速度，即可计算出被测面与超声波传感器的距离。

The ultrasonic wave emitted by the sensor transmits in a certain direction through the air medium, and part of them is reflected back and received by the sensor. With the help of transmitting speed of ultrasonic wave in the medium, we can calculate the interval time between the emission and reception of the acoustic wave, then can calculate the distance from the measured surface to the ultrasonic sensor.

主要种类和规格 Main Parameters

型号Part Number	STPSC
频率Frequency	175-300kHz
带宽Bandwidth	标称频率Nominal Frequency 10%-15%
阻抗Impedance	100-300Ω
静电容Capacitance	500-1000 pF
波束角Beamwidth	13±2°
可根据客户要求，进行定制开发 Customized available	

外型 Figures



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

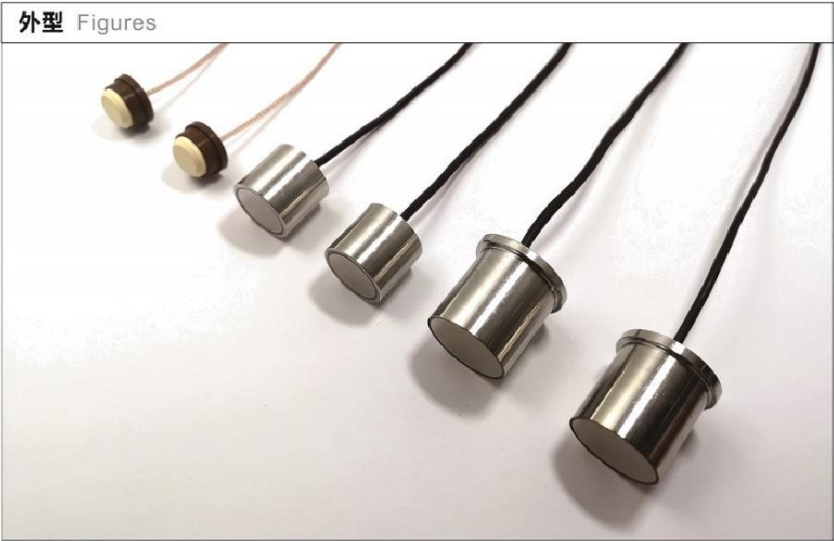
超声波传感器（防腐/耐高温）
Ultrasonic Transducer(anti-corrosion/withstand high temperature)

为扩展超声波传感器的使用范围，产品采用了金属封装方式提高了传感器的耐腐蚀性能，使用了新型耐高温声匹配层材料提高了耐高温性能。
In order to extend the scope of using ultrasonic transducers, metal packaging is adopted to improve corrosion resistance, and new acoustic matching material is used to improve high temperature resistance.

主要种类和规格 Main Parameters

型号Part Number	STPSC
频率Frequency	125-200kHz
带宽Bandwidth	标称频率Nominal Frequency 10%-15%
阻抗Impedance	150-300 Ω
静电容Capacitance	1500-2000 pF
波束角Beamwidth	13±2°
可根据客户要求，进行定制开发Customized available	

外型 Figures



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

超声波传感器（气体流速） Ultrasonic Transducer (gas flow velocity)

利用超声波在已知介质中的传播速度是确定的，测量超声波在流动介质中传播的总速度，从而计算出当前介质的流动速度分量。可广泛应用于工业流速计、工业流量计、气象风速风向计等。

As the propagation speed of the ultrasonic wave in a known medium is determined, the total speed of ultrasonic waves propagating in a flowing gas medium is measured to calculate the anemometer and so on
flow speed of the gas medium. Our transducers are widely applied in industrial flowmeter,

主要种类和规格 Main Parameters

型号Part Number	STPSC
频率Frequency	200kHz
带宽Bandwidth	标称频率Nominal Frequency 10%-15%
阻抗Impedance	200-500Ω
静电容Capacitance	500-2000 pF
波束角Beamwidth	13±2°
可根据客户要求，进行定制开发Customized available	

外型 Figures



压电陶瓷元件应用制品介绍

The Introduction of Piezoelectric Ceramic Components

超声波传感器（液位计 / 物料仪）

Ultrasonic Sensor(liquid level meter/ material instrument)

传感器(换能器)发出超声波脉冲，声波经被测物表面反射后被同一传感器接收，由声波的发射和接收之间的时间来计算传感器到被测物体表面的距离。超声波液位计由于采用非接触的测量，被测介质几乎不受限制，可广泛用于各种液体和固体物料高度的测量。

The sensor (transducer) emits the ultrasonic pulse, which is reflected by the detected surface and received by the same sensor. We can calculate the distance from the sensor to the detected surface by the interval time between the emission and reception of the acoustic wave. Due to the adoption of non-contact measurement, the ultrasonic level meter can be widely used in the height measurement of both the liquid and solid materials, not limited to the kind of media.

主要种类和规格 Main Applications and Parameters

型号Part Number	STPSC
频率Frequency	40~60 kHz
尺寸Size	Φ 40~ Φ 100 mm
静电容Capacitance	800~2500 pF
波束角Beamwidth	13±2°
可根据客户要求，进行定制开发Customized available	

外型 Figures



压电材料特性表 Piezoceramic(Transducer/Sensor)Material Data Sheet

名称	符号	P4																
		P67	266	P68	P67	P668		P66	Pb	P690	P666	P67	P667	P.66	P-659	P-664		
机电耦合系数 Electromechanical coupling coefficient	K	0.65	0.62	0.58	0.68	0.68	0.72	0.70	0.70	0.74	0.78	0.82	0.10	0.68	0.58	0.67		
	K ₃₁	0.38	0.35	0.32	0.39	0.39	0.42	0.39	0.41	0.40	0.42	0.45		0.38	0.32	0.37		
	K ₃₃	0.70	0.68	0.62	0.70	0.70	0.72	0.73	0.72	0.75	0.78	0.80		0.70	0.60	0.70		
	K	0.46	0.44	0.42	0.46	0.46	0.47	0.46	0.46	0.48	0.50	0.50	0.45	0.45	0.42	0.45		
相对介电常数 Relative dielectric constant	ε _{ss} /ε ₀	1400	125	1100	2000	2300	2750	3200	3400	3800	4200	6000	180	850	1100	2800		
压电应变常数 Piezoelectric strain	d ₃₁ ×10 ⁻¹² C/N	320	250	220	430	450	540	700	600	710	780	850	70	300	280	480		
	d ₃₁ ×1012C/N	150	-130	-110	230	230	260	-350	280	360	-350	420			-120	200		
机械品质因数 Mechanical quality factor	Q _m	1000	1000	1000	90	90	80	60	80	70	60	60	2500	70	100	500		
频率常数 Frequency constant	f _r ·d kHz·mm	2300	2300	2300	2000	2000	1900	1900	1900	1900	180C	1800		2100	2300	2200		
	f _r ·t kHz·mm	2000	2000	2000	2250	2250		2000		2000				2100	2100			
温度系数 Temperature coefficient	TKfr / /ppm/°C -20℃~80℃	100	100	100	100	150	200	260	300	260	400	400	30	250	100	120		
	TKCT / /ppm/°C (-20℃~80℃)	1500	1500	1500	2000	1800	3000	4500	4000	4000	6000	6000		1500	1500	2500		
居里温度 Curie temperature	T _c °C	330	340	320	325	355	280	220	230	210	180	175	450	380	320	230		
介质损耗(弱场) Dielectric loss	tgo(%)	0.4	0.3	0.3	2	2	1.5	1.8	2.3	1.8	2.6	2.6	0.7	1.5	1.2	0.5		
介质损耗(强场) Dielectric loss	tgo(%) (400V/mm)	1.0	1.0	0.7														

名称	主要用途
Electrical Data	Main Applications
P4	P-679 高稳定大功率发射材料 High stable and high power emission
P8	P-669 高稳定大功率发射材料 High stable and high power emission
	P-689 高稳定大功率超声波焊接 High stable and high power ultrasonic welding
P5A	P-673 高稳定电声，超声波接收与发射 The transmission and reception of high stable electroacoustic and ultrasonic
	P-668 高稳定电声，超声波接收与发射 The transmission and reception of high stable electroacoustic and ultrasonic
P5J	P-678 高稳定电声，超声波接收与发射 The transmission and reception of high stable electroacoustic and ultrasonic
P5H	P-660 低温烧结材料，用于多层烧结各类致动器 Material sintered in low temperature; applied in various multi-layer sintered actuators
	P-672 电声，超声波接收与发射 The transmission and reception of electroacoustic and ultrasonic
	P-690 电声，超声波接收与发射 The transmission and reception of electroacoustic and ultrasonic
P5X	P-666 大应变材料，用于单/双晶片，压电发电等 Large strain material; applied in single chip /bimorph piezoelectric power generation
	P-676 大应变材料，用于单/双晶片，压电发电等 Large strain material; applied in single chip/bimorph piezoelectric power generation
PT	P-667 高居里温度材料，用于高温涡街流量计 Material with high Curie temperature for high temperature vortex flowmeter
	P-662 高居里温度材料，用于中高温涡街流量计 Material with high Curie temperature for medium, high temperature vortex flowmeter
	P-659 超声探伤材料 Flaw detector
	P-664 大功率发射与接收，用于水声换能器 High power transmission and reception; applied in the underwater acoustic sensor

其它用途和特殊形状的元素可商谈。
Other applications and special shapes of components can be negotiated.

用于教学、科研、实验的单价产品也可以制作。
Products for the use of teaching, research, experiment can also be produced.

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