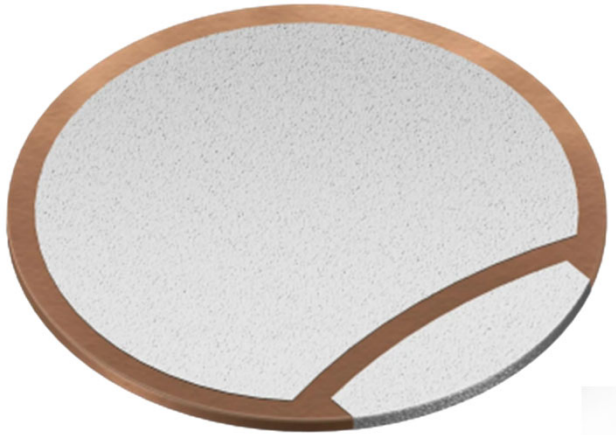
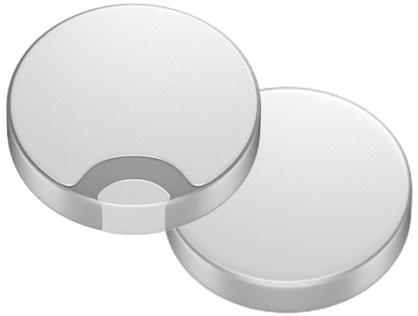
Ultrasonic Sensors (USS) Disks

For:

- Industrial automation & Industry 4.0
- Automotive ADAS & smart mobility
- Medical diagnostics
- Smart infrastructure & flow metering





TDK Electronics AG
PPD PI AE/IE

June 2026

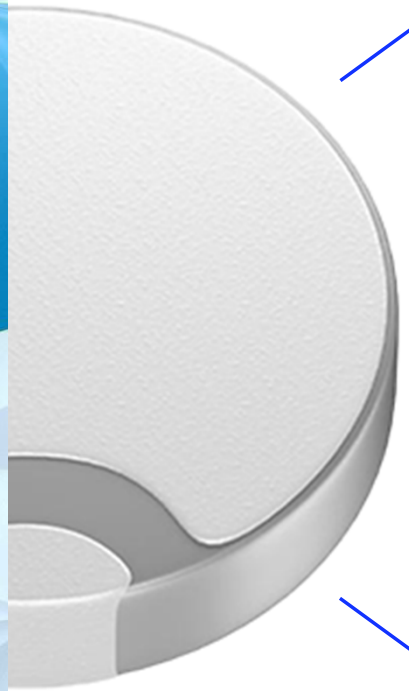
TDK is a global leader in piezoelectric ultrasonic sensors, delivering end-to-end expertise across the entire value chain.



TDK In Everything, Better

TDK's Leadership in Ultrasonic Sensor Disk Technology





- End-to-end in-house expertise with full traceability and in consistent quality

Customer-specific designs & development

- Technical support throughout the design process
- Radial or thickness (fully printed or wrap-around)
- Tape casting or dry pressing
- Lead-free versions (under request)
- Transducers or modules (under request)

- 9-digits annual production capacity

Reliable, Cost-Effective Non-Contact Sensing



Ultrasonic Sensors (USS) Disks

- Reliable performance in harsh environments

Effective in dust, dirt, fog, smoke, and moisture (transducer).

- Wide material detection

Detects clear glass, liquid surfaces, black plastics, and mirror finishes with equal precision.

- Cost-effective & versatile

Low-cost, compact designs in multiple shapes for easy integration.

- Non-contact measurement

Detects objects, measure distance, or sense levels without physical contact. Ideal for fragile, sterile, or moving objects

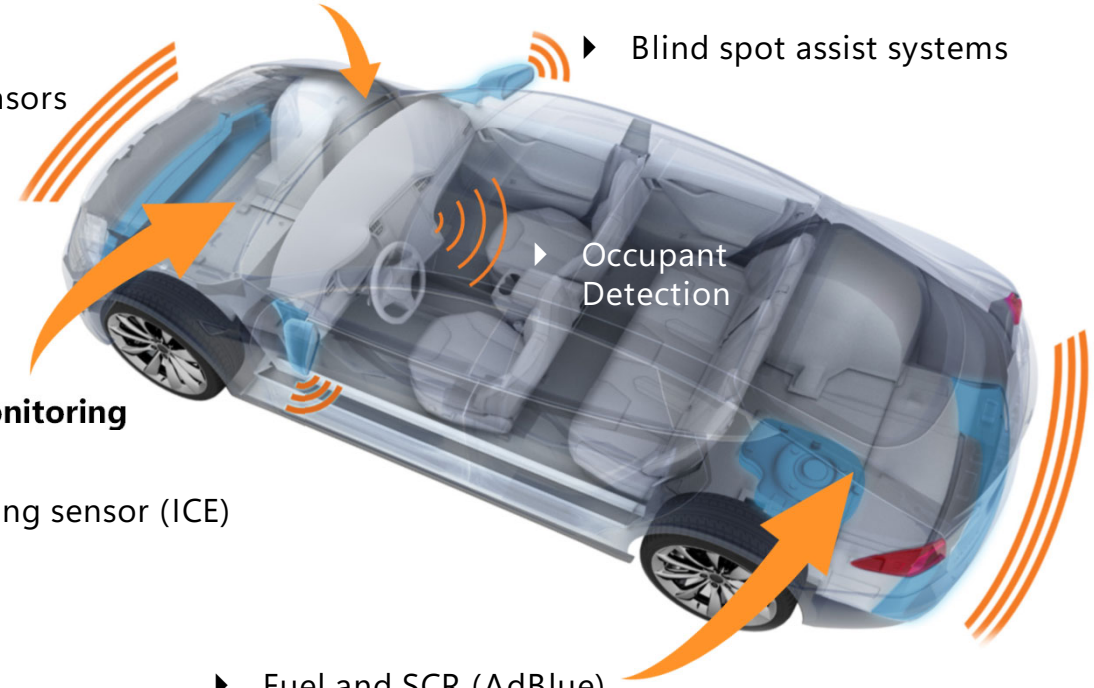
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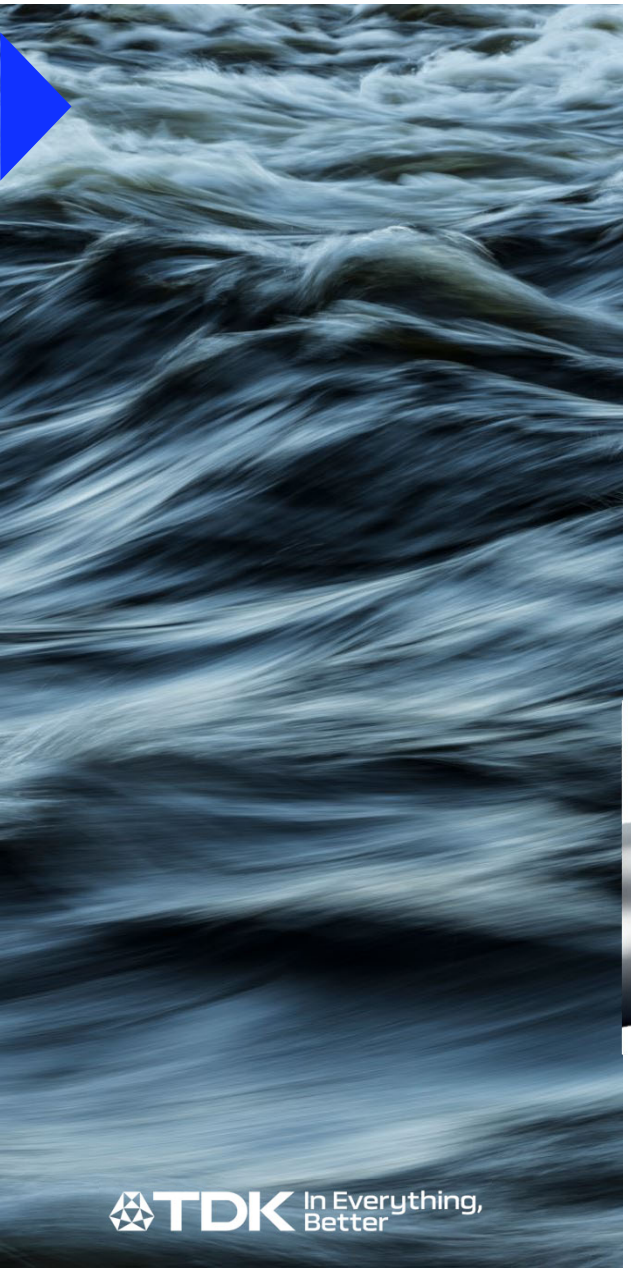
USS in Automotive Applications

USS enables further features for driver assistance and autonomous driving

- Windshield washer fluid monitoring
- Blind spot assist systems
- Parking sensors
- Occupant Detection
- Oil-level monitoring
- Needle closing sensor (ICE)
- Fuel and SCR (AdBlue) level sensing



Production certified to automotive standard (IATF 16949)



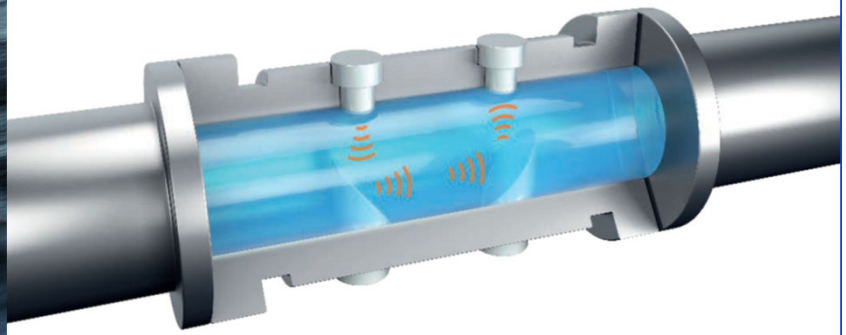
USS for Smart Flow Metering & Level Sensing

Contactless metering/sensing for the industry

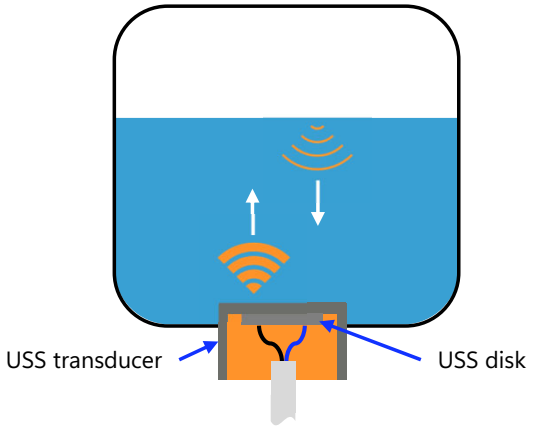
Accurate, maintenance-free, and unaffected by color, transparency, or contamination, making the USS ideal for smart and robust fluid management systems.

Flow metering

USS measure flow by comparing sound wave travel times upstream and downstream.
Fluid velocity alters the signal, enabling precise, non-contact flow measurement.



Level sensing



The ultrasonic waves travel through the liquid and reflect off boundaries. Changes in the received signal indicate the liquid level.
The same disk functions as both transmitter and receiver.

Working Principle

- Ultrasonic sensor disks are ceramic disks which are using the piezoelectric effect to emit and to detect inaudible sound waves. This property can be used in gases and liquids for various applications like obstacle detection, distance measuring, flow metering, and level sensing.
- By measuring the time-of-flight t of an acoustic wave packet and at the known speed of sound in the respective medium cmedium, the travelled distance x can be calculated as x = t/2•cmedium. This principle can be used for obstacle detection or distance measurement, where the wave packet is reflected by a target object.

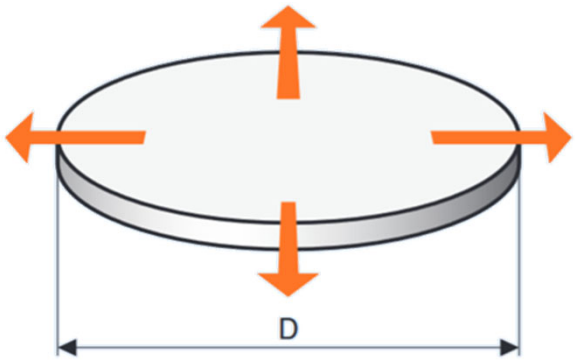


Dynamic Behavior of Free Disk Resonance Modes: Radial & Thickness

- A single disk can vibrate in two primary direction – radial and thickness. Its motion characteristics determine its utilization.

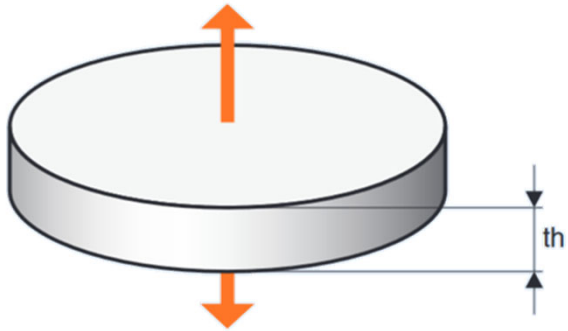
Due to frequency-dependent sound absorption in air, ultrasonic frequencies used in air applications must be significantly lower than those used in liquids.

Radial mode



The disk vibrates radially, expanding and contracting along its diameter.
Vibrations occur over a longer path, resulting in lower resonant frequencies (kHz).

Thickness mode



The disk vibrates vertically, expanding and contracting along its thickness.
Vibrations occur over a short path, resulting in higher resonant frequencies (MHz).

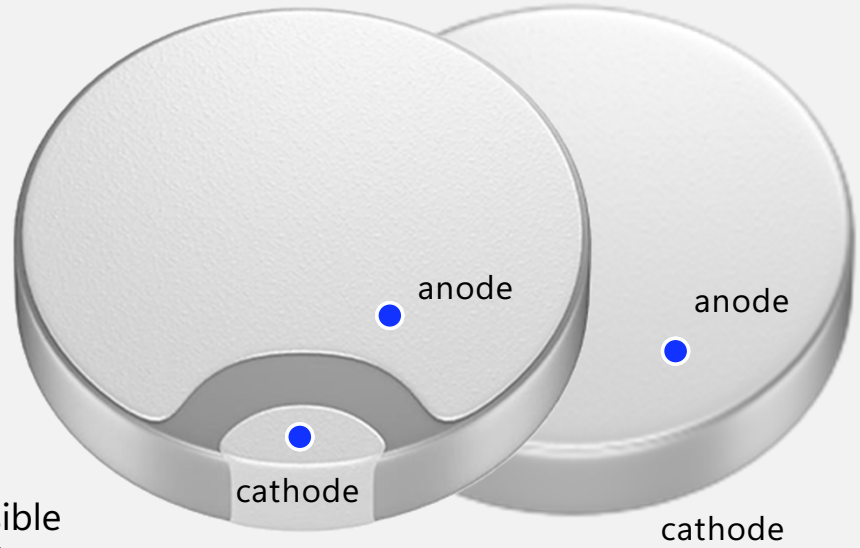
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Metallization Options

Fully printed

Electrodes are positioned on opposite sides of the disk

- Higher signal strength and more cost-effective
- Screen printed, or sputtered metallization



Wrap around

Both electrodes are accessible from one side of the disk for contacting

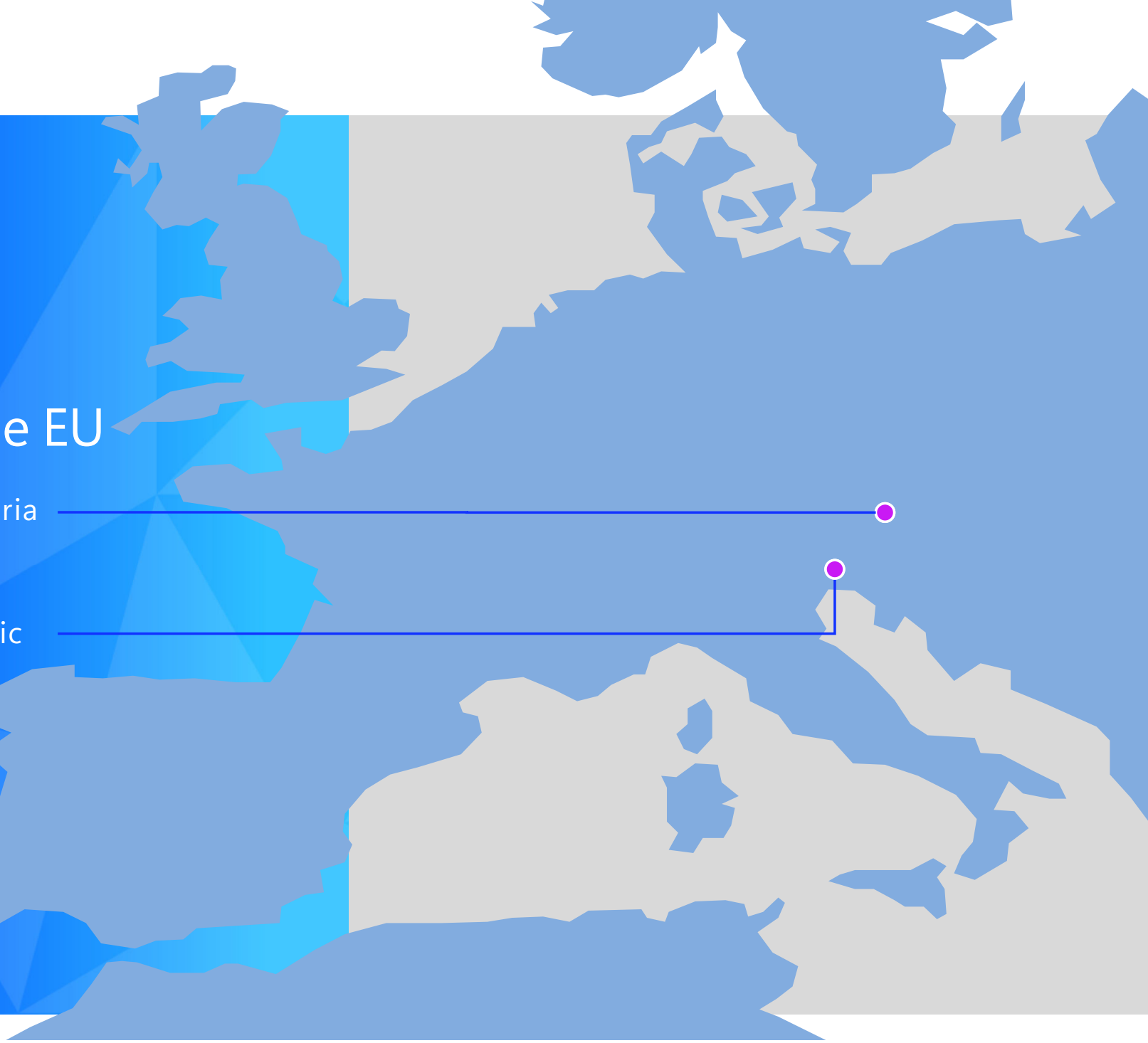
- Sputtered metallization only

- Screen printed for welding, bonding, or soldering
- Sputtered metallization for glueing, clamping

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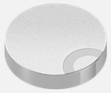
Full In-house Production in the EU

- Deutschlandsberg, Austria
  - Powder production
  - Tape casting
- Šumperk, Czech Republic
  - Pressing
  - Sintering
  - Metallization
  - Poling
  - Electric inspection
  - AOI
  - Outgoing inspection



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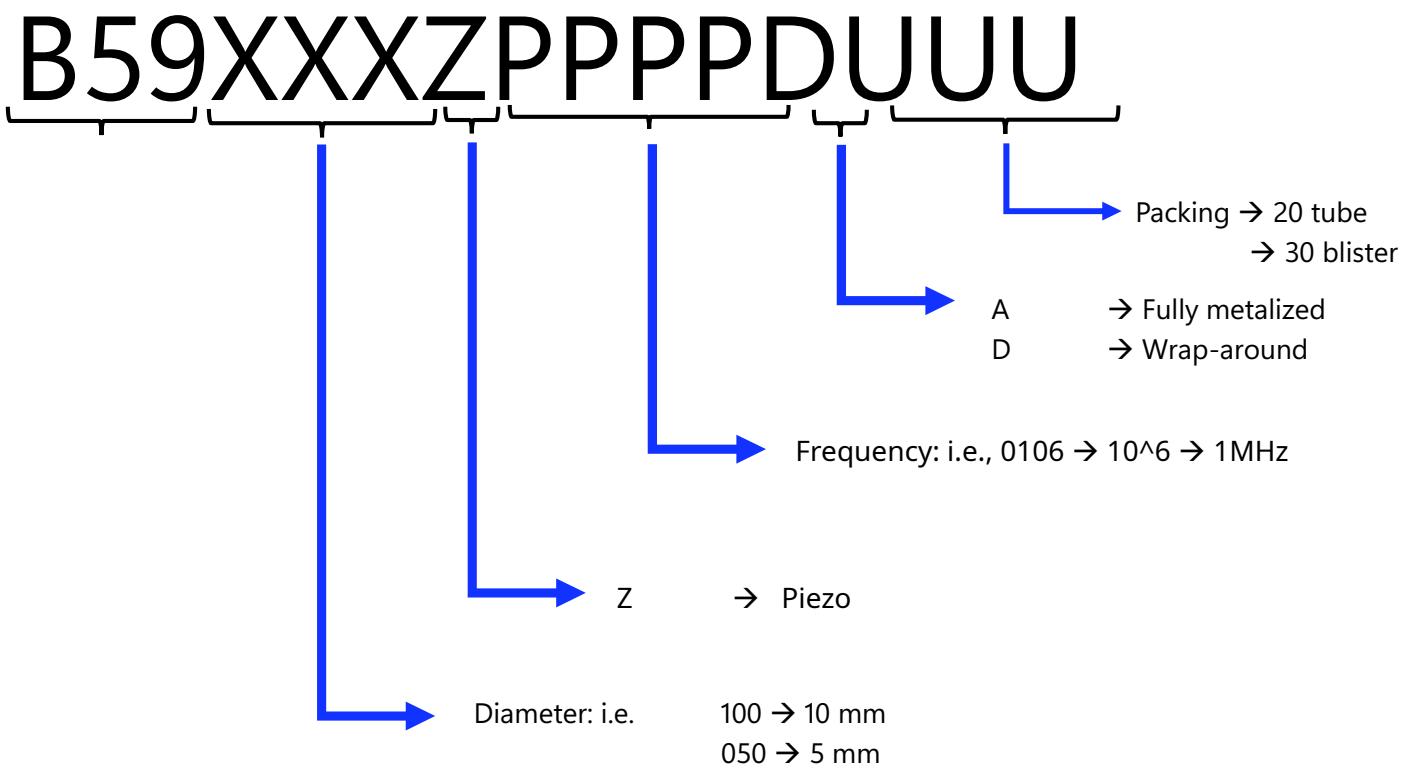
Standard Portfolio

	Diameter	Thickness	Serial resonance	Part no.
	Ø 5 mm	1.02 mm	2000 kHz	B59050Z0206A030
	Ø 10 mm	1.0 mm 2.0 mm	2000 kHz 1000 kHz	B59100Z0206D030 B59100Z0106D030
	Ø 7 mm	0.195 mm	285 kHz	B59070Z0285D120
	Ø 5 mm	0.2 mm	400 kHz	B59050Z0405D030
	Ø 5 – 15 mm	0.15 – 4 mm	125 – 2500 kHz	on request

https://product.tdk.com/en/search/sensor/ultrasonic/sensor-disk/list#psts%5B%5D=0&psts%5B%5D=-20&psts%5B%5D=-10&_l=20&_p=1&_c=part_no-&_d=0

- For custom designs: piezo@tdk.com

Ordering Code Reading



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Additional Information

- Application note: Ultrasonic Sensor Disks - Application Notes
- Product Brief: Ultrasonic Sensors
- Solution Guides, Smart Meter Solutions: Sensor Solutions for Highly Accurate and Reliable Flow Measurement in Smart Meters | Application Note | Tech Library | TDK Product Center
- Website: Product catalog: Ultrasonic sensor disks | TDK Electronics - TDK Europe
- Ultrasonic sensor module – Product catalog | TDK Electronics - TDK Europe
- SmartSonic™ | TDK InvenSense

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TDK Complete Portfolio for Ultrasonic Sensors

Ultrasonic Sensors

TDK offers Ultrasonic ToF (Time-of-Flight) sensors and Ultrasonic Sensor Disks.
TDK's ultrasonic ToF (Time-of-Flight) sensors utilize a tiny ultrasonic transducer chip to send out an ultrasonic pulse, and then listen for echoes returning from targets in the sensor's field-of-view.
These ToF sensors are intended for consumer electronics, AR/VR, robotics, drones, IoT, automotive, and industrial market segments.
Ultrasonic sensors disks are ceramic disks, which are using the piezoelectric effect to emit and to detect inaudible sound waves.
The portfolio covers ultrasonic sensor disks with radial and thickness oscillation mode as well as with the option of wrap around metallization.



- https://product.tdk.com/en/products/sensor/ultrasonic/index.html

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