Product Catalogue

SAW COMPONENTS Dresden GmbH

Frieder Birkholz
Manfred-von-Ardenne-Ring 7
01099 Dresden
Germany

www.sawcomponents.de

E-Mail: support@sawcomponents.de

Tel.: +49 351 88725-10

Content

Product Catalogue **1**
Content **2**
Introduction **4**
System Components **5**
Select your Reader **6**
Legend **7**
Reader **8**
SAW INDUSTRY 9
SAW ECO+ 11
Software **12**
SAW IDENT 13
SAW TEMP 14
SAW Transponders **15**
High Temperature Transponder 16
Ultra High Temperature Transponder 17
Hot Surface Transponder 18
Medium Temperature Transponder 19
Universal Transponder 20
Neckband Transponder 21
Cow Earmark Transponder 22
SAW Access Transponders 23
Sensor Modules **24**
Overview: Temperature Sensors **25**
Your Custom Sensor 27
SAW Cable Temperature Sensor 28
Wireless Temperature Spit 29
Universal Temperature Sensor Module 31
Nail Sensor 32
Flexible Temperature Sensor 33
M4 Miniature Temperature Sensor Screw 34
Short Range Temperature Sensor for Rotating Applications 35
Antennas **36**
Universal Antenna 8 dBi 37
Universal Antenna 5 dBi 38
Universal Antenna 16 / 20 dBi 39
High Temperature Slot Antenna 40
High Temperature Horn Antenna 41
Strip Line Antenna 42
Antenna Accessories 43
Sensor Elements **44**
Overview: Sensor Elements **45**
SS43XFB2 46

SS43XFB3 47
SS43XFB4 48
SS43XFO2 49
SS43XFO4 50
SS24*xx*BB2 51
SS24XXBB3 52
SS2XXXAB3 53
SS24XXBO3 54

Introduction

SAW Sensor Systems provide a sophisticated sensing technology for challenging requirements. The robust and reliable sensors are fit for harshest environments and high temperatures in industrial applications.

The service and support for all industrial components is guaranteed for at least 5 years. Combining high precision and long lifetime with passive and wireless sensing, SAW Sensor Systems enable continuous process control and efficiency.

Systems

- temperature sensing
- - 180°C - +350°C
- accuracy +/- 1K

- wireless
- range up to 10 m
- passive

- aging: 0.3K / 1000h
- lifetime: min. 1000h
- at Tmax

- RFID / identification
- up to 700°C
- up to 64 bit code

- wireless
- up to 15 m
- passive

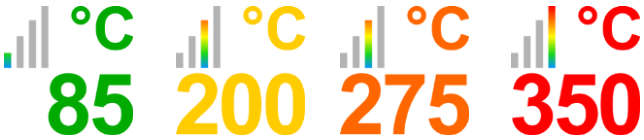
- lifetime: min. 1000h
- at Tmax

Frequency Band

ISM 2.4 — ISM Band 2.4 GHz (2400 – 2483 MHz)

ISM 433 — ISM Band 433 MHz (433,05 – 434,79 MHz)

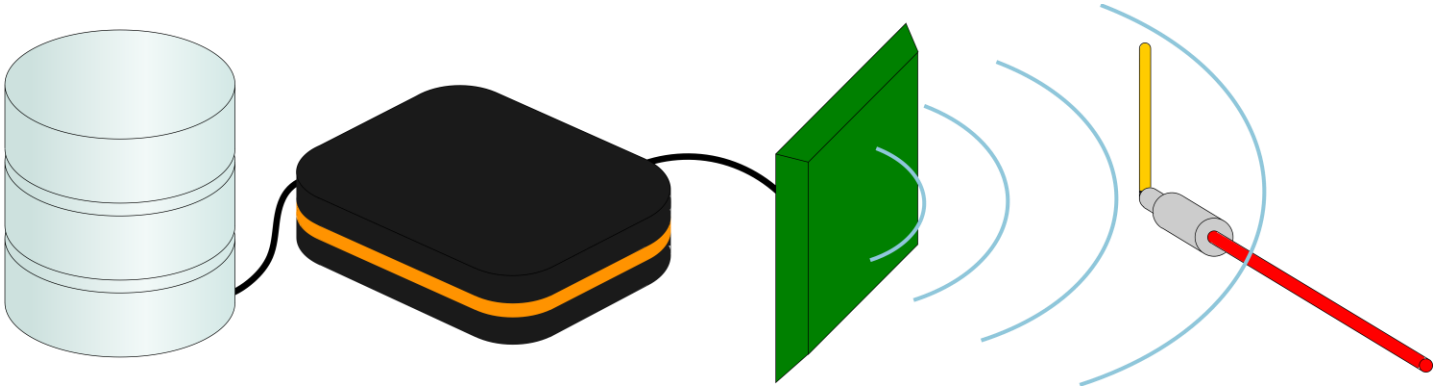
Operating Temperature



Maximum operating temperature of a device is displayed by this symbol in each datasheet.

System Components

Every SAW System contains of these basic elements:



Customer IT	SAW Reader	Reading Antenna	Sensor Antenna	Sensor Module
SAW Systems can be connected to a broad variety of customer systems.	SAW Reader interrogate the wireless sensors and transponders. They provide the measurement results at the interface.	The Reading Antenna is connected to the reading unit by antenna cable. It is the stationary part of the wireless interrogation.	The Sensor Antenna is part of the sensor module. It can be inside of the sensor module or a separate position and connected by antenna cable.	The sensor module includes the SAW sensor and, in case of integrated antennas, the sensor antenna. It is available as standard part and custom part for your application.
• SPS • Server • Computer • …	Interfaces: • Ethernet • WIFI • 0-10 V • 4-20 mA • Webserver	Antennas for: • high temperature • rotating applications • long range • short range	• Separate Antenna • Integrated Antenna	• SAW Temperature Sensor • SAW Strain Sensor • SAW Transponder

Please see the specific section in the catalogue to find the device for your application.

Please contact us for custom sensors, antennas and readers.

www.sawcomponents.de

Select your Reader

Below please find a brief overview about the major features of all SAW readers. The detailed datasheets and descriptions are listed on the following pages.

	ECO+	INDUSTRY	HYBRID
SAW IDENT	●	●	●
SAW TEMP	○	●	○
# of Antennas	2	2 / 4	4
Read Rate (Hz)	10	10	75
Ethernet	●	●	●
Analog Output	-	●	●
Protection Class	IP 40	IP 65	IP 20

Legend:

- ● Feature integrated in reader (stand alone, no PC necessary)
- ○ Feature available on PC software (PC necessary)
- \- Feature not available

Legend

Dimensions	all dimensions are given in the following format, unless otherwise stated: Width x Length x Height

Reader

SAW INDUSTRY

The SAW Reader

ISM 2.4

Order Number:	INDUSxxxxx
Antenna:	2x external (SMA female)
optional:	4x external (N female)
Frequency Band:	2400 – 2483 MHz (ISM)
Interface:	LAN Trigger (in/out) WIFI (5 GHz)
Sampling Rate:	up to 10 Hz
Frequency Accuracy:	± 3 ppm
CPU Speed:	Dual Core 1.60 GHz
RAM:	2GB RAM
Hard Disk:	32 GB SSD
Dimensions:	198 mm x 127 mm x 47 mm
Weight:	770g (900g with optional interfaces)
Power:	100-240 V AC power supply 15 V DC, 4.3 A (4.8 W)
Protection Class:	IP65
Assembly:	stand alone mounting plate (e.g. cap rail)
Operating Temp.:	0°C – 40°C
SAW Systems:	SAW IDENT SAW TEMP SAW STRAIN

Options
SAW INDUSTRY

Useful Add-Ons for the industrial application

4 Antenna Ports

Extent the number of antennas for your reader to 4 robust N-connectors.

The 2x SMA connectors get replaced by an additional stack with 4x N connectors.

N connectors provide best robustness for harsh industrial environments.

SAW ECO+

The SAW IDENT Reader

ISM 2.4

Order Number:	ECO0006
Antenna:	2x external (N female)
Frequency Band:	2400 – 2483 MHz (ISM)
Interface:	LAN
Sampling Rate:	up to 10 Hz
Frequency Accuracy:	± 3 ppm
Dimensions:	200 mm x 127 mm x 45 mm
Weight:	550g
Power:	8-36V, 1A, typ. 24V DC
Protection Class:	IP40
Assembly:	stand alone, mounting angle (e.g. cap rail)
Operating Temp.:	0°C - 40°C
SAW Systems:	SAW IDENT

<u>Optional Features:</u>

SAW TEMP available on PC:

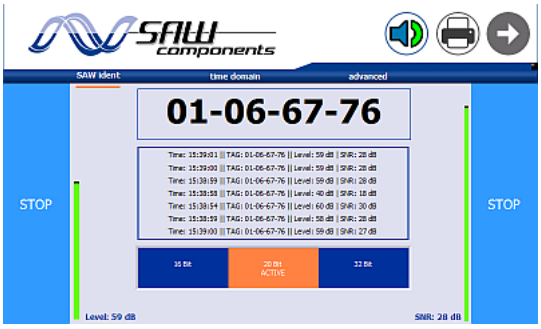
- Reader used as PC-connected reader (not stand alone)
- with SAW Wireless Systems software installed on PC

Software

SAW IDENT

Module for the RFID with SAW

Features



- reader control and setup
- display transponder code
- logging of the identification data
- output to interfaces
- acoustic reading signal

Stand Alone - Reader

- reader setup via SAW IDENT Module
- remote control of reader via Ethernet (TCP/IP protocol) by customer software
- datagramm

PC connected Reader: system requirements

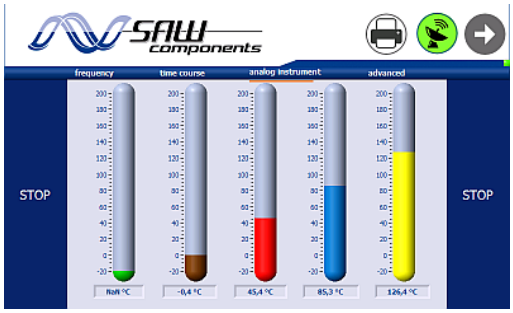
- operating system: min. Windows XP / 7
- CPU: min. Dual-Core 1.60GHz
- RAM: 2 GB
- Hard Disk: 1 GB

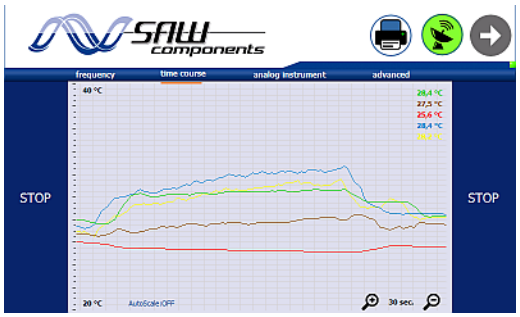
SAW TEMP

Module for the Wireless Temperature Measurement

Features

- reader control and setup
- graphic user interface
  - analoge instruments
  - flexible time domain-presentation
- logging of measurement values
- output to interfaces





For Stand Alone - Reader

- reader setup via SAW TEMP Module
- remote control of reader via Ethernet (TCP/IP protocol) by customer software
- datagramm

PC connected Reader: system requirements

- operating system: Windows XP / 7
- CPU: min. Dual-Core 1.60GHz
- RAM: 2 GB
- Hard Disk: 1 GB

SAW Transponders

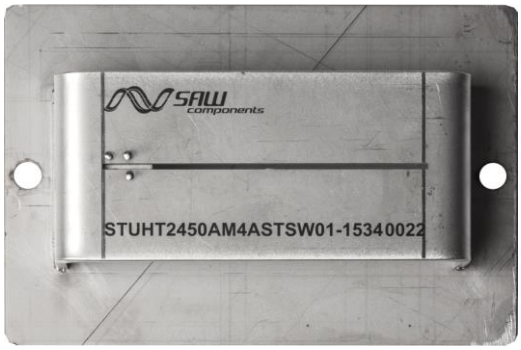
High Temperature Transponder

STHT2450B

°C 200

ISM 2.4

Order Number:	STHT2450B
Code:	SAW Code 16 Bit
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna Gain:	9 dBi
Polarity:	linear
Use on Metal:	yes
Operating Temp.:	-40°C - 200°C
Dimensions:	96 x 65 x 23 mm
Material:	Stainless Steel
Protection:	IP 67
Weight:	157g
Assembly:	screwing (M6) welding



(Image may differ from original product)

The High Temperature Transponders STHT2450B is a full-passive state-of-the-art transponder for logistic applications in hot environments like the steel industry or painting lines. The robust steel design provides a high reading range and a great resistivity against dust and mechanical influences.

Features and Applications:

- container and material tracking in high temperature environments
- ladle tracking
- painting lines

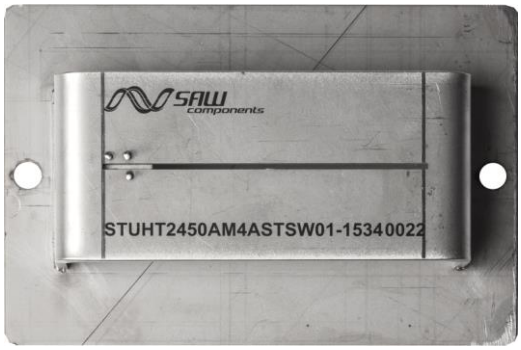
Ultra High Temperature Transponder

STUHT2450A

°C 350

ISM 2.4

Order Number:	STUHT2450A
Code:	SAW Code 16 Bit
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna Gain:	9 dBi
Polarity:	linear
Use on Metal:	yes
Operating Temp.:	-40°C - +350°C
Dimensions:	96 x 65 x 23 mm
Material:	Stainless Steel
Protection:	IP 67
Weight:	157g
Assembly:	screwing (M6) welding



The High Temperature Transponders STUHT2450A is a full-passive state-of-the-art transponders for logistic applications in very hot environments like the steel industry or painting lines. The robust steel design provides a high reading range and a great resistivity against dust and mechanical influences.

Features and Applications:

- container and material tracking in high temperature environments
- ladle tracking
- painting lines

Hot Surface Transponder

STUHT2450-S

°C 350 °C 700 ISM 2.4

Order Number:	STUHT2450-S
Code:	SAW Code 16 Bit
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna Gain:	9 dBi
Polarity:	linear
Use on Metal:	yes
Operating Temp.:	
at Transponder	-40°C - +350°C
Object Surface	-40°C - +700°C
Dimensions:	110 x 72 x 36 mm
Material:	Stainless Steel
	Calcium Silicate
Protection:	IP 67
Weight:	215g
Assembly:	welding

Application Notice:
This transponder is capable to be used on hot surfaces under the condition that the surrounding air temperature provides sufficient cooling that the chip-location on the transponder remains at <350°C. **This transponder is NOT suited for use in environmental (air) temperatures above 350°C!**

Features and Applications:

- tracking of containers and material with particularly hot surfaces
- tracking of Beam Blanks, Billets or Castings

Medium Temperature Transponder

°C 165

ISM 2.4

STMT2450HF1APTPL01

Order Number:	STMT2450HF1APTPL01
Code:	SAW Code 16 Bit
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna Gain:	6 dBi
Polarity:	RCP
Use on Metal:	yes
Operating Temp.:	-40°C - +165°C
Dimensions:	26 mm diameter x 8 mm height
Material:	PX 234HT
Protection:	IP 67
Weight:	9.3g
Assembly:	gluing

Features and Applications:

- logistics
- asset tracking

This transponder can be mounted flush to a metal surface.

Universal Transponder

STUT2450

°C 120

ISM 2.4

Order Number:	STUT2450
Code:	SAW Code 16 Bit SAW Code 20 Bit
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna Gain:	4 dBi
Polarity:	linear
Use on Metal:	yes
Operating Temp.: Type STUT2450	-40°C - +120°C
Dimensions:	49.5 mm x 36.5 mm x 13 mm
Material:	PX 223HT
Protection:	IP 67
Weight:	30g
Assembly: optional:	gluing, magnetic assembling mounting plate

Features and Applications:

- logistics
- asset tracking

The STUT2450 is the standard SAW Transponder for logistic application with a robust plastic packaging.

Neckband Transponder

STCNT2450 (agriculture)

°C 85

ISM 2.4

Order Number:	STCNT2450
Code:	SAW Code 16 Bit SAW Code 20 Bit
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna Gain:	5 dBi
Polarity:	linear
Use on Metal:	yes
Operating Temp.:	-40°C - +85°C
Dimensions:	59 mm x 52 mm x 27 mm
Material:	PX 223HT
Protection:	IP 67
Weight:	49g
Assembly:	on animal neckband

Features and Applications:

- compatible with standard animal neckbands
- animal identification and location in the agriculture

The STCNT2450 is the special version of the STUT2450 for use on neckbands in the agriculture.

Cow Earmark Transponder

STCET2450

°C
85

ISM
2.4

Order Number:	STCET2450
Code:	SAW Code 16 Bit SAW Code 20 Bit SAW Code 50 Bit
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna Gain:	0 dBi
Polarity:	circular
Use on Metal:	no
Operating Temp.:	-40°C - +85°C
Dimensions:	Ø 29.5 mm x H 17 mm
Material:	TPU
Protection:	IP 67
Weight:	6.5 g
Assembly:	with standard earmark applicator

The STCET2450 is a special SAW Transponder for the use in agriculture. It uses a standard earmark packaging and can be applied with all typical earmark applicators. The Transponder provides the great reading range (ca. 2-3 m) of the passive SAW IDENT technology for the agriculture, improving reading distance and reliability on gates, stations and during manual selection.

Features and Applications:

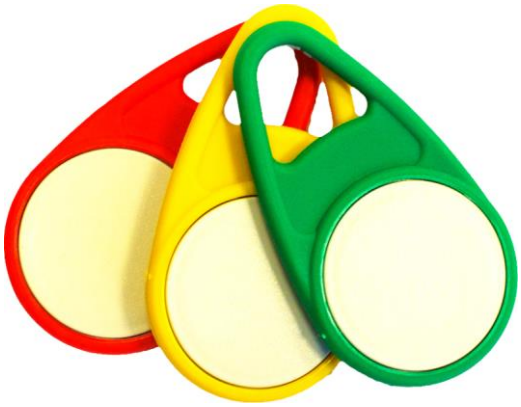
- 10x reading distance compared to standard LF/HF transponders
- fully passive (no battery)
- fully compatible to usual earmark applicators
- for animal identification according to international animal identification laws

SAW Access Transponders

°C 85

ISM 2.4

STT2450 (Token)
STC2450 (Card)



Order Number:	
Token	STT2450
Card	STC2450
Code:	SAW Code 16 Bit SAW Code 20 Bit
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna Gain:	0 dBi
Polarity:	circular
Use on Metal:	no
Operating Temp.:	-40°C - +85°C
Dimensions:	
STT2450	32 mm x 57 mm x 4 mm
STC2450	86 mm x 54 mm x 2.5 mm
Material:	
STT2450	ABS top, polyamide casing
STC2450	
Protection:	IP 54
Weight:	
STT2450	
STC2450	8.5 g

The SAW Access Transponders allow contact-free access control using passive SAW IDENT technology. The reading distance is significantly larger than with LF/HF transponders, combining the range of infrared door openers with the access control function of RFID.

Features and Applications:

- 10x reading distance compared to standard LF/HF transponders
- fully passive (no battery)
- for hands-free access

Sensor Modules

Overview: Temperature Sensors

SAW COMPONENTS provides a broad range of SAW Sensor Elements. Choose the element which meets the needs of your application.

Temperature Range

The temperature range of a sensor or sensor module is indicated by the number in the product name:

Type:	Tmax:
FB2	200°C
FB3	275°C
FB4	350°C

Package

The package of the sensor is indicated by the last letter in the product name:

FB2
SMD 3x3 mm

FO2
TO25 2.5 mm

FM4
TO39 10 mm

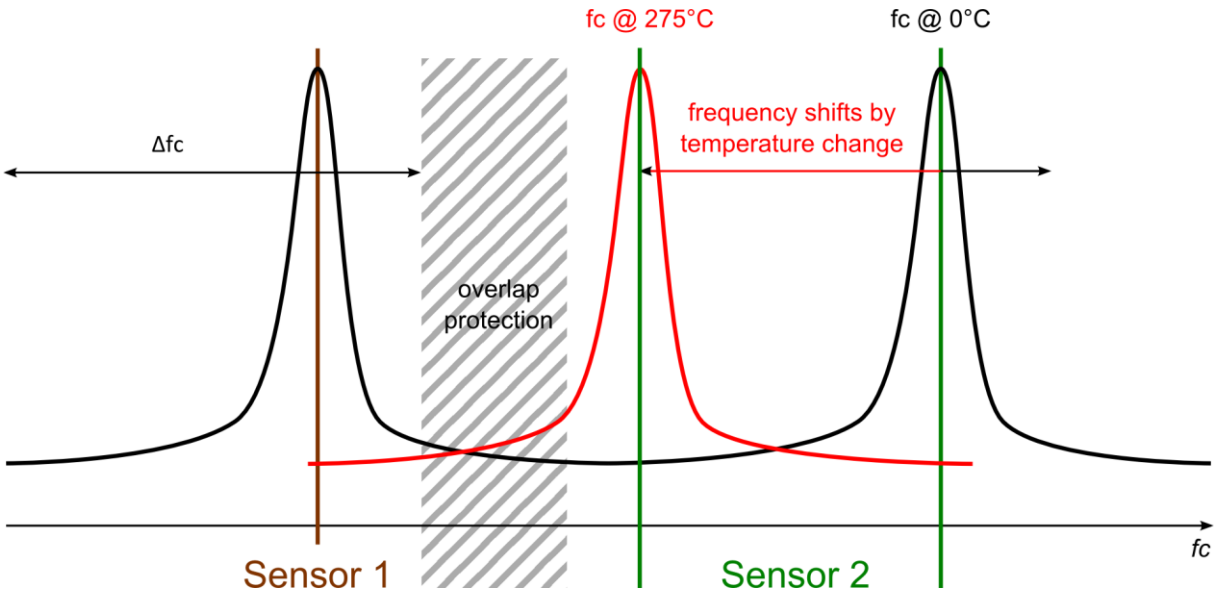
Available Sensor Types: Temperature Sensors

Type	Band	Measurement R.	Package	Number of FQ
SS43*x*FB2	ISM 433 MHz	-40°C – 200°C	SMD 3x3 mm²	4
SS43*x*FB3	ISM 433 MHz	-40°C – 275°C	SMD 3x3 mm²	4
SS43*x*FB4	ISM 433 MHz	-40°C – 350°C	SMD 3x3 mm²	4
SS43*x*FO2	ISM 433 MHz	-40°C – 200°C	TO25 2.5mm	3
SS43*x*FO4	ISM 433 MHz	-40°C – 350°C	TO25 2.5mm	3
SS24*xx*BB2	ISM 2.4 GHz	-40°C – 200°C	SMD 3x3 mm²	18
SS24*xx*BB3	ISM 2.4 GHz	-40°C – 275°C	SMD 3x3 mm²	18
SS2*xxx*AB3	ISM 2.4 GHz	0°C – 275°C	SMD 3x3 mm²	20
SS24*xx*BO2	ISM 2.4 GHz	-40°C – 200°C	TO25 2.5mm	19

Number of Sensors

SAW Sensors based on the **resonator principle** shift their centre frequency (fc) over the temperature. The frequency is measured by the reader and the resulting temperature is calculated from this frequency.

It is possible to use several sensors simultaneously in the ISM band. The sensors are distinguished and identified by the nominal frequency [see "nominal frequencies" in the sensor section]. To avoid an overlap of sensors, which would result in the loss of assignability of the sensor data, there is a frequency gap between each sensor:



The number of sensors that can be used simultaneously without leaving the restrictions of the ISM bands depend two factors: **Measuring Range (MR)** and **Temperature Difference between the Measuring Points (ΔT)**. See the following table for typical values in the ISM Band 2.4 GHz (2400 MHz – 2483 MHz):

	Measurement Range				
ΔT	**0 – 50°C**	**0 – 100°C**	**0 – 200°C**	**-40 – 200°C**	**-40 – 275°C**
10 K	20	18	12	12	7
50 K	12	10	6	5	3
100 K		7	4	4	2
200 K			3	3	2

Note: Above description only applies for SAW sensors using resonator principle. For delay line sensors, the information does not apply.

Your Custom Sensor

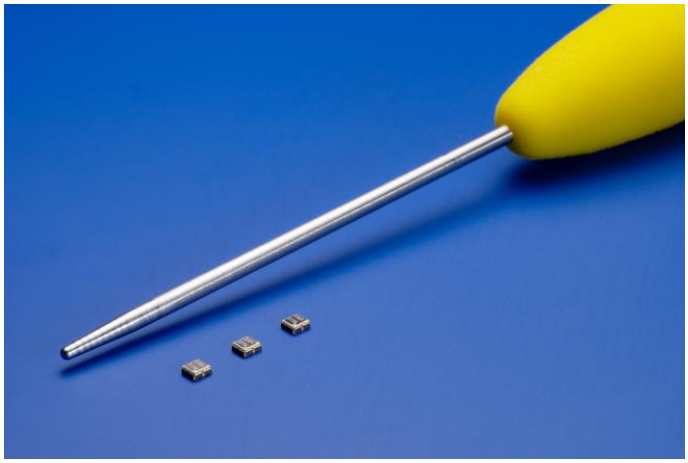
°C 85 | °C 200 | °C 275 | °C 350

ISM 433 | ISM 2.4

Your machine needs a measurement in a spot that is difficult to access? The moving part is cramped and only small space available?

We support you with the custom-made sensor that perfectly fits to your application in size, performance and cost. Choose from the broad variety of sensor elements, antennas and casings.

Contact us via
www.sawcomponents.com



SAW Cable Temperature Sensor

°C 200 °C 275 ISM 2.4

Order Number:
Type 200°C SCS24*xx*BB20SM
Type 275°C SCS24*xx*BB30SM

Sensor Type: Resonator
Frequency Band: 2400 – 2483 MHz (ISM)
Antenna: SMA-, N-connector or antenna (on request)

Operating Temp.:
Type SCS24XXBB2
at Sensor: -40°C – 200°C
at Connector: -40°C – 160°C

Type SCS24XXBB3
at Sensor: -40°C – 275°C
at Connector: -40°C – 160°C

Dimensions: sensing head: Ø 4.00 mm x L 15.00 mm
cable length: on request
Material: Stainless Steel, Ceramic, Kapton
Protection Class: IP 64

Assembly: on request

The SAW Cable Sensor is a small SAW sensor with a separated antenna. This allows the temperature measurement in conditions, where the sensor and the antenna have to be separated.

Features and Applications:

- applications with separated measurement point and antenna mount
- use in vacuum

Wireless Temperature Spit

°C 200 °C 275 ISM 2.4

Order Number:

Type 200°C with connector:	WTSB24*xx*BB2RSF
Type 275°C with connector:	WTSB24xxBB3RSF
Type 275°C with slot antenna:	WTSC24*xx*BB3ASTSW05

Sensor Type:	Resonator
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna:	R-SMA connector

Operating Temp.:

Type WTSB24XXBB2	
at Sensor:	-40°C – 200°C
at Connector:	-40°C – 160°C
Type WTSB24XXBB3	
at Sensor:	-40°C – 275°C
at Connector:	-40°C – 160°C
Type WTSC24XXBB3:	-40°C – 275°C

Dimensions:	sensing head: 165 mm x 15 mm / Ø 4.00 mm (tip) sensor length: on request
Material:	V2A: ALSI 304 / 1.4301
Protection Class:	IP 67

Assembly:

Type WTS B	Use WTS-E1 and WTS-AM1
Type WTS C	Threat G¼ 20.30mm (length)

Customization Options:

- spit length on request
- 1-axis pliable
- fixed antenna APTSW01 5 dBi (WTS C)

WTS C WTS B

The Wireless Temperature Spit is screwed into the M10 connection flange (WTS-E1) and can be removed from a tube without pressure shutdown. The Wireless Temperature Spit can be customized to applications.

Features and Applications:

- temperature measurement in tubes with fitting
- wireless sensing head
- use miscellaneous antennas

Accessories:

WTS-AM1

Function:	solder fitting, access to tube, screw in WTS-E1
Dimensions:	Ø 17 mm x H 18 mm
Material:	brass
Weight:	20 g
Assembly:	hard-soldering on tube flat drill 6 mm hole

WTS-E1

WTS-E1

Function:	metering point, screw in WTS-AM1 holds Wireless Tube Spit
Dimensions:	W 19 mm x H 52 mm
Material:	stainless steel 1.4571 clamp collar: peek
Weight:	52 g
Pressure:	40 bar
Buckling load:	max. 5kg
Assembly:	screw in WTS-AM1 wrench size: 19

WTS-AM1

Universal Temperature Sensor Module

°C 200

ISM 2.4

Order Number:	SM24xxBB20SF
Sensor Type:	Resonator
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna:	SMA
Operating Temp.:	
at Sensor:	-40°C – 200°C
at Connector:	-40°C – 160°C
Dimensions:	Ø 25 mm x H 19.50 mm
Material:	Stainless Steel
Protection Class:	IP 67
Assembly:	Screwing (M3) hole distance: 16mm Welding, Gluing Mounting on Clamp

The Universal Sensor Module is a small SAW sensor for the use in all kind of application, including switch gears, tubes (with additional clamp ring) or tools. Equipped with a robust SMA connector it can be equipped with different types of 2.4 GHz antennas, to provide optimal reading signals for each application.

Features and Applications:

- use miscellaneous antenna
- for switch gears

Nail Sensor

°C 200

ISM 2.4

Order Number: SNS24xxBB2APTPL

Sensor Type: Resonator
Frequency Band: 2400 – 2483 MHz (ISM)
Antenna: Patch

Operating Temp.:
at Sensor: -40°C – 200°C
at Antenna: -40°C – 165°C

Dimensions:
Antenna: 18x18x4mm
Sensor: Ø 4 mm x L 35 mm
(length customizable)

Material: Stainless Steel, Ceramic
Protection Class: IP 64

Assembly: fix in 4mm hole (i.e. glueing)

The Nail Sensor is the newest member of small SAW temperature sensors with integrated antennas for monitoring temperature inside of tools, batteries and all kinds objects. The module is fully encapsulated for the use in dirty and harsh environments. The small antenna allows a reading distance of about 50cm with standard antennas.

Features and Applications:

- small size
- fully encapsulated

Flexible Temperature Sensor

°C 200

ISM 2.4

Order Number: SFS24XXBB2APTAB01

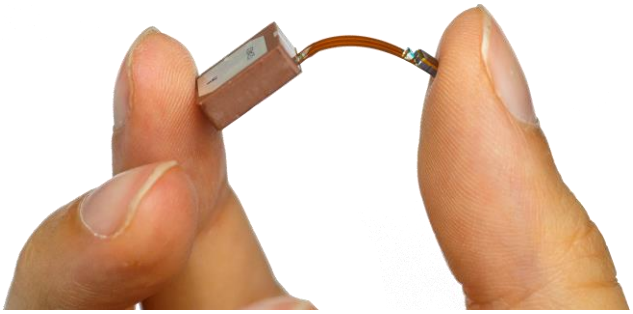
Sensor Type: Resonator
Frequency Band: 2400 – 2483 MHz (ISM)
Antenna: Patch

Operating Temp.:
at Sensor: -40°C – 200°C
at Antenna: -40°C – 165°C

Dimensions:
Antenna: 18x18x4mm
Sensor: 3x3x2mm
(length customizable)

Material: flexible PCB
Protection Class: IP40

Assembly: on demand



(Flexible Sensor embedded by additive manufacturing)

The Flexible Sensor is perfectly suited for the integration of the temperature sensor even in the narrowest space and crooked corners. The flexible connection between sensor and antenna can bend around corners and be used also with additive manufacturing processes of printed parts. The small but powerful patch antenna allows great signal quality in machines for rotating and moving parts.

Features and Applications:

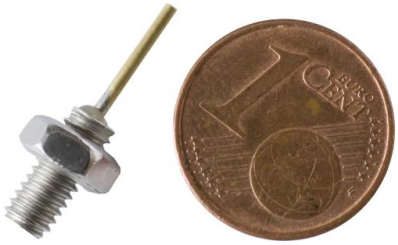
- small sensor size
- flexible bending of the connecting line

M4 Miniature Temperature Sensor Screw

°C 200

ISM 2.4

Order Number:	SSS0424*xx*BO2AMPSW01
Sensor Type:	Resonator
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna Gain:	0 dBi
Operating Temp.:	-40°C – 200°C
Dimensions:	sensing head: M4 screw x H 10 mm antenna: 36mm (dep. on range) wrench size: 7 mm
Material:	Stainless Steel, Brass
Protection Class:	IP 67
Assembly:	Screwing (M4), wrench size: 7 mm



The M4 Miniature Sensor Screw is the smallest SAW temperature sensor ever created. Its special low weight construction is especially suitable for applications on vibrating parts, e.g. fuel pumps.

Features and Applications:

- short range temperature monitoring
- vibrating objects (engines, ...)

Short Range Temperature Sensor for Rotating Applications

°C 200

ISM 2.4

Order Number:

Type AB3*	SES2*xxx*AB3ASLSW02
Type BB3	SES2*xxx*BB3ASLSW02

Sensor Type:	Resonator
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna Gain:	-3 dBi

Operating Temp.:

Type SES2XXXAB3*	0°C – 275°C
Type SES24XXBB3	-40°C – 275°C

Dimensions:	Ø 25mm
Material:	Stainless Steel, Rogers
Protection:	IP 67
Assembly:	Screwing (M2), Cavity

*) diff. temperature coefficient of frequency (TCF)

The Short Range Temperature Sensor Module is a special temperature sensor for applications which require a flush construction, with no supernatant. The sensor can be let-in flush into any surface, even in metal surfaces. The construction allows operation under extreme G-forces up to 16’000 g.

Features and Applications:

- maximum centrifugal force: 16’000 g
- short range temperature monitoring
- zero construction height
- use on rotating objects
- engines, turbines, sealings

Antennas

°C 85

ISM 2.4

Universal Antenna 8 dBi

Order Number:	AFPHS01LCP080850SM
Antenna Type:	Sencity Antenna
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna Gain:	8.5 dBi
3dB Beam Angle:	70°
Polarity:	left circular
Operating Temp.:	-40°C - +85°C
Dimensions:	95 mm x 101 mm x 32 mm
Material:	ASA
Protection:	IP 54
Connector:	SMA
Assembly:	screwing, mounting plate

The universal 8 dBi antenna is the standard 2.4 GHz reading antenna for many applications that have no increased requirements in environmental conditions or reading distance, e.g. production logistics or assembly lines. The 8 dBi gain provides a reading distance of 1-3 meters with many types of SAW IDENT transponders and SAW Sensors (depending on transponder/sensor antenna).

Features and Applications:

- best price-performance ratio
- easy to handle
- for medium range reading
- RFID stations

Universal Antenna 5 dBi

°C 85

ISM 2.4

Order Number:	APTSW020LP050850SF
Antenna Type:	Patch
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna Gain:	5 dBi
3dB Beam Angle:	???
Polarity:	linear
Operating Temp.:	-40°C - +85°C
Dimensions:	80 mm x 80 mm x 9 mm
Material:	???
Protection:	IP 67
Connector:	SMA
Assembly:	screwing, mounting plate

The universal 5 dBi antenna is the standard 2.4 GHz reading antenna for many applications. It is fully encapsulated to operate also in dirty environments. With its 5 dBi gain and open arc it provides a reading distance of 1-2 meters and is easy in handling with many types of SAW IDENT transponders and SAW Sensors (depending on transponder/sensor antenna).

Features and Applications:

- best price-performance ratio
- easy to handle
- for medium range reading
- for dirty environments

Universal Antenna 16 / 20 dBi

°C 85

ISM 2.4

AFPSC 16 dBi
AFPSC 20 dBi

Order Number:
Type 16 dBi: AFPSC010LP160850NF
Type 20 dBi: AFPSC010LP200850NF

Antenna Type: Flat Panel Antenna
Frequency Band: 2400 – 2483 MHz (ISM)
Antenna Gain: 16 dBi / 20 dBi
3 dB Beam Angle: 28° / ??
Polarity: linear

Operating Temp.: -40°C - +85°C

Dimensions:
Type 16 dBi: 205 mm x 205 mm x 45 mm
Type 20 dBi: 350 mm x 350 mm x 30 mm

Material: PVC, Aluminium
Protection: IP 54

Connector: N, female
Assembly: screwing, mounting plate

The universal 16 dBi antenna is a standard 2.4 GHz reading antenna for applications that have no increased requirements in environmental conditions but require a high reading distance. The 16 dBi gain provides a reading distance of 5-8 meters with many types of SAW IDENT transponders and SAW Sensors.

Features and Applications:

- cost efficient
- for high range reading

High Temperature Slot Antenna

°C 275 °C 350

ISM 2.4

ASTSW02 8 dBi
ASTSW03 10 dBi

Order Number:	
Type 8 dBi	ASTSW080LP082600NF
Type 10 dBi	ASTSW030LP102600NF
Antenna Type:	Slot Antenna
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna Gain:	8 dBi / 10 dBi
Polarity:	linear
Operating Temp.:	-40°C - +260°C (optional 350°C)
Dimensions:	
Type 8 dBi	130 mm x 40 mm x 30 mm
Type 10 dBi	165 mm x 165 mm x 30 mm
Material:	stainless steel Kapton (optional also stainless steel)
Protection:	IP 67
Connector:	N, female
Assembly:	screwing (M5)

The High Temperature Slot Antenna is the standard reading antenna for all applications that have harsh environmental conditions, like temperatures up to 260°C or even 350°C. It provides enhanced reading distance for many applications, e.g. production ovens and heaters. The 350°C-version can be used in high vacuum conditions.

Features and Applications:

- for high temperature environments
- steel industry, production ovens, heaters, vacuum chambers.

High Temperature Horn Antenna

°C 275 °C 350

ISM 2.4

AHOSW01 17 dBi

Order Number:	AHOSW010LP172750NF
Antenna Type:	Horn Antenna
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna Gain:	17 dBi
Polarity:	linear
Operating Temp.:	-40°C - +275°C (optional 350°C)
Dimensions:	305 mm x 305 mm x 320 mm
Material:	stainless steel (V2A)
Protection:	IP 67
Connector:	N, female
Assembly:	screwing (M5)

The High Temperature Horn Antenna is a special high-range antenna for very harsh environments. It is especially built to work in conditions with a high level of dust or dirt and temperature. It combines a robust design with a very high antenna gain of 17 dBi for high reading distances up to 10 meters with many types of SAW sensors and SAW transponders.

Features and Applications:

- for high temperature environments
- for harsh conditions like dirt, spray water
- steel industry, production ovens, heaters; also vacuum chambers

Strip Line Antenna

Ring / Ring Segment Strip Line Antenna

°C 275 °C 350 °C 200 ISM 2.4

Order Number:	on request
Antenna Type:	Strip Line Antenna
Frequency Band:	2400 – 2483 MHz (ISM)
Antenna Gain:	0 dBi
Polarity:	linear
Operating Temp.:	depending on application
Dimensions:	depending on application
Material:	depending on application
Protection:	depending on application
Connector:	SMA / N
Assembly:	depending on application

The Strip Line Antenna is available for rotating applications like shafts and axles run at high rotating speeds. The antenna is customized to the requirements of the application like diameter, available building space and temperature.

Features and Applications:

- diameter customized for application
- different temperature ranges available
- for rotating objects like shafts, axles, etc.
- can be run at all rotation speeds (> 0 rpm)

Full ring

Ring Segment

Antenna Accessories

Antenna Cables and Connectors

All antennas can be equipped with different types of cables. Cables will be made up with the connectors in the desired length.

Cable	Tmax [°C]	Cover Material	Ø [mm]	Bending-Rad. [mm]	Flexible	Connector		Attenuation [dB / m]
						SMA	N	
ARCL7	85	PVC	7.30	25.00	•		•	0.3
RG142	165	FEP	4.95	30.00 (static)	•	•	•	0.8
KPTN1	260	Kapton	2.40	18.00	•	•	•	4.0
TCX01	600	Stainless Steel	3.00	9.00		•	•	2.6

ARCL7

KPTN1

RG142

TXC01

SAW TEMP

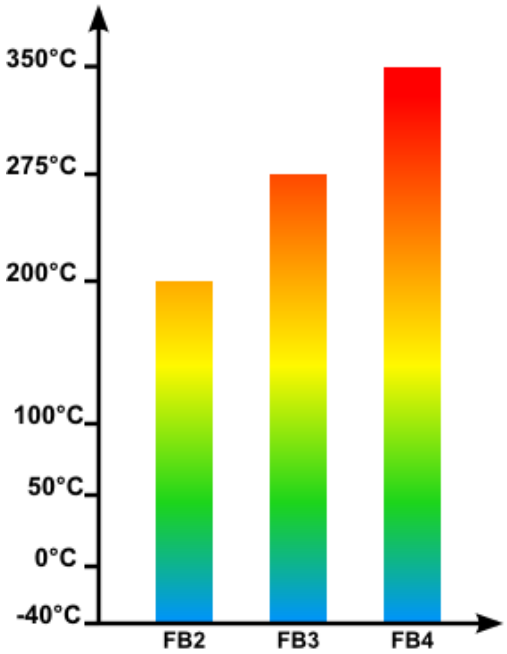
Sensor Elements

Overview: Sensor Elements

SAW COMPONENTS provides a broad range of SAW Sensor Elements. Choose the element which meets the needs of your application.

1. Choose from 3 temperature ranges:

Type:	Tmax:
FB2	200°C
FB3	275°C
FB4	350°C



2. Choose from 2 licence free ISM bands:

ISM 433 — ISM Band 433 MHz
433.05 MHz – 434.79 MHz

ISM 2.4 — ISM Band 2.4 GHz
2400 MHz – 2483 MHz

3. Choose package:

Type	Package:
FB	SMD 3x3mm² ceramic
FO	TO25 2.5mm metal
FM	TO39 10mm metal

FB **FO** **FM**

Type	Band	Temperature R.	Package	Number of FQ
SS43xFB2	ISM 433 MHz	-40°C – 200°C	SMD 3x3 mm²	4
SS43xFB3	ISM 433 MHz	-40°C – 275°C	SMD 3x3 mm²	4
SS43xFB4	ISM 433 MHz	-40°C – 350°C	SMD 3x3 mm²	4
SS43xFO2	ISM 433 MHz	-40°C – 200°C	TO25 2.5mm	3
SS43xFO4	ISM 433 MHz	-40°C – 350°C	TO25 2.5mm	3
SS24xxBB2	ISM 2.4 GHz	-40°C – 200°C	SMD 3x3 mm²	18
SS24xxBB3	ISM 2.4 GHz	-40°C – 275°C	SMD 3x3 mm²	18
SS2xxxAB3	ISM 2.4 GHz	0°C – 275°C	SMD 3x3 mm²	20
SS24xxAO2	ISM 2.4 GHz	0°C – 275°C	TO25 2.5mm	20
SS24xxBO2	ISM 2.4 GHz	-40°C – 200°C	TO25 2.5mm	19
SS24xxAO3	ISM 2.4 GHz	0°C – 275°C	TO25 2.5mm	20
SS24xxBO3	ISM 2.4 GHz	-40°C – 275°C	TO25 2.5mm	19

SS43XFB2

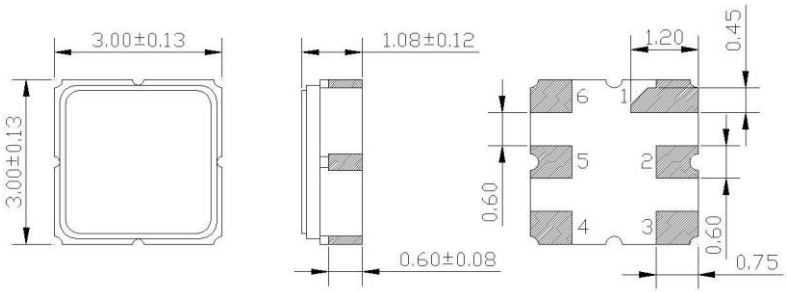
433 MHz - SAW Sensor for 200°C

SAW Sensor for the ISM 433 MHz-Band do NOT operate with the ISM 2.4 GHz-Band system components in this catalogue.

Sensor Type:	Resonator
Operating Temp.:	-40°C – 200°C

Order Number	**nominal Frequency**	**Tolerance**
SS433FB2	433.560 MHz	± 15 kHz
SS434FB2	434.350 MHz	± 15 kHz
SS435FB2	435.740 MHz	± 15 kHz
SS436FB2	437.030 MHz	± 15 kHz

Sensitivity:	15 kHz / K
Aging (Tmax):	0.3 K / 1000 h @ 200°C
Package	SMD 3x3mm²



All dimensions in mm

Pin 1	Case ground	Pin 6	to be grounded
Pin 2	Antenna (Input / Output)	Pin 5	to be grounded
Pin 3	to be grounded	Pin 4	Case ground

Features and Applications:

- temperature measurement probes
- food industry
- environments without line-of-sight between antennas

Important Note: SAW Sensor for the ISM 433 MHz-Band do **NOT** operate with the ISM 2.4 GHz-Band system components in this catalogue.

SS43XFB3

433 MHz - SAW Sensor for 275°C

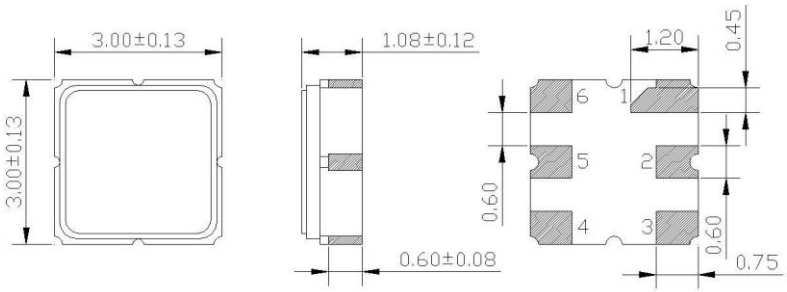
SAW Sensor for the ISM 433 MHz-Band do NOT operate with the ISM 2.4 GHz-Band system components in this catalogue.

Sensor Type:	Resonator
Operating Temp.:	-40°C – 275°C

Order Number	**nominal Frequency**	**Tolerance**
SS433FB3	433.560 MHz	± 15 kHz
SS434FB3	434.350 MHz	± 15 kHz
SS435FB3	435.740 MHz	± 15 kHz
SS436FB3	437.030 MHz	± 15 kHz

(Image may differ from original product)

Sensitivity:	15 kHz / K
Aging (Tmax):	-0.3 K / 1000 h @ 275°C
Package	SMD 3x3mm²



All dimensions in mm

Pin 1	Case ground	Pin 6	to be grounded
Pin 2	Antenna (Input / Output)	Pin 5	to be grounded
Pin 3	to be grounded	Pin 4	Case ground

Features and Applications:

- temperature measurement probes
- food industry
- environments without line-of-sight between antennas

Important Note: SAW Sensor for the ISM 433 MHz-Band do **NOT** operate with the ISM 2.4 GHz-Band system components in this catalogue.

SS43XFB4

433 MHz - SAW Sensor for 350°C

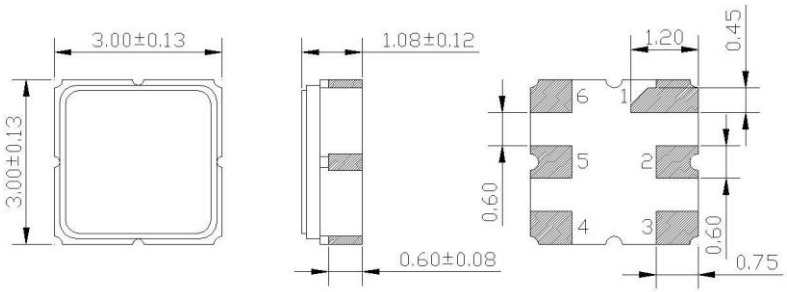
SAW Sensor for the ISM 433 MHz-Band do NOT operate with the ISM 2.4 GHz-Band system components in this catalogue.

Sensor Type:	Resonator
Operating Temp.:	-40°C – 350°C

Order Number	**nominal Frequency**	**Tolerance**
SS433FB4	433.560 MHz	± 15 kHz
SS434FB4	434.350 MHz	± 15 kHz
SS435FB4	435.740 MHz	± 15 kHz
SS436FB4	437.030 MHz	± 15 kHz

(Image may differ from original product)

Sensitivity:	15 kHz / K
Aging (Tmax):	-0.3 K / 1000 h @ 350°C
Package	SMD 3x3mm²



All dimensions in mm

Pin 1	Case ground	Pin 6	to be grounded
Pin 2	Antenna (Input / Output)	Pin 5	to be grounded
Pin 3	to be grounded	Pin 4	Case ground

Features and Applications:

- temperature measurement probes
- process monitoring
- environments without line-of-sight between antennas

Important Note: SAW Sensor for the ISM 433 MHz-Band do **NOT** operate with the ISM 2.4 GHz-Band system components in this catalogue.

SS43XFO2

The smallest 433 MHz - SAW Sensor for 200°C

SAW Sensor for the ISM 433 MHz-Band do NOT operate with the ISM 2.4 GHz-Band system components in this catalogue.

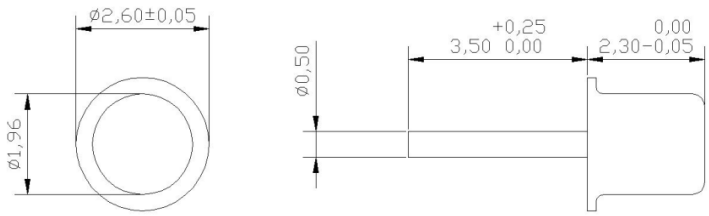
Sensor Type:	Resonator
Operating Temp.:	-40°C – 200°C

Order Number	**nominal Frequency**	**Tolerance**
SS434FO2	434.290 MHz	± 15 kHz
SS435FO2	435.265 MHz	± 15 kHz
SS436FO2	436.580 MHz	± 15 kHz

Sensitivity:	15 kHz / K
Aging (Tmax):	-0.8 K / 1000 h @ 200°C
Package	TO25 2.5mm metal package

Features and Applications:

- temperature measurement probes
- food probes
- PT100 replacement
- environments without line-of-sight between antennas



All dimensions in mm

Pin 1	Antenna (Input / Output)
Cap	to be grounded

Important Note: SAW Sensor for the ISM 433 MHz-Band do **NOT** operate with the ISM 2.4 GHz-Band system components in this catalogue.

SS43XFO4

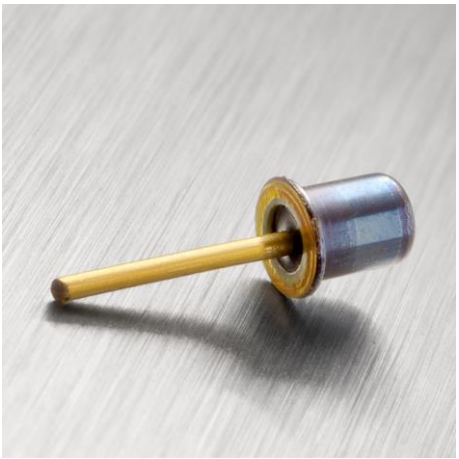
The smallest 433 MHz - SAW Sensor for 350°C

SAW Sensor for the ISM 433 MHz-Band do <u>NOT</u> operate with the ISM 2.4 GHz-Band system components in this catalogue.

Sensor Type:	Resonator
Operating Temp.:	-40°C – 350°C

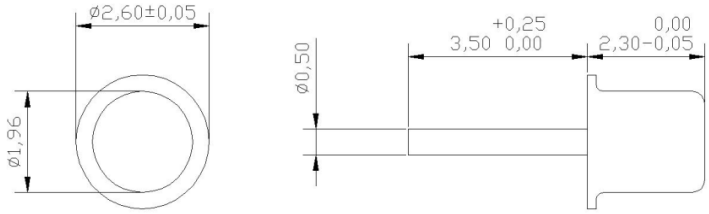
Order Number	**nominal Frequency**	**Tolerance**
SS434FO4	434.280 MHz	± 15 kHz
SS435FO4	435.285 MHz	± 15 kHz
SS436FO4	436.610 MHz	± 15 kHz

Sensitivity:	15 kHz / K
Aging (Tmax):	+2.0 K / 1000 h @ 350°C
Package	TO25 2.5mm metal package



Features and Applications:

- temperature measurement probes
- food probes
- process monitoring
- PT1000 replacement
- environments without line-of-sight between antennas



All dimensions in mm

Pin 1	Antenna (Input / Output)
Cap	to be grounded

Important Note: SAW Sensor for the ISM 433 MHz-Band do **<u>NOT</u>** operate with the ISM 2.4 GHz-Band system components in this catalogue.

SS24*xx*BB2

2.45 GHz - SAW Sensor for 200°C

°C 200

ISM 2.4

Sensor Type: Resonator
Operating Temp.: -40°C – 200°C

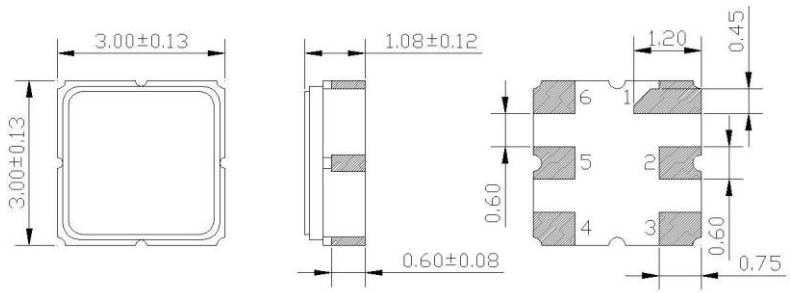
Order Number	nominal Frequency	Tolerance
SS2414BB2	2415.770 MHz	+/- 700 KHz
SS2417BB2	2417.820 MHz	+/- 700 KHz
SS2422BB2	2423.000 MHz	+/- 700 KHz
SS2429BB2	2430.230 MHz	+/- 700 KHz
SS2432BB2	2432.350 MHz	+/- 700 KHz
SS2437BB2	2437.470 MHz	+/- 700 KHz
SS2444BB2	2444.710 MHz	+/- 700 KHz
SS2447BB2	2446.860 MHz	+/- 700 KHz
SS2452BB2	2451.960 MHz	+/- 700 KHz
SS2459BB2	2459.220 MHz	+/- 700 KHz
SS2467BB2	2466.490 MHz	+/- 700 KHz
SS2474BB2	2473.770 MHz	+/- 700 KHz
SS2482BB2	2481.900 MHz	+/- 700 KHz

Q-Factor: 8750
Sensitivity: 66 kHz / K
Aging (Tmax): -0.5 K / 1000 h @ 200°C
Package SMD 3x3mm²

(Image may differ from original product)

Features and Applications:

- temperature measurement probes
- process monitoring
- metallic environments (chambers)



All dimensions in mm

Pin 1	Case ground
Pin 2	Antenna (Input / Output)
Pin 3	to be grounded
Pin 6	to be grounded
Pin 5	to be grounded
Pin 4	Case ground

SS24XXBB3

2.45 GHz - SAW Sensor for 275°C

°C 275

ISM 2.4

Sensor Type: Resonator
Operating Temp.: -40°C – 275°C

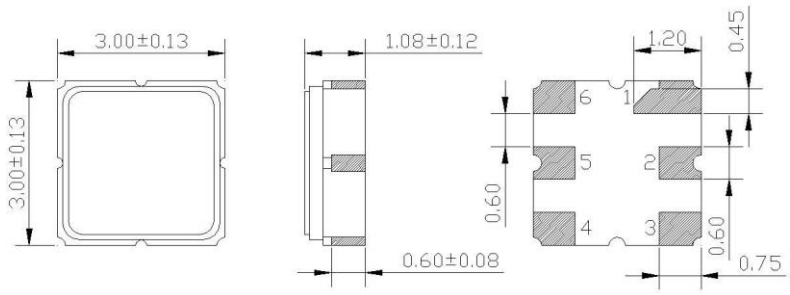
Order Number	nominal Frequency	Tolerance
SS2414BB3	2412.700 MHz	+/- 700 KHz
SS2422BB3	2420.500 MHz	+/- 700 KHz
SS2429BB3	2427.800 MHz	+/- 700 KHz
SS2437BB3	2435.000 MHz	+/- 700 KHz
SS2444BB3	2442.000 MHz	+/- 700 KHz
SS2452BB3	2449.400 MHz	+/- 700 KHz
SS2459BB3	2456.100 MHz	+/- 700 KHz
SS2467BB3	2463.500 MHz	+/- 700 KHz
SS2474BB3	2470.900 MHz	+/- 700 KHz
SS2482BB3	2478.000 MHz	+/- 700 KHz

Q-Factor: 6800
Sensitivity: 66 kHz / K @ 23°C (non-linear)
Aging (Tmax): +1.2 K / 1000 h @ 275°C
Package SMD 3x3mm²

(Image may differ from original product)

Features and Applications:

- temperature measurement probes
- process monitoring
- metallic environments (chambers)



Pin 1	Case ground
Pin 2	Antenna (Input / Output)
Pin 3	to be grounded
Pin 6	to be grounded
Pin 5	to be grounded
Pin 4	Case ground

All dimensions in mm

SS2XXXAB3

Low Sensitivity 2.45 GHz - SAW Sensor for 275°C

°C 275

ISM 2.4

Sensor Type: Resonator
Operating Temp.: 0°C – 275°C

Order Number	nominal Frequency	Tolerance
SS2398AB3	on request	
SS2412AB3	on request	
SS2417AB3	on request	
SS2422AB3	on request	
SS2426AB3	on request	
SS2429AB3	on request	
SS2432AB3	on request	
SS2437AB3	on request	
SS2441AB3	on request	
SS2444AB3	on request	
SS2447AB3	on request	
SS2453AB3	on request	
SS2457AB3	on request	
SS2459AB3	on request	
SS2462AB3	on request	
SS2467AB3	on request	
SS2472AB3	on request	
SS2474AB3	on request	
SS2477AB3	on request	
SS2481AB3	on request	

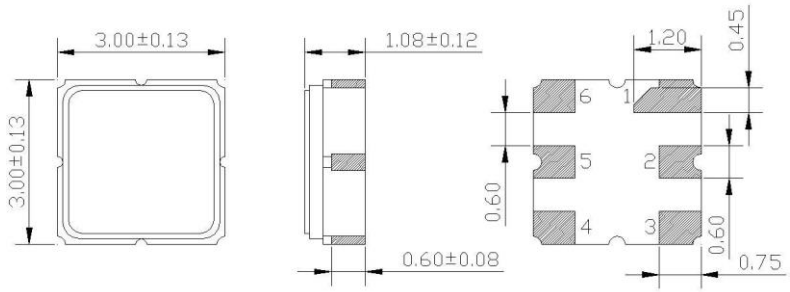
Q-Factor:
Sensitivity: 25 kHz / K @ 23°C (non-linear)
Aging (Tmax): +1.2 K / 1000 h @ 275°C
Package SMD 3x3mm²

(Image may differ from original product)

Features and Applications:

- temperature measurement probes
- process monitoring
- metallic environments (chambers)

Important Note: This sensor element may leave 2.4 GHz ISM Band Specification during operation at high temperatures.



All dimensions in mm

Pin 1	Case ground
Pin 2	Antenna (Input / Output)
Pin 3	to be grounded
Pin 6	to be grounded
Pin 5	to be grounded
Pin 4	Case ground

SS24XXBO3

2.45 GHz - SAW Sensor for 200°C

°C 200

ISM 2.4

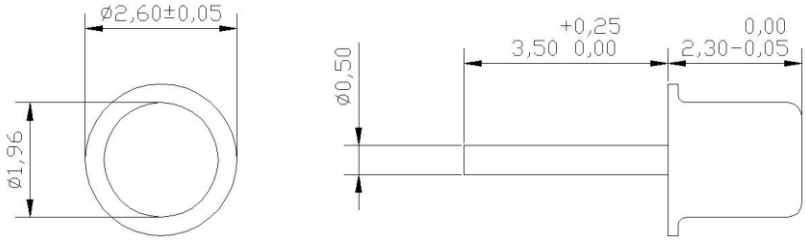
Sensor Type: Resonator
Operating Temp.: -40°C – 200°C

Order Number	nominal Frequency	Tolerance
SS2413BO3	2413.000 MHz	+/- 1000 KHz
SS2420BO3	2420.000 MHz	+/- 1000 KHz
SS2427BO3	2427.400 MHz	+/- 1000 KHz
SS2435BO3	2434.600 MHz	+/- 1000 KHz
SS2442BO3	2441.800 MHz	+/- 1000 KHz
SS2449BO3	2449.000 MHz	+/- 1000 KHz
SS2456BO3	2456.200 MHz	+/- 1000 KHz
SS2463BO3	2463.400 MHz	+/- 1000 KHz
SS2471BO3	2470.600 MHz	+/- 1000 KHz
SS2478BO3	2477.800 MHz	+/- 1000 KHz

Q-Factor:
Sensitivity: 66 kHz / K @ 23°C
Aging (Tmax):
Package TO25 2.5mm metal package

Features and Applications:

- temperature measurement probes
- very thin probes (3 mm spits possible)



All dimensions in mm

Pin 1	Antenna (Input / Output)
Cap	to be grounded