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Data Sheet iSYS-5005

Version 1.7—17.12.2021

| PRODUCT FAMILY	24GHz Movement Detection System	Movement Velocity Direction Presence Distance Angle

| APPLICATIONS | • Security Applications

• Industrial Applications | |

FEATURES:

• 3D MIMO radar operating in the 24GHz band

• Tracking of moving objects in a distance of typically 20 m

• For security and industrial applications

• Individual configuration of ignore and alarm zones

• Multi-target capability

• Includes digital signal processing to output a target or object list via UART

• Compact design 50 x 50 x 13mm

• Reference design for radome available
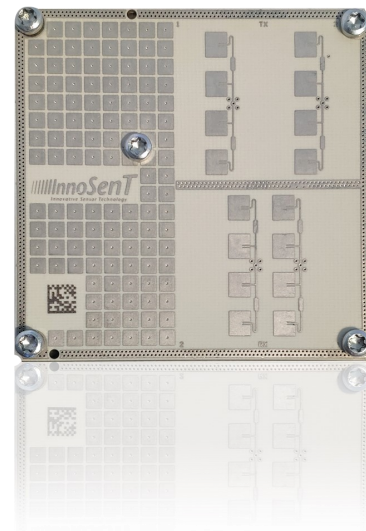
DESCRIPTION

The iSYS-5005 with intelligent µC preprocessing unit can detect and track moving objects.

The sensor detects objects in a speed range from 0.4 to 27.5 km/h. Individual programming and adjustment is easily done via the included GUI which is also available at www.innosent.de.

CERTIFICATES

InnoSenT GmbH has established and applies a quality system for: development, production and sales of radar sensors for industrial and automotive sensors. More information on our quality standards:

https://www.innosent.de/en/company/certifications/

ADDITIONAL INFORMATION

InnoSenT Standard Product. Changes will not be notified as long as there is no influence on form, fit and within this data sheet specified function of the product.

PARAMETERS

The iSYS-5005 consists of a 24 GHz Radar Front End (RFE) with a DSP Board for measurement of distance, velocity and angle of arrival. The output of the sensor is an object list (tracked data) or a target list (preprocessed radar data).

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNITS
Radar						
transmit frequencies		f_t	24.050		24.250	GHz
output power (EIRP)		P_{out}			12.7	dBm
Sensor						
detection range	depending on RCS of target	d_r	0.9	20		m
standard detection field	compare with plots on page 3	horizontal		±75		°
		vertical		±30		°
velocity range			0.4		27.5	km/h
range resolution	two targets in same direction	d_{res}		1.8		m
angular resolution	two targets in equal distance			36		°
update rate				75		msec
Power supply						
supply voltage		V_{CC}	3.8		5.5	V
supply current	$V_{CC} = 4.0\ V$	I_{CC}		330		mA
Environment						
operating temperature		T_{OP}	-40		+85	°C
storage temperature		T_{STG}	-40		+85	°C
Mechanical Outlines						
outline dimensions	compare to schematic on page 5	height length width		50.0 50.0 13.2		mm
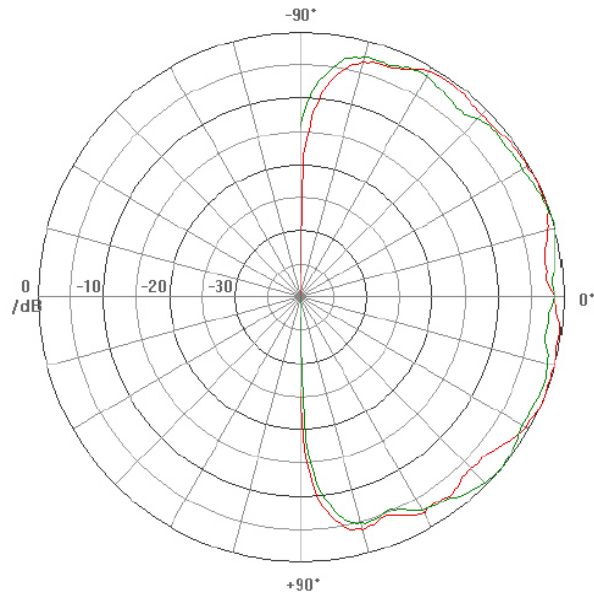
ANTENNA PATTERN

	Red graph azimuth angle	Green graph azimuth angle
TX antenna pattern	TX 1_Azimuth	TX 2_Azimuth
3 dB—Width [°]	135	137
10 dB—Width [°]	169	170
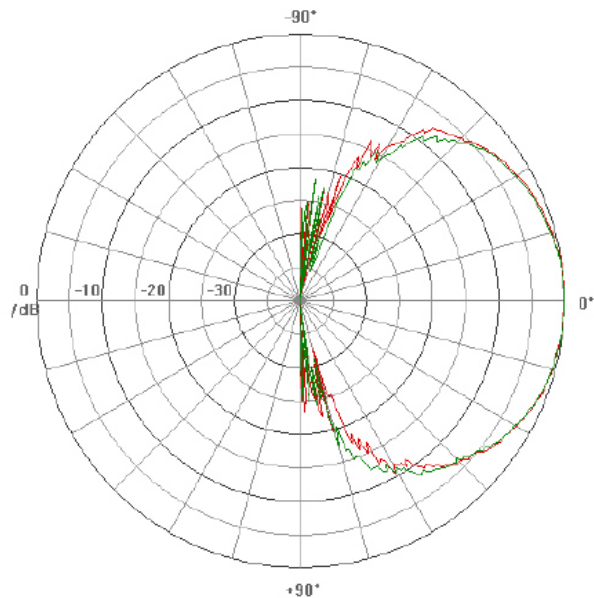
	Red graph elevation angle	Green graph elevation angle
TX antenna pattern	TX 1_Elevation	TX 2_Elevation
3 dB—Width [°]	67	66
10 dB—Width [°]	110	111

INTERFACE

The iSYS-5005 provides a 5x2, 1.27mm pitch Pin header. The connector (W+P 46-7072-010-20-00-00) is mounted on the module facing backwards. InnoSenT uses a gold plated connector. A compatible female pin header is W+P 46-6060-010-46-XX-XX-XX.
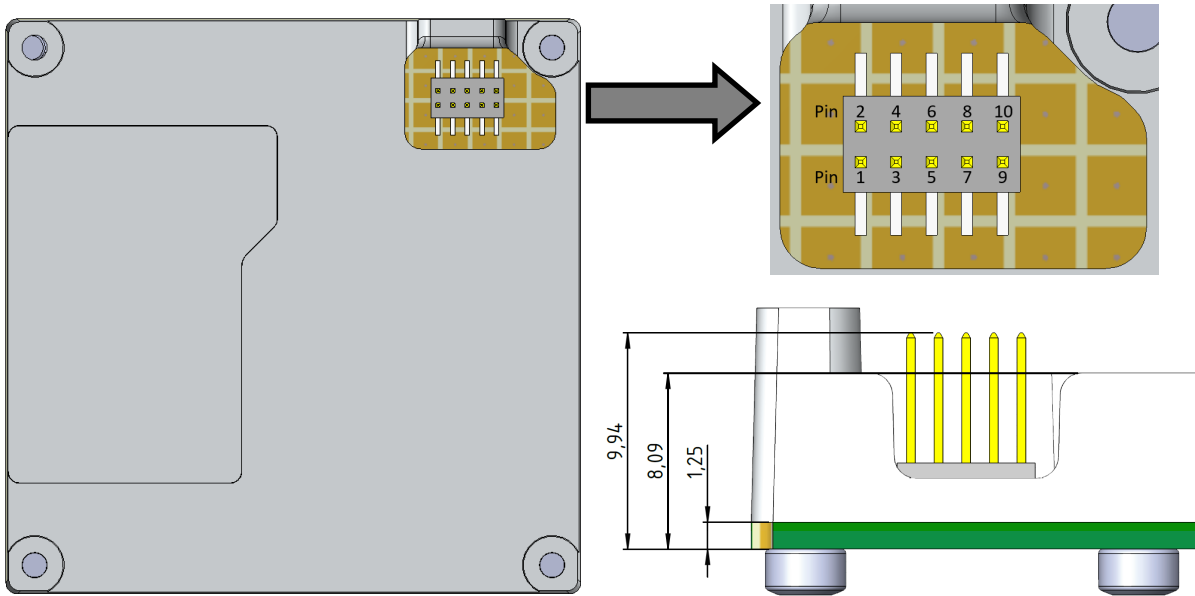
PIN #	DESCRIPTION	COMMENT
1	UART_TX	UART -> command interface (module side view)
2	V_{CC}	3.3 V—5.5 V supply voltage
3	UART_RX	UART -> command interface (module side view)
4	GND	
5	DNC	Do not connect
6	DNC	Do not connect
7	DNC	Do not connect
8	DNC	Do not connect
9	DNC	Do not connect
10	DNC	Do not connect

COMMUNICATION

The sensor uses a UART protocol with a bitrate of 1MBaud.

It can easily be configured with the supplied Object Viewer software or the iSYS5005_radarAPI.dll.
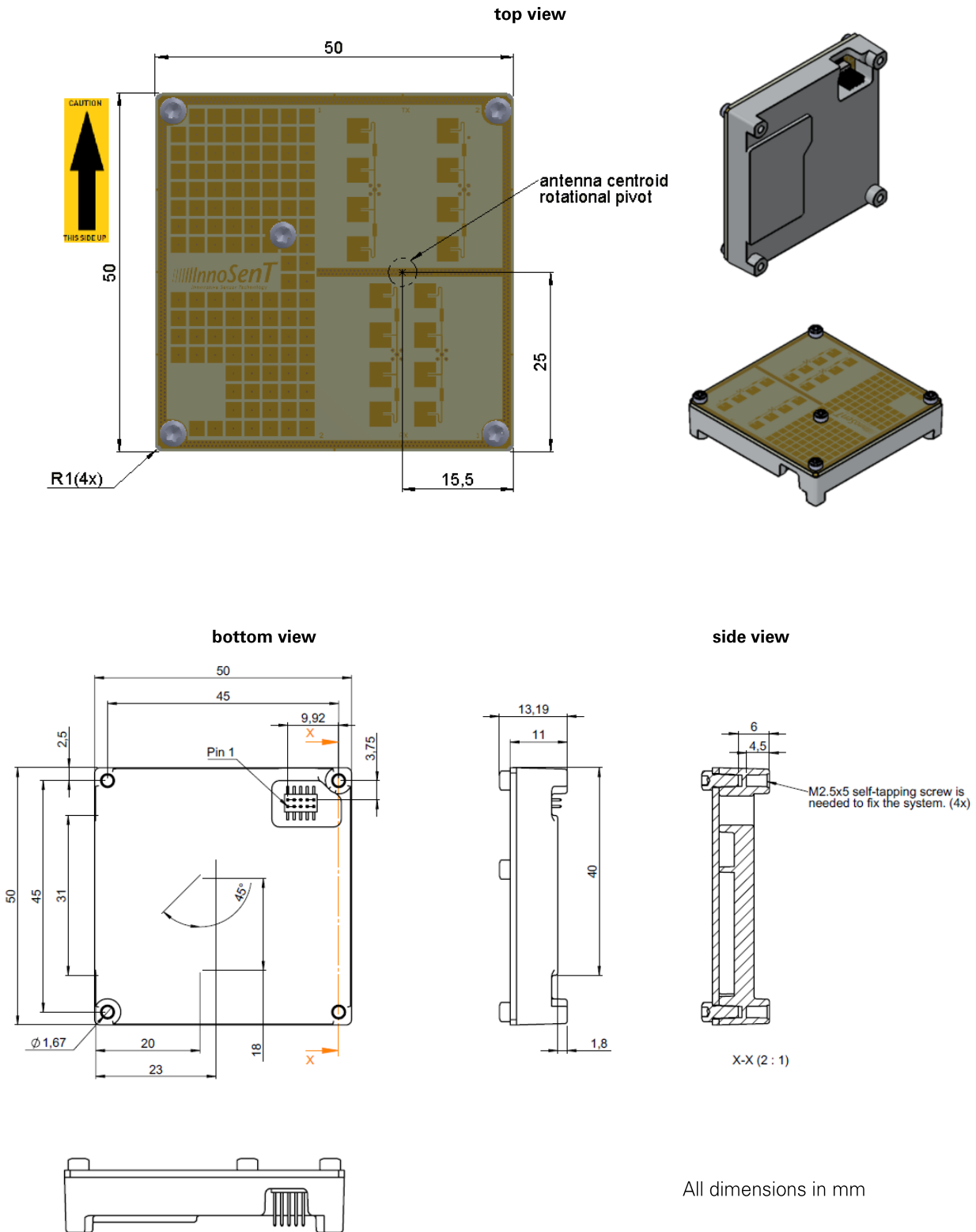
The dll is pre-compiled for different compilers and comes with an example project for easy integration.

The sensor's available commands can be found in the accompanying iSYS-5005_RadarAPI_readMe.pdf.

MECHANICAL DRAWING

top view

antenna centroid
rotational pivot

bottom view

side view

M2.5x5 self-tapping screw is
needed to fix the system. (4x)

X-X (2 : 1)

All dimensions in mm

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Annex A

The information that will be given below is only a rough overview; for details please contact the local approval agencies. An overview over the frequency bands in Europa can also be found in the REC 70-03 (Annex B) which is available under www.cept.org

Frequency Bands in Europe

Generally the iSYS-5005 standard version can be used in all countries in Europe.

24.000	24.050		24.250

Europe-frequency
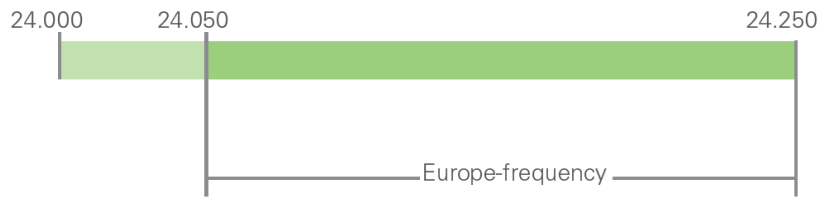
Frequency Bands in US FCC 15.249
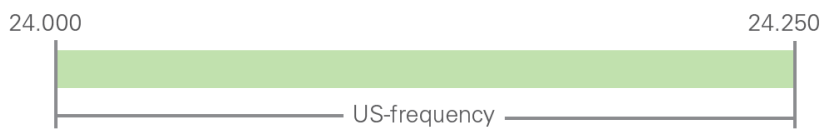
24.000		24.250

US-frequency

ESD-INFORMATION

This InnoSenT sensor is sensitive to damage from ESD. Normal precautions as usually applied to CMOS devices are sufficient when handling the device. Touching the signal output pins has to be avoided at any time before soldering or plugging the device into a motherboard.

APPROVAL

This Data Sheet contains the technical specifications of the described product. Changes of the specification must be in written form. All previous versions of this Data Sheet are no longer valid.

VERSION	DATE	COMMENT
1.0	11.03.2020	initial release
1.1	08.05.2020	added communication
1.2	24.06.2020	modes renamed
1.3	20.10.2020	Spec updated according to newest FW
1.4	12.05.2021	updated velocity range
1.5	09.06.2021	updated supply voltage
1.6	07.09.2021	corrected velocity range
1.7	17.12.2021	updated detection range vom max. ≥15m to typ. 20m

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