

# Data Sheet IMD-1100







Version 1.0 — 08.10.2021

## PRODUCT FAMILY

InnoSenT Motion Detector

## APPLICATIONS

- Building Automation
- Security Applications

	Movement
	Velocity
	Direction
	Presence
	Distance
	Angle

## FEATURES:

- Radar Front End working in 24 GHz ISM band
- Worldwide certification possible
- Small outline dimensions
- Ability to detect velocity and direction of moving objects (output of IF I- and Q-signal)
- Detection of a person typically up to 15m
- Packaging: bulk material



## DESCRIPTION

The product focusses on price-sensitive applications like motion detectors for security applications and building automation, e.g. automated control of light.

The IMD-1100 24GHz radar front end comes in the smallest design possible and features the ability to deliver velocity measurement and direction of movement. The 24 GHz band can be certified worldwide—no variants needed. The achievable range of about 15 m for a person covers most applications.

## ADDITIONAL INFORMATION

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

## CERTIFICATES

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

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

## PARAMETERS

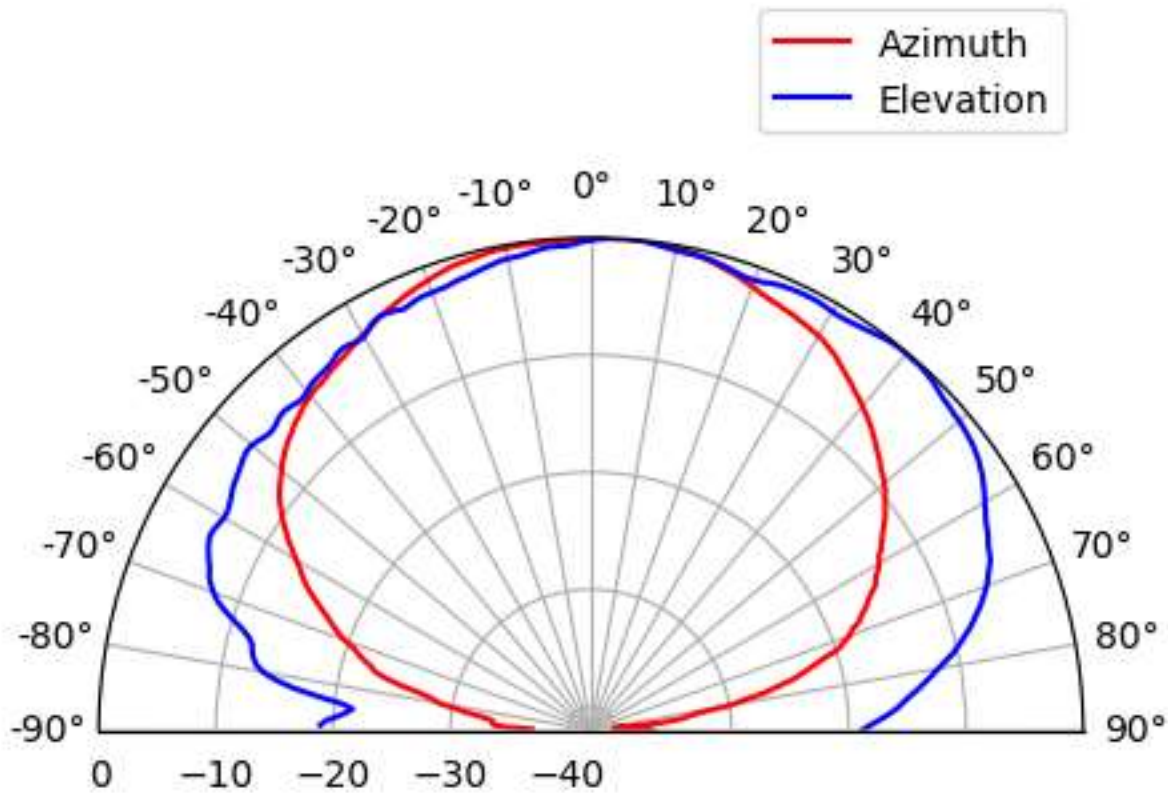
The IMD-1100 is a 24 GHz Radar front end (RFE) for CW-modulation.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
<b>Radar</b>					
transmit frequency	f	24.150		24.250	GHz
output power (EIRP)	P <sub>out</sub>			12.7	dBm
IF bandwidth (-3dB)	B		1		MHz
signal level (RCS = 0.5m <sup>2</sup> @5m)	IF <sub>1/2</sub>		80		μVrms
noise level (100Hz .. 1kHz)	N <sub>1/2</sub>		10		μVrms
quadrat. phase imbalance	ε <sub>p</sub>		+/-25		°
overall gain (conversion gain + antenna gain)	G <sub>OA</sub>		22		dB
Field of view (@-3 dB) azimuth			72		°
Field of view (@-3 dB) elevation			36		°
<b>Power supply</b>					
supply voltage	V <sub>CC</sub>	3.2	3.3	3.4	V
supply current	I <sub>CC</sub>		48		mA
<b>Environment</b>					
operating temperature	T <sub>OP</sub>	-25		+55	°C
storage temperature	T <sub>STG</sub>	-40		+85	°C
<b>Mechanical Outlines</b>					
outline dimensions	height width depth		20.0 15.0 2.7		mm

### DETECTION FIELD OF VIEW

The antenna beamwidth in degrees specifies the off-boresight angle where the transmitted or received energy has dropped down to 50 percent of the maximum value (3dB-beamwidth). It definitely does not mean that beyond this point no transmission or reception is possible. For instance, an object with a very large radar cross-section (truck, metallic door) might very well compensate the loss of the antenna pattern and provide a significant radar return signal. Due to this fact, the detection range of the sensor can vary depending on the RCS (radar cross section) of the detected object.

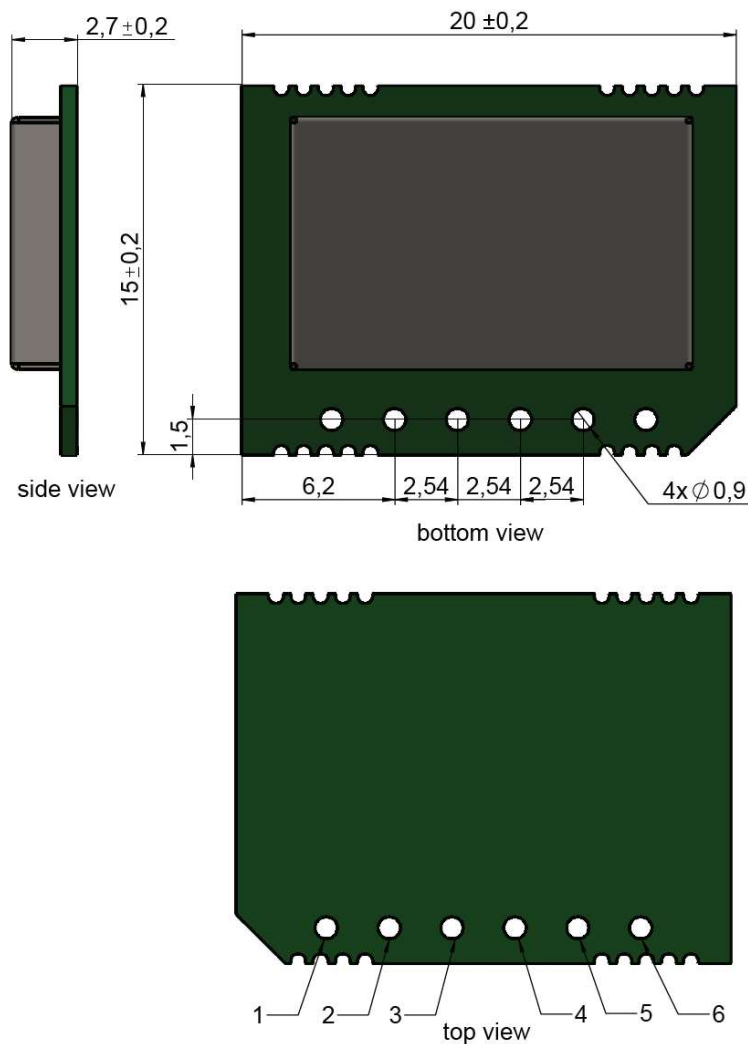
### IMD-1100 System Pattern



PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNITS
<b>SYSTEM ANTENNA PATTERN</b>						
system pattern (3dB width)	horizontal	azimuth		40		°
	vertical	elevation		25		°
system pattern (10dB width)	horizontal	azimuth		107		°
	vertical	elevation		151		°

### MECHANICAL DRAWING

All dimensions in mm



### INTERFACE

The IMD-1100 provides 4x1, 2.54mm pitch through-hole connection.

Through-hole #	DESCRIPTION	IN/OUT	COMMENT
1	D.N.C.	-	DO NOT CONNECT
2	V <sub>CC</sub>	input	3.2 V - 3.4 V supply voltage
3	GND	input	ground
4	IF I	output	signal I(nphase) - use this channel if you use only one channel
5	IF Q	output	signal Q(uadrature)
6	D.N.C.	-	DO NOT CONNECT

## RADOME DESIGN RULE

For the radome design, please consider the following parameters

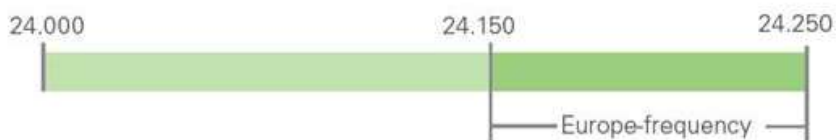
PARAMETER	SYMBOL	VALUE	UNIT	COMMENT
distance	d	approx. $\lambda_0/2$	mm	$\lambda_0$ is the wave length in free space
thickness	$t_{\text{radome}}$	approx. $\lambda_g/2$	mm	$\lambda_g$ is the guided wave in radome material

### ANNEX A

The information that is 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](http://www.cept.org)

### FREQUENCY BANDS IN EUROPE

Generally the IMD-1100 can be used in all countries in Europe and UK.



### FREQUENCY BANDS IN US FCC 15.249



## 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
0.1	11.05.2021	initial preliminary release
0.2	16.06.2021	Corrections - interface description - mechanical drawing Addition - signal level - noise level - overall gain
1.0	08.10.2021	Introduction of final release

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