Data Sheet IMD-1100

Version 1.1 - 20.06.2023

PRODUCT FAMILY

InnoSenT Motion Detector

APPLICATIONS

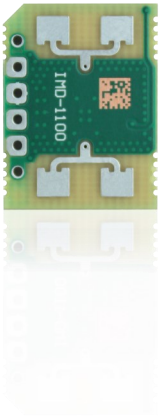
Building Automation

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.

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/

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.

PERFORMANCE

PARAMETER	TYPICAL VALUE[1]	UNIT
Regulatory		
Transmit Frequency	24.15 .. 24.25	GHz
Output Power (EIRP)	12.7	dBm
RADAR		
IF Bandwidth (-3 dB)	1	MHz
Signal Level: $IF_{1/2}$[2]	80	µVrms
Noise Level: $N_{1/2}$[3]	10	µVrms
I/Q Phase Difference	90	°
I/Q Phase Imbalance: ε_p	± 25	°
Overall Gain: G_{OA}[4]	22	dB
Angle		
Field of View: Azimuth[5]	72	°
Field of View: Elevation[5]	36	°
Power supply		
Operating Voltage	3.2 .. 3.4	V
Supply Current[6]	48	mA
Environment		
Operating Temperature	-25 .. +55	°C
Storage Temperature	-40 .. +85	°C
Mechanical		
Dimensions (with connectors): H/W/D	20.0 x 15.0 x 2.7 | 0.8 x 0.6 x 0.1	mm | in
Weight	< 1 | < 0.035	g | oz

[1] typical specifications are for general understanding and may vary

[2] RCS = 0.5m² @5m

[3] 100Hz .. 1kHz

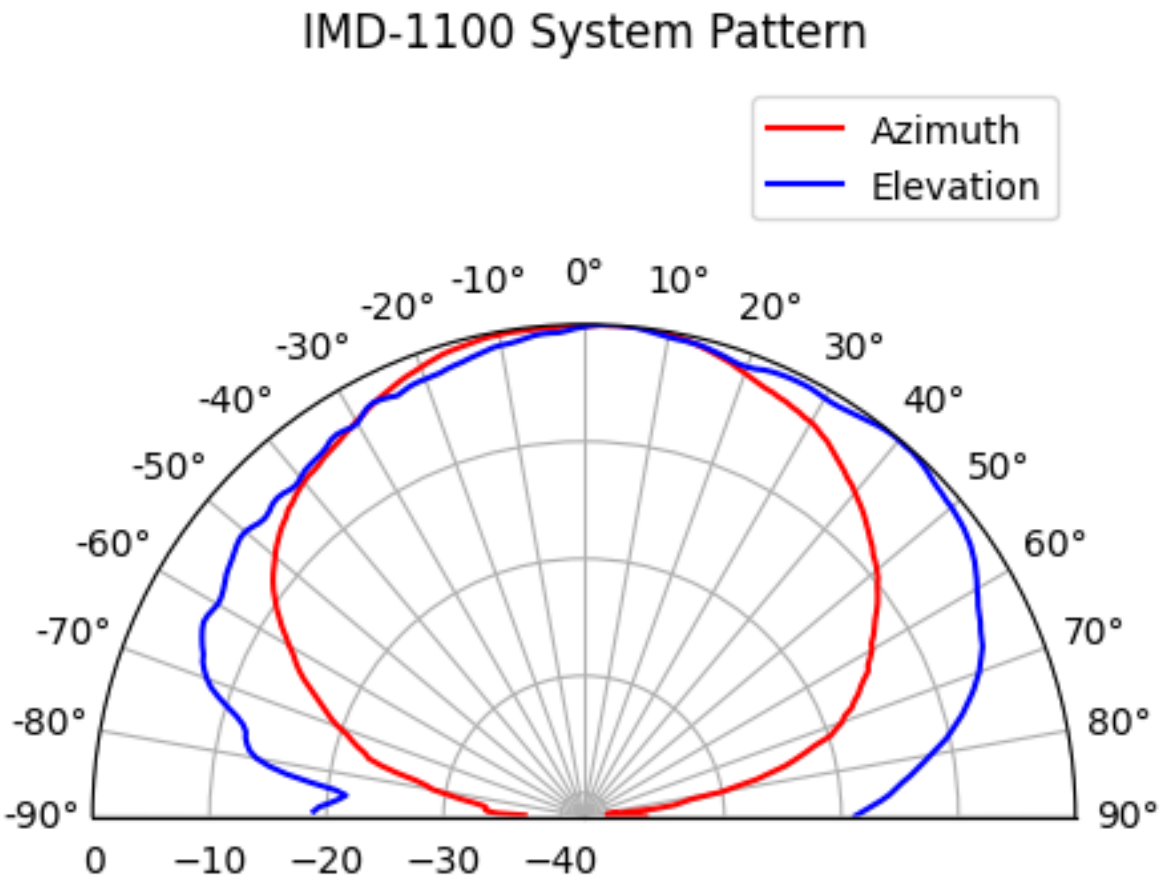
[4] conversion gain + antenna gain

[5] standard detection field @-3dB beam width

[6] the typical value is given for 3.3V at 25°C

DETECTION FIELD OF VIEW

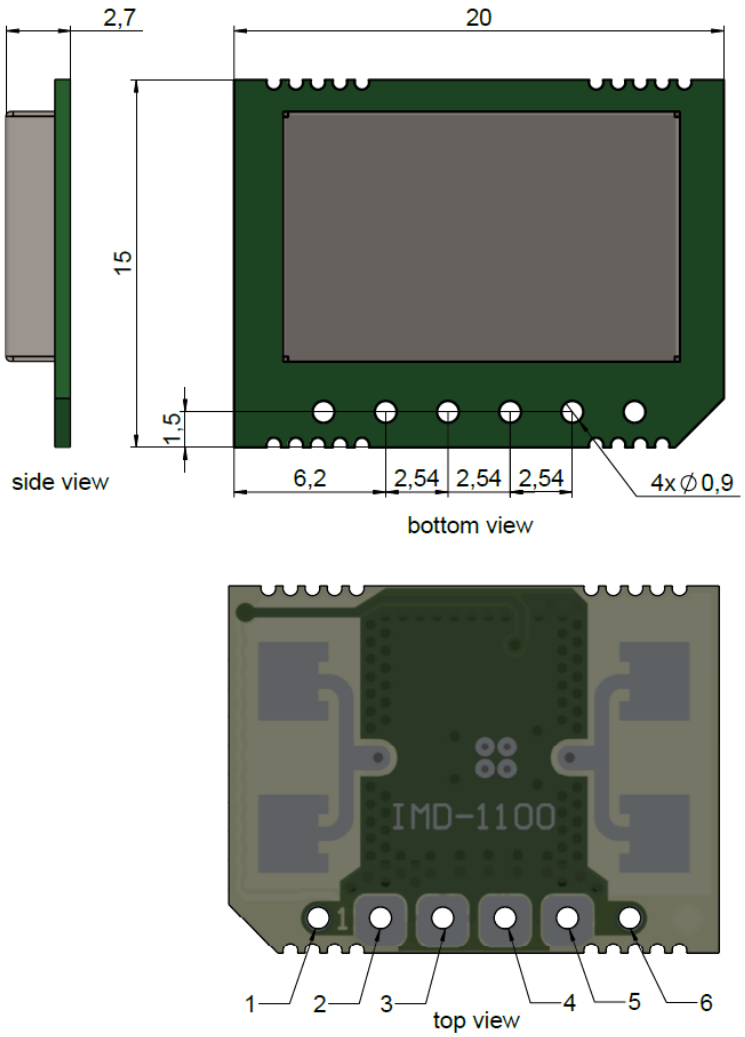
The antenna beam width in degrees specifies the off-boresight angle where the transmitted or received energy has dropped down to 50 percent of the maximum value (-3 dB beam width). It definitely does not mean that beyond this point no transmission or reception is possible. For instance, an object with 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.



PARAMETER	TYPICAL VALUE[1]	UNIT
System Pattern: Azimuth (-3 dB beam width)	40	°
System Pattern: Elevation (-3 dB beam width)	25	°
System Pattern: Azimuth (-10 dB beam width)	107	°
System Pattern: Elevation (-10 dB beam width)	151	°

MECHANICAL DRAWING

Note: All dimensions are in mm.



INTERFACE

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

TROUGHHOLE #	DESCRIPTION	IN/OUT	COMMENT
1	D.N.C.	-	do not connect
2	V_{CC}	input	operating 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

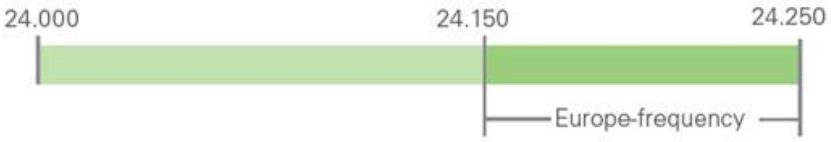
PARAMETER	SYMBOL	VALUE	UNIT	COMMENT
Distance from Antenna	d	approx. $\lambda_0/2$	mm	λ_0 is the wave length in free space
Thickness	t_{radome}	approx. $\lambda_g/2$	mm	λ_g is the guided wave in radome material

FREQUENCY INFORMATION

The information that will be given below is only a broad overview; for details please contact the regional approval agency. An overview over the frequency bands in Europe can also be found in the REC 70-03 which is available under www.cept.org.

FREQUENCY BANDS IN EUROPE

In general, the IMD-1100 can be used in all European countries 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
1.0	08.10.2021	Introduction of final release
1.1	20.06.2023	Change to standard InnoSenT datasheet form Correction - Removed tolerances in mechanical drawings Addition - phase difference - weight Renaming - Quadr. Phase Imbalance to I/Q Phase Imbalance

InnoSenT GmbH
Am Roedertor 30
97499 Donnersdorf
GERMANY
Tel.: +49 (0) 9528—9518—0
E-Mail: info@innosent.de
URL: www.innosent.de