

Data Sheet IPS-280_AMP

Version 1.0 — 12.07.2021

PRODUCT FAMILY

K-Band Transceiver

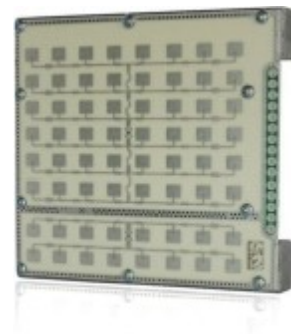
APPLICATIONS

- Traffic Monitoring
- Industrial Applications

	Movement
	Velocity
	Direction
	Presence
	Distance
	Angle

FEATURES:

- Radar-based speed & motion sensor
- Advanced MMIC Technology
- Integrated Low Noise Amplifier
- Extended temperature range from – 40 °C up to + 85 °C
- Shutdown feature for low power operation



DESCRIPTION

High sensitivity K-Band CW Doppler Radar with adjustable frequency and I Q - outputs.

The shutdown option can be used for intermittent operation in battery powered applications.

ETSI / FCC

The IPS-280 module is compliant to ETSi 300 440 and FCC 15.245.

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.

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/>

RoHS-INFO

This product is compliant to the restriction of hazardous substances (RoHS - European Union directive 2011/65/EU).

APPLICATION INFORMATION

The IPS-280 is typically centred in the US Band 24.075...24.175. By adding a resistor (20k...30k Ω) between 'R_tune' and GND the transmit frequency can be tuned to a higher value, e.g. 24.150...24.250GHz.

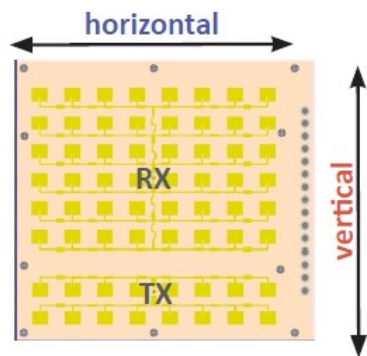
The frequency can be monitored @ Pin 'DIV_OUT' (frequency divider ratio 1 : 8192).

ELECTRICAL CHARACTERISTICS

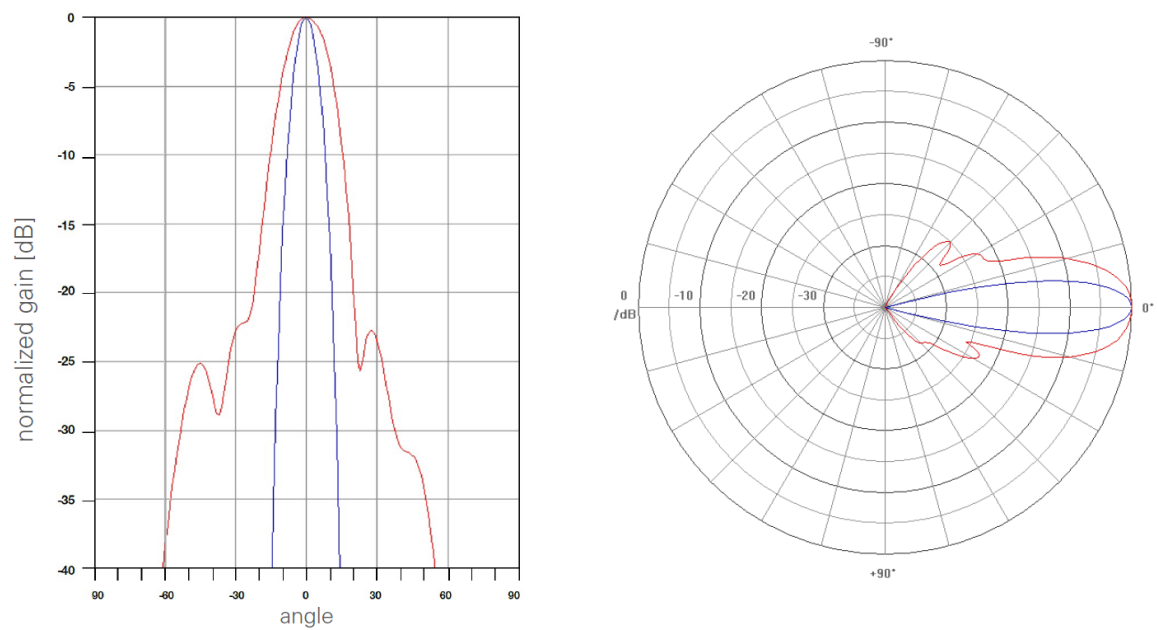
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNITS
Radar						
Transmit frequencies		f	24.075		24.175	GHz
Output power (EIRP)		P _{out}			20	dBm
IF output DC-Offset		U _{DC-offset}	1.4	1.8	2.2	V
IF-Bandwidth (-3dB)		B	33		20k	Hz
Signal level	(RCS = 10 m ² @ 50 m)	IF _{IQ}		1		mV
Noise level	100Hz...1kHz	N _{1/2}		60		μ V
Quadrat. Phase imbalance		ϵ_p	-25		25	°
Overall gain	Conversion gain + antenna gain	G _{OA}		64		dB
Divider						
Divider ratio				8192		
Divider output voltage	Term with 50 Ω			120		mV
Power supply						
supply voltage	transceiver	V _{cc}	3.2	3.3	3.4	V
	divider	V _{CC_DIV}	3.2	3.3	3.4	V
supply current	transceiver	I _{cc}		55	67	mA
	divider	I _{CC_DIV}		20		mA
Environment						
operating temperature		T _{OP}	- 40		+ 85	°C
storage temperature		T _{STG}	- 40		+ 85	°C
Mechanical Outlines						
outline dimensions	compare to schematic	Hight Length Width		10.2 70 65.8		mm

SIMULATED ANTENNA PATTERN

Antenna Orientation:



System Pattern (without radome)



PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNITS
System beam width @ -3dB		horizontal		9		°
		vertical		18		°

INTERFACE

The sensor provides a 2.54 mm hole grid

PIN #	DESCRIPTION	IN/OUT	COMMENT
1	GND	Input	Analog ground
2	R_Tune		Frequency tuning by adding a resistor to GND
3	D.n.c.		Do not connect
4	VP	D.n.c.	Test output, do not connect
5	Enable	Input	Active low, enables power supply
6	V _{CC}	Input	Supply voltage 3.3 V
7	VCCP	D.n.c.	Test output, do not connect
8	VCC_DIV	Input	Divider supply voltage (optimal) 3.3 V
9	TX_ON	Input	Active high, enables transmit power
10	GND	Input	Analog ground
11	Q	Output	Analog output quad phase
12	I	Output	Analog output in phase
13	GND	Input	Analog ground
14	DIV_OUT	Output	Divider signal / 1:8192
15	GND	Input	Analog ground

Technical drawing of the antenna structure. The top view shows a rectangular array of elements with dimensions: overall width 65,8; overall height 70; element pitch 2,54 (14x); element diameter $\varnothing 1$ (15x); distance from top edge to first row of elements 32,6; distance from bottom edge to last row of elements 2,95; distance from left edge to first column of elements 8,4; and distance from right edge to last column of elements 8,2. A section line A-A is indicated. The side view shows the profile of the antenna with dimensions: 8,2, 9,14, and 10,34. The antenna centroid rotational pivot is marked. A detail view A-A shows the internal structure of the antenna element, with components labeled 3, 4, and 6.

„Contains
FCC ID: UXS-IPS280“.

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.

The sensor uses Hydrocarbon based material which may change its dielectric properties when used in an oxidative environment. This may vary based on temperature. Therefore InnoSenT recommends evaluating this influence within the specific environment.

VERSION	DATE	COMMENT
1.0	12.07.2021	initial release

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