

Data Sheet IVS-947

Version 1.2 — 17.06.2020

PRODUCT FAMILY

K-Band Transceiver

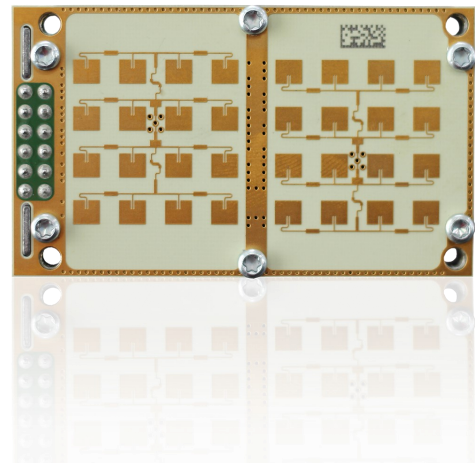
APPLICATIONS

- Traffic Monitoring
- Industrial Applications

- Movement
- Velocity
- Direction
- Presence
- Distance
- Angle

FEATURES:

- » K-Band VCO Transceiver with advanced SiGe MMIC technology
- » supports CW / FSK / FMCW modes
- » RF prescaler divider ratio 8192
- » I/Q channels for direction of motion discrimination
- » RF LNA for high SNR



DESCRIPTION

The IVS-947 provides an advanced 24GHz MMIC Design. The module can be used in CW / FSK / FMCW-mode. This design includes an RF prescaler for transmit frequency reference. The prescaler output is 2.94MHz.

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.

RoHS-INFO

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

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ELECTRICAL CHARACTERISTICS

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNITS
Transmitter						
transmit frequencies	delivery conditions	$f_{\text{IVS-947}}$	24.000		24.250	GHz
varactor tuning voltage		V_{tune}	0.7		2.5	V
varactor input impedance				10k		Ω
tuning slope				720	2000	MHz/V
temperature drift (frequency)	-40°C...+85°C	$\Delta f_{-40^\circ\text{C}...+85^\circ\text{C}}$		-4.6		MHz/°C
output power (EIRP)	@ 25°C	P_{out}		19	20	dBm
power drift over temp.		ΔP_{temp}		-0.01		dB/°C
Receiver						
$ I/Q $ balance	amplitude		-1.2	0	1.2	dB
	phase		78	90	102	°
IF-output	voltage offset			1,6		V
self clutter ¹					±0.4	Vpp
¹ self clutter is the signal measured at the IF output (without enclosure) due to modulation when no target is present.						
Antenna System Pattern (compare with antenna plot on page 4)						
full beam width @ -3dB	azimuth	horizontal		33		°
	elevation	vertical		33		°
full beam width @ -10dB	azimuth	horizontal		59		°
	elevation	vertical		61		°
side-lobe suppression	azimuth	horizontal	20	25		dB
	elevation	vertical	20	25		dB
antenna gain		gain		15		dBi

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ELECTRICAL CHARACTERISTICS

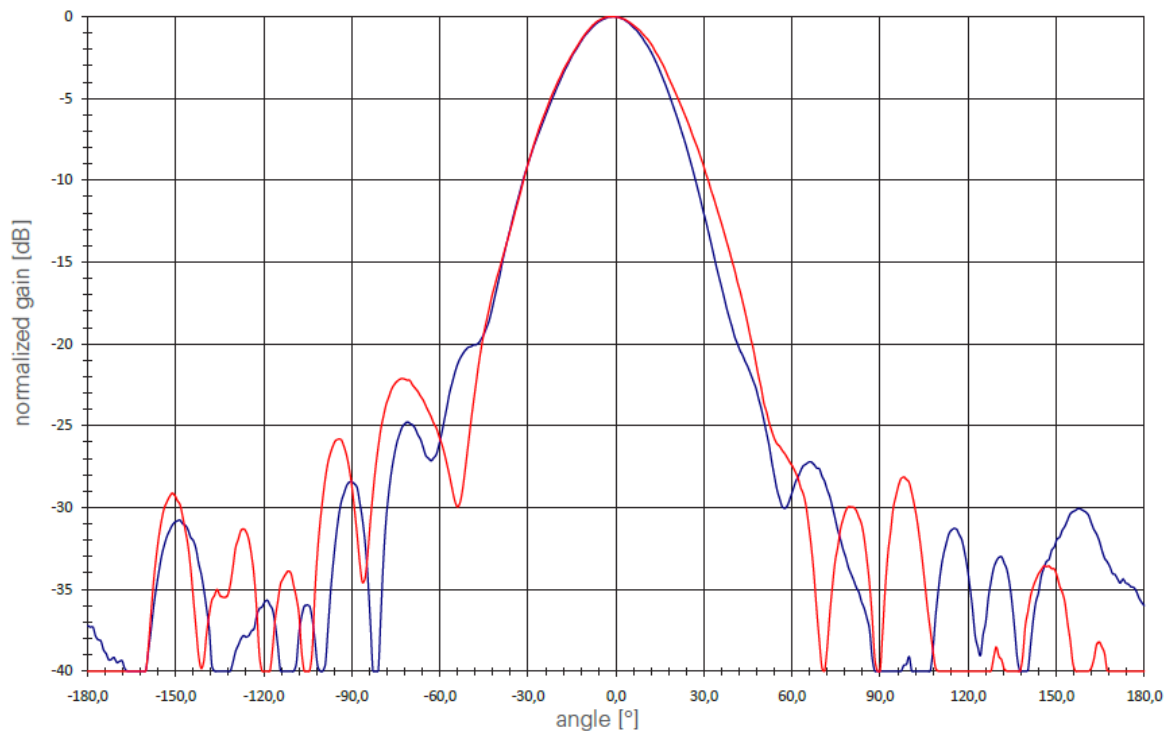
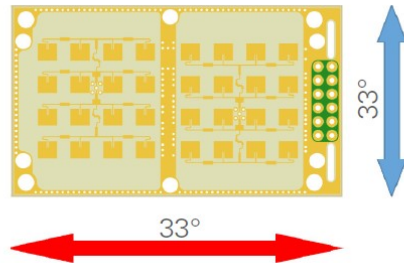
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNITS
Frequency Divider						
Prescaler division ratio			8192			
Prescaler output voltage	Peak to peak voltage Terminated with 50Ω	V_{DIV}	60	120	260	mV
Power supply						
supply voltage		V_{CC}	3.2	3.3	3.4	V
Prescaler supply voltage		$V_{CC \text{ divider}}$	3.2	3.3	3.4	V
supply current		I_{CC}		55	65	mA
Prescaler supply current		I_{CC_DIV}		19		mA
Environment						
operating temperature		T_{OP}	-40		+85	°C
storage temperature		$T_{storage}$	-40		+85	°C
Mechanical Outlines (compare with mechanical outlines on page 5)						
outline dimensions		height length width	9.0 61.6 37.0			mm

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TX-ANTENNA PATTERN

Antenna Orientation:



PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNITS
full beam width @ -3dB	azimuth	horizontal		33		°
	elevation	vertical		33		°
full beam width @ -10dB	azimuth	horizontal		59		°
	elevation	vertical		61		°
side-lobe suppression	azimuth	horizontal	20	25		dB
	elevation	vertical	20	25		dB

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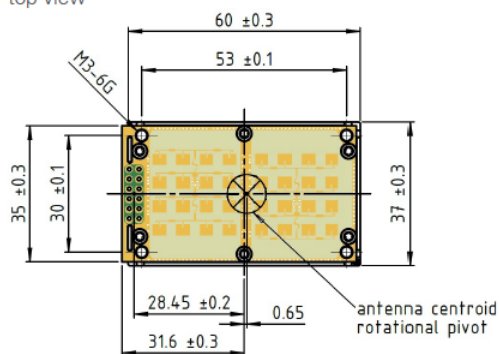
INTERFACE

The sensor provides a 2.5mm grid, single row pin header (square pin 0.635mm).

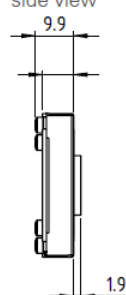
PIN #	DESCRIPTION	IN / OUT	COMMENT
1	TX on		active high / enable TX-power / internal pulled up to +3.3V with 10kOhm / pull down to GND to disable
2	enable	input	active low / enable OSC + LNA / internally pulled up to VCC with 10kOhm / pull down to GND to enable
3	V _{cc}	input	supply voltage +3.3V
4	GND	input	analog ground
5	IF2	output	signal Q(uadrature)
6	IF1	output	signal I(nphase)
7	dnc		do not connect
8	Div_out	output	divider output (Tx / 8192)
9	V _{CC} divider	input	supply voltage divider +3.3V
10	V _{tune}	input	tuning voltage (0.7...2.5V)
11	dnc		do not connect
12	dnc		do not connect

MECHANICAL OUTLINES

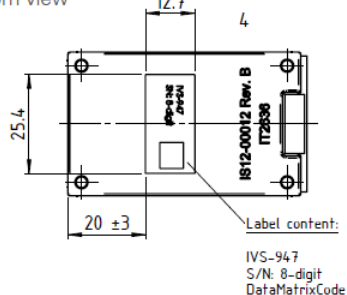
top view



side view



bottom view



connector view



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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. 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	05.09.2017	initial release
1.1	31.01.2018	remove IF - amplifier
1.2	17.06.2020	changes in IF-output

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