

# Data Sheet IVS-979

Document Version 1.3 - 07.05.2014

designed and manufactured in Germany

## PRODUCT FAMILY

K-Band VCO Transceiver with advanced MMIC technology

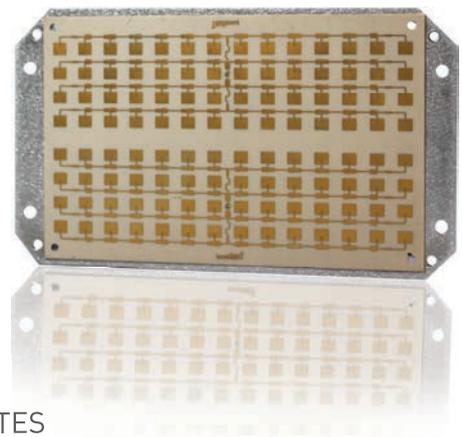
## APPLICATIONS

- Traffic Monitoring

	Movement
	Velocity
	Direction
	Presence
	Distance
	Angle

## FEATURES:

- » K-Band VCO Transceiver with advanced SiGe MMIC technology
- » FSK / FMCW modes
- » 1/x divider for reference frequency output
- » stereo (dual channel) operation to detect direction of motion
- » integrated RF-pre-amplifier



## DESCRIPTION

The IVS-979 is a K-Band VCO Transceiver with advanced SiGe MMIC technology that can be operated in FSK and FMCW mode.

The sensor provides a special RF-design for maximum sensitivity in long range applications such as traffic monitoring or speed enforcement.

Another smart new feature is the 1/x divider output for VCO tuning slope linearization.

## CERTIFICATES

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



## ADDITIONAL INFORMATION

InnoSenT Standard Product. Changes will not be notified as long as there is no influence on form, fit and within this datasheet 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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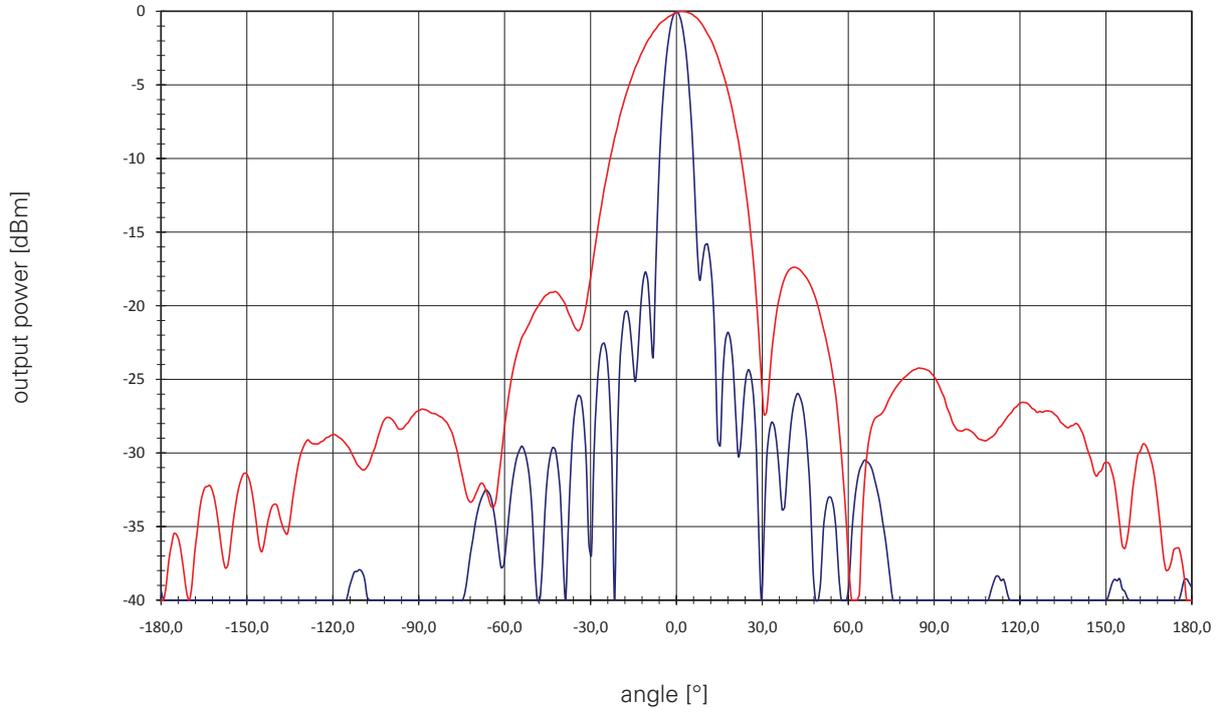
**ELECTRICAL CHARACTERISTICS**

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNITS
<b>Oscillator</b>						
transmit frequency	depending on $V_{tune}$	f	24.000-24.250			GHz
varactor tuning voltage		$V_{tune}$	0		3	V
tuning bandwidth fine			DC		500k	Hz
tuning bandwidth coarse			DC		0.4	Hz
input impedance Vtune fine	200pf ESD protection			1		k $\Omega$
input impedance Vtune coarse	200pf ESD protection			1		k $\Omega$
tuning slope coarse			340	552	766	MHz/V
tuning slope fine			59	96	133	MHz/V
temperature drift frequency		$\Delta f$		-4	-5	MHz/ $^{\circ}$ C
output power (EIRP)	@ room-temperature	$P_{out-ETSI}$	17	19	20	dBm
out of band radiation (EIRP)	@ room-temperature	$P_{out of band}$			-30	dBm
divider ratio factory setting	for example 24.125GHz lead to 1.18MHz			20,480		
<b>Receiver</b>						
IF-amplifier	part number LT6204	gain		40		dB
		bandwidth	100		2.5M	Hz
output impedance				100		$\Omega$
signal level	@ InnoSenT Test setup @ room-temperature	$S_{VQ}$	40	72	104	mV
	@ room-temperature	$R_{VQ}$	0.2	0.4	0.6	mV
IF-output		voltage offset		1.65		V
I/Q balance		amplitude			6	dB
		phase	60	90	120	$^{\circ}$
<b>Antenna pattern</b>						
antenna pattern (@3dB)	azimuth	horizontal		7		$^{\circ}$
	elevation	vertical		28		$^{\circ}$
side lobe suppression	azimuth	horizontal		15		dB
	elevation	vertical		15		dB
<b>Power supply</b>						
supply voltage	max. 1mV <sub>pp</sub> ripple	$V_{CC}$	5.3	5.5	6	V
supply current		$I_{CC}$			170	mA
<b>Environment</b>						
operating temperature		$T_{OP}$	-30		+60	$^{\circ}$ C
storage temperature		$T_{STG}$	-30		+85	$^{\circ}$ C
outline dimensions	compare drawing	120 x 70.5 x 11.4 (18.9)				mm

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TX - ANTENNA PATTERNS



PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNITS
full beam width @ -3dB		horizontal		7		
		vertical		28		°
side-lobe suppression		horizontal		15		dB
		vertical		15		dB

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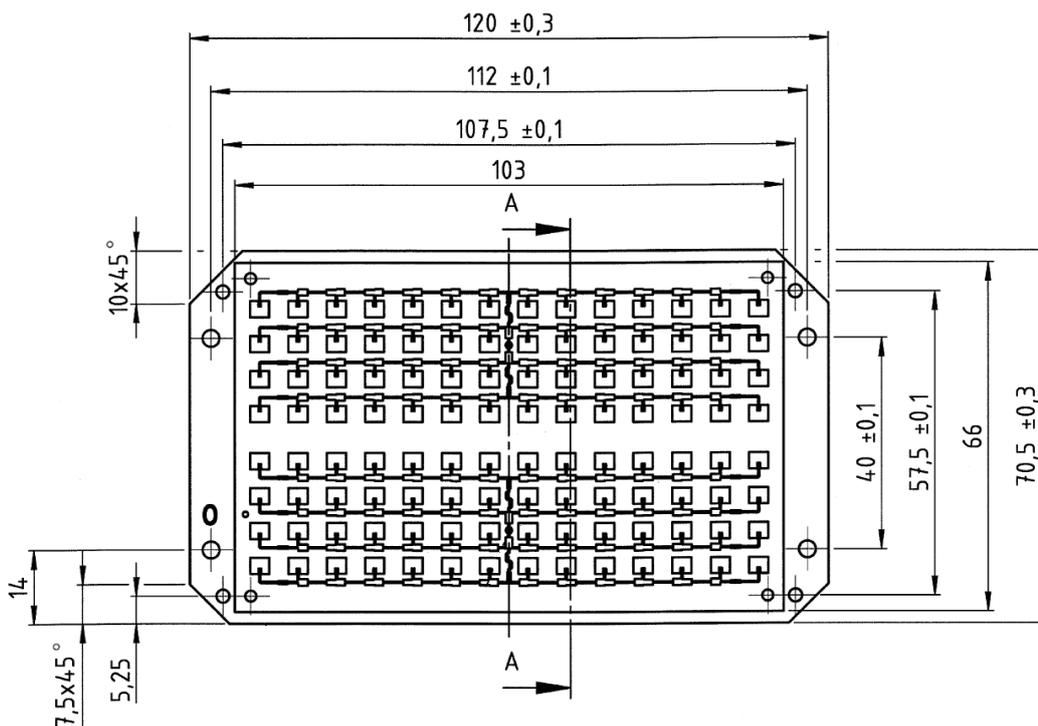
## INTERFACE

The sensor provides a 2.54 mm grid pin header.

PIN #	DESCRIPTION	IN / OUT	COMMENT
1	MUXOUT	OUT-digital	reference signal VCO frequency already divided by prescaler
2	GND		ground
3	V <sub>cc</sub>	IN-analog	5.5V supply voltage
4	SPI_CLOCK	IN-digital	SPI-clock
5	SPI_DATA	IN-digital	SPI-data
6	PLL_LE	IN-digital	latch enable PLL
7	d.n.c.		do not connect
8	CUST_PROG_LE	IN-digital	enable customer programming (active low)
9	d.n.c.	IN-digital	do not connect
10	d.n.c.		do not connect
11	d.n.c.		do not connect
12	Q-SIGNAL	OUT-analog	IF-output-signal
13	I-SIGNAL	OUT-analog	IF-output-signal
14	V <sub>tune</sub> coarse	IN-analog	tuning voltage for coarse tuning VCO
15	V <sub>tune</sub> fine	IN-analog	tuning voltage for fine tuning VCO

## MECHANICAL OUTLINES

All dimensions in mm



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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.

## LABEL INFORMATION

CE 0682 !

FCC: ID: UXS-IVS-979

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) This device must accept any interference received including interference that may cause undesired operation

## 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.

ETSI EN 300 400 - 1V1.6.1.

ETSI EN 300 400 - 2V.1.4.1.

VERSION	DATE	COMMENT
1.0	21.06.2013	new layout & correction Rev.Number
1.1	26.11.2013	new picture / Approval ETSI / Label Info
1.2	24.02.2014	limits for signal amplitude and noise added, signal level conditions, factory setting, mechanical drawing, outline dimensions, I/Q-phase, additional information
1.3	07.05.2014	divider ratio factory setting, new product picture

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