InnoSenT

Innovative Sensor Technology

Standard Products

Version: 2008-03-11

Universelle Low-Cost Radar Transceiver

Die bereits in vielen Anwendungen erfolgreiche Produktfamilie der Low-Cost Transceiver bietet Ihnen universell einsetzbare CW Radarmodule zu sehr attraktiven Preisen.

Die einzelnen Produkte zeichnen sich besonders durch Ihre kleinen Abmessungen und hohe Empfindlichkeit aus. Typische Einsatzgebiete für diese Module sind:

- Alarmanlagen und Sicherheitstechnik
- Haustechnik (z.B. Bewegungsmelder für automatische Lichtschalter)
- Automatische Türöffner

Die Standardprodukte stellen wir auf den folgenden Seiten vor:

Sollten Ihre Anforderungen von den Produkten abweichen, können Sie auch gerne direkten Kontakt mit uns aufnehmen, wir sind sicher, dass wir auch für Ihr Problem eine passende Lösung finden.

Universal Low-Cost radar transceivers

The highly appreciated product line of Low-Cost radar transceivers offers the possibility of universal applications at very attractive prices.

The specific products can be particularly characterized by their extra small outline dimensions and high sensitivity. The typical application areas of these modules include:

- Intrusion alarm and security
- Home automation (e.g. motion detector for automatic light switch)
- Automatic door openers

The standard products are listed on the following pages.

If your requirements are different, don't hesitate to contact us, we are sure that we shall find the right solution to your problem.

Überblick universelle Low-Cost Radar Transceiver

Overview universal Low-Cost radar transceivers

Low-Cost CW doppler radar for moving objects

model	Mixers	no. of antennas	antenna pattern		side lobe suppression	supply voltage	page
			horizontal	vertical			
IPM-165	Mono	2	80°	32°	typ. 13 dB	5 V	18
IPM-170	Mono	2	70°	70°	typ. 13 dB	5 V	18
IPM-365	Mono	2	80°	32°	typ. 13 dB	3 V	18
IPM-190	Mono	2	λ/4 dipole rod antennas			5 V	18

Environmental Tests and Handling Precautions:

- The InnoSenT universal Low-Cost radar transceivers are sensitive to damage from ESD.
- Additional pre-cautions regarding ESD are required
- Applying multimeters e.g. for resistance measurement between any of the connector pins may cause damage to the module.

Low-Cost CW doppler radar transceivers

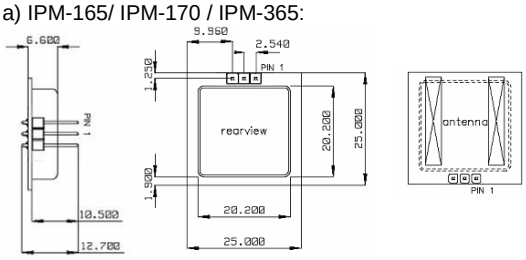
K-Band Transceivers: IPM-165 / IPM-170 / IPM-190 / IPM-365

Description:

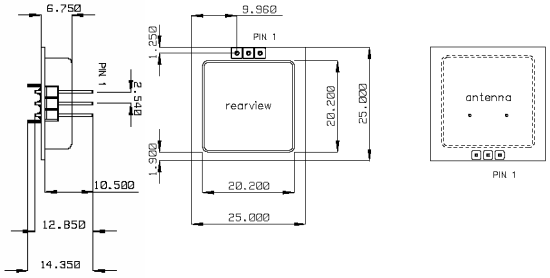
- radar-based motion detector
- available in different frequency ranges: Standard; _F and _UK variants
- advanced PHEMT-oscillator with low current consumption
- split transmit and receive path for maximum gain
- mono (single channel) operation for motion detection
- very small outline dimensions

Outline dimensions: (all dimensions in mm)

a) IPM-165/ IPM-170 / IPM-365:



b) IPM-190:



Absolute Maximum Ratings:

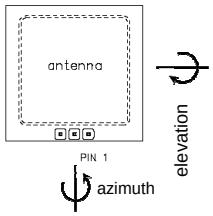
Parameter	Symbol	Rating
supply voltage IPM-165, IPM-170, IPM-190	V_{CC}	5.5 V
supply voltage IPM-365	V_{CC}	3.6 V
operating temperature (out of spec)	T_{OP}	- 40 ℃ / + 85 ℃
storage temperature	T_{STG}	+ 90 ℃

Interface:

The sensor provides a 2.54 mm grid, single row pin header (square pin ☐ 0.635 mm).

Pin #	Description	In/Out	Comment
1	V_{CC}	input	supply voltage
2	IF1	output	signal output
3	GND	input	analog ground

Pin Description / Antenna Planes

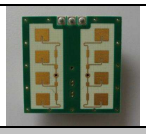
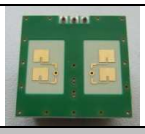
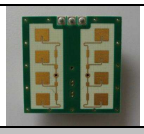
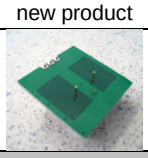


Common electrical characteristics:

Parameter	Symbol	min.	typ.	max.	Units	Comment
transmit frequency	$f_{Standard}$	24.000	24.125	24.250	GHz	
	$f_{\_UK\ variant}$	24.150	24.200	24.250	GHz	
	$f_{\_F\ variant}$	24.075	24.125	24.175	GHz	
temperature drift	Δf		- 1		MHz/℃	
IF output	voltage offset	-300		300	mV	
supply current	I_{CC}		30	40	mA	continuous operation
pulse length	t_{pulse}		10		µs	oscillator start time using V_{CC}
operating temperature	T_{OP}	-20		+60	℃	

Specific electrical characteristics:

new product

Parameter	Symbol	IPM-165			IPM-170			IPM-365			IPM-190		
output power (EIRP)	P_{out}	typ. 16 dBm			typ. 16 dBm			typ. 13 dBm			typ. 10 dBm		
antenna pattern	horizontal	typ. 80°			typ. 70°			typ. 80°			λ/4 dipole rod antennas		
	vertical	typ. 32°			typ. 70°			typ. 32°					
side lobe suppression	horizontal	typ. 13 dB			typ. 13 dB			typ. 13 dB					
	vertical	typ. 13 dB			typ. 13 dB			typ. 13 dB					
supply voltage	V_{CC} [V]	min 4.75	typ. 5.0	max. 5.25	min 4.75	typ. 5.0	max. 5.25	min 2.85	typ. 3.0	max. 3.3	min 4.75	typ. 5.0	max. 5.25
outline dimensions*	dim [mm]	~ 25 x 25 x 7 (12.7)			~ 25 x 25 x 7 (12.7)			~ 25 x 25 x 7 (12.7)			~ 25 x 25 x 7 (14.4)		

Cells marked in light green distinguish the respective sensor from the IPM-165.

* the numbers in brackets specify the size of the respective sensor including connector- and antenna pins. Compare drawing

Appendix A: Antennendiagramme / antenna patterns

K-Band Transceiver

model	no. of antennas	antenna pattern [°]		side lobe suppr. [dB]	comment
		horiz.	Vert.		
IPS-144	2	12	25	H = 20 / V = 13	
IPS-146	2	30	32	typ. 20	
IPS-154	2	45	38	typ. 13	
IPS-155	2	70	36	typ. 13	
IPS-168	2	5	21	max. 15	

K-Band VCO-Transceiver

model	no. of antennas	antenna pattern [°]		side lobe suppr. [dB]	comment
		horiz.	Vert.		
IVS-148	2	12	25	typ. 15	
IVS-162	2	45	38	typ. 13	
IVS-163	2	70	36	typ. 13	
IVS-167	1	11	11	typ. 15	
IVS-179	2	7	28	typ. 15	

Universal Low-Cost radar transceivers

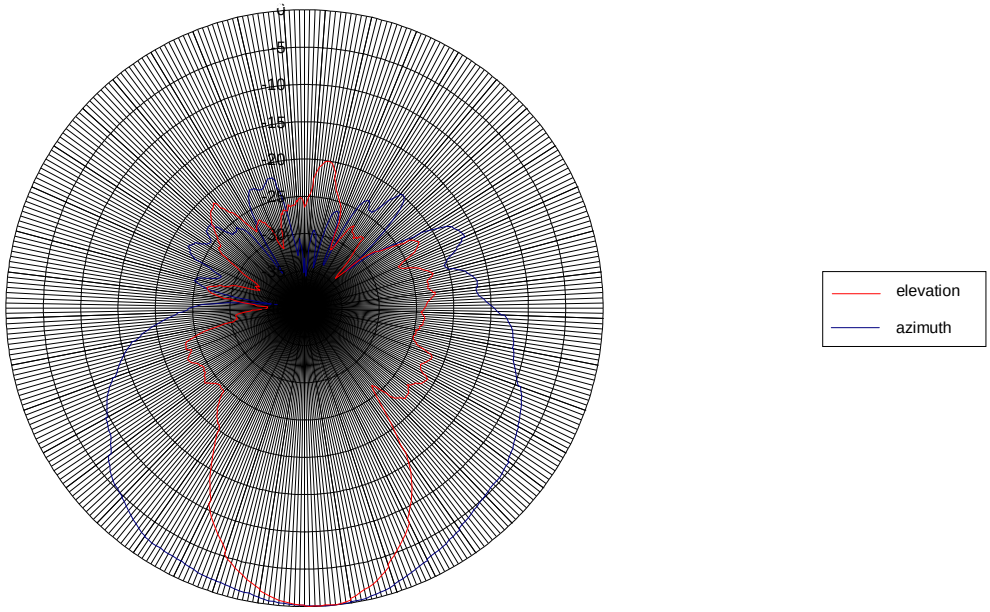
model	no. of antennas	antenna pattern [°]		side lobe suppr. [dB]	comment
		horiz.	Vert.		
IPM-165	2	80	32	typ. 13	
IPM-170	2	70	70	typ. 13	
IPM-365	2	80	32	typ. 13	
IPM-190	2	λ/4 dipole rod antennas			

Special Products

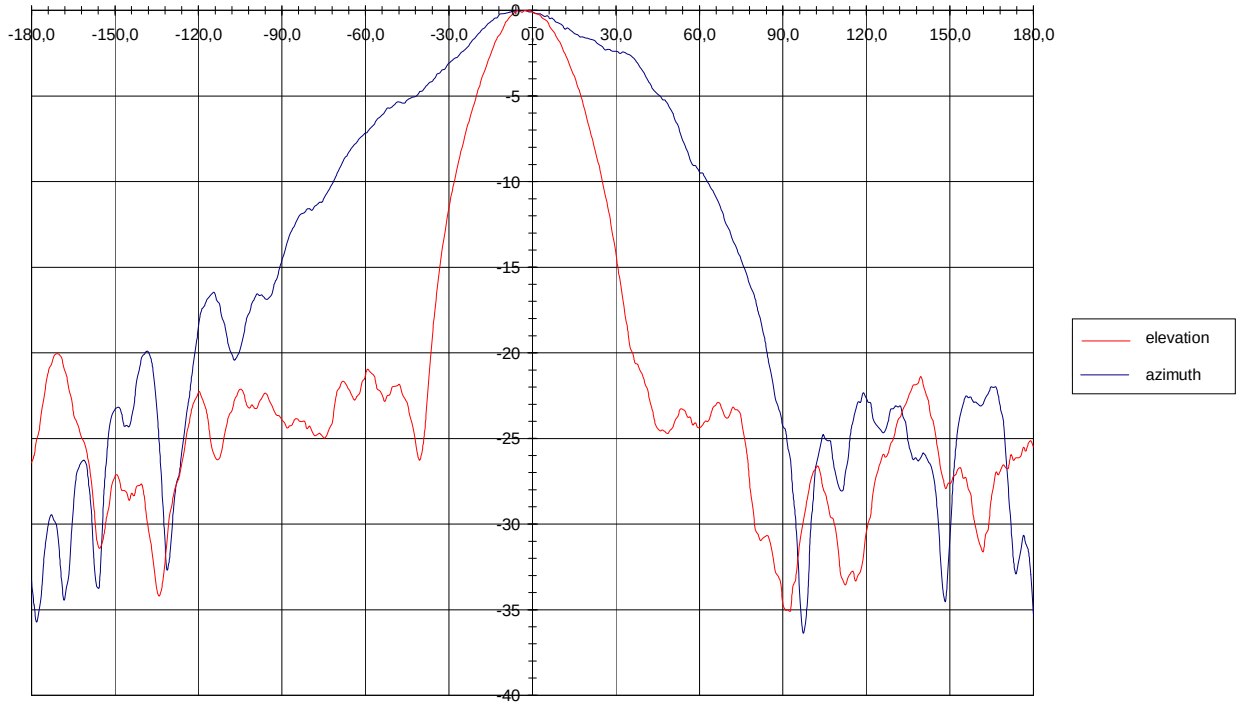
model	antenna	antenna pattern [°]		side lobe suppr. [dB]	comment
		horiz.	vert.		
IPB-114	1	31	15	typ. 18	Barrier
IVS-195	2	13	36	H = 20 / V = 13	PLL
IVQ-405	3	55 23	12 12	H = 10 / V = 15 typ. 15	RX TX

Low-Cost K-Band Transceiver: IPM-165 / IPM-365

Polardiagramm / *radiation pattern*



Richtdiagramm / *radiation pattern*



Parameter	Symbol	min	typ.	max.	units	comment
antenna pattern	horizontal		80		°	azimuth
	vertical		32		°	elevation
side lobe suppression	horizontal		13		dB	azimuth
	vertical		13		dB	elevation