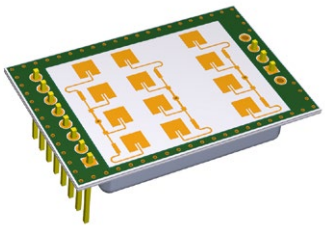
RFbeam Microwave GmbH

product information

K-LD7

digital radar transceiver

Available in Q2/2019



Features

- Small and low cost digital 24 GHz radar motion detector
- Measures distance, speed and angle of moving objects
- Detection distance: 15 m for persons/30 m for cars
- Target list output over serial interface
- Integrated FFT signal processing with digital outputs
- Detection distance and hold time can be set using analogue inputs
- Wide power supply range from 3.2 to 5.5 V
- 3 × 4 patch antenna with 80°/34° beam aperture

Applications

- Distance triggered movement detection applications
- Pedestrian counting
- Traffic counting
- Simple gesture recognition
- Indoor and outdoor lighting control applications

Description

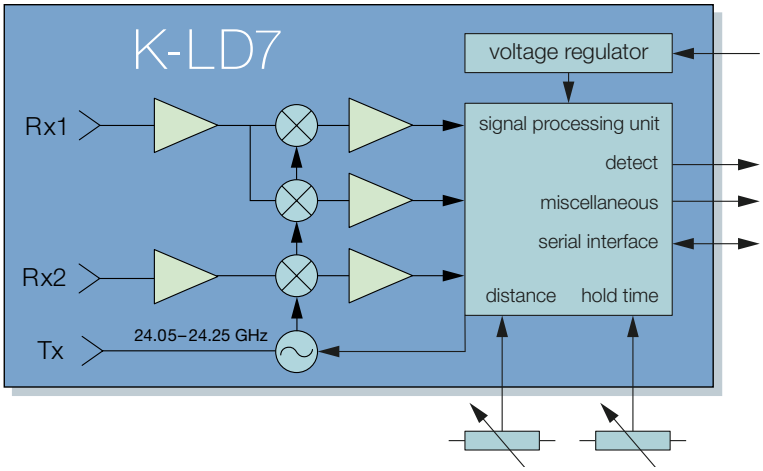
The K-LD7 is a fully digital and low cost Doppler radar that can measure speed, distance and angle of objects in front of the sensor. The digital structure and wide power supply range make it very easy to use in any stand-alone or MCU based application.

The sensor includes a 3 × 4 patch radar front-end with an asymmetrical beam and a powerful signal processing unit with two digital outputs for signal detection information. Detection distance and detection hold time are adjustable using analogue inputs with potentiometers. The serial interface features the possibility to read out a target list with speed, distance and angle information of all moving objects in front of the sensor or to digitally configure the sensors detection parameters.

There is no need to write own signal processing algorithms or handle small and noisy signals. This module contains everything that is necessary to build a simple but powerful motion detector with distance and angle information. A very small footprint of 38 × 25 × 7 mm gives maximum flexibility in the product development process. For fast prototyping an evaluation kit (K-LD7-EVAL) is available which features powerful signal visualization on a PC.

Block Diagram

Figure 1: block diagram



CHARACTERISTICS

Parameter	Conditions/Notes	Symbol	Min	Typ	Max	Unit
Operating Conditions						
Supply voltage		V_{cc}	3.2		5.5	V
Supply current		I_{cc}		150		mA
Operating temperature		T_{op}	-20		+85	°C
Storage temperature		T_{st}	-40		+105	°C
Transmitter						
Transmitter frequency	T_{amb} = -20 °C .. +85 °C	f_{TX}	24.050		24.250	GHz
Output power	EIRP	P_{TX}		12		dBm
Spurious emissions	According to ETSI 300 440	P_{spur}		-30		dBm
Receiver						
LNA gain		G_{LNA}		19		dB
Mixer conversion loss	f_{IF} = 1 kHz	D_{mixer}		10		dB
Antenna gain	f_{TX} = 24.125 GHz	G_{Ant}		8.6		dBi
Receiver sensitivity	f_{IF} = 500 Hz, B = 1 kHz, S/N = 6 dB	P_{RX}		-112		dBm
Overall sensitivity	f_{IF} = 500 Hz, B = 1 kHz, S/N = 6dB	D_{system}		-127		dBc
Max. detection distance	σ = 1 m² (Person)	R		15		m
Signal Processing						
Modulation				FSK		
Velocity processing				256 point complex FFT		
Speed range	Maximum digitally controllable	r_{speed}	0		20/50/100	km/h
Distance range	Maximum digitally controllable	$r_{distance}$	0		10/30/100	m
Antenna						
Horizontal -3 dB beamwidth	E-Plane	W_{φ}		80		°
Vertical -3 dB beamwidth	H-Plane	W_{θ}		34		°
Horiz. sidelobe suppression		D_{φ}	-12	-20		dB
Vertical sidelobe suppression		D_{θ}	-12	-20		dB
Rx1/Rx2 spacing		l		6.223		mm
Interface						
Digital output high level voltage		$V_{OH@8mA}$	2.4		3	V
Digital output low level voltage		$V_{OL@8mA}$	0		0.4	V
Digital output high level voltage		$V_{OH@20mA}$	1.7		3	V
Digital output low level voltage		$V_{OL@20mA}$	0		1.3	V
Digital input high level voltage		V_{IH}	1.7		4	V
Digital input low level voltage		V_{IL}	-0.3		1.3	V
Digital I/O source/sink current		I_{OH}, I_{OL}	-20		20	mA
Analogue input level		V_{Ain}	0		3	V
Analogue input impedance		Z_{in}			50	kΩ
Body						
Outline dimensions				37×25×7		mm³
Weight				5		g
Connector			3 pin 2.54 mm / 8 pin 2.54 mm			