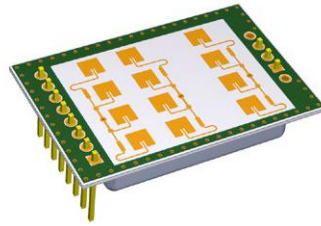


product information

# K-LD7

digital radar transceiver



## 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/30m 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 5.5V
- 3 x 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

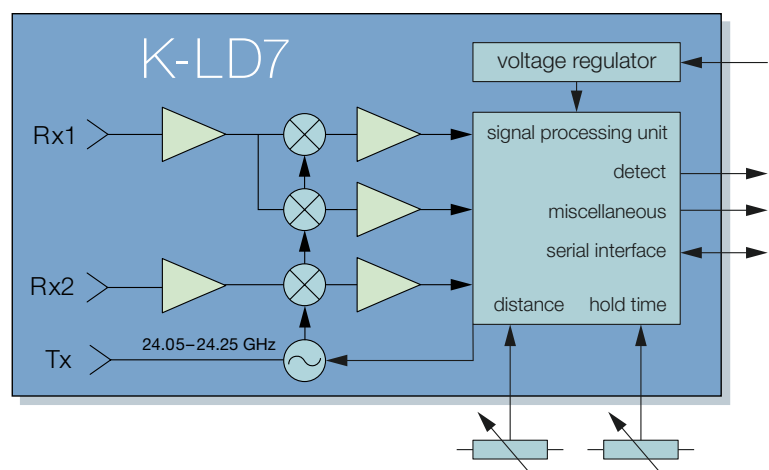
The K-LD7 is a fully digital and low cost Doppler radar that can measure speed, distance and angle of objects in front of the sensor. The digital structure and wide power supply range make it very easy to use in any stand-alone or MCU based application.

The sensor includes a 3 x 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 x 25 x 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
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## 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	$T_{amb} = -20^{\circ}\text{C} \dots +85^{\circ}\text{C}$	$f_{TX}$	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	$f_{IF} = 1\text{kHz}$	$D_{mixer}$		10		dB
Antenna gain	$f_{TX} = 24.125\text{GHz}$	$G_{Ant}$		8.6		dBi
Receiver sensitivity	$f_{IF} = 500\text{Hz}$ , $B = 1\text{kHz}$ , $S/N = 6\text{dB}$	$P_{RX}$		-112		dBm
Overall sensitivity	$f_{IF} = 500\text{Hz}$ , $B = 1\text{kHz}$ , $S/N = 6\text{dB}$	$D_{system}$		-127		dBc
Max. detection distance	$\sigma = 1\text{m}^2$ (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	$W_{\phi}$		80		°
Vertical -3 dB beamwidth	H-Plane	$W_{\theta}$		34		°
Horiz. sidelobe suppression		$D_{\phi}$	-12	-20		dB
Vertical sidelobe suppression		$D_{\theta}$	-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	k $\Omega$

## Body

Outline dimensions				37×25×7		mm <sup>3</sup>
Weight				5		g
Connector				3 pin 2.54 mm/8 pin 2.54 mm		