socionext™

CMOS Radar sensor with three measurement modes

CMOS 24-GHz Radar Sensor

Ultra-small 24-GHz Radar sensor with superior detection
This is a FMCW/FSK capable sensor for short distance measurement.

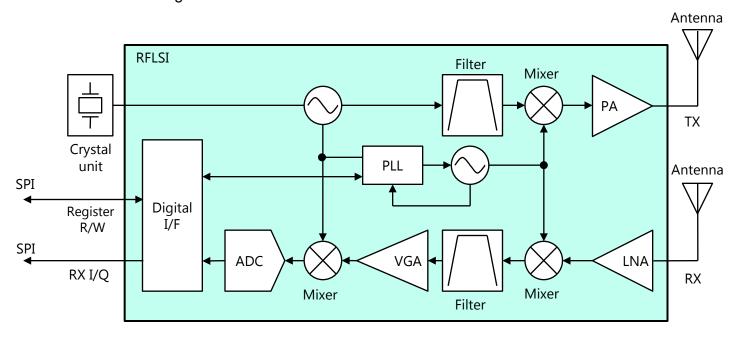**Clutter cancellation function to cut the leakage radio waves**

■ Overview

This is a CMOS single-chip 24-GHz Radar sensor module with a variable-frequency transmitter and an ultra-high sensitivity radio wave receiver. This module has 3 sensing modes of Doppler mode, FSKCW mode, and FMCW mode, detecting stationary or moving objects and measuring the distance.

<Key Features>
- High-performance clutter cancellation function to prevent the direct leakage of transmission wave and cancel out the unnecessary reflected wave, enabling the highly accurate motion sensing
- Automatic adjustment function for the variation of components or the variation with temperature in transmission power, receiver gain, and other parameters

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■ Functional Block Diagram

■ Key Specifications

Feature	Typical characteristics	Description
ARIB T73 compliant	24.15 ±0.1 GHz	Specified low-power radio stations, ISM band
Sensor type	CW, FSKCW, FMCW	Sensor type selectable depending on the target object (moving or stationary)
Transmission power	0.8mW	Transmission output power of RFLSI
Detection of motion direction	Detection of approaching and leaving	I/Q output, SSB transmitter and image rejection receiver
Detection of motion speed	Up to 220 km/h	Detecting frequency (Doppler frequency): up to 10 kHz
Detection of wide-range distance	0.5 m to 8 m 80° @-3dB	Receiver gain control
Variable frequency width	24.15 ±0.1 GHz	Built-in VCO varactor, Frac-N PLL
Fast frequency pull-in	100 µs	Frac-N PLL
Automatic adjustment		Built-in initial adjustment function (e.g., adjustment of RC for filter)
Power supply voltage	2.5 V	The RF circuit operates at 1.2 V with the internal regulator.
Power consumption	200 mA	Intermittent operation allows operating current to be reduced.

■ Applications

Digital Signage
Turns ON/OFF as people approach/leave.
Available for outdoor use,
with excellent environmental resistance.

Observation (non-contact heart rate /respiration sensor)
Detects heart or lung movement and other small movements as Doppler shift.