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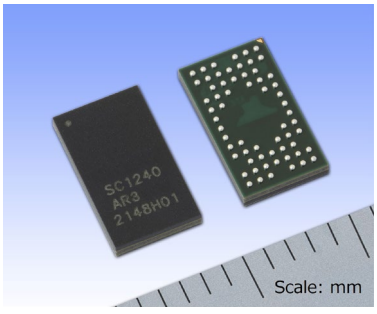
60GHz Radio-wave ranging sensor 3D Detection model SC1240AR3

SC1240AR3 is an extremely low-power and intelligent CMOS 60GHz radar sensor device and available for 3D (including 1D, 2D) sensing without an external MCU.

It contains a high-performance signal processing unit and detects the 3D position of moving objects and the presence of the objects in any specific area.



SC1240AR3

■ Features

● Suited for 1D to 3D sensing

- 1 Tx and 2x2 Rx antennas detect azimuth/elevation angle, velocity and distance
- Wide bandwidth (6.8 GHz max.) and high-accuracy linear chirp FMCW radar
- Sensing area: Up to 0.5 m[*1] with a resolution of less than 1 cm[*2] (in case of palm gesture)
  Up to 15 m[*1] with a resolution of less than 12.4 cm[*2] (in case of human detection)

● Highly integrated device enabling easy hardware design

- Integrates signal processing unit (Distance/Angle/Presence detection), antennas, RF circuit, ADC, FIFO and SPI interface, and has a self-boot function
- Enable to use reasonable PCB, less BOM and easy assembly
- Small package (4.0 mm x 7.0 mm, BGA package)

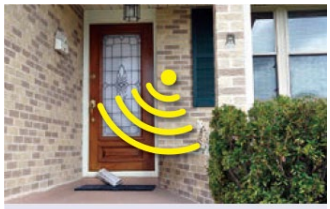
● Low power consumption

- 4-level operation states (Shutdown, Deep Sleep, Light Sleep, Sensing)
- Intelligent power control sequencer managing flexible duty cycle operation

*1: Depending on sensor configuration and environmental conditions

*2: To be changed according to further study

■ Applications

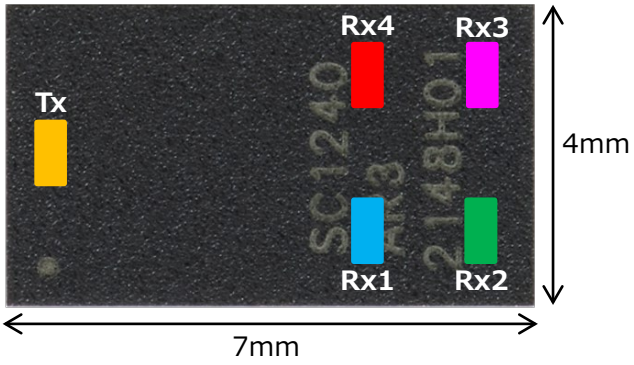

Detection of people at the front door (use in a doorbell)


Detection of people in rooms such as the living room(use in a smart thermostat)

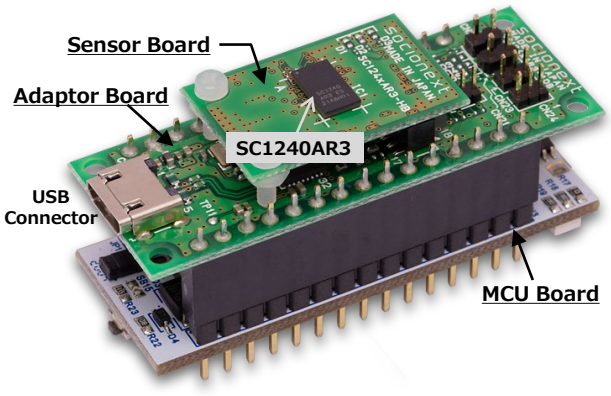

Detection of people to switch the liquid crystal display of smart home appliances on and off


Gesture operations

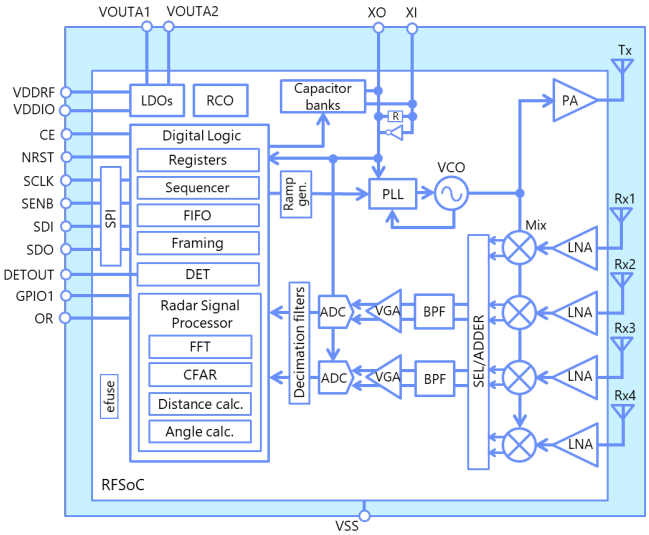
Antenna Configuration



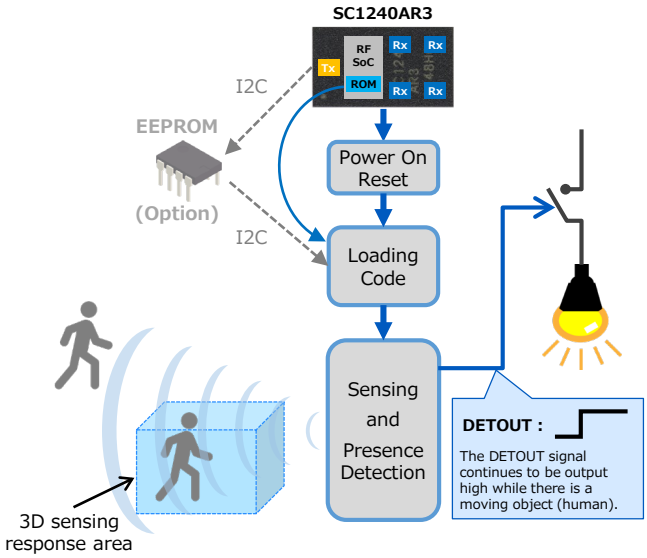
Evaluation Kit



Block Diagram



Example of use case (ROM mode)



Specifications

Radar mode	FMCW (Frequency Modulated Continuous Wave)
Power supply	1.8 V (Core) / 1.8 V - 3.3 V (I/O)
Power consumption	0.7 mW (Operation average*3) / 250 mW (Operation maximum)
Transmitter	Frequency: 57.1 - 63.9 GHz (bandwidth: up to 6.8 GHz), EIRP: +3.0 dBm
Receiver	Noise Figure: 12 dB
Digital block	Radar signal processing (3D location detection, Presence detection), Self-boot ROM
Temperature	-40 to 85℃
Sensor output	Distance detection result, 3D position (X, Y, Z) detection result, Presence detection result

*3: In case of 0.1% duty cycle operation

Deliverables of the Evaluation kit

- SC1240AR3 evaluation kit hardware with USB cable
- Sensor driver/ library and 3D location sensing evaluation software (GUI)
- Related documents
  - Evaluation software (GUI) operation manual
  - Application note (Sample C source for API)
  - Control API specification

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