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.

- **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

Block Diagram

Evaluation Kit

Example of use case (ROM mode)

Specifications

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

*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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