

Application brief

60 GHz in cabin monitoring system

Enhancing vehicle occupant safety to the next level

In-cabin monitoring systems are becoming more and more present thanks to the new in-vehicle experiences and new regulations for user's safety. They can be split in different applications with different technologies.

- **Driver Monitoring System** (DMS) can be supported with technologies such as 2D and 3D cameras, while for the **Occupant Monitoring System** (OMS) a radar solution is preferred (for precision and privacy reasons).
- **The radar based technology** can cover different type of applications like: the **Occupant Status Monitoring** (OSM) and even the **Seat Belt Reminder** (SBR).
  - Child Presence Detection (CPD) or Rear Occupancy Alert (ROA)
  - Occupancy Status Monitoring (OSM) including Seat Belt Reminder (SBR)
  - Respiratory rate monitoring for occupant wellbeing
  - Occupant classification of a child or adult optimizing airbag deployment
  - Driver monitoring supporting established camera based systems offering redundancy and vital sign detection
  - Object detection to distinguish between persons, pets or parcels
  - Gesture detection
  - Vehicle intrusion detection

Innovative signal processing techniques potentially take these applications to a next level of robustness providing a good compromise between computational costs, degree of information needed for the many different user-cases as well as the optimizing the power consumption of the system. In the future, the multi-sensor fusion approach is expected to penetrate many more robust systems by offering sensor redundancy.

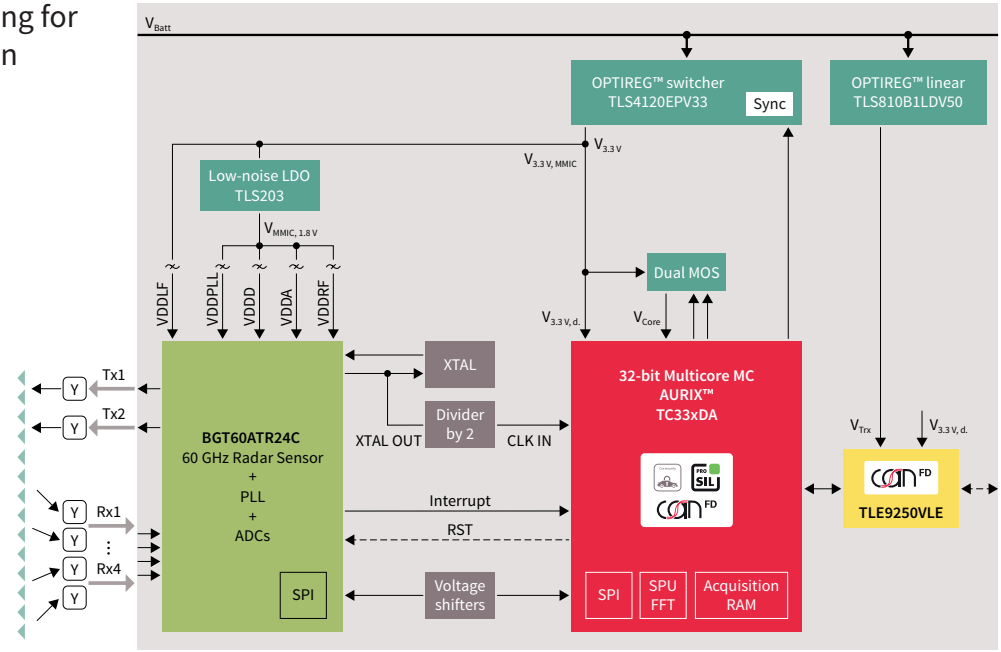
The Infineon product portfolio offers best in class performance, features and scalability meeting the necessary requirements in order to address the growing number of user cases. The following product families combined will enable a state of the art radar based in cabin monitoring system:

XENSIV™ BGT60ATR24C, an automotive 60 GHz radar sensor, enables ultra-wide bandwidth FMCW operation in a small package. Sensor configuration and data acquisition are enabled with a digital interface and the integrated state machine enables independent data acquisition with power mode optimization for lowest power consumption.

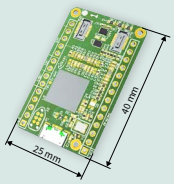
AURIX™ high performance microcontroller portfolio features 3 TriCore™ running at 300 MHz, 2 checker cores achieving highest functional safety levels (ASIL-D) and Signal Processing Units (SPU) dedicated to radar processing in addition to a high security data encryption module for secure communication.

The OPTIREG™ power supply product families offer a large range of devices meeting the power needs specific to noise sensitive radar based systems.

Infineon's offering for mass production

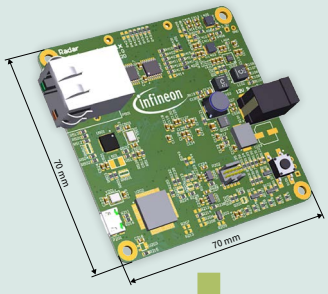


Radar baseboards for demonstrations and prototyping



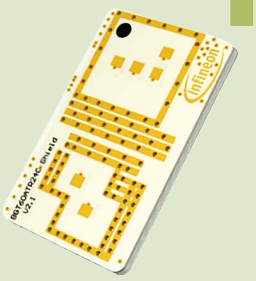
Radar baseboard MCU7

- For rapid prototyping and data acquisition via a PC
- High-speed USB 2.0 interface
- Compatibility with Arduino MKR standard
- Operates with radar GUI
- Resources: 300 MHz & 384 kByte (SRAM)
- Dimension: 40.64 x 25.4 mm



Radar baseboard AURIX™ TC356TA

- Embedded signal processing
- IFX MCU scalability
- Ethernet and CAN interfaces
- SPU
- Visualization support through GUI like Range Doppler etc.
- Resources: 300 MHz & 4 MB (SRAM)
- Dimension: 70 x 70 mm



BGT60ATR24C RF Shield (34V2.0)

- Bandwidth: 4 GHz
- Range resolution 3.75 mm
- HPBW: 80°H / 100°E
- Angular Accuracy (±30° span): 2.5°H / 3.5°E
- Angular resolution: 29 °H / 38 °E
- Dimension: 16 x 26 mm
- Virtual array:

[www.infineon.com > Application Page](www.infineon.com)

www.infineon.com

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