



Product brief

Automotive 60 GHz radar application kit

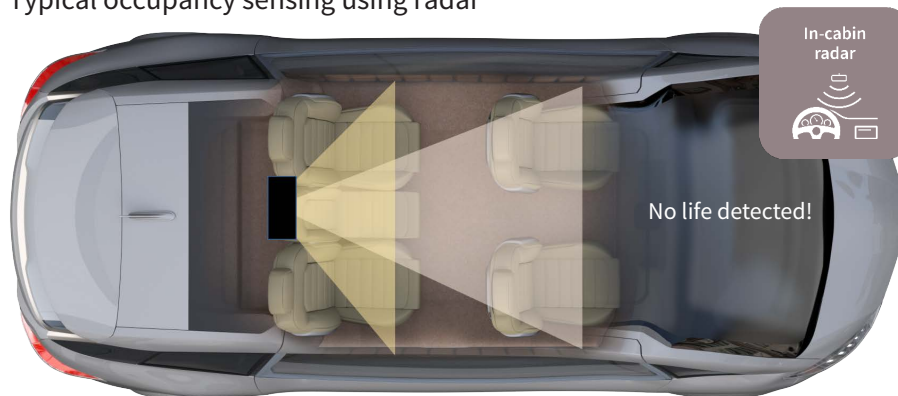
SHIELD_ATR24ES_01 + KIT_AURIX_2G_RADAR

All Infineon embedded platform for 60 GHz ultra-wideband radar sensing

XENSIV™ BGT60ATR24C + AURIX™ TC356TA + OPTIREG™
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Automotive electronic market is undergoing radical changes with strong demand of safety and comfort features and high level of automation. The interior systems of the cabin are reshaping to provide a holistic driving experience. Radar sensor solutions are seen as one of the most promising technologies to address numerous passive safety applications like left-behind child detection, driver vital monitoring and occupancy sensing due to their ability to sense micro motions aesthetically.

Typical occupancy sensing using radar



Infineon's BGT60ATR24C has been designed for ultra-short range applications with best in-class jitter performance, ultra-low power consumption, wideband operation and robustness. The platform offers cognitive sensing solution with multiple transmit/receive for virtual array configurations, highly agile modulation generation mechanism, automatic power mode configurability and simplified interfaces between RF and processing side.

Infineon's TC356TA microcontroller features 3 TriCore™ running at 300 MHz, 2 checker cores to achieve highest functional safety levels (ASIL-D) and 2 Signal Processing Units (SPU) dedicated to radar processing. The configurability and scalability of BGT60ATR24C and TC356TA makes the platform suitable for a wide range of applications. DEMO BGT60ATR24C P2S Board is designed to develop application algorithms and measure the critical performance parameters with minimum setup effort.

Key features

- > Modular architecture
- > Automotive qualified components
- > Virtual array processing (TDM MIMO)
- > Ultra-wideband operation of 4 GHz
- > Optimized performance versus power with SPU
- > Power consumption
 - MMIC (deep sleep) 0.25 mW
 - MMIC (full-active) 450 mW
 - MCU (full-active) less than 2 W
- > 1 Gbit Ethernet and 8 CAN channels

Benefits

- > Easy installation in vehicles for rapid prototyping
- > Embedded algorithm development
- > Maximal re-use with various antenna topologies
- > Quick start-up with full software environment
- > Scalable MCU family

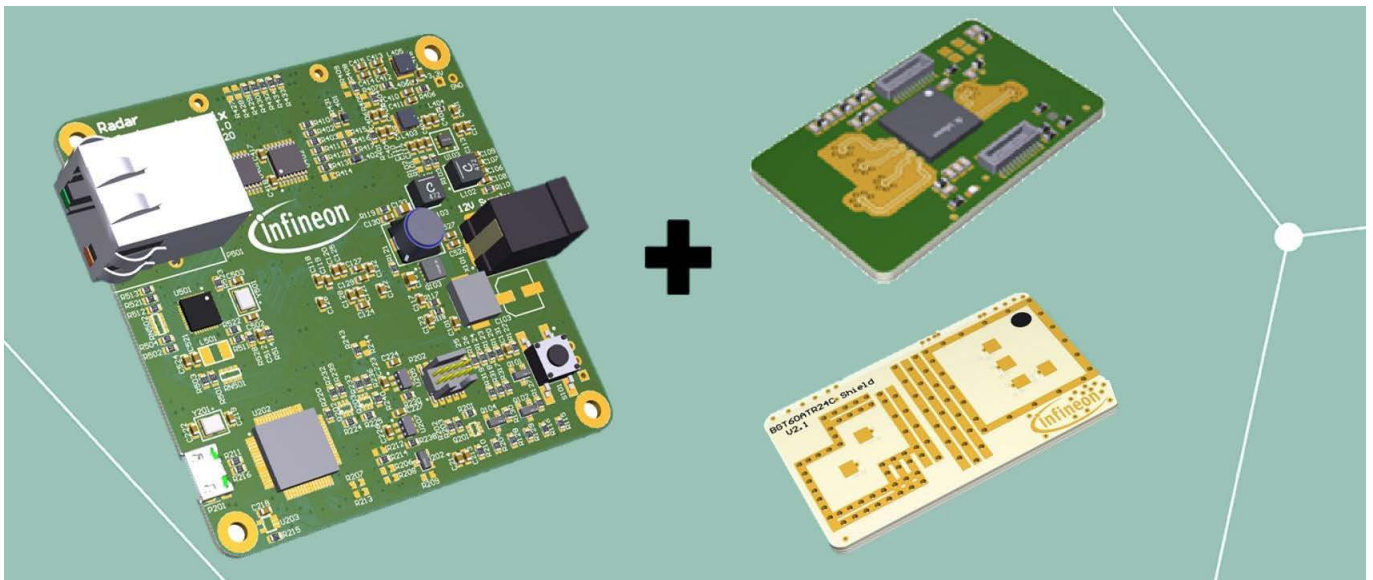
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The platform operates in **58–62 GHz** with a continuously usable bandwidth of **4 GHz**. The associated modular ecosystem **DEMO BGT60ATR24C P2S Board** constitutes of:

- > **SHIELD_ATR24ES_01**: BGT60ATR24C enabled RF shields with 3 x 4 virtual antenna array topology
- > **KIT_AURIX_2G_RADAR**: TC356TA enabled radar baseband board
- > **Infinion toolbox package**: The GUI, software and firmware with application notes, datasheets, communication library, schematics and gerber files etc. are contained in the package named as 'Radar BGT60ATR24C P2S' in Infineon toolbox.

(Left): KIT_AURIX_2G_RADAR (Right): SHIELD_ATR24ES_01



Functional description

The chipset offers the full functionality of standalone high-performance radar ECU with various types of bus interfaces available (e.g. CAN-FD, Gigabit-Ethernet, etc.).

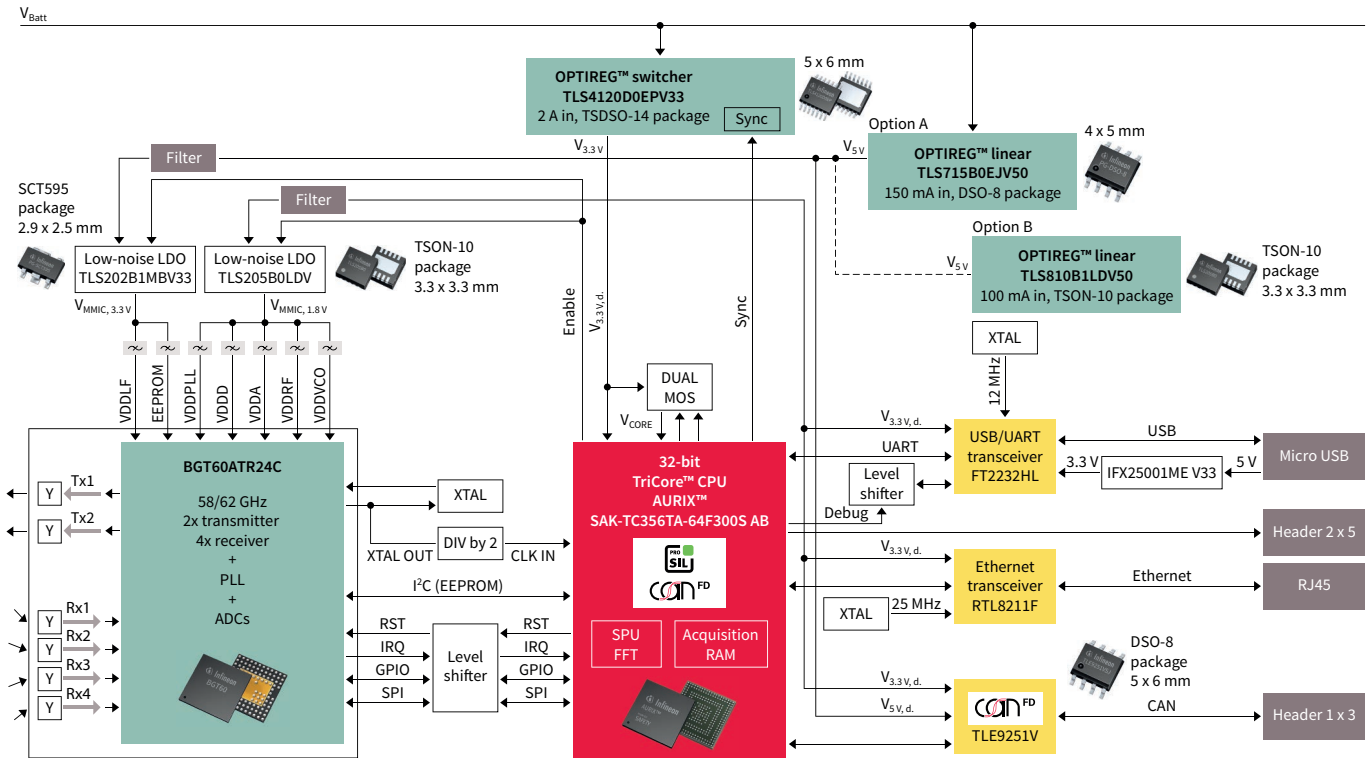
The MMIC (XENSIV™ BGT60ATR24C) is a fully integrated radar transceiver operating in the frequency band from 58 to 62 GHz. It is a state-of-the-art radar chip featuring 2 transmit channels, 4 receive channels, a low noise Phase Locked Loop (PLL), an integrated anti-aliasing Loop Filter (LF), sequencer and finite state machine for ramp generation, integrated RX baseband including Analog to Digital Conversion (ADC), sensor ADCs for temperature and power monitoring – all within a single chip. The digitized time signals are forwarded via the SPI interface to the application controller where they are being processed further.

The AURIX™ scalable microcontroller family offers multiple options to support in-cabin monitoring from low-cost to high performance systems. The μ C (AURIX™ TC356TA) offers 3 cores at 300 MHz, up to 3.6 MB embedded RAM. Its mirrored embedded flash banks (2x 2 MB) support A/B swap capabilities. The MCU is responsible both for configuring / monitoring the operation of the RF components and processing the digital baseband data. The customer can utilize the radar signal-processing units (SPUs) to accelerate the throughput (e.g. 1 cycles per bin) while keeping the computational power consumption at a minimum.

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DEMO BGT60ATR24C P2S board



Evaluation support

To analyze the chipset capabilities, **DEMO BGT60ATR24C P2S board** can be ordered by purchasing two boards separately. Please contact your sales to order RF shield with sales name **SHIELD_ATR24ES_01** and baseband board with sales name **KIT_AURIX_2G_RADAR**. Please make a myInfineon account and contact your sales for accessing radar BGT60ATR24C P2S package.

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