

# XENSIV™ BGT60CUTR13AIP



## Infineon's 60 GHz CMOS radar sensor for IoT

The XENSIV™ BGT60CUTR13AIP is the lead type of Infineon's new CMOS radar sensors family for consumer and IoT applications.

The sensor is designed for **ultra-low power** and **system cost optimization**. Manufactured in 28 nm RF CMOS technology, the MMIC integrates blocks like LDO and XTAL, as well as a **Hardware Accelerator (HWA)** for processing.

The **integrated Hardware Accelerator (HWA)** allows the device to operate **autonomously** and offload complex tasks from the host MCU by running either radar **pre-processing** or the complete **motion detection on-chip**.

Key highlights of the Hardware Accelerator (HWA) include processing steps such as **2D FFT, filtering, 2D CFAR, and Angle of Arrival** estimation. The **motion detector** delivers **up to 8 targets**, including **range, velocity, azimuth, elevation, and magnitude**. To **improve robustness** and **reduce false alarms**, users can configure the radar to **mask information** below specific thresholds (e.g., range or velocity) or **exclude up to 112 range-angle zones**. This offers exceptional flexibility for custom detection scenarios.

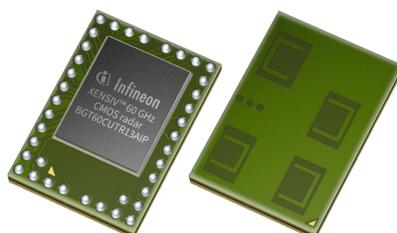
The XENSIV™ BGT60CUTR13AIP achieves exceptional resolution with its ultra-wide 7 GHz bandwidth FMCW operation. It can detect even sub-millimeter movements and the micro-motions of nearly static targets. The **output power of 11 dBm** ensures reliable detection ranges of over **20 m** in boresight and **16 m** across the entire field of view.

The **compact Antenna-in-Package (AIP)** design, featuring **one transmitting (Tx) channel and three receiving (Rx) channels in a L-shaped configuration**, enables both azimuth and elevation angles while maintaining a small form factor of just 4.3 x 6.05 mm<sup>2</sup>. This cost-optimized design strikes an excellent balance between performance and affordability.

The integrated hardware sequencer and **Finite State Machine (FSM)** offer users full flexibility in defining configurable chirps and timings, while ensuring cycle-accurate data acquisition. Together with the embedded Hardware Accelerator (HWA) and an integrated bootloader, the MMIC is able to run fully autonomous ultra-low power presence detection to wake the host MCU. Achieving power consumption of less than 1 mW in ultra-low power autonomous mode the XENSIV™ BGT60CUTR13AIP targets low power and battery powered IoT applications.

### Target applications include

- **Smart home and building automation**, such as security camera, video doorbell, HVAC systems, and smart thermostat
- **Consumer electronics**, such as smart speakers, smart TVs, and home appliances
- **Healthcare**, such as baby monitors and sleep tracker
- **Robotics**, such as vacuum cleaners and lawn mowers
- **Wearables**, such as headphones, smart glasses and smartwatches



### Key features

The XENSIV™ BGT60CUTR13AIP is a **60 GHz** radar sensor with a detection range of more than **20 m** and power consumption of less than **1 mW**.

#### Key figures

- 4.30 x 6.05 x 0.9 mm<sup>3</sup> package size
- 1 Tx, 3 Rx Antenna-in-Package (AiP)
- 30 dB Tx-to-Rx isolation
- 11 dBm output power
- 5 dBi antenna gain
- 7 GHz ultra-wide bandwidth
- 700 MHz/μs ramp speed
- 12-bit ADC channel
- 20 MSps ADC sampling
- 50 MHz SPI interface
- -20 to +85°C operating temperature

### Key benefits

- Optimized for **ultra-low power** and battery-powered IoT
- **On-chip processing** via Hardware Accelerator (HWA)
- **Integrated bootloader** for autonomous wake-up
- **Small size** (26 mm<sup>2</sup>) covering both azimuth and elevation
- **System-level cost optimization** by integration of supporting blocks



Presence detection



Segmentation angular zones



Gestures



Vital sensing



IoT

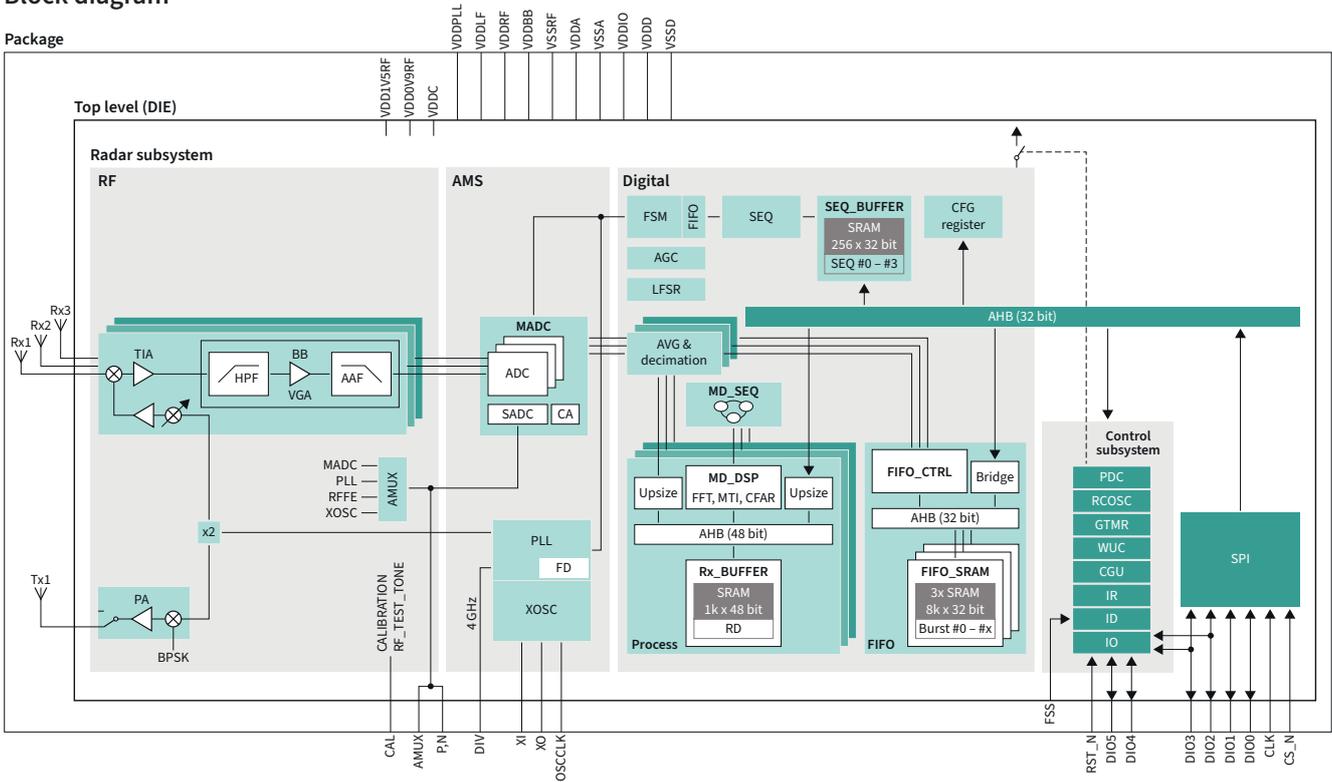
**PRODUCT BRIEF**

The XENSIV™ BGT60CUTR13AIP consists of several analog and digital blocks: Radio Frequency (RF) front-end, Analog Base-Band (ABB), Analog-to-Digital Converter (ADC), Phase-Locked Loop (PLL), FIFO (First-In, First-Out) memory, Serial Peripheral Interface (SPI) and antennas. For power efficiency reasons, the BGT60CUTR13AIP has an embedded Hardware Accelerator (HWA) based pre-processing which helps reduce data rates. The sensor is optimized for high power efficiency, achieved through the integration of domain-specific Low Drop-Out

voltage regulators (LDOs), the separation of logic into power domains that are dynamically controlled by hardware, and the use of both low-power RC oscillator (RCOSC) and high-precision crystal oscillator (XOSC) on-chip.

The sensor also includes a fully embedded standalone Motion/ Presence Detection (MD) processing module that can detect moving targets within its field of view and notify the host via an interrupt.

**Block diagram**



**Product overview**

Sales name	SP number	Description	Status
BGT60CUTR13AIP	SP005729332	Radar MMIC	QS available, MP Q1 2026

Published by  
 Infineon Technologies AG  
 Am Campeon 1-15, 85579 Neuberg  
 Germany

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Public

Date: 10/2025

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