

## Product brief

# BGT60LTR11AIP

## A completely autonomous radar sensor

**The BGT60LTR11AIP is a fully integrated microwave motion sensor** including Antennas in Package (AIP) as well as built-in detectors for motion and direction of motion. A state machine enables operation of the sensor without any external microcontroller. In this autonomous mode, it detects a human target up to 7 m with a low power consumption.

**The BGT60LTR11AIP enables radar technology for everyone**, since it does not require know-how in RF, antenna design or radar signal processing. These features make the small sized radar solution a compelling smart and cost-effective replacement for conventional PIR sensors in low power or battery-powered applications.

**The BGT60LTR11AIP adds 'smartness' to traditional motion sensing applications and beyond:**

- > Smart home devices (Thermostats, smoke detectors, smart speakers, etc.)
- > Smart building (Contactless switches, occupancy & proximity sensors, etc.)
- > Smart appliances (Vacuum cleaners, kitchen appliances, etc.)
- > Smart lighting systems
- > Security systems including IP cameras
- > Automated door openers
- > Screen based systems (TV, notebook, tablet, etc.)



This radar sensor can be integrated into such systems to 'wake' them up, put them to sleep or auto-lock when no motion is detected for a defined amount of time. It can also trigger another functionality based on motion or direction of motion detection.

This way, it can be a smart power saving feature for many devices. Furthermore, the radar sensor can be hidden in the end product since radar operates through non-metallic materials. Therefore, the BGT60LTR11AIP enables a seamless integration of radar technology in our day-to-day lives.

### Key features

The BGT60LTR11AIP is designed as a low-power Doppler radar sensor operating in the 60 GHz ISM-band<sup>1</sup>.

- > 3.3 x 6.7 x 0.56 mm package size
- > 1Tx 1Rx Antennas in Package (AIP) with 80 ° Half Power Beam-Width
- > Built-in motion detector
- > Built-in direction of motion detector
- > Multiple modes of operation incl. a completely autonomous mode
- > Adjustable performance parameters: detection sensitivity, hold time and frequency of operation
- > FR4 material for PCB design



### Key benefits

#### Autonomous mode:

- > Up to 7 m detection range
- > Less than 2 mW power consumption
- > Requires minimal external circuitry incl. crystal, LDO and some resistors capacitors (BGT60LTR11AIP shield).

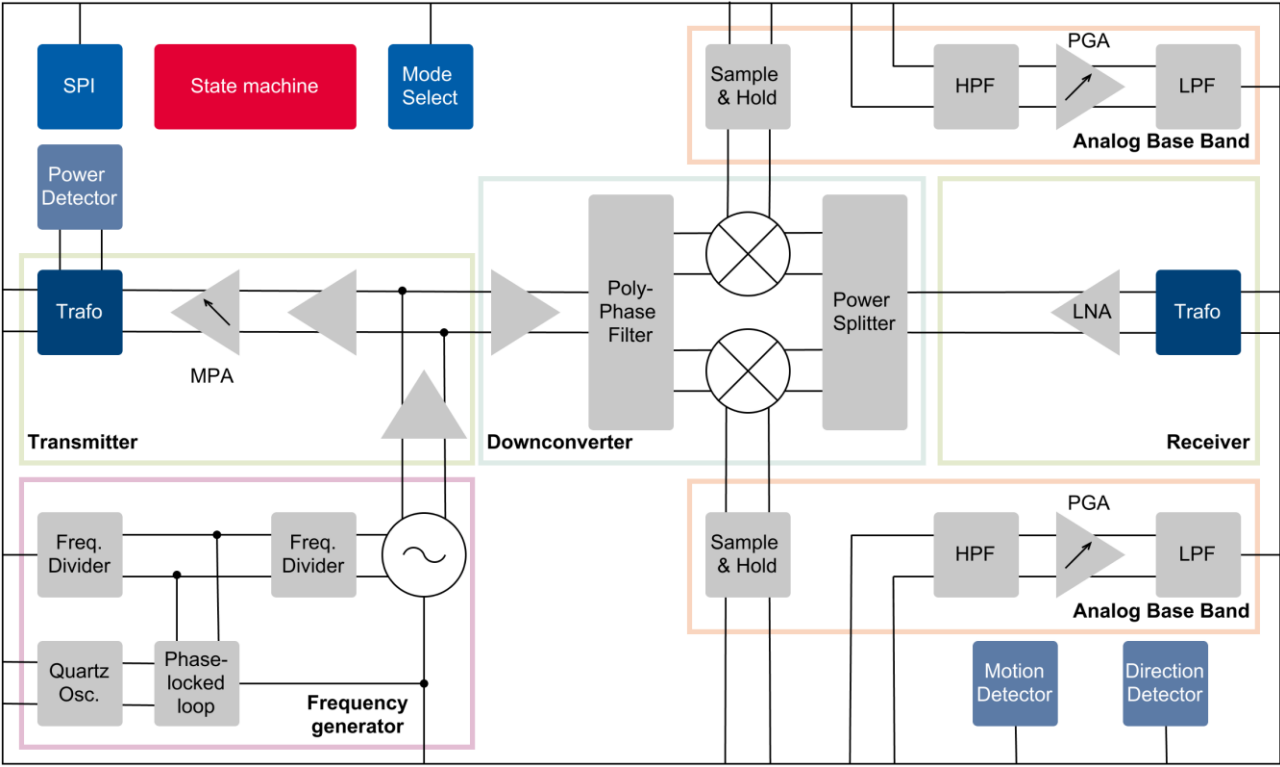
#### Adding a M0 MCU extends flexibility:

- > Up to 10 m detection range (SPI mode)
- > Advanced functionalities by SPI configuration or signal processing

# BGT60LTR11AIP

Fully integrated microwave motion sensor including antennas in package

## Block diagram of the radar sensor MMIC



## Four quad states allow multiple degrees of freedom

The radar sensor has four quad-state (QS1-4) input pins that give the performance parameters flexibility even when it is running in autonomous mode. For instance, the user can easily select between 16 values at QS2 to increase or reduce the detector sensitivity in order to change the detection range. The table on the left displays the QS parameter settings.

QS	Parameter
1	Radar operation mode
2	Detector sensitivity (~detection range)
3	Signal hold time after target detection
4	Radar sensor operating frequency

In the SPI mode (selected via QS1 pin), the radar raw data can be extracted from BGT60LTR11AIP for signal processing on PC or an external MCU. This sampled radar data can be used for developing customized algorithms.

<sup>1</sup>Product fulfills ETSI & FCC standardization.

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