

24GHz radar sensor

Infinion offers a wide portfolio of mmWave radar sensors to address different customer requirements. The BGT24M/L family is the largest and highest integrated 24GHz radar transceiver family currently on the market, saving ~30 percent board space compared to discrete line ups. Infineon provides a total of four 24GHz industrial radar chips, providing a range of different transmitter and receiver channel configurations, supporting different application requirements.

Applications

- > Building and smart home (IoT)
- > Indoor/outdoor lighting
- > Smart street lighting
- > UAV/multicopter
- > Security
- > Robotics



Key benefits

- > Direction, proximity and speed detection
- > Hidden mounting capability
- > Maintains operation through harsh weather conditions
- > Motion tracking
- > Ghost target suppression
- > Target positioning
- > Adaptable to different application requirements

In addition to the Infineon BGT24M/L family of MMIC chips, Infineon provides a continuously expanding range of evaluation and demo boards to support the testing and development of radar in multiple applications. All boards are provided with base level software to support ease-of-use and faster to market integration.

Utilizing our strong network of partners, the radar portfolio is extended to include a range of easy-to-integrate modules which each contain an Infineon 24GHz MMIC.

Infineon's radar offerings

Infineon MMIC	Evaluation and demo boards	Radar modules
BGT24M/L family	Supporting testing and development	Turnkey modules and design support

Infinion BGT24M/L family of MMIC chips

The Infineon range of 24GHz industrial radar chips provide four configurations of transmit and receiver channels ensuring there is a chip to support your specific application. From basic applications such as motion detection in security systems which only require one transmit and one receive channel, through to more complex applications like 3D positioning which require two or more receive channels, our range of radar chips support all of your requirements.

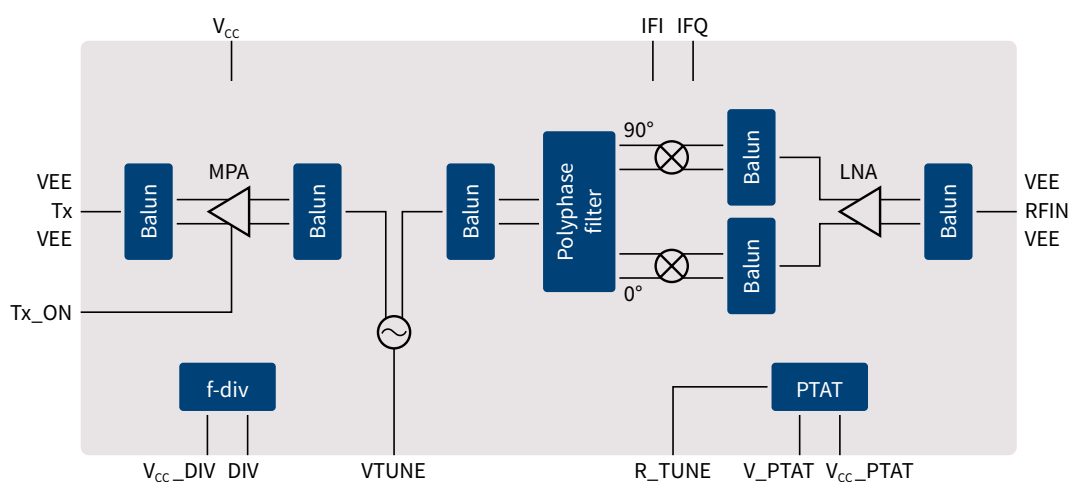
Features	Infineon MMIC	Benefits
<ul style="list-style-type: none"> > 24GHz ISM band operation for motion, speed, direction movement and distance measurements > 4 MMIC chips available 		<ul style="list-style-type: none"> > Long range distance detection of moving objects up to 30 m > Wide range speed detection up to ± 100 km/h

BGT24MTR11	BGT24MR2	BGT24MTR12	BGT24LTR11
<ul style="list-style-type: none"> > Transceiver 1Tx+1Rx/ IQ differential > RF_{in} 24.0-26.0 GHz > 500 mW @3.3 V > 4.5 x 5.5 mm -VQFN-32 	<ul style="list-style-type: none"> > Twin receiver 2Rx/ IQ differential > RF_{in} 24.0-26.0 GHz > 300 mW @3.3 V > 4.5 x 5.5 mm -VQFN-32 	<ul style="list-style-type: none"> > Transceiver 1Tx+2Rx/IQ differential > RF_{in} 24.0-26.0 GHz > 700 mW @3.3 V > 4.5 x 5.5 mm -VQFN-32 > VCO integrated, SPI > Power/temp sensor 	<ul style="list-style-type: none"> > Transceiver (1Tx+1Rx) > Single-ended > BITE Tested > RF_{in} 24.0 – 24.25 GHz > 150 mW @3.3 V > 2.4 x 2.4 mm -TSNP-16

The BGT24LTR11N16 key features

- > 24GHz transceiver MMIC
- > Fully integrated low phase noise V_{CO}
- > Built in temperature compensation circuit for VCO stabilization
- > Low power consumption
- > Fully ESD protected device
- > Single ended RF and IF terminals
- > 200 GHz bipolar SiGe:C technology b7hf200
- > Single supply voltage 3.3 V

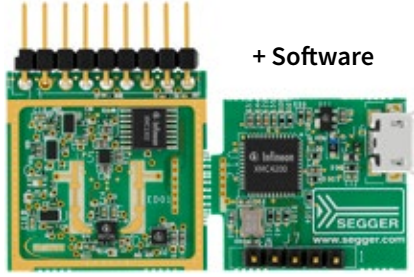
Block diagram



For similar level of information on the other MMIC listed above, please visit:
www.infineon.com/24GHz

24GHz evaluation and demo boards

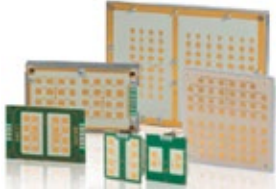
Our range of 24GHz evaluation and demo boards continues to expand to support the needs of our customers and the increasing number of innovative ways radar is being incorporated into new applications.

Features	Infineon development kit	Benefits
<ul style="list-style-type: none"> › Three system boards available › All include 24GHz radar and XMC™ microcontroller › Kit contains user manual, GUI, MATLAB compiler and Gerber files › Requires software 	 <p style="text-align: center;">+ Software</p> <p style="text-align: center;">Demokit with SW, reference design</p>	<ul style="list-style-type: none"> › Capability to detect motion, speed and direction of movement (approaching or retreating) distance and angle of arrival based on hardware › FW/SW available for each radar mode

Sense2GoL (BGT24LTR11 + XMC1300)	Distance2Go (BGT24MTR11 + XMC4200)	Position2Go (BGT24MTR12 + XMC4700)
<ul style="list-style-type: none"> › Capability to detect motion, speed and direction of movement (approaching or retreating) Precise measurement of object detection compared to PIR › Operates in harsh environments and detects through non-metallic materials › Low power mode for enhanced battery life › One of the world's smallest complete radar + MCU development kit › BGT24LTR11 – 24GHz highly integrated RF MMIC › XMC1300 ARM® Cortex®-M0 –32-bit industrial microcontroller › Debug over cortex 10 pin debug connector › Integrated multiple element patch antennas 	<ul style="list-style-type: none"> › Capability to detect distance of multiple targets › Capability to detect motion, speed and direction of movement (approaching or retreating) › Operates in harsh environments and detects through non-metallic materials › BGT24MTR11 – 24GHz highly integrated RF MMIC › XMC4200 ARM® Cortex®-M4 –32-bit industrial microcontroller › Debug over cortex 10 pin debug connector › Integrated multiple element patch antennas 	<ul style="list-style-type: none"> › Capability to detect position of multiple targets › Capability to detect distance of multiple targets › Capability to detect motion, speed and direction of movement (approaching or retreating) › Operates in harsh environments and detects through non-metallic materials › BGT24MTR12 – 24GHz highly integrated RF MMIC › XMC4700 ARM® Cortex®-M4 –32-bit industrial microcontroller › Debug over cortex 10 pin debug connector › Integrated multiple element patch antennas
<p>Main applications</p> <ul style="list-style-type: none"> › Security › Lighting control › Automatic door opener › Vital sensing 	<p>Main applications</p> <ul style="list-style-type: none"> › Drone: soft landing/obstacle avoidance › Smart toilets › Tank level sensing › Intelligent switches 	<p>Main applications</p> <ul style="list-style-type: none"> › Drone/robots: obstacle avoidance › Security › People tracking (IoT, smart home) › Vital sensing
<p>Board dimensions</p> <ul style="list-style-type: none"> › 25 mm x 25 mm (pictured with the Segger Debugger break-off board for reprogramming) 	<p>Board dimensions</p> <ul style="list-style-type: none"> › Board 36 mm x 45 mm 	<p>Board dimensions</p> <ul style="list-style-type: none"> › Board 50 mm x 45 mm
<p>Kit contents</p> <ul style="list-style-type: none"> › User's manual › SW GUI to operate kit › Schematic and bill-of-materials of module 	<p>Kit contents</p> <ul style="list-style-type: none"> › User's manual › SW GUI to operate kit › FMCW FW and SW¹⁾ › Doppler FW and SW¹⁾ › Schematic and bill-of-materials of module 	<p>Kit contents</p> <ul style="list-style-type: none"> › User's manual › SW GUI to operate kit › FMCW FW and SW › Doppler FW and SW › Schematic and bill-of-materials of module

24GHz modules

Partnering with the leading radar solution providers enables Infineon to connect our customers looking for turnkey solutions and design support for a complete range of applications.

Features	Partner modules using Infineon chips	Benefits
<ul style="list-style-type: none"> Complete module, including radar MMIC, antenna options, MCU signal processing options, and SW options (Doppler, FSK and FMCW versions available) 		<ul style="list-style-type: none"> Ease-of-design Turn-key solution for customers with limited radar/RF/SW know-how
Module (RF module; RF module + MCU including SW)		

By integrating the Infineon 24GHz MMIC chip into their own easy-to-use, and simple to integrate modules we have reduced the complexity and time to market for a range of applications from home automation, multicopter, robotics and street lighting.

Lighting

Security

Touch free switches

Door automation



New application or simple PIR replacement? Radar has it covered.

Radar used in motion detection applications increases accuracy when compared to passive infrared (PIR) technology allowing a more precise measurement of object detection and providing new capabilities such as the detection of speed and direction of moving objects. Radar is also superior to camera-based systems by allowing detection of the objects while keeping identities anonymous.

Visit the link below to view our network of partners who provide modules and design support for all 24GHz industrial applications: www.infineon.com/24GHzpartners