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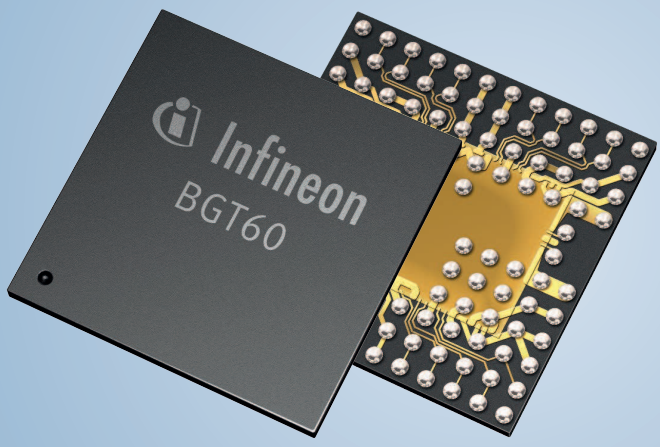


Product Brief

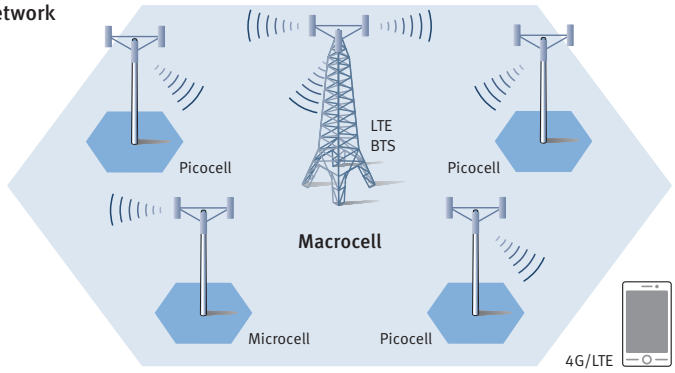
Infineon rounds off the Backhaul Family with a packaged RF Solution for V-band Radio

Backhaul Transceiver Chip – BGT60

Infineon has a broad portfolio of packaged RF transceivers for basestation backhaul solutions – beside BGT70 and BGT80 for E-band radio, also BGT60 for V-band radio. The family approach has a major benefit – one architecture supporting the three backhaul frequency ranges of 60, 70 and 80GHz. Customers can easily design all three radios with the same footprint for all three transceivers.

Mobile communication and especially LTE (4G) is gaining momentum these days due to the fact that all big carriers and mobile phone manufacturers are investing in the 4th generation ecosystem. The primary challenge facing this ecosystem is the fact that LTE will further enhance video and data exchange to a maximum, allowing everybody to send their latest holiday pictures and videos to friends. The bulk of today's base station infrastructure is not equipped to support the required high data throughput. The connection between the base station has up to now been planned for lower data rates (< 100MBit/s) and now needs increased capacity. This is where wireless backhaul technology comes into play. A solution using wireless backhaul in the V-band (57–64GHz) will enable the 7GHz frequency to support higher data rates. This enables data rates > 1Gbit/s for video and data services, sufficient for LTE.

Backhaul Network Example



Characteristics of different Base Station Sizes

Base Station	Picocell	Microcell	Macrocell
Range	10–200m	200m–2km	1–30km
No. of users	8–32	64+	200+
Typical application	SMB, enterprise, public indoor areas	Metro outdoors, city centers, capacity hotspots	Outdoor coverage
Deployment scenario	Enterprise or operator deployed	Operator deployed	Operator deployed

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BGT60 Features

Target Feature Details

- Developed for telecommunication only
- Support FDD and TDD systems (in full duplex or half-duplex mode)
- Support modulation schemes: QPSK, QAM
- Support small cell backhaul (up to 1000m)
- Direct conversion I/Q transceiver
- IF bandwidth 1000MHz
- Differential RF/IF interface for lower loss and better isolation
- Integration of VCO (Voltage Controller Oscillator) signal generation
- PNssb (Phase Noise single side band) < -80dBc/Hz @ 100kHz offset
- Typ. 13dBm linear output power
- 7dB NF (Noise Figure)
- Integrated power detection function
- Integrated thermal sensor
- eWLB (embedded Wafer Level Ball Grid Array) packaged device

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However, if we compare the 60GHz V-band with the 80GHz E-band, the former is always seen as a less favorable frequency band, due to the sharp oxygen absorption. This means that in addition to the Free Space Loss (FSL), oxygen absorption loss must be taken into account and a margin allowed for rain fade. As a result, a maximum link distance of up to 1000 meters is possible.
This could be considered a disadvantage in traditional network design, where a microwave link would mostly be used for distances beyond 1000 meters. Particularly in the case of Picocell deployment, high oxygen absorption and the associated reduced range becomes a real benefit compared to traditional microwave or other wireless backhauling solutions:

Benefits of V-band Radio

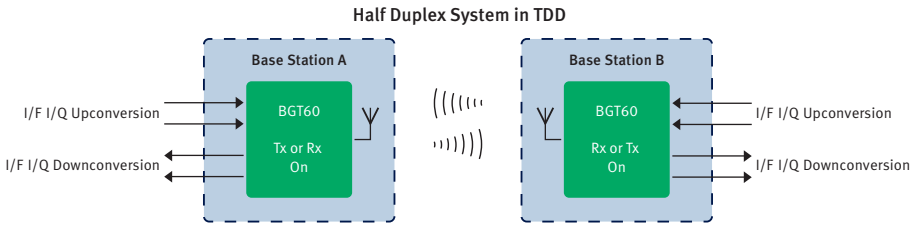
- Hundreds of links can be installed in a dense area
- Very low interference between the PTP links or other 60GHz devices in the field
- High bandwidth for up to 1Gbit/s (full duplex) per link

The Infineon business approach enables such a Gbit service with the latest technology. Thanks to Infineon's advanced SiGe (Silicon Germanium) technology with a transit frequency of 200GHz, we can integrate all RF (Radio Frequency) building blocks – such as Power Amplifier (PA), Low Noise Amplifier (LNA), Mixer, Programmable Gain Amplifier (PGA), Voltage Controlled Oscillator (VCO) – into a single chip.

This technology is already proven and fully qualified for Infineon Millimeter and Microwave chipsets (e.g. 77GHz automotive radar). Furthermore, Infineon houses this single-chip in a plastic package which makes a major difference to the market. Up to now, solutions have been bare die and require expensive tools and equipment to build up a radio system. With the Infineon packaged chipset, customers can save money and reduce the time-to-market significantly.

The chip is a transceiver for 57–64GHz (BGT60), housed in an eWLB(6 × 6mm²) package.

V-Band TDD



Benefits of BGT60

- Packaged solution, easy to use and standard SMT flow for mounting on customer system
- Highly integrated RF transceiver requiring no external RF discretes, thereby simplifying the customer design and time-to-market
- Architecture of Direct Conversion Zero IF eases interface to latest modem/BB designs (no external filter)
- A transceiver approach with implemented BIST (**B**uilt-**I**n **S**elf-**T**est) on the chip to enable RF testing at Infineon production
- Family concept (common architecture, package, pinning) simplifies customer designs due to modular approach

Transceiver Chip Solution

- BGT60 for ISM band (license free), 57–64GHz
- BGT60 has identical pinning and same footprint as BGT70 or BGT80
- Channel, Tx or Rx, selection via SPI

Published by
Infineon Technologies AG
85579 Neubiberg, Germany

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Order Number: B132-H9781-G1-X-7600
Date: 08 / 2013