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Information Brief



1.9 GHz GaAs Downconverter Cuts Design Time with Integrated LNA and Downmixer

Standby mode and GaAs technology can improve battery life

The MRFIC1814 is designed primarily for use in wireless Personal Communication Systems (PCS) applications such as Digital European Cordless Telephone (DECT), Japan's Personal Handyphone System (PHS), and the emerging North American systems. This Gallium Arsenide IC includes a Low Noise Amplifier (LNA) and a downmixer in a small, low-cost TSSOP-16 surface mount plastic package. The device requires minimal off-chip matching, while allowing for maximum flexibility and efficiency. The mixer is optimized for low-side injection and offers a reasonable intercept point, as well as high efficiency with 8 dB of conversion gain. Image filtering is implemented off-chip to maximize flexibility, and CMOS-compatible ENABLE pins allow standby operation with a current drain of less than 0.1 mA.

The reduced operating voltage level (as low as 2.7 V) of the MRFIC1814 will allow use of a smaller battery in most designs. The very low current drain in the standby mode can also contribute to improved battery life. Together with the other MRFIC18xx series of GaAs ICs, this family offers the complete transmit and receive functions, less the Local Oscillator (LO) and filters, needed for a typical 1.8 GHz digital cellular phone.

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FEATURES

- Usable frequency range from 1.8 to 2.0 GHz
- LNA with gain of 17 dB and noise figure of 2.5 dB
- Mixer has 8 dB gain with a noise figure of 10 dB
- Mixer input intercept point at -5.5 dBm
- Low power consumption of 39 mW
- Single bias supply of 2.7 to 4.5 V
- Standby operation with drain current of less than 0.1 mA
- Low LO power requirement of -5 dBm
- Simple LO/IF off-chip matching for maximum flexibility
- Miniature TSSOP-16 surface-mount package reduces pc board space and cost

TYPES OF APPLICATIONS

A 1.8 to 2.0 GHz integrated Low Noise Amplifier and downmixer for use in wireless communications systems.

- PCS in the United States
- DECT, DCS1800 in Europe
- PHS in Japan

BENEFITS TO YOU

- Lower system cost and manufacturing cost due to reduced parts count and simplified manufacturing process with integrated LNA and downmixer.
- Smaller battery with 2.7 V operation.
- Improved battery life due to low power consumption, and standby mode when receiver is not in use.
- Maximized design flexibility and efficiency with off-chip matching/ image filtering.
- Higher circuit and system density with the miniature TSSOP-16 surface mount plastic package.

A SOLUTION FOR THESE QUESTIONS

- Are you designing a wireless communications system that operates in the 1.8 to 2.0 GHz frequency range?
- Do you need to decrease the battery size and improve the battery life in your wireless system by reducing the operating voltage and powerconsumption?
- Are you designing DCS1800 or PCS1900 handsets?
- Do you want to reduce your system cost with a more cost-effective design requiring fewer external components?
- Do you need to reduce the pc board area for the downconverter function?
- Are you looking for a flexible and efficient downconverter with off-chip matching?
- Do you want to reduce the parts count and lower manufacturing costs with an integrated LNA and downmixer?

EVALUATION BOARD

An evaluation board for the MRFIC1814 is available as part number MRFIC1814TF.

LITERATURE

A complete data sheet containing full specifications, characteristic curves, circuit configurations, and applications information is available through Motorola's LDC as MRFIC1814/D. Alternately, call Mfax at 602/244-6609 and key-in MRFIC1814.

ORDERING INFORMATION

Device	Operating Temperature Range	Package
MRFIC1814R2	$T_{C} = -30^{\circ}C$ to +85°C	TSSOP-16
		Tape and Reel*

*(2,500 units per 16 mm, 13 inch reel)

3



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