



SOT343R

MBC13916

High reverse isolation in a cascode LNA

Overview

Freescale Semiconductor's MBC13916 is a cost-effective, high isolation cascode amplifier that operates at frequencies ranging from 100 MHz to 2.5 GHz. This unique monolithic IC uses the SiGe:C module of Freescale's advanced 0.35 micron RF BiCMOS process. The SiGe:C technology requires the addition of only one masking step into a proven mainstream process.

This IC is available in the SOT-343R miniature surface mount package. This industry-standard, ultra-small package saves significant printed circuit board space in a wide variety of applications.

The MBC13916 has on-chip bias circuitry that sets the bias point, while off-chip matching maximizes design flexibility and efficiency. Reverse isolation is 45 dB at 900 MHz, which offers excellent design advantages. The IC has a minimum noise figure (NF_{min}) of only

0.9 dB at the device level, and a noise figure (NF) of 1.25 dB in a typical circuit at 900 MHz. At 1.9 GHz, the NF_{min} is 1.9 dB, and the NF is 2.1 dB in a typical circuit. The drain current is only 4.7 mA at a VCC of 2.7V.

This integrated cascode amplifier is ideal for buffer amplifiers, low noise amplifiers (LNAs), mixers, IF amplifiers and voltage controlled oscillators (VCOs) in RF end products over a wide range of frequencies.

Features

- Usable frequency range of 100 MHz to 2.5 GHz
- 42 dB reverse isolation at 900 MHz
- NF_{min} at the device level of only 0.9 dB at 900 MHz and 1.9 dB at 1.9 GHz
- NF in typical application circuits of only 1.25 dB at 900 MHz, and 2.1 dB at 1.9 GHz
- Small signal gain of 19 dB at 900 MHz, VCC=2.7V
- Bias current of 4.7 mA at VCC=2.7 V

- Ultra-small SOT-343R miniature surface mount package
- 2.5 dBm output power at 1.0 dB gain compression at 900 MHz, VCC=2.7V
- On-chip bias circuitry sets bias point
- Lead free

Types of Applications

These integrated cascode amplifiers are ideal for use in any RF product that operates between 100 MHz and 2.5 GHz, and may be applied in:

- Buffer amplifiers
- LNAs
- Mixers
- IF amplifiers
- VCOs

Benefits to You

- Improved end-product performance due to lower noise figure and improved high frequency gain
- Higher circuit and system density with ultra-small SOT-343R miniature surface mount package
- Simplified design through integrated bias network and cascode amplifier in a single package
- Lower system cost and manufacturing costs due to integrated, on-chip bias circuitry
- Usable in three-cell battery-powered applications with a power supply voltage as low as 2.7V
- Maximized design flexibility and efficiency with off-chip matching
- Smaller battery for portable applications with 2.7V operation
- Inherent excellent RF signal isolation with 42 dB of reverse isolation at 900 MHz

A Solution for These Questions

- Do you need to use one or more cascode amplifiers in your design to enhance the RF signal isolation in your wireless or RF product?
- Do you want to reduce the PC board area for your portable RF product?
- Do you need more isolation between your VCO and mixer?
- Does your design require that the battery size be reduced with a supply voltage as low as 2.7V?
- Do you want to reduce the parts count and lower your manufacturing costs by using an integrated cascode amplifier with on-chip bias circuitry?
- Would you like to improve your design flexibility by externally customizing the matching for your cascode amplifier in buffer amplifier, LNA, VCO, IF amplifier and/or mixer designs?

Evaluation Board

Evaluation boards demonstrating RF performance are available for 350 MHz, 900 MHz and 1900 MHz applications.

Literature

A complete data sheet containing full specifications, characteristic curves, S-parameters, typical noise parameters and application circuit configurations are available through Freescale's LDC as MBC13916 and on freescale.com. S-parameter and behavioral model files are also available on freescale.com.

Device Information

- Device: MBC13916NT1
- Operation case, temperature range: TC = -40°C to +85°C
- Package in tape and reel: SOT-343R



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For current information about Freescale products and documentation, please visit www.freescale.com.