

MBC13720

First SiGe:C Standard Product

Overview

Freescale Semiconductor's MBC13720 low noise amplifier (LNA) with an on-chip bypass switch is Freescale's first SiGe:C standard product. This device uses the SiGe:C module of Freescale's advanced 0.35 micron RF BiCMOS process. The on-chip bypass switch improves the dynamic range of the receiver with low insertion loss. In addition to providing improved performance, the bypass switch helps conserve board space and reduce system and manufacturing costs. The device also provides selectable IP3 modes, low noise figure, selectable gain settings and a standby mode to turn the device completely off. Input and output matching is performed externally to allow maximum design flexibility.

Features

- > Uses SiGe:C module of advanced RF BiCMOS process for superior performance in a cost-effective monolithic device
- > Integrated bypass switch
- > Low noise figure
- > High input IP3
- > Receive/enable pins
- > Selectable IP3 modes
- > Simplified off-chip matching
- > Packaged in ultra-small SOT-363 surface mount package
- > Usable frequency range of 400 MHz to 2400 MHz
- > Low standby current <20 microamps
- > Supply voltage from 2.5V to 3.0V
- > Lead-free

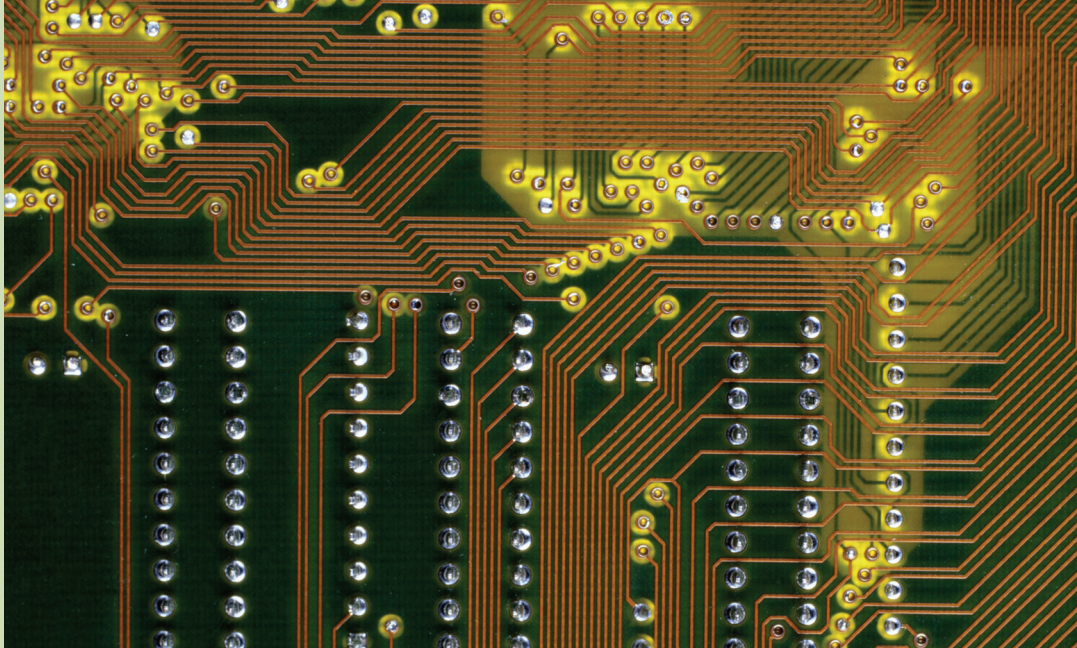


| Key Parameters | Low IP3 Mode | High IP3 Mode | Bypass |
|---------------------------|--------------|---------------|------------|
| >RF Gain | | | |
| 900 MHz | 19 dB | 20 dB | -2.9 dB |
| 1900 MHz | 13 dB | 14.5 dB | -2.5 dB |
| 2400 MHz | 11.5 dB | 12 dB | -2.8 dB |
| >Current Consumption | 5.0 mA | 9.0 mA | 10 μ A |
| >Noise Figure | | | |
| 900 MHz | 1.30 dB | | |
| 1900 MHz | 1.38 dB | | |
| 2400 MHz | 1.55 dB | | |
| >Input IP3 | | | |
| 900 MHz | -3.0 dBm | 10 dBm | 29 dBm |
| 1900 MHz | 4.0 dBm | 10 dBm | 29 dBm |
| 2400 MHz | 6.0 dBm | 13 dBm | 25 dBm |
| >Input/Output Return Loss | 10 dB | 10 dB | 12 dB |
| >Reverse Isolation | 25 dB | 20 dB | 18 dB |

Types of Applications

The MBC13720 SiGe:C low noise amplifier with bypass switch can operate over a frequency range of 400 MHz to 2400 MHz. Applications include:

- > PCS 1900 MHz cellular telephones
- > 900 MHz and 2400 MHz industrial, scientific and medical (ISM) band designs



Benefits to You

- > Lowers system manufacturing costs due to integrated, on-chip bypass switch and gain control circuitry
- > Improves dynamic range of the receiver with integrated bypass switch
- > Provides improved receiver sensitivity through low noise figure
- > Smaller battery for portable applications with 2.7V operation and low current consumption of less than 20 microamps in standby mode
- > Maximizes design flexibility and efficiency with off-chip matching to optimize gain or noise figure
- > Provides higher circuit and system density with ultra-small SOT-363 surface mount package
- > Improved reliability due to lower power dissipation

A Solution for these Questions

- > Do you want to reduce part count and lower your system and manufacturing costs by using an LNA with on-chip bypass switch?
- > Do you want to improve the dynamic range and sensitivity of your receiver?
- > Would you like to improve the flexibility of your design by customizing the input/output matching to optimize gain or noise figure?
- > Does your design require that the battery size be reduced with a supply voltage as low as 2.7V and low power consumption?
- > Do you need to improve the IP3 performance of your design?
- > Do you want to reduce the PC board area for your portable RF product?

Learn More: For more information about Freescale products, please visit www.freescale.com.

Evaluation Kit

An evaluation kit is available in a low- (900 MHz) or high- (1900 MHz) frequency version. Each kit contains both the MBC13720 and MBC13916 low noise amplifiers. Visit www.freescale.com to order 900MHZ-AMP-EVK or 1900MHZ-AMP-EVK.

Literature

A complete data sheet containing full specifications, characteristic curves and application circuit configuration is available at Freescale's Technical Information Center. www.freescale.com

Device Information

Device

MBC13720NT1

Operating Case

Temperature Range

$T_A = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Package in Tape and Reel

SOT-363*

*(3,000 units per 8 mm, 7 inch reel)