

Si4133G RF Synthesizer for GPRS

DUAL-BAND RF FREQUENCY SYNTHESIZER WITH INTEGRATED VCOs FOR WIRELESS COMMUNICATIONS



PRODUCT DESCRIPTION

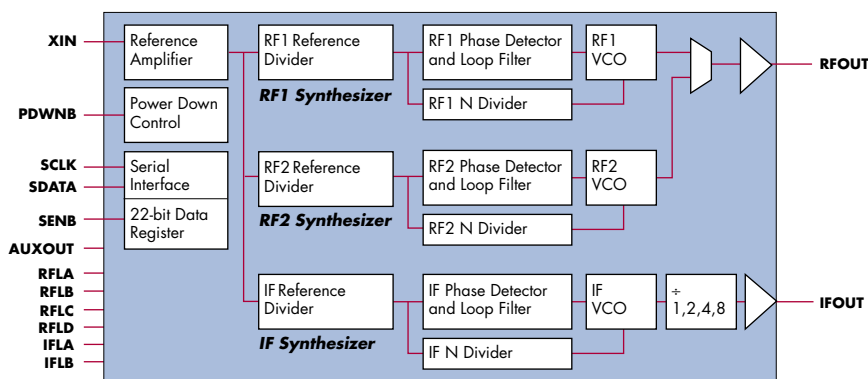
The Si4133G is a monolithic integrated circuit that has been optimized for IF and dual-band, low-noise RF frequency synthesis for GPRS (General Packet Radio Services) applications in GSM/DCS1800 mobile terminals. The Si4133G addresses the price-sensitive, low-power, high-performance requirements for personal wireless communications by substantially reducing external passive component count, eliminating external VCOs and varactor diodes, improving power efficiency and isolating, in silicon, unwanted external interference. The stable, low phase noise characteristics are achieved through a proprietary self-tuning architecture that does not require external adjustments or laser trimming for component-tolerance matching.

The Si4133G has been optimized for GPRS applications with industry leading settling times required for multi-slot data communications. Using an integer-N Phase Locked Loop (PLL), the Si4133G settles to 0.1 ppm frequency error in less than 150 μ S. The settling time of the synthesizer is consistent even when hopping from one end of the synthesizable tuning range to the other.

The Si4133G includes three voltage-controlled oscillators, loop filters, reference and VCO dividers, and phase detectors. Variables for dividers, phase detector gain settings, and power-down settings are programmable through a three-wire serial interface (Data, Clock, and Enable) and a 22-bit internal shift register.

The Si4133G comes standard in a low-profile, small outline, 24-pin package (TSSOP) and will be available in a 28-lead chip scale package.

Si4133G Enhanced Frequency Synthesizer Block Diagram



FEATURES

- Dual-Band RF Synthesizers:
 - RF1 900 MHz to 1.8 GHz
 - RF2 750 MHz to 1.5 GHz
- IF Synthesizer:
 - IF 62.5 MHz to 1.0 GHz
- Settling time <150 μ S for multi-slot data applications (GPRS classes 1–12)
 - Integer-N architecture provides fast settling times without spurious limitations of fractional-N synthesizers
- Dual synthesizer and single synthesizer derivatives available
- Fully integrated VCOs
- Integrated loop filters
- Minimal (2) passive external components
- Automatic selection of optimal phase detector gain and modulus prescaler values
- Low phase noise
- 1 μ A standby current @ 3V
- 17 mA supply current @ 3V
- 2.7V to 3.6V operation
- 0.35 μ CMOS

APPLICATIONS

- Dual-Band GSM/DCS1800 Handsets
- GPRS-Capable Handsets and Data Terminals
- Wireless Communications

PRODUCT BRIEF

ENABLING THE GSM AND GPRS

MARKETS WITH A NEW STANDARD

IN SYNTHESIZER INTEGRATION

AND PERFORMANCE.

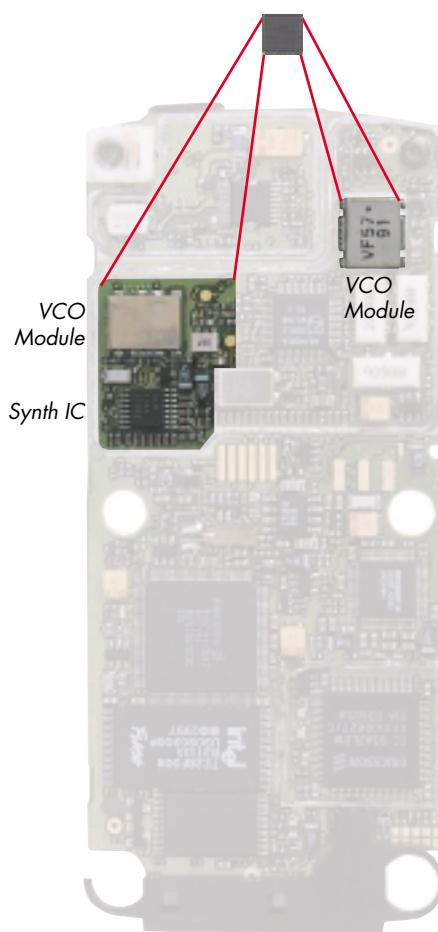


**INNOVATIVE DESIGN
FOR FAST LOCK TIMES
AND LOW POWER**

The Si4133G uses a proprietary architecture that not only results in fast settling times, but also significantly reduces power consumption in a cellular handset. Silicon Laboratories' technology combines a fast calibration mode with an highly innovative PLL architecture for the fastest lock times of any integer-N synthesizer. Lock times of <150 μ S (with a 200 kHz phase detector update rate) provide designers with a state of the art synthesis engine required for today's demanding GPRS requirements. Faster settling times also allow the system to wait longer before turning on the power amplifier, resulting in significant power savings and extended battery life. The integration of all the components of the frequency synthesis function into a monolithic CMOS device allows the designer to achieve greater control over the power consumption of the entire functional block with one control interface. With active consumption of 17 mA from a 3V supply, the Si4133G sets a new standard in power efficiency.

DEVELOPMENT TOOLS

Design engineers can order the Si4133G-EVB which includes an evaluation board that supports all derivative and performance grade options for the Si4133G family of synthesizers. New user-friendly evaluation software features a windowing interface for easy manipulation of the device from a standard PC. The development environment allows for straightforward assessment of the device's performance using industry-standard test and measurement equipment.

84% Area Reduction / 33% Cost Savings

The Si4133G dramatically reduces the number of components required to implement a complete dual-band RF frequency synthesizer function for wireless communications. This unprecedented level of integration can reduce board space by as much as 84% over traditional frequency synthesizer architectures using a dual-band frequency synthesizer IC, external VCOs, varactor diodes and up to 35 additional passive components. Designers can realize cost reductions of 33% over traditional solutions by designing with the Si4133G. The robustness and consistency of an integrated solution improves ease of manufacture and lowers test and assembly costs for high volume wireless applications.

SIZE COMPARISON

	Number of Discrete Components	Total Area Required	Height
Silicon Laboratories Solution	4	64 mm²	1 mm
Traditional Solution	41	402 mm²	2 mm

CONTACT INFORMATION

SILICON LABORATORIES

Silicon Laboratories, Inc.

4635 Boston Lane • Austin, TX 78735

Toll Free: 1(877)444-3032

Email: productinfo@silabs.com

Web site: www.silabs.com

Silicon Laboratories and the Silicon Laboratories logos
are trademarks of Silicon Laboratories, Inc.

PB-Si4133G; KES-5,000-8/99-0

ORDERING INFORMATION

Product	Description
Si4133G-KT	RF1/RF2/IF Frequency Synthesizer
Si4133G-BT	RF1/RF2/IF Frequency Synthesizer
Si4123G	RF1/IF Frequency Synthesizer
Si4122G	RF2/IF Frequency Synthesizer
Si4113G	RF-Only Synthesizer
Si4112G	IF-Only Synthesizer
Si4133G-EVB	Si4133G Evaluation Board supports all derivative products
Si4133G-DS	Si4133G Product Data Sheet
Si4133G-EVB-DS	Si4133G Evaluation Board Data Sheet