PRODUCT SUMMARY

SKY77916-21 Tx-Rx Front-End Module for Quad-Band GSM / GPRS / EDGE w/ 14 Linear TRx Switch Ports, Dual-Band TD-SCDMA, and TDD LTE Band 39

Applications

- Cellular handsets encompassing Quad-Band GSM/EDGE, Dual-Band TD-SCDMA, and TDD LTE
  - Class 4 GSM850/900
  - Class 1 DCS1800/PCS1900
  - Class 12 GPRS multi-slot operation
  - Linear EDGE operation
  - TD-SCDMA Bands 34/39
  - TDD LTE Band 39

Features

- Small, low profile package
  - 5.5 mm x 5.3 mm x 0.75 mm
  - 38-pad configuration
- MIPI® RFFE control with dual-standard support
  - User-selectable register mappings
  - Linear or VRAMP-based GMSK power control
- RF ports internally matched to 50 Ω load
- High Efficiency (inclusive of coupler)
  - 40% GSM850 31% DCS1800
  - 40% GSM900 33% PCS1900
- Tx harmonics below –40 dBm
- Supports APT, buck DC-DC supply
- 14 low insertion loss/high linearity TRx switch ports
- RF input switching to 3G/4G path
- Integrated broadband directional coupler
- Integrated noise suppression notch filter for WiFi coexistence
- Built-in IEC-compliant antenna ESD protection
- High impedance control inputs: 20 µA, maximum
- Current limiting and over-voltage protection for ruggedness and extended battery life
- Power control circuitry built-in for improved TRP variation

Skyworks Green™ products are compliant with all applicable legislation and are halogen-free. For additional information, refer to Skyworks *Definition of Green™*, document number SQ04-0074.

Description

SKY77916-21, a Tx / Rx Front-End Module (FEM), offers the complete transmit VCO-to-Antenna and Antenna-to-receive SAW filter solution for advanced cellular handsets comprising quad-band GSM, GPRS, EDGE multi-slot operation, and TD-SCDMA and TDD LTE transmission. The FEM fully enables broadband 3G/4G RF switch-through, outward switching of the Power Amplifier (PA) RF inputs, 14 transmit / receive (TRx) antenna switch ports, and an integrated directional coupler.

A new multi-standard CMOS controller provides PA band/mode selection and bias control, including the Mobile Industry Processor Interface (MIPI®) RFFE logic, and switch decoder circuitry. The controller supports user-optional control of linear RF or analog VRAMP of the GMSK envelope. A distinct MIPI register mapping included in the Data Sheet provides for each of these control paradigms, including associated approaches to PA and switch control.

The Heterojunction Bipolar Transistor (HBT) PA blocks are fabricated in Gallium Arsenide (GaAs). The low band (LB) PA transmits in the GSM850/900 bands. The high band (HB) PA supports DCS, PCS, TD-SCDMA bands 34/39, and TDD LTE band 39. The HBT, switch, and controller die, and passive components mount onto a multi-layer laminate substrate and the entire assembly encapsulated with plastic over-mold.

Built into the SKY77916-21 is a complete features set for state-of-the-art performance and minimal phone board complexity, including PA over-voltage and over-current protection, 50 ohms matching and zero DC offset on all RF pins, TRx high linearity/low loss switching and high off-state isolation, integrated directional coupler, IEC ruggedness at antenna output, LB and HB input switching for alternate routing of 3G/4G Tx paths, power supply pads shared between LB and HB, and ultra-low leakage currents for long standby times.

Selecting the linear-GMSK operation standard disables VRAMP input so all PA biasing depends only on MIPI mode selection. The transmitted envelope is a linear function of RF input.

Selecting VRAMP-enabled operation, the PA controller provides VRAMP control of the GMSK envelope and reduces sensitivity to input drive, temperature, power supply, and process variations. Skyworks' Finger-Based Integrated Power Amplifier Control (FB-iPAC) minimizes output power variation into mismatch. In EDGE and TD-SCDMA / TDD LTE linear modes, VRAMP voltage and MIPI-based bias settings jointly optimize PA linearity and efficiency.

Downloaded from Arrow.com.

Ordering Information

Product Name	Order Number	Evaluation Board Part Number
SKY77916-21 Tx-Rx Front-End Module	SKY77916-21	

© 2015, Skyworks Solutions, Inc. All Rights Reserved.

Information in this document is provided in connection with Skyworks Solutions, Inc. (“Skyworks”) products or services. These materials, including the information contained herein, are provided by Skyworks as a service to its customers and may be used for informational purposes only by the customer. Skyworks assumes no responsibility for errors or omissions in these materials or the information contained herein. Skyworks may change its documentation, products, services, specifications or product descriptions at any time, without notice. Skyworks makes no commitment to update the materials or information and shall have no responsibility whatsoever for conflicts, incompatibilities, or other difficulties arising from any future changes.

No license, whether express, implied, by estoppel or otherwise, is granted to any intellectual property rights by this document. Skyworks assumes no liability for any materials, products or information provided hereunder, including the sale, distribution, reproduction or use of Skyworks products, information or materials, except as may be provided in Skyworks Terms and Conditions of Sale.

THE MATERIALS, PRODUCTS AND INFORMATION ARE PROVIDED “AS IS” WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE, INCLUDING FITNESS FOR A PARTICULAR PURPOSE OR USE, MERCHANTABILITY, PERFORMANCE, QUALITY OR NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHT; ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED. SKYWORKS DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. SKYWORKS SHALL NOT BE LIABLE FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO ANY SPECIAL, INDIRECT, INCIDENTAL, STATUTORY, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS THAT MAY RESULT FROM THE USE OF THE MATERIALS OR INFORMATION, WHETHER OR NOT THE RECIPIENT OF MATERIALS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Skyworks products are not intended for use in medical, lifesaving or life-sustaining applications, or other equipment in which the failure of the Skyworks products could lead to personal injury, death, physical or environmental damage. Skyworks customers using or selling Skyworks products for use in such applications do so at their own risk and agree to fully indemnify Skyworks for any damages resulting from such improper use or sale.

Customers are responsible for their products and applications using Skyworks products, which may deviate from published specifications as a result of design defects, errors, or operation of products outside of published parameters or design specifications. Customers should include design and operating safeguards to minimize these and other risks. Skyworks assumes no liability for applications assistance, customer product design, or damage to any equipment resulting from the use of Skyworks products outside of stated published specifications or parameters.

Skyworks and the Skyworks symbol are trademarks or registered trademarks of Skyworks Solutions, Inc., in the United States and other countries. Third-party brands and names are for identification purposes only, and are the property of their respective owners. Additional information, including relevant terms and conditions, posted at www.skyworksinc.com, are incorporated by reference.

Downloaded from Arrow.com.