SKY77590 Tx-Rx FEM for Quad-Band GSM/ GPRS/ EDGE with Six Linear TRx Switch Ports

Applicable to Products SKY77590-11 and SKY77590-21

Applications

- Quad-band cellular handsets encompassing
  - Class 4 GSM850/900
  - Class 1 DCS1800/PCS1900
  - Class 12 GPRS multi-slot operation
  - 6 low insertion loss / high linearity interchangeable TRx switch ports
  - Linear EDGE operation

Features

- Small, low profile package
  - 6 mm x 6 mm x 0.85 mm
  - 28-pad configuration
- Low input power range −1 dBm to 6 dBm
- Tx-VCO-to-antenna and antenna-to-Rx-SAW filter RF interface
- Tx harmonics below −38 dBm
- Current limiting for over-voltage protection and extended battery life
- Input/Output matched internally to 50 Ω
- High impedance control inputs: 20 μA, maximum
- 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

SKY77590 is a transmit and receive Front End Module (FEM) designed in a very low profile (0.9 mm) and compact form factor for quad-band cellular handsets comprising GSM850/900, DCS1800, and PCS1900 operation — a complete transmit VCO-to-Antenna and Antenna-to-receive SAW filter solution. The FEM also supports Class 12 General Packet Radio Service (GPRS) multi-slot operation and linear EDGE operation. 3G switch-through support is provided by six dedicated high-linearity ports.

The module consists of a GSM850/900 PA and DCS1800/PCS1900 PA block, impedance-matching circuitry for 50 Ω input and output impedances, Tx harmonic filtering, a high linearity/low insertion loss switch, and a CMOS Power Amplifier Control (PAC) block. A custom silicon integrated circuit contains decoder circuitry to control the RF switch while providing a low current, external control interface.

Fabricated in InGaP/GaAs, the Heterojunction Bipolar Transistor (HBT) PA blocks support the GSM850/900 bands and DCS1800/PCS1900 bands. Both PA blocks share common power supply pads to distribute current. The output of the PA block and the outputs to the six receive pads connect to the antenna pad through a high-linearity antenna switch. The 3G and Rx ports feature a 0 volts DC offset level which eliminates the need for external blocking capacitors. The InGaP/GaAs die, switch die, Silicon (Si) controller die, and passive components are mounted on a multi-layer laminate substrate and the entire assembly is encapsulated with plastic overmold.

RF input and output ports of the SKY77590 are internally matched to a 50 Ω load to reduce the number of external components on the phone board. Extremely low leakage current of the FEM maximizes handset standby time. Control of transmit and receive RF signal flows, and band selection are performed by four external control pads (see Figure 1 on overleaf). Mode of operation, Tx vs. Rx, and Band (GSM850, GSM900, DCS1800, and PCS1900) are controlled with the four logic inputs: Mode, TxEN, BS1, and BS2. Proper timing of the TxEN input and the VRAMP input ensures high isolation between the antenna and Tx-VCO while the VCO is being tuned prior to the transmit burst.

The integrated power amplifier control (PAC) function provides envelope amplitude control while reducing sensitivity to input drive, temperature, power supply, and process variation. Output power variation into mismatch is minimized with Skyworks' True Power control circuit.

Ordering Information

Product Name	Order Number	Evaluation Board Part Number
SKY77590 Tx-Rx Front-End Module	SKY77590	