

**PRODUCT SUMMARY**

# **SKY77594 Tx-Rx FEM for Quad-Band GSM / GPRS / EDGE with Two Rx Switch Ports and Dual-Band TD-SCDMA**

## **Applications**

- Quad-band GSM/EDGE and Dual-Band TD-SCDMA cellular handsets encompassing
  - Class 4 GSM850 / 900
  - Class 1 DCS1800 / PCS1900
  - Class 12 GPRS multi-slot operation
  - 2 low insertion loss / interchangeable Rx switch ports
  - Linear EDGE operation
  - TD-SCDMA Bands 34/39

## **Features**

- Small, low profile package
  - 6 mm x 6 mm x 0.9 mm
  - 28-pad configuration
- Low input power range 0 dBm to 6 dBm
- High efficiency
- 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



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## **Description**

SKY77594 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/PCS1900 operation and dual-band TD-SCDMA bands 34 and 39 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.

The module consists of a GSM850/900 PA and DCS1800/PCS1900/TD-SCDMA 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 GaAs, the Heterojunction Bipolar Transistor (HBT) PA blocks support the GSM850/900 bands and DCS1800/PCS1900 bands and TD-SCDMA bands 34/39. Both PA blocks share common power supply pads to distribute current. The output of the PA block and the outputs to the two receive pads connect to the antenna pad through a high-linearity antenna switch. The Rx ports feature a 0 volts DC offset level which eliminates the need for external blocking capacitors. The GaAs die, switch die, CMOS 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 SKY77594 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, PCS1900, and Bands 34/39) 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' Finger-Based Integrated Power Amplifier Control (FB-iPAC) control circuit.

## Ordering Information

Product Name	Order Number	Evaluation Board Part Number
SKY77594 Tx-Rx Front-End Module	SKY77594	

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