

PRODUCT SUMMARY

# SKY77544 Tx-Rx FEM for Quad-Band GSM / GPRS / EDGE – Triple-Band WCDMA Antenna Switch Support

## Applications

- Quad-band cellular handsets encompassing
  - Class 4 GSM850/900
  - Class 1 DCS1800 PCS1900
  - Class 12 GPRS multi-slot operation
  - EDGE polar modulation
  - Triple band WCDMA antenna switch support

## Features

- Small, low profile package
  - 6 mm x 6 mm x 0.9 mm
  - 28-pad configuration
- Low input power range
  - 0 to 6 dBm
- High efficiency
  - GSM850 41%
  - GSM900 41%
  - DCS 40%
  - PCS 40%
- Tx-VCO-to-antenna and antenna-to-Rx-SAW filter RF interface
- Tx harmonics below -38 dBm
- Wideband envelope control path
- Input/Output matching 50  $\Omega$  internal
- Low APC current
  - 20  $\mu$ A
- High impedance control inputs
  - 15  $\mu$ A, typical
- Integrated module temperature sensor

## Description

SKY77544 is a transmit and receive Front End Module (FEM) designed in a very low profile (0.9 mm), 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 EDGE Polar Modulation. WCDMA switch-through support is provided by three dedicated high-linearity ports.

The module consists of a GSM850/900 PA and DCS1800/PCS1900 PA block, impedance-matching circuitry for 50  $\Omega$  input and output impedances, Tx harmonic filtering, high linearity-low insertion loss switches, 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. An integrated temperature sensor provides an analog voltage based on the temperature of the module.

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 seven receive pads connect to the antenna pad through a highly linear antenna switch. The WCDMA and Rx ports feature a near 0 volts DC offset level, which eliminates any 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 SKY77544 are internally matched to a 50  $\Omega$  load to reduce the number of external components for a quad-band design. Extremely low leakage current of the FEM maximizes handset standby time. Band selection and control of transmit and receive RF signal flows are performed by use of four external control pads. See Figure 1 shown on overleaf. Mode of operation Tx, Rx, Band (GSM850, GSM900, DCS, PCS, and UMTS) is controlled with 4 logic inputs: BS1, BS2, Mode, and  $\overline{\text{TxEN}}$ . Proper timing of the  $\overline{\text{TxEN}}$  input and the VAPC input ensures high isolation between the antenna and Tx-VCO while the VCO is being tuned prior to the transmit burst. The Enable input controls the initial turn-on of the PAC circuitry to minimize battery drain.

The integrated power amplifier control (PAC) function provides envelope amplitude control by reducing sensitivity to input drive, temperature, power supply, and process variation.



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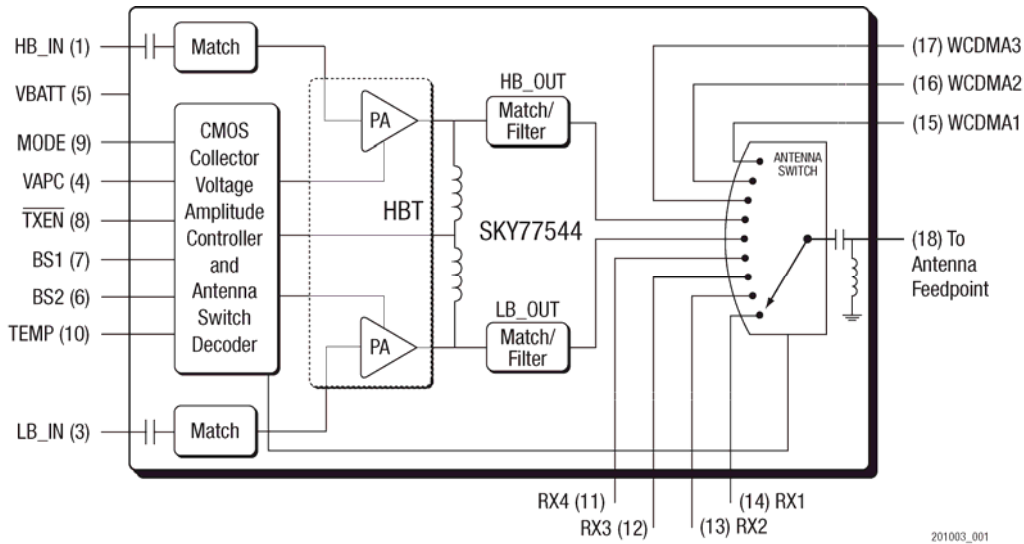


Figure 1. SKY77544 Functional Block Diagram

Ordering Information

Model Number	Manufacturing Part Number	Product Revision	Package	Operating Temperature
SKY77544	SKY77544		MCM 6 mm x 6 mm x 0.9 mm	-30 °C to +90°C

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