Helios™ Polar Loop™ RF Subsystem for GSM, GPRS, and EDGE Mobile Handset Applications

Applications

- EDGE-based wireless data services
- GSM850, EGSM900, DCS1800, and PCS1900 handsets
- GPRS handsets and modules

Features

- Polar Loop™ transmit modulation architecture
- Integrated noise filtering; no pre-PA filters required
- Closed loop phase and amplitude modulation (GMSK, $3\pi/8$ 8-PSK) via control of non-linear GSM PA
- PA inside control loop provides excellent EVM and phase error performance with up to 6:1 VSWR without external isolator
- Direct conversion receiver
- Transmitter with integrated VCOs
- Fully integrated fractional-N synthesizer and UHF VCO
- Impedance matching circuitry

Description

Skyworks Helios™ Polar Loop™ RF Subsystem combines a direct conversion transceiver, Power Amplifier (PA), and a PA controller/modulator into a three-chip radio solution that saves significant space, cost, and design cycle time while providing improved performance.

All of the necessary RF components needed to build a quad-band, multi-standard handset have been incorporated into the Polar Loop Radio. The highly integrated subsystem includes Skyworks SKY74045 RF transceiver, SKY74046 PA controller, and SKY77316 PA.

At the heart of the RF subsystem is Skyworks advanced Polar Loop transmit modulation architecture. This unique architecture enables the radio to transmit both constant as well as non-constant envelope signals through the same transmit path to minimize the number of external components required to build a mobile handset. This significantly reduces the complexity, size, cost, and power requirements of next-generation Enhanced Data for GSM Evolution (EDGE) platforms.

The SKY74045 is based on Skyworks industry-leading, single-chip direct conversion transceiver technology. This device consists of a direct conversion receiver, a transmitter with an integrated Voltage Controlled Oscillator (VCO), and a fully integrated fractional-N synthesizer. Together with the SKY74046 PA controller, a seamless closed-loop transmit system is formed around the SKY77316 PA. The SKY74045 is fabricated using BiCMOS technology and is available in a 56-pin, 8 x 8 x 1 mm RF Land Grid Array (RFLGA™) package.

The SKY74046 is a highly integrated device used for PA and amplitude modulation control. The device requires a minimal number of external components to complete an automatic output control loop. The SKY74046 is fabricated using BiCMOS technology and is available in a 24-pin, 4 x 4 x 1 mm RFLGA package.

The SKY77316 PA incorporates a GSM850/900 block, a DCS1800/PCS1900 block, impedance-matching circuitry for 50 Ω input and output, and a PA bias control block. Two separate Heterojunction Bipolar Transistor (HBT) blocks provide maximum performance in a small footprint. The SKY77316 is fabricated using GaAs technology and is available in a 16-pin, 8 x 10 x 1.5 mm Multi-Chip Module (MCM) package.

A functional block diagram for the Helios Polar Loop RF Subsystem is shown in Figure 1.

NEW Skyworks offers lead (Pb)-free "environmentally friendly" packaging that is RoHS compliant (European Parliament for the Restriction of Hazardous Substances).
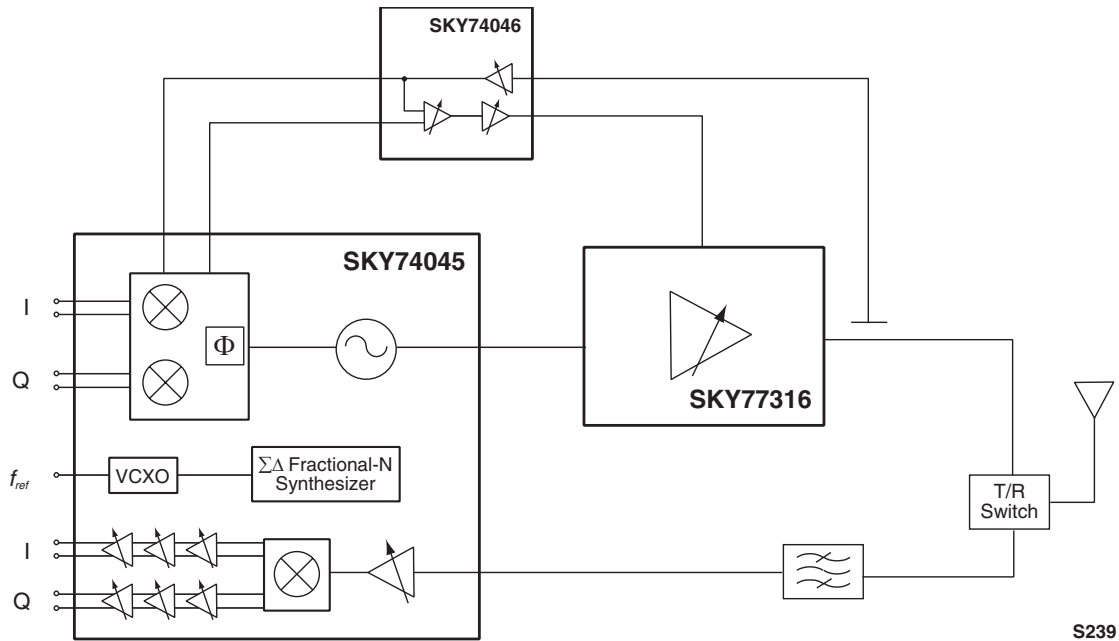
Figure 1. Helios Polar Loop RF Subsystem Functional Block Diagram

Ordering Information

Model Name	Manufacturing Part Number	Product Revision
Helios Polar Loop RF Subsystem:		
SKY74045 RF Transceiver (26 MHz output option)	SKY74045-21 (Pb-free package)	
SKY74045 RF Transceiver (13 MHz output option)	SKY74045-31 (Pb-free package)	
SKY74046 PA Controller	SKY74046-11 (Pb-free package)	
SKY77316 PA Module	SKY77316	

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