

ACCURATE AND TUNEABLE ACTIVE DIFFERENTIAL PHASE SPLITTERS IN RFIC WIRELESS APPLICATIONS

Abstract

A differential phase splitter circuit for producing opposite phase signals from an input AC signal is provided. A first and second transistor is provided. The source of these transistors are connected to a common first node. Further, these transistors act as a differential amplifier. The gate of the first transistor receives an input AC signal. The drain of the first transistor produces a first output AC signal. Similarly, the drain of the second transistor produces a second output AC signal that is 180 degrees out of phase with the first output AC signal. A source resistor is provided, connected in series to the common first node and ground. Lastly, an LCR feedback circuit is provided. This feedback circuit is connected between the drain of the first transistor and the gate of the second transistor. The LCR feedback circuit couples at least a fraction of the amplitude of the first output AC signal to the gate of the second transistor for amplitude balancing and phase balancing. This compensates for an unequal division of the input signal between the first and second transistor due to the finite impedance value of the source resistor. The LCR feedback circuit may include an active element for modifying the phase and amplitude balance of the two output AC signals. The active element may be adjusted using a control voltage.

Fig. 2A

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