A Temperature Stable CMOS Variable Gain Amplifier with 80-dB Linearly Controlled Gain Range

Takafumi Yamaji, Nobuo Kanou*, and Tetsuro Itakura

Corporate R&D Center, Toshiba Corporation, Kawasaki, Japan
*Semiconductor Company, Toshiba Corporation, Kawasaki, Japan

Abstract

An IF variable gain amplifier with a quadrature demodulator is fabricated using a 0.25-µm CMOS technology. An 80-dB linearly controlled gain range is achieved with exponential voltage-to-current converters using MOS transistors biased in a subthreshold exponential region. To avoid the temperature dependence of the gain control characteristic, a master-slave control technique is adopted to the exponential voltage-to-current converters. The experimental results indicate that the proposed technique is effective for a CMOS VGA.