

Compact Low-Voltage Biomedical Instrumentation Amplifiers

Authors : Phanumas Khumsat, Chalermchai Janmane

Abstract : Low-voltage instrumentation amplifier has been proposed for 3-lead electrocardiogram measurement system. The circuit's interference rejection technique is based upon common-mode feed-forwarding where common-mode currents have cancelled each other at the output nodes. The common-mode current for cancellation is generated by means of common-mode sensing and emitter or source followers with resistors employing only one transistor. Simultaneously this particular transistor also provides common-mode feedback to the patient's right/left leg to further reduce interference entering the amplifier. The proposed designs have been verified with simulations in 0.18- μm CMOS process operating under 1.0-V supply with CMRR greater than 80dB. Moreover ECG signals have experimentally recorded with the proposed instrumentation amplifiers implemented from discrete BJT (BC547, BC558) and MOSFET (ALD1106, ALD1107) transistors working with 1.5-V supply.

Keywords : electrocardiogram, common-mode feedback, common-mode feedforward, communication engineering

Conference Title : ICEICE 2014 : International Conference on Electronics, Information and Communication Engineering

Conference Location : Amsterdam, Netherlands

Conference Dates : May 15-16, 2014