

ABSTRACT

Design of a 10 MHz Transimpedance Low-Pass Filter with Sharp Roll-Off for a Direct Conversion Wireless Receiver

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A fully-differential base-band transimpedance low-pass filter is designed for use in a direct conversion wireless receiver. Existing base-band transimpedance amplifiers (TIA) often utilize single-pole filters which do not provide good stop-band rejection and may even allow the filter to saturate in the presence of large interferers near the edge of the pass-band. The designed filter is placed in parallel with an existing single-pole TIA filter and diverts stop-band current signals away from the existing filter, providing added rejection and safeguarding the filter from saturating. The presented filter has a bandwidth of 10 MHz, achieves 35 dB rejection at 50 MHz (25 dB in post-layout simulations), and can process interferers as large as 10 mA. The circuit is designed in Jazz 0.18 μ m CMOS technology, and it is shown, using macromodels, that the design is scalable to smaller, faster technologies.