

# Transimpedance Amplifier Circuit Design Report



## Overview

The transimpedance amplifier (TIA) is utilized to convert this low-level current to a usable voltage signal and the TIA often needs to be compensated for proper operation. This application report explores a simple TIA design using a 345 MHz rail-to-rail output VFA, such as. This application note reviews the basic issues of transimpedance design, provides a set of detailed design equations, explains those equations, and develops an approach to easily compare potential solutions. Despite or because of their simple topologies, TIAs pose rigid tradeoffs among their gain, noise, and bandwidth (BW). In this article, we design a TIA in 28-nm CMOS technology while targeting the. It is challenging to design a good current-to-voltage (transimpedance) converter using a voltage-feedback amplifier (VFA). • Many of the slides include more detail in the. Low Noise Transimpedance Amplifier Design Using Berkeley Analog Generator by Eric Jan A dissertation submitted in partial satisfaction of the requirements for the degree of Master of Science in Electrical Engineering and Computer Science in the Graduate Division of the University of California. One version of an amplifier that is equally as important for certain sources in circuits is a transimpedance amplifier.

## Article Content

Sep 29, 2025

### Transimpedance Amplifier Selection and Circuit Design

Transimpedance amplifiers (TIAs) are electronic circuits that convert signals from a current source to a voltage. The conversion factor is given by Ohm's law, where the modifying factor ...

Jul 31, 2025

### High Speed Amps Roadmap

The next slide steps through finding the maximum available transimpedance gain for a given op amp and diode if a maximally flat Butterworth response is the target design.

Jul 08, 2025

### Transimpedance Amplifier (TIA): Op-Amp Circuit, ...

A transimpedance amplifier (TIA) converts an input current into a proportional voltage, typically using an inverting op-amp with a feedback resistor ...

Mar 04, 2026

### AN-1803 Design Considerations for a Transimpedance Amplifier

The transimpedance amplifier (TIA) is utilized to convert this low-level current to a usable voltage signal and the TIA often needs to be compensated for proper operation. This application report explores a ...

Mar 18, 2026

### Low Noise Transimpedance Amplifier Design Using Berkeley ...

Upon noting trends and determining generally how a design choice (such as picking a specific architecture or varying a circuit parameter in one way) impacts the resulting noise, a design script is ...

Sep 05, 2025

### Transimpedance Considerations for High-Speed Amplifiers

This application note reviews the basic issues of transimpedance design, provides a set of detailed design equations, explains those equations, and develops an approach to easily compare potential ...

Apr 17, 2026

### Front Matter

The term transimpedance amplifier may evoke the image of a voltage divider with a shunt-feedback resistor. However, this is just one particular implementation. Several other topologies exist and novel TIA circuits ...

Jul 25, 2025

The Design of a Transimpedance Amplifier [The Analog Mind]

transimpedance amplifiers (TIAs) serve in the front end of optical communication receivers (RXs). Despite or because of their simple topologies, TIAs pose rigid tradeoffs among their gain, noise, and ...

Apr 15, 2026

Exploring Transimpedance Amplifier Topologies: Design ...

In this paper, we have explored various topologies of transimpedance amplifiers (TIAs) and their implications on performance parameters such as bandwidth, gain, and noise.

Jul 02, 2025

Transimpedance Amplifier (TIA): Op-Amp Circuit, Design & ICs

A transimpedance amplifier (TIA) converts an input current into a proportional voltage, typically using an inverting op-amp with a feedback resistor ( $R_f$ ). TIAs present a low-impedance input ...

Oct 02, 2025

Transimpedance Amplifier [Circuit Intuitions]

As the title suggests, each article provides insights and intuitions into circuit design and analysis. These articles are aimed at undergraduate students but may serve the interests of other...

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