

## Low noise transimpedance amplifier design\*

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### Abstract

The aim of this research is to study a simplified approach for the design of low-noise bipolar transimpedance preamplifiers for optical receivers. Analytical solutions for optimum biasing and minimum equivalent input-noise current were derived. The study was achieved by doing comparison between the designed circuits. The equivalent input noise current was calculated by entering the parameters in Matlab program and using Multisim as a simulation tool to detect a pulse signal of 30ns width.

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**Keywords:** Transimpedance Amplifier, equivalent input-noise current, preamplifiers, frequency response.

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\* This Research was done by Ph.D student Mohamed Sharyda under supervision of Dr. Abdel Razak Badawieh and Dr. Zafer moussa.

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## References:

1. Z. Bielecki, W. Kolosowski, R. Dufrene, and M. Borejko, "Low noise optical receiver" 11<sup>th</sup> GAAS Symposium- Munich 2003.
2. G. Ghione, semiconductor devices for high-speed optoelectronics, Cambridge University press, 2009.
3. T. Ruostalainen. Integrated Receiver Channel Circuits & structures for a Pulsed Time-of-Flight Laser Radar. Academic dissertation, Oulo Univ. 1999.
4. E.Säckinger. Broadband Circuits for Optical Fiber Communication, John Wiley & Sons, Inc., 2005.
5. El-Diwany MH, Roulston DJ & Chamberlain SG (1981) Design of low-noise bipolar transimpedance preamplifiers for optical receivers. IEE Proceedings, Part G. 128(6): 299-305.
6. P.R. Gray, R.G. Meyer. Analysis of Design Analog Integrated Circuits, John Wiley & Sons, Inc., New York, 2003.
7. R. G. Meyer. "Wideband Amplifier Design," Reader for EE240.
8. A. Abo (1994). A wide-band low noise Transimpedance Preamp. EE240 Project.