



The Research Migration Project is an initiative of FOSSEE, IIT Bombay that promotes the use of eSim for reproducing published research circuits originally implemented using proprietary simulation tools. The objective is to migrate these validated designs to eSim to build an open source resource database.

Name of the participant : Yogeswaran I

Affiliation / Institution : Department Of Electronics and communication Engineering ,
Meenakshi Sundararajan Engineering College , Chennai

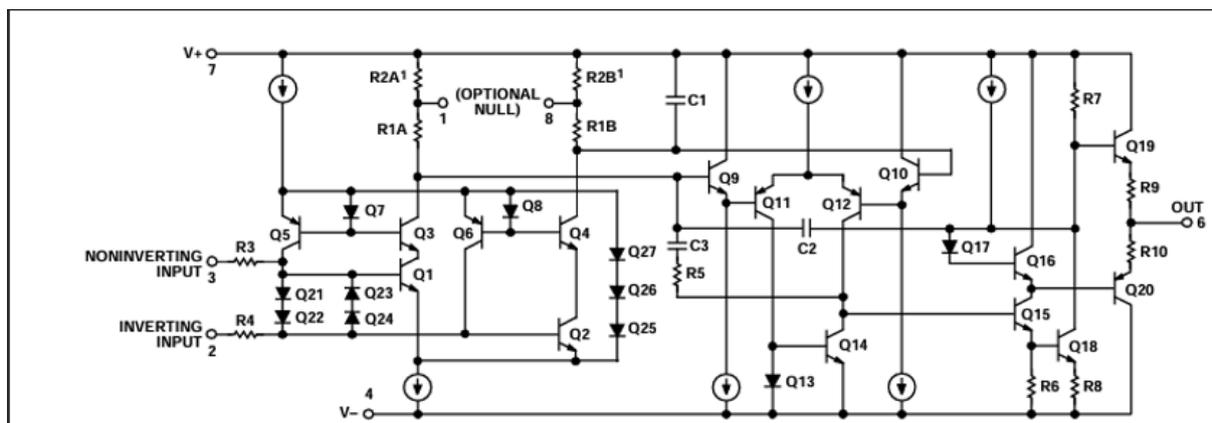
Title of the circuit : Ultralow Offset Voltage Operational Amplifier and Its applications

Theory/Description : To Design and simulate a low-noise instrumentation amplifier suitable for electrocardiogram (ECG) signal acquisition using operational amplifiers. The objective is to achieve high differential gain, wide bandwidth, and high common-mode rejection while minimizing noise. The performance of the designed amplifier is analyzed through AC analysis to obtain the differential gain and bandwidth, and noise analysis to evaluate the output noise spectral density using the eSim/NGSpice simulation environment.

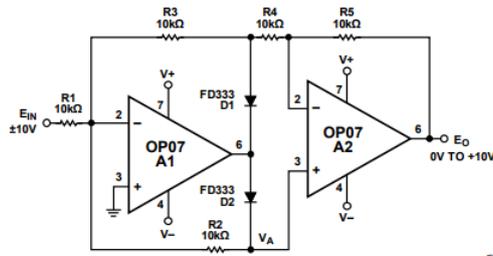
Reason to reproduce with eSim : The circuit is simulated in eSim to validate gain, bandwidth, common-mode rejection, and noise performance using AC and noise analyses before hardware realization.

Expected Outcome: The OP07 internal circuit is expected to provide high gain, high common-mode rejection, stable bandwidth, and low noise, making it suitable multiple purposes including amplification

Circuit Diagram:



INTERNAL CIRCUIT DIAGRAM

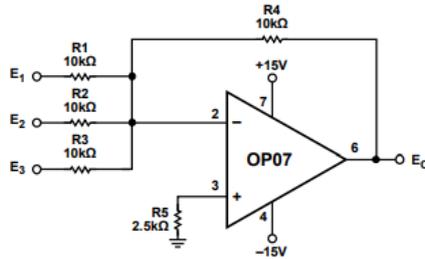


NOTES
1. PINOUT SHOWN FOR P PACKAGE

Figure 33. Precision Absolute-Value Circuit

00316-033

APPLICATION 1



NOTES
1. PINOUT SHOWN FOR P PACKAGE

Figure 31. Adjustment-Free Precision Summing Amplifier

00316-031

APPLICATION 2

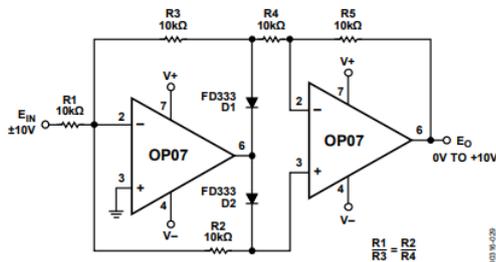


Figure 29. Absolute Value Circuit

00316-029

APPLICATION 3

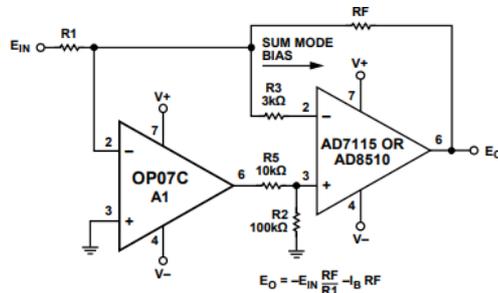


Figure 26. Typical Offset Voltage Test Circuit

00316-026

APPLICATION 4

Research Paper/Journal/etc. :

Low-Noise Precision Amplifier Design

Title: Design of Low-Noise Precision Amplifier

Authors: K. R. Laker, W. M. C. Sansen

Journal: IEEE Journal of Solid-State Circuits

Year: 1997

Noise Analysis of Precision Op-Amps

Title: Input Noise Characteristics of Precision Operational Amplifiers

Authors: T. D. Ross, L. K. Baxter

Journal: IEEE Transactions on Circuits and Systems I

Year: 2008

Source/Reference(s):

[1] S. Li, Y. Zhou, and H. Wang, "Design of ECG front end instrumentation amplifier with high CMRR and low noise," IEEE Transactions on Biomedical Circuits and Systems, vol. 8, no. 4, pp. 512–520, Aug. 2014.

[2] T. D. Ross and L. K. Baxter, "Input noise characteristics of precision operational amplifiers," IEEE Transactions on Circuits and Systems I: Regular Papers, vol. 55, no. 7, pp. 1978–1986, Jul. 2008.
