

Fully Differential Amplifiers: Common-Mode Limitations

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Prerequisites

Electrical characterization: FDAs

- Following prerequisites are recommended prior to proceeding though the handbook

Prerequisites:

TI-Precision Labs (TIPL) courses:

TIPL - Op Amps: Fully Differential Amplifiers

ti.com/fda-introduction

Pocket reference:

Training: Analog Engineer's Pocket Reference

ti.com/analogrefguide

Application handbook:

A-B-A: Board Level Troubleshooting

ti.com/board-level-troubleshooting

Simulation tools:

Simulations are presented within the handbook. It is recommended to install TINA-TI

TINA-TI can be downloaded for free on ti.com: ti.com/tina-ti

Fully Differential Amplifier (FDA)

Overview:

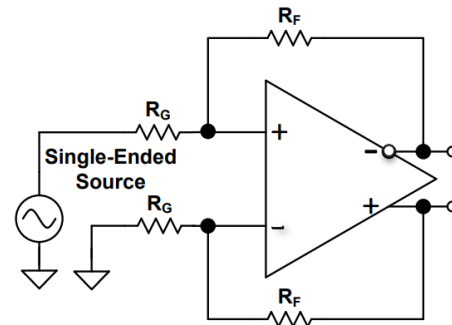
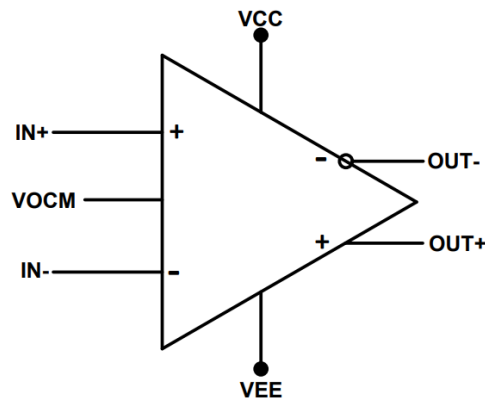
- Understanding common-mode limitations for a FDA can be difficult.
- Diagram to right shows a basic diagram of FDA

V_{OCM} : common mode voltage input pin

- Can be left open (default to mid-supply) or drive voltage externally to be compatible with an ADC connected to the output
- Setting the V_{OCM} pin outside of the specified range can cause the differential output signals to clip

Configuration of FDA:

- THS4551 Evaluation Module is used to simulate a customer board application
- Configured to be single-ended input source and monitor the individual and differential outputs



<http://www.ti.com/lit/ds/symlink/th4551.pdf>

THS4551 EVM test configuration

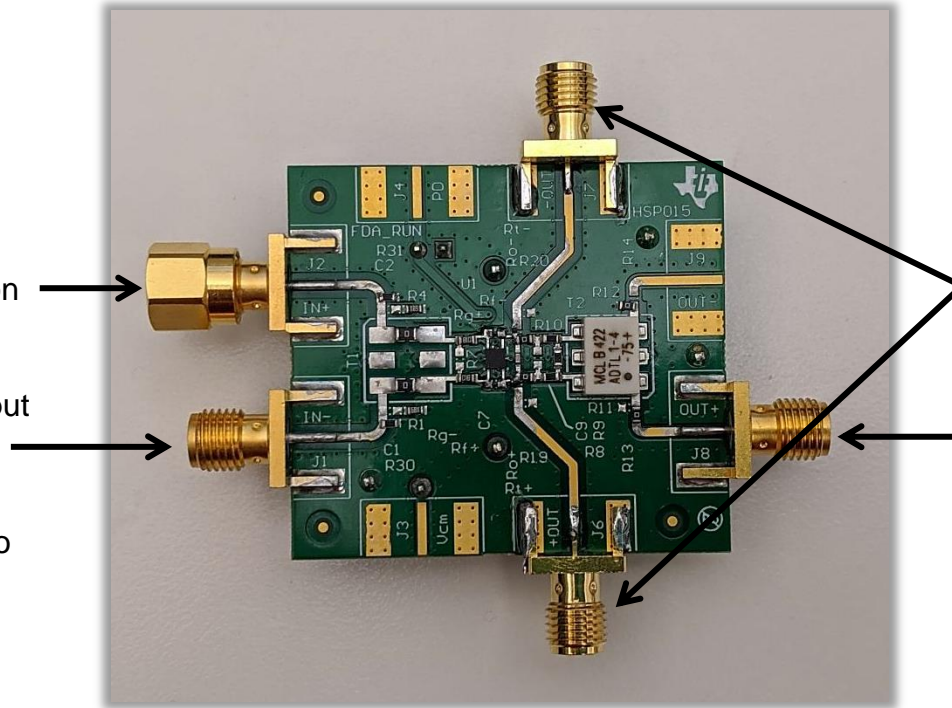
Supply = $\pm 2.5V$

50 Ω load terminator

- Match impedance on each input terminal

Function Generator Input Waveform

- Set to 50 Ω impedance output to match IN+



Individual outputs

- Monitor on the oscilloscope

Differential output

- Monitor on the oscilloscope