

Level shift 0V to 5V to -12V to +12V

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Calculations & simulation of ideal circuit

$$\frac{V_{out}}{V_{in}} = \frac{24}{5} = 4.8$$

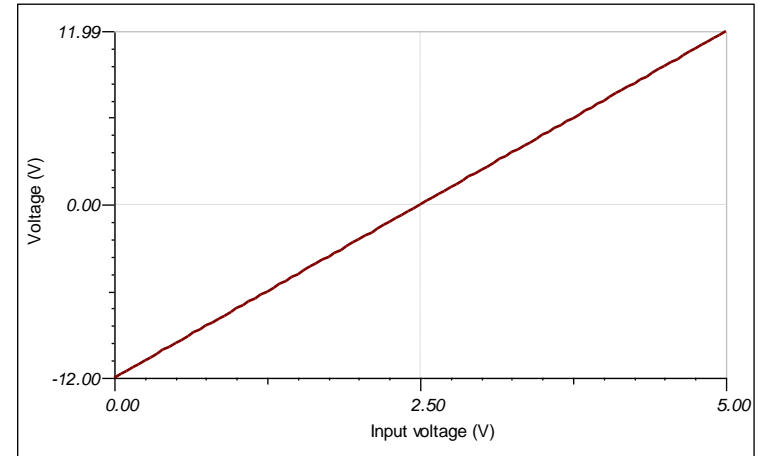
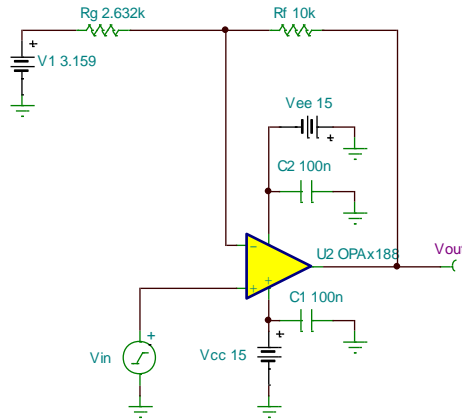
$$\frac{V_{out}}{V_{in}} = \frac{R_f}{R_g} + 1$$

let $R_f := 10 \text{ k}\Omega$

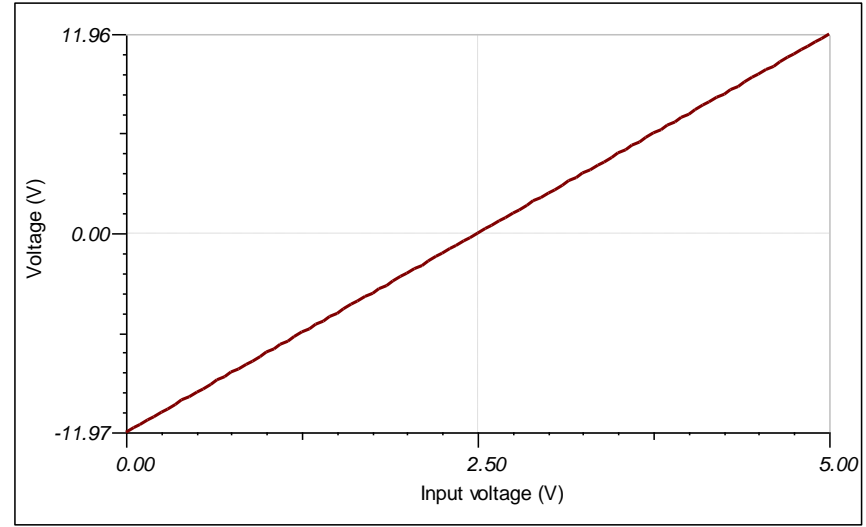
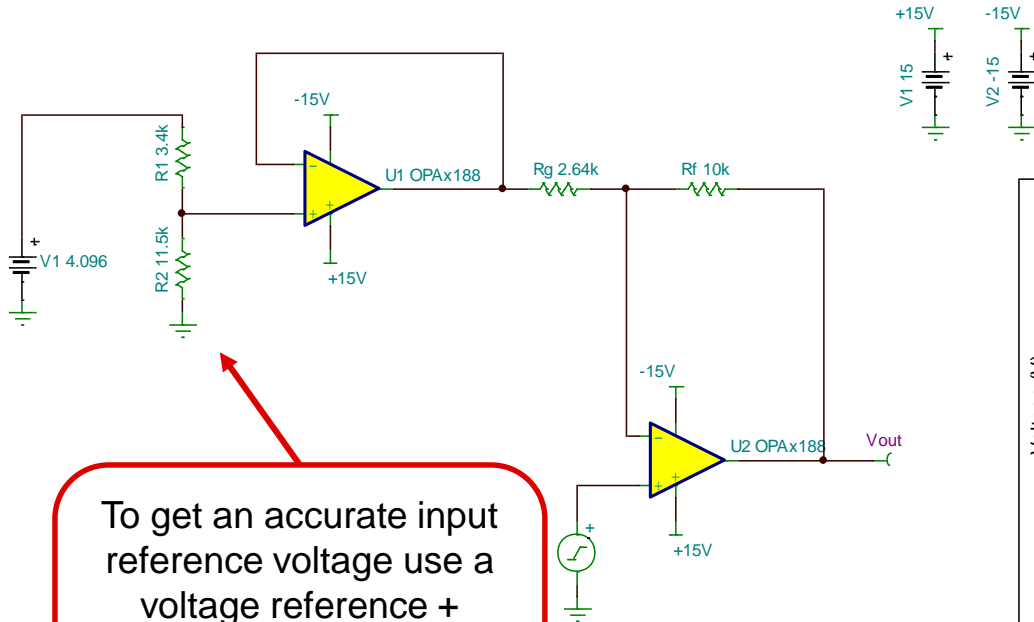
$$R_g := \frac{R_f}{4.8 - 1} = 2.632 \text{ k}\Omega$$

$$V_{shift} := -12 \text{ V}$$

$$V_{ref} := \frac{V_{shift}}{-R_f} = 3.158 \text{ V}$$



Practical circuit: standard resistors, Vref + voltage divider



To get an accurate input reference voltage use a voltage reference + voltage divider. A buffer is needed or the divider will interact with Rg