

Voltage References Basic Training

Use Cases

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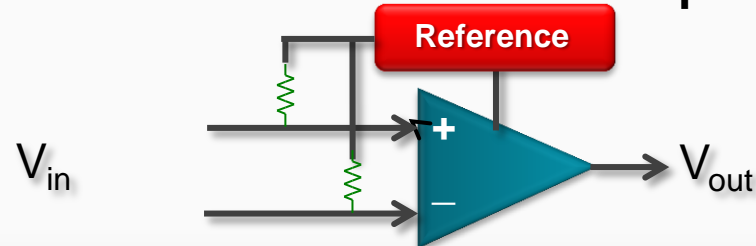
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Common use cases

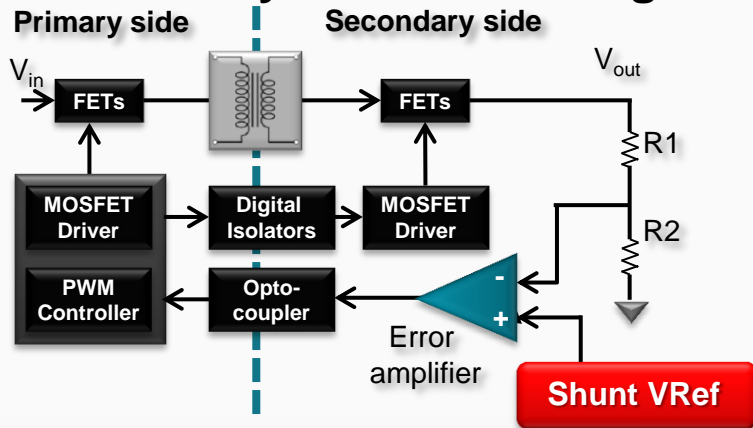
Power supply to a data converter



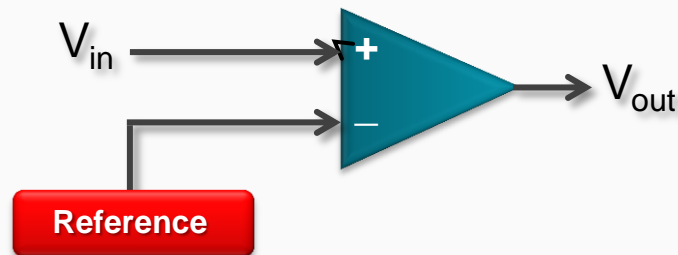
Common mode bias to an amplifier



Secondary side monitoring

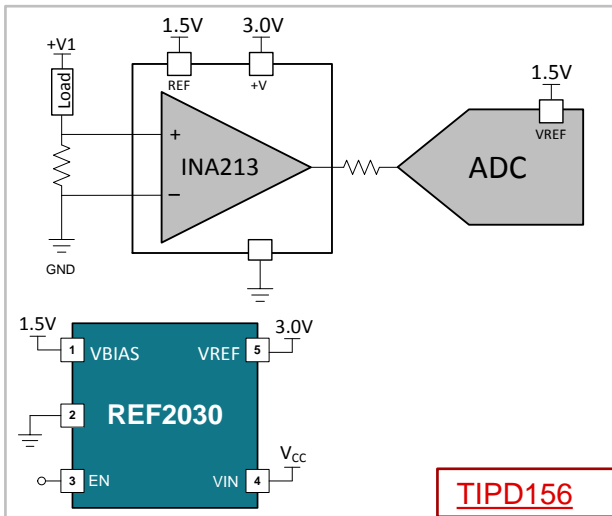


Accurate reference to a comparator



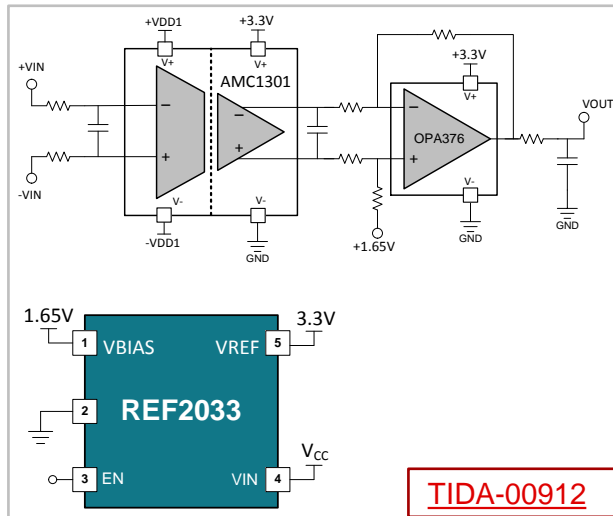
Function: Current Sensing

Low-side sense with ADC interface



Dual-output voltage reference provides both supply voltage and reference voltage. Single output series Vref can also be used.

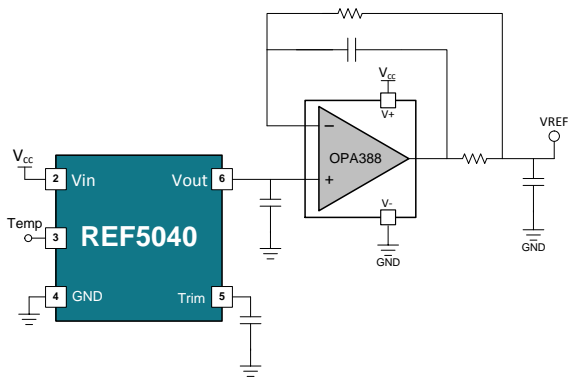
Isolated sense with level-shifting



Voltage references can provide a supply voltage or a common-mode voltage for level shifting.

Function: Signal Chain Conditioning

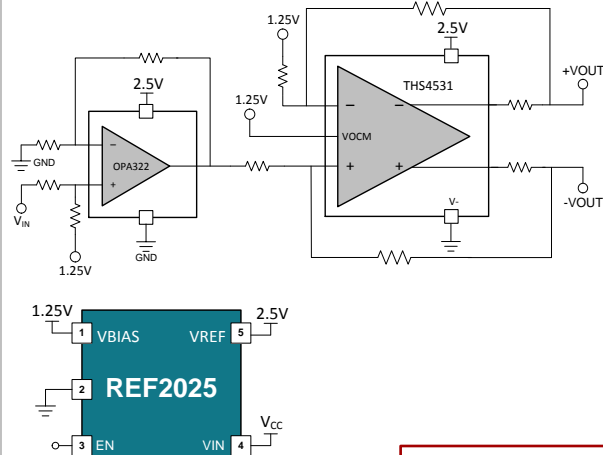
Reference buffer



[TIPD173](#)

Reference voltage is buffered to drive a required load or ADC. Use when a low-impedance voltage reference is needed.

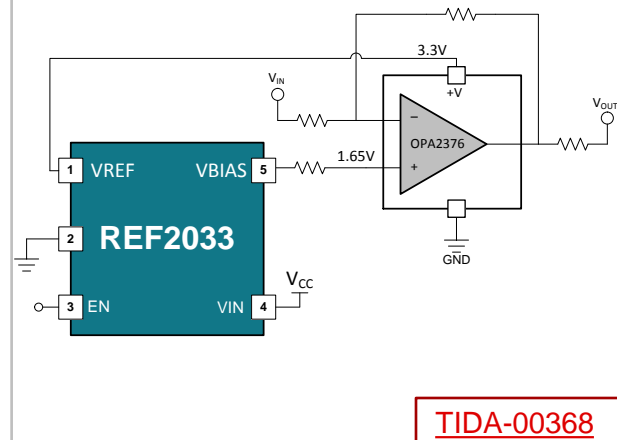
Single-ended to differential signals



[TIDA-00439](#)

Voltage reference used to bias amplifiers and provide reference for single-ended to differential signal conversion.

Level shifting

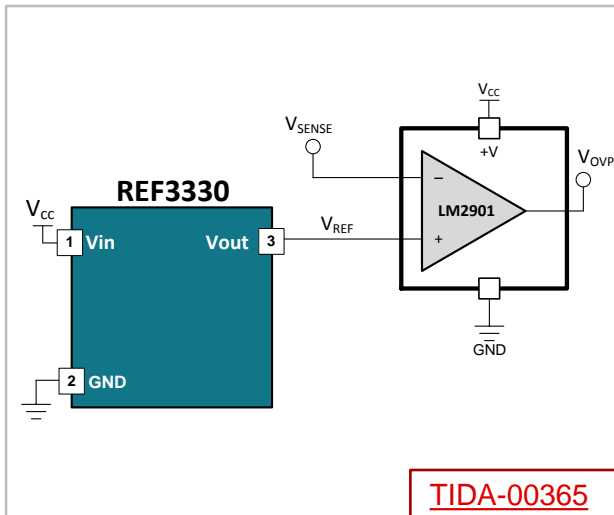


[TIDA-00368](#)

Voltage reference used to bias the amplifier and provide reference for level-shifting a signal.

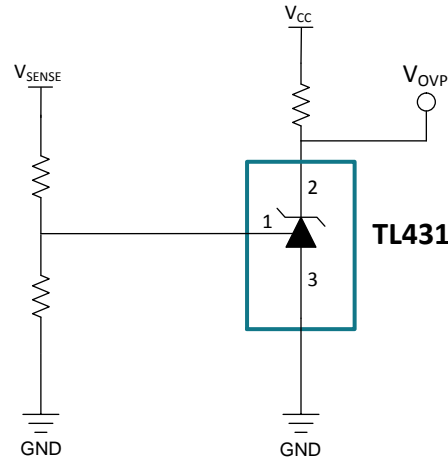
Function: Overvoltage Detection

Voltage ref + comparator



Series voltage references provide a voltage threshold. Use for precision and low temperature coefficient.

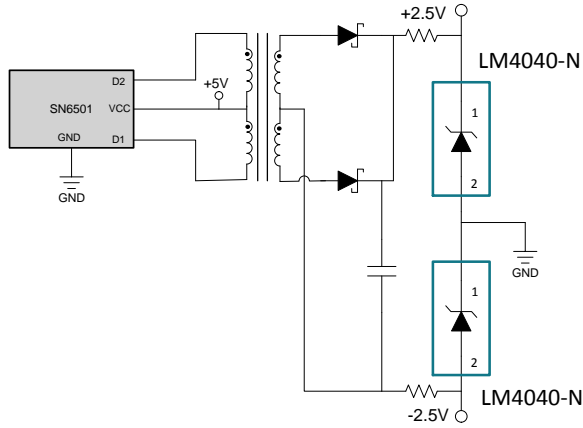
Adjustable shunt vref



Shunt references regulates with an internal reference and error amplifier. Use for low-cost applications.

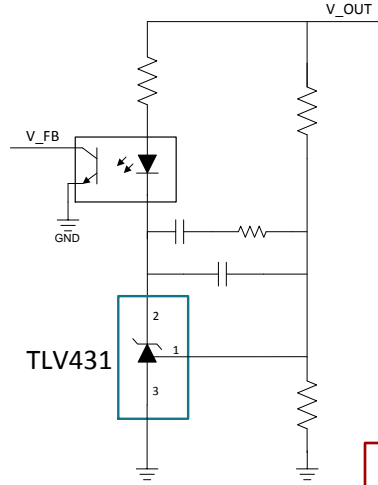
Power Delivery

Isolated bipolar voltage



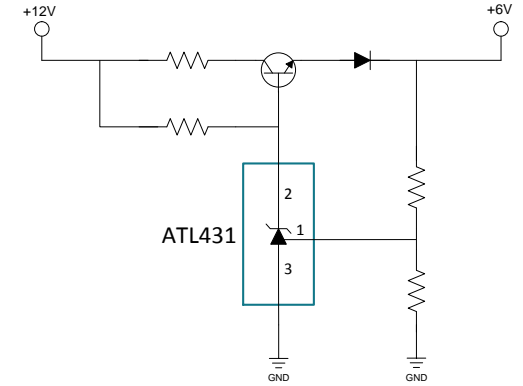
[TIDA-00912](#)

Optocoupler feedback regulator



[PMP21002](#)

Precision voltage regulator



[PMP9802](#)

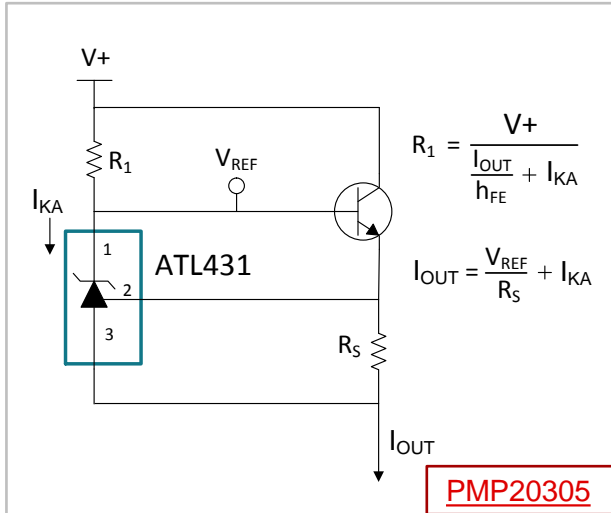
The isolated power supply provides bipolar voltages for isolated devices such as amplifiers.

The adjustable shunt reference is used to monitor an isolated output voltage and provide an accurate reference for proper regulation.

The adjustable shunt reference is used in the control loop of a step-down regulator. The reference is fed back to transistor for regulation.

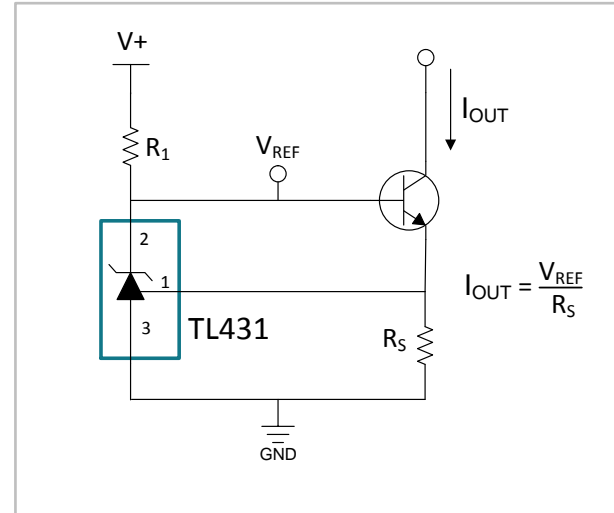
Function: Current Sourcing and Sinking

Shunt constant-current source



Low-cost precision constant-current source. The shunt reference regulates and feeds back to the transistor for accurate current sourcing.

Shunt constant-current sink



Low-cost precision constant-current sink. The shunt reference regulates and feeds back to the transistor for accurate current sinking.

Thanks for watching

- For more information, go to www.ti.com/vref