

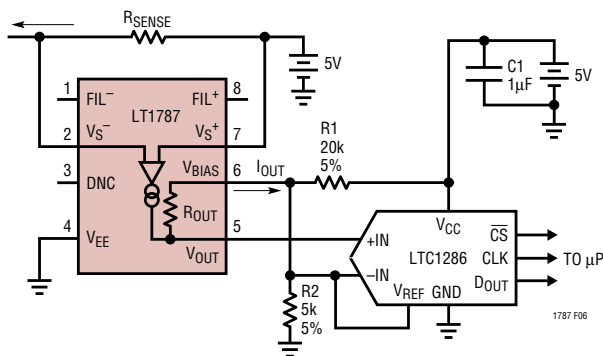
APPLICATION NOTE 105: Current Sense Circuit Collection

Unidirectional

Unidirectional current sensing monitors the current flowing only in one direction through a sense resistor.

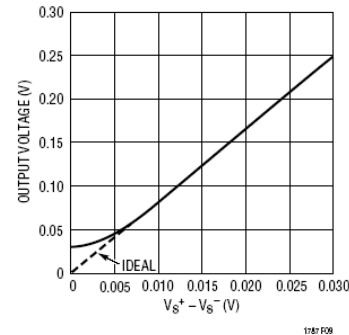
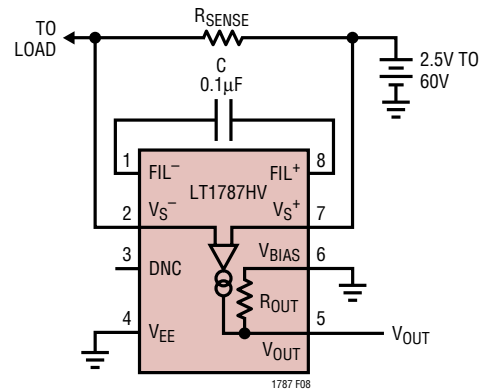
To see other chapters in this Application Note, return to the [Introduction](#).

Unidirectional Output into A/D with Fixed Supply at V_S^+



Here the LT1787 is operating with the LTC1286 A/D converter. The $-IN$ pin of the A/D converter is biased at 1V by the resistor divider R1 and R2. This voltage increases as sense current increases, with the amplified sense voltage appearing between the A/D converters $-IN$ and $+IN$ terminals. The LTC1286 converter uses sequential sampling of its $-IN$ and $+IN$ inputs. Accuracy is degraded if the inputs move between sampling intervals. A filter capacitor from FIL^+ to FIL^- as well as a filter capacitor from V_{BIAS} to V_{OUT} may be necessary if the sensed current changes more than 1LSB within a conversion cycle.

Unidirectional Current Sensing Mode



This is just about the simplest connection in which the LT1787 may be used. The V_{BIAS} pin is connected to ground, and the V_{OUT} pin swings positive with increasing sense current. The output can swing as low as 30mV. Accuracy is sacrificed at small output levels, but this is not a limitation in protection circuit applications or where sensed currents do not vary greatly. Increased low level accuracy can be obtained by level shifting V_{BIAS} above ground. The level shifting may be done with resistor dividers, voltage references or a simple diode. Accuracy is ensured if the output signal is sensed differentially between V_{BIAS} and V_{OUT} .

