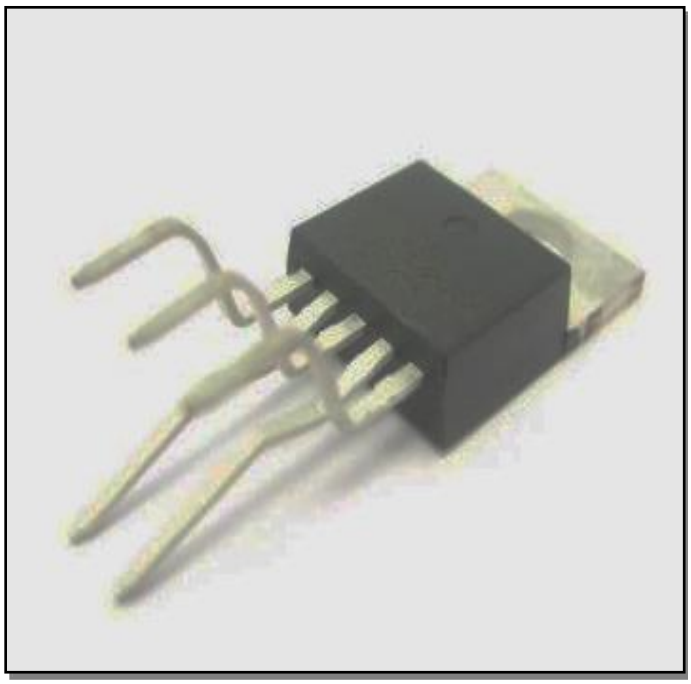
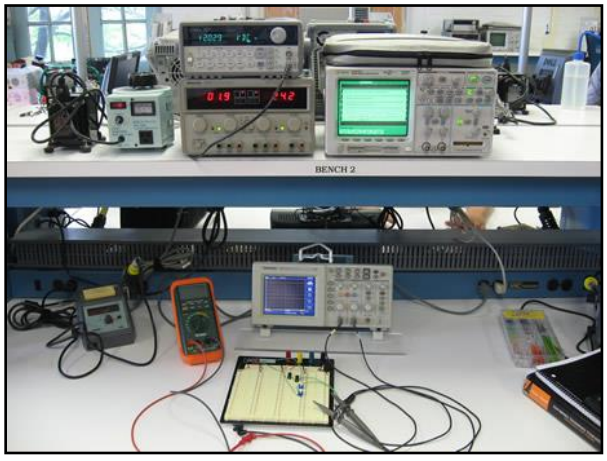
The Source Sink Transistor (SST)





What is a Source Sink Transistor?

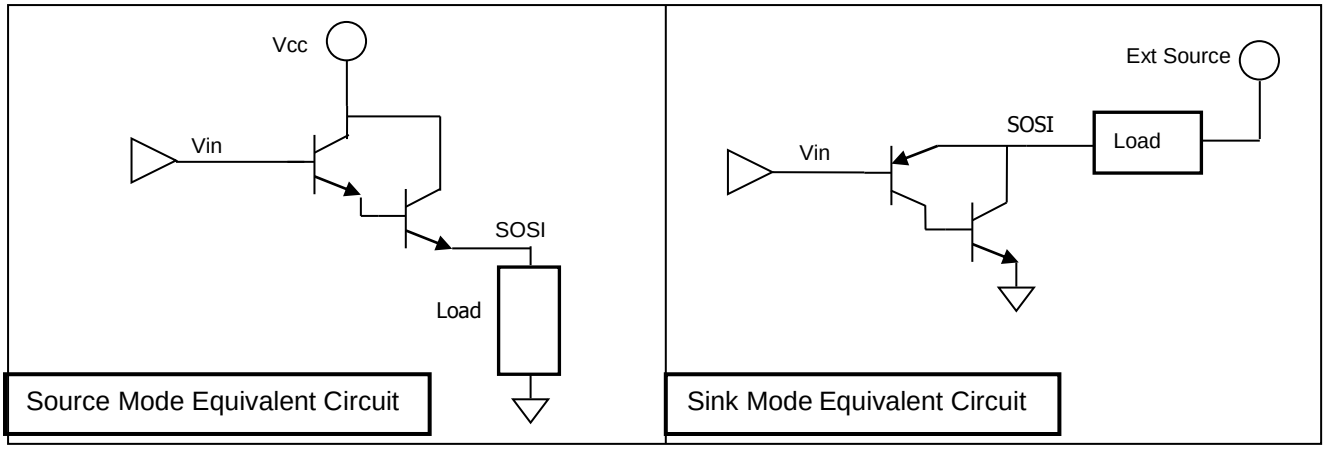
The Source Sink Transistor (SST) is a unique transistor configuration originally designed to be used as the output stage of a new generation of Sourcemeters. The SST can be configured to source a constant voltage or current into a load or Device Under Test, or sink a constant voltage or current from a load or Device Under Test. The present prototype is built on a 2 sided PCB using standard off the shelf components. It is a 6 pin device.

Pin Description

Name	Type	Description
Vcc	Power	Positive power supply with respect to Ground
Ground		Ground
SOSI		Source Out Sink In – When the SST is configured in *source mode*, SOSI supplies voltage and current to an external circuit. When the SST is configured in *sink mode*, SOSI regulates a voltage or current supplied by an external circuit.
Vin	Analog Signal	Connects to the output of an error amplifier to regulate voltage or current. Similar to the base terminal of a transistor.
Control	TTL Logic Input	With Enable low, setting Control low configures the SST in *source mode*. Setting Control logic high configures the SST in *sink mode*.
Enable		Logic low enables the SST. Logic high disables all functionality, and sets the SOSI pin to a high impedance state.

How it works

The Control input determines the method of operation. When the Control pin is low, the SST is configured as an NPN Darlington pass transistor output stage. When the Control pin is high, the SST is configured as a PNP/NPN shunt regulator output stage.

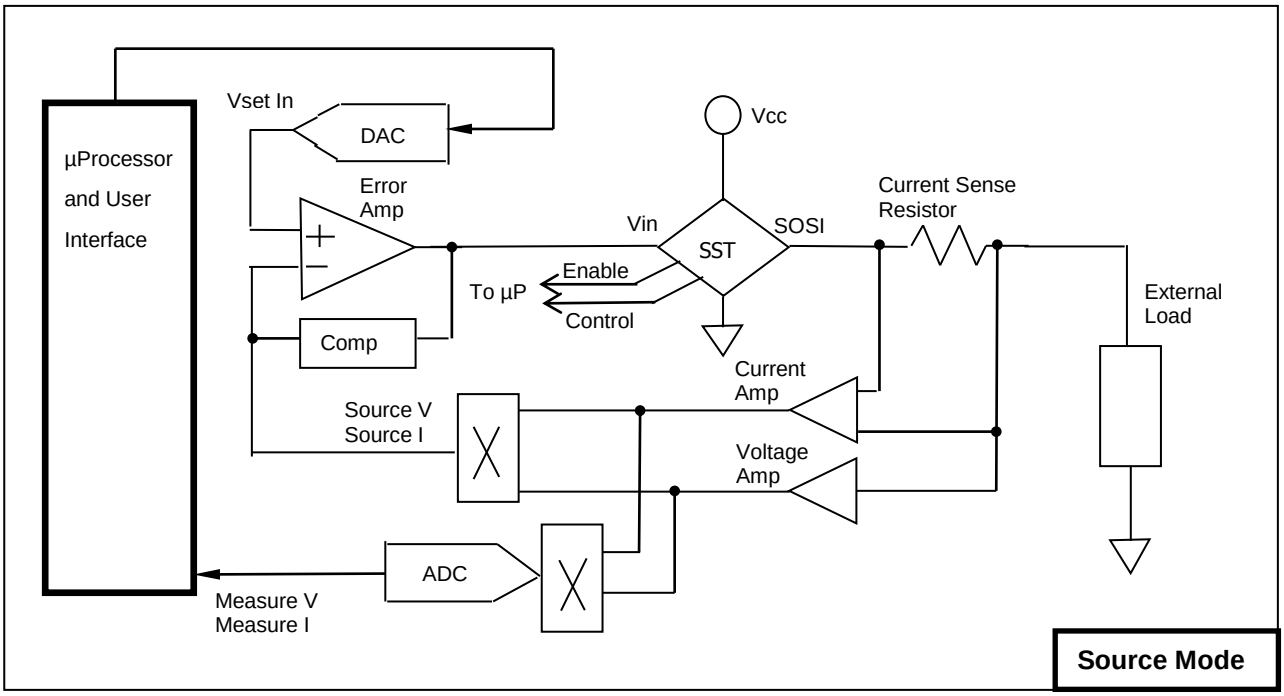


Application Information: Sourcemeter Basics

A Sourcemeter combines the regulation capability of a power supply and electronic load with the measurement capability of a DMM.
Besides the SST, a Sourcemeter requires:

- A DC power supply
- An error amplifier, feedback and loop compensation.
- Voltage and current measuring amplifiers.
- A microcontroller, user interface, DACs to control the source operation and ADCs to measure the voltage and current. GPIO pins are used to control operation. DAC and ADC resolution determine source and measure range and resolution.

The Figures below illustrate how the SST is used in a Sourcemeter application.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Vcc
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Control
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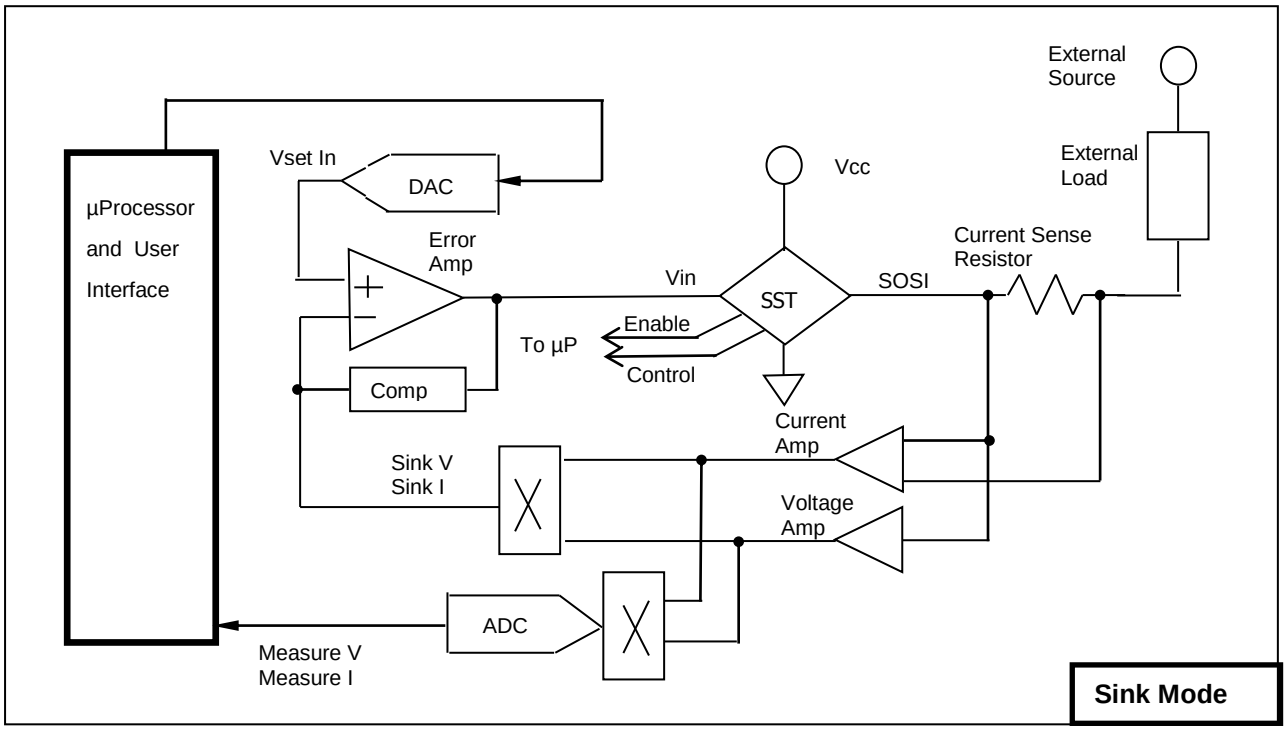
Load
Current
Amp
Source V
Source I
Voltage
Amp
ADC
Measure V
Measure I
Source Mode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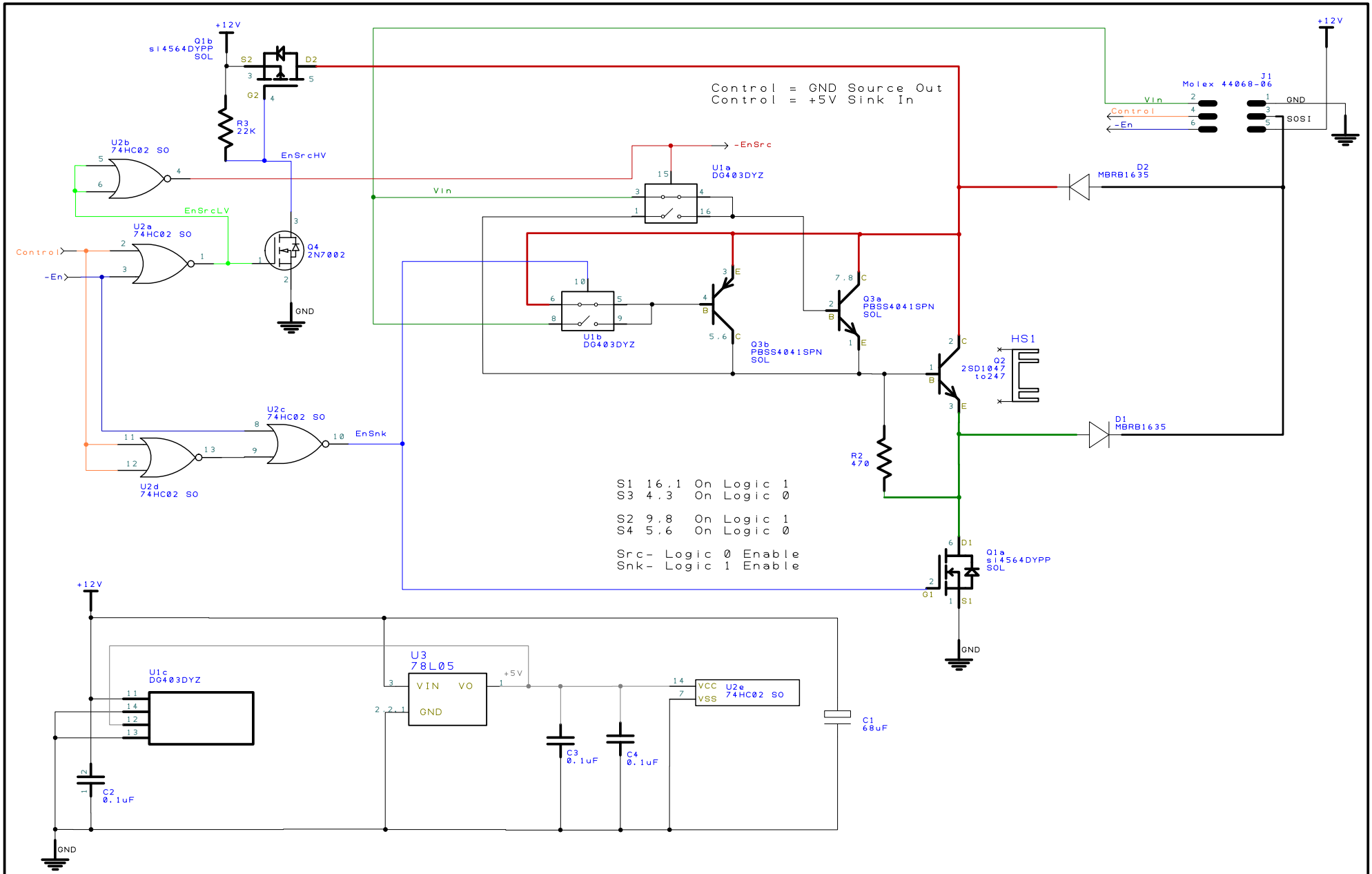
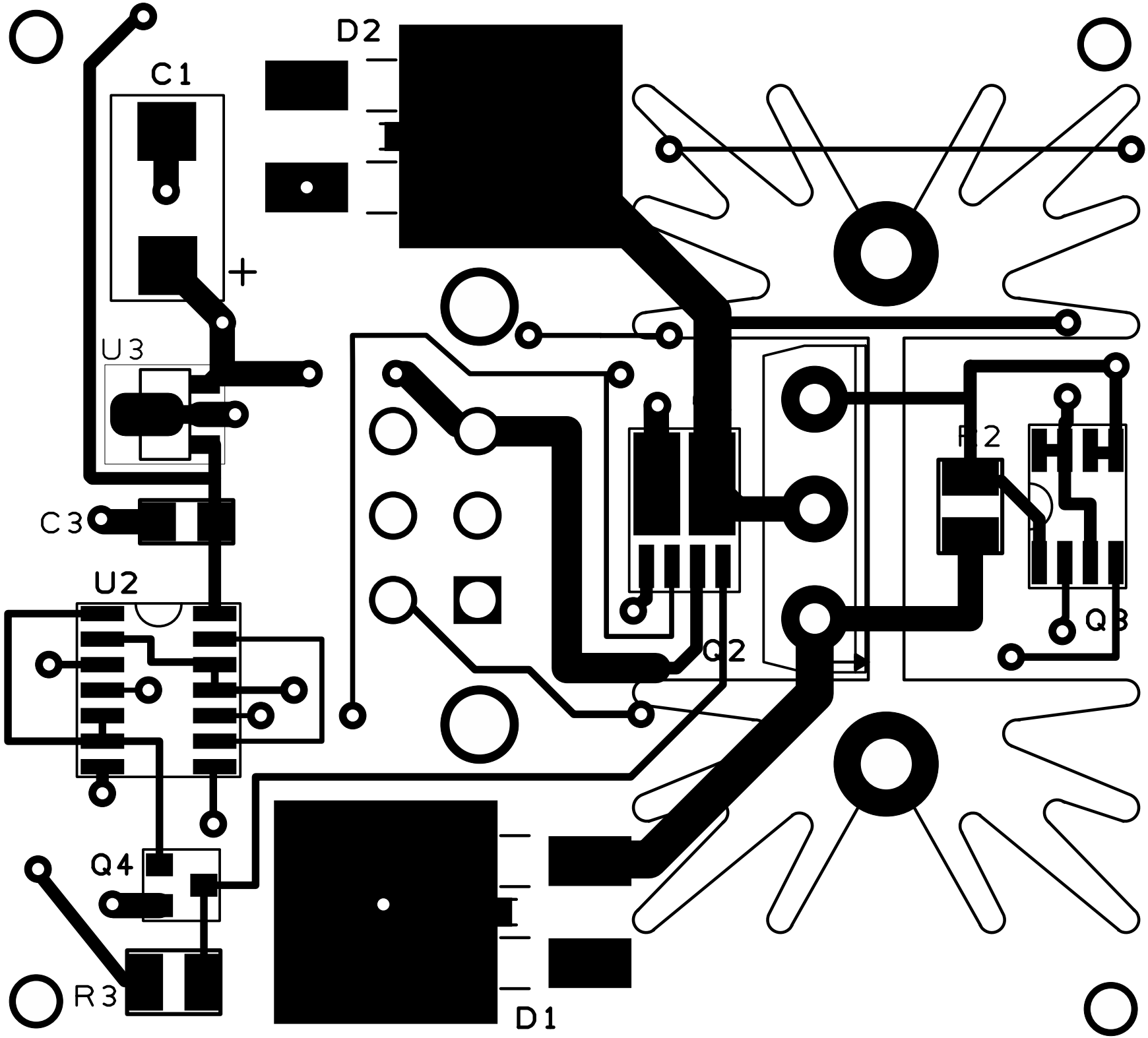
ADC
Measure V
Measure I
Sink Mode



E	D	C	B	A	Drawn	Check	Projection Do Not Scale	SST Rev 04 Enable Added No ideal Diodes
Drn	Drn	Drn	Drn	Project Source Measure Unit Rev 04			Client Revision 4	
Chk	Chk	Chk	Chk	Title Source Sink Transistor Rev 04			Filename SST4.sch	Drawing No. A	Sheet 1 of 1


D2
C1
+
U3
C3
U2
Q4
R3
D1
Q2
Q3