Power Transistor Tester

Background

The idea is to create an automated tester for power transistors.

Introduction

Numerous manufacturers of power transistors may be advertising components that do not perform with the advertised ratings. Companies that use power transistors in critical applications are likely to be interested in purchasing an automated test system (ATS) for qualifying such components.

The automated test system (ATS) will have the following features:

- Run a test program.

- Collect test results.

- Generate a test report.

- Submit the test report.

Block Diagram
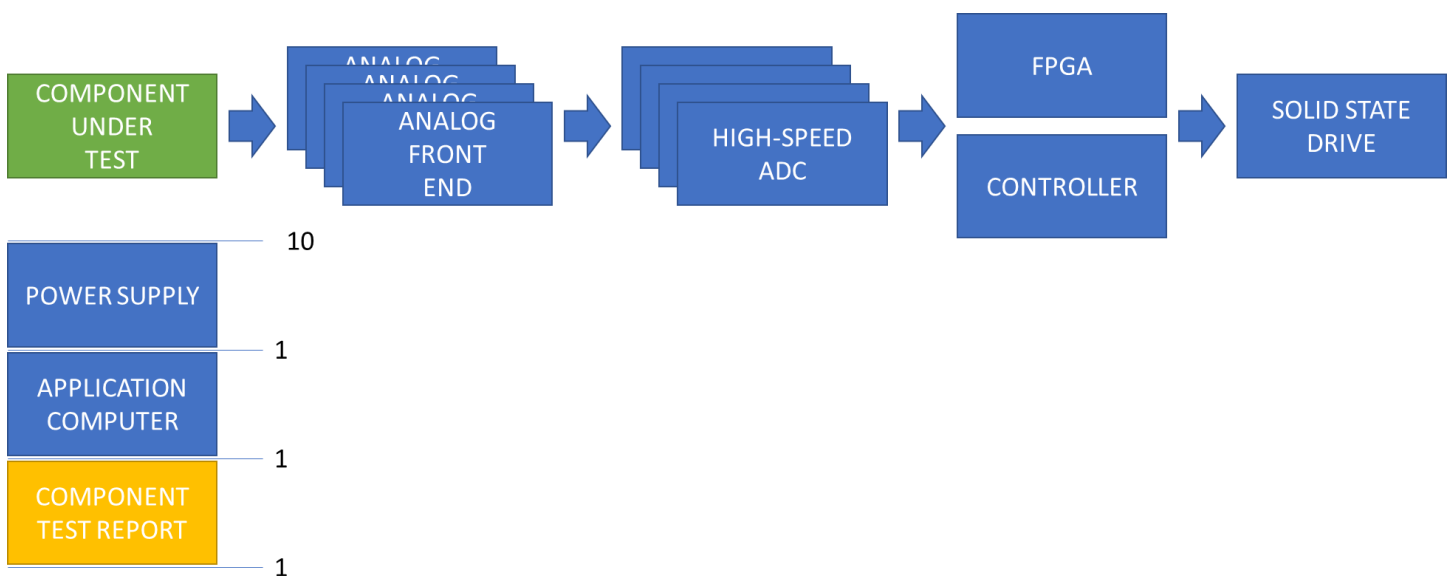
Test Description

Each of the ten (10) components will be tested in four (4) phases.

1. Burn-In
2. Nominal Performance
3. Maximum Performance
4. Stress-Out

The fourth phase, Stress-Out, will ramp up performance stresses until each component fails.

After each component fails, each FPGA will analyze all of the data from each test cycle it observed and create a report for the application computer.

The application computer will analyze the reports of each of the ten (10) components and create a final report.
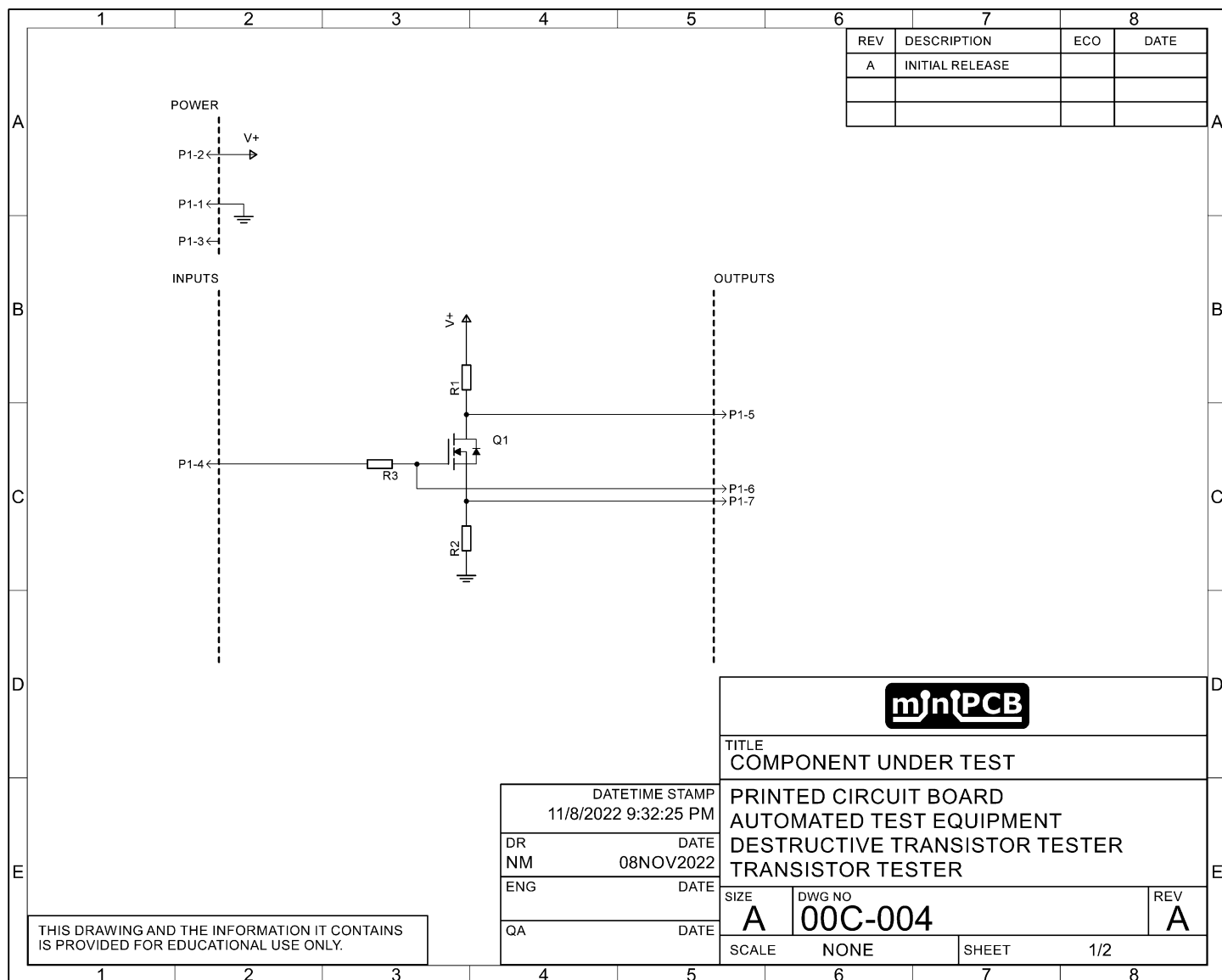
Theory of Operation

By controlling the power supply voltage and control signal, and measuring the voltage at each transistor terminal, it is possible to analyze the transconductance characteristics.

By measuring the temperature leaving the component, it is possible to analyze power dissipation characteristics.

By using multiple ADC channels on the drain pin, where each ADC channel is focused on a different voltage range, a high resolution of Vds can be achieved.

By giving each FPGA individual access to an SSD, nearly unlimited data can be recorded throughout the test.

Schematic: Component Under Test

REV	DESCRIPTION	ECO	DATE
A	INITIAL RELEASE		

POWER

V+

P1-2

P1-1

P1-3

INPUTS

OUTPUTS

V+

R1

Q1

P1-4

R3

P1-5

P1-6
P1-7

R2

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TITLE
COMPONENT UNDER TEST

DATETIME STAMP	PRINTED CIRCUIT BOARD
11/8/2022 9:32:25 PM	AUTOMATED TEST EQUIPMENT

DESTRUCTIVE TRANSISTOR TESTER
TRANSISTOR TESTER

DR	DATE
NM	08NOV2022
ENG	DATE

SIZE	DWG NO		REV
A	00C-004		A

QA	DATE

SCALE	NONE	SHEET	1/2

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Revision History

REV	DESCRIPTION	ECO	DATE
A	Initial Release	N/A	DDMMMYYYY