

TPS54383PWPR

Dual Channel Buck Converter Implementation

Problem Analysis & Observations

TPS54383 IC Overview

- **Dual Channel Buck Converter** - 2 Independent 3A Output Channels
- **Input Range:** 4.5V to 28V wide input voltage support
- **Output Current:** Up to 3A per channel (6A total)
- **Output Voltage:** 0.8V to 90% of input voltage
- **Switching Frequency:** 300kHz Internal Compensation

Problem Statement

Issue #1: Only One Channel Operating

- Expected: Both channels output power simultaneously
- Observed: Only Channel 1 or Channel 2 operational (not both)

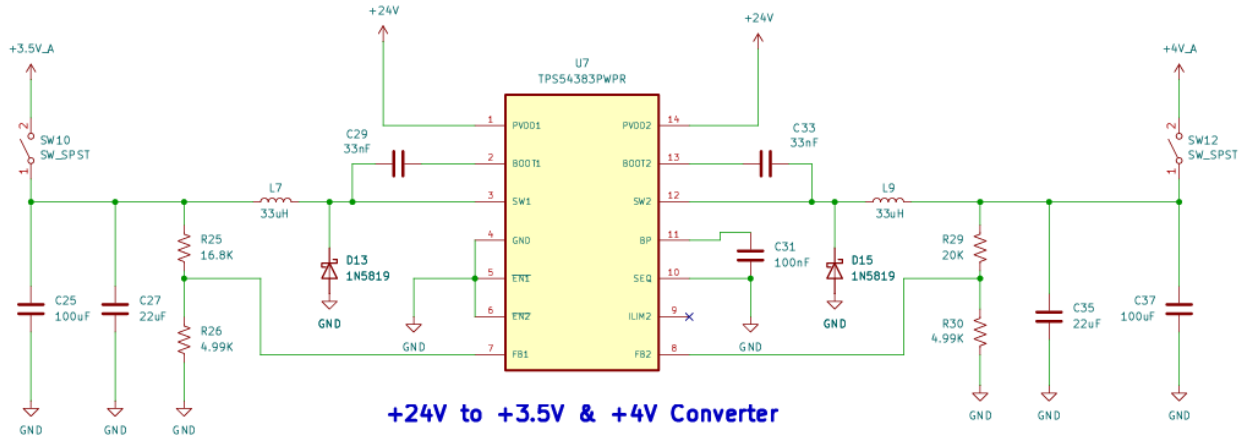
Issue #2: Voltage Collapse Under Load

- Expected: Stable output voltage when connected to DUT
- Observed: Output voltage drops suddenly when DUT is connected

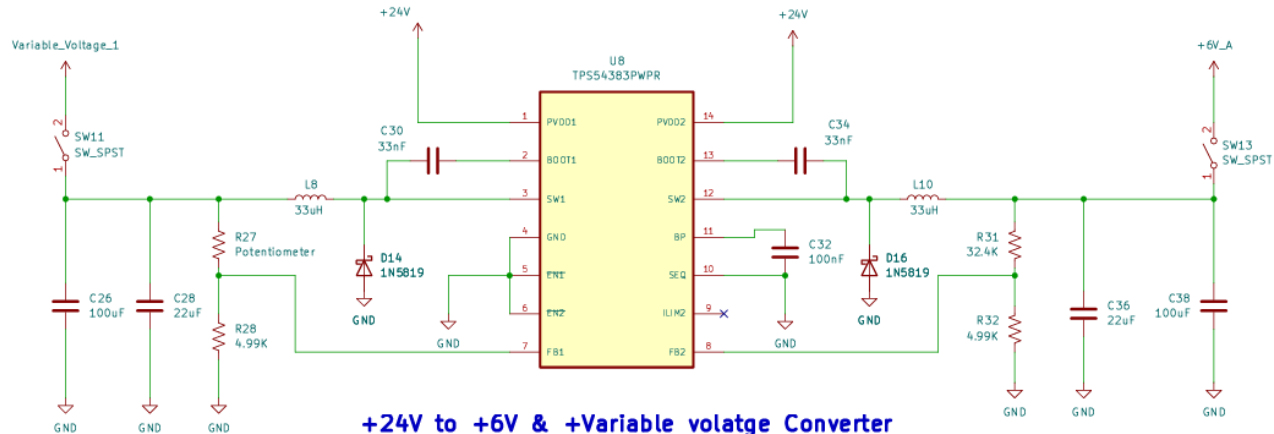
Issue #3: Current Limiting at 40mA

- Expected: Up to 3A continuous output per channel
- Observed: Current limits to ~40mA under any load (1.3% of rating)

Schematic Implementation



+24V to +3.5V & +4V Converter



+24V to +6V & +Variable Voltage Converter

Channel 1: +3.5V & +4V Converters

- **Feedback Dividers:** R25 (16.8k) & R26 (4.99k) set output voltages
- **Output Capacitors:** C29 (33nF) & C27 (22μF) for filtering
- **Status:** The output is expected to be +3.5V under load, but when a load is connected, the voltage drops to 0.7V and the current is limited to 40mA.

Channel 2: +4V Converter

- **Feedback Dividers:** R29 (20k) & R30 (4.99k) set output voltages
- **Output Capacitors:** C30 (33nF) & C37 (100nF) decoupling
- **Status :** Channel 2 not working

Observation: Load-Dependent Voltage Collapse

No-Load vs Load Behavior:

No Load: Output voltage stable at nominal value

With DUT Connected: Voltage drops suddenly

Current Delivery: Limited to $\sim 40\text{mA}$

Thank You