Buck Testing

# Unpowered Tests

* 10K on EN pins is actually 8.7k – IDK, don’t trust this multimeter

# Performance Tests

## Line Regulation

Line regulation is the ability of a power supply to maintain and constant output voltage, despite changes in the input voltage.

Note: should probably use a more accurate/sensitive voltmeter for this test since line regulation is expected to be <0.1%.

|  |  |
| --- | --- |
| **Vi** | **Vo** |
| 25 | 0 |
| 30 | 23.76 |
| 32 | 23.75 |
| 34 | 23.75 |
| 36 | 23.75 |
| 38 | 23.75 |
| 40 | 23.76 |
| 42 | 23.76 |
| 44 | 23.76 |
| 46 | 23.76 |
| 48 | 23.76 |
| 50 | 23.78 |
| 52 | 23.82 |

Given that the actual operating voltage is 40.8 – 50.2V, the line regulation across that interval would be,

d

## Load Regulation

Load regulation is the capability to maintain a constant voltage level at the output despite changes in the supply’s load.

Where,

* Vmin-load is the voltage when the output is open circuit
* Vmax-load is the maximum expected/allowable load
* Vnom-load is the voltage at a typical or specified load

## Efficiency

Efficiency is who effectively the buck steps down the voltage, how much power is lost.

Considerations for multiphase:

* PCB impedances cause voltage drops along the output trace of each phase as it routes from the switching node pins of the IC to the load
* A good, symmetric layout will minimize this impact. Layout asymmetries, however, can lead to imbalances in the outputs of the buck
* In order to properly calculate the efficiency of a multiphase buck, need to measure the current and voltage output at each phase individually.

## Output Ripple

Output ripple is the variation in voltage at the output caused by the switching nature of the regulator.

# Questions for Farris

* Better multimeter/voltmeter?
* How to test load regulation and efficiency?