TND307

Graphical Data Test Circuits for the NCP1650

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APPLICATION NOTE

The following circuits are the test configurations that were used to obtain the data for the graphical section of the NCP1650/D data sheet. Each graph has a schematic associated with it and in some cases a description of the procedure.

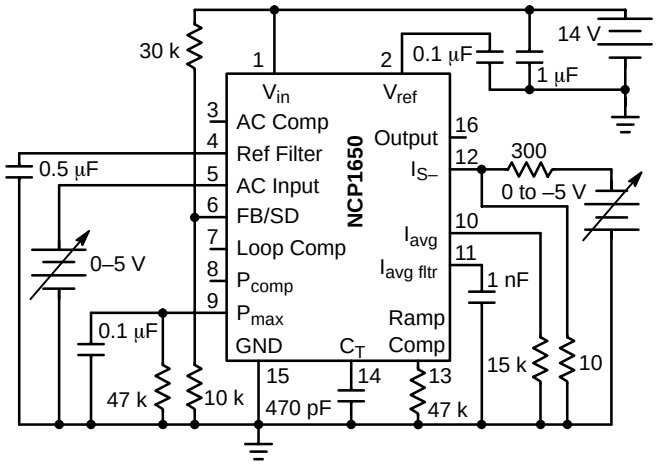

Figure 1. Power Multiplier Family of Curves
Re: NCP1650/D data sheet, Figure 3

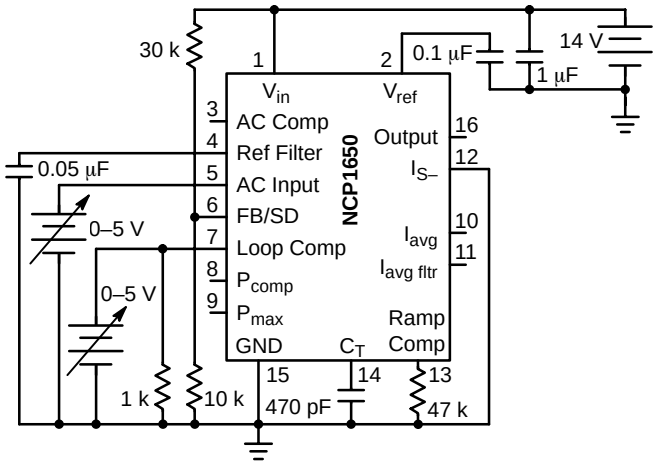

Figure 2. Reference Multiplier Family of Curves
Re: NCP1650/D data sheet, Figure 4

Power up chip. Set I_{S-} between 0 and –200 mV in 50 mV increments. For each value of I_{S-} set the ac input (pin 5) to various values from 0 to 3.8 volts. Record output P_{max} (pin 9).

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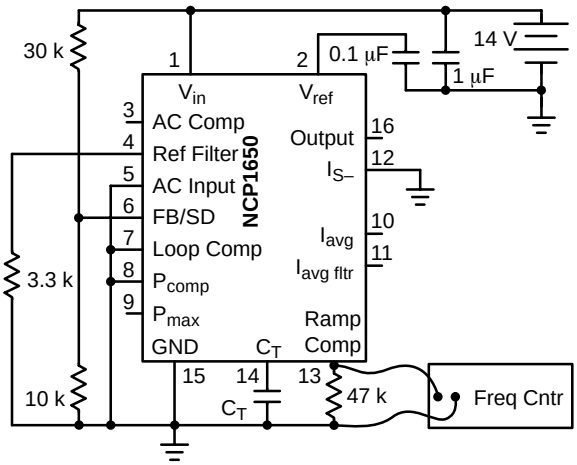

Figure 3. Frequency versus C_T
Re: NCP1650/D data sheet, Figure 5

Bias device per the above figure. Install various values of C_T, and measure the frequency at pin 13. Do not measure directly from pin 14, as the impedance of the measuring device will cause errors in the reading.

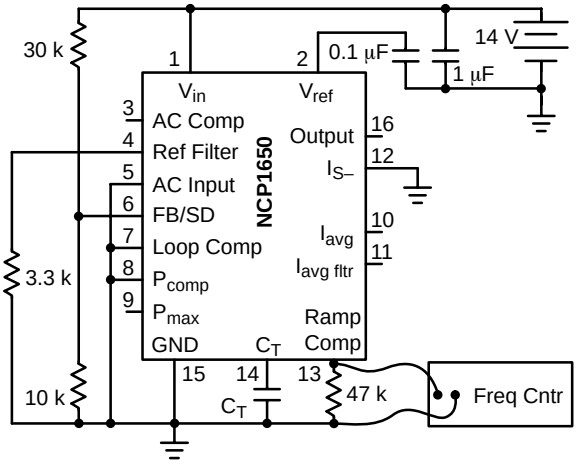

Figure 4. Ramp Peak versus Frequency
Re: NCP1650/D data sheet, Figure 6

Bias device per the above figure. Install various values of C_T, and measure the frequency at pin 13. Measure amplitude at pin 14 with an oscilloscope.

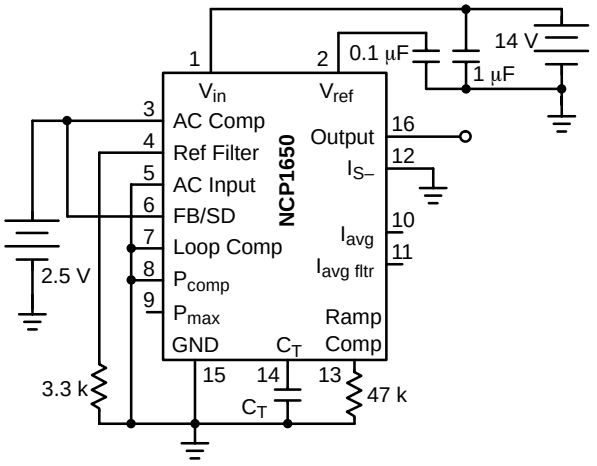

Figure 5. Max Duty Cycle versus Frequency
Re: NCP1650/D data sheet, Figure 7

Measure frequency and duty cycle for various values of C_T.

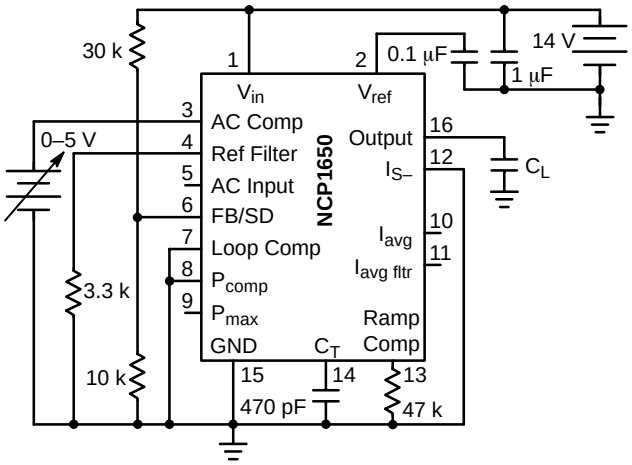

Figure 6. Drive Rise and Fall Time versus Capacitance
Re: NCP1650/D data sheet, Figure 8

Adjust the voltage on pin 3 for approximately 50% duty cycle from the output driver. Measure the waveform on pin 16 with an oscilloscope and measure the rise and fall times at the 10% and 90% levels. Change C_L as required.

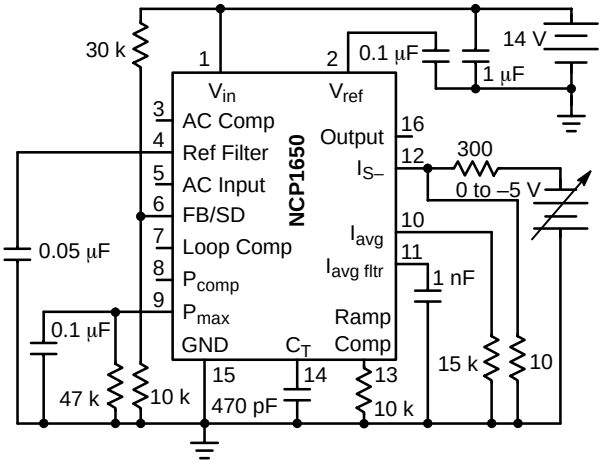

Figure 7. Current Sense Amplifier Gain
Re: NCP1650/D data sheet, Figure 9

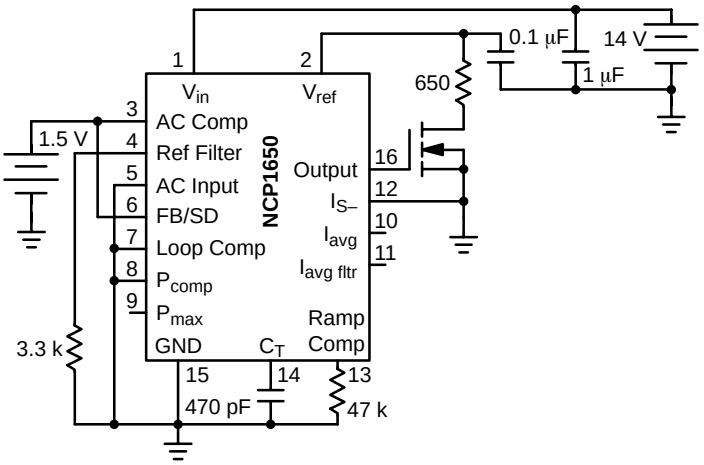

Figure 8. V_{ref}, Transient Response
Re: NCP1650/D data sheet, Figure 11

Adjust voltage at pin 12, and read values at pins 10 & 11.

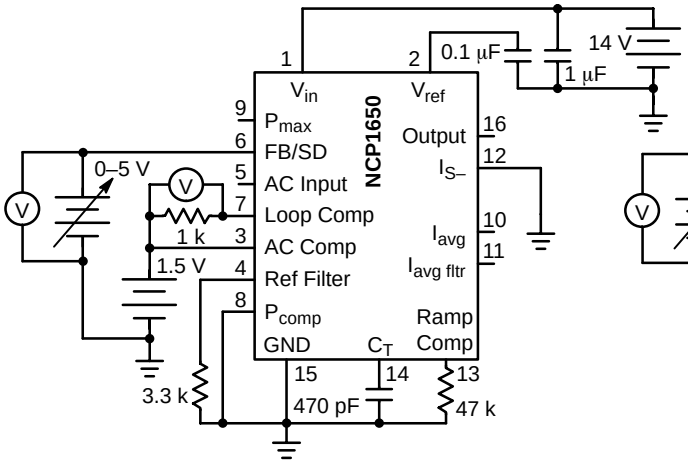

Figure 9. Voltage Error Amplifier Gain
Re: NCP1650/D data sheet, Figures 12 & 13

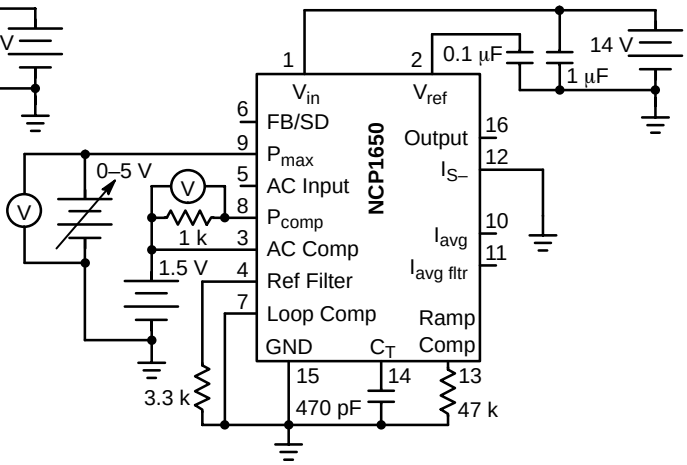

Figure 10. Power Error Amplifier Gain
Re: NCP1650/D data sheet, Figures 14 & 15

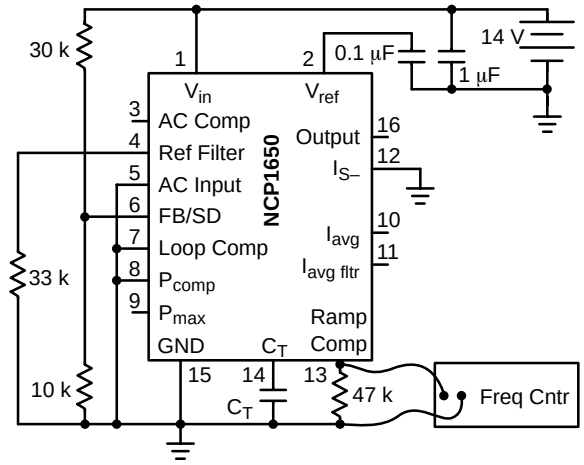

Figure 11. Frequency versus C_T
Re: NCP1650/D data sheet, Figure 16

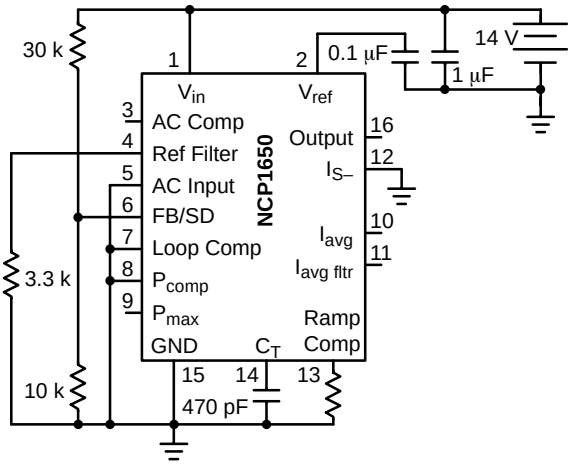

Figure 12. Ramp Peak versus Temperature
Re: NCP1650/D data sheet, Figure 17

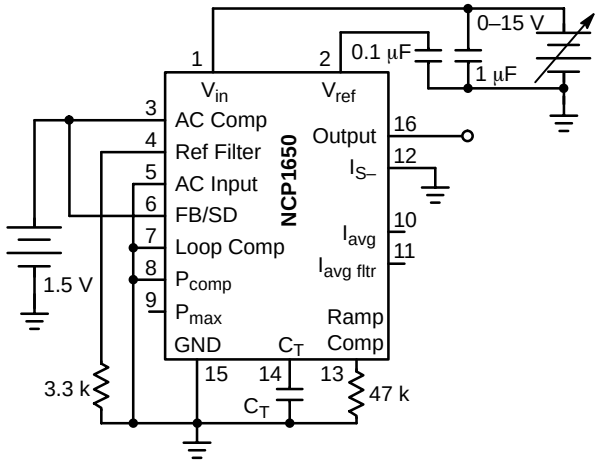

Figure 13. UVLO Turn On/Turn Off
Re: NCP1650/D data sheet, Figure 18

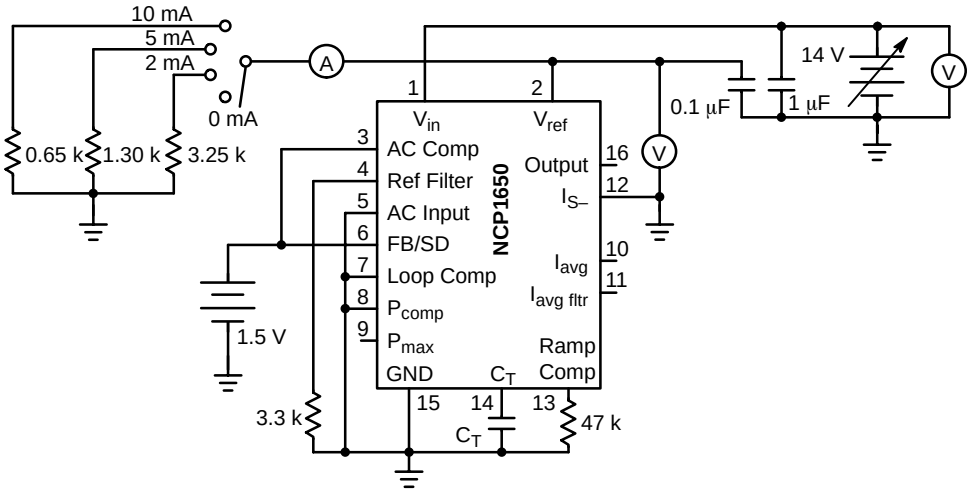

Figure 14. V_{ref} Line/Load Regulation in Operating Mode
Re: NCP1650/D data sheet, Figures 19 & 20

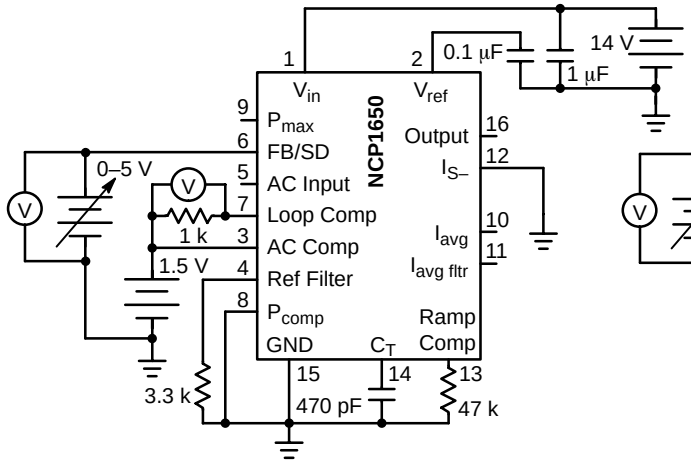

Figure 15. Voltage Error Amplifier Gain
Re: NCP1650/D data sheet, Figure 21

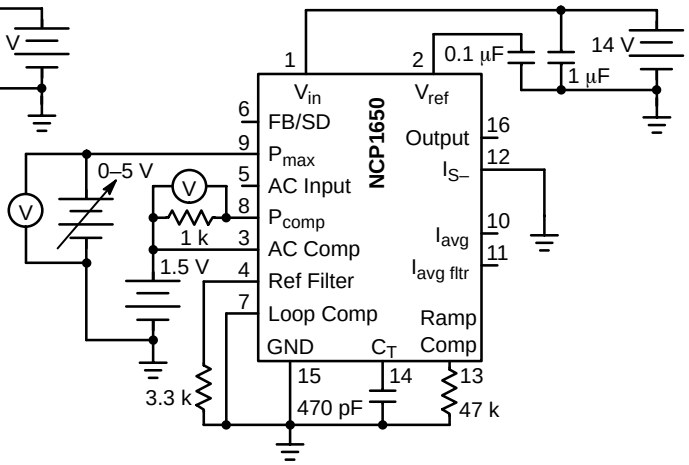

Figure 16. Power Error Amplifier Gain
Re: NCP1650/D data sheet, Figure 22

Energize unit by applying 14 volt supply. Using a precision supply with resolution of 1 mV or less, adjust the voltage at pin 6 for zero current out of pin 7. The voltage at pin 6 will be the effective 4.0 V reference voltage.

Energize unit by applying 14 volt supply. Using a precision supply with resolution of 1 mV or less, adjust the voltage at pin 9 for zero current out of pin 8. The voltage at pin 9 will be the effective 2.5 V reference voltage.

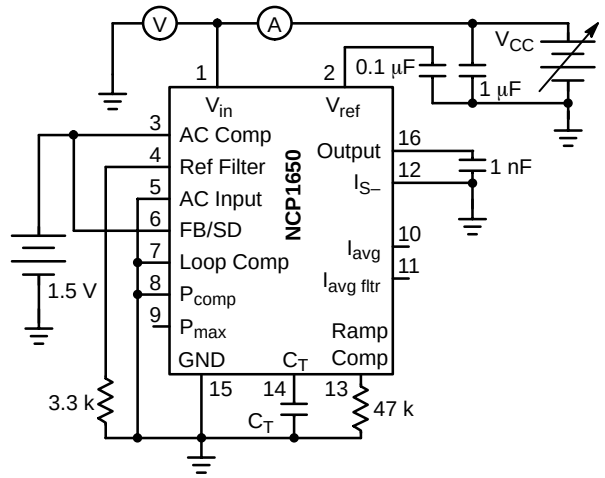

Figure 17. Bias Current versus V_{CC}
Re: NCP1650/D data sheet, Figure 23

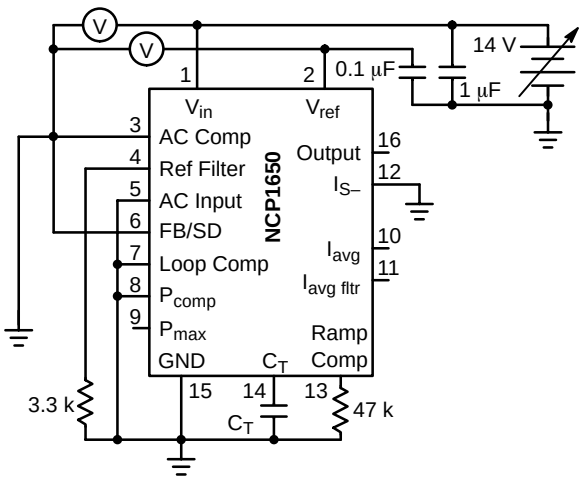

Figure 18. V_{ref} versus V_{CC} in Shutdown Mode
Re: NCP1650/D data sheet, Figure 24

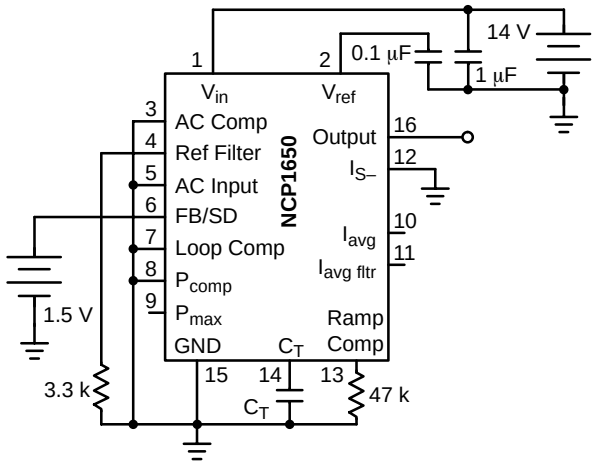

Figure 19. Minimum Duty Cycle versus Frequency
Re: NCP1650/D data sheet, Figure 25

Apply power to 14 V supply and then to 1.5 V supply. Measure on time, and period at pin 16 using an oscilloscope. Vary capacitor value from 2000 pF to 100 pF for frequency range of 25 kHz to 300 kHz.

Notes

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