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WMO uses Monsoon Devices

B. T. V. O. M. L. M. V. S.

Move-Diversify vs Move-Jittery

## Uniform NLTL

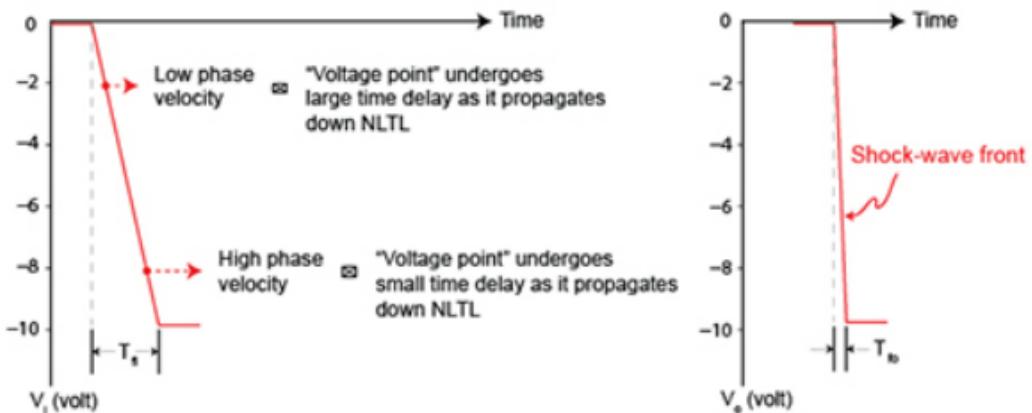
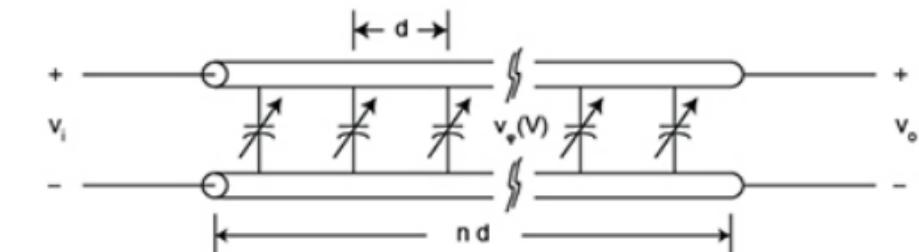
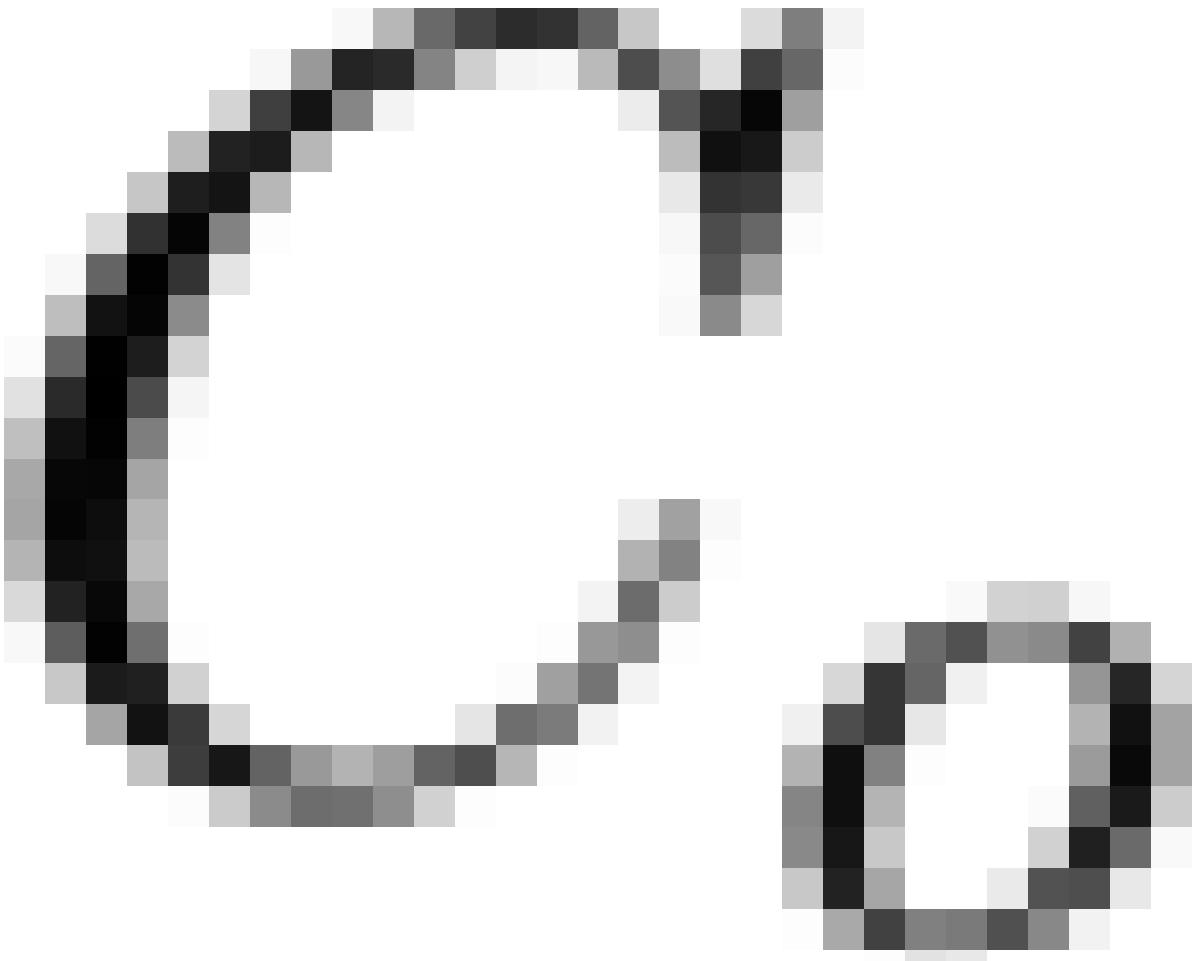


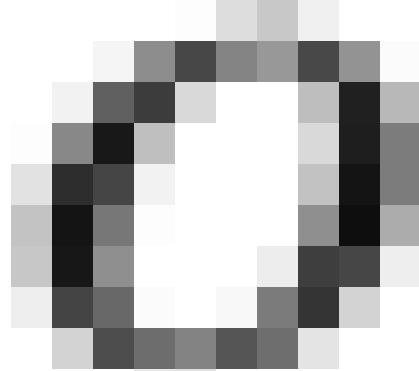
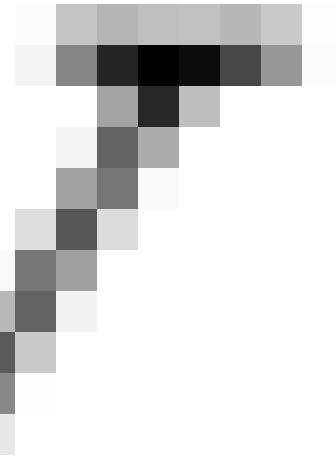
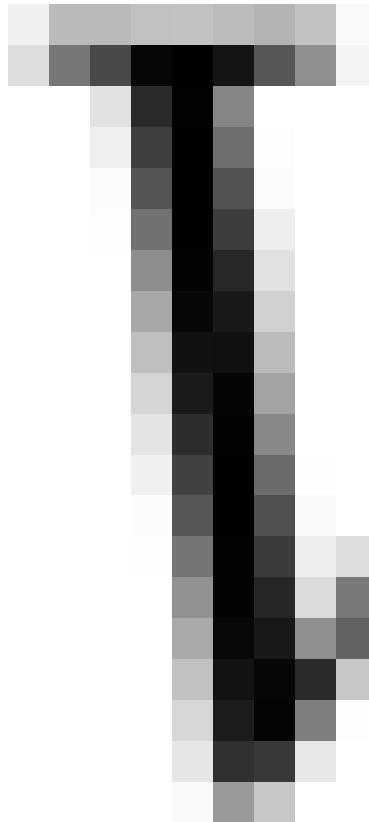
Figure 1. This graphic taken from an ANRITSU application note shows the basic principle of catch-up theory, and how it can be used to sharpen input pulses

Monte Carlo Methods in Finance

$$C(v) =$$

$$= \frac{c_0}{\sqrt{1 + v/v_0}} (1)$$





$$C_{ls}(V_l, V_n) = \frac{1}{V_n - V_l} \int_{V_l}^{V_n} C(v) dv \quad (2)$$

$$f_{\text{bragg}} \approx$$

$$\frac{1}{2\pi\sqrt{L_C(v)}}$$

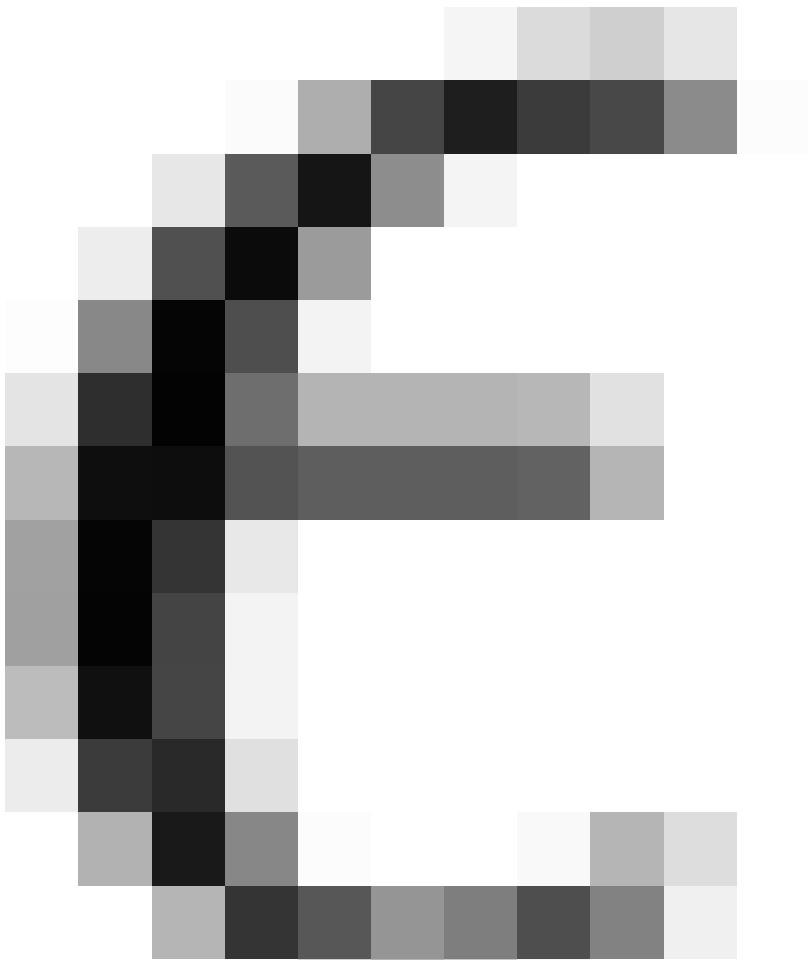
$$(3)$$

Figure 2. Methods of Model 2

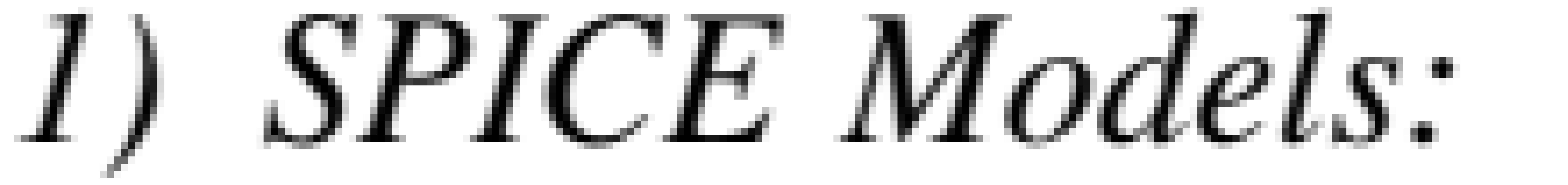
Modelling Board Characteristics

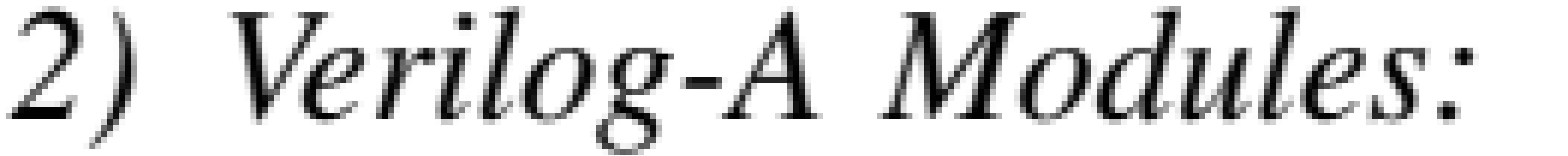
$$C = \frac{\epsilon A}{d}$$

$$C = \frac{4}{d}$$

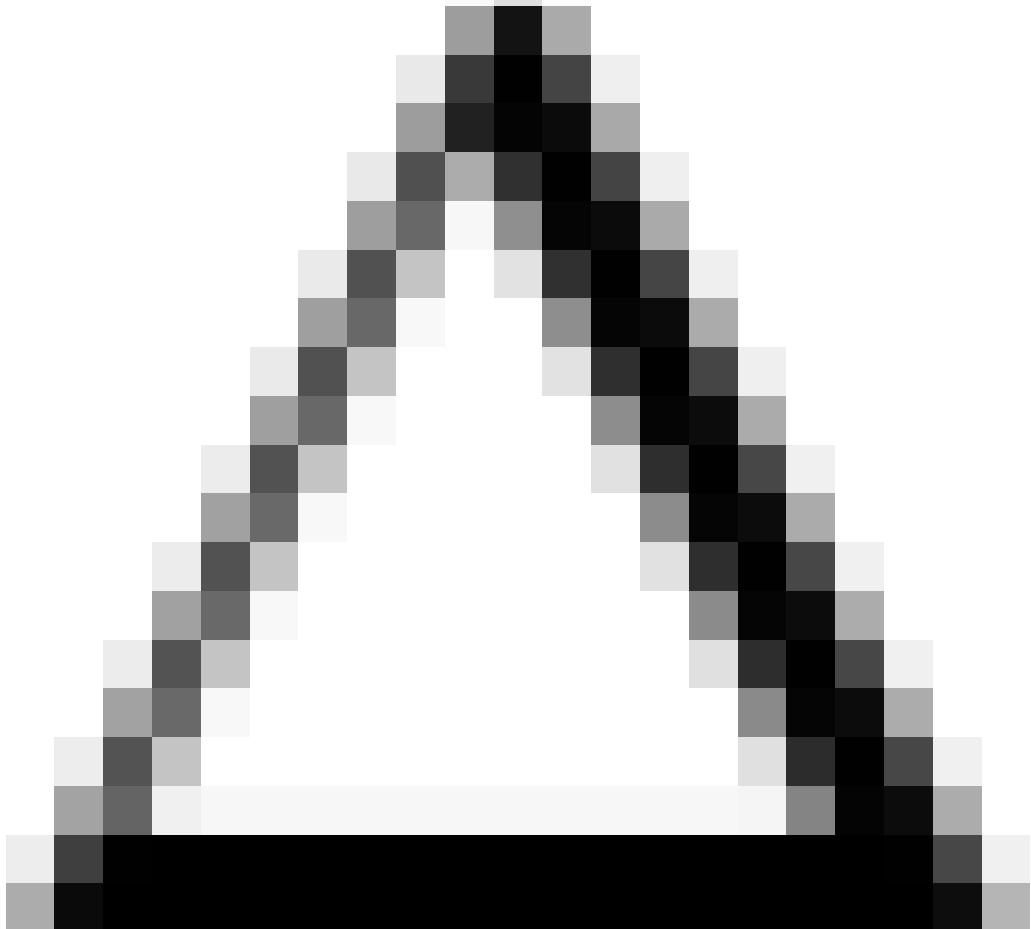


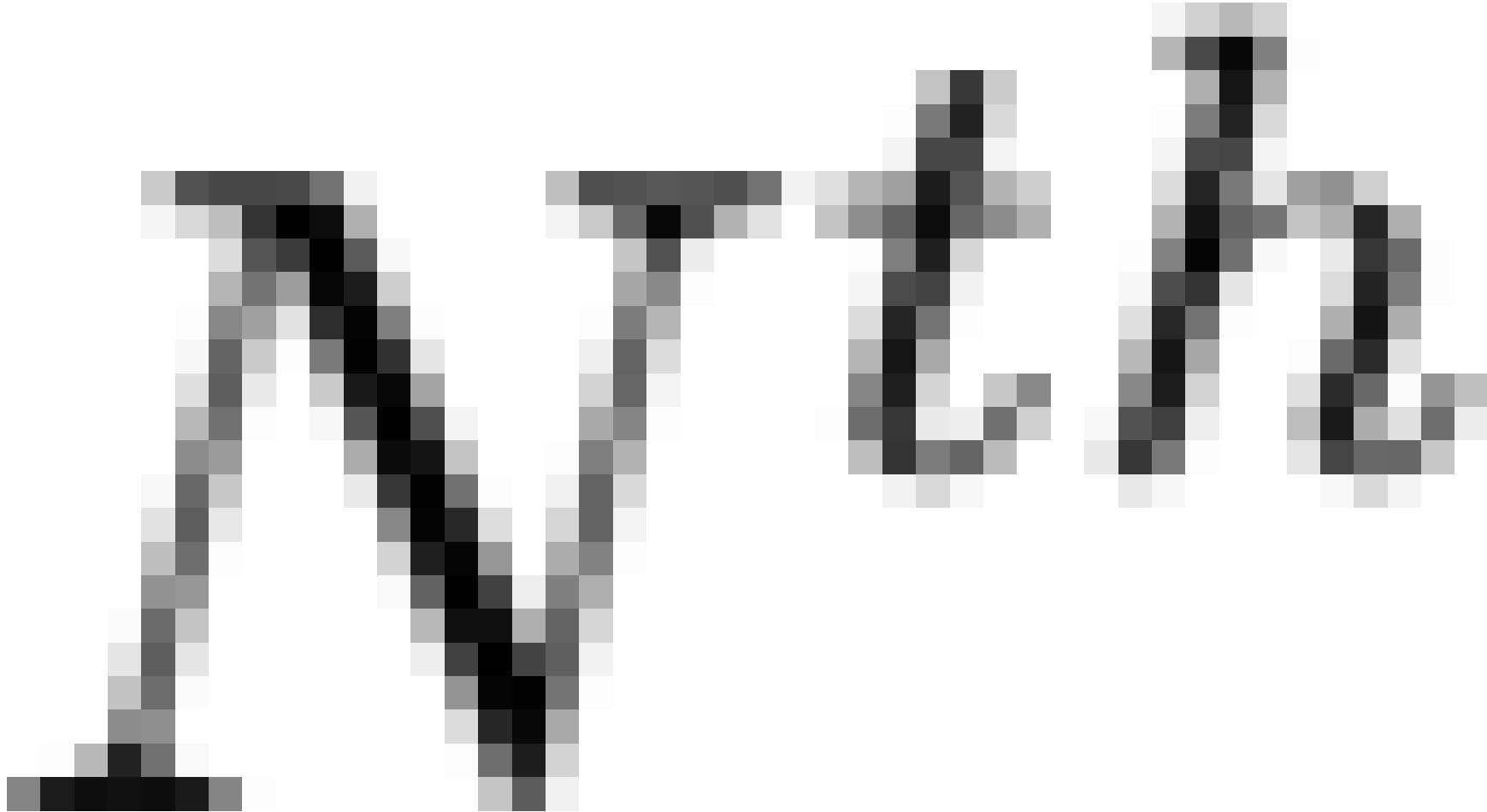






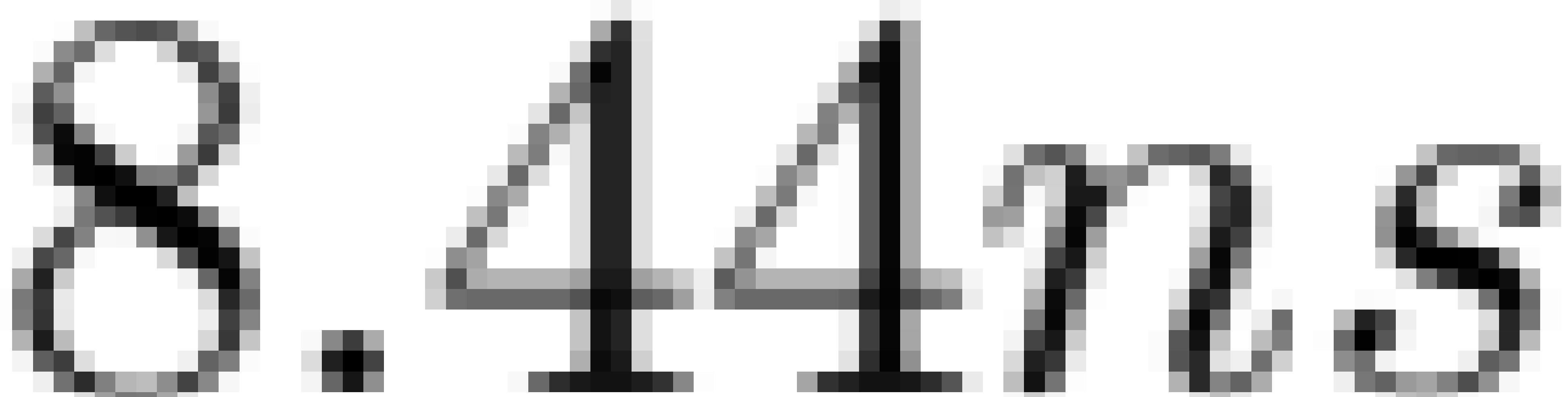
III SIMULATIONS

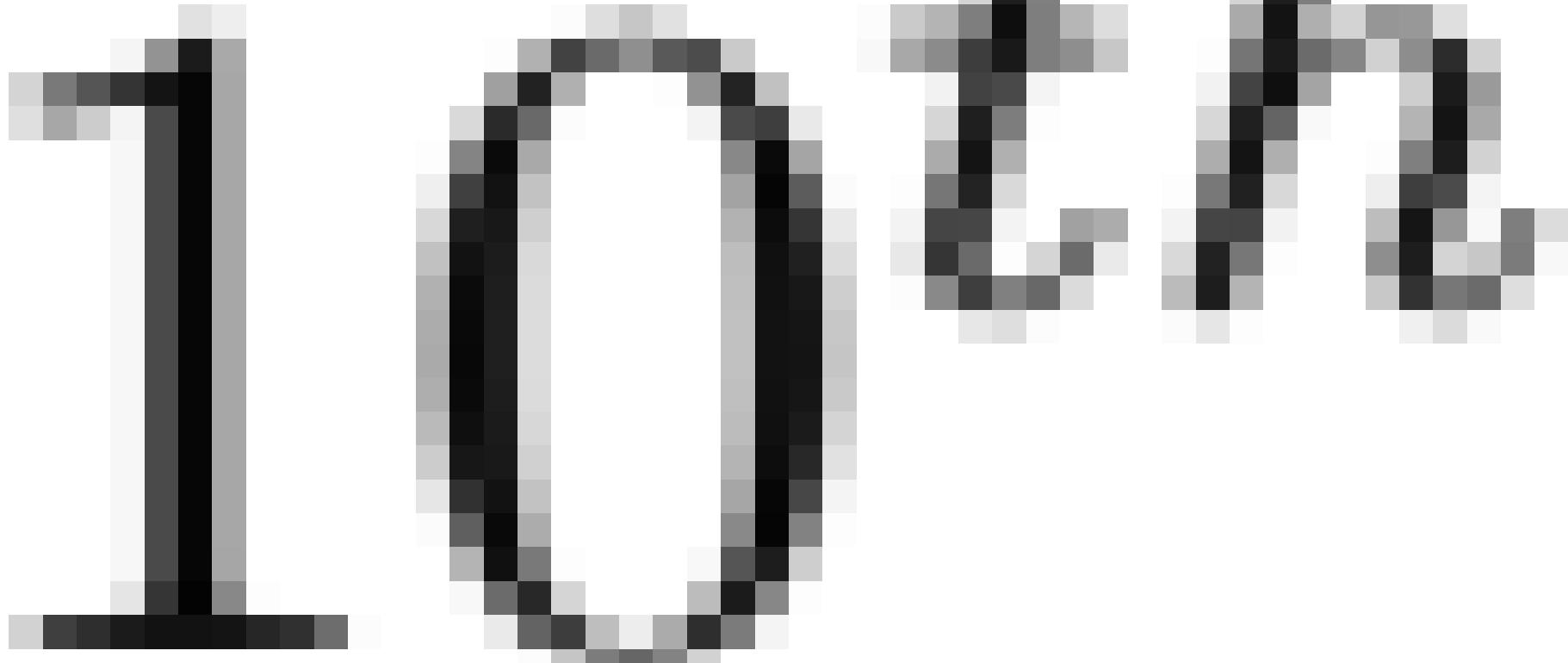


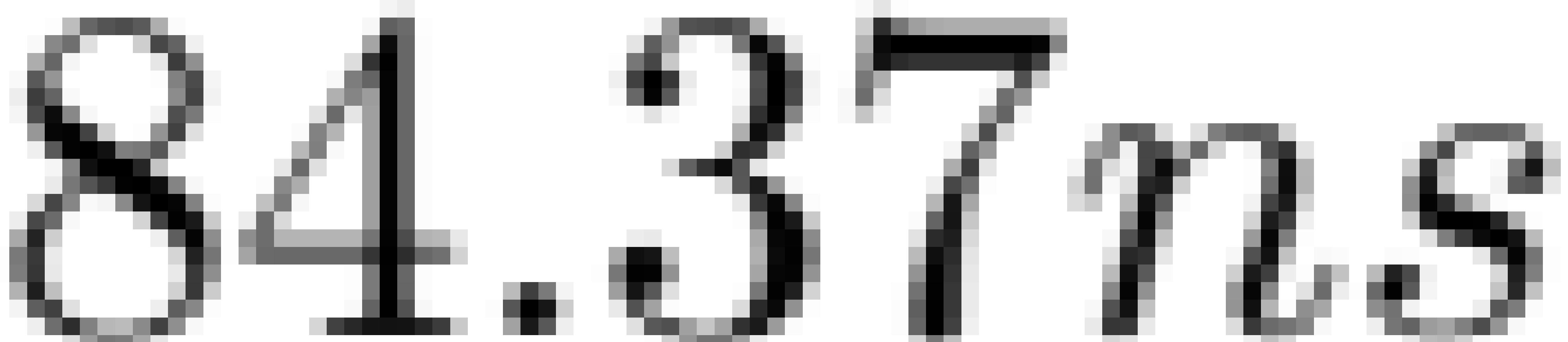


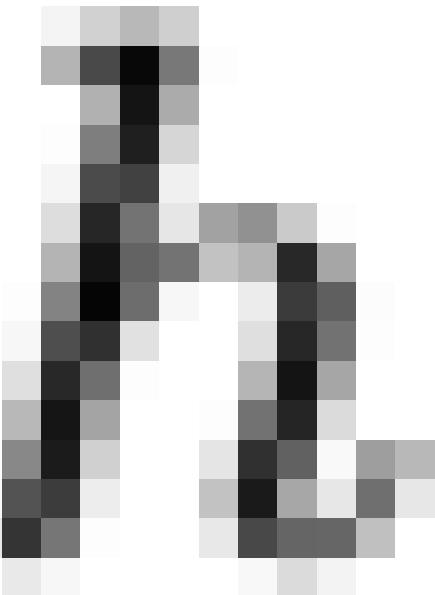
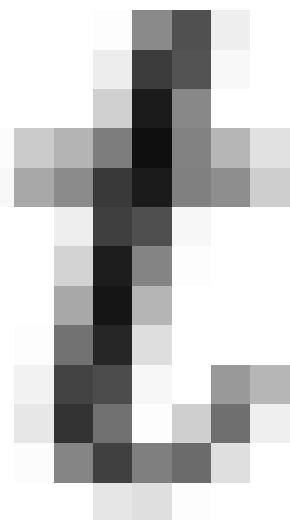
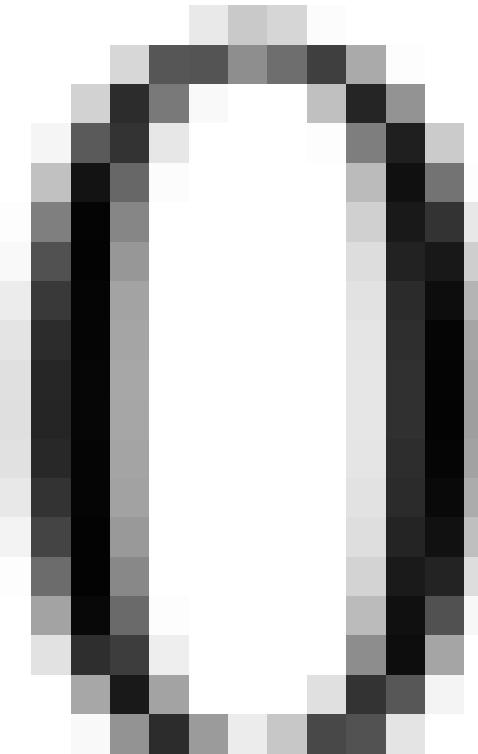
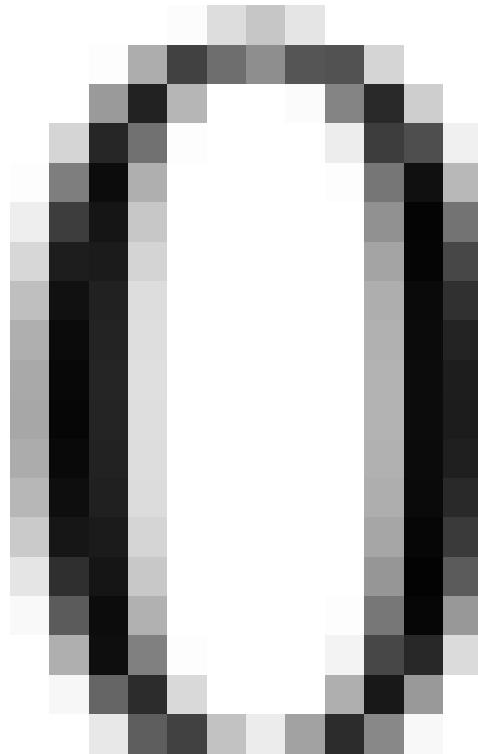
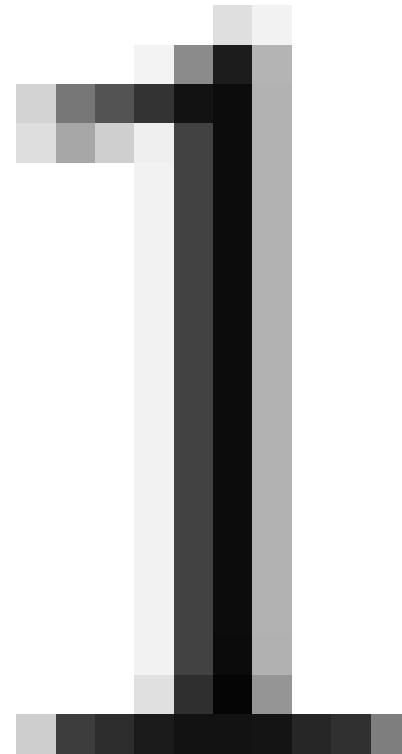
A. Simulation Rise Time





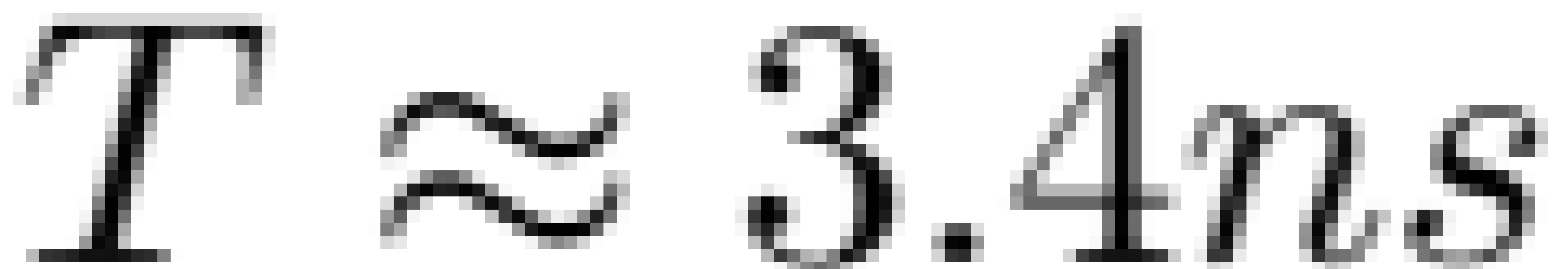


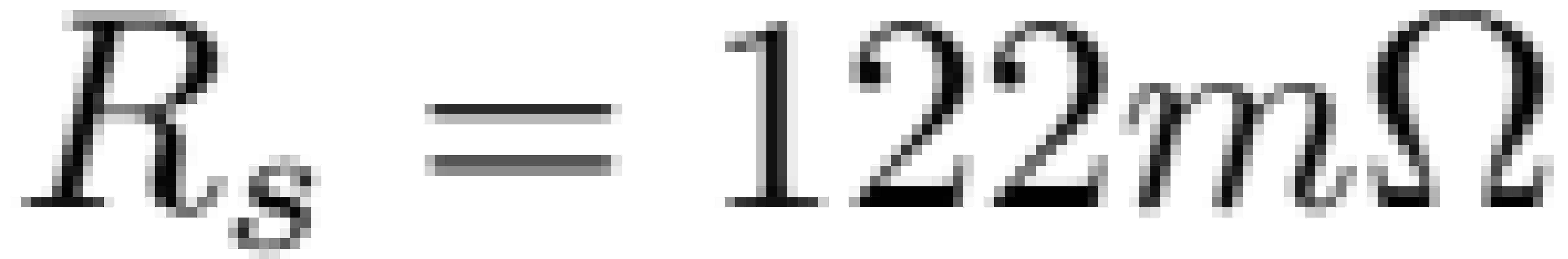


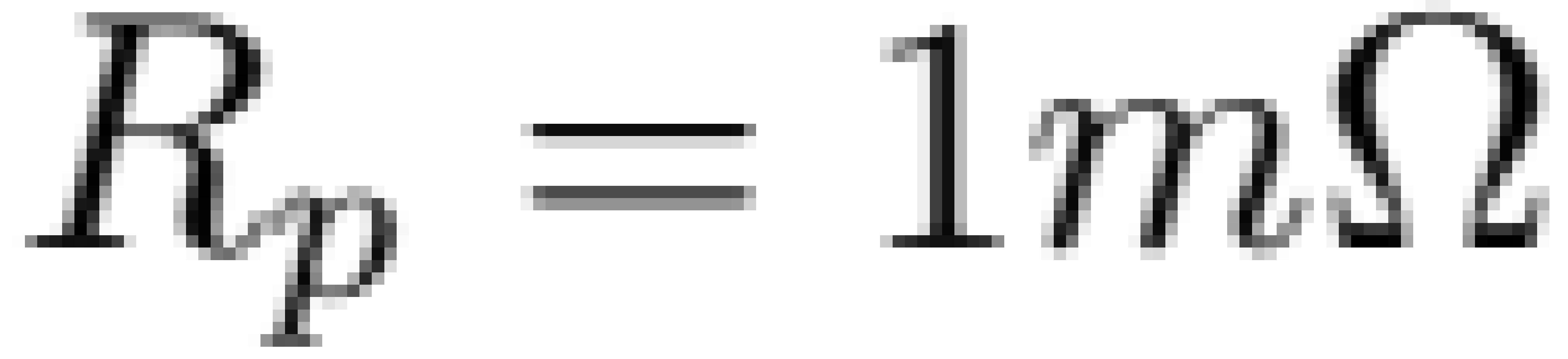


$$\Delta = N(\mathcal{L}_G) \cup \mathcal{L}_G(S)$$

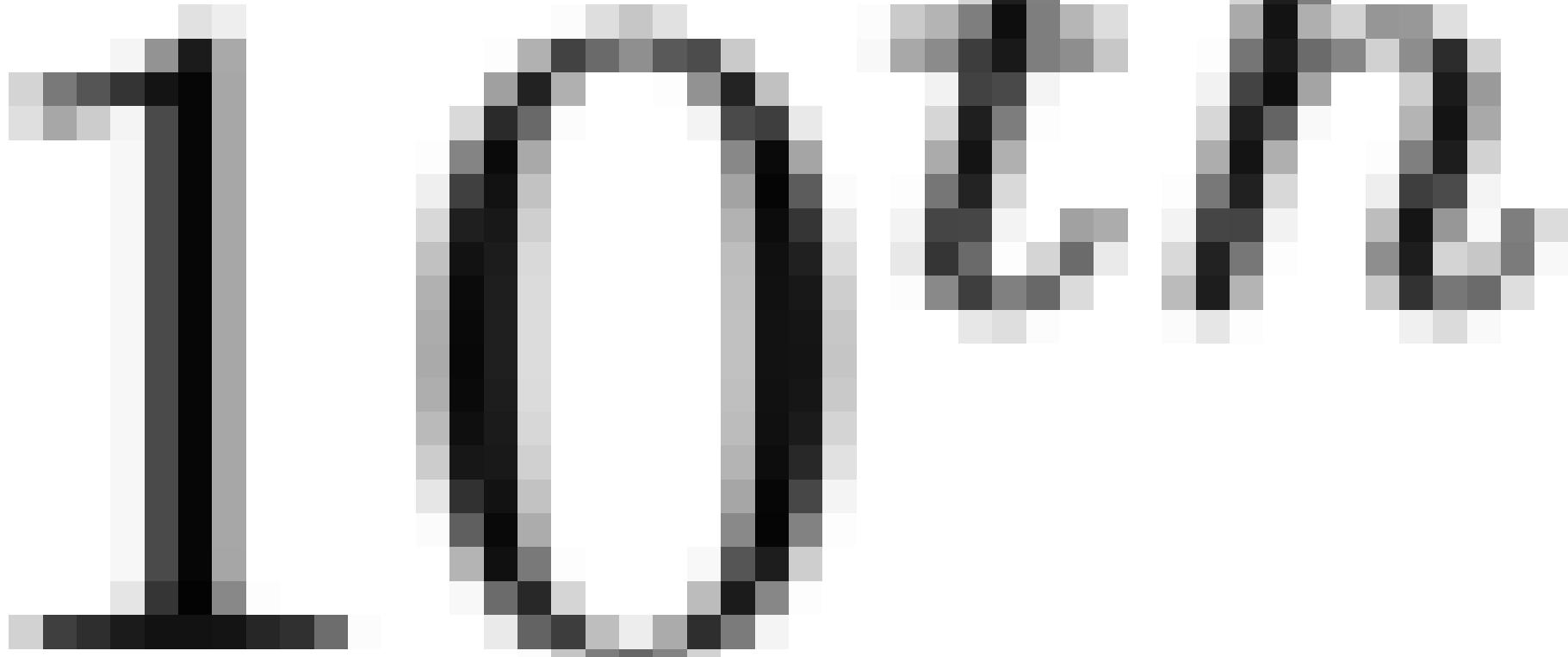


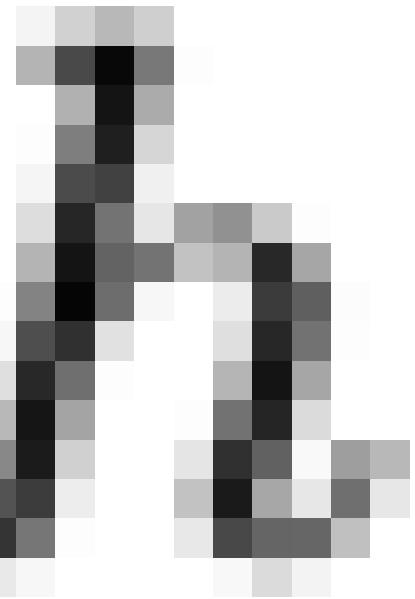
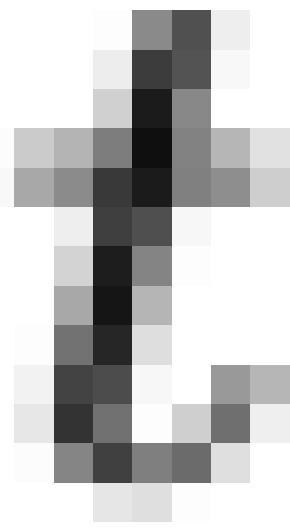
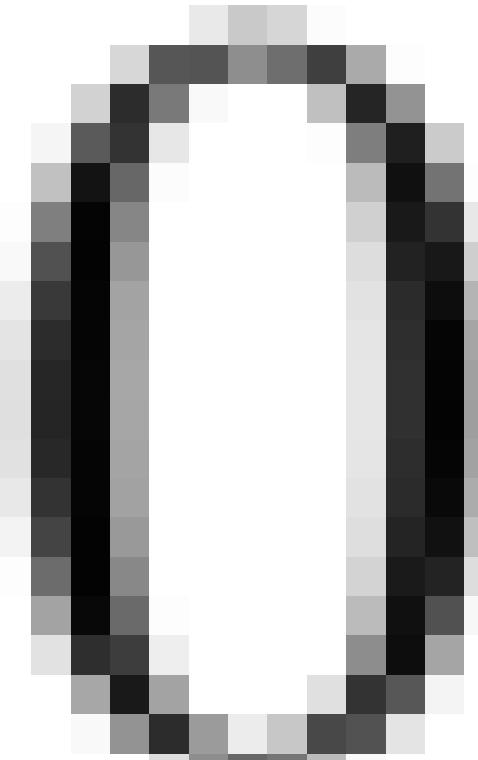
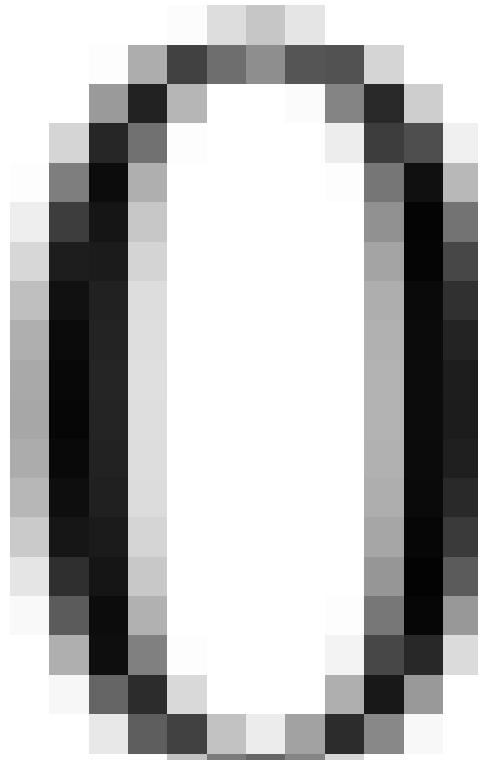
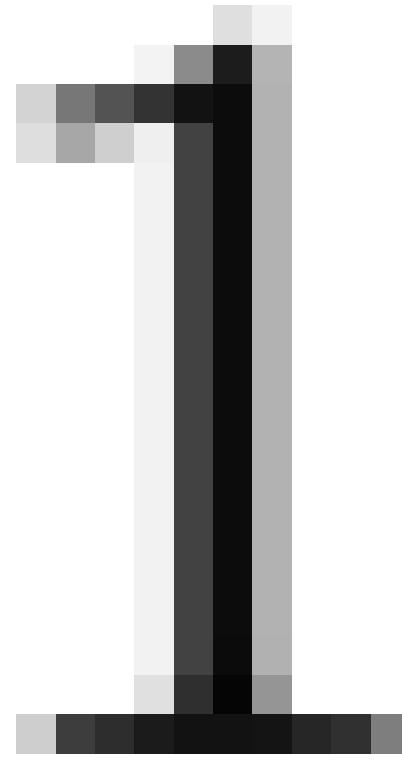






$$\omega_c = \frac{2}{\sqrt{Lc_s}} \quad (6)$$





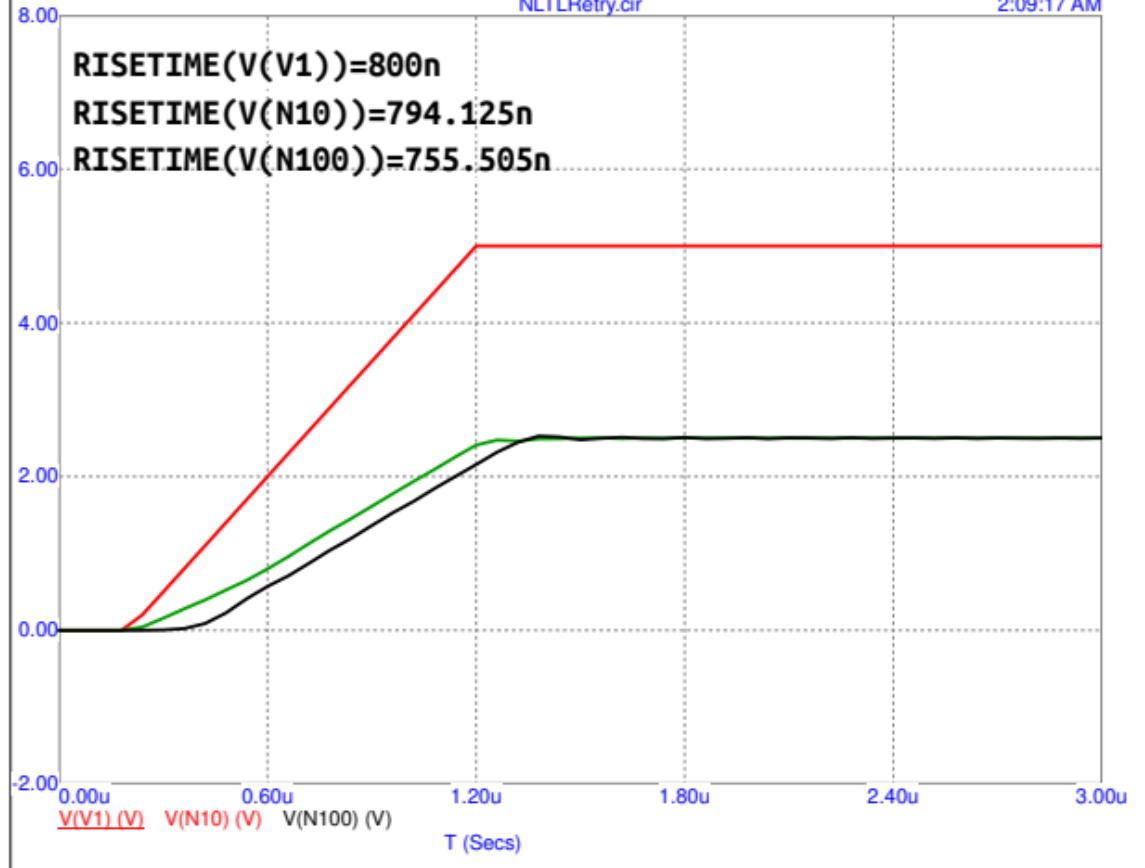
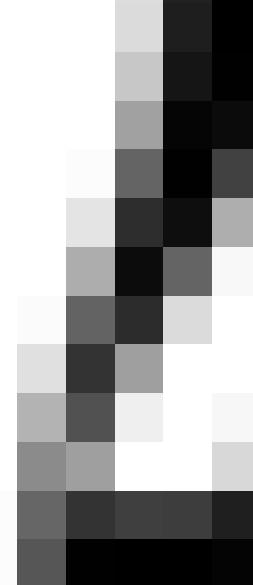
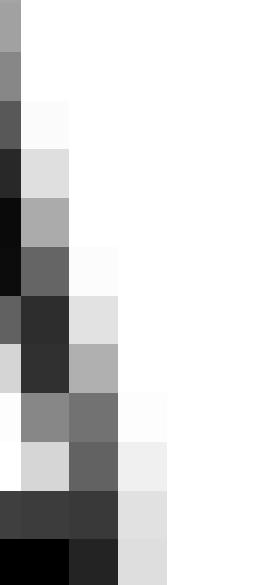
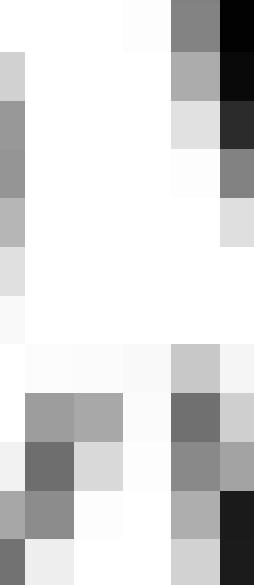
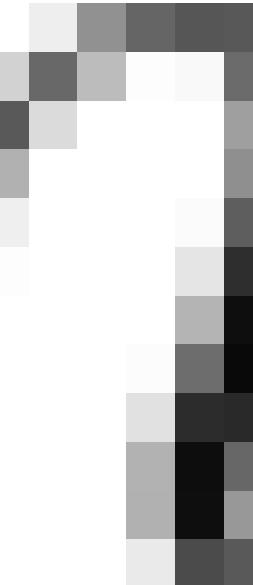
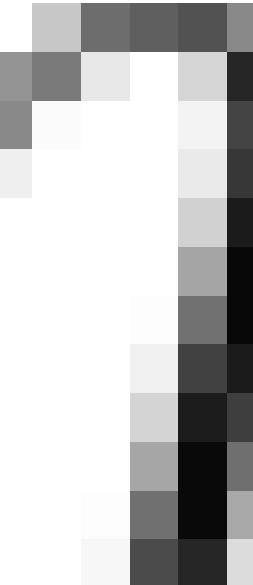
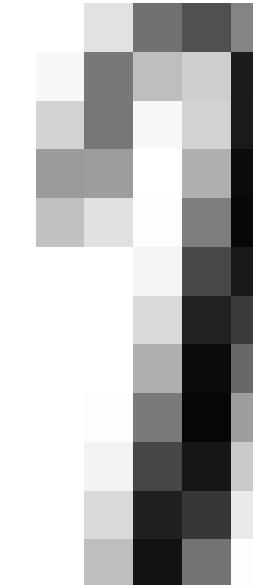
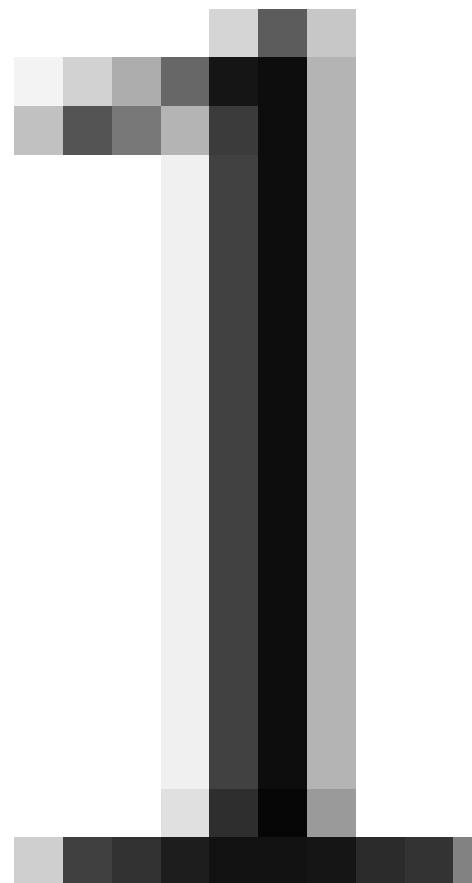
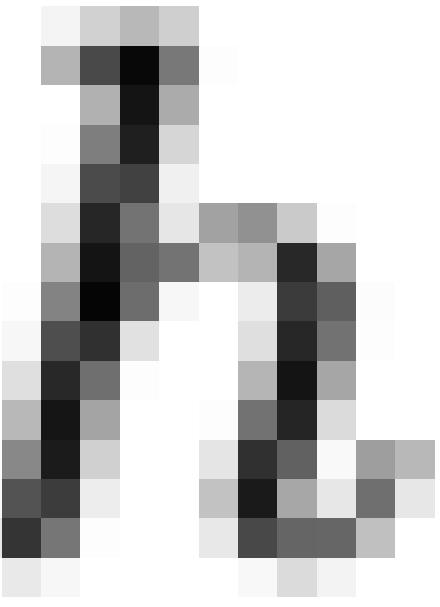
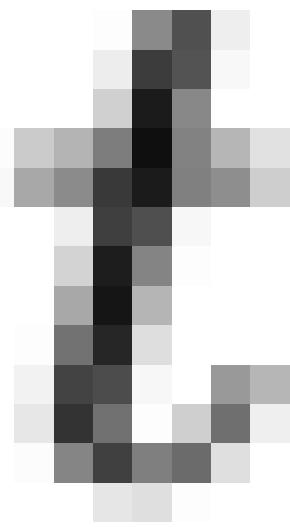
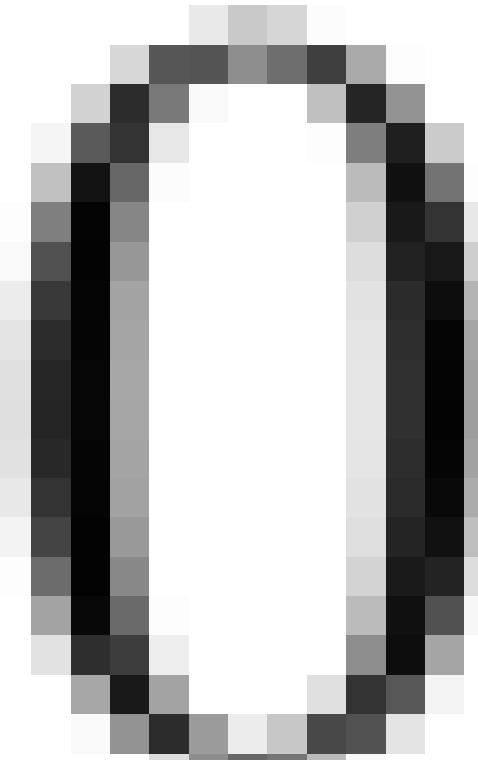
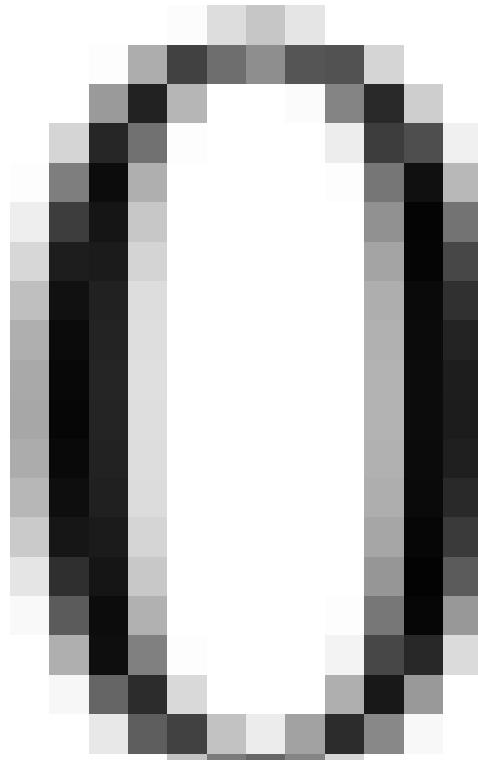
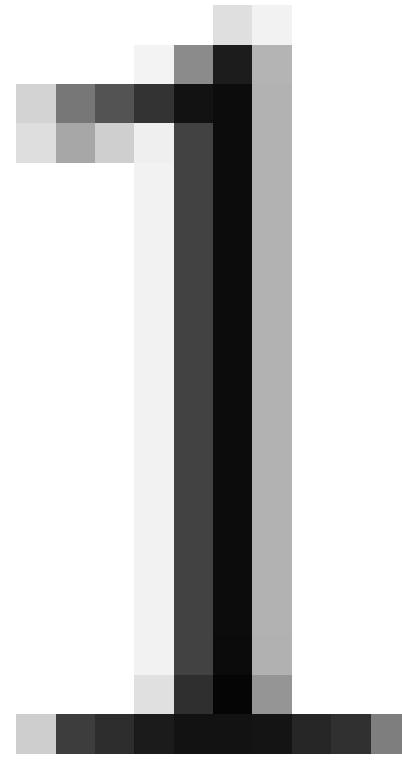


Figure 2. Rise time at source, node 10 and node 100 simulated with no resistive loss







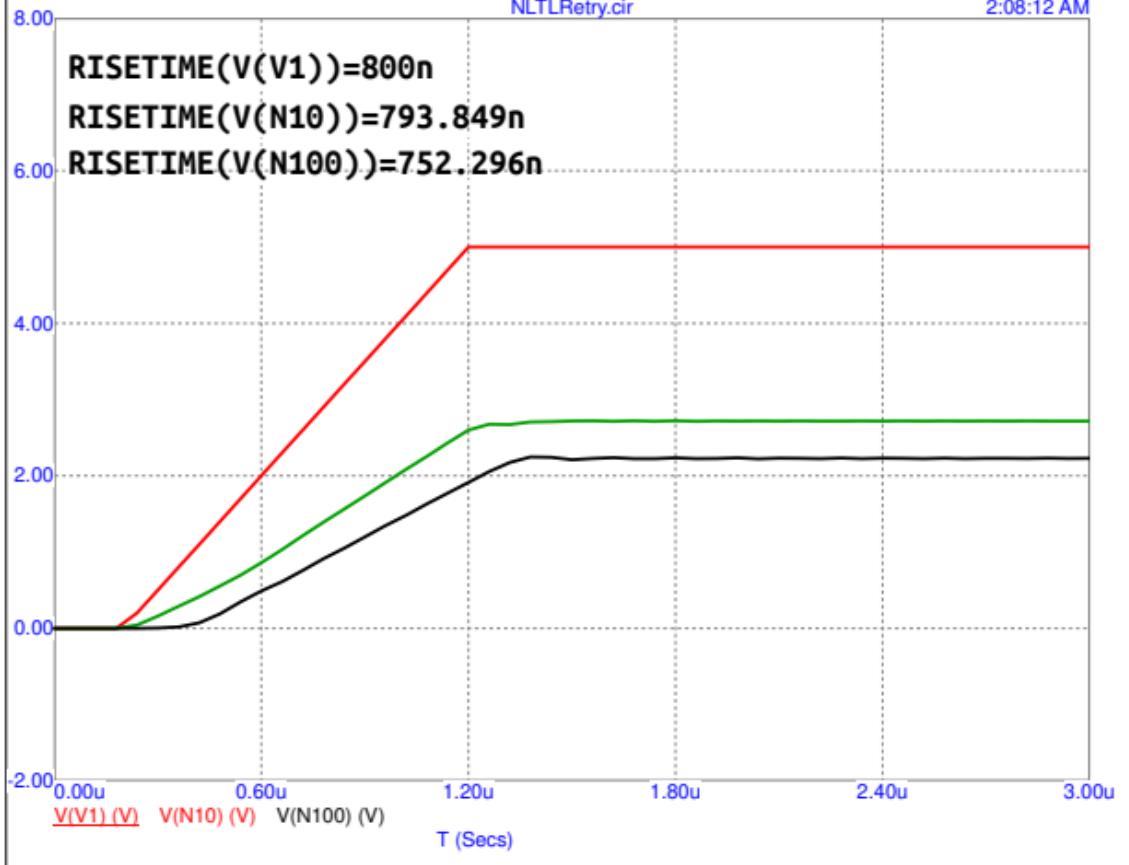
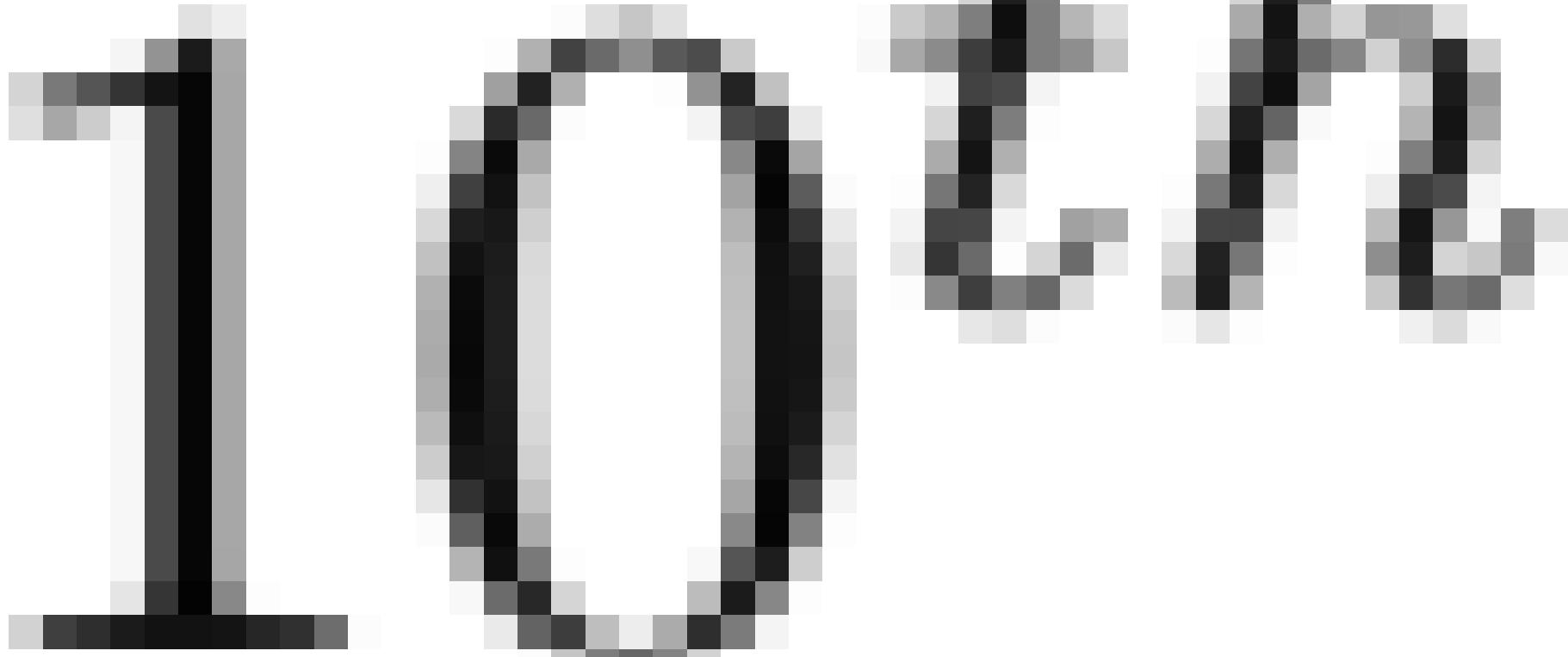
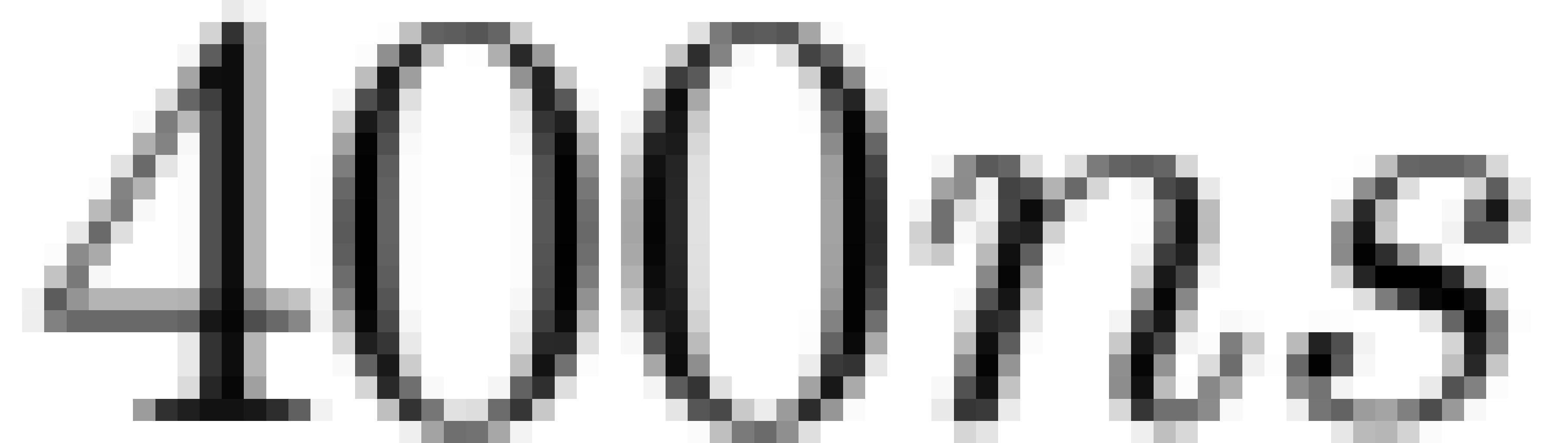


Figure 3. Rise time at source, node 10 and node 100 simulated with resistive loss of  $0.122\Omega$  per ladder section





## RiseTime at Nodes N10 through N50 Vs. DC Bias

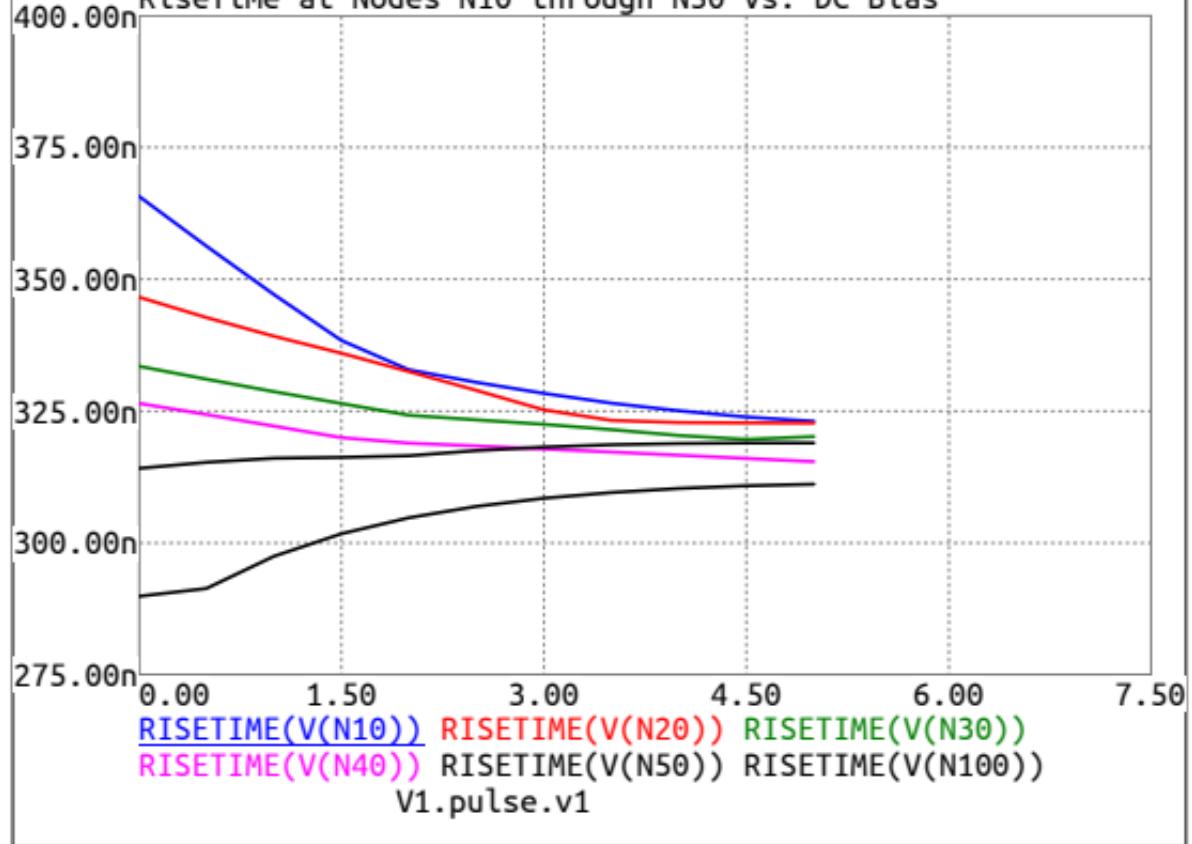
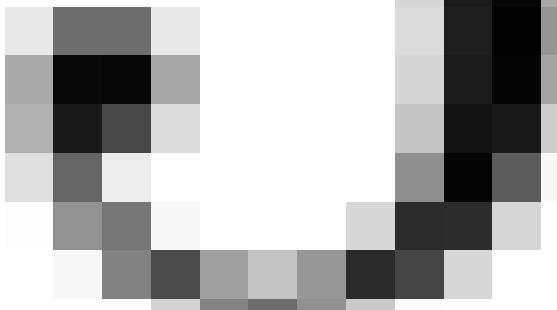
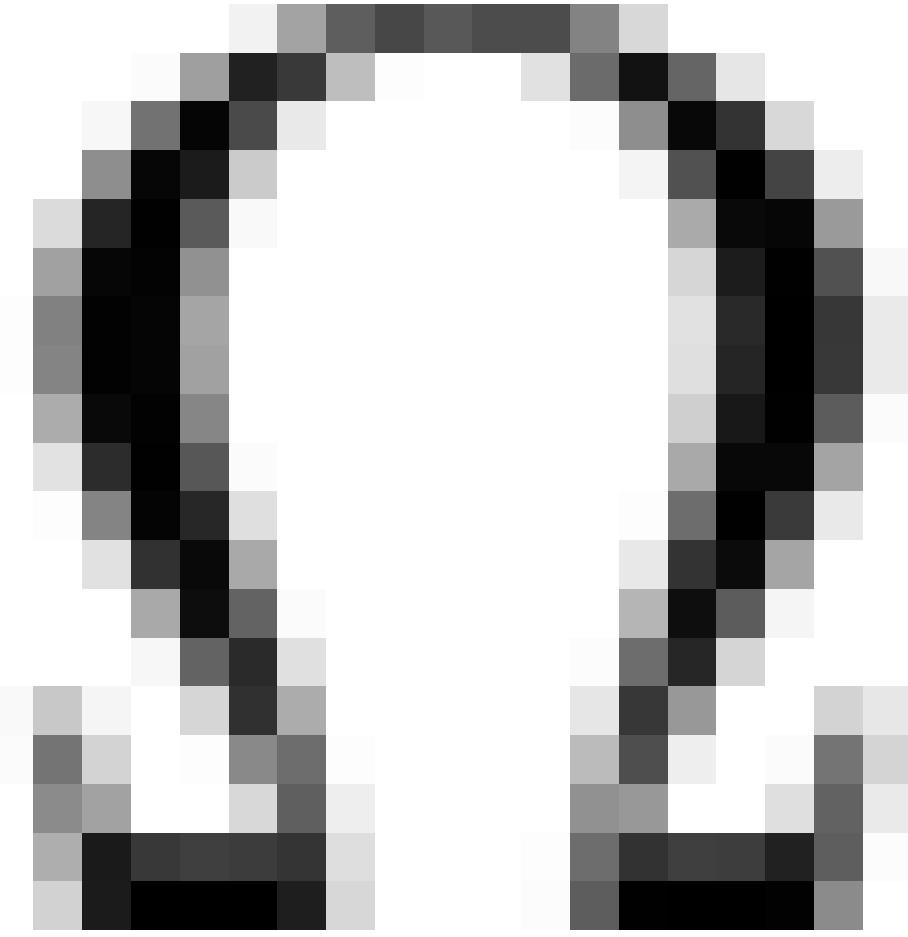
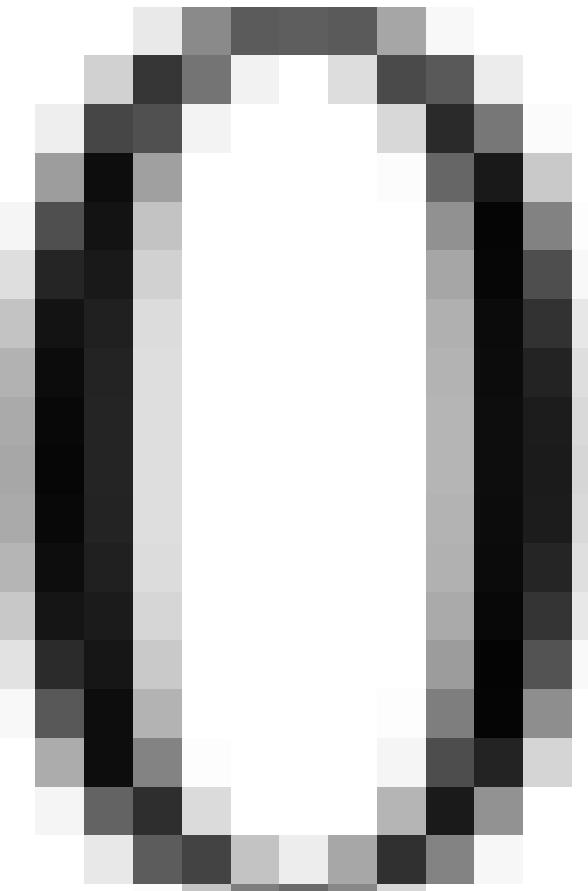
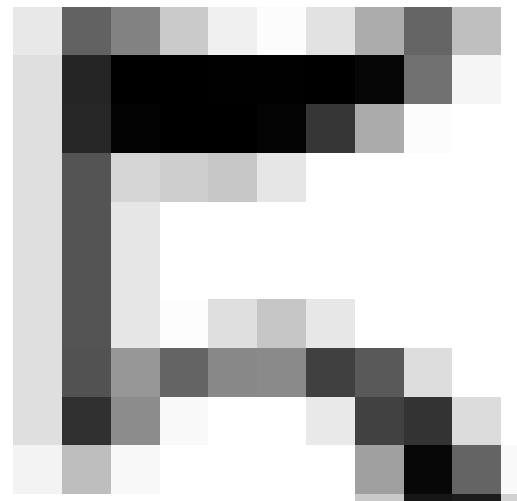


Figure 4. Risetime Vs. Line Length vs. DC Bias Voltage

I W

B O D

E S I G N



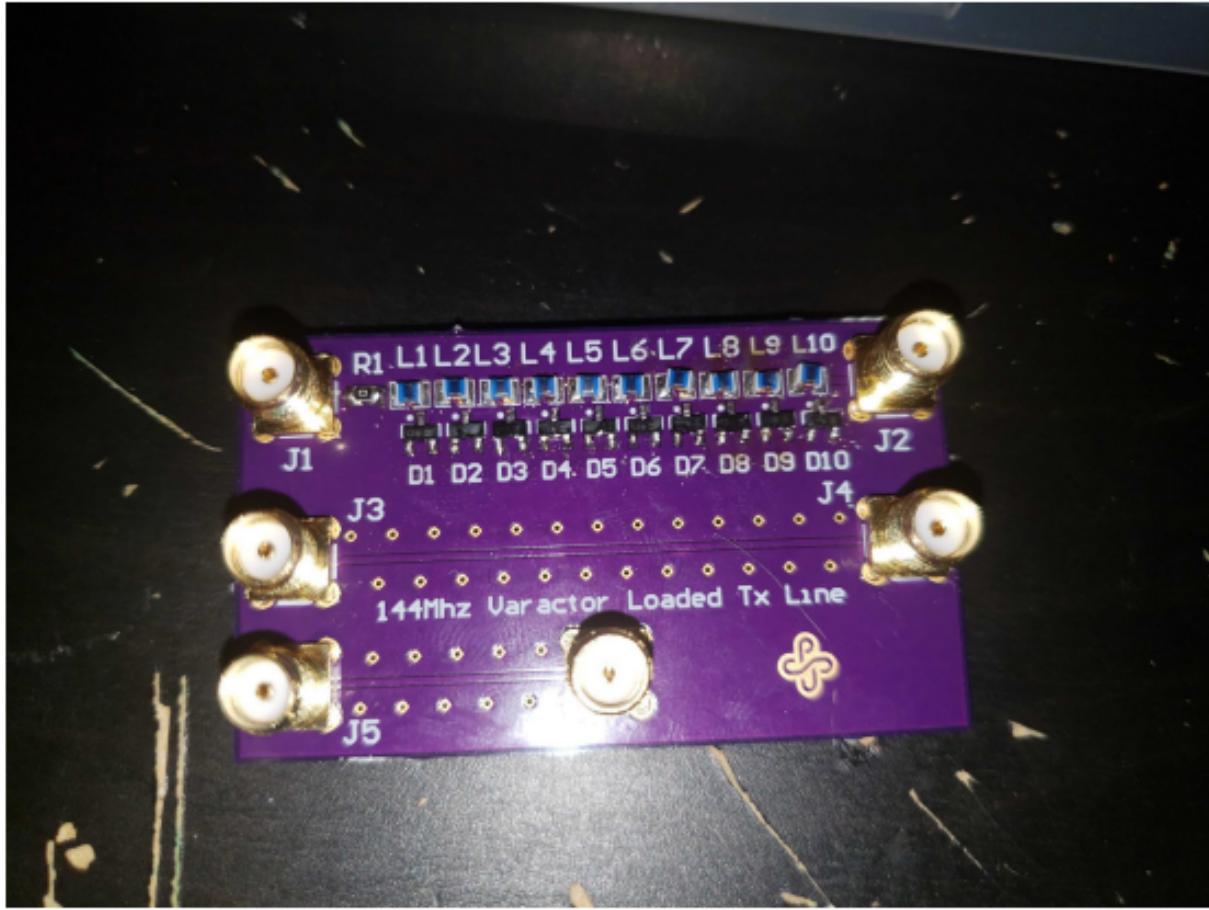


Figure 5. Assembled Tx Line Board made for 144Mhz

WAGNER

WAGNER

A Man With A Gun



Figure 6. Test Fixture used for plotting CV Curve of BBY40

## BBY40 Capacitance Vs. Reverse Voltage

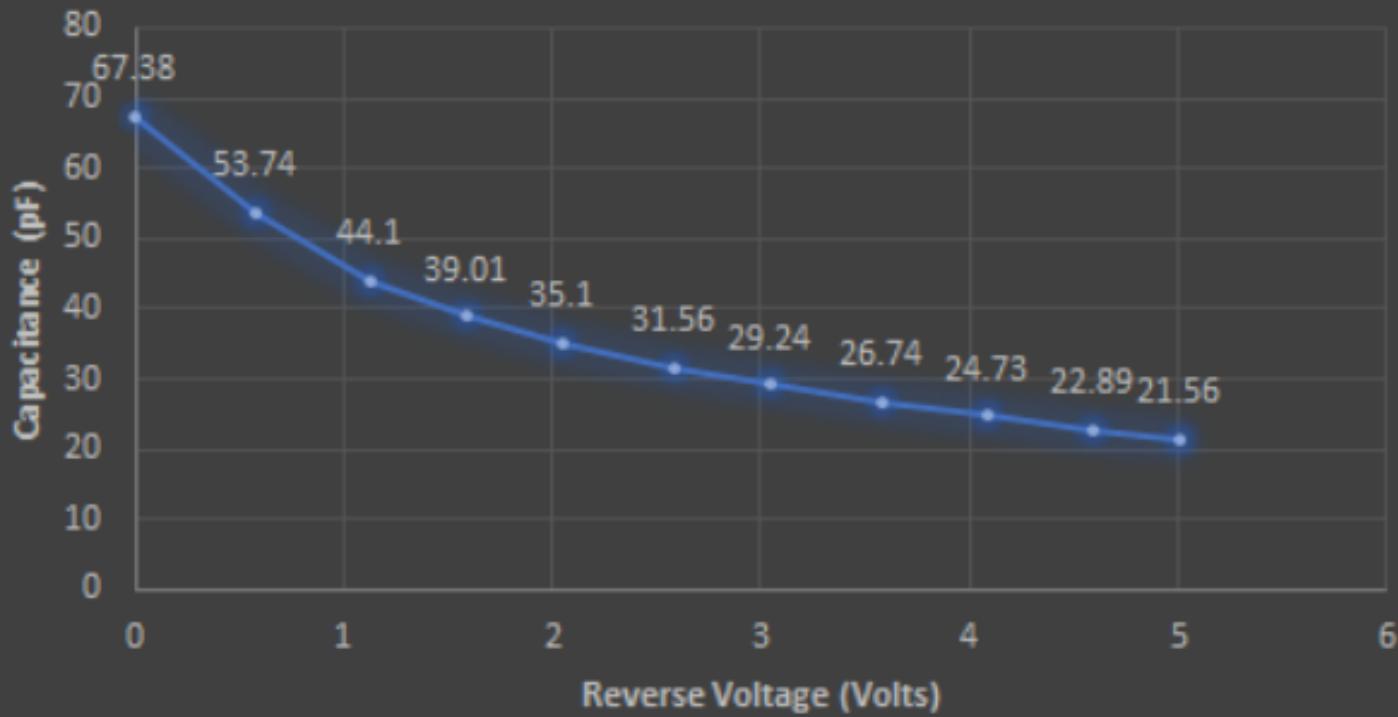


Figure 7. Measured CV Characteristics of BBY40

## Capacitance vs. Reverse Voltage

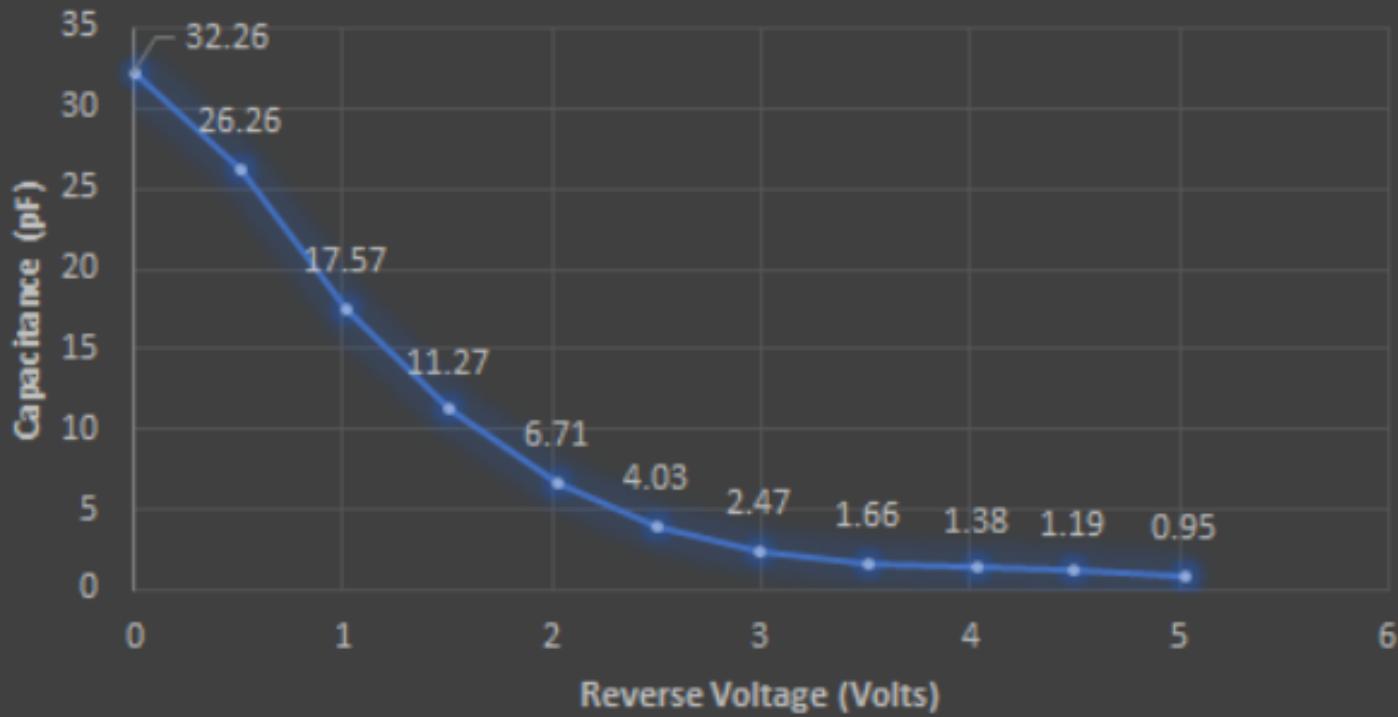


Figure 8. Measured CV Characteristics of SMV1249

B. A C Response

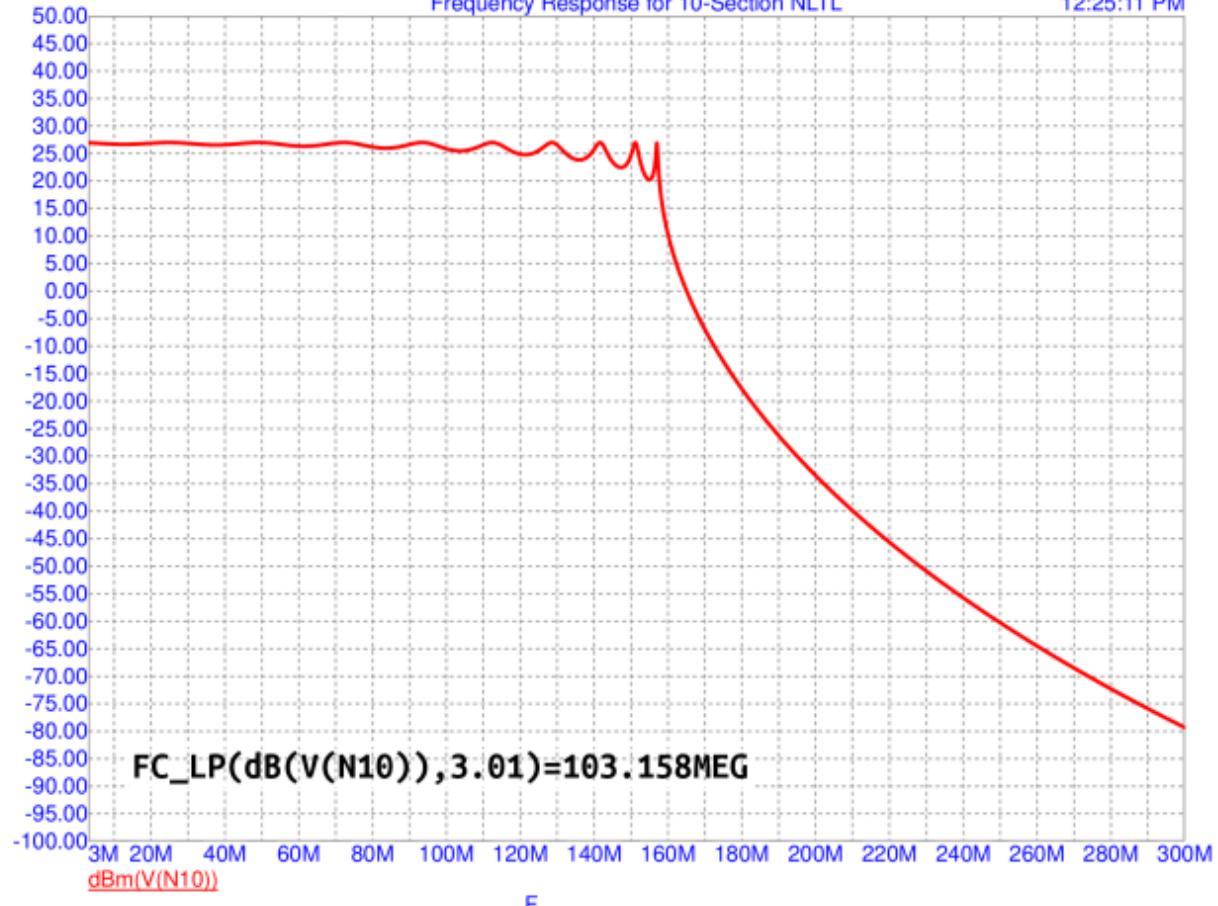


Figure 9. Simulated AC Response for Board 1

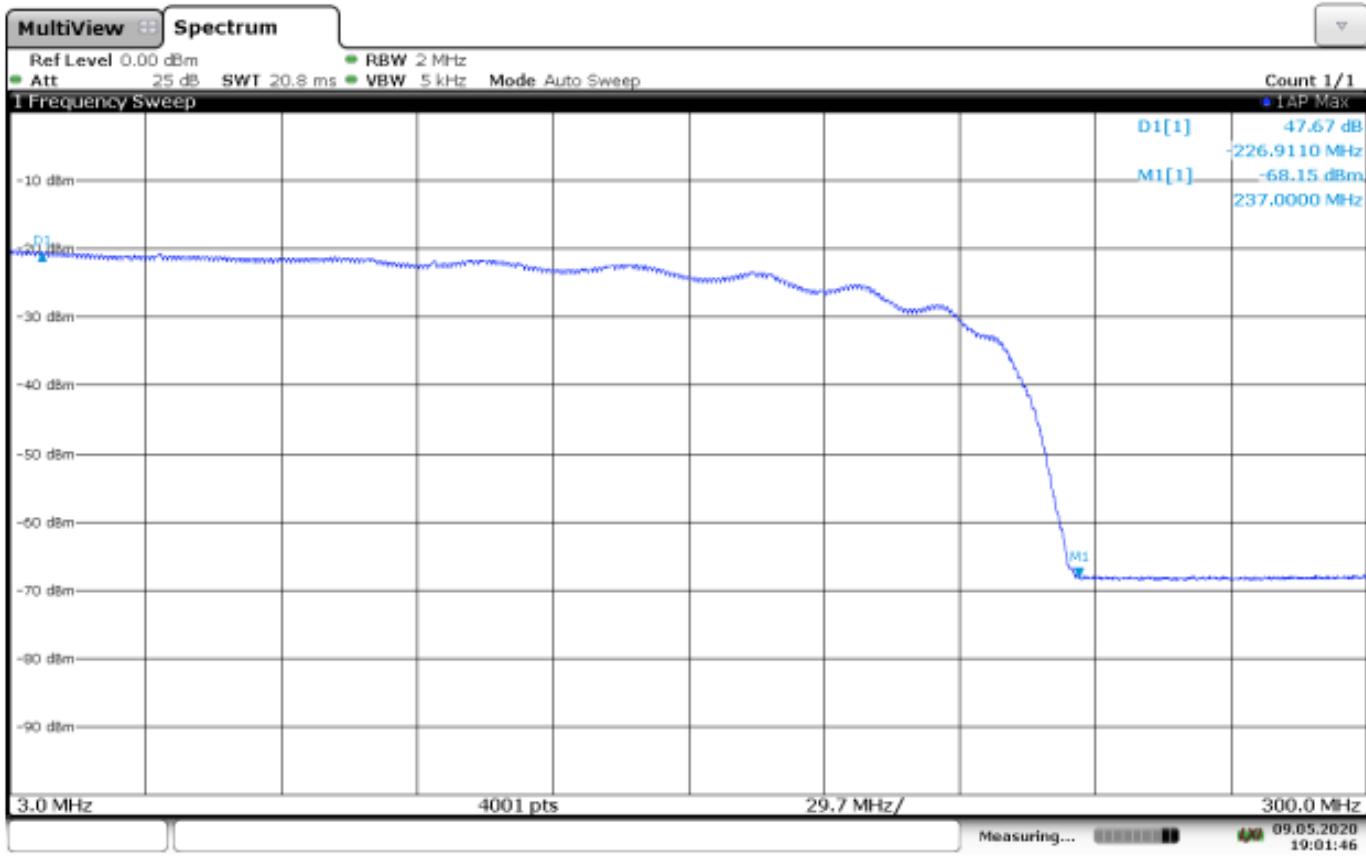


Figure 10. Measured Frequency Response for Board 1 ( $L = 56\text{nH}$ )



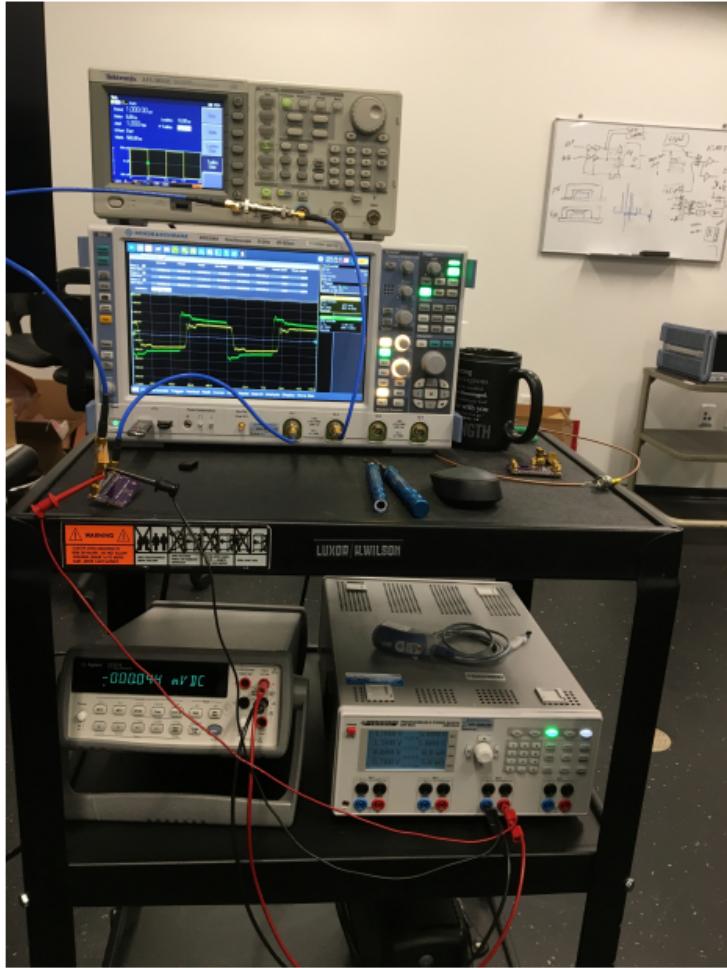


Figure 11. Test Setup for Measuring Risetime With Bias

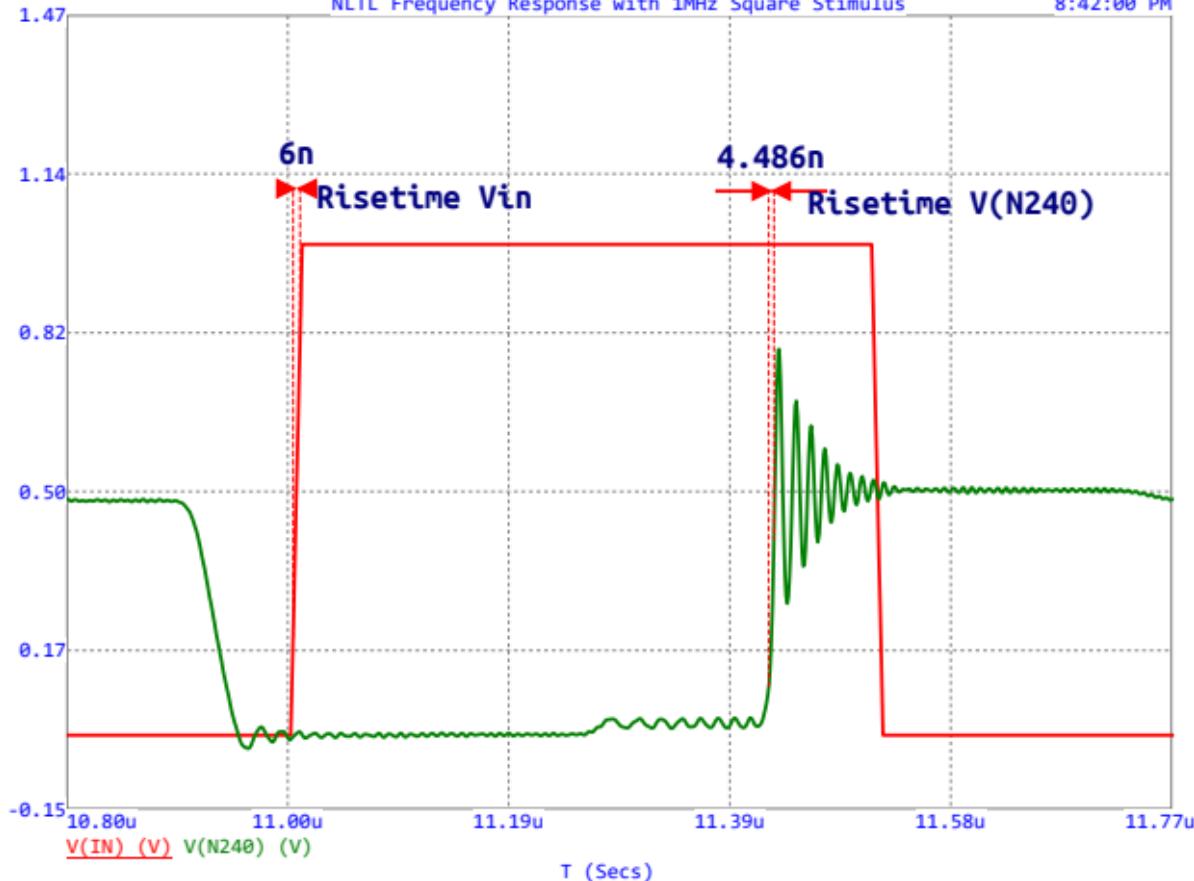


Figure 12. Simulated Risetimes for Input pulse, and the 240<sup>th</sup> node



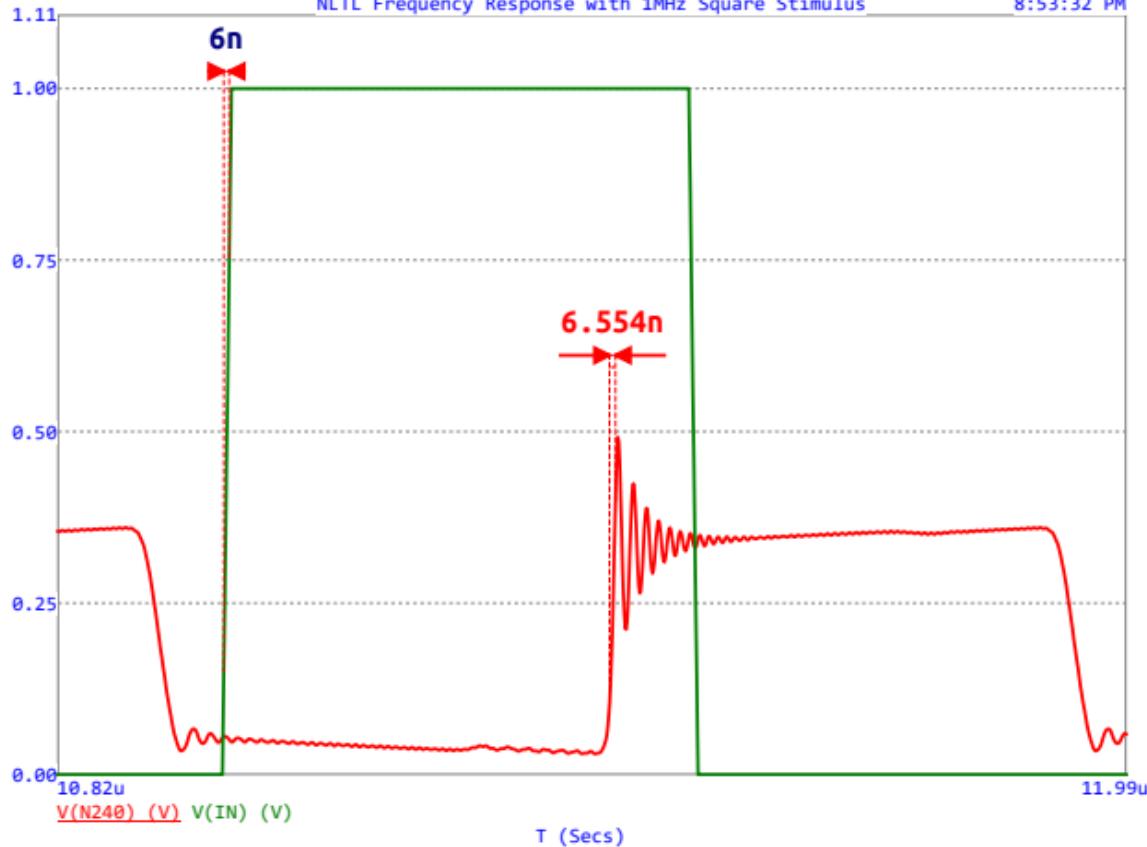


Figure 13. Accounting for Series Resistance shows that there is a certain point where no more sharpening takes place





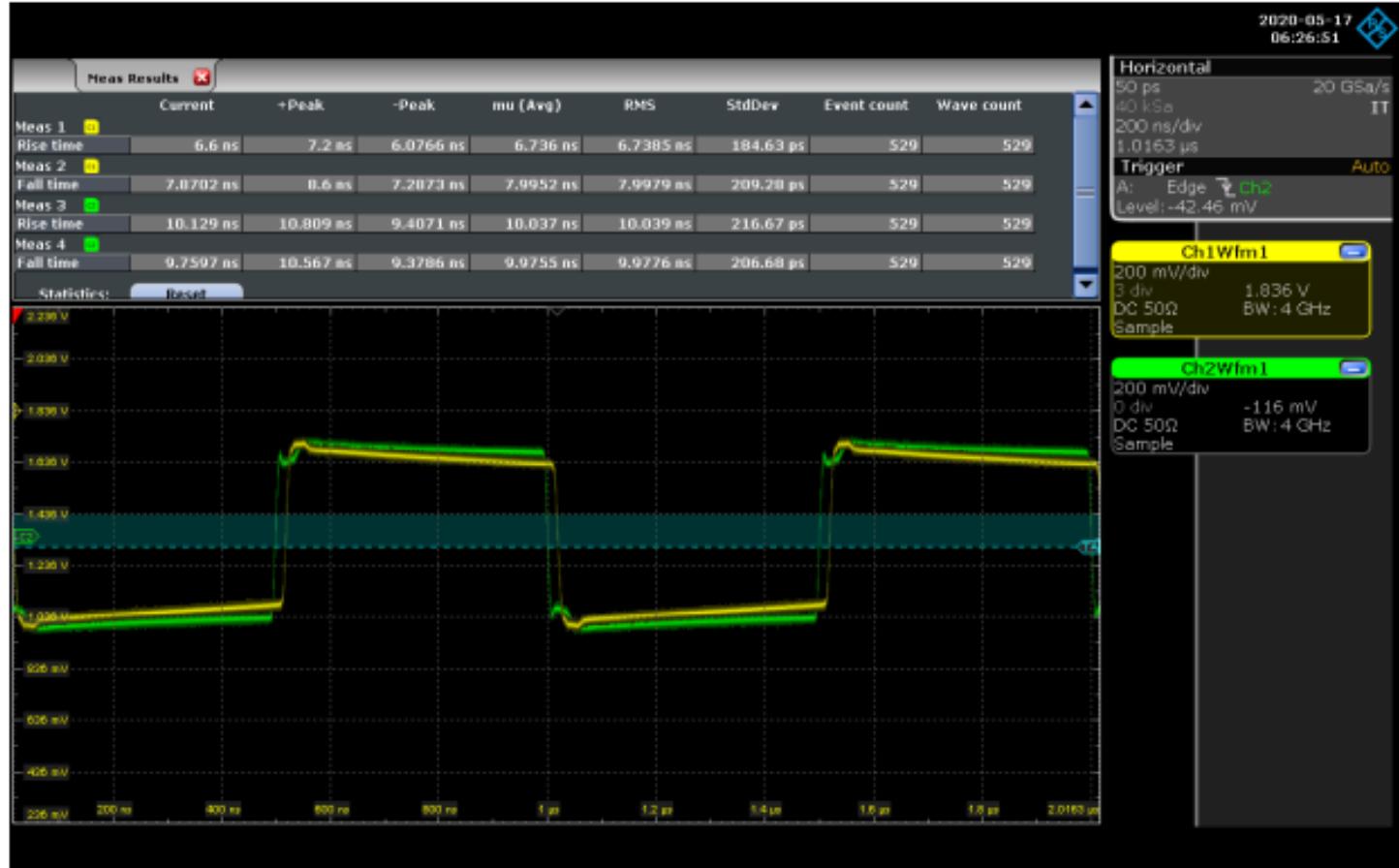


Figure 14. Measured Risetime with 1V DC Bias



Figure 15. Measured Risetime with 2V DC Bias

## NLTL Frequency Response with 1MHz Square Stimulus

6:14:38 PM

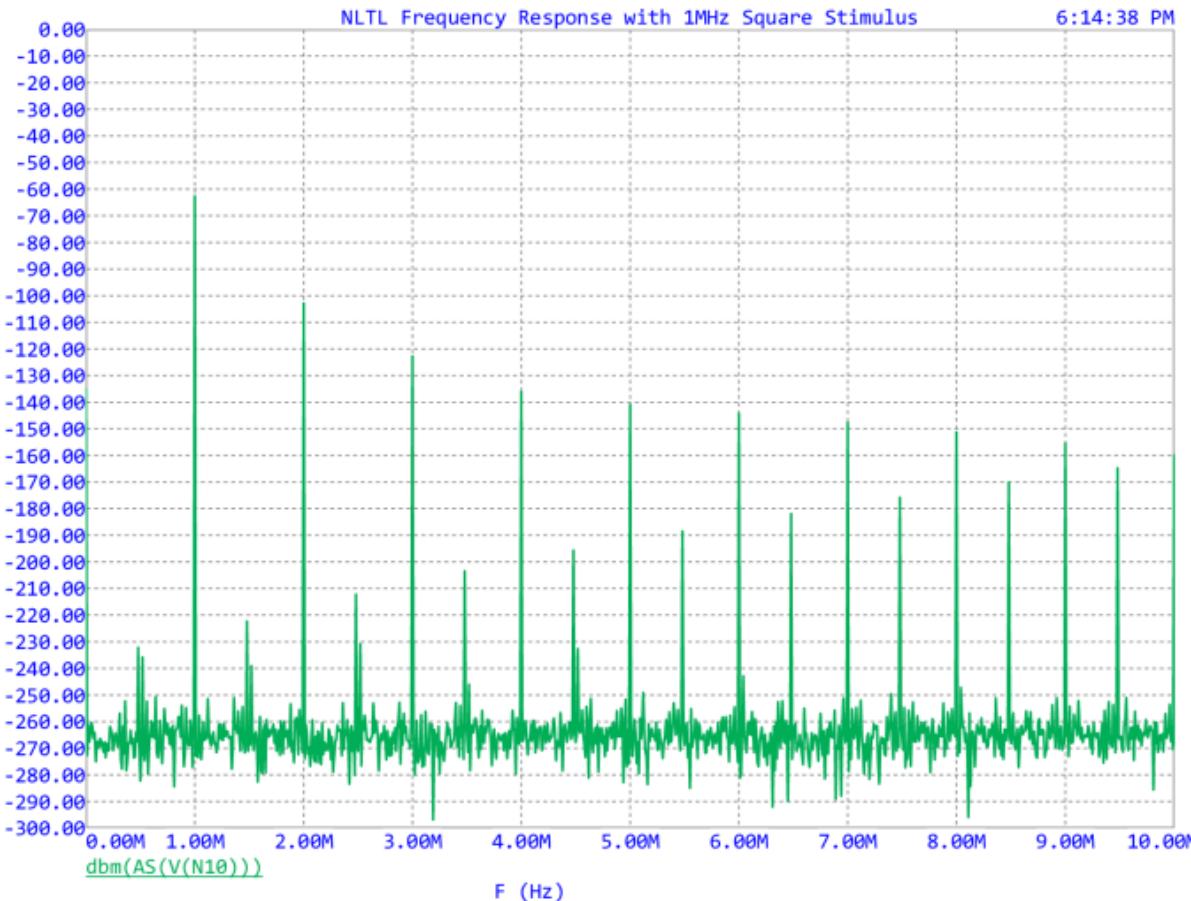


Figure 16. Expected Power Spectrum when DUT fed with 1Mhz 1Vpp Sine Wave

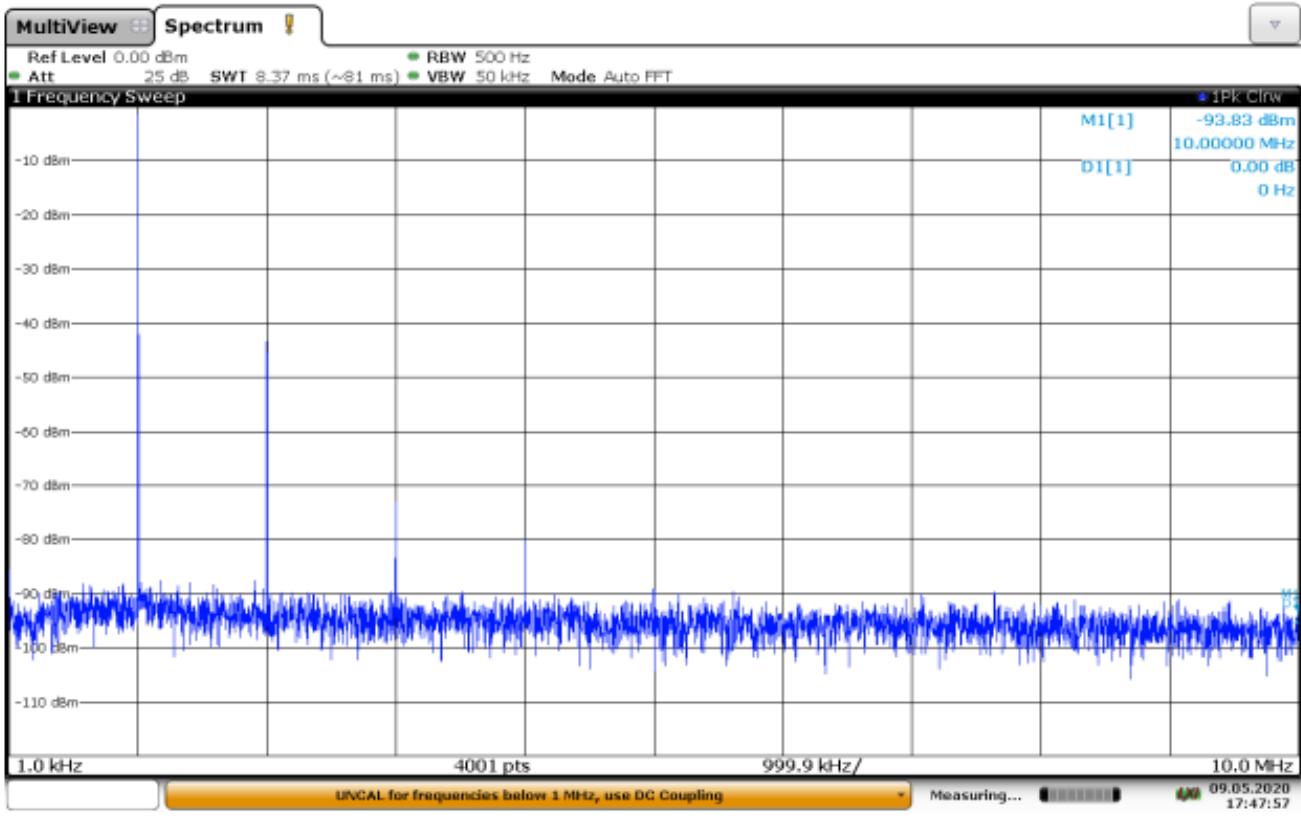


Figure 17. Measured Power Spectrum of Board 1. We see a lack of the harmonics we expected from simulation

D. S-Parameters

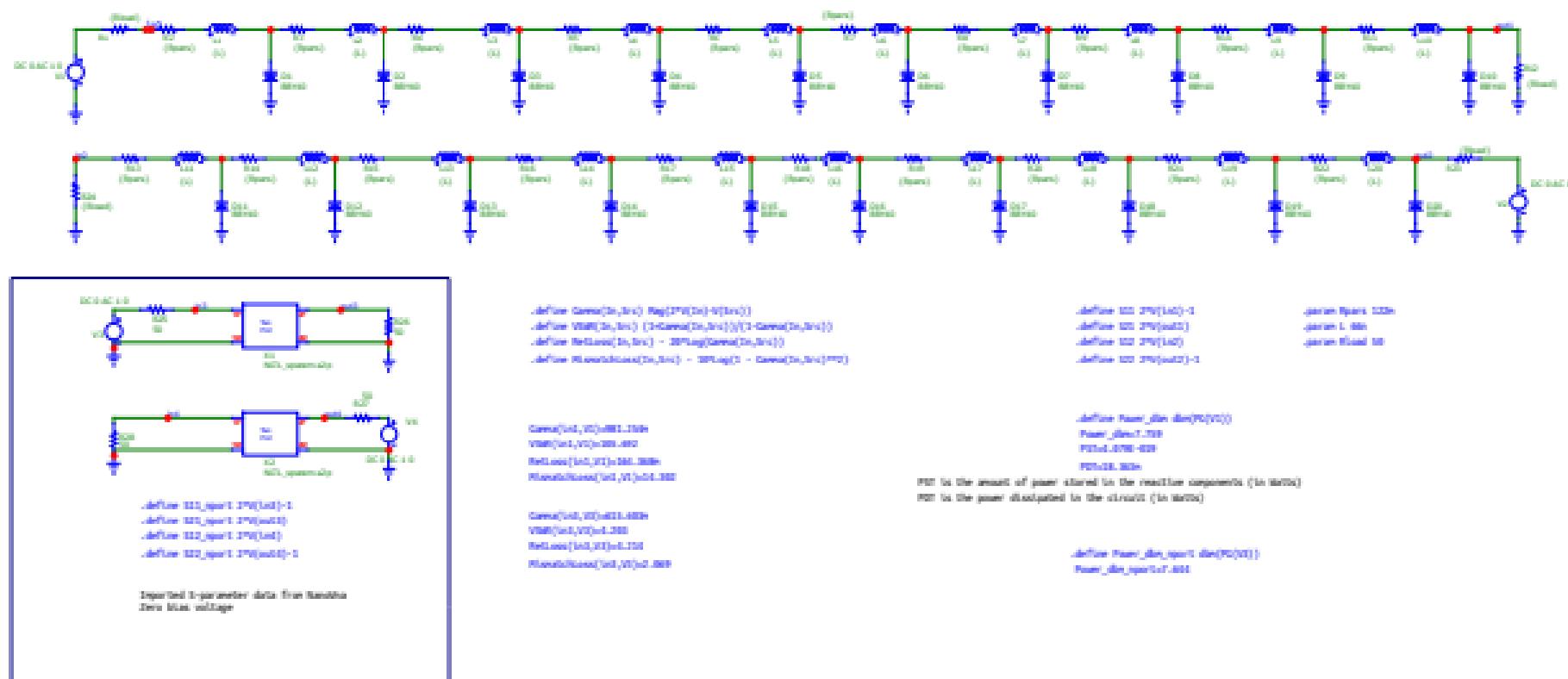
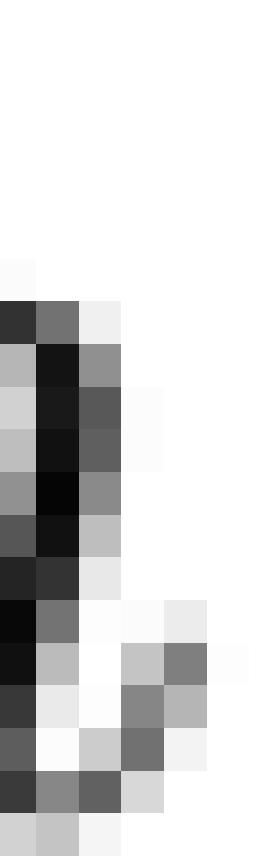
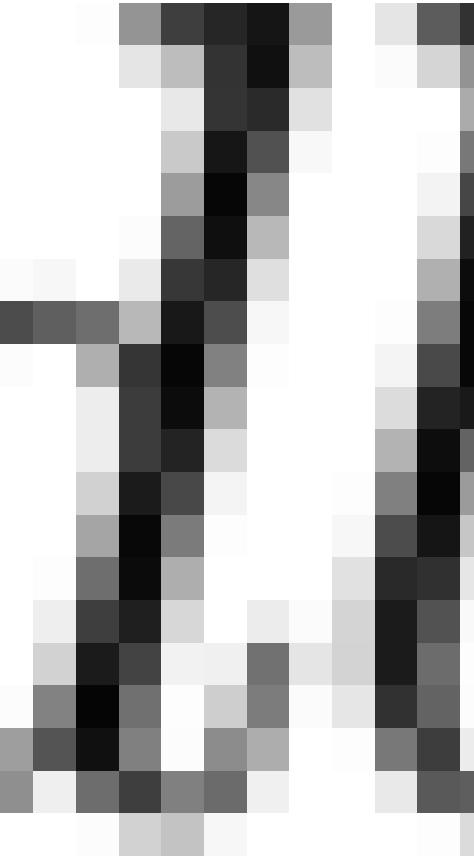
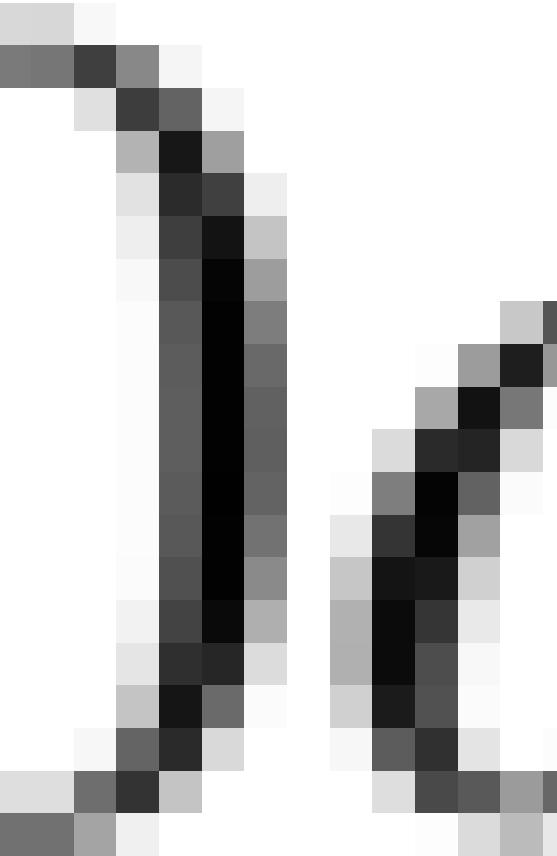
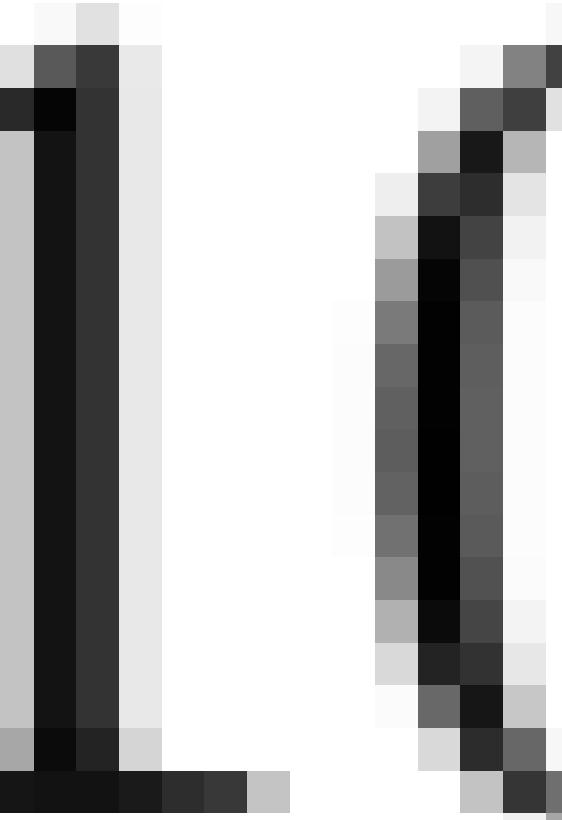


Figure 18. Schematic used to generate S-parameter plots. The top line measures S<sub>11</sub> and S<sub>12</sub>, and bottom line measures S<sub>21</sub> and S<sub>22</sub>.



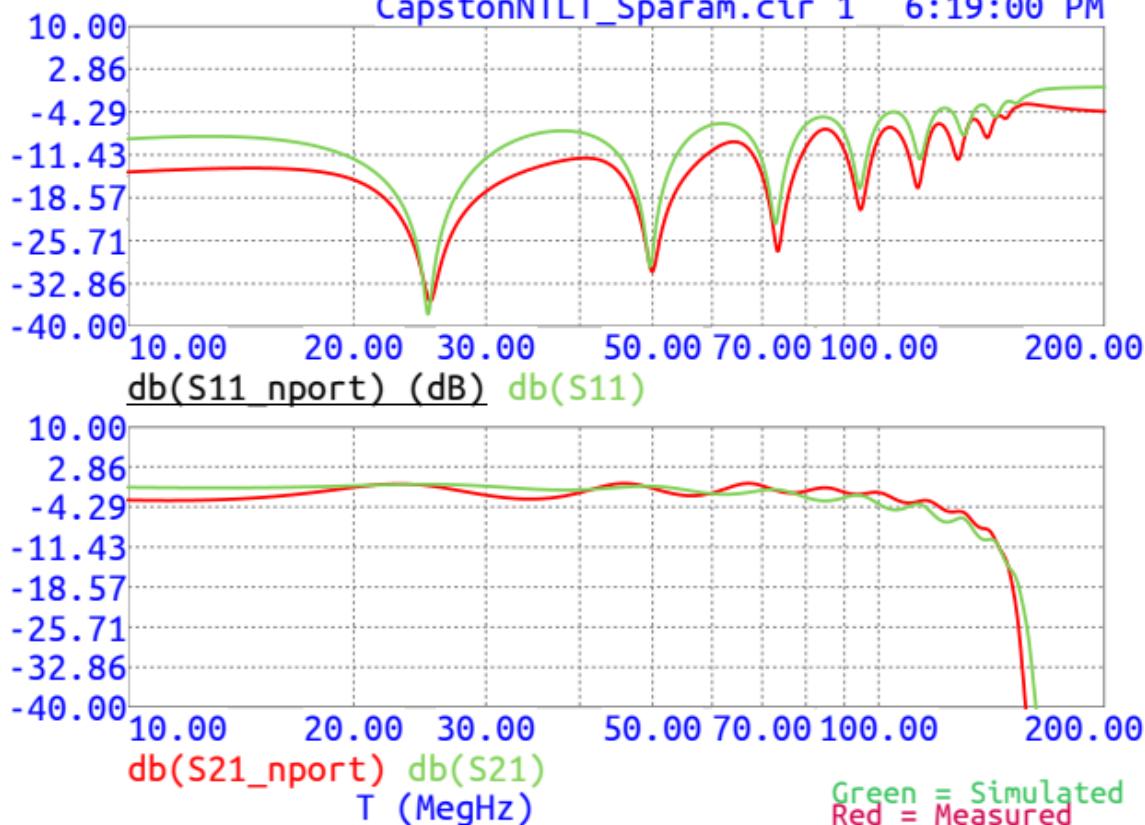


Figure 19. Simulated vs. Measured  $S_{11}$  and  $S_{21}$ . Corrections to make on next draft include more sensible scaling of axes

CapstonNTLT\_Sparam.cir 2 6:19:00 PM

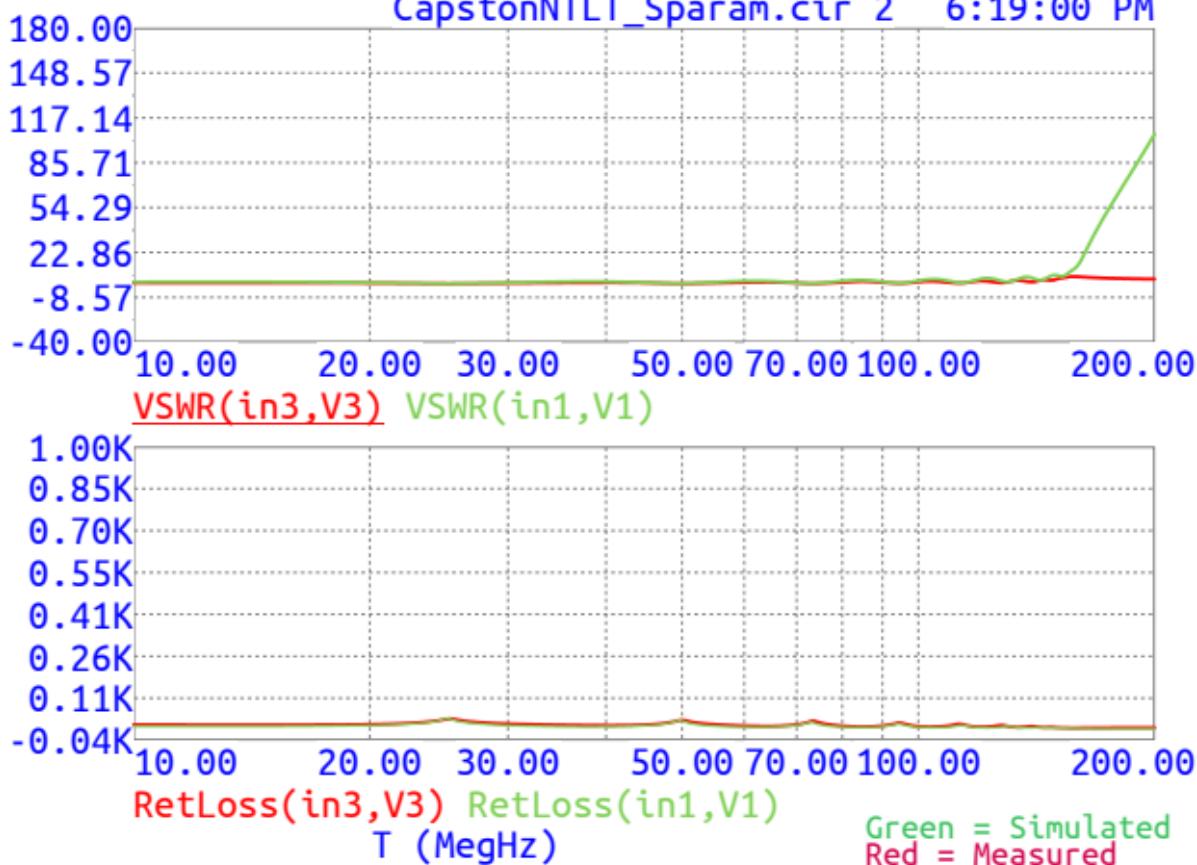
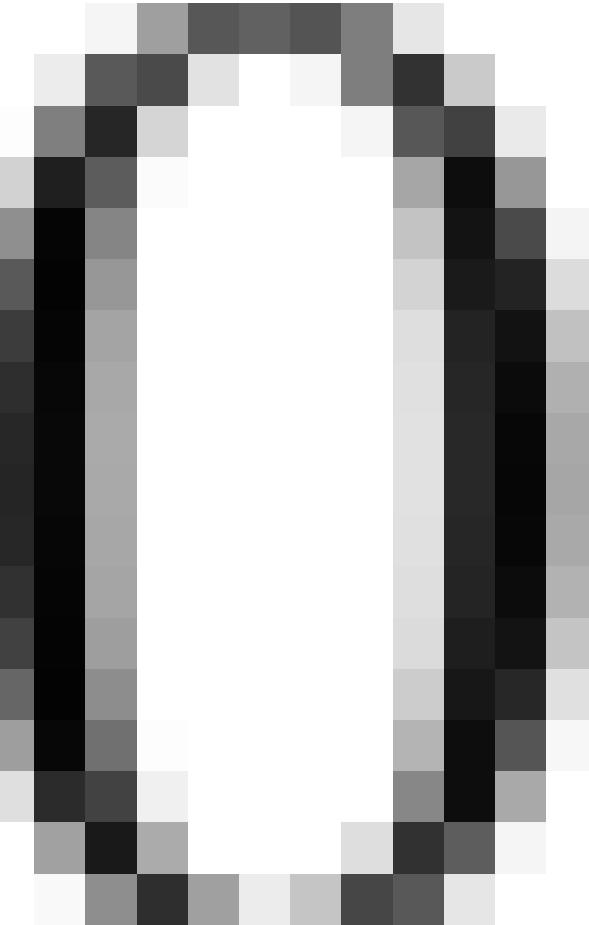
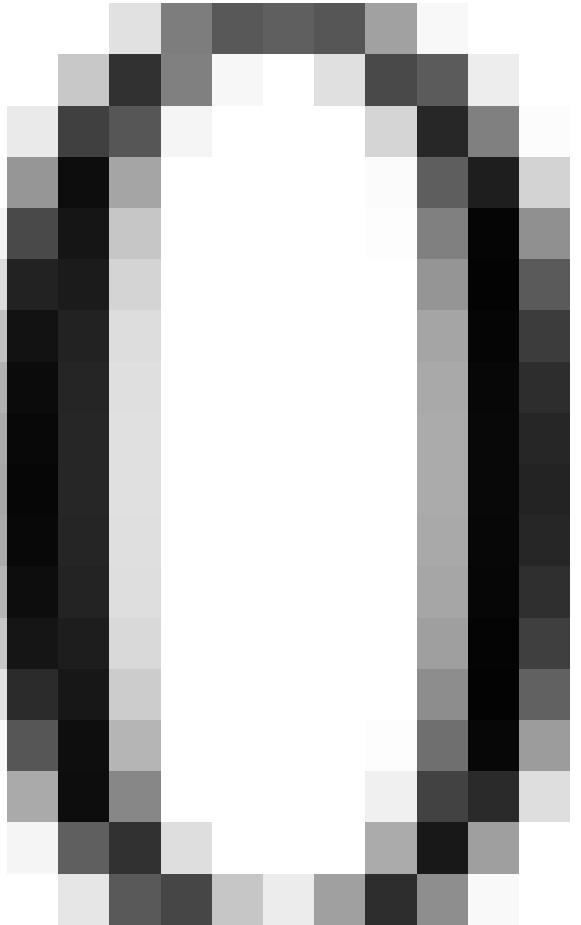
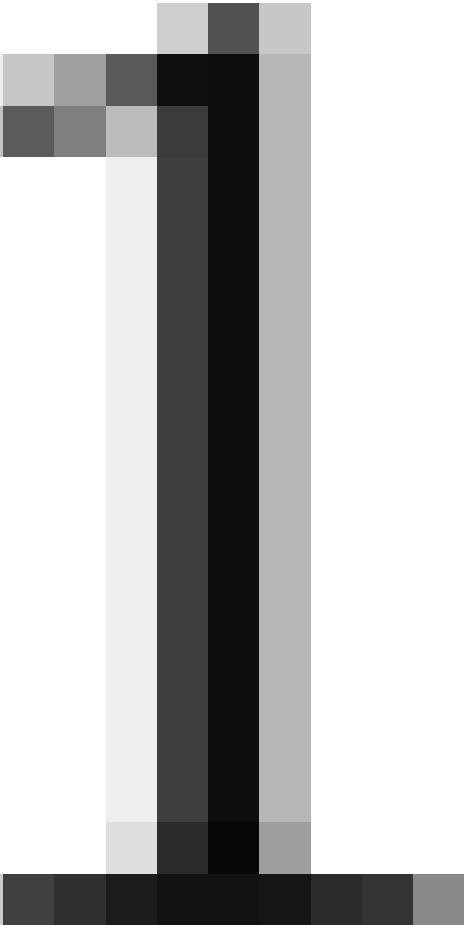
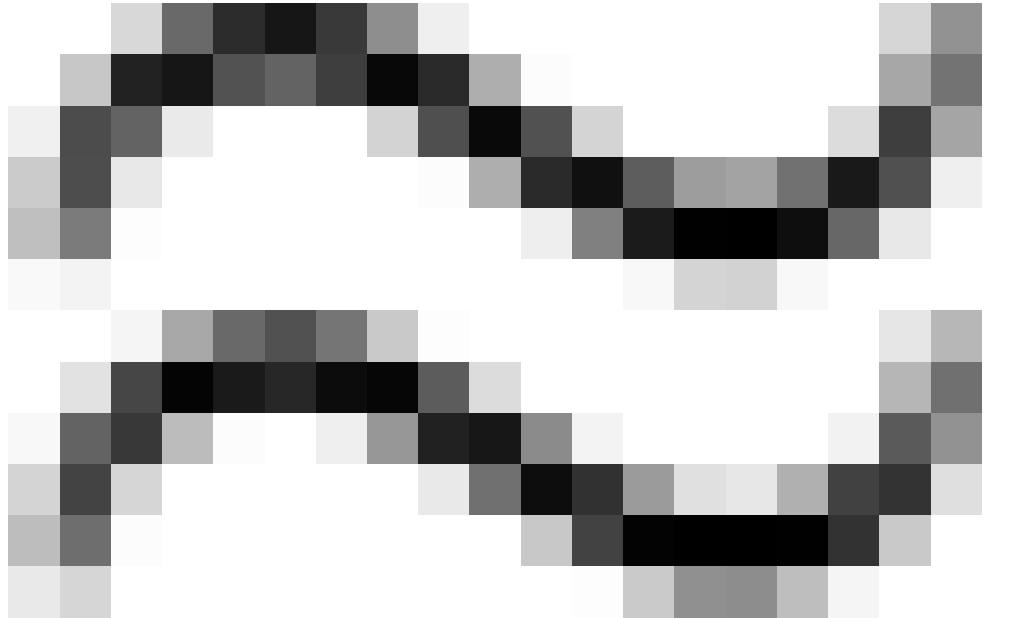


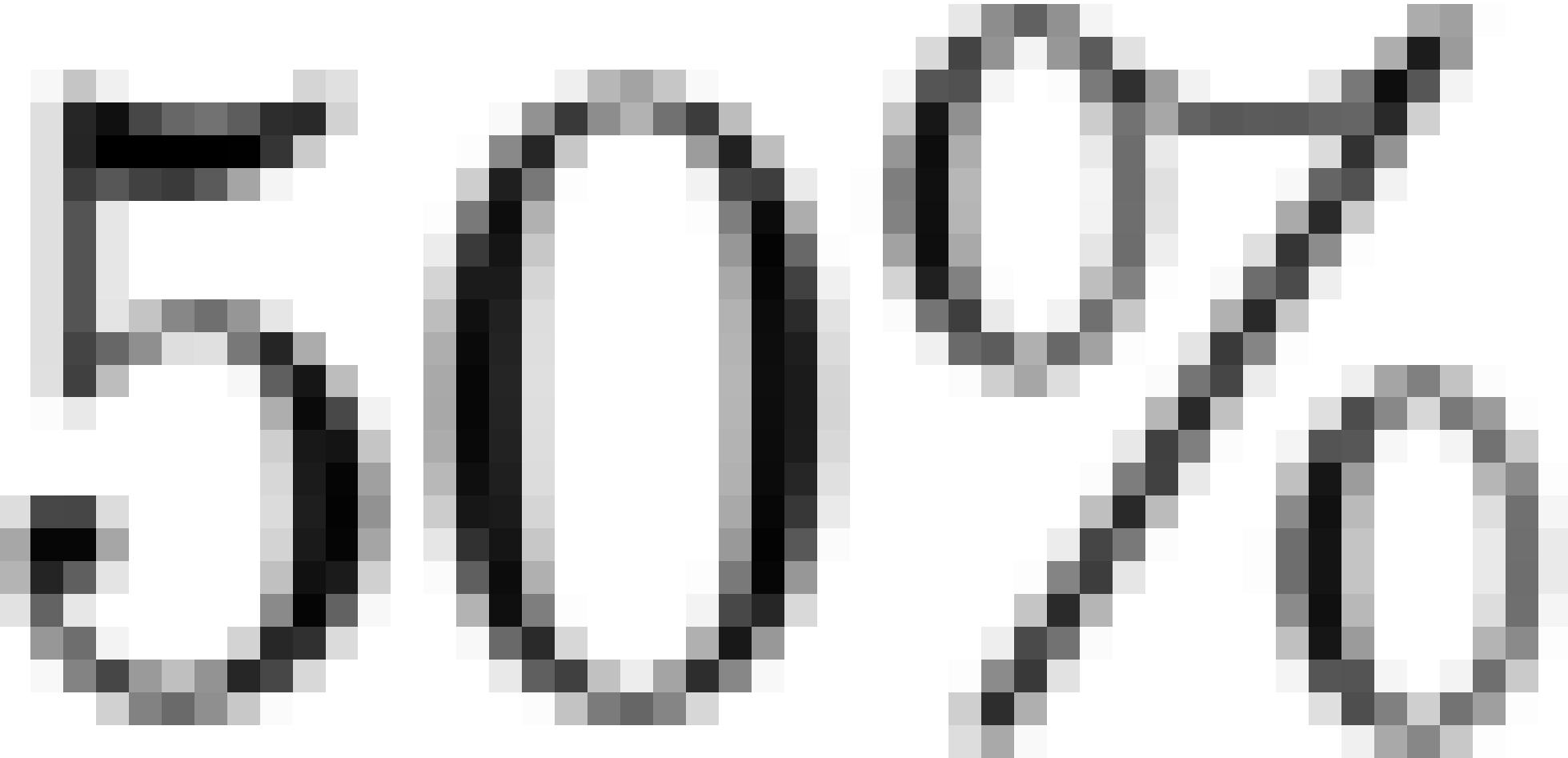
Figure 20. Simulated vs. Measured Return Loss and VSWR

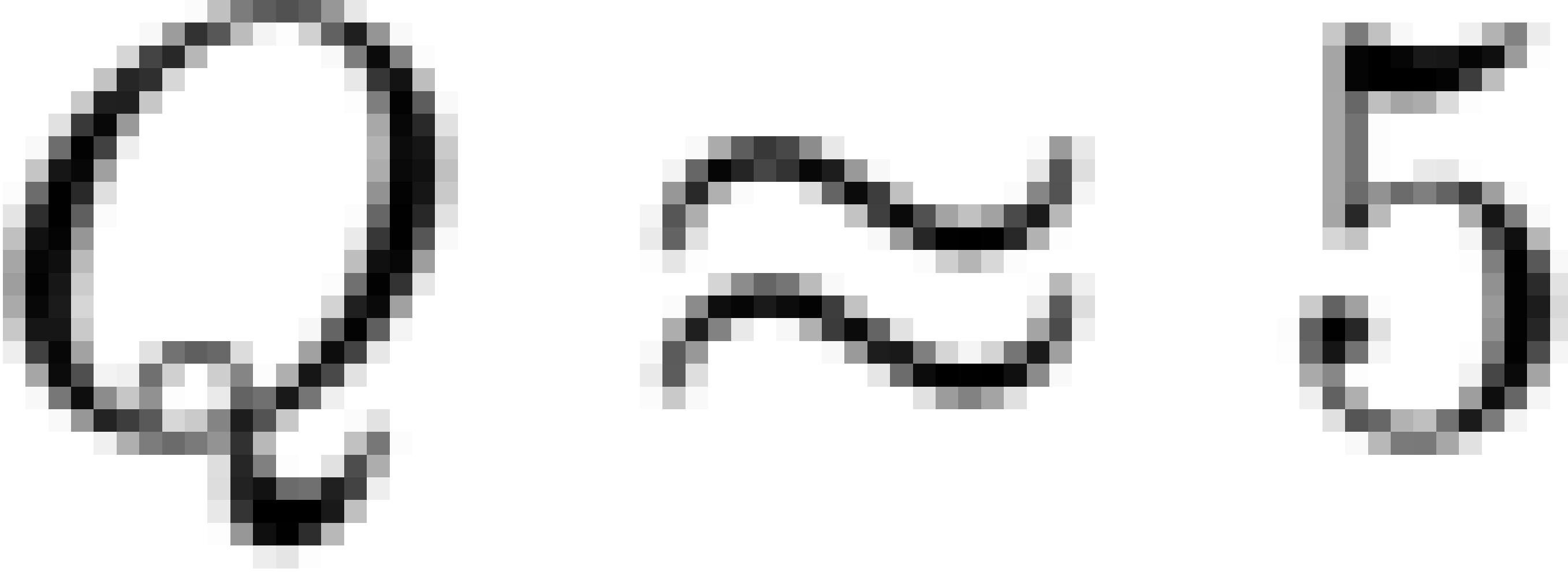


2 Estimating Circular



Figure 21. Transient Waveform for Estimating Q





VI  
EXT  
STEPs

A. *Vellosa*  
Module



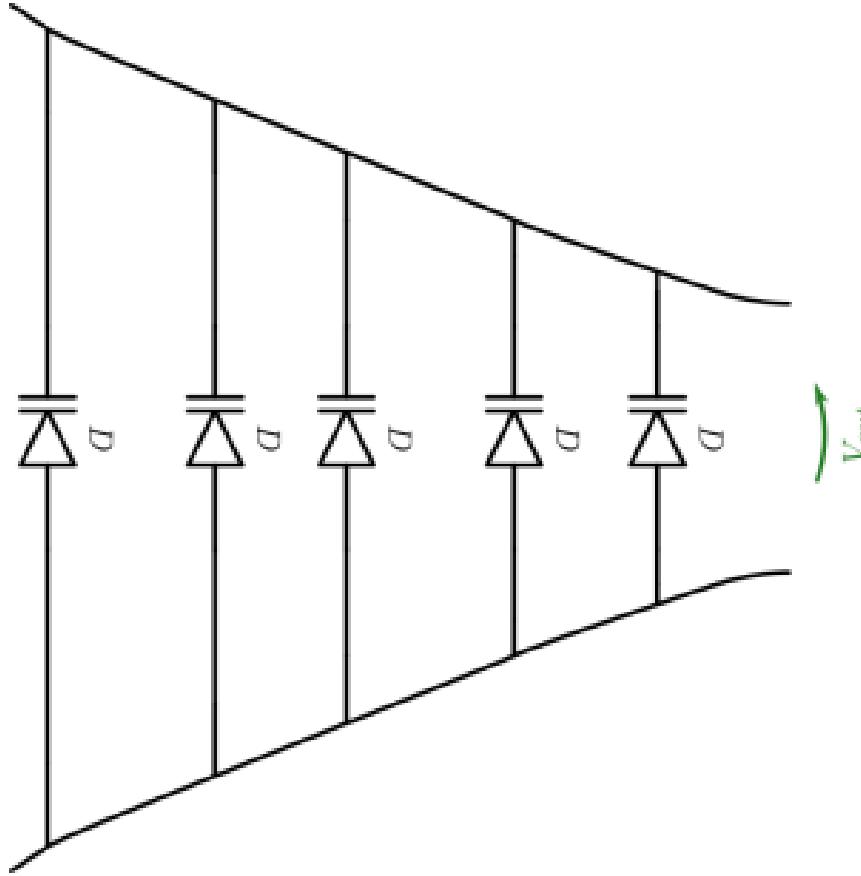


Figure 22. Potential circuit geometry to be simulated and built going forward

WII CONUSION