

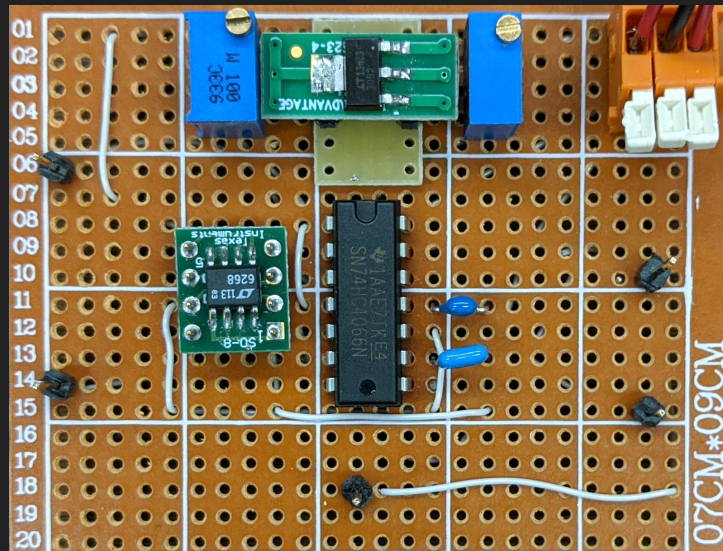


Time-to-Amplitude Converter

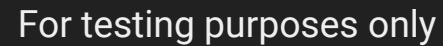
Presented by: Jon Itokazu
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PHYS 475

Overview and Specifications

26 ps resolution Time-to-Digital Converter for Time-of-Flight applications.



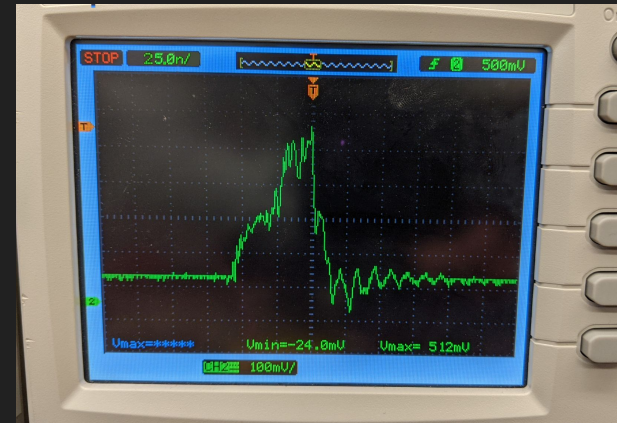
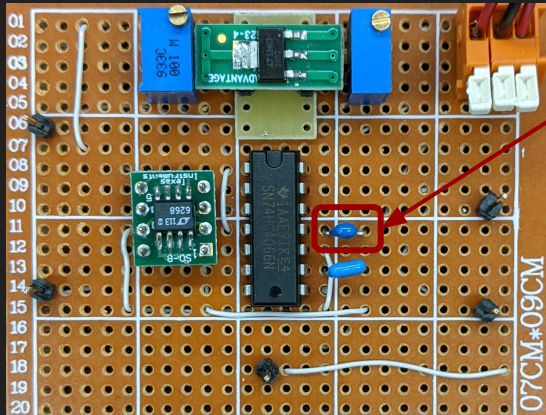
	Min	Typ.	Max	Unit
Supply Range	-3.6	-	3.6	V
V _{IH}	1.7	-	V _{dd}	V
V _{IL}	-V _{dd}	-	0.7	V
Resolution	-	26	-	ps
Ramp Rate	-	10	-	mV/ns
V _{out}	0	-	1.0	V
PW _{start}	10	-	-	ns
PW _{stop}	10	-	-	ns



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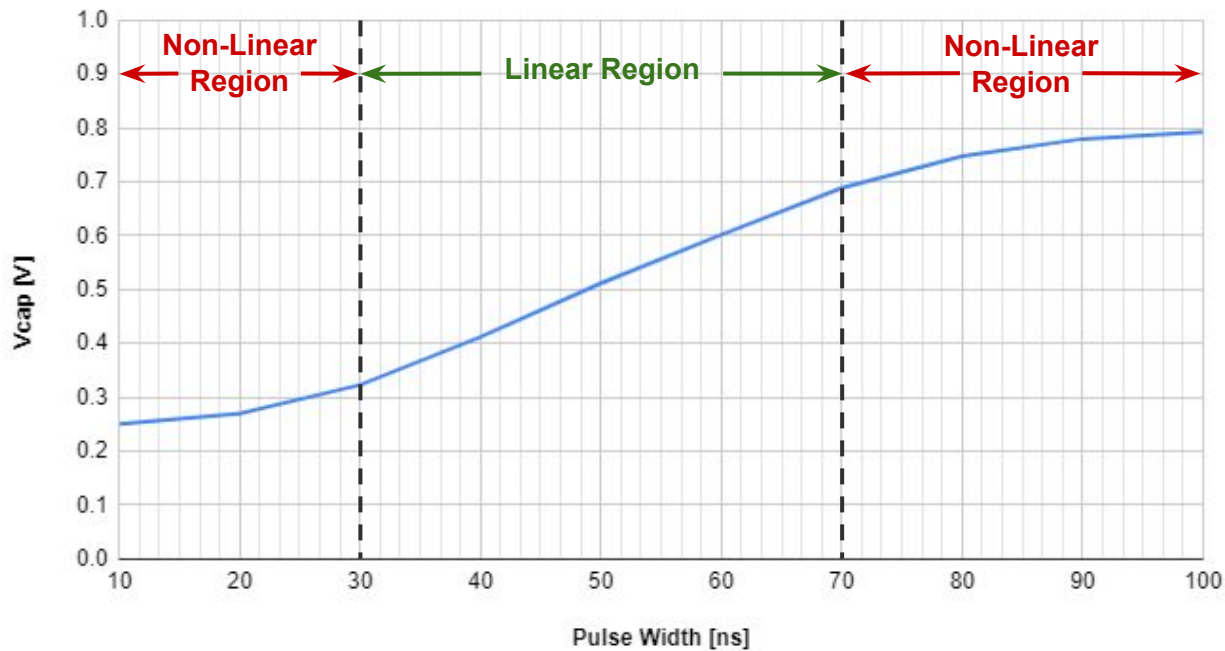
Simulation vs. Measurement

- Measurement was taken at Vcap
 - discrepancy at ramp peak due to oscilloscope probe causing the sampling capacitor to discharge
- Measurement and Simulation information
 - Time Div. $\rightarrow 25 \text{ ns/div}$
 - Volt. Div. $\rightarrow 100 \text{ mV/div}$
 - $V_{\text{max}}(\text{sim:ideal}) \rightarrow 496 \text{ mV}$
 - $V_{\text{max}}(\text{sim:non-ideal}) \rightarrow 525 \text{ mV}$
 - $V_{\text{max}}(\text{sim:measured}) \rightarrow 512 \text{ mV}$



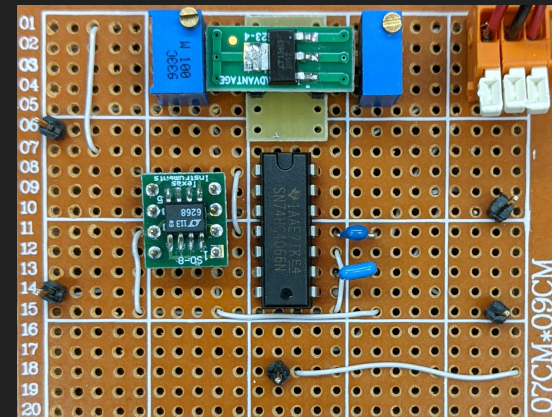
Capacitor Ramp Linearity

Ramp Linearity



Future Works

- Improve linear range
 - switches with better isolation to reduce leakage current
- Reduce Noise
 - Survey for alternate parts with better noise performance
 - Implement on board using layout techniques
- Create circuit at the transistor level





Q&A

Thank you for your time and attention



The floor is now open for questions