

# Transmitter ALC

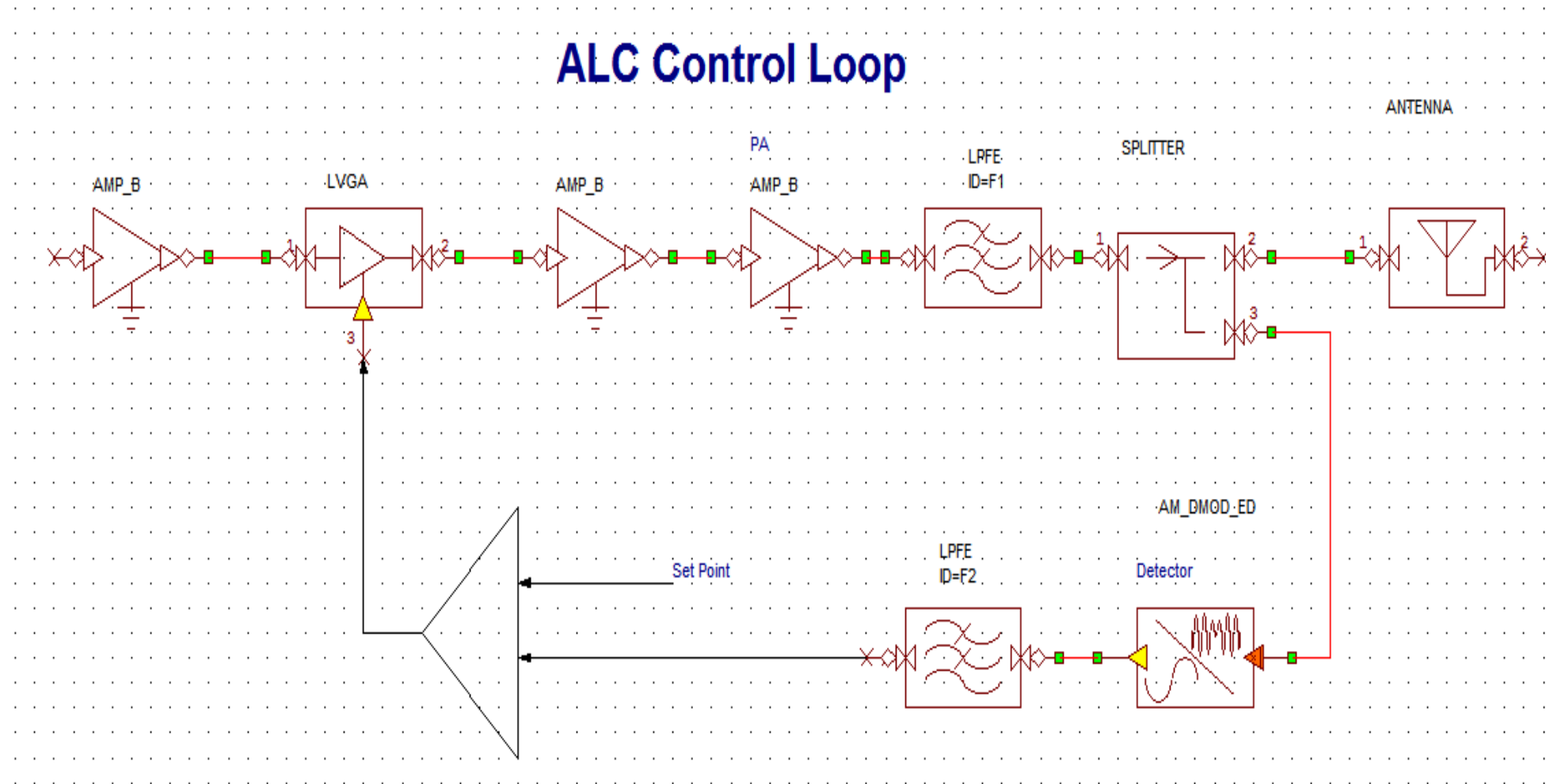
## Is it a Lost Cause?

Chuck Clark AF8Z

# Function of ALC

- Hold peak transmitter power constant
- Prevents splatter(?)
- Make up for gain variations in different transmitters
- Vary the output power on command
  - 14 watt to drive my new PA....not 100 Watts
- Uses feedback from PA to reduce drive.

# Transmitter Block Diagram



# Actual Results

- Apparent control of output power
- Occasional output transient's at maximum power of transmitter.
  - Transients not detectable by most detectors.
  - Not detected by FCC type approval!
- Do the transients matter?

# LDMOS PA's

- Known Failure Mode    **Overdrive**
- Rugged into open or short, all phase angles
- More rugged than 8877 or 3-500Z, except for overdrive
- The age of the tube PA is OVER

# LDMOS Transistor

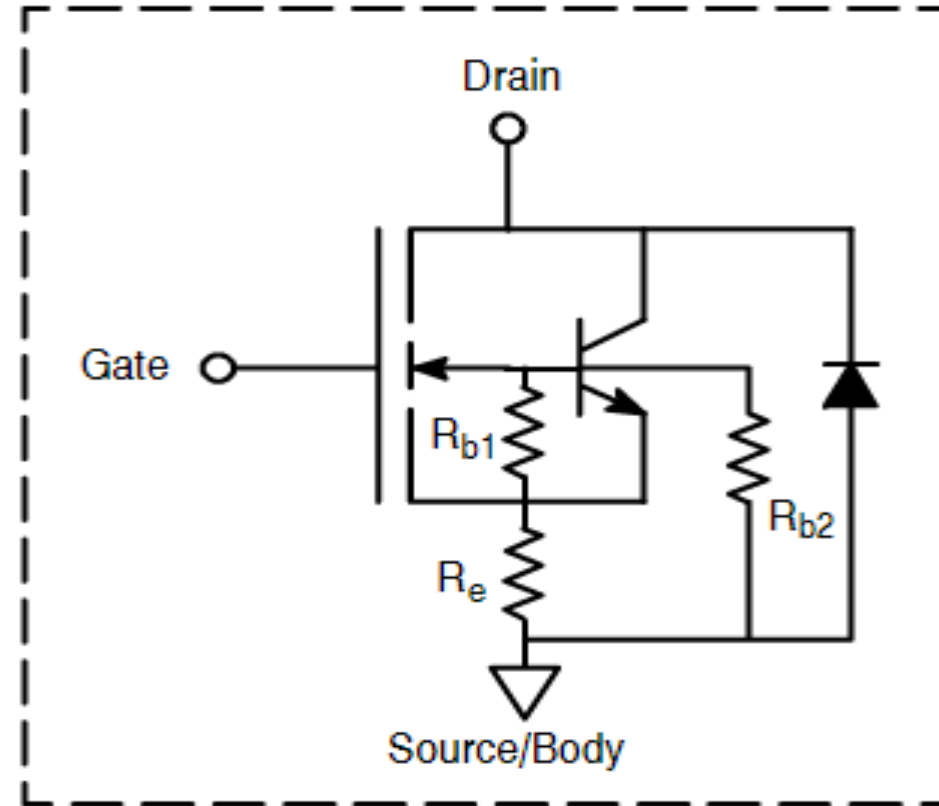
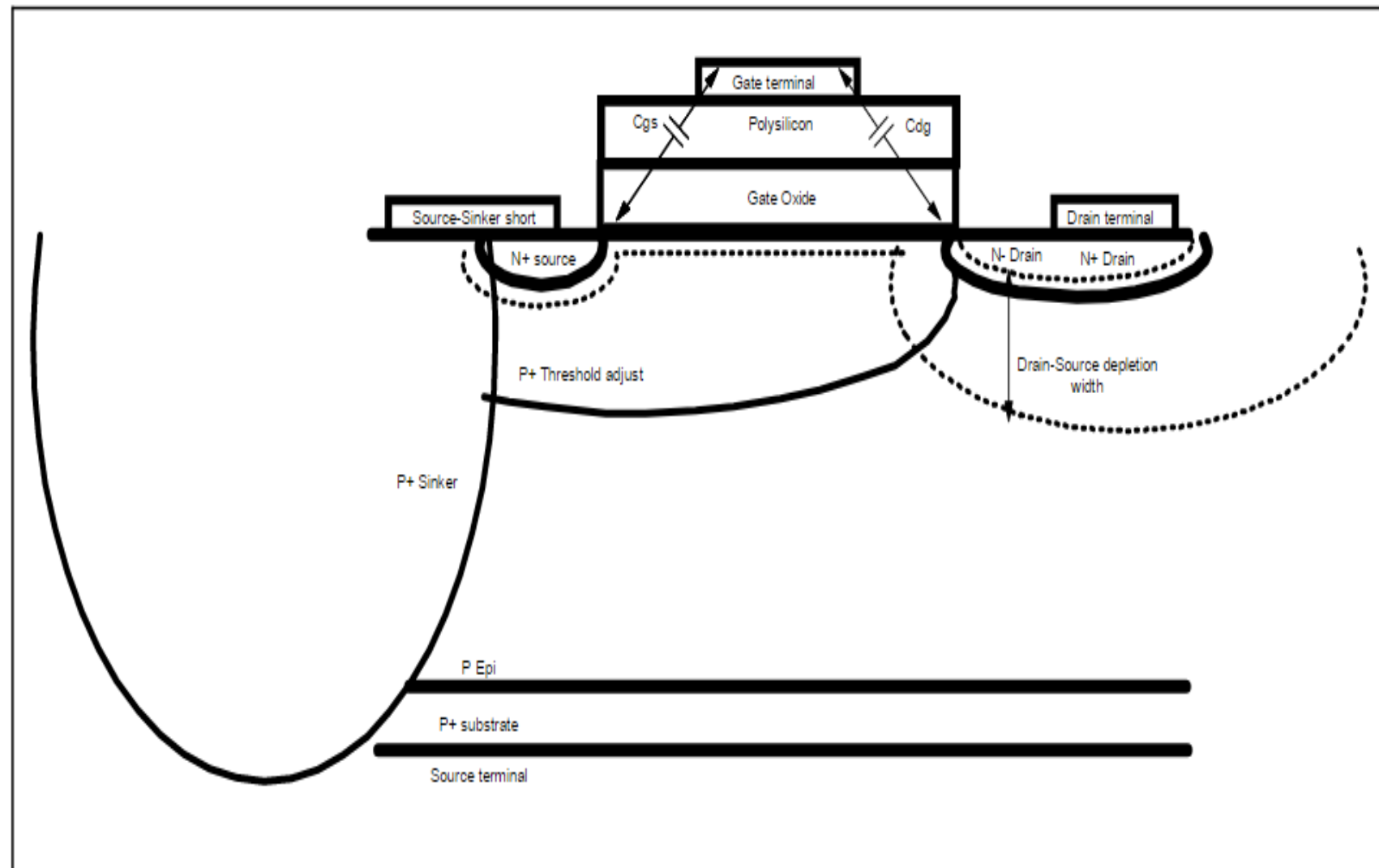


Figure 4b: MOSFET schematic showing parasitic elements

**Figure 2: Basic LDMOS Structure**



# FET Picture

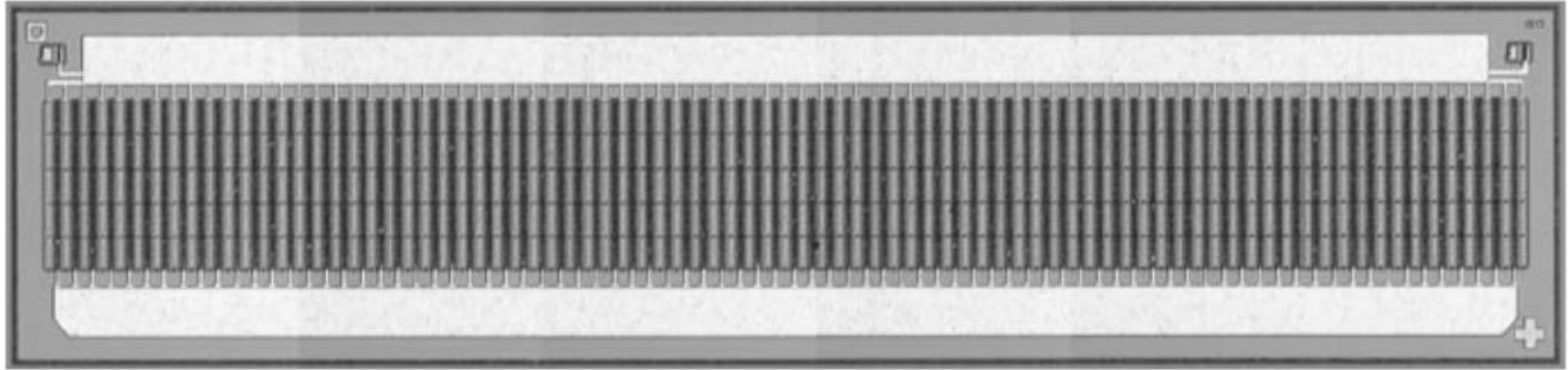
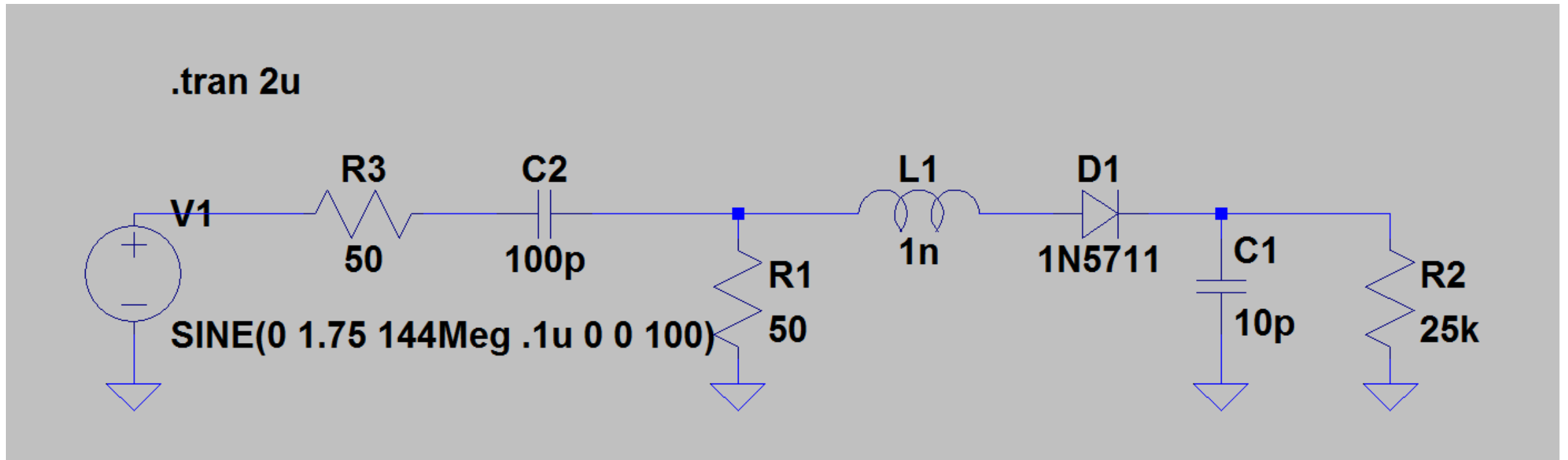


Fig. 6.1. Discrete LDMOS 80 W power transistor; this device has 164 gate fingers for a total gate width or periphery of 82 mm, courtesy of Freescale Semiconductor.



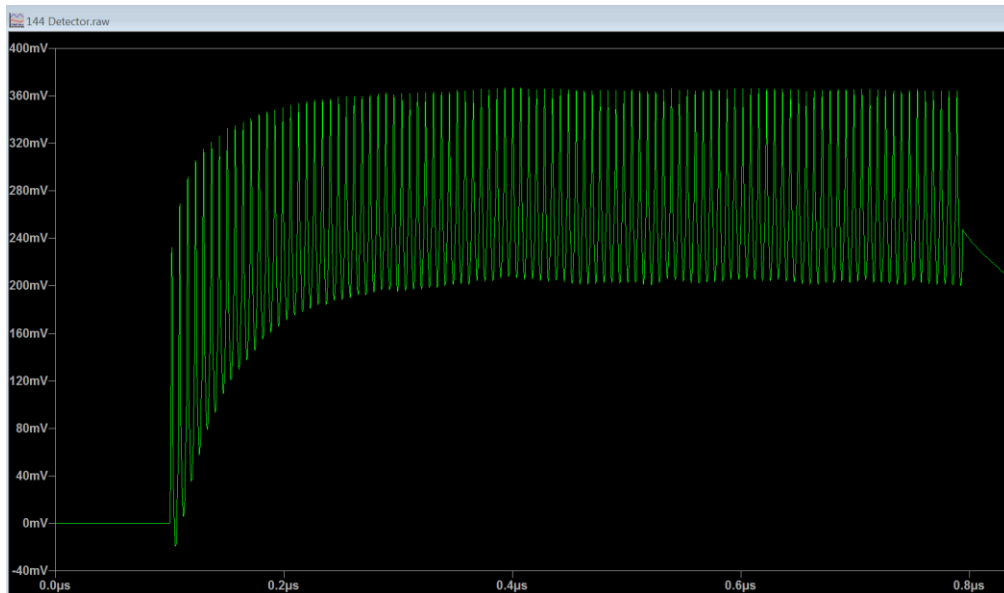
# Why the ALC Circuit Doesn't Work

- Detector is too slow

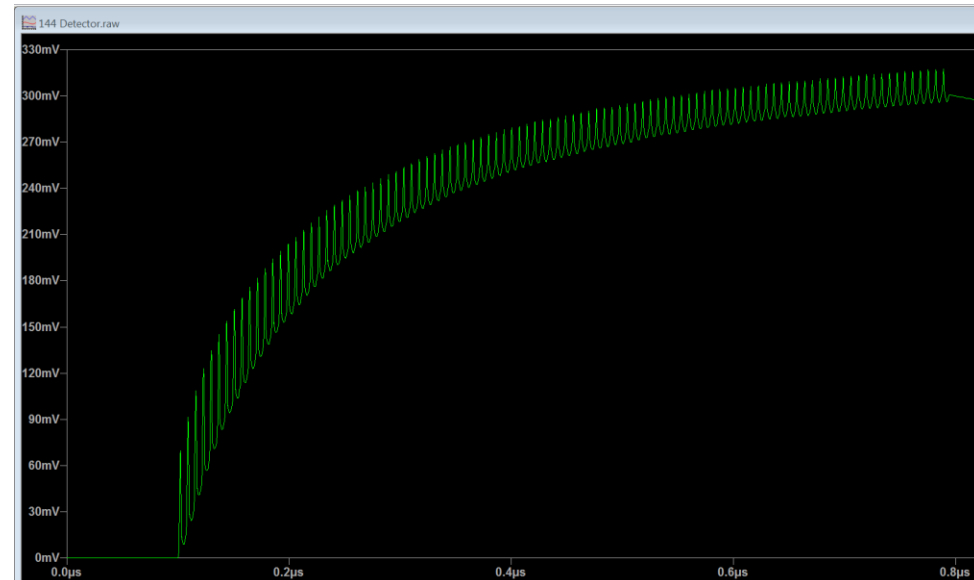


# Results

- Even with 10pf, takes several pulses!



100pf less fuzz, slower response



# Power Comparator/LPF

- Must be slow for speech.

# Result

- 1-3ms power spike.
  - Difficult to measure on diode detector.
- Will a precharge at the beginning of the Transmission work?
  - What happens when you are slow speaking the next word, or slow on the key?
    - Going AHHHHHHH between words might work!
    - Cranking up the audio gain so your PA blower is S9 would also work. But your Q rate might decline.

# Future Fix

- Digital control loop with memory.
  - Measure individual transmitters and set points.
  - Gain remains fixed during transmissions
  - Now it is not Automatic Level Control!
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- No equations this time!