

6.002 Demo# 09GS (Load Set up demo#09GS.set) MOSFET Inverting Amplifier

Small signal

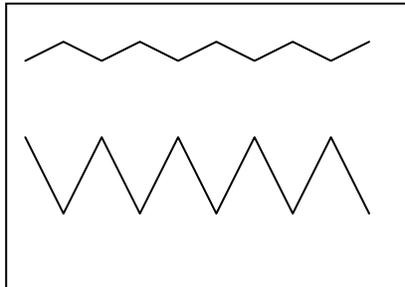
Fall 00

Lectures 9 and 10

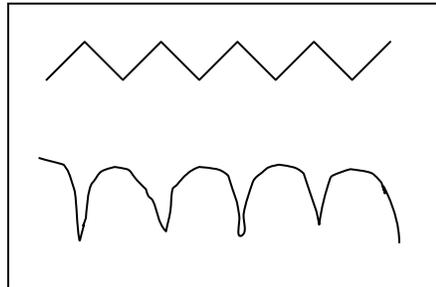
Purpose: This demo shows the amplification of small waveforms using a MOSFET, along with the limitations of such an amplifier. Using a biased sine wave as input, the output is seen as an inverted triangle wave. By increasing the amplitude or changing the bias, the output is shown to become distorted. This corresponds to amplifier operation outside the saturation region.

Steps:

1. Show a small sine wave and the inverted and amplified output on the scope.
2. Increase the amplitude of the input until the output becomes distorted. (Alternatively, it is more instructive to show distorted output (since amp is nonlinear), and then reduce amplitude to show more or less linear behavior.)



Small input signal & output



Large input signal & output

Description: Small signal, cut off/linear region distortion

- 1) To show the distortion you should increase the amplitude of FG1 from 50 mV to 500 mV and see how the output of the sine wave will be distorted ; see the picture on the next page Fig 1.
- 2) When the input signal is decreased to ~ 100 mV the output should be without distortion; see the picture on the next page Fig2.

Note: for circuit connections and pins out please check next page for more detail

Oscilloscope Setup

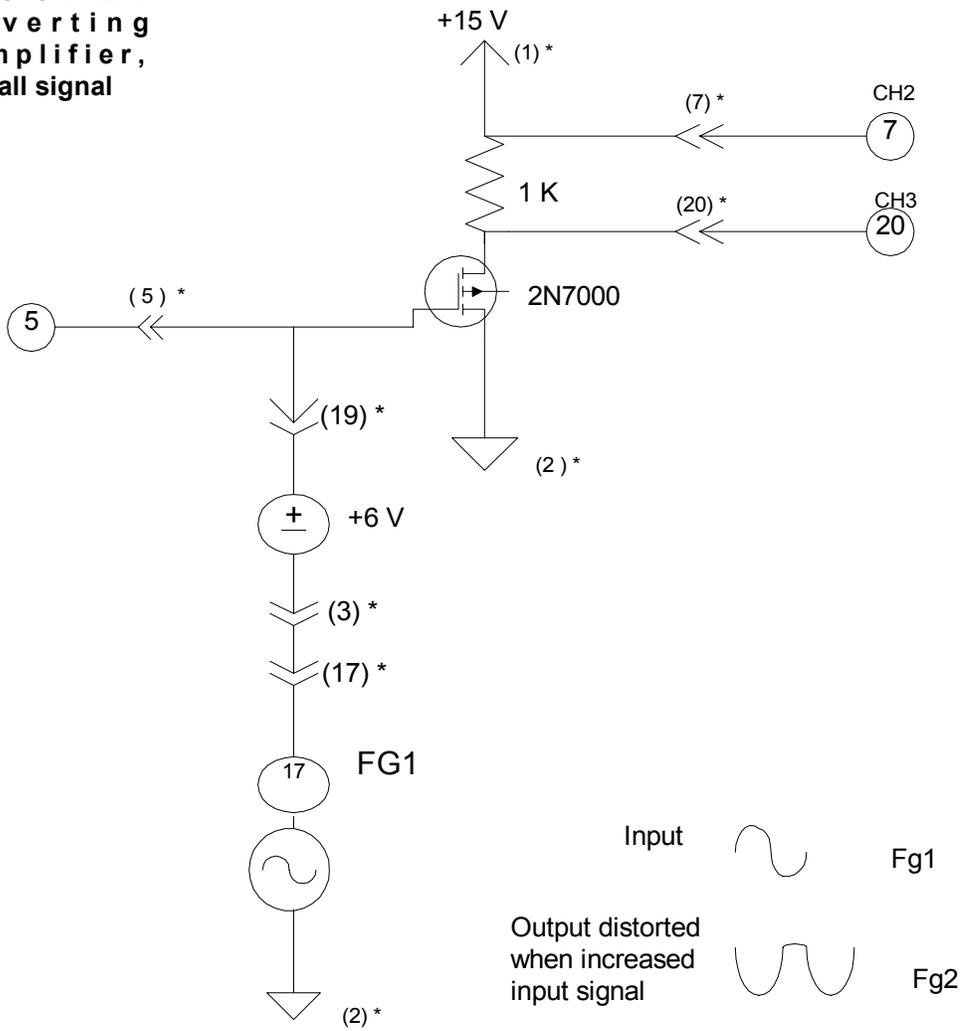
CH	V/DIV	OFFSET	MODE	FUNC	MATH	VERTICAL	HORIZONTAL	
1 on	500 mV	1.382	DC	off				
2 on	1	4.130	DC	off				
Horizontal: 200 uS		Acquisition: AUTO			AUTO	4	Trigger:	CH2

Waveform Generator Setup**Power Supply Setup**

UNIT	WAVE	AMP	OFFSET	FREQ		+6	+25	-25	OUTPUT
FG1	Sine	50 mV	0	3 KHZ	Hi Z	2.6V	5 V		
Trigger: INT									

Note: Prof Sussman prefers to have pin #20 (Blue coax cable) plugged into channel 2 on the oscilloscope, because the green trace is easier to see than the purple trace. Prof Sussman prefers to change FG1 same as prof. Agarwal.

M O S F E T
I n v e r t i n g
A m p l i f i e r ,
s m a l l s i g n a l



* Note: # of pins on the PC board and BNC connectors



() Pins