Memorandum

To: EDS Group

CC: Senior Management

From: Alyssa Batula

Date: 4/21/2009

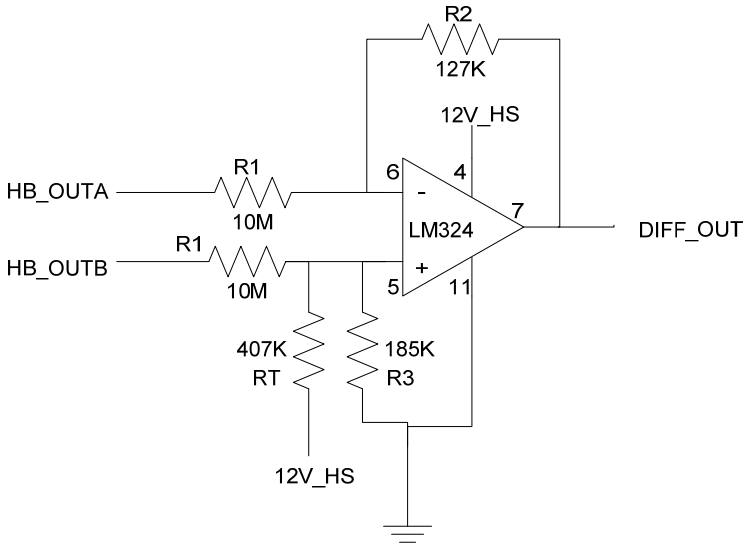
Re: EDS High Voltage AC Voltage Sensors Diff Amp

This circuit depends on the gain of the opto-isolator circuit. The gain and bias level must be re-calculated for each individual circuit. One of the opto-isolators used to gather previous opto-coupler data stopped working and was replaced, so gain values from those tests are no longer accurate

To produce a sine wave with a minimum of 1V and maximum of 4V at the output of the EDS opto-coupler, the input to the opto-coupler must be a sine wave with a maximum of 5.9V and a minimum of 1.6V (determined through experimentation). A differential amplifier will be used to convert the 340Vp-p sine wave output from the H-bridge into the desired waveform (4.32Vp-p sine wave biased at 3.74V). Spice simulations show this output, with a gain of .0127V/V. The capacitor was removed from the circuit to eliminate delay, but space should be left for it on the board in case it is necessary later.

The resistors use approximately 6mW of power and the LM325 uses approximately 24mW for a total of 30mW.

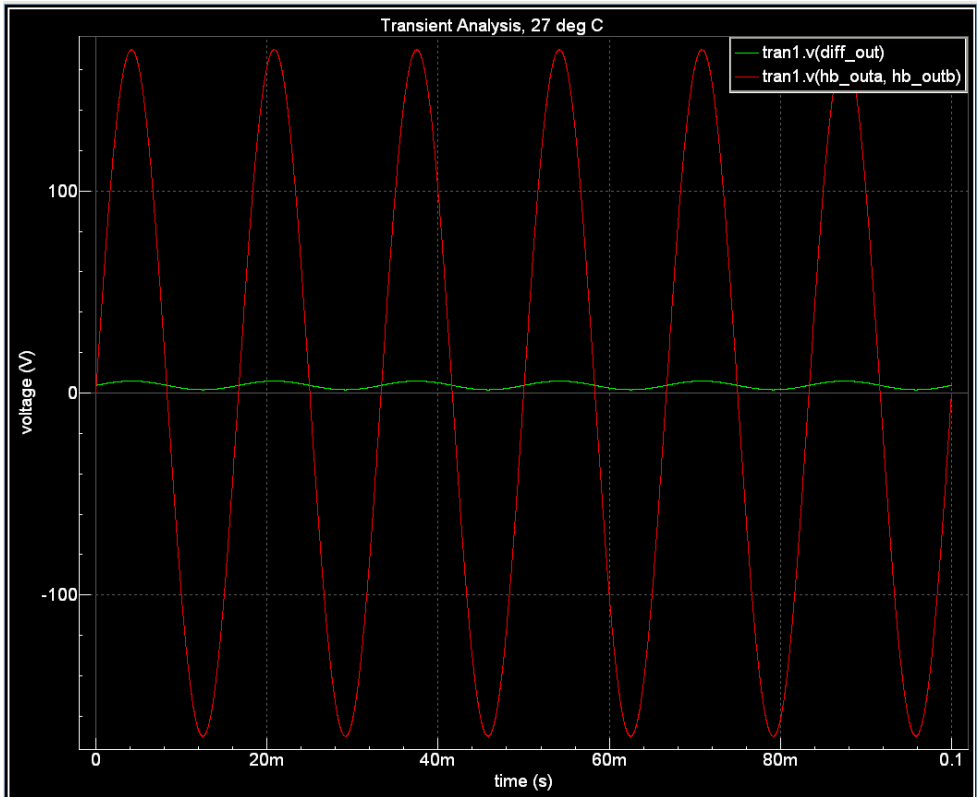
Simulation Results:

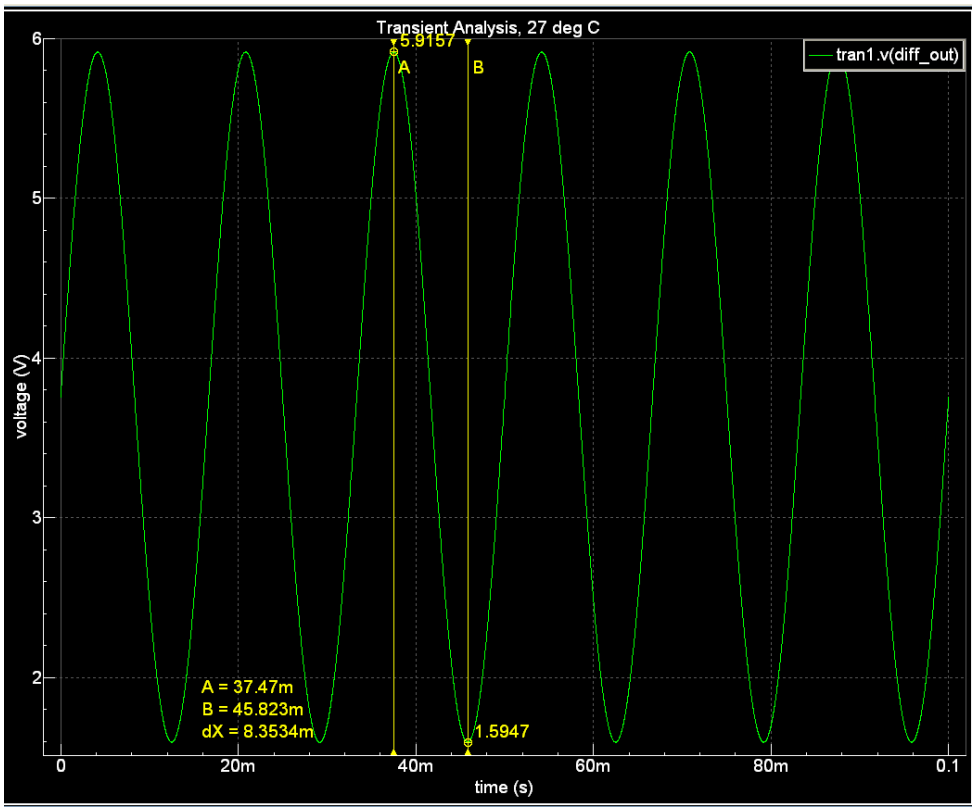


$$A = \frac{V_{out}}{V_{in}} = \frac{R1}{R2}$$

$$12 * \frac{R3}{R3 + RT} = V_{offset}$$

$$\frac{R3 * RT}{R3 + RT} = R2$$


Transient Analysis, 27 deg C
tran1.v(diff_out)
tran1.v(hb_outa, hb_outb)
100
0
-100
voltage (V)
0
20m
40m
60m
80m
0.1
time (s)


Transient Analysis, 27 deg C
tran1.v(diff_out)
5.9157
A
B
6
5
4
3
2
voltage (V)
A = 37.47m
B = 45.823m
dX = 8.3534m
1.5947
0
20m
40m
60m
80m
0.1
time (s)