HW 6 Report - Ring Oscillator

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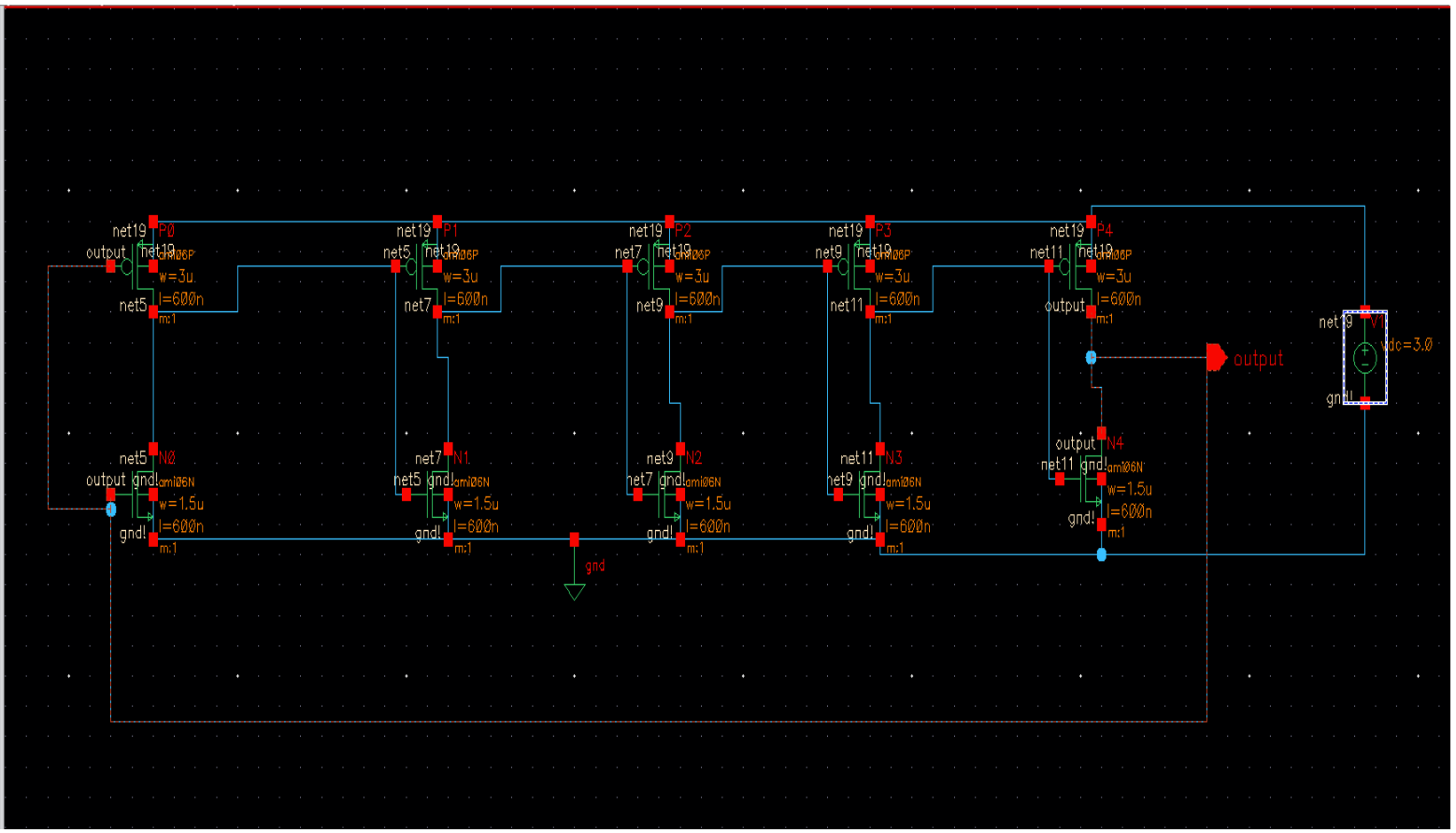


Figure showing the schematic of Ring oscillator using 5 inverters

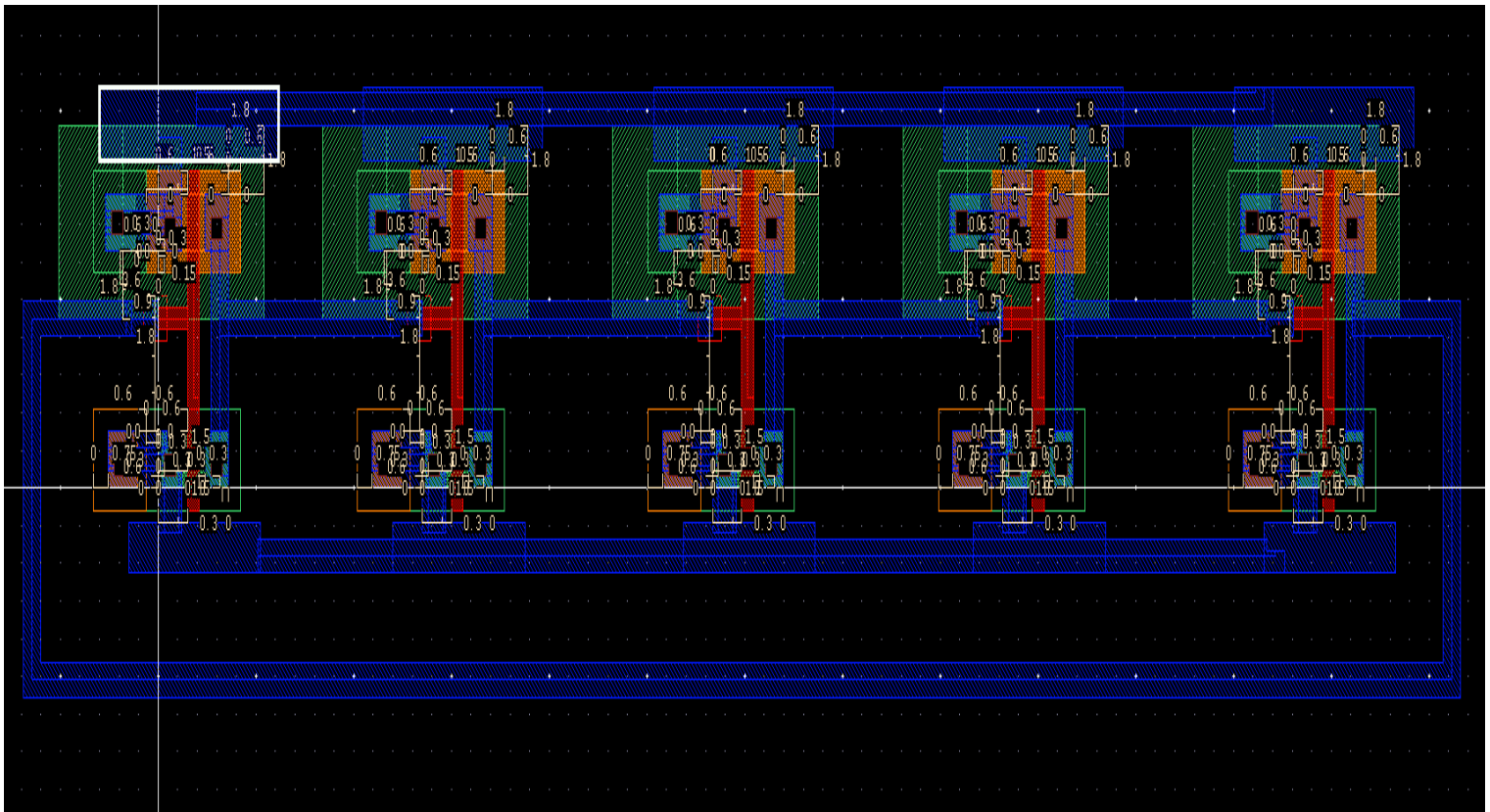


Figure showing the Layout of Ring oscillator using 5 inverters

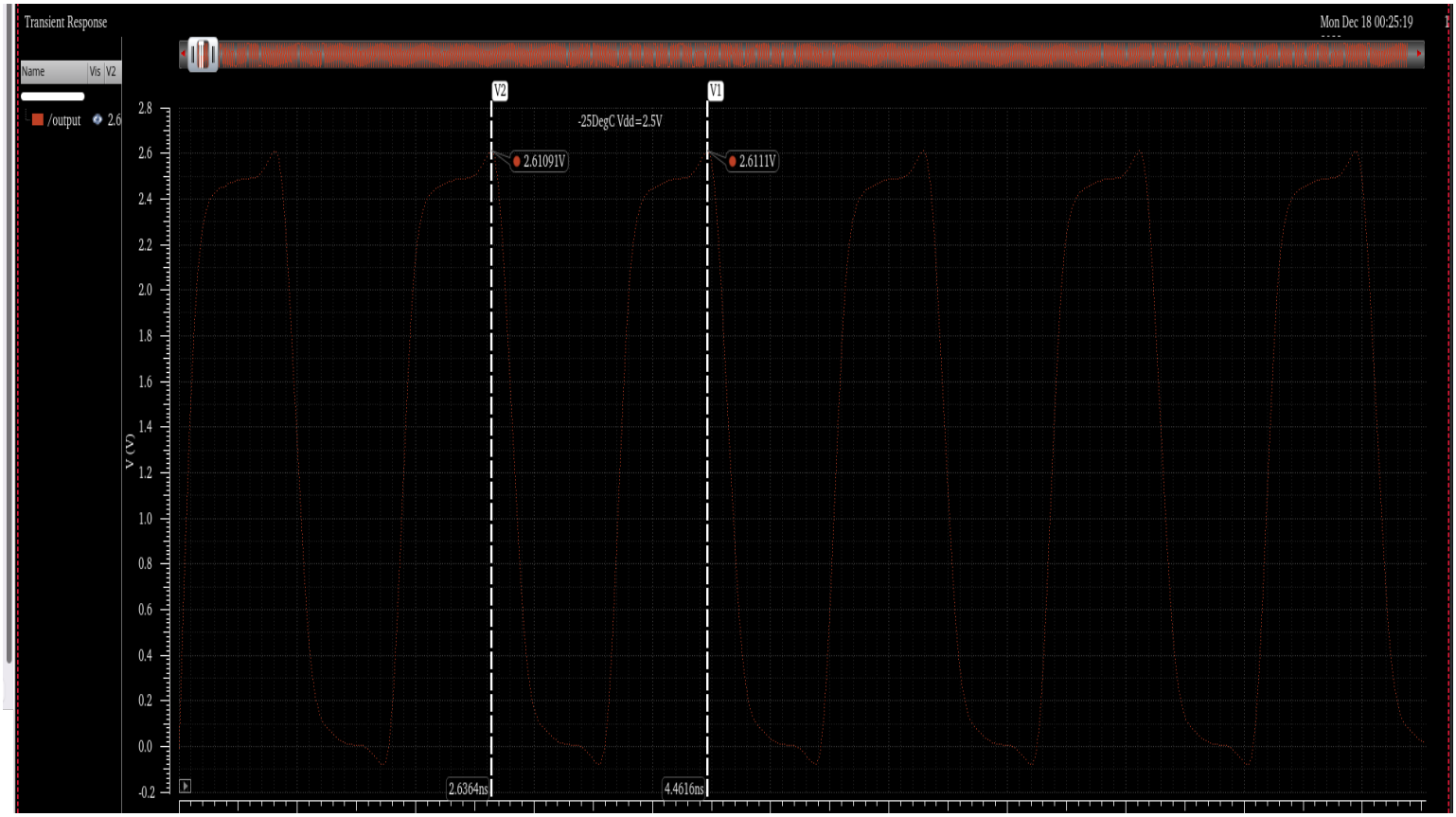
Observations during the simulations:

Vdd	Temp in Deg.C	Frequency of Oscillations in GHz without Load Capacitance
2.5V	-25	0.54
	25	0.43
	100	0.32
3.0V	-25	0.69
	25	0.56
	100	0.42
3.5V	-25	0.82
	25	0.67
	100	0.51
At 3.5V Vdd, 100 DegC and Varying Capacitance	**Voltage Swing**	**Frequency with Load Capacitane in GHz**
10fF	0-3.5V	0.6
100fF	0.6-3.1V	0.37
1pF	1.5-2.1V	0.20
10pF	1.77-1.81V	0.12

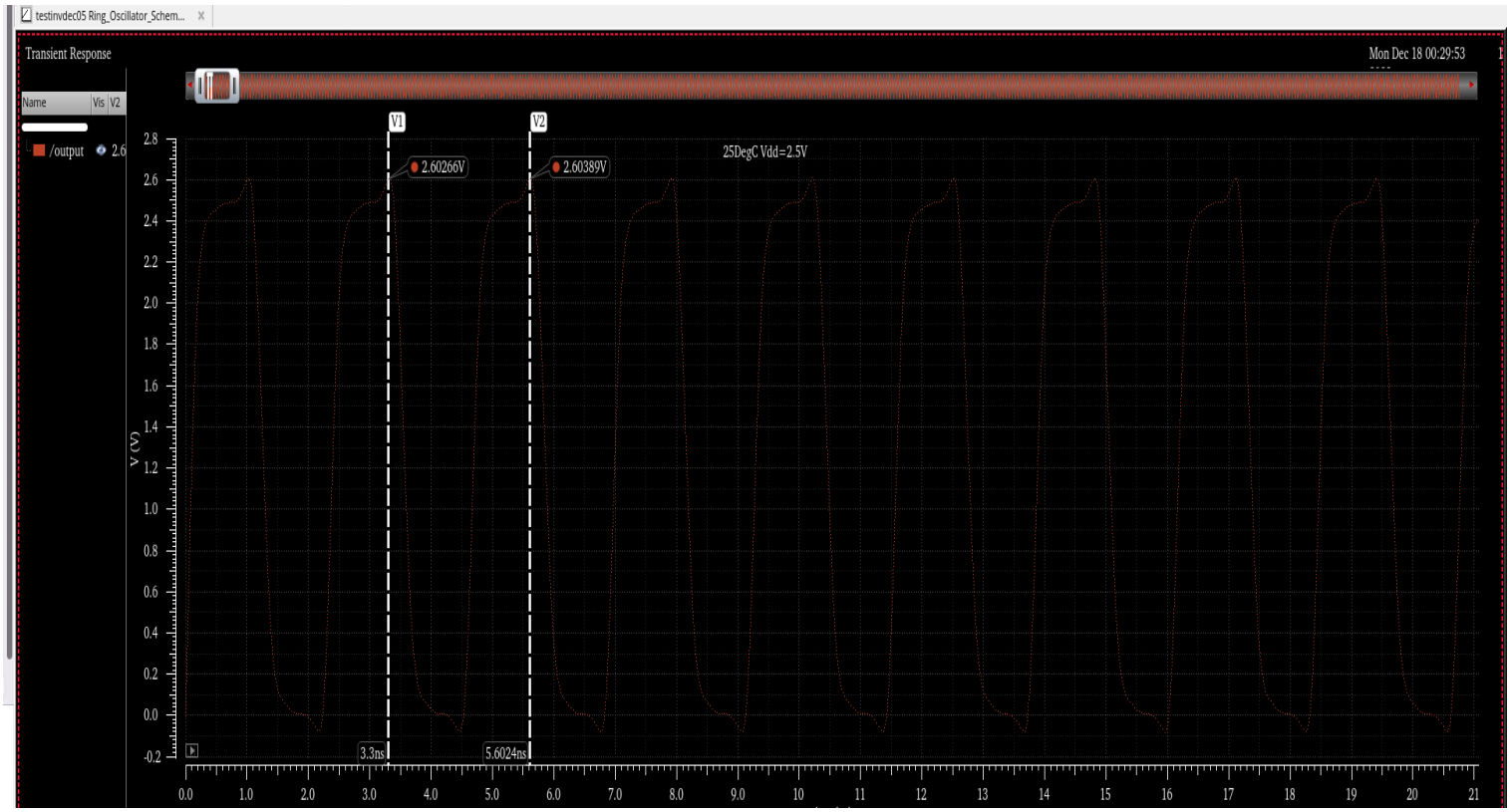
Observations:

- Frequency is decreasing (Time period increases) with increase in temperatures at constant Vdd.
- Frequency is increasing (Time period decreases) with increase in Vdd at Constant Temperatures.
- With Increase in load capacitance Voltage Swing decreases and Freq. of oscillations also decreases.

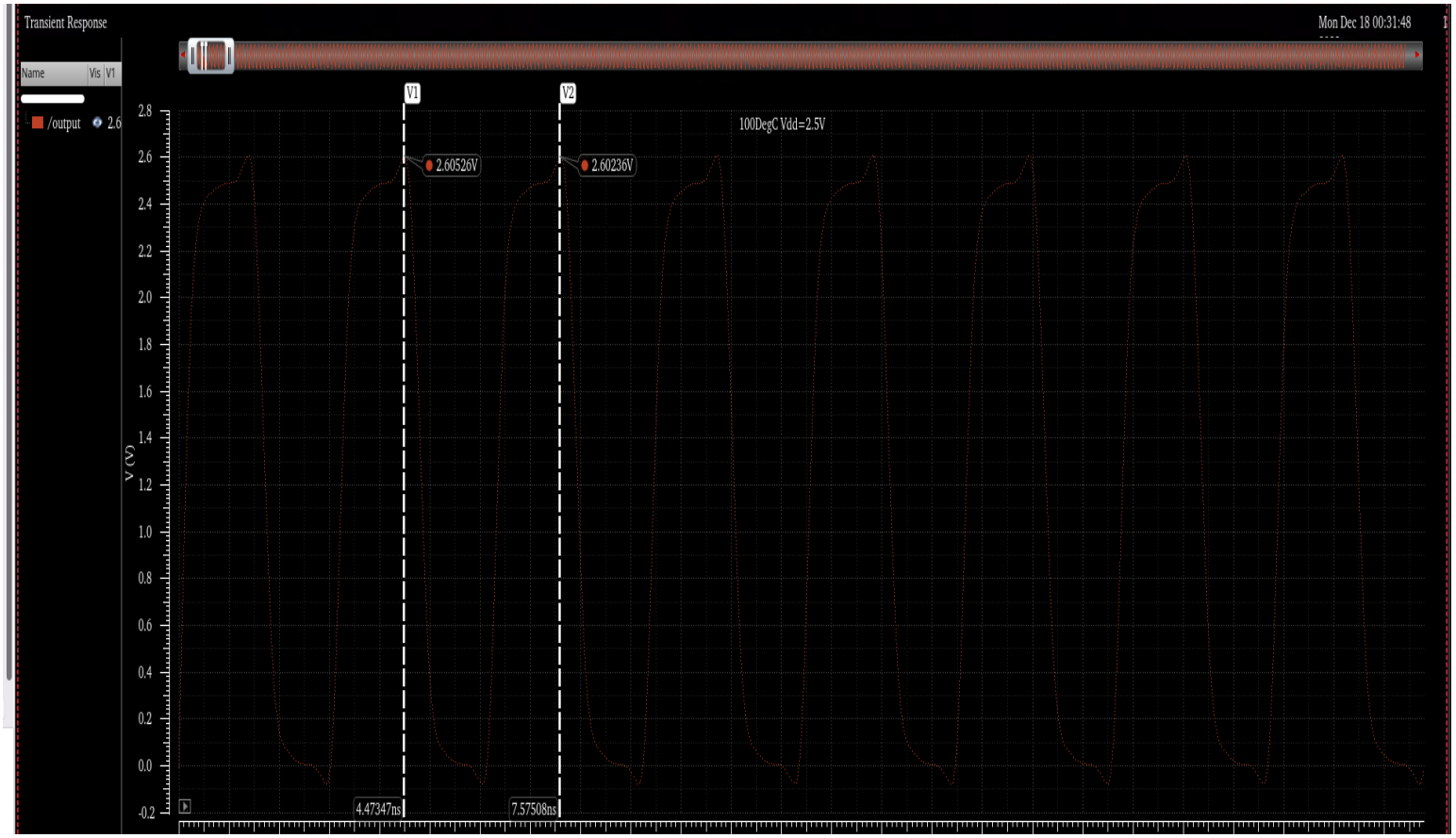
Simulation Screenshots:
-25DegC with Vdd=2.5V



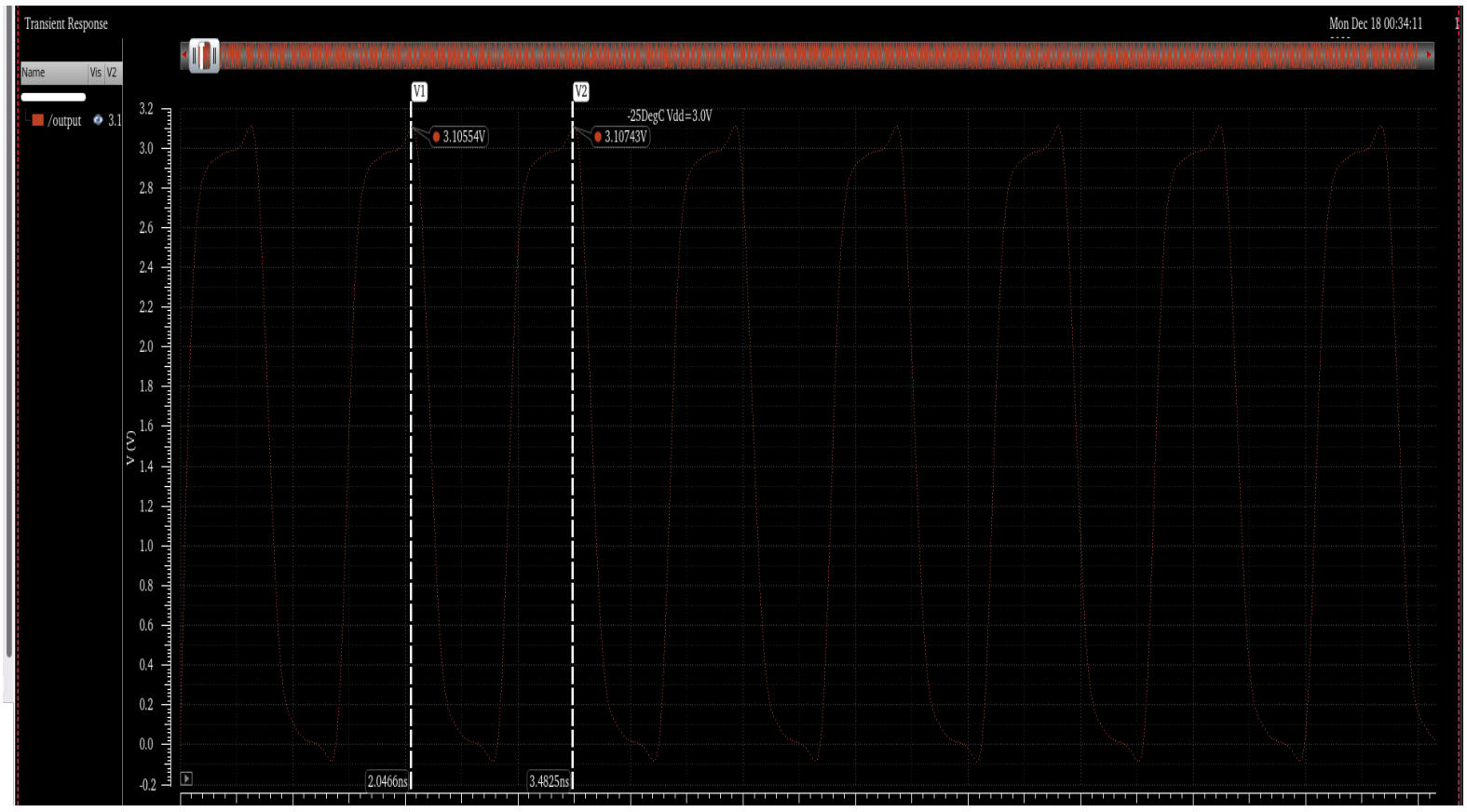
25DegC with Vdd=2.5V



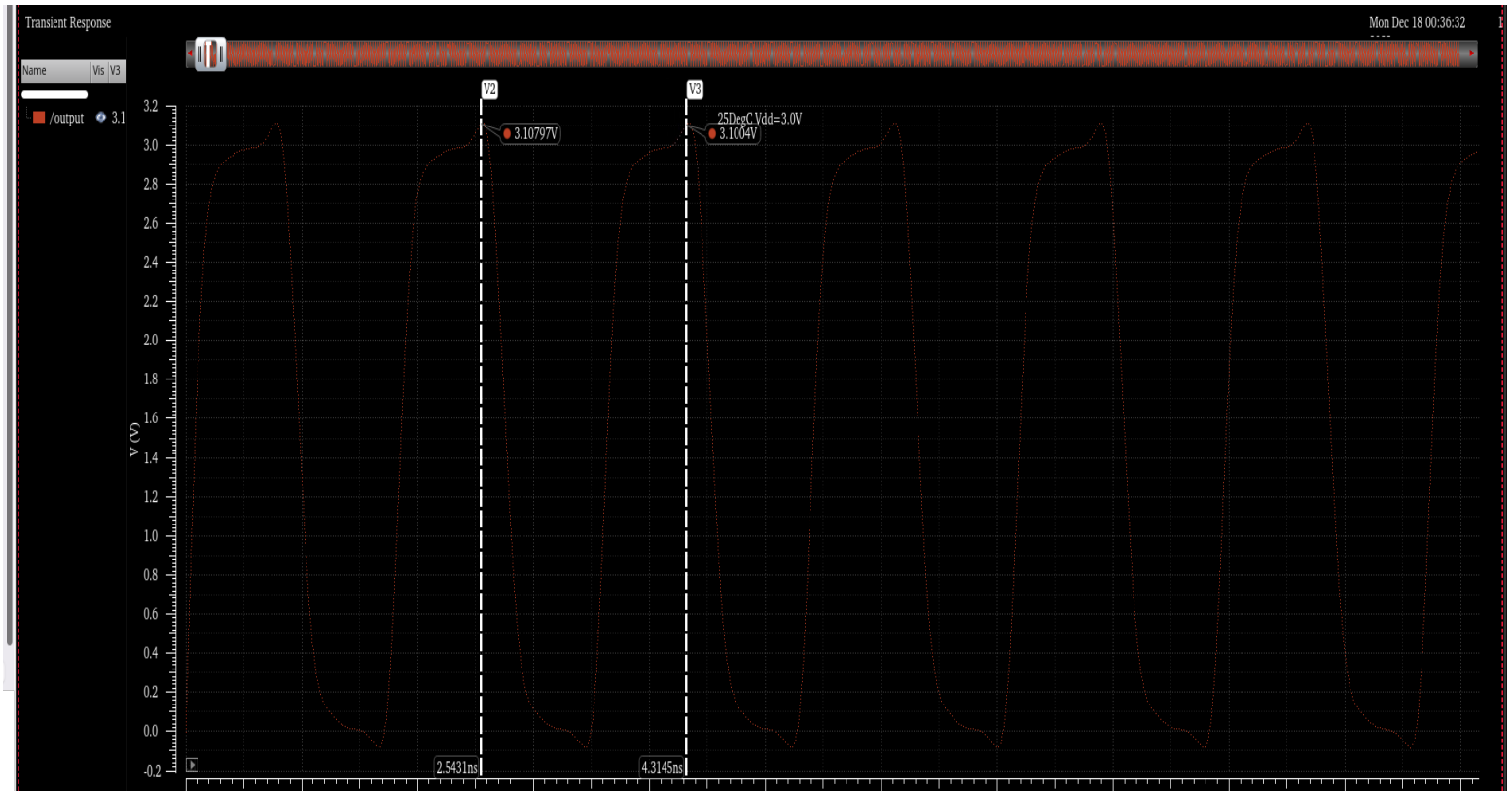
100DegC with Vdd=2.5V



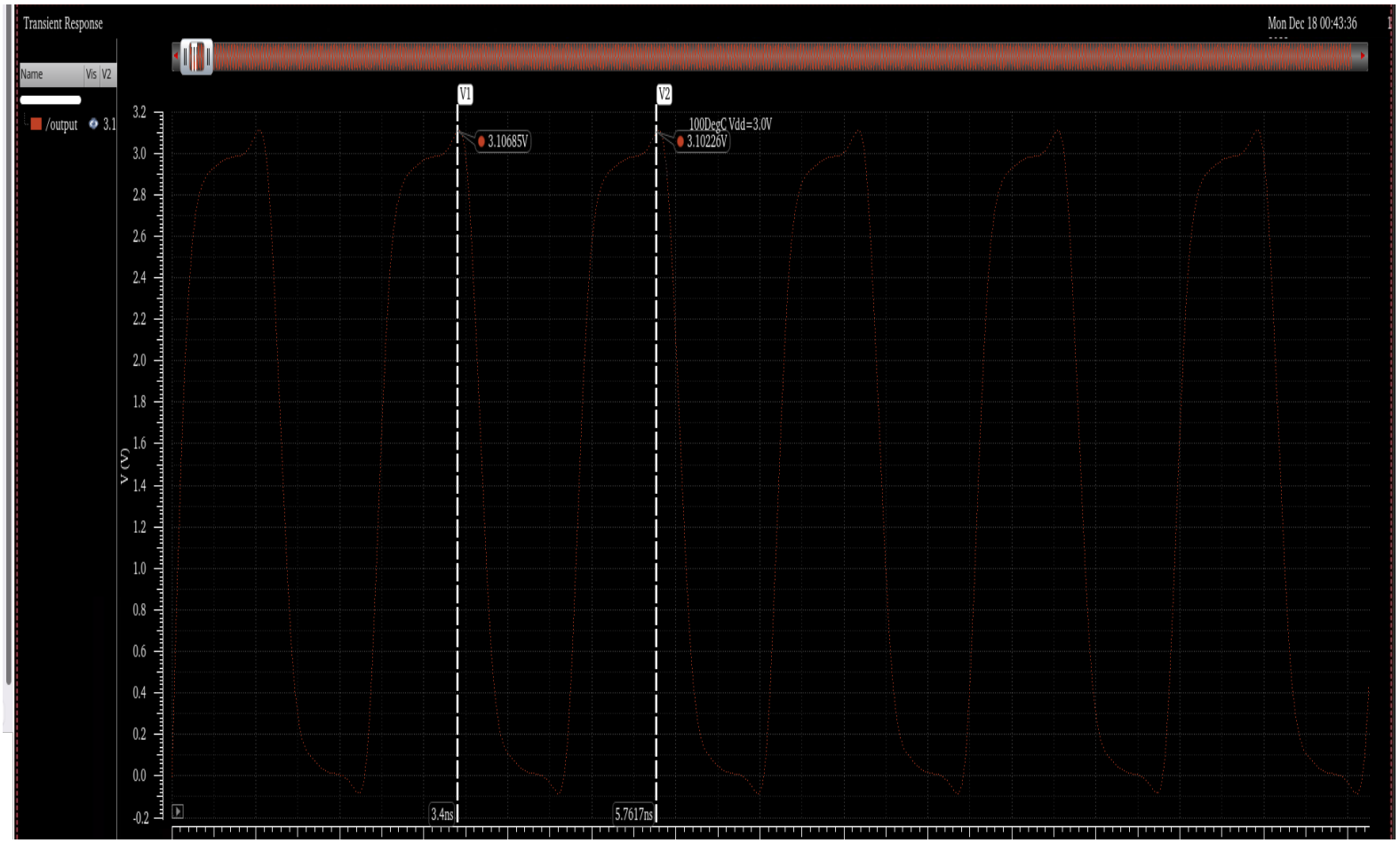
-25DegC with Vdd=3.0V



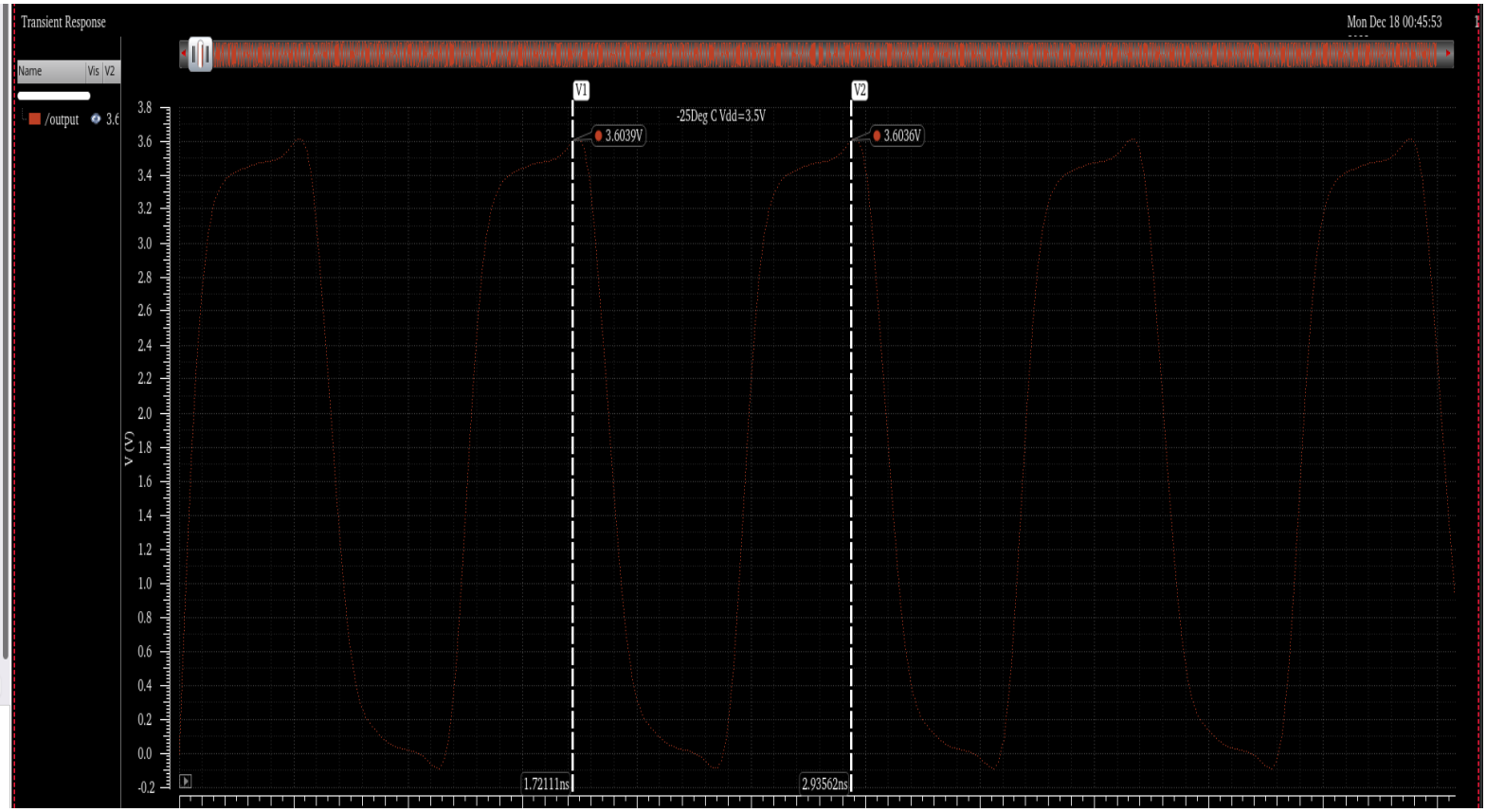
25DegC with Vdd=3.0V



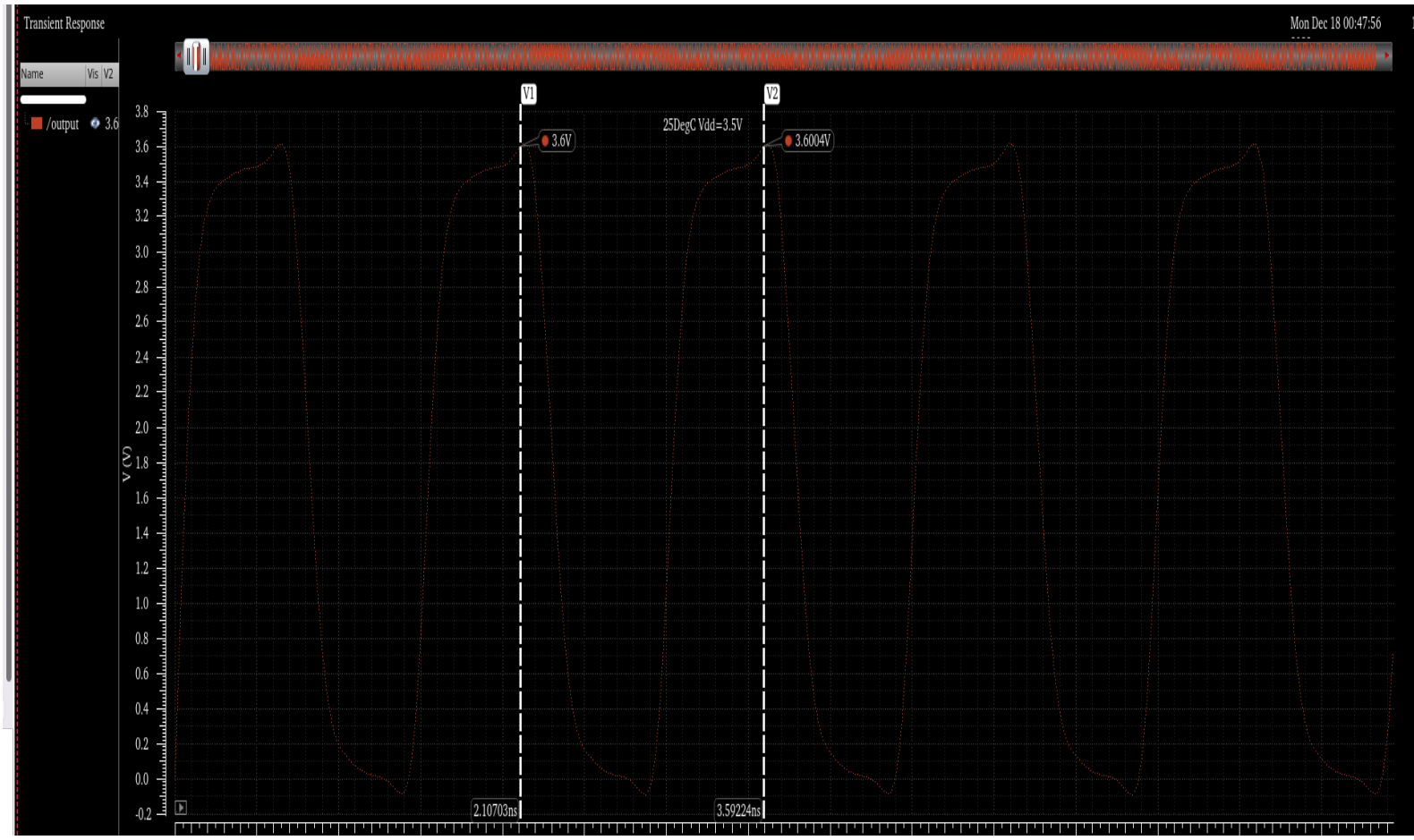
100DegC with Vdd=3.0V



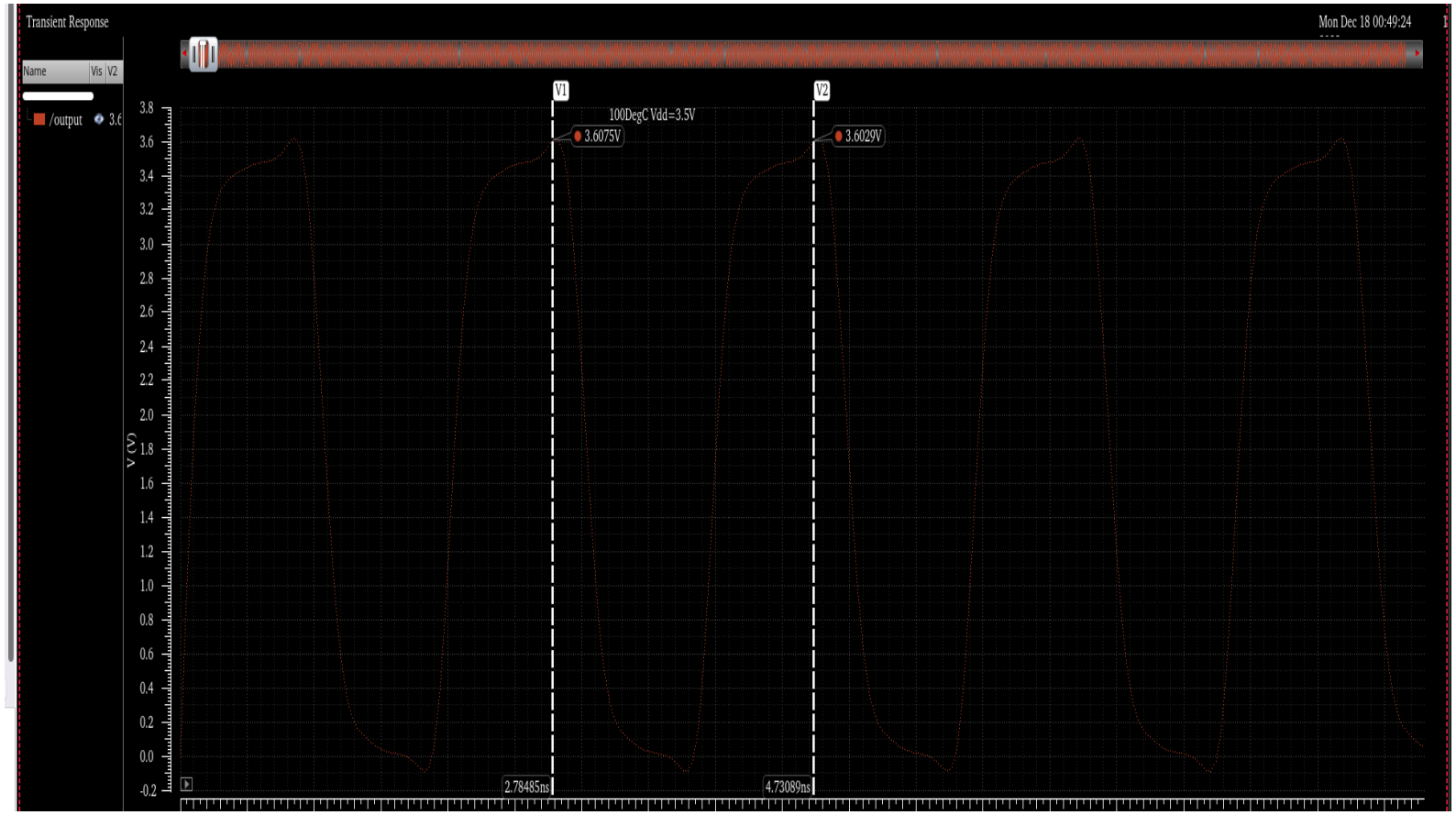
-25DegC with Vdd=3.5V



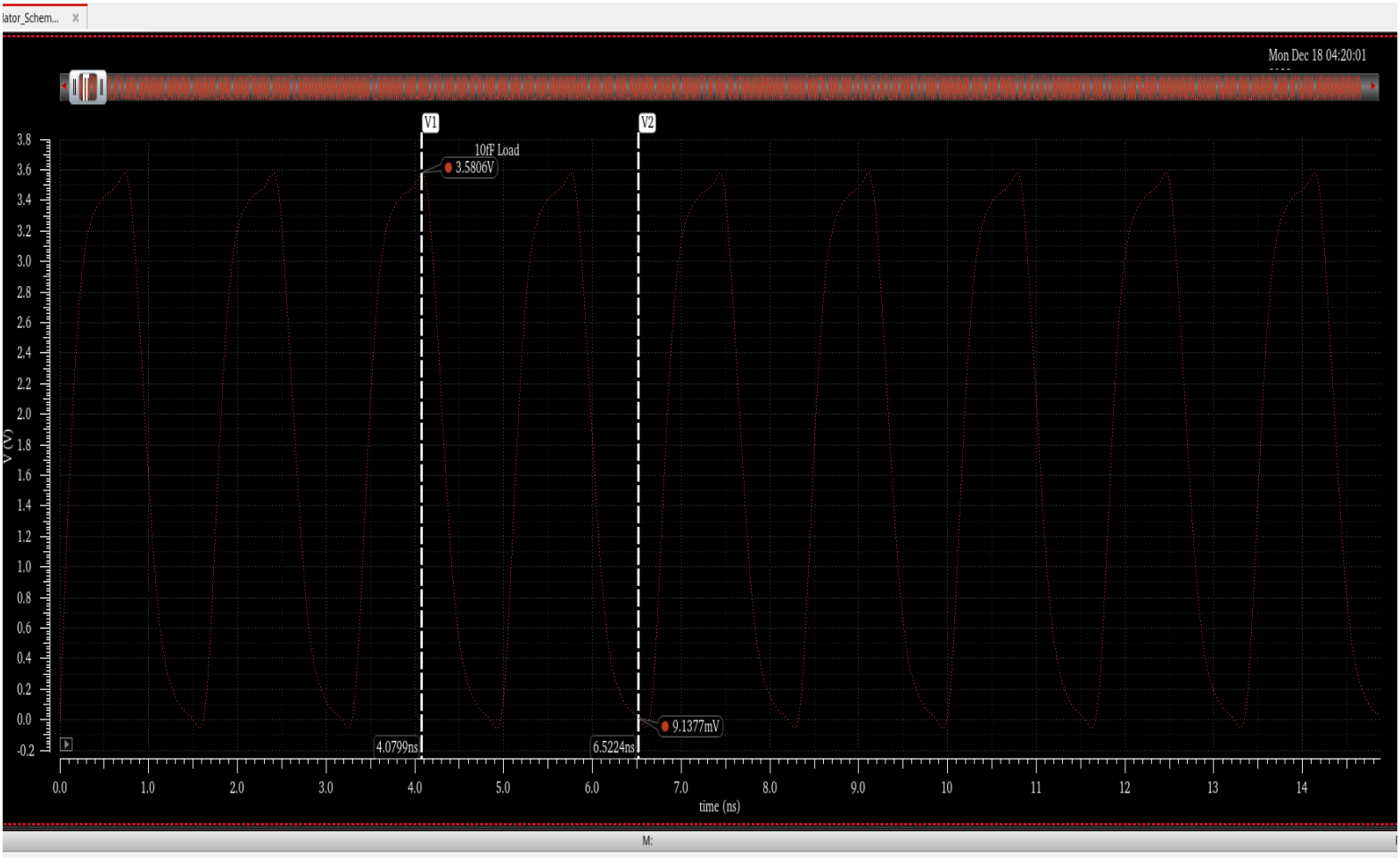
25DegC with Vdd=3.5V



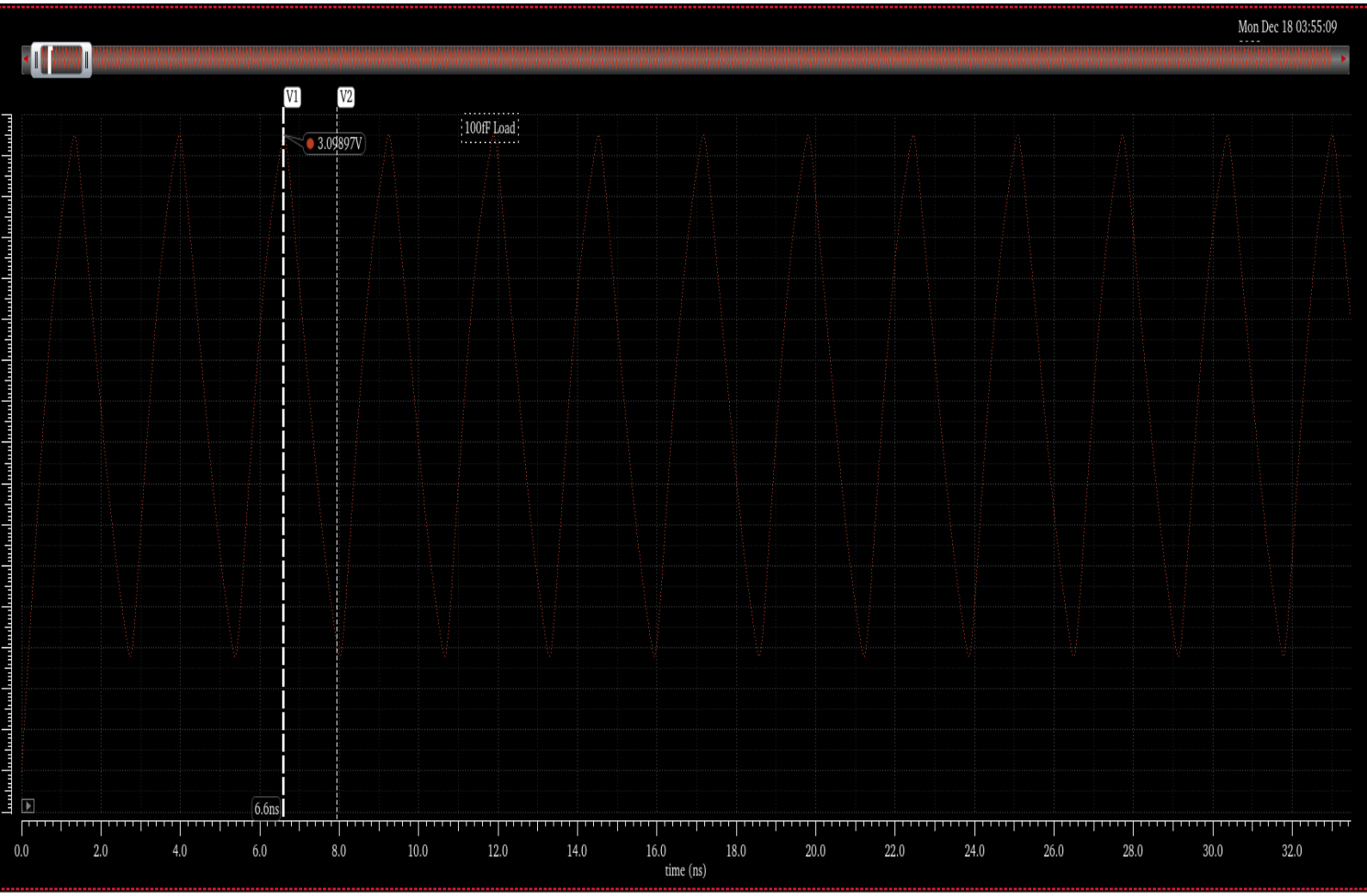
100DegC with Vdd=3.5V



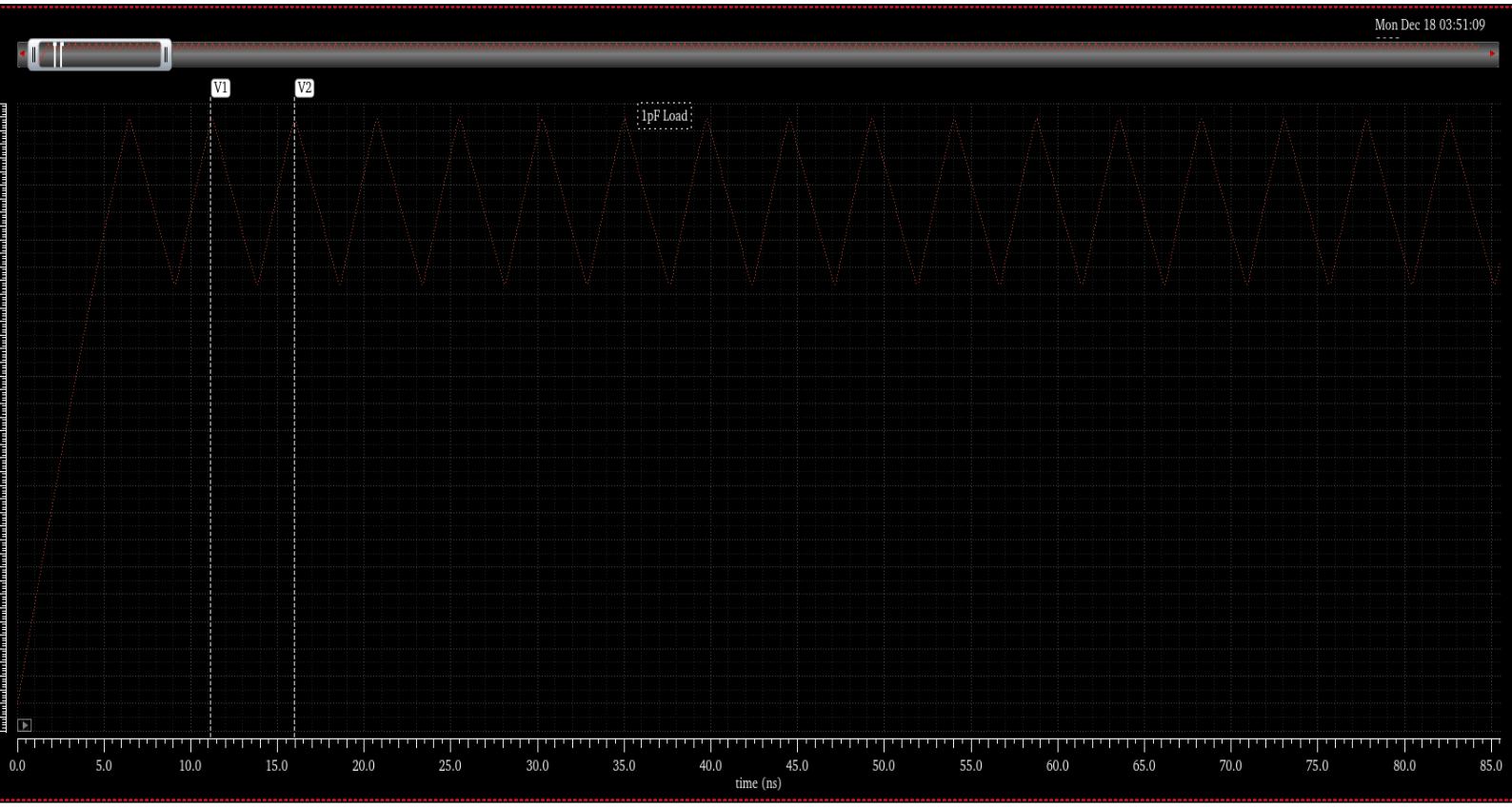
With Load Capacitance : 10fF at 3.5V Vdd, 25DegC



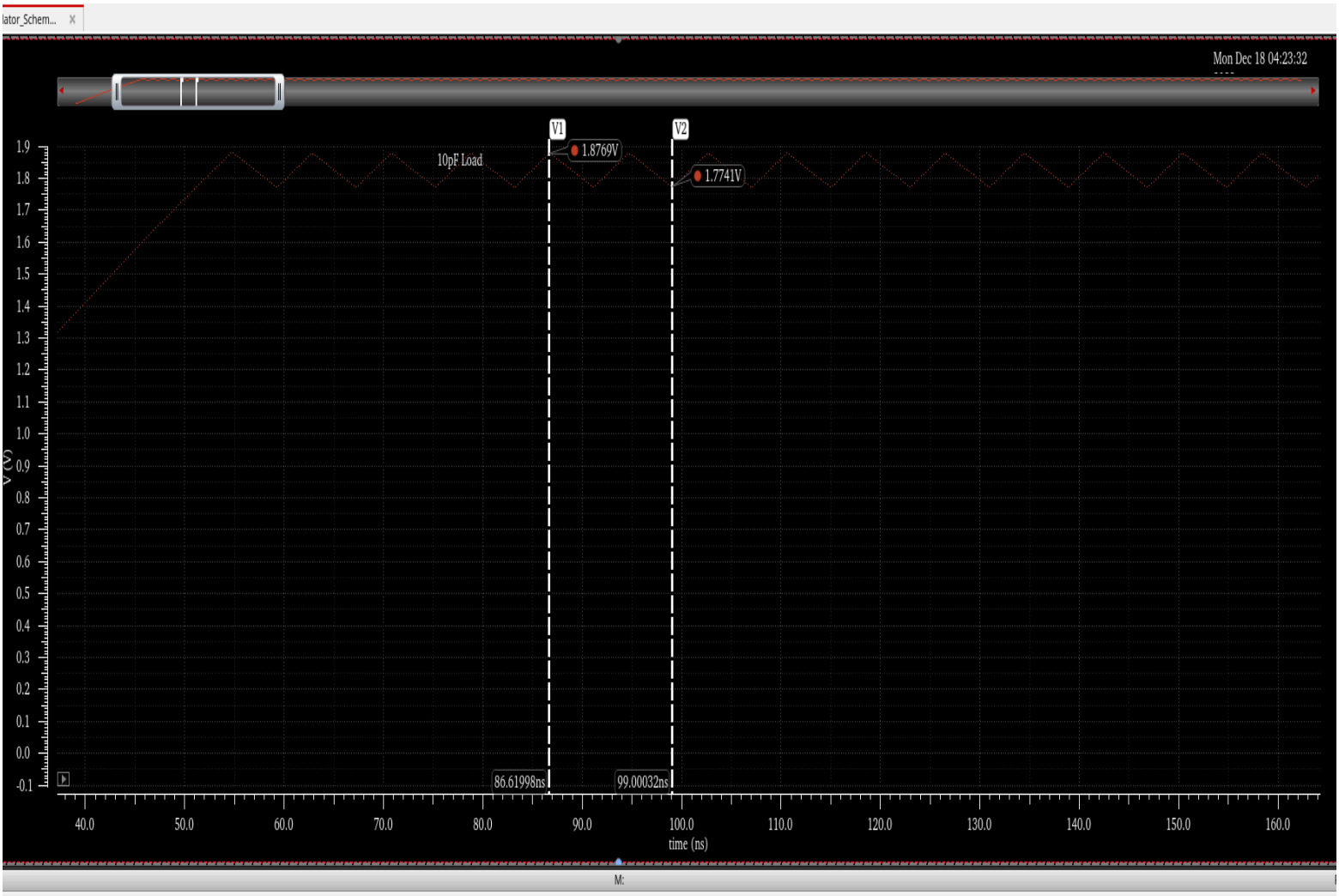
With Load Capacitance : 100fF at 3.5V Vdd, 25DegC



With Load Capacitance : 1pF at 3.5V Vdd, 25DegC



With Load Capacitance: 10pF at 3.5V Vdd, 25DegC



Schematic with Load Capacitor