BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY

Gate Driver Using HEMT GS66504B and ADuM4121A

Prepared by-

Sagar Kumar Das
Ratul Kundu
Shuvo Chandra Pall
MSc 22, BUET

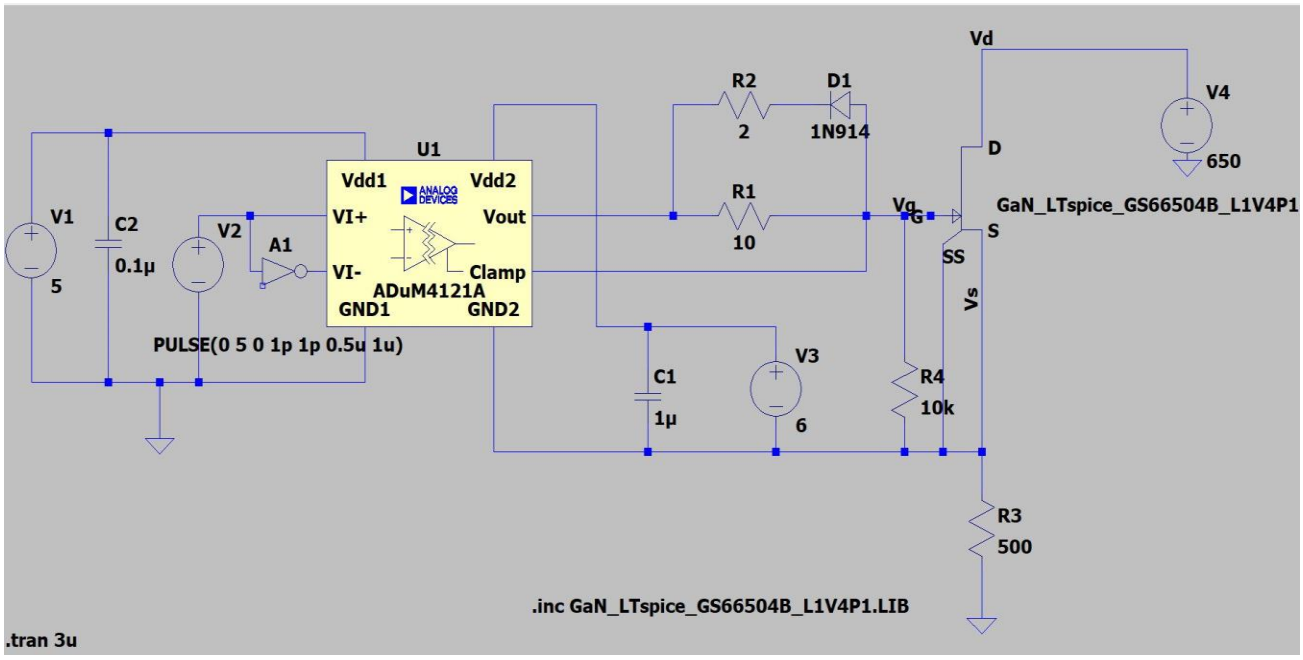
Submitted to-

Dr. Cheng Zhang
Lecturer,
University of Manchester

Supervised by-

Dr. Nadim Chowdhury
Assistant Professor, BUET

Schematic Diagram:



Here,

V_{IN}= 650V

Load Resistor = 500Ω

Switch_On_Current= $\frac{650}{500} = 1.3A$

$$V_{Pulse} = \begin{cases} 0; Keeps\ gate\ voltage\ low \\ 5; keeps\ gate\ voltage\ high \end{cases}$$

$$V_{GS} = \begin{cases} 0; & switch\ off \\ 6; & switch\ on \end{cases}$$

Output:

At Switching Frequency = **500KHz**

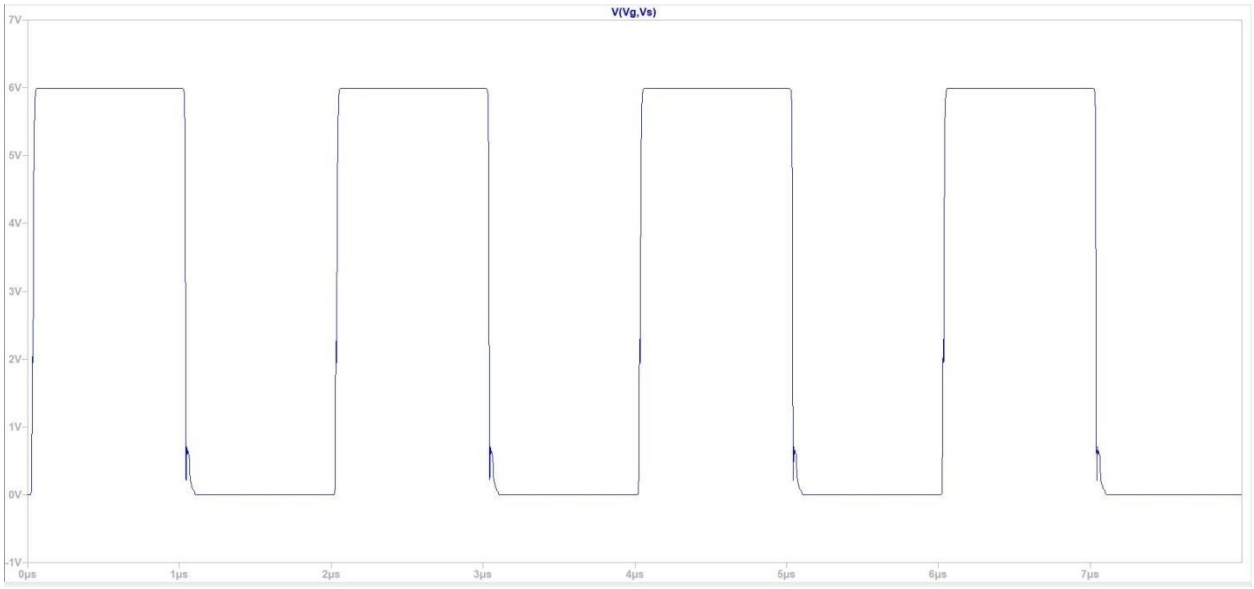
Turning ON, $\frac{dv}{dt} = \mathbf{79.2}\ \boldsymbol{V/ns}$ (approx.)

Turning OFF, $\frac{dv}{dt} = \mathbf{4.17}\ \boldsymbol{V/ns}$ (approx.)

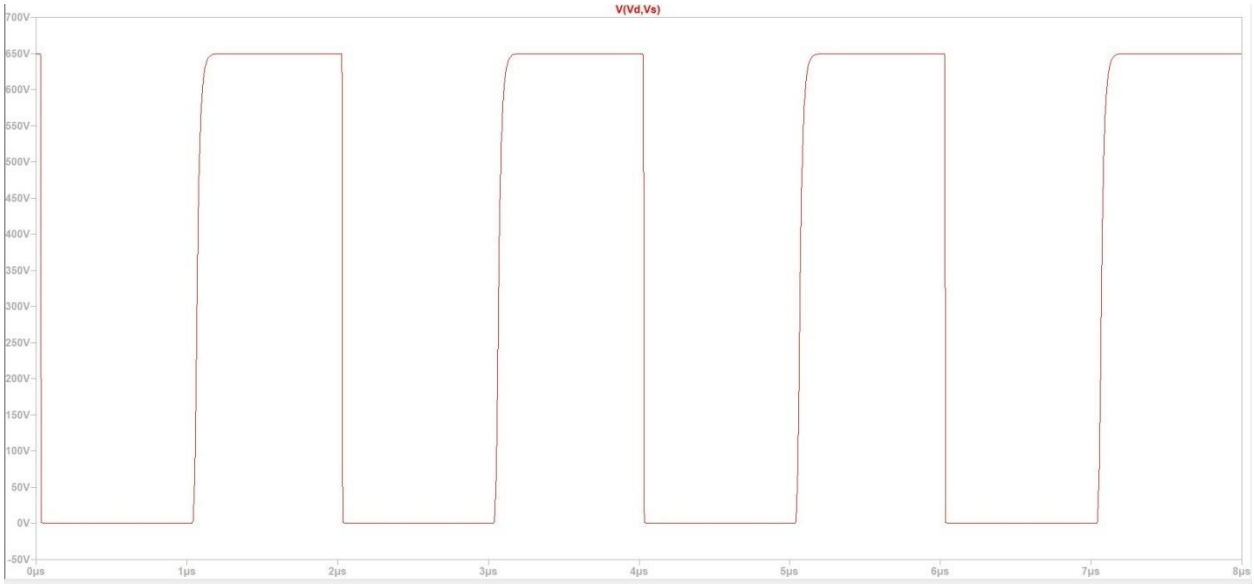
If, V_{GS}=6 V → V_{DS}=0V & I=1.3A

If, V_{GS}=0V → V_{DS}=650V & I=0A

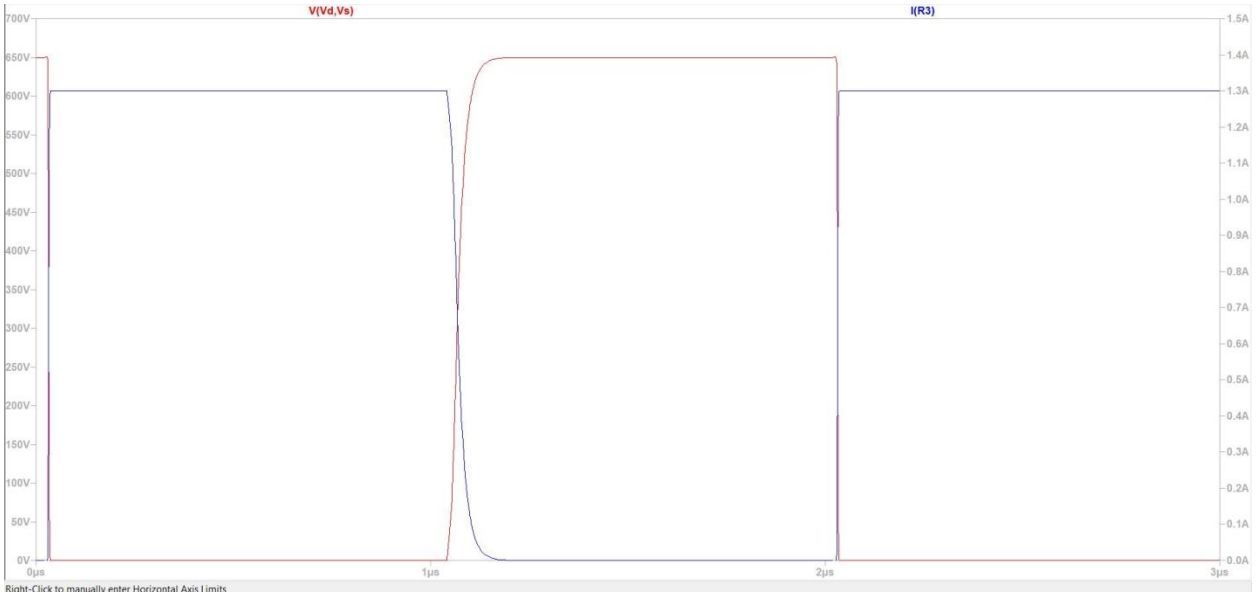
V_{GS} VS Time:



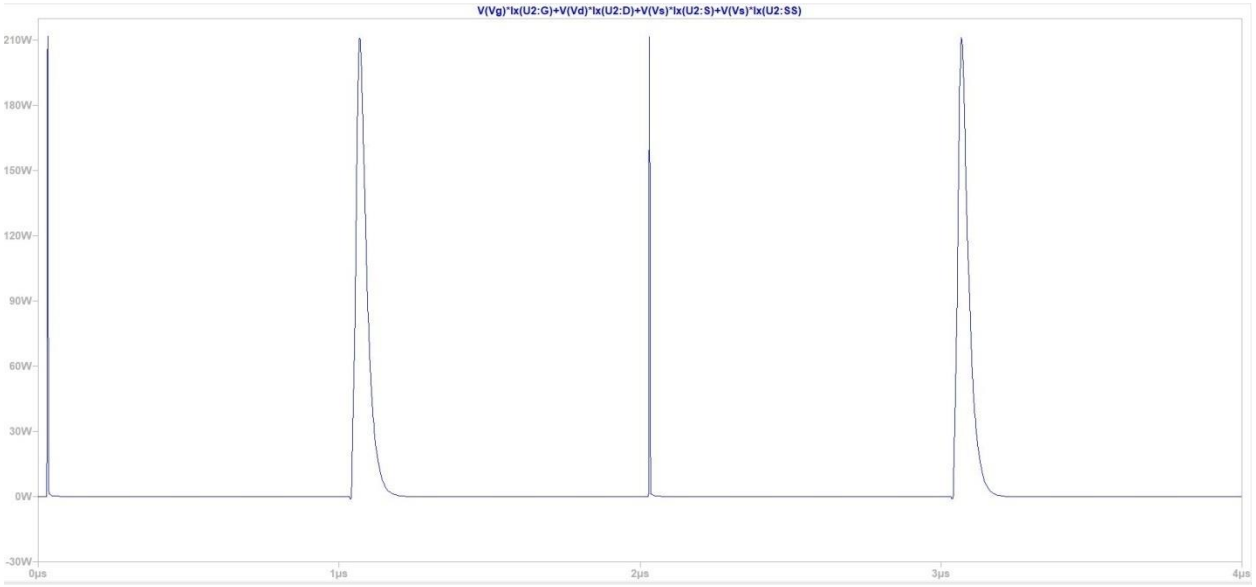
V_{DS} VS Time



V_{DS} & I_{load}



Powerloss VS Time



At Frequency = **1MHz**

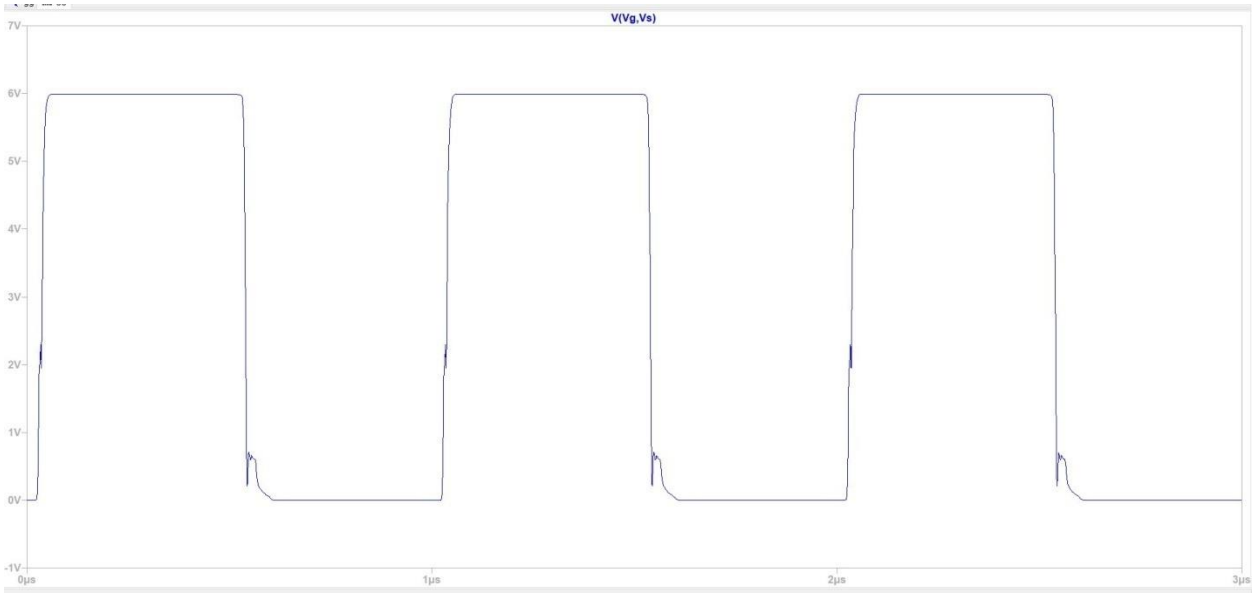
Turning ON, $\frac{dv}{dt} = 76.2\ V/ns$ $(approx.)$

Turning OFF, $\frac{dv}{dt} = 4$ **V/ns (approx.)**

If, V_{GS}=6 V → V_{DS}=0V & I=1.3A

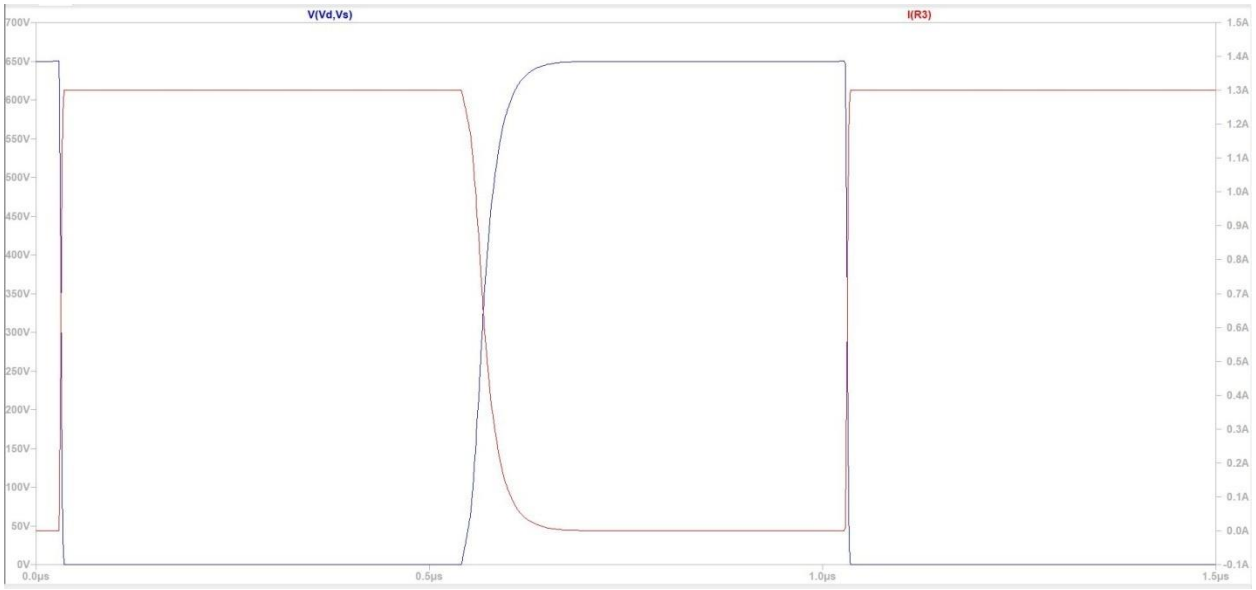
If, V_{GS}=0V → V_{DS}=650V & I=0A

V_{GS} VS Time

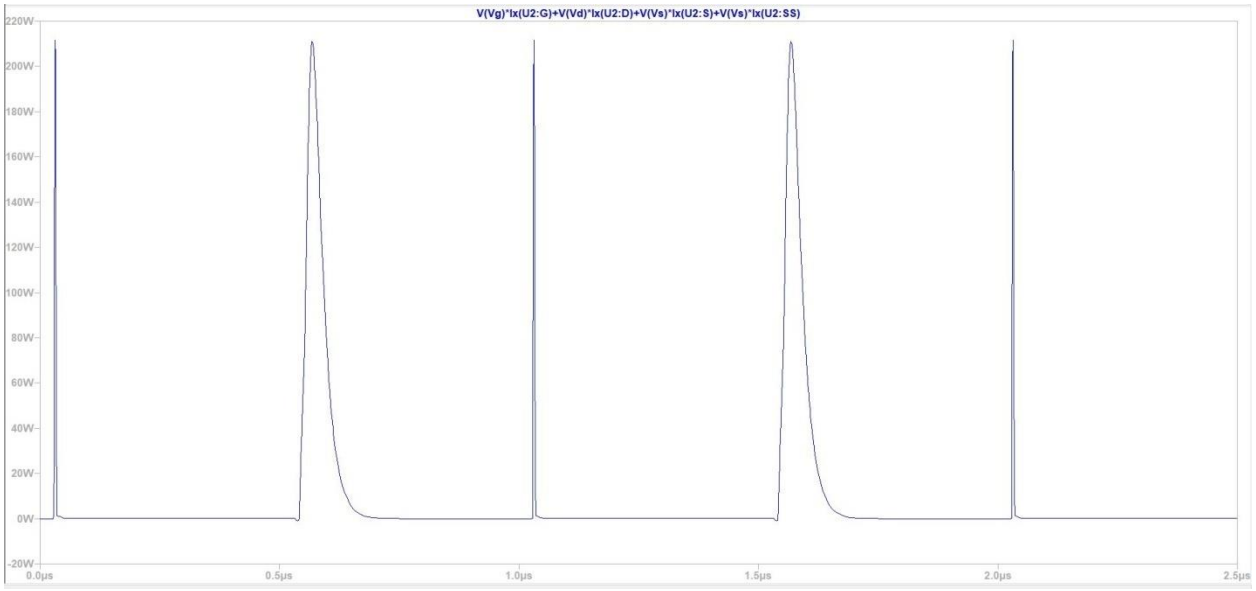


V_{DS} VS Time

V_{DS} & I_{Load}



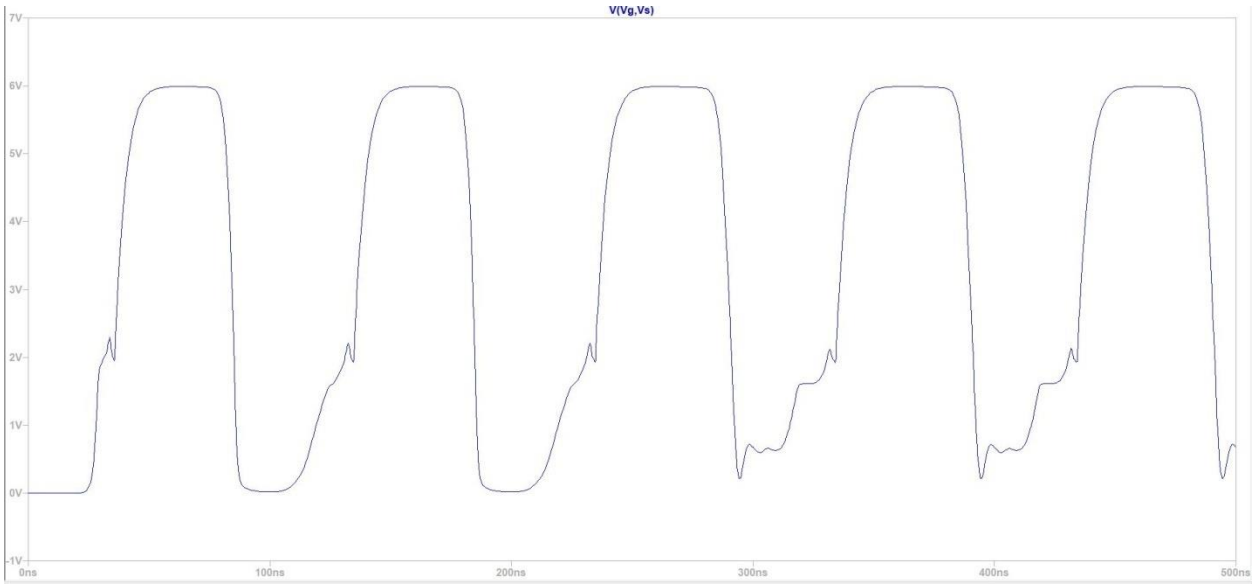
Switching_power_losses VS Time



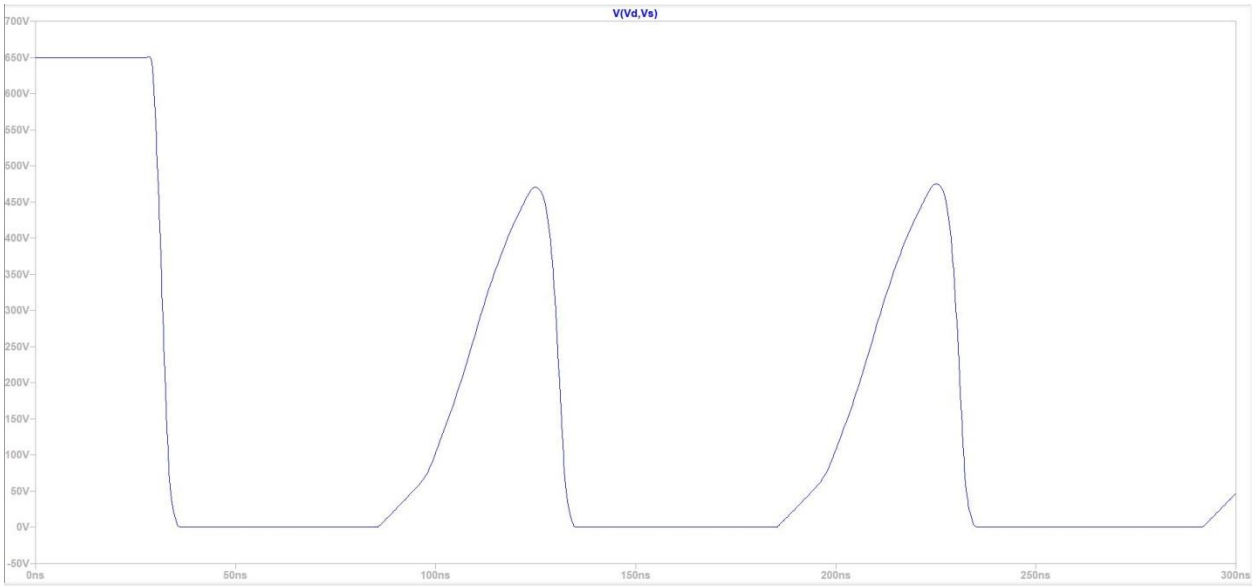
At Frequency= **10MHz**

Distorted output!!!

V_{GS} VS Time



V_{DS} VS Time



Switching_power_losses VS Time