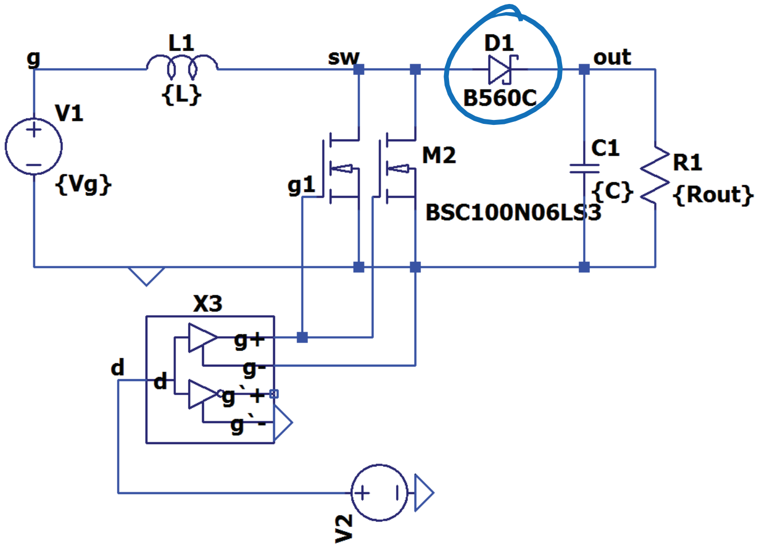
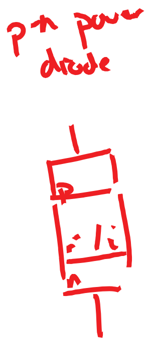
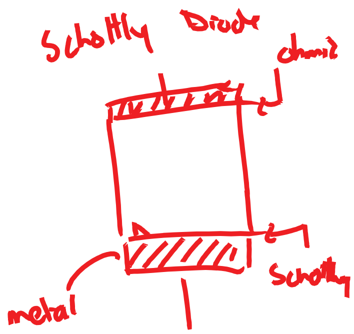
Schottky Diode



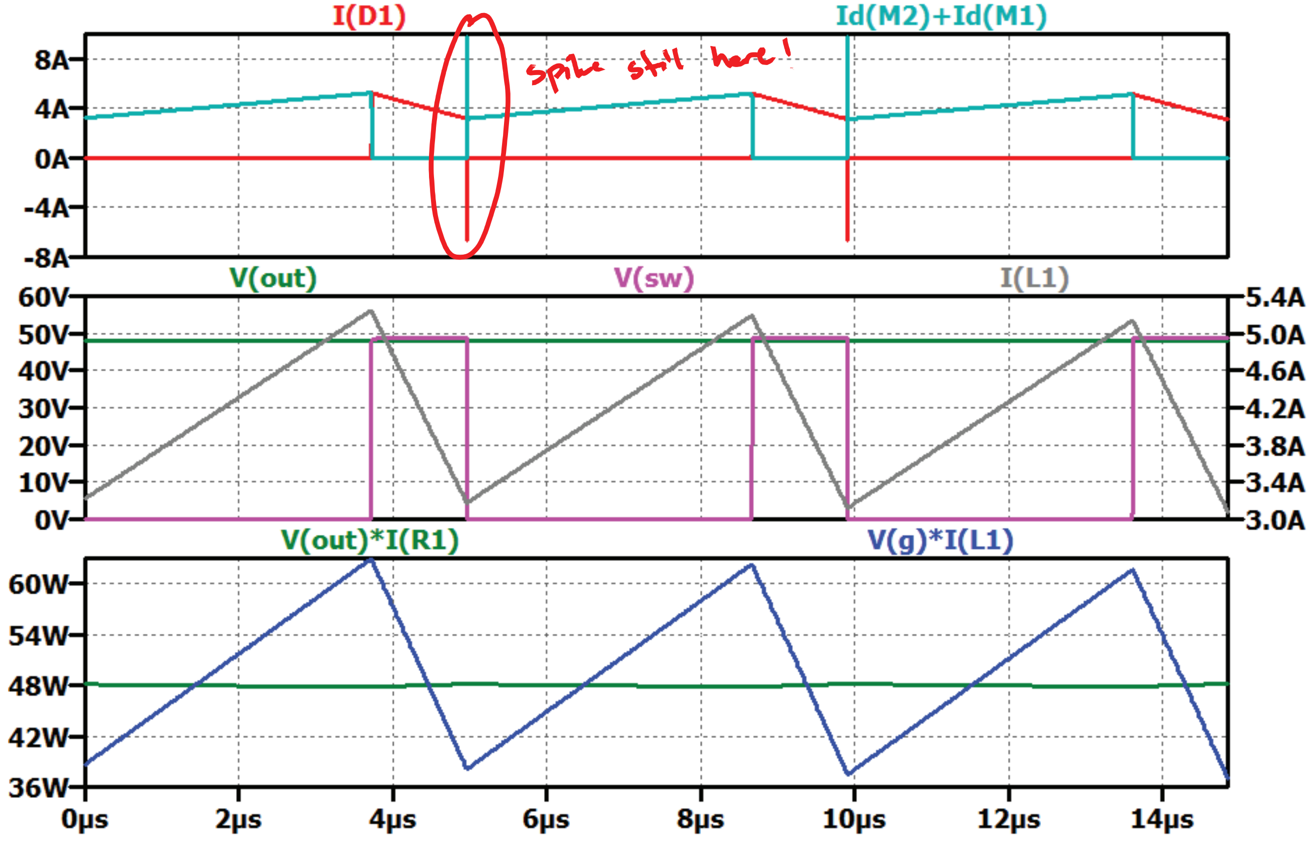




L	C_{out}	f_s	Diode	*η* (Sim)
22uH	22uF	202k	Si (FR)	93.9%
22uH	22uF	202k	Si Schottky	95.8%

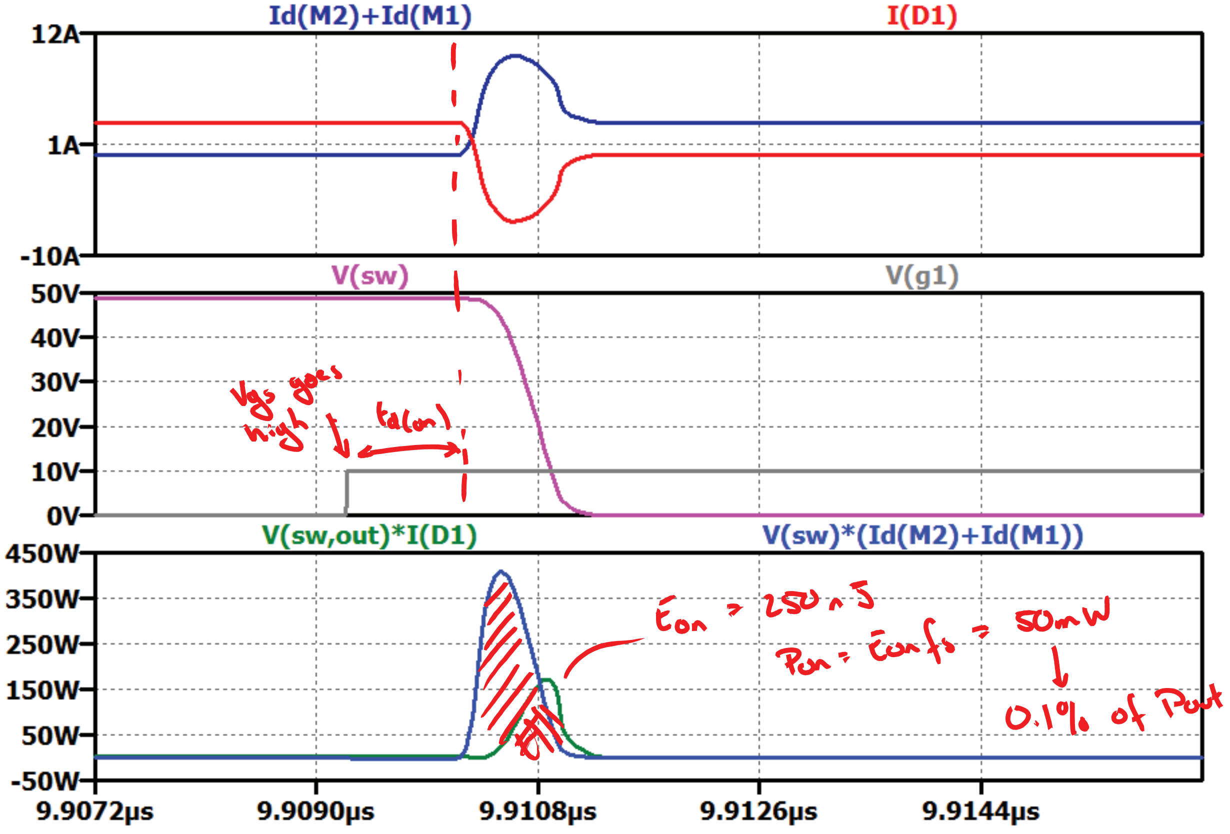
only 2% increase!

Simulation Waveforms



spike still here!

Switching Transition – FET turn ON



V_{gs} goes high

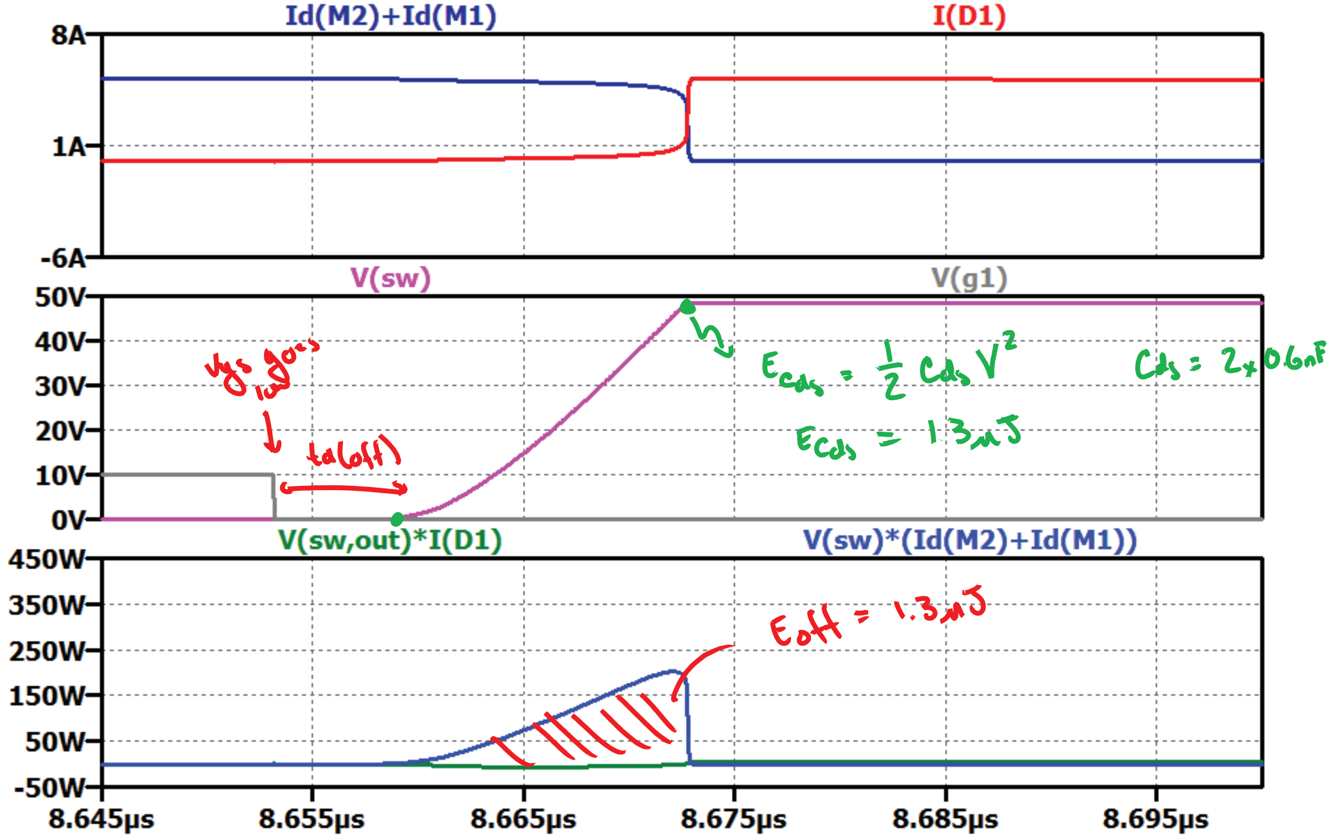
$t_{d(on)}$

$E_{on} \approx 250nJ$

$P_{on} = E_{on} f_s \approx 50mW$

0.1% of P_{out}

Switching Transition – FET turn OFF



V_{gs} goes low

$t_{d(off)}$

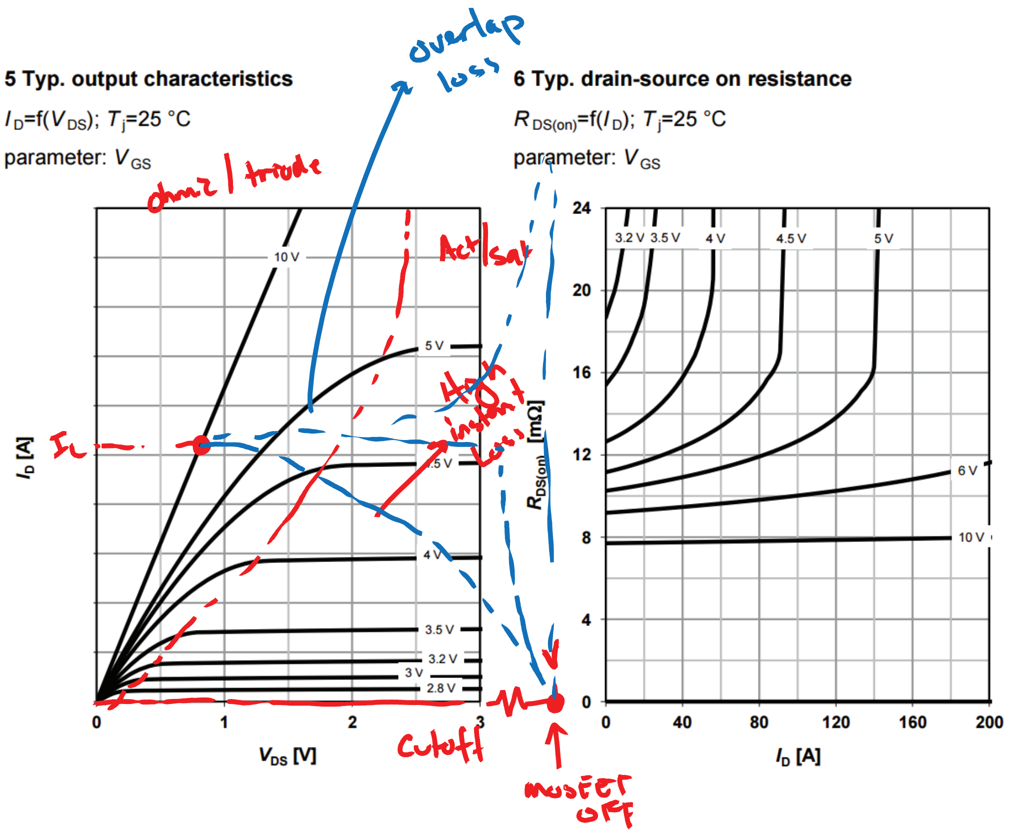
$E_{cds} = \frac{1}{2} C_{ds} V^2$

$C_{ds} = 2 \times 0.6nF$

$E_{cds} = 1.3\mu J$

$E_{off} = 1.3\mu J$

MOSFET Switching Behaviors (1) – static


5 Typ. output characteristics

$I_D=f(V_{DS})$; $T_j=25$ °C

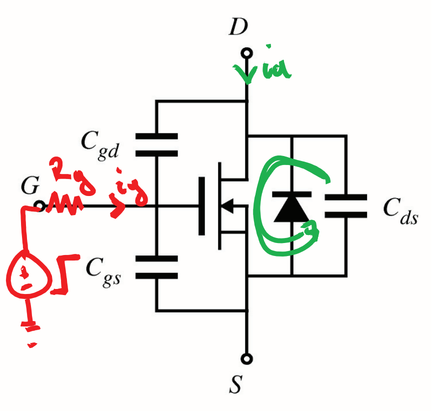
parameter: V_{GS}

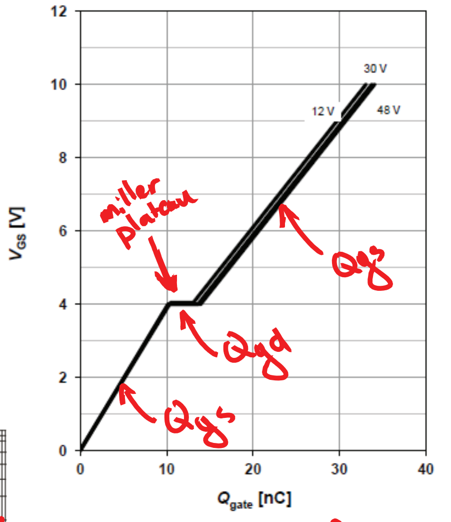
6 Typ. drain-source on resistance

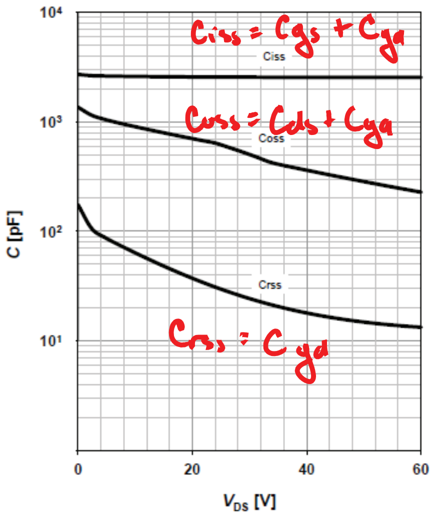
$R_{DS(on)}=f(I_D)$; $T_j=25$ °C

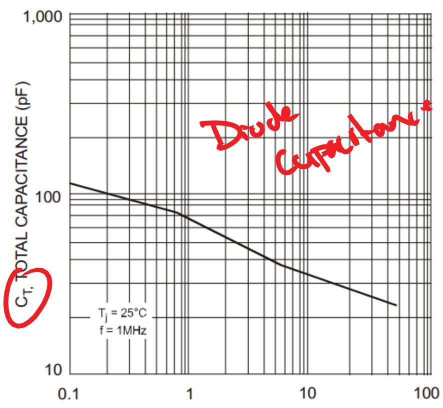
parameter: V_{GS}

MOSFET Stored Charge (2) – dynamic

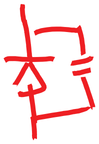








$Q_{gate} = Q_g = \int i_g \, dv_{gs}$



$C_j = C_D$

Device Capacitances – FET Turn Off

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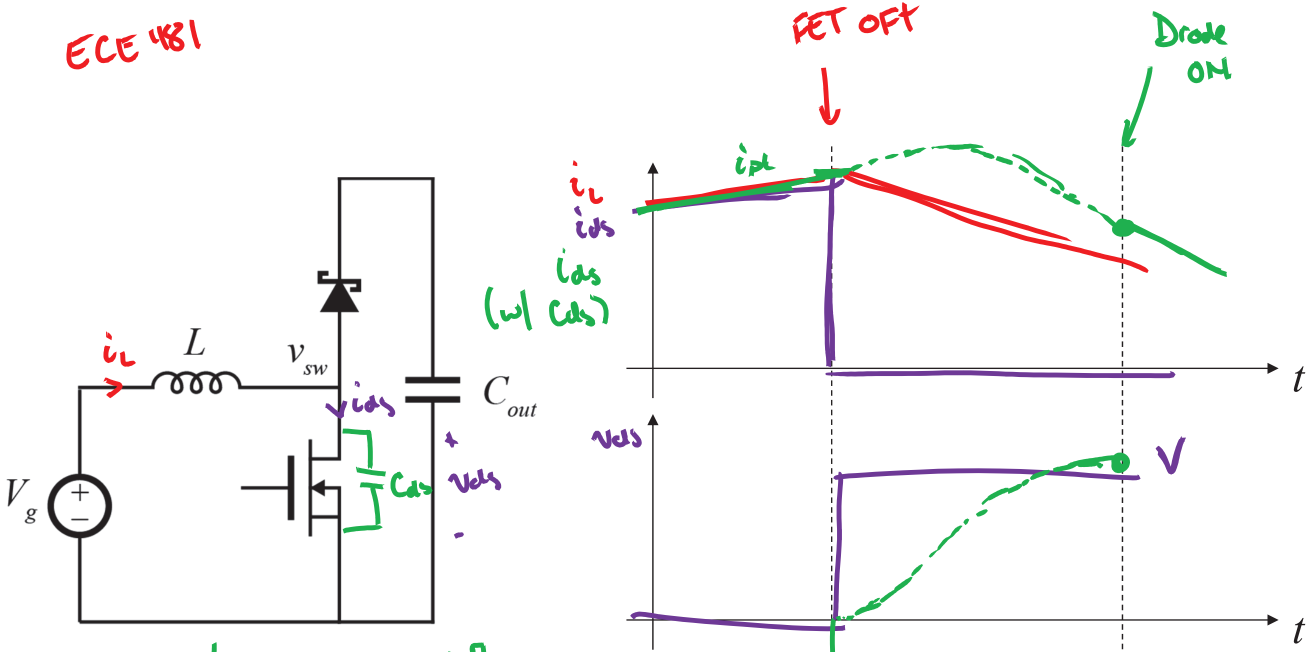

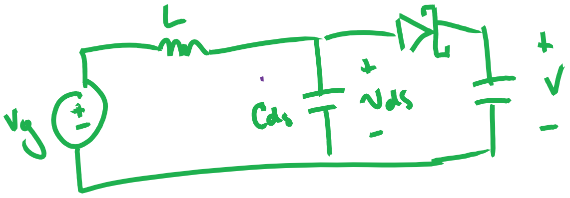

$i_L(0) = i_{pk}$

$V_{ds}(0) = 0$