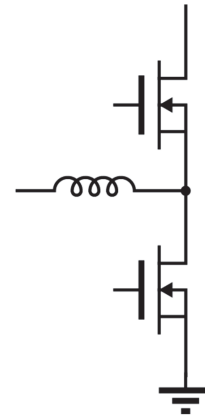# Synchronous Switching
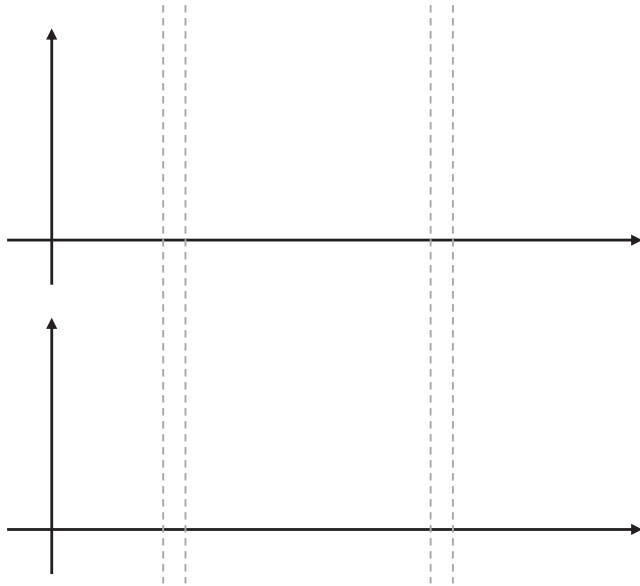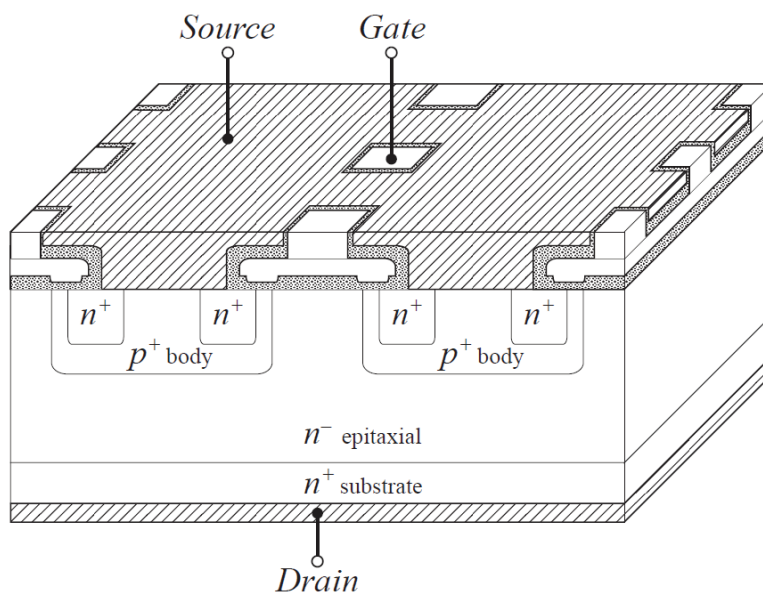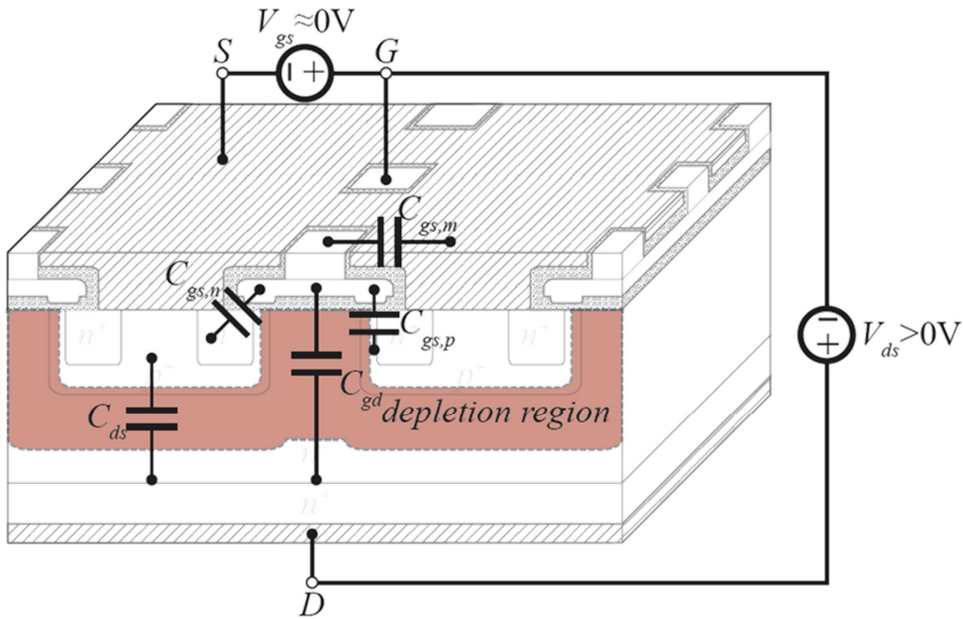
MOSFET Cross Section

MOSFET Depletion Capacitance
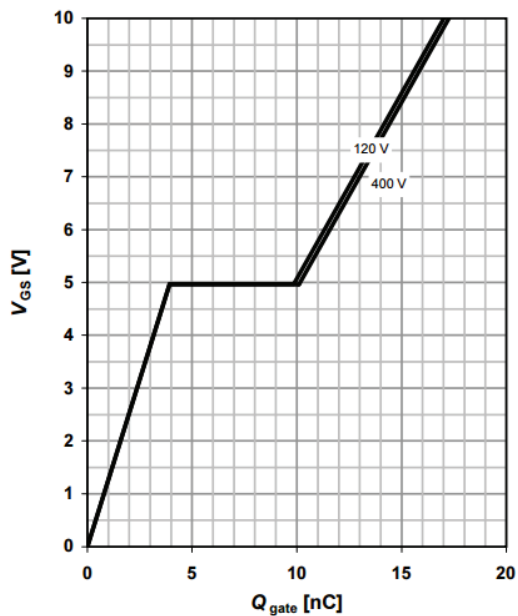
Gate Charge
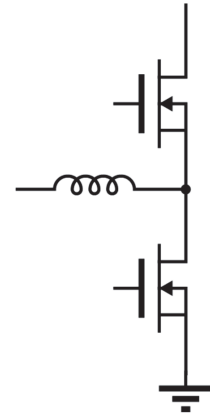
9 Typ. gate charge

V_{GS}=f(Q_{gate}); I_D=5.2 A pulsed
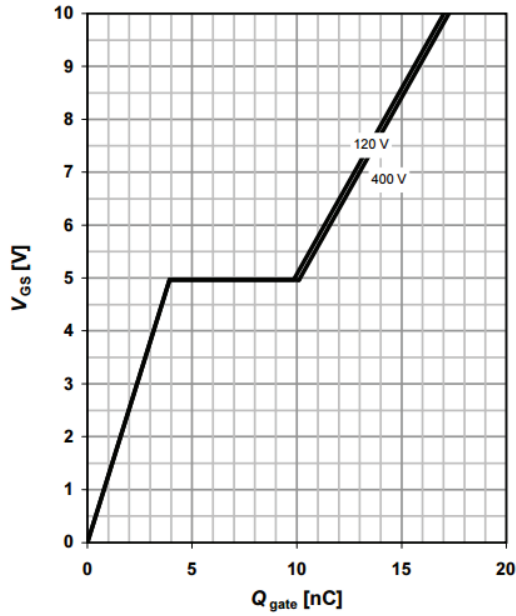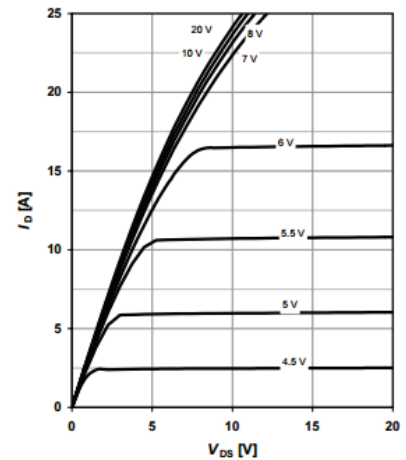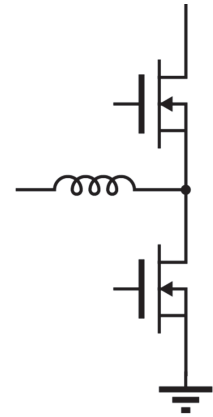
parameter: V_{DD}

Overlap Time

9 Typ. gate charge

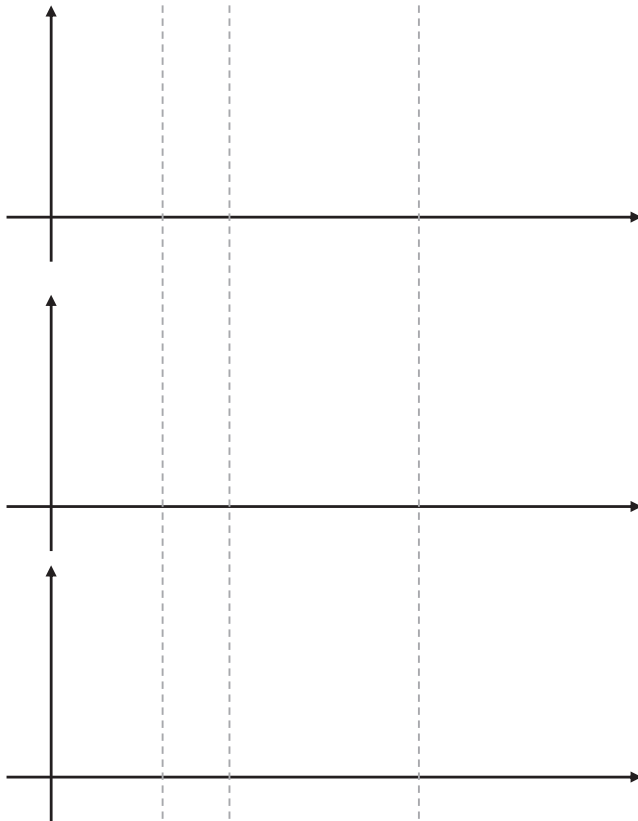$V_{GS}=f(Q_{gate})$; $I_D=5.2$ A pulsed

parameter: V_{DD}

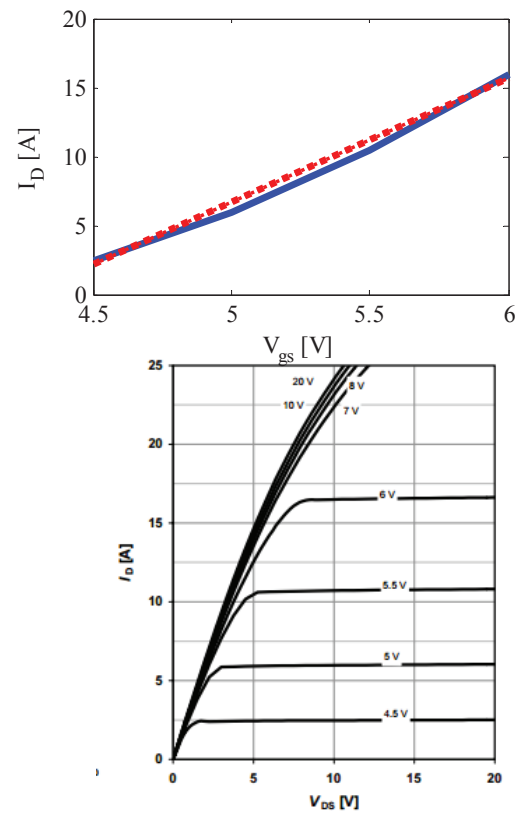| Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=0.34$ mA	2.5	3	3.5	
Gate resistance	R_G	$f=1$ MHz, open drain	-	1.8	-	Ω

FET Turn-On

Device Transconductance

Example Simulation

```
.ic V(g) = 0
.tran 0 50n 0 1p
```
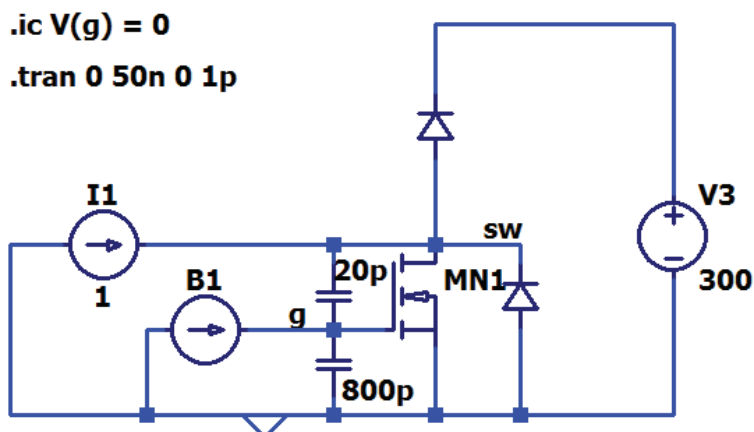


```
I=IF(V(g)<10,1,0)
.model myD D(n=.01)
.model testFET VDMOS(Rg=.1 Rd=0 Rs=0 Vto=3 Kp=9 Cgdmax=0p
+ Cgdmin=0p Cgs=0p Cjo=1.5f Is=26p Rb=0m  Vds=600 Ron=385m Qg=0n)
```

Simulation Waveforms – Turn On