go atlas

set vstart = 0

set vstop = 15

set vinc = .5

set index=1

set light=1e-5

mesh width=100 ^diag.flip

x.m l=0 s=0.2

x.m l=0.5 s=0.2

x.m l=1.0 s=0.1

x.m l=3 s=0.25

x.m l=4 s=0.25

x.m l=6 s=0.1

x.m l=9 s=0.75

y.m l=-5 s=1

y.m l=0.2 s=0.2

y.m l=0.5 s=0.01

y.m l=0.5267 s=0.0025

y.m l=0.75 s=0.1

y.m l=1.0 s=0.05

y.m l=2.0 s=0.25

y.m l=3.0 s=3

y.m l=20 s=3

region num=1 x.min=0.5 x.max=8.5 y.max=0.5267 mat=AlGaN x.comp=0.25

region num=2 x.min=0.0 x.max=9.0 y.min=-5 y.max=0.5 mat=nitride insulator

region num=3 x.min=0.5 x.max=8.5 y.min=0.5267 y.max=1 mat=GaN donors=1e15 substrate

region num=4 x.min=0.0 x.max=9.0 y.min=1.0 y.max=2.0 mat=GaN

region num=5 x.min=0.0 x.max=9.0 y.min=2.0 y.max=20.0 mat=sapphire insulator

elec num=1 name=source x.min=0 x.max=1 y.min=-5 y.max=1

elec num=2 name=drain x.min=6 x.max=9 y.min=-5 y.max=1

elec num=3 name=gate x.min=3 x.max=4 y.min=0.2 y.max=0.5

elec num=4 substrate

contact name=gate work=5.1

contact name=source work=4.31

contact name=drain work=4.31

models k.p print srh

model lat.temp

mobility FMCT.N Gansat.N

model polarization calc.strain polar.scale=0.75

model region=1 pch.elec

interface neutralize x.min=3 x.max=4 y.min=0.48 y.max=0.52

thermcontact num=1 y.min=20 y.max=20 ext.temp=300 alpha=5000

output con.band val.band charge polar.charge band.par e.mobility

##############################################################

save outfile=mainhemt.str

#### OFF state:

solve vgate=-0.05

solve name=gate vstep=-0.05 vfinal=-2

solve name=gate vstep=-0.5 vfinal=-8

save outfile=mainhemt\_Vg-8V\_Vd0V.str

load infile=mainhemt\_Vg-8V\_Vd0V.str master

solve previous

solve vdrain=0.0 vstep=0.5 vfinal=5 name=drain

log outfile=mainhemt\_Vds\_5V.log

solve vgate=-8

solve vstep=0.5 vfinal=-7.0 name=gate

solve vstep=0.2 vfinal= 0.0 name=gate

## Transconductance (dId/dVg):

extract init infile="mainhemt\_Vds\_5V.log"

extract name="gm" deriv(v."gate", i."drain"/10) outfile="mainhemt\_gm\_Vds\_5V.dat"

log off

tonyplot mainhemt\_gm\_Vds\_5V.dat

############################################################