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

# flip Chip structure

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

go atlas simflags="-80"

set vstart = 0

set vstop = 15

set vinc = .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=-20 s=3

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

region num=6 x.min=0.0 x.max=9.0 y.min=-20 y.max=-5 mat=AlN

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

method newton trap maxtraps=25

solve init

save outf=ganfetex14\_0.str

solve previous

solve vdrain=0.01

solve vdrain=0.1

solve vdrain=1

solve vstep=1 name=drain vfinal=5

solve name=gate vfinal=-10 vstep=-0.5

log outf=ganfetex14\_0.log

solve name=gate vfinal=1 vstep=0.25

log off

solve init

solve vgate=-3

log outf=ganfetex14\_1.log

solve name=drain vdrain=$vstart vfinal=$vstop vstep=$vinc

log off

#

solve init

solve vgate=-2

log outf=ganfetex14\_2.log

solve name=drain vdrain=$vstart vfinal=$vstop vstep=$vinc

log off

solve init

solve vgate=-1

log outf=ganfetex14\_3.log

solve name=drain vdrain=$vstart vfinal=$vstop vstep=$vinc

log off

#

solve init

solve vgate=0

log outf=ganfetex14\_4.log

solve name=drain vdrain=$vstart vfinal=$vstop vstep=$vinc

log off

save outf=ganfetex14\_1.str

log outf=ganfetex14\_5.log master gains s.params inport=gate outport=drain

solve ac freq=10 fstep=10 mult.f nfstep=7

solve ac freq=1e9

solve ac freq=2e9 fstep=2e9 nfstep=3

solve ac freq=1e10 fstep=5e9 nfstep=8

log off

#Transient simualtion (Gate lag)

solve init

solve vdrain=0.01

solve vdrain=0.1

solve vdrain=1

solve vstep=1 name=drain vfinal=5

solve name=gate vfinal=-10 vstep=-0.5

LOG outf=ganfetex14\_6.log

solve Vgate=0 ramptime=1e-8 dt=5e-10 tstop=1e-8

solve dt=1e-9 tstop=1e-7

solve dt=1e-8 tstop=1e-6

solve dt=1e-7 tstop=1e-5

solve dt=1e-6 tstop=1e-4

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

# Normal structure

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

go atlas simflags="-80"

set vstart = 0

set vstop = 15

set vinc = .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

method newton trap maxtraps=25

# idvg curves

solve init

save outf=ganfetex14\_2.str

solve previous

solve vdrain=0.01

solve vdrain=0.1

solve vdrain=1

solve vstep=1 name=drain vfinal=5

solve name=gate vfinal=-10 vstep=-0.5

log outf=ganfetex14\_7.log

solve name=gate vfinal=1 vstep=0.25

log off

solve init

solve vgate=-3

log outf=ganfetex14\_8.log

solve name=drain vdrain=$vstart vfinal=$vstop vstep=$vinc

log off

#

solve init

solve vgate=-2

log outf=ganfetex14\_9.log

solve name=drain vdrain=$vstart vfinal=$vstop vstep=$vinc

log off

solve init

solve vgate=-1

log outf=ganfetex14\_10.log

solve name=drain vdrain=$vstart vfinal=$vstop vstep=$vinc

log off

#

solve init

solve vgate=0

log outf=ganfetex14\_11.log

solve name=drain vdrain=$vstart vfinal=$vstop vstep=$vinc

log off

save outfile=ganfetex14\_3.str

log outf=ganfetex14\_12.log master gains s.params inport=gate outport=drain

solve ac freq=10 fstep=10 mult.f nfstep=7

solve ac freq=1e9

solve ac freq=2e9 fstep=2e9 nfstep=3

solve ac freq=1e10 fstep=5e9 nfstep=8

log off

#Transient simualtion (Gate lag)

solve init

solve vdrain=0.01

solve vdrain=0.1

solve vdrain=1

solve vstep=1 name=drain vfinal=5

solve name=gate vfinal=-10 vstep=-0.5

LOG outf=ganfetex14\_13.log

solve Vgate=0 ramptime=1e-8 dt=5e-10 tstop=1e-8

solve dt=1e-9 tstop=1e-7

solve dt=1e-8 tstop=1e-6

solve dt=1e-7 tstop=1e-5

solve dt=1e-6 tstop=1e-4

tonyplot ganfetex14\_0.str ganfetex14\_2.str -set ganfetex14\_0.set

tonyplot -overlay ganfetex14\_0.log ganfetex14\_7.log -set ganfetex14\_1.set

tonyplot -overlay ganfetex14\_1.log ganfetex14\_2.log ganfetex14\_3.log ganfetex14\_4.log ganfetex14\_8.log ganfetex14\_9.log ganfetex14\_10.log ganfetex14\_11.log -set ganfetex14\_2.set

tonyplot -overlay ganfetex14\_5.log ganfetex14\_12.log -set ganfetex14\_3.set

tonyplot -overlay ganfetex14\_6.log ganfetex14\_13.log -set ganfetex14\_4.set

tonyplot ganfetex14\_1.str ganfetex14\_3.str -set ganfetex14\_5.set