UTBNTFET CODE IN SLIVACO

```
go atlas simflags=" -P 16"

mesh space.mult=2.0

x.mesh loc=-0.020 spac=0.0001
x.mesh loc=-0.015 spac=0.001
x.mesh loc=-0.010 spac=0.001
x.mesh loc=-0.005 spac=0.001
x.mesh loc=-0.003 spac=0.001
x.mesh loc=-0.002 spac=0.0001
x.mesh loc=0.000 spac=0.0001
x.mesh loc=0.003 spac=0.0001
x.mesh loc=0.005 spac=0.001
x.mesh loc=0.010 spac=0.001
x.mesh loc=0.015 spac=0.001
x.mesh loc=0.020 spac=0.001
x.mesh loc=0.030 spac=0.001
x.mesh loc=0.035 spac=0.001
x.mesh loc=0.037 spac=0.0001
x.mesh loc=0.040 spac =0.0001
x.mesh loc=0.043 spac=0.0001
x.mesh loc=0.045 spac=0.001
x.mesh loc=0.050 spac=0.001
x.mesh loc=0.055 spac=0.001
x.mesh loc=0.060 spac=0.0001

y.mesh loc=-0.003 spac=0.0001
y.mesh loc=-0.002 spac=0.0001
y.mesh loc=-0.001 spac=0.0001
y.mesh loc=0.000  spac=0.0001
```

```
y.mesh loc=0.001 spac=0.001
y.mesh loc=0.004 spac=0.0001
y.mesh loc=0.005  spac=0.001
y.mesh loc=0.008  spac=0.001
y.mesh loc=0.010 spac=0.001
y.mesh loc=0.015 spac=0.0001
#y.mesh loc=0.035 spac=0.001
#y.mesh loc=0.040 spac=0.0001

qtx.mesh loc=-0.015 spac=0.001
qtx.mesh loc=0.035 spac=0.001
qtx.mesh loc=0.030 spac=0.001
qtx.mesh loc=0.055 spac=0.001
qty.mesh loc=0.000 spac=0.001
qty.mesh loc=0.004  spac=0.001

#region
region number=1 x.min=-0.020 x.max=0.000 y.min=0.000 y.max=0.004 material=silicon
region number=2 x.min=0.000 x.max=0.040 y.min=0.000 y.max=0.004 material=silicon
region number=3 x.min=0.040 x.max=0.060 y.min=0.000 y.max=0.004 material=silicon
region number=4 x.min=-0.020 x.max=0.000 y.min=-0.003 y.max=0.000 material=si3N4
region number=5 x.min=0.000 x.max=0.040 y.min=-0.003 y.max=0.000 material=sio2
region number=6 x.min=0.040 x.max=0.060 y.min=-0.003 y.max=0.000 material=si3N4
region number=7 x.min=-0.020 x.max=0.060 y.min=0.004 y.max=0.015 material=sio2
region number=8 x.min=0.00 x.max=0.002 y.max=0.00 material=hfo2
region number=8 x.min=0.038 x.max=0.040 y.max=0.00 material=hfo2
region number =8 x.min=0.00 x.max=0.040 y.min=-0.001 y.max=0.00 material=hfo2

#region number=8 x.min=-0.020 x.max=0.070 y.min=0.008 y.max=0.009 material=silicon
```

```
#elctrode
electrode name=drain number=1 x.min=0.060 x.max=0.060 y.min=0.00 y.max=0.004
electrode name=source number=2 x.min=-0.020 x.max=-0.020 y.min=0.00 y.max=0.004
electrode name=gate number=3 x.min=0.00 x.max=0.040 y.min=-0.003 y.max=-0.003

#doping
doping uniform conc=1e20 p.type direction=y regions=1
doping uniform conc=1e15 n.type direction=y regions=2
doping uniform  conc=5e10 n.type direction=y regions=3

contact name=drain neutral
contact name=source neutral
contact name=gate workfunction=4.45



material material= silicon me.tunnel=0.20 mh.tunnel=0.24

models cvt srh bgn FERMI
models bbt.nonlocal bbt.nlderivs qtunn.dir=1



method newton carrier=2 trap itlimit=50 atrap=0.5 maxtraps=10 \
autonr nrcriterion =0.1 tol.time=0.005 dt.min=1e-25


solve init
solve vdrain=0.01
solve vdrain=0.0 vstep=.05 vfinal=1.0 name=drain
```

```
log outf=tunnel_si_basic.log

solve vgate=-0.5 vstep=-0.1 vfinal=0.0 name=gate ac freq=1e6
solve vgate=0.0 vstep=0.1 vfinal=1.5 name=gate ac freq=1e6



output e.field recombination band.param con.band  val.band e.mobility ex.velocity \
      ey.velocity e.velocity impact.i flowlines charge j.drift j.total j.diffusion

save outf = ntfet.str
tonyplot tunnel_si_basic.log ntfet.str


extract name="vt"(xintercept(maxslope(curve(abs(v."gate"),abs(i."drain"))))- abs(ave(v."drain"))/2.0)

extract name="subvt"1.0/slope(maxslope(curve(abs(v."gate"),log10(abs(i."drain")))))

quit
```