

## BSIMSOI4.0 beta Version Bug Fixes

	Description of Bug	Involved C-file	Bug Reporter
1	Calculation of intrinsic input resistance for RF	b4soild.c	Bo Hu (Univ. of Washington), Peter Watts (MIT LL)
2	Update of phi in each temperature iteration	b4soild.c	Richard Williams, Joe Watss (IBM)
3	Adding frbody as a model parameter	b4soild.c	Judy Ann (AMD), Jung-Suk, Goo (AMD), Richard Williams, (IBM)
4	Rename of gm/ids in b4soi.c	b4soi.c	Gediminas Paulavicius (Zenasis)
5	Check of parameter rds0	b4check.c	Gediminas Paulavicius (Zenasis)
6	Initialization of Vgs	b4soild.c	Gediminas Paulavicius (Zenasis)
7	Uninitialized qjs, qjd, here->B3SOIqde/qse, here->B3SOIgcse/gcde at the case of ChargeComputattionNeeded = 0	b4soild.c	Gediminas Paulavicius (Zenasis)
8	Uninitialized variables in the case of capMod not equal to 2 and 3	b4soild.c	Gediminas Paulavicius (Zenasis)

### Explanation of Bug Fixes

#### 1. Calculation of intrinsic input resistance for RF

*Original Code (line 3533 in b3soild.c of BSIMSOI3.2)*

here->B3SOIgrcg = pParam->B3SOIxcrg1 \* (T0 + Ids);

*Fixed to:*

here->B4SOIgrcg = pParam->B4SOIxcrg1 \* (T0 + here->B4SOIidovVds);

#### 2. Update of phi in each temperature iteration

*Original Code (line 831 in b3soild.c of BSIMSOI3.2)*

phi = here->B4SOIphi;

This will cause the discontinuity issue in drain current at the starting bias point as the gate ramping from high voltage to low voltage

*Fixed to:*

phi = 2.0 \* Vtm \* log(pParam->B4SOInpeak / ni);

### 3. Adding frbody as a model parameter

*Original Code* (line 1454 in b3soiset.c of BIMSIO3.2)

```
if (!here->B3SOIfrbodyGiven)
    here->B3SOIfrbody = 1.0;
```

*Fixed to:*

```
if (!model->B4SOIfrbodyGiven)
    model->B4SOIfrbody = 1;
```

```
if (!here->B4SOIfrbodyGiven)
    here->B4SOIfrbody = model->B4SOIfrbody;
```

### 4. Rename of gm/ids in b4soi.c

*Original code* (line 48 b3soi.c of BSIMSIO3.2)

```
OP( "gm/ids", B3SOI_GMID, IF_REAL, "Gm/Ids"),
```

*Fixed to:*

```
OP( "gmids", B4SOI_GMID, IF_REAL, "Gm/Ids"),
```

### 5. Check of parameter rds0

*Original code* (line 389 in b3soicheck.c of BSIMSIO3.2)

```
else if ((pParam->B3SOIrd0 > 0.0) && (pParam->B3SOIrd0 < 0.001))
```

*Fixed to:*

```
else if (pParam->B4SOIrd0 < 0.001)
```

### 6. Initialization of Vgs

*Original code* (line 460 in b3soild.c in BSIMSIO3.2)

```
vgs = model->B4SOItype*0.1 + here->B4SOIvth0;
```

*Fixed to:*

```
vgs = model->B4SOItype * here->B4SOIvth0 + 0.1;
```

### 7. Uninitialized qjs, qjd, here->B3SOIqde/qse, here->B3SOIgcse/gcde at the case of ChargeComputattionNeeded = 0

*Original code*

Qjs qjd, here->B3SOIqde/qse, here->B3SOIgcse/gcde are not initialized at the case of ChargeComputattionNeeded = 0

*Fixed to:*

```
else {
    qjs = qjd = 0.0;
    here->B4SOIqse = here->B4SOIqde = 0.0;
    here->B4SOIgcse = here->B4SOIgcde = 0.0;
}
```

## 8. Uninitialized variables in the case of capMod not equal to 2 and 3

*Original code*

Variables not initialized in the case of capMod not equal to 2 and 3

*Fixed to:*

```
else { /* v4.0 */
  Qsub0 = Qac0 = 0.0;
  qgate = qdrn = qsrc = qbody = qsub = 0.0;
  Cbg = Cbd = Cbb = 0.0;
  here->B4SOIcgggb = here->B4SOIcggb
    = here->B4SOIcgdb = 0.0;
  here->B4SOIcdggb = here->B4SOIcdgb
    = here->B4SOIcddb = 0.0;
  here->B4SOIcbggb = here->B4SOIcbgb
    = here->B4SOIcbdb = 0.0;
}
```