

# Summary of Changes from BSIM-BULK107.2.0 Beta0\_2 to BSIM-BULK107.2.0 Beta 1:

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## A. Summary of bug fixes:

1. **2023bug8(ADI):** Removing the redundant 0V source in TNOIMOD=0.

## B. Description of bug fixes:

### 1. 2023bug8(ADI): Removing the redundant 0V source in TNOIMOD=0.

- In BSIM-BULK107.2.0 Beta0\_2, internal node N1 is tied to ground with a 0V voltage source as shown below:

```
4546 case (TNOIMOD)
4547 0: begin
4548   QSi = -NF * Weff * Leff * Cox * Vt * Qs;
4549   QDi = -NF * Weff * Leff * Cox * Vt * Qd;
4550   T0 = ueff * abs(QSi + QDi);
4551   T1 = T0 * Rdsi + Leff * Leff;
4552   Gtnoi = (T0 / T1) * NTNOI;
4553   sidn = Nt * Gtnoi;
4554   I(di, si) <+ white_noise(MULT_I * sidn, "id");
4555   V(N1) <+ 0.0;
4556 end
```

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- Outside the “case (TNOIMOD)” we have following highlighted lines which provide 1-ohm resistors in order to ground the two internal nodes N2 and N1 due to definition “branch (N1) NR;”

```
4546 case (TNOIMOD)
4547 0: begin
4557 1: begin
4597 endcase
4598 I(N2) <+ V(N2);
4599 I(NR) <+ V(NR);
```

- Since we already have a resistor tying N1 to ground, and no other sources on N1 in TNOIMOD=0, there is no need for adding explicit 0V source.
- In some simulators, 0V source adds an extra row to the circuit matrix, for the current through the source. Therefore, in BSIM-BULK107.2.0 Beta 1, the line “V(N1) <+ 0.0;” is removed in TNOIMOD=0.

```

4546 case (TNOIMOD)
4547   0: begin
4548       QSi  = -NF * Weff * Leff * Cox * Vt * Qs;
4549       QDi  = -NF * Weff * Leff * Cox * Vt * Qd;
4550       T0   = ueff * abs(QSi + QDi);
4551       T1   = T0 * Rdsi + Leff * Leff;
4552       Gtnoi = (T0 / T1) * NTNOI;
4553       sidn  = Nt * Gtnoi;
4554       I(di, si) <+ white_noise(MULT_I * sidn, "id");
4555   end
4556   1: begin
4596 endcase
4597 I(N2) <+ V(N2);
4598 I(NR) <+ V(NR);

```

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