BSIM 4.6.5 Bug Report

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Bugfix Assistance:
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BSIM4.6.5 Bug Fix

- **Source and Drain diode current shows unphysical and high values for Aseff=Pseff=Adeff=Pdeff=0, although it shows correct prediction for positive values of Aseff, Pseff, Adeff and Pdeff.**

- **Action:**

  - **If Aseff, Pseff, Adeff, Pdeff are negative, their values are set to '0' .**

  - **For Aseff && Pseff = 0, source side diode is turned off by setting SourceSaturationCurrent=0.0**

  - **For Adeff && Pdeff = 0, drain side diode is turned off by setting DrainSaturationCurrent=0.0**

    (Code with red font is replaced by that with blue.)

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if (here->BSIM4sourcePerimeterGiven)   [Source side]

{ if (model->BSIM4perMod == 0)

here->BSIM4Pseff = here->BSIM4sourcePerimeter;

 else

here->BSIM4Pseff = here->BSIM4sourcePerimeter

- pParam->BSIM4weffCJ * here->BSIM4nf;

} b4temp.c (1742-1748)

if (here->BSIM4sourcePerimeterGiven)   [Source side]

{ if (here->BSIM4sourcePerimeter == 0.0)

here->BSIM4Pseff = 0.0;

else if (here->BSIM4sourcePerimeter < 0.0)

{ printf("Warning: Source Perimeter is specified as negative, it is set to zero.\n");

here->BSIM4Pseff = 0.0;}

else

{ if (model->BSIM4perMod == 0)

here->BSIM4Pseff = here->BSIM4sourcePerimeter;

Else

here->BSIM4Pseff = here->BSIM4sourcePerimeter - pParam->BSIM4weffCJ * here->BSIM4nf;

}

}

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if (here->BSIM4drainPerimeterGiven)   [Drain side]

{ if (model->BSIM4perMod == 0)

here->BSIM4Pdeff = here->BSIM4drainPerimeter;

 else

here->BSIM4Pdeff = here->BSIM4drainPerimeter

-pParam->BSIM4weffCJ * here->BSIM4nf;

} b4temp.c (1758-1763)

if (here->BSIM4drainPerimeterGiven)   [Drainside]

{ if (here->BSIM4drainPerimeter == 0.0)

here->BSIM4Pdeff = 0.0;

else if (here->BSIM4drainPerimeter < 0.0)

{ printf("Warning: Drain Perimeter is specified as negative, it is set to zero.\n");

here->BSIM4Pdeff = 0.0;}

else

{ if (model->BSIM4perMod == 0)

here->BSIM4Pdeff = here->BSIM4drainPerimeter;

Else

here->BSIM4Pdeff = here->BSIM4drainPerimeter - pParam->BSIM4weffCJ * here->BSIM4nf;

}

}

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if ((here->BSIM4Aseff <= 0.0) && (here->BSIM4Pseff <= 0.0))   [Source side]

    {   SourceSatCurrent = 1.0e-14;

    }   b4ld.c (664-666), b4temp.c (1854-1856)

if ((here->BSIM4Aseff <= 0.0) && (here->BSIM4Pseff <= 0.0))   [Source side]

    {   SourceSatCurrent = 0.0;

    }

if ((here->BSIM4Adeff <= 0.0) && (here->BSIM4Pdeff <= 0.0))   [Drain side]

    {   DrainSatCurrent = 1.0e-14;

    }   b4ld.c (762-764), b4temp.c (1912-1914)

if ((here->BSIM4Adeff <= 0.0) && (here->BSIM4Pdeff <= 0.0))   [Drain side]

    {   DrainSatCurrent = 0.0;

    }