cmos028fdsoi Technology

NOSO ESD NFET models

DK1.2_RF_mmW

Comparison with DK1.1_RF_mmW model(s)

Please use the bookmark to navigate

General information on NOSO models

- Maximum supply voltage is - V.
- Validity domain is defined as follows:
  - ✔ Drawn gate length varies from 48nm to 10um.
  - ✔ Drawn transistor width varies from 80nm to 10um.
  - ✔ Device temperature varies from -40 °C to 125 °C.

Output parameters definitions

- Model(s): esdnfet
  - ✔ Vt_lin : Threshold voltage defined as Vgs value for which drain current is 300e-9*M*1*W/(1*L+0+1*p_la) at Vds = 0.05V.
  - ✔ Cggmean : Average total gate capacitance for Vgs values between 0V and 1, Vds = 0V, f = 100kHz.
  - ✔ Ilin : Drain current at Vgs = 1V, Vds = 0.05V.
  - ✔ DIBL : Vt_lin - Vt_sat.
  - ✔ Cbd_off : Bulk-to-Drain capacitance at Vgs = 0V, Vds = 0V, f = 100kHz.
  - ✔ Vt_sat : Threshold voltage defined as Vgs value for which drain current is 300e-9*M*1*W/(1*L+0+1*p_la) at Vds = vds_satV.
  - ✔ Cgg_inv : Total gate capacitance at Vgs = 1V, Vds = 0V, f = 100kHz.
  - ✔ LogIoff : log10(Ioffsat).
  - ✔ Slp_sat : Sub-threshold slope at Vds = vds_satV, extracted from drain current vs. Vgs curve between its minimum and 300e-9*M*W/L.
  - ✔ Isat : Drain current at Vgs = 1V, Vds = VddV.
  - ✔ Slp_lin : Sub-threshold slope at Vds = 0.05V, extracted from drain current vs. Vgs curve between its minimum and 300e-9*M*W/L.
  - ✔ CGd_0V : Gate-to-Drain capacitance at Vgs = 0V, Vds = 0V, f = 100kHz.
  - ✔ VtGmmax : Threshold voltage at Vds = 0.05 derived from Gm max method.

esdnfet
Electrical characteristics per geometry

esdnfet @ w=150e-6, l=0.048e-6, nf=30, esu=0.2e-06, edu=0.5e-06, vbs=0, vdd=1, temp=25.0

DK1.2_RF_mmW wrt DK1.1_RF_mmW

	ESDWC	TT	ESDBC
Vt_lin [mV]	669.5 0.0mV	562.2 0.0mV	449.8 0.0mV
Ilin [mA]	4.84 0.0%	5.53 0.0%	6.05 0.0%
Slp_lin [mV/dec]	87.42 0.0%	86.14 0.0%	85 0.0%
VtGmmax [mV]	589.5 0.0mV	485.7 0.0mV	376.6 0.0mV
DIBL [mV]	98.29 0.0mV	96.61 0.0mV	94.9 0.0mV
Vt_sat [mV]	571.2 0.0mV	465.6 0.0mV	354.9 0.0mV
Isat [mA]	30.24 0.0%	43.54 0.0%	59.11 0.0%
Slp_sat [mV/dec]	78.5 0.0%	78.26 0.0%	78.09 0.0%
LogIoff [log(A)]	-9.9 -0.0%	-8.68 -0.0%	-7.33 -0.0%
CGd_0V [fF]	53.92 0.0%	54.74 0.0%	55.63 0.0%
Cgg_inv [fF]	232.4 0.0%	237.9 0.0%	242.9 0.0%
Cggmean [fF]	168.1 0.0%	179.5 0.0%	192.2 0.0%
Cbd_off [fF]	303.1 0.0%	252.6 0.0%	202 0.0%

esdnfet @ w=150e-6, l=0.048e-6, nf=30, esu=0.2e-06, edu=0.5e-06, vbs=0, vdd=1, temp=-40.0

DK1.2_RF_mmW wrt DK1.1_RF_mmW

	ESDWC	TT	ESDBC
Vt_lin [mV]	714.5 0.0mV	607.8 0.0mV	496.1 0.0mV
Ilin [mA]	5.09 0.0%	5.9 0.0%	6.48 0.0%
Slp_lin [mV/dec]	65.48 0.0%	64.78 0.0%	64.15 0.0%
VtGmmax [mV]	645.3 0.0mV	541.5 0.0mV	432.4 0.0mV
DIBL [mV]	90.76 0.0mV	89.4 0.0mV	87.96 0.0mV
Vt_sat [mV]	623.7 0.0mV	518.4 0.0mV	408.1 0.0mV
Isat [mA]	29.35 0.0%	43.78 0.0%	60.92 0.0%
Slp_sat [mV/dec]	61.41 0.0%	61.21 0.0%	61.06 0.0%
LogIoff [log(A)]	-11.01 -0.0%	-10.62 -0.0%	-9.34 -0.0%
CGd_0V [fF]	54.01 0.0%	54.84 0.0%	55.74 0.0%
Cgg_inv [fF]	234 0.0%	239.6 0.0%	244.6 0.0%
Cggmean [fF]	164.5 0.0%	176 0.0%	188.9 0.0%
Cbd_off [fF]	297 0.0%	247.5 0.0%	198 0.0%

esdnfet @ w=150e-6, l=0.048e-6, nf=30, esu=0.2e-06, edu=0.5e-06, vbs=0, vdd=1, temp=125.0

DK1.2_RF_mmW wrt DK1.1_RF_mmW

	ESDWC	TT	ESDBC
Vt_lin [mV]	583.2 0.0mV	474.9 0.0mV	361.2 0.0mV
Ilin [mA]	4.61 0.0%	5.14 0.0%	5.55 0.0%
Slp_lin [mV/dec]	125.4 0.0%	123 0.0%	121 0.0%
VtGmmax [mV]	486.3 0.0mV	382.4 0.0mV	273 0.0mV
DIBL [mV]	112.5 0.0mV	110.3 0.0mV	108.1 0.0mV
Vt_sat [mV]	470.8 0.0mV	364.6 0.0mV	253.1 0.0mV
Isat [mA]	33.36 0.0%	45.43 0.0%	59.1 0.0%
Slp_sat [mV/dec]	106.6 0.0%	106.3 0.0%	106.2 0.0%
LogIoff [log(A)]	-7.24 -0.0%	-6.29 -0.0%	-5.26 -0.0%
CGd_0V [fF]	53.8 0.0%	54.62 0.0%	55.55 0.0%
Cgg_inv [fF]	230.9 0.0%	236.1 0.0%	241 0.0%
Cggmean [fF]	175.3 0.0%	186.5 0.0%	199 0.0%
Cbd_off [fF]	315.2 0.0%	262.7 0.0%	210.1 0.0%

Annex

Conditions of simulations

The simulations were done with SBenchLSF Alpha using Eldo simulator 2018.3.

- Model esdnfet (DK1.2_RF_mmW)
  - ✔ Input Parameters
    - ✘ vds_off = vds_sat V
    - ✘ vds_cgd = 0 V
    - ✘ vds_cgg = 0 V
    - ✘ mc_sens = 0
    - ✘ vds_lin = 0.05 V
    - ✘ ivt = 300e-9 A
    - ✘ model_version = 1.1
    - ✘ ams_release = 2018.3
    - ✘ vgs_stop = vdd V
    - ✘ dlshrink_ivt = 0
    - ✘ sbenchlsf_release = Alpha
    - ✘ vds_sat = Vdd V
    - ✘ mc_nsigma = 3
    - ✘ shrink_ivt = 1

- ✘ dlshrink_tinv = 3e-9
- ✘ vgs_start = -0.5 V
- ✘ plashrink_ivt = 1
- ✘ ithslwi = 10e-9 A
- ✘ vds_cbd = 0 V
- ✘ vddmax = vdd
- ✘ mc_runs = 1000
- ✘ vstep_ivt = 0.005 V
- ✘ vgs_off = 0 V
- ✘ temp = 25 °C
- ✘ f_ext = 100k Hz
- ✘ vbs = 0 V
- ✘ vdd = 1 V
- ✘ shrink_tinv = 0.9

✔ Sweep Parameters

- ✘ temp = -40.0, 25.0, 125.0

✔ Extra parameters

- ✘ rvtnfetsb_dev = 0

● Model esdnfet (DK1.1_RF_mmW)

✔ Input Parameters

- ✘ vds_off = vds_sat V
- ✘ vds_cgd = 0 V
- ✘ vds_cgg = 0 V
- ✘ mc_sens = 0
- ✘ vds_lin = 0.05 V

- ✘ ivt = 300e-9 A
- ✘ model_version = 1.1
- ✘ ams_release = 2018.3
- ✘ vgs_stop = vdd V
- ✘ dlshrink_ivt = 0
- ✘ sbenchlsf_release = Alpha
- ✘ vds_sat = Vdd V
- ✘ mc_nsigma = 3
- ✘ shrink_ivt = 1
- ✘ dlshrink_tinv = 3e-9
- ✘ vgs_start = -0.5 V
- ✘ plashrink_ivt = 1
- ✘ ithslwi = 10e-9 A
- ✘ vds_cbd = 0 V
- ✘ vddmax = vdd
- ✘ mc_runs = 1000
- ✘ vstep_ivt = 0.005 V
- ✘ vgs_off = 0 V
- ✘ temp = 25 °C
- ✘ f_ext = 100k Hz
- ✘ vbs = 0 V
- ✘ vdd = 1 V
- ✘ shrink_tinv = 0.9

✔ Sweep Parameters

- ✘ temp = -40.0, 25.0, 125.0

- ✔ Extra parameters
  - ✘ rvtnfetsb_dev = 0