C28SOI_IO_EXT_CSF_TESTMUX1V8_-LR_EG

TRnD/CIO

IBIS Modeling Quality Report

MOS028_FDSOI

Table of Contents

1 Table of Contents **3**

2 MODELING **5**

2.1 Pin/Part Model List 5

2.2 Modeling Conditions 6

2.3 Circuit For Data Extraction 26

2.3.1 Extracting I/V Data 26

2.3.2 Extracting V/T Data 27

3 QUALITY VERIFICATION **29**

3.1 Syntax Check By IBIS Parser 29

3.2 Behaviour Verification 30

3.2.1 Verification results 31

MODELING

2.1 Pin/Part Model List

Model_Name	Model_Type	Notes
BD2_1V2	I/O	-
BD4_1V2	I/O	-
BD6_1V2	I/O	-
BD8_1V2	I/O	-
BD2_1V5_LOWEMI_0	I/O	-
BD2_1V5_LOWEMI_1	I/O	-
BD4_1V5_LOWEMI_0	I/O	-
BD4_1V5_LOWEMI_1	I/O	-
BD6_1V5_LOWEMI_0	I/O	-
BD6_1V5_LOWEMI_1	I/O	-
BD8_1V5_LOWEMI_0	I/O	-
BD8_1V5_LOWEMI_1	I/O	-
BD2_1V8_LOWEMI_0	I/O	-
BD2_1V8_LOWEMI_1	I/O	-
BD4_1V8_LOWEMI_0	I/O	-
BD4_1V8_LOWEMI_1	I/O	-
BD6_1V8_LOWEMI_0	I/O	-
BD6_1V8_LOWEMI_1	I/O	-
BD8_1V8_LOWEMI_0	I/O	-
BD8_1V8_LOWEMI_1	I/O	-

2.2 Modeling Conditions

Component Name: DummyChip_C28SOI_IO_TESTMUX1V8_LR_EG

Model Name: BD2_1V2
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.2V 1.08V 1.32V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.35125pF 1.35055pF 1.35205pF

Vinl and Vinh Values: typ/min/max
Vinl: 360.00000mV 360.00000mV 360.00000mV
Vinh: 840.00000mV 840.00000mV 840.00000mV

Test Load Settings :
Vref : 1.2V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 600.0mV

Model Name: BD4_1V2
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.2V 1.08V 1.32V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.41565pF 1.41555pF 1.41730pF

Vinl and Vinh Values: typ/min/max
Vinl: 360.00000mV 360.00000mV 360.00000mV
Vinh: 840.00000mV 840.00000mV 840.00000mV

Test Load Settings :
Vref : 1.2V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 600.0mV

Model Name: BD6_1V2
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.2V 1.08V 1.32V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.46470pF 1.46370pF 1.46710pF

Vinl and Vinh Values: typ/min/max
Vinl: 360.00000mV 360.00000mV 360.00000mV
Vinh: 840.00000mV 840.00000mV 840.00000mV

Test Load Settings :
Vref : 1.2V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 600.0mV

Model Name: BD8_1V2
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.2V 1.08V 1.32V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.53410pF 1.53230pF 1.53770pF

Vinl and Vinh Values: typ/min/max
Vinl: 360.00000mV 360.00000mV 360.00000mV
Vinh: 840.00000mV 840.00000mV 840.00000mV

Test Load Settings :
Vref : 1.2V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 600.0mV

Model Name: BD2_1V5_LOWEMI_0
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.8V 1.65V 1.95V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.36650pF 1.36620pF 1.36695pF

Vinl and Vinh Values: typ/min/max
Vinl: 630.00000mV 577.50000mV 682.50000mV
Vinh: 1.17000V 1.07250V 1.26750V

Test Load Settings :
Vref : 1.8V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 900.0mV

Model Name: BD2_1V5_LOWEMI_1
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.5V 1.35V 1.65V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.36080pF 1.36035pF 1.36140pF

Vinl and Vinh Values: typ/min/max
Vinl: 450.00000mV 405.00000mV 495.00000mV
Vinh: 1.05000V 945.00000mV 1.15500V

Test Load Settings :
Vref : 1.5V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 750.0mV

Model Name: BD4_1V5_LOWEMI_0
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.8V 1.65V 1.95V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.43080pF 1.42990pF 1.43390pF

Vinl and Vinh Values: typ/min/max
Vinl: 630.00000mV 577.50000mV 682.50000mV
Vinh: 1.17000V 1.07250V 1.26750V

Test Load Settings :
Vref : 1.8V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 900.0mV

Model Name: BD4_1V5_LOWEMI_1
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.5V 1.35V 1.65V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.42495pF 1.42485pF 1.42670pF

Vinl and Vinh Values: typ/min/max
Vinl: 450.00000mV 405.00000mV 495.00000mV
Vinh: 1.05000V 945.00000mV 1.15500V

Test Load Settings :
Vref : 1.5V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 750.0mV

Model Name: BD6_1V5_LOWEMI_0
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.8V 1.65V 1.95V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.47955pF 1.47795pF 1.48245pF

Vinl and Vinh Values: typ/min/max
Vinl: 630.00000mV 577.50000mV 682.50000mV
Vinh: 1.17000V 1.07250V 1.26750V

Test Load Settings :
Vref : 1.8V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 900.0mV

Model Name: BD6_1V5_LOWEMI_1
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.5V 1.35V 1.65V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.47375pF 1.47290pF 1.47640pF

Vinl and Vinh Values: typ/min/max
Vinl: 450.00000mV 405.00000mV 495.00000mV
Vinh: 1.05000V 945.00000mV 1.15500V

Test Load Settings :
Vref : 1.5V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 750.0mV

Model Name: BD8_1V5_LOWEMI_0
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.5V 1.35V 1.65V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.54330pF 1.54180pF 1.54670pF

Vinl and Vinh Values: typ/min/max
Vinl: 450.00000mV 405.00000mV 495.00000mV
Vinh: 1.05000V 945.00000mV 1.15500V

Test Load Settings :
Vref : 1.5V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 750.0mV

Model Name: BD8_1V5_LOWEMI_1
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.5V 1.35V 1.65V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.54330pF 1.54180pF 1.54675pF

Vinl and Vinh Values: typ/min/max
Vinl: 450.00000mV 405.00000mV 495.00000mV
Vinh: 1.05000V 945.00000mV 1.15500V

Test Load Settings :
Vref : 1.5V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 750.0mV

Model Name: BD2_1V8_LOWEMI_0
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.8V 1.65V 1.95V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.36650pF 1.36615pF 1.36665pF

Vinl and Vinh Values: typ/min/max
Vinl: 630.00000mV 577.50000mV 682.50000mV
Vinh: 1.17000V 1.07250V 1.26750V

Test Load Settings :
Vref : 1.8V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 900.0mV

Model Name: BD2_1V8_LOWEMI_1
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.8V 1.65V 1.95V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.36650pF 1.36600pF 1.36705pF

Vinl and Vinh Values: typ/min/max
Vinl: 630.00000mV 577.50000mV 682.50000mV
Vinh: 1.17000V 1.07250V 1.26750V

Test Load Settings :
Vref : 1.8V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 900.0mV

Model Name: BD4_1V8_LOWEMI_0
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.8V 1.65V 1.95V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.43075pF 1.42990pF 1.43230pF

Vinl and Vinh Values: typ/min/max
Vinl: 630.00000mV 577.50000mV 682.50000mV
Vinh: 1.17000V 1.07250V 1.26750V

Test Load Settings :
Vref : 1.8V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 900.0mV

Model Name: BD4_1V8_LOWEMI_1
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.8V 1.65V 1.95V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.43055pF 1.42985pF 1.43285pF

Vinl and Vinh Values: typ/min/max
Vinl: 630.00000mV 577.50000mV 682.50000mV
Vinh: 1.17000V 1.07250V 1.26750V

Test Load Settings :
Vref : 1.8V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 900.0mV

Model Name: BD6_1V8_LOWEMI_0
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.8V 1.65V 1.95V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.47950pF 1.47795pF 1.48230pF

Vinl and Vinh Values: typ/min/max
Vinl: 630.00000mV 577.50000mV 682.50000mV
Vinh: 1.17000V 1.07250V 1.26750V

Test Load Settings :
Vref : 1.8V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 900.0mV

Model Name: BD6_1V8_LOWEMI_1
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.8V 1.65V 1.95V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.47960pF 1.47805pF 1.48275pF

Vinl and Vinh Values: typ/min/max
Vinl: 630.00000mV 577.50000mV 682.50000mV
Vinh: 1.17000V 1.07250V 1.26750V

Test Load Settings :
Vref : 1.8V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 900.0mV

Model Name: BD8_1V8_LOWEMI_0
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.8V 1.65V 1.95V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.54910pF 1.54685pF 1.55345pF

Vinl and Vinh Values: typ/min/max
Vinl: 630.00000mV 577.50000mV 682.50000mV
Vinh: 1.17000V 1.07250V 1.26750V

Test Load Settings :
Vref : 1.8V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 900.0mV

Model Name: BD8_1V8_LOWEMI_1
Model Type: I/O

PAD Supply Voltage: typ/min/max
VDDE: 1.8V 1.65V 1.95V

Junction Temperature(Tj): typ/min/max
Tj: 25.0 125.0 -40.0

Process Setting: typ/min/max
Corner: typ worst best

Ramp R_load Value: 50.0[Ohm]

V/T Waveforms Request
R_fixture to GND and POWER termination (Rising=2 and Falling=2)
R_fixture = 50.0 Ohms

C_comp Values: typ/min/max
C_comp: 1.54910pF 1.54685pF 1.55255pF

Vinl and Vinh Values: typ/min/max
Vinl: 630.00000mV 577.50000mV 682.50000mV
Vinh: 1.17000V 1.07250V 1.26750V

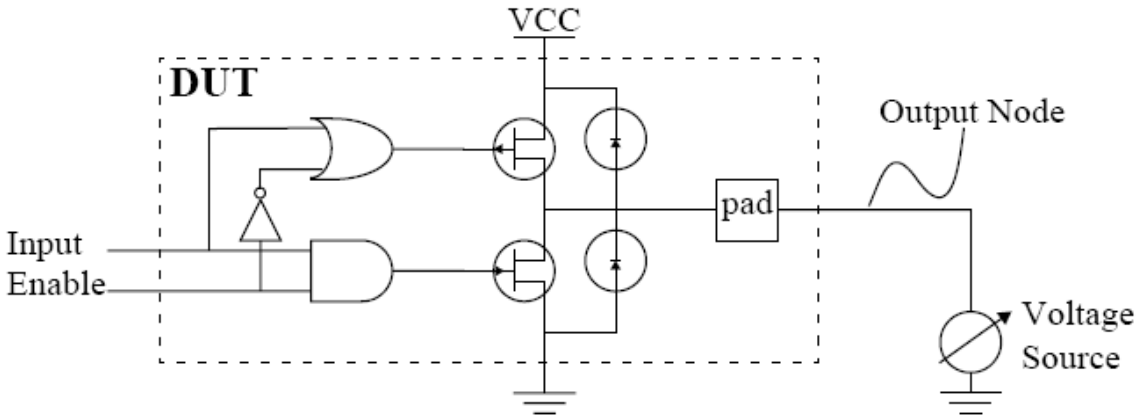
Test Load Settings :
Vref : 1.8V
Cref : 15.0pF
Rref : 1.0MOhm
Vmeas: 900.0mV

2.3 Circuit For Data Extraction

The Data is Extracted based on the following circuit

2.3.1 Extracting I/V Data

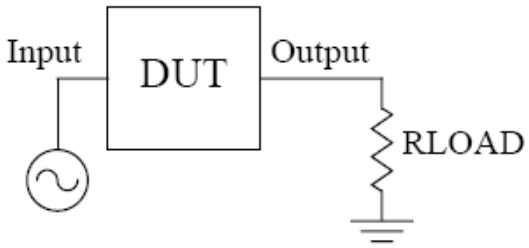
1	How I/V data was measured/extracted?	Extracted from Spice simulations.
2	What states are used for data extraction(high, low etc.)?	Depending on the I/V data.
3	Pulldown data is created from state(high, low, hi-Z).	Low
4	Pullup data is created from state.	High
5	Gnd_Clamp and Power_Clamp data are created from state.	three state



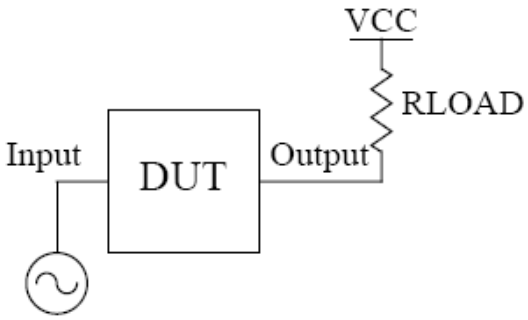
2.3.2 Extracting V/T Data

1	How V/T data was measured/extracted?	Extracted from Spice simulations.

Load resistor tied to ground



Load resistor tied to VCC



QUALITY VERIFICATION

Check	Vendor comments	Done	Not-done
All steps from checklist on NMP IBISSpecification done (Chapter 5).	Packaging data missing.	Yes	-
Simulations with SPICE buffer models and results inserted to document. Circuit given in ”NMP IBIS specification” should be used (Chapter 5.1).	input buffers not checked	Yes	-
Optional simulations with IBIS models and simulation result comparison with SPICE results.	-	Yes	-

3.1 Syntax Check By IBIS Parser

IBISCHK6 V6.0.0

Checking ./IBIS/ff28_1.15V_1.95V_m40C_ss28_0.80V_1.65V_125C/c28soi_io_testmux1v8_lr_-eg.ibs for IBIS 4.2 Compatibility...

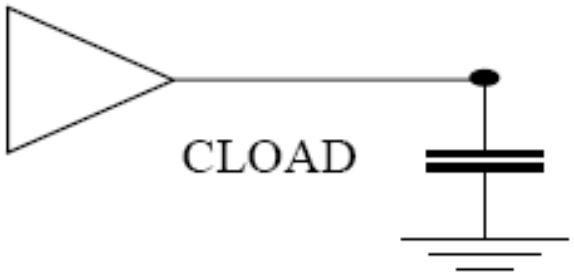
Errors : 0

File Passed

3.2 Behaviour Verification

1	Simulator used for IBIS Vs SPICE models comparison	Eldo® from Mentor Graphics®.
2	Comparison results (How well/bad results are matched?)	Good matching.

Circuit used for obtaining SPICE results:



Test load parameters used for performing the simulation for open drain models :

For Push-Pull Models :

Cell name Load Frequency
BD2_1V2 470pF 2.5MHz
BD4_1V2 470pF 2.5MHz
BD6_1V2 470pF 2.5MHz
BD8_1V2 470pF 2.5MHz
BD2_1V5_LOWEMI_0 15pF 20MHz
BD2_1V5_LOWEMI_1 15pF 10MHz
BD4_1V5_LOWEMI_0 15pF 40MHz
BD4_1V5_LOWEMI_1 15pF 20MHz
BD6_1V5_LOWEMI_0 15pF 50MHz
BD6_1V5_LOWEMI_1 15pF 25MHz
BD8_1V5_LOWEMI_0 15pF 60MHz
BD8_1V5_LOWEMI_1 15pF 30MHz
BD2_1V8_LOWEMI_0 15pF 50MHz
BD2_1V8_LOWEMI_1 15pF 25MHz
BD4_1V8_LOWEMI_0 15pF 80MHz
BD4_1V8_LOWEMI_1 15pF 40MHz

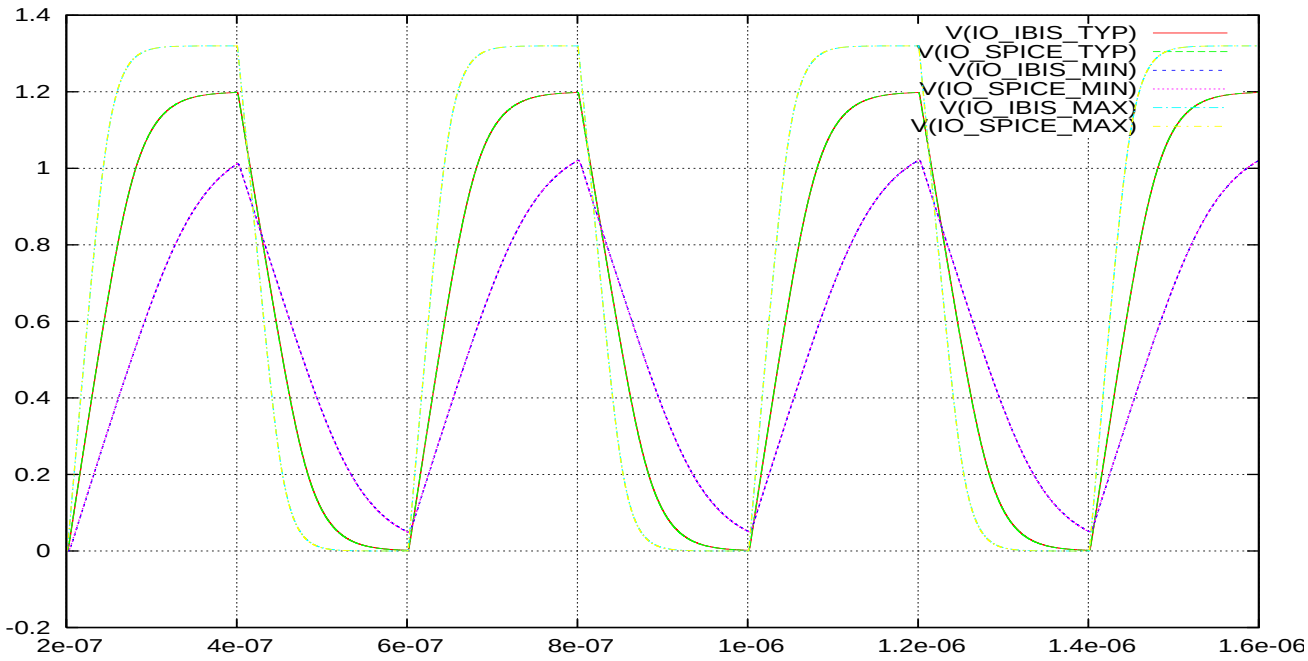
BD6_1V8_LOWEMI_0 15pF 100MHz
BD6_1V8_LOWEMI_1 15pF 50MHz
BD8_1V8_LOWEMI_0 15pF 120MHz
BD8_1V8_LOWEMI_1 15pF 60MHz

NOTE :

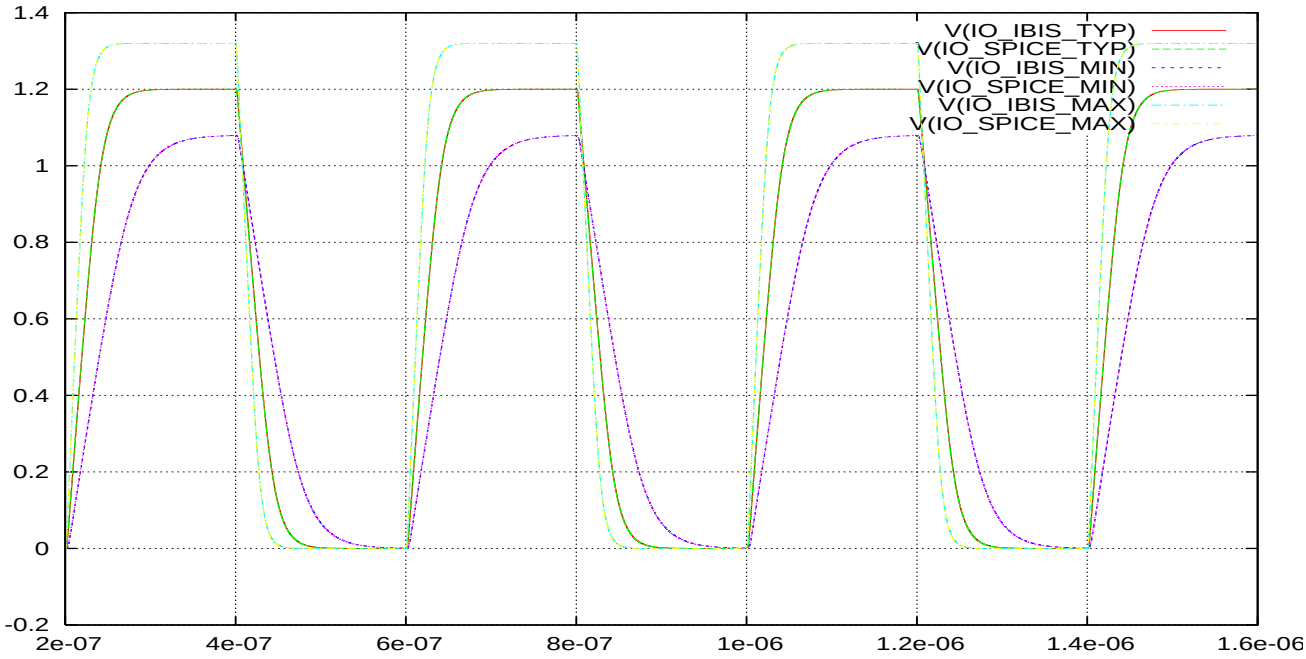
1. R̈esolution of the V/I tables should be at least 100mV. This guarantees acceptable accuracy¨
This statement is not valid.
In the V/I tables more than 100 points cannot be supported. Thus for maintaining the accuracy only the best 100 points are selected. Where there is no variation in current w.r.t voltage, there is no need to take another point.

3.2.1 Verification results

BD2_1V2



BD4_1V2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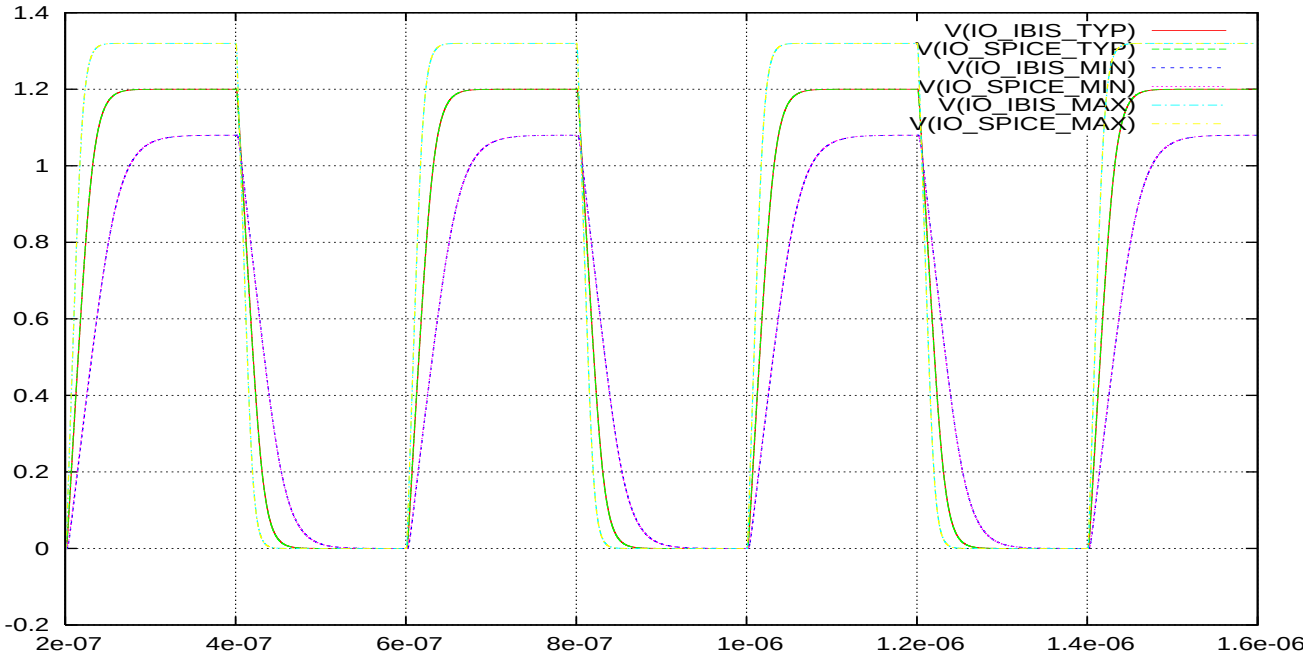
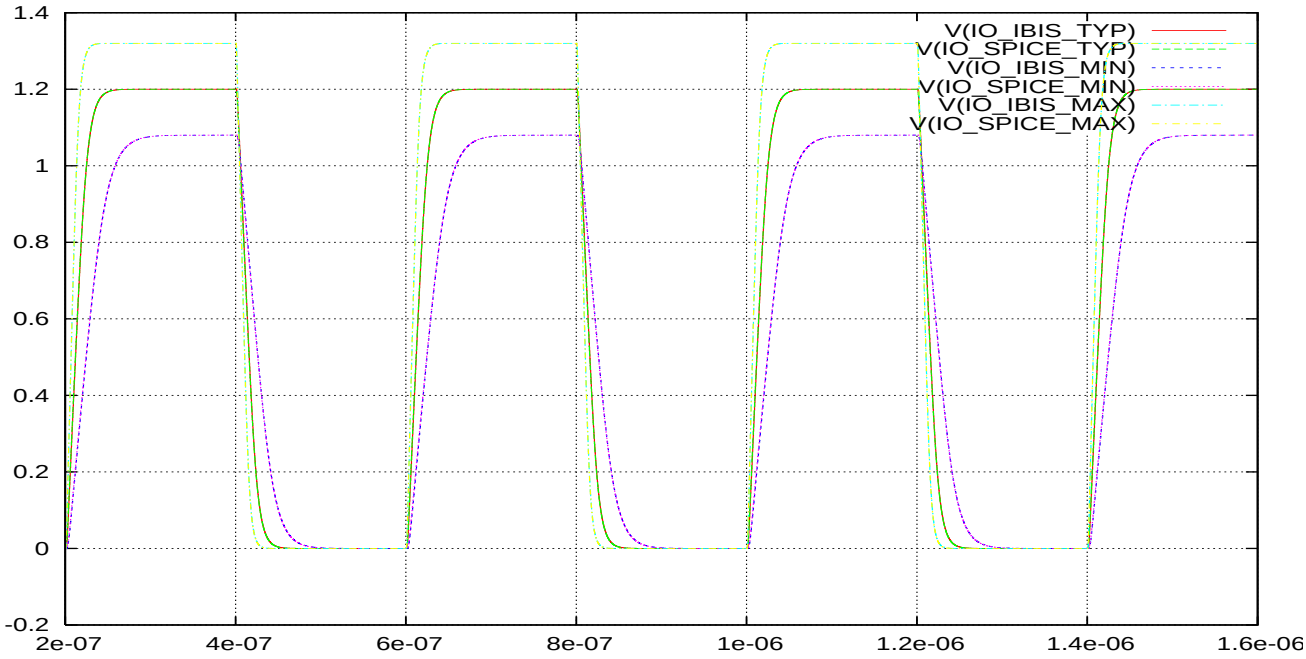
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
2e-07
4e-07
6e-07
8e-07
1e-06
1.2e-06
1.4e-06
1.6e-06
V(IO_IBIS_TYP)
V(IO_SPICE_TYP)
V(IO_IBIS_MIN)
V(IO_SPICE_MIN)
V(IO_IBIS_MAX)
V(IO_SPICE_MAX)

BD6_1V2


1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
2e-07
4e-07
6e-07
8e-07
1e-06
1.2e-06
1.4e-06
1.6e-06
V(IO_IBIS_TYP)
V(IO_SPICE_TYP)
V(IO_IBIS_MIN)
V(IO_SPICE_MIN)
V(IO_IBIS_MAX)
V(IO_SPICE_MAX)

BD8_1V2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1.2
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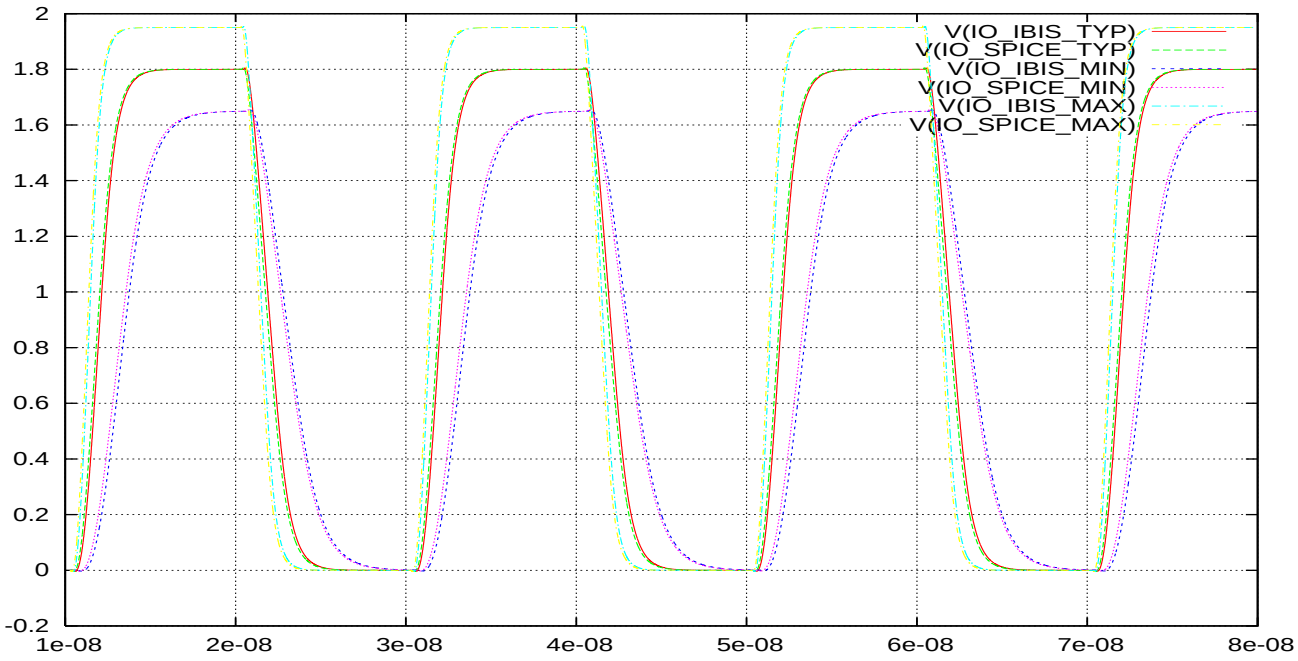
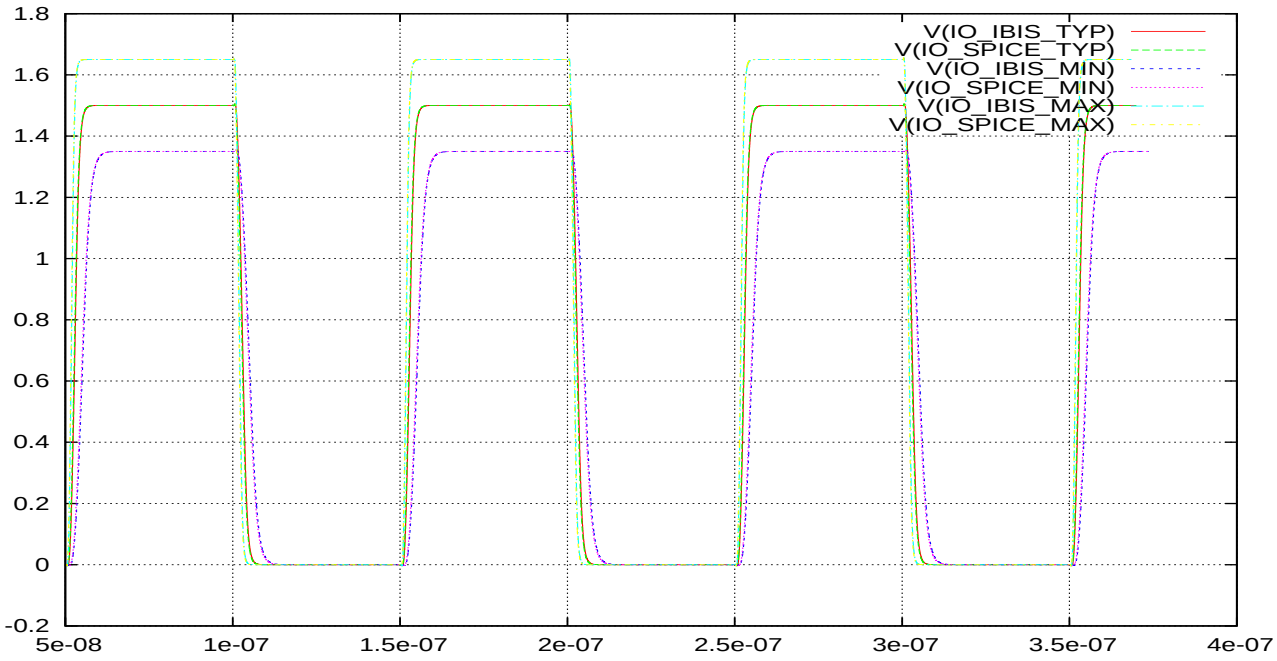
0.8
0.6
0.4
0.2
0
-0.2
2e-07
4e-07
6e-07
8e-07
1e-06
1.2e-06
1.4e-06
1.6e-06
V(IO_IBIS_TYP)
V(IO_SPICE_TYP)
V(IO_IBIS_MIN)
V(IO_SPICE_MIN)
V(IO_IBIS_MAX)
V(IO_SPICE_MAX)

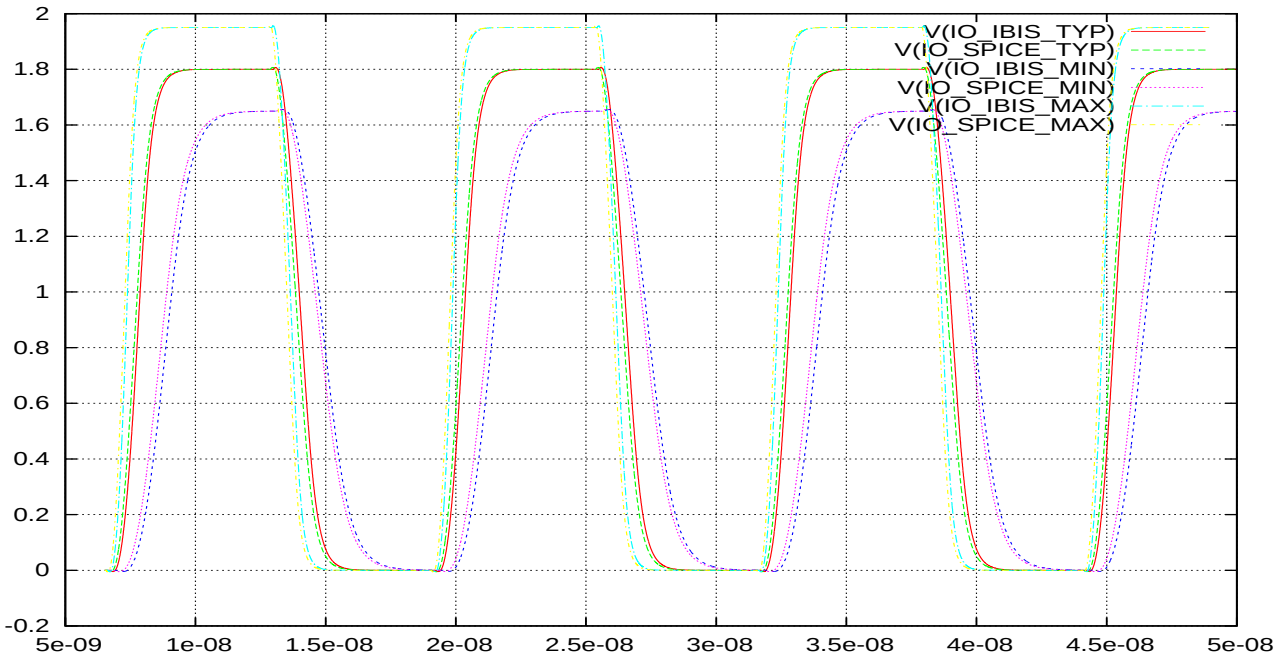
BD2_1V5_LOWEMI_0



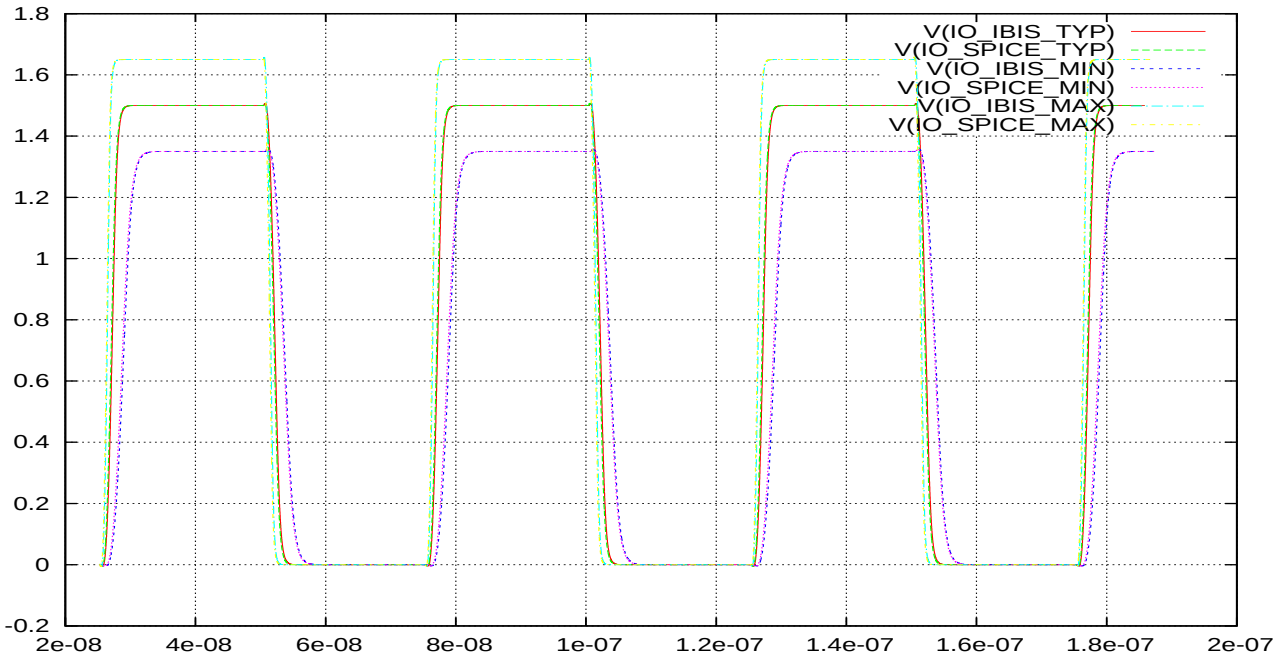
BD2_1V5_LOWEMI_1



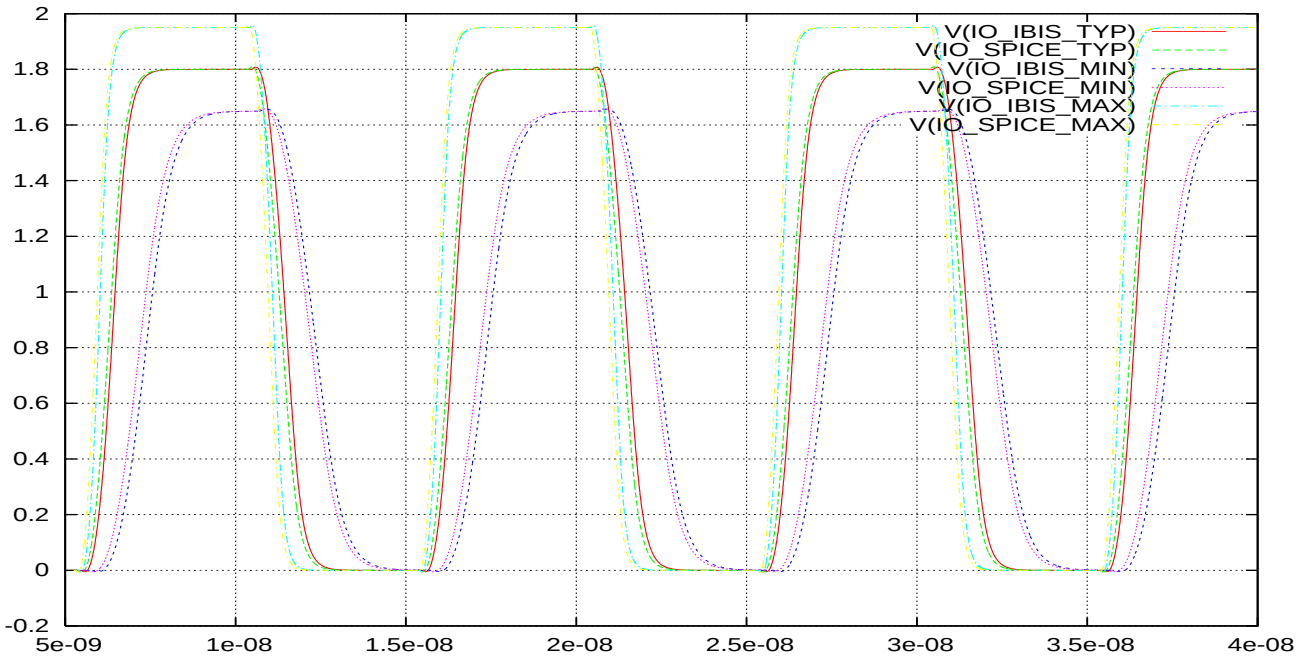
BD4_1V5_LOWEMI_0



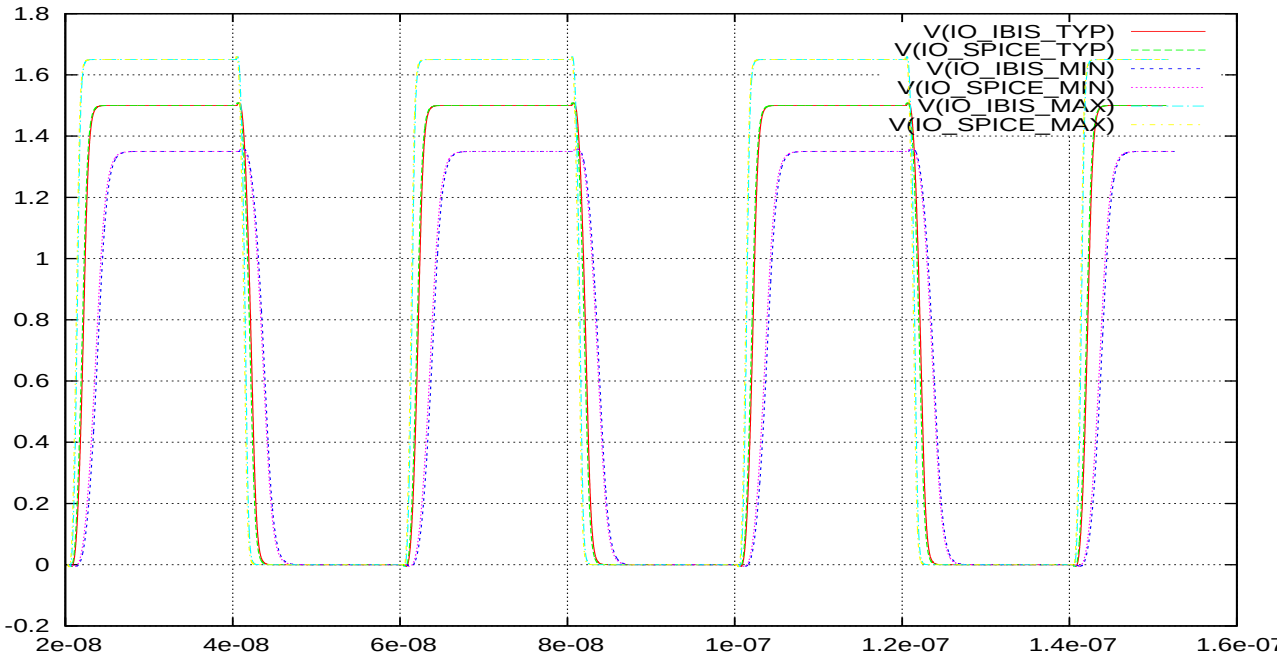
BD4_1V5_LOWEMI_1



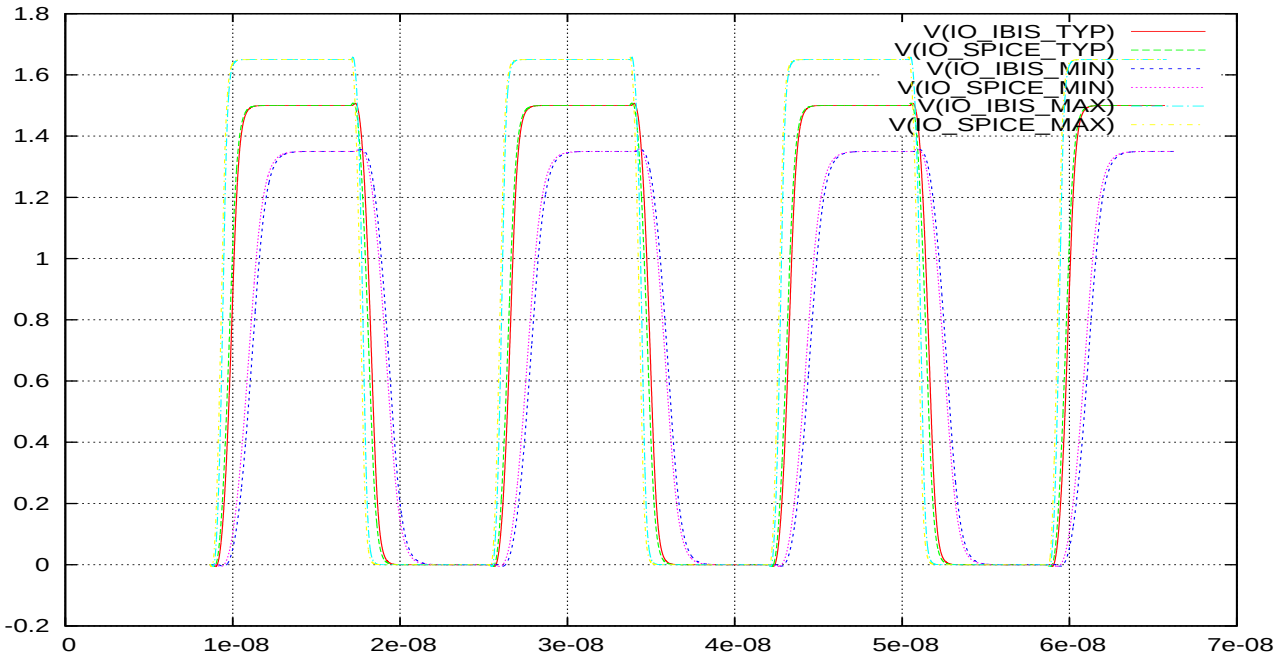
BD6_1V5_LOWEMI_0



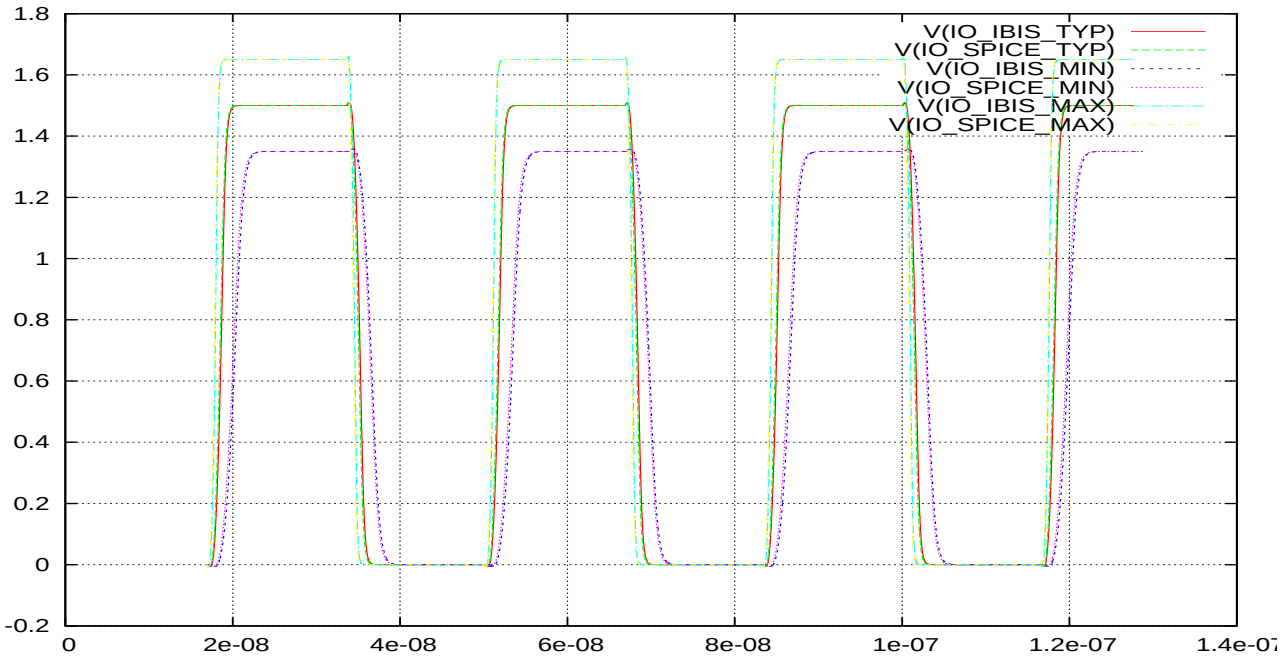
BD6_1V5_LOWEMI_1



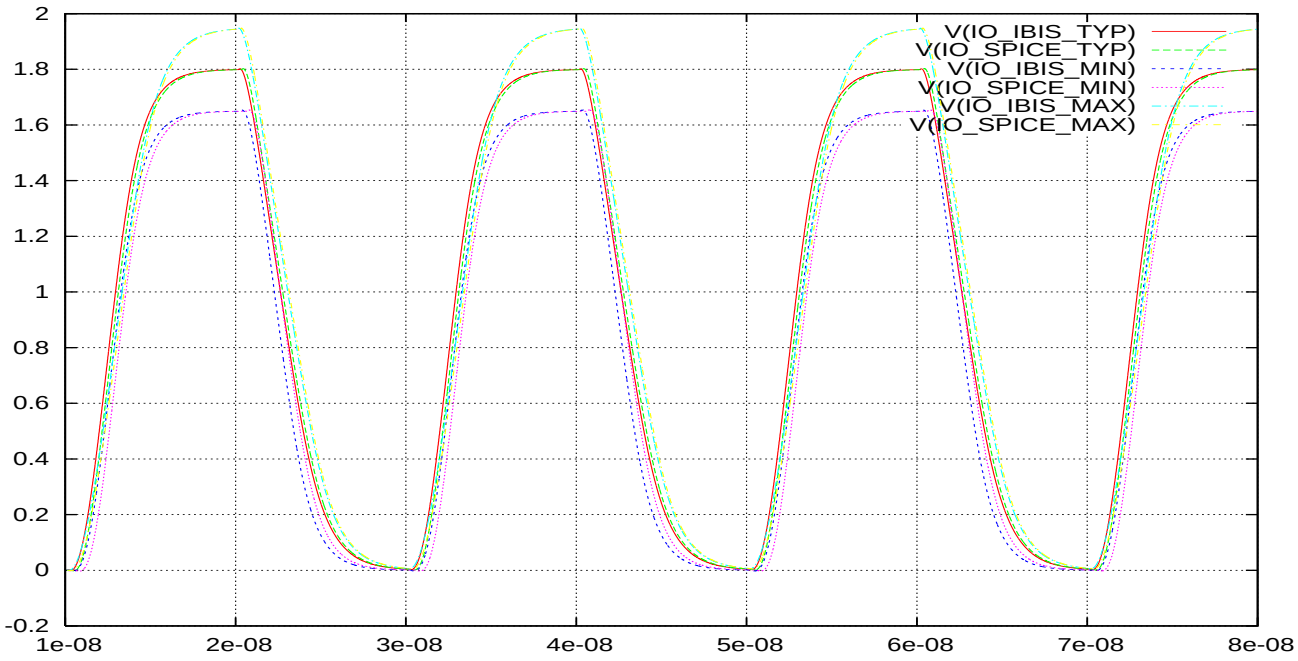
BD8_1V5_LOWEMI_0



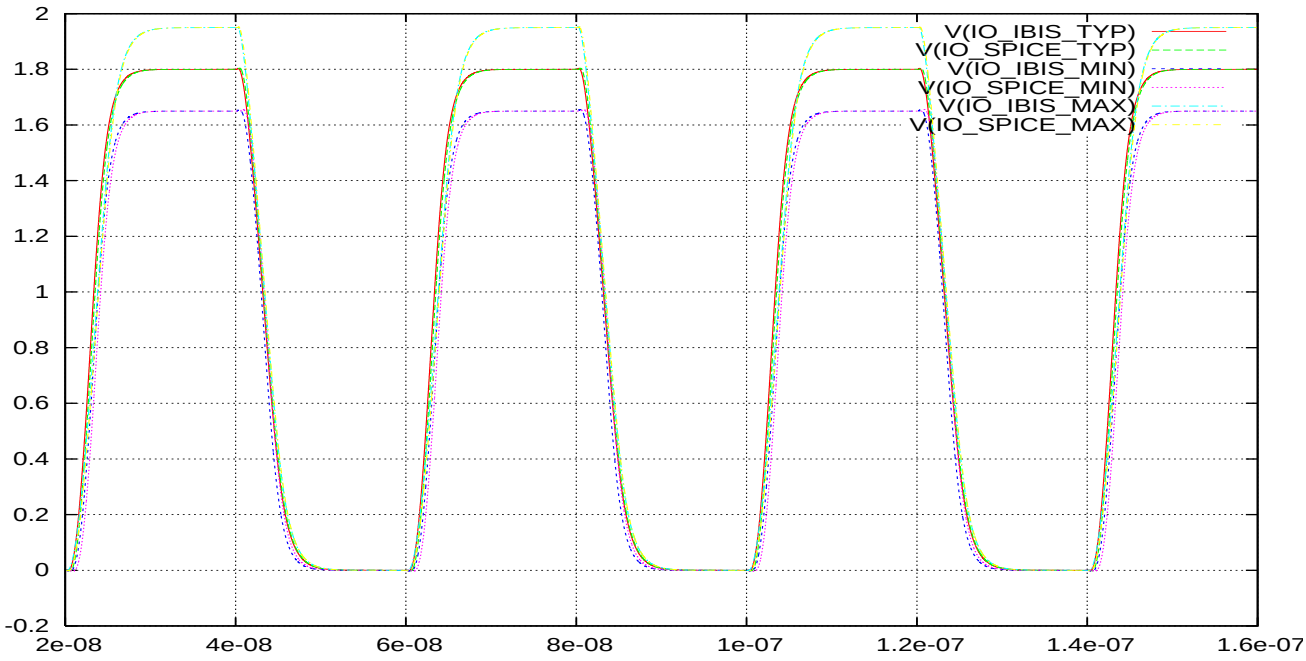
BD8_1V5_LOWEMI_1



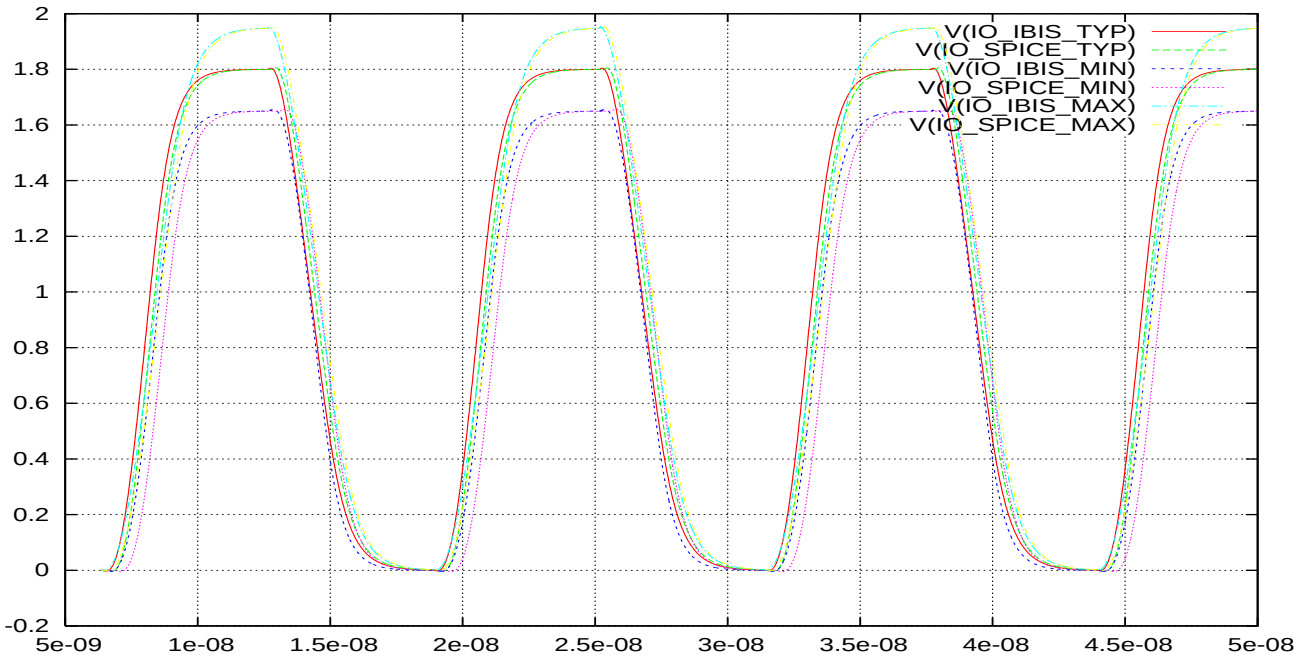
BD2_1V8_LOWEMI_0



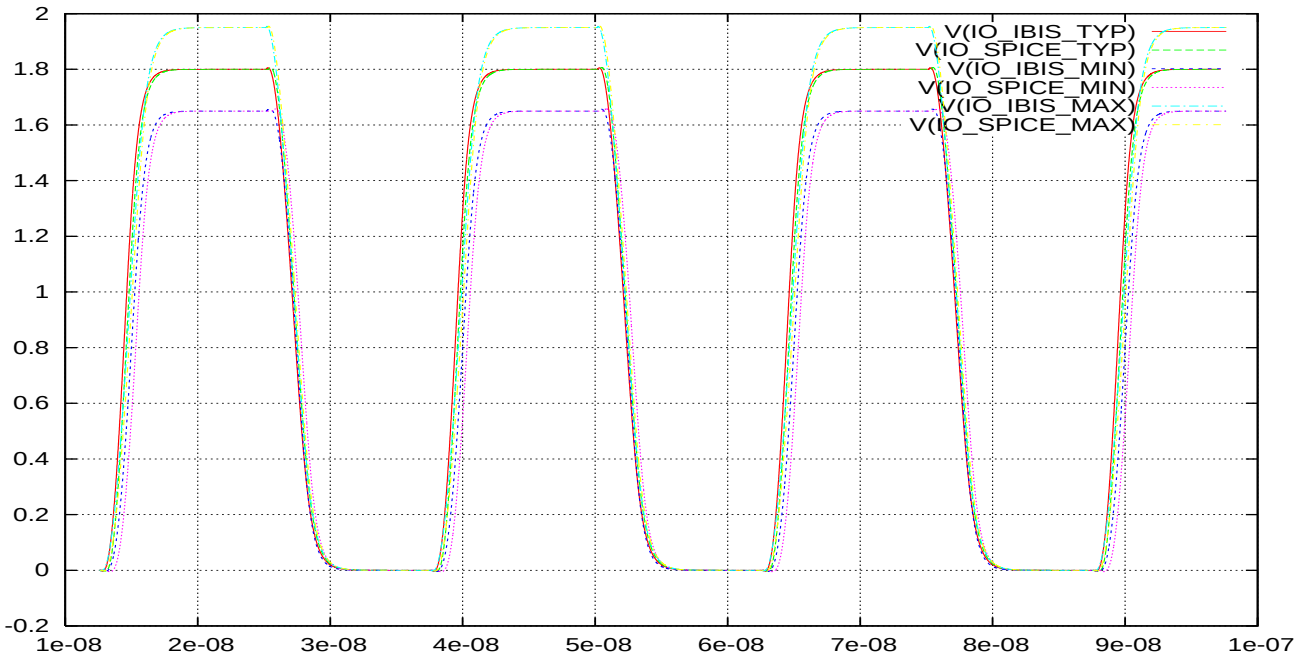
BD2_1V8_LOWEMI_1



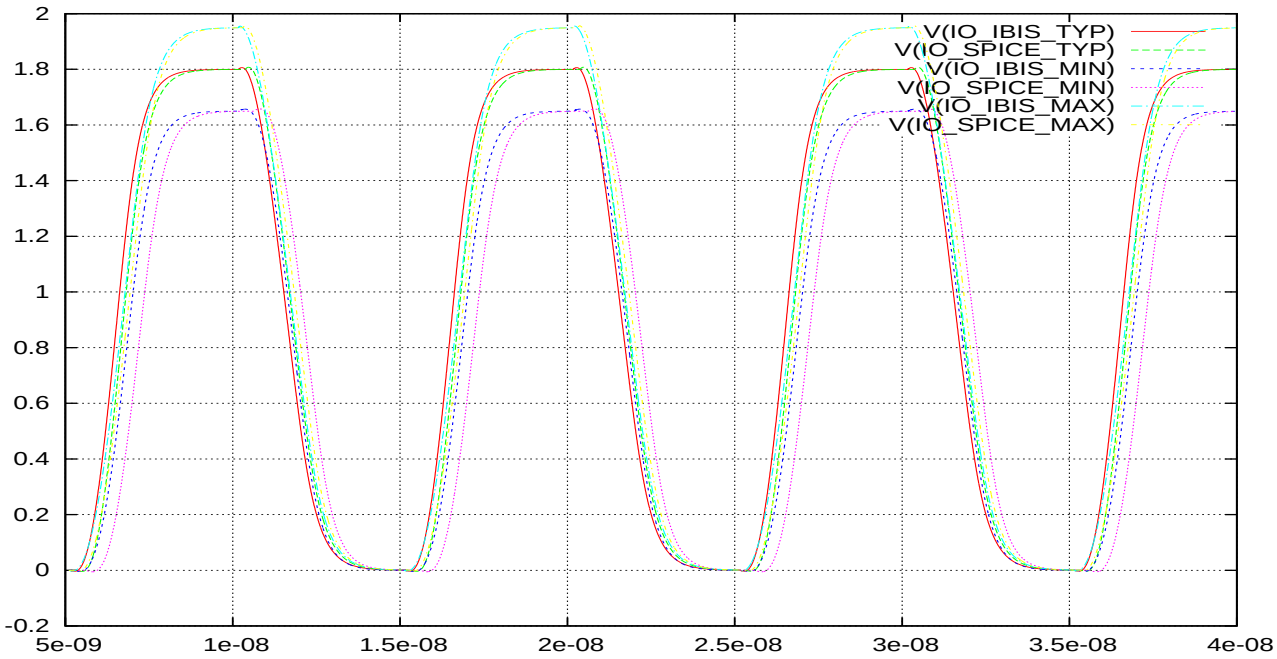
BD4_1V8_LOWEMI_0



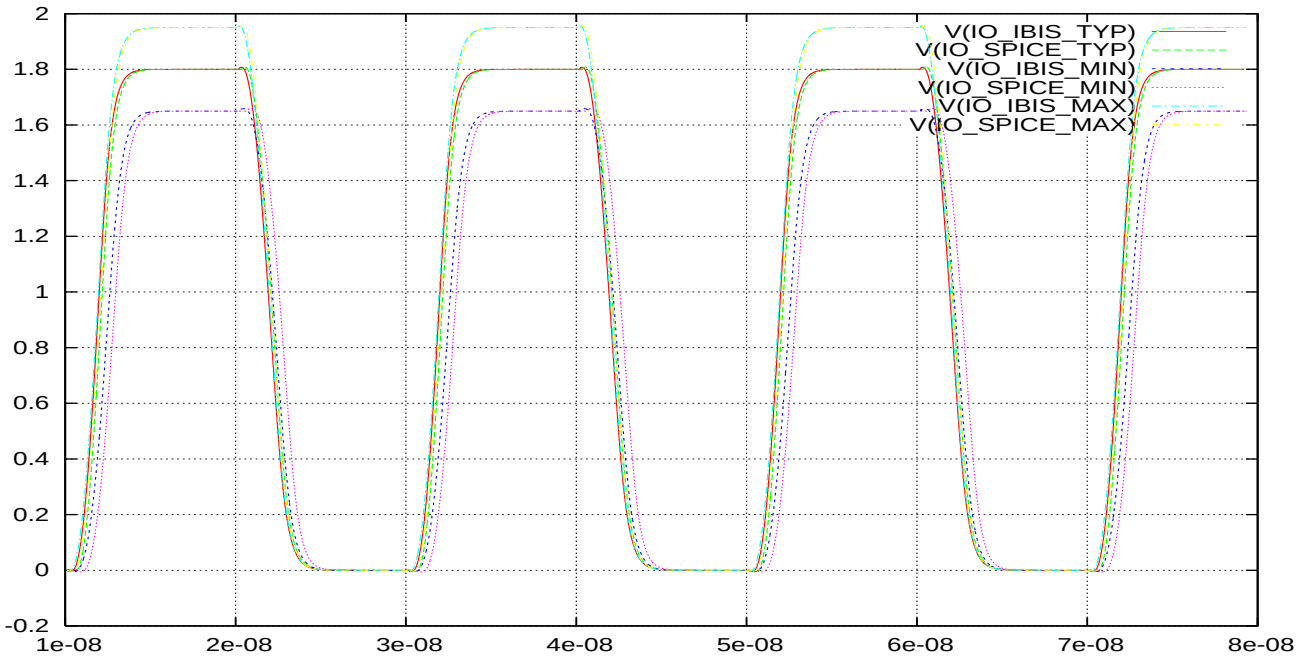
BD4_1V8_LOWEMI_1



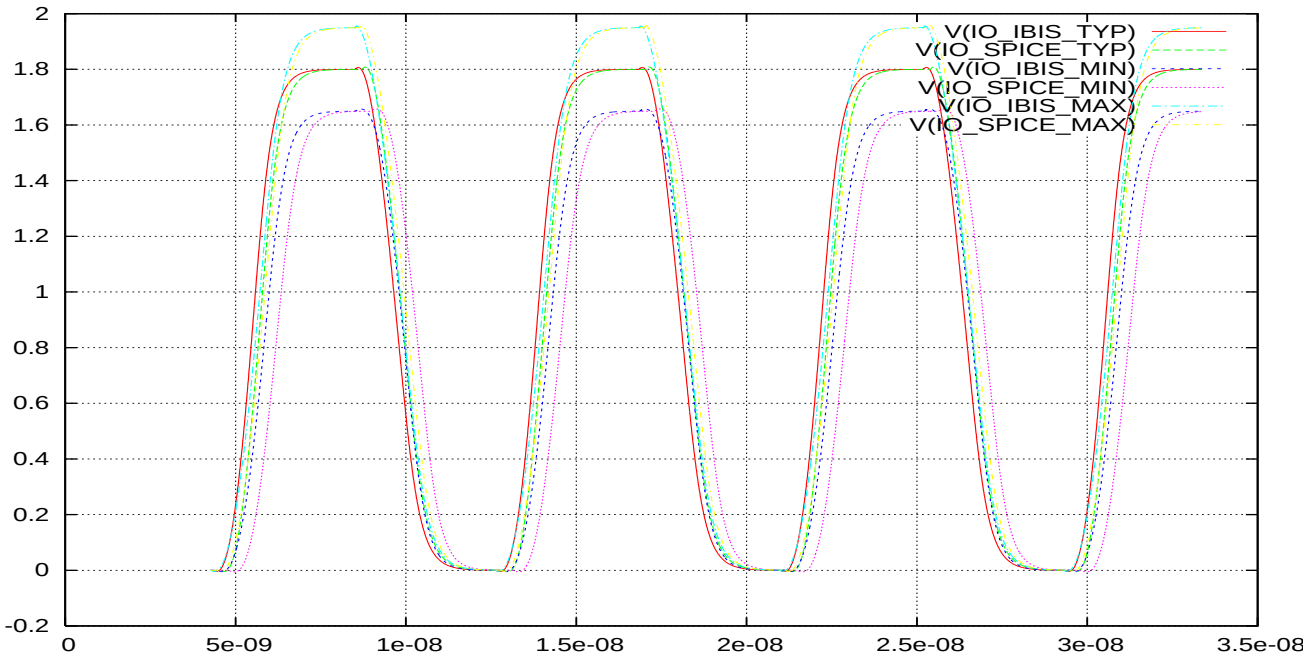
BD6_1V8_LOWEMI_0



BD6_1V8_LOWEMI_1



BD8_1V8_LOWEMI_0



BD8_1V8_LOWEMI_1