sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Library

Cell Groups
ADDF
AND2x
ANT
AOI21
BUFx
DFFSR
DFF
INVx
NAND2
NOR2
OAI21
OR2x
TBUFI
TIEHI
TIELO
XNOR2
XOR2

ADDF

sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Cell Library: Process , Voltage 1.80, Temp 25.00

Truth Table

INPUT			OUTPUT		
A	B	CI	CO	CON	S
0	0	0	0	1	0
0	0	1	0	1	1
0	1	0	0	1	1
0	1	1	1	0	0
1	0	0	0	1	1
1	0	1	1	0	0
1	1	0	1	0	0
1	1	1	1	0	1

Footprint

Cell Name	Area
ADDFX1	31.25760

Pin Capacitance Information

Cell Name	Pin Cap(pf)			Max Cap(pf)		
	A	B	CI	CO	CON	S
ADDFX1	0.01047	0.01054	0.00821	0.09285	0.03473	0.08282

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
ADDFX1	0.00000	0.06743	0.08429

Delay Information

Delay(ns) to CO rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
ADDFX1	A->CO (RR)	0.15627	0.50628	1.88367
	B->CO (RR)	0.15512	0.50002	1.86834
	CI->CO (RR)	0.14855	0.50703	1.93017
	CON->CO (FR)	0.02812	0.17517	0.81840

Delay(ns) to CO falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
ADDFX1	A->CO (FF)	0.20996	0.65191	2.37762
	B->CO (FF)	0.19115	0.61672	2.28036
	CI->CO (FF)	0.18508	0.62480	2.37268
	CON->CO (RF)	0.02464	0.14170	0.64997

Delay(ns) to CON rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
ADDFX1	A->CON (FR)	0.16057	0.31347	0.79143
	B->CON (FR)	0.14130	0.28688	0.75442
	CI->CON (FR)	0.13576	0.28657	0.79203

Delay(ns) to CON falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
ADDFX1	A->CON (RF)	0.09478	0.18608	0.47735
	B->CON (RF)	0.09478	0.19079	0.52124
	CI->CON (RF)	0.08706	0.18671	0.52924

Delay(ns) to S rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
ADDFX1	A->S (-R)	0.29631	0.67565	2.02179
	B->S (-R)	0.31013	0.68949	2.01526
	CI->S (-R)	0.26966	0.64626	2.01390
	CON->S (RR)	0.08317	0.22184	0.65191

Delay(ns) to S falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
ADDFX1	A->S (-F)	0.24508	0.54992	1.55415
	B->S (-F)	0.24156	0.52787	1.52491
	CI->S (-F)	0.23685	0.54864	1.59822
	CON->S (FF)	0.09439	0.24020	0.69668

Power Information

Internal switching power(pJ) to CO rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
ADDFX1	A	0.00246	0.00239	0.00279
	B	0.00310	0.00311	0.00358
	CI	0.00328	0.00345	0.00403

Internal switching power(pJ) to CO falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
ADDFX1	A	0.00890	0.00900	0.00959
	B	0.00888	0.00911	0.00976
	CI	0.00776	0.00808	0.00884

Internal switching power(pJ) to CON rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
ADDFX1	A	0.00888	0.00890	0.00899
	B	0.00886	0.00895	0.00908
	CI	0.00775	0.00791	0.00816

Internal switching power(pJ) to CON falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
ADDFX1	A	0.00242	0.00227	0.00237
	B	0.00305	0.00300	0.00305
	CI	0.00327	0.00334	0.00353

Internal switching power(pJ) to S rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
ADDFX1	A	0.00890	0.00899	0.00946
	B	0.00888	0.00909	0.00964
	CI	0.00776	0.00806	0.00870

Internal switching power(pJ) to S falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
ADDFX1	A	0.01829	0.01780	0.01768
	B	0.01639	0.01604	0.01674
	CI	0.01469	0.01441	0.01465

AND2x

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Truth Table

INPUT		OUTPUT
A	B	Y
0	x	0
1	0	0
1	1	1

Footprint

Cell Name	Area
AND2X1	8.30280
AND2X2	10.25640

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
AND2X1	0.00272	0.00284	0.08996
AND2X2	0.00272	0.00284	0.17306

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
AND2X1	0.00000	0.03425	0.05439
AND2X2	0.00000	0.05439	0.05637

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
AND2X1	A->Y (RR)	0.07744	0.20562	0.61399
	B->Y (RR)	0.08146	0.20360	0.60475
AND2X2	A->Y (RR)	0.08463	0.20264	0.65600
	B->Y (RR)	0.08864	0.20024	0.64230

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
AND2X1	A->Y (FF)	0.06688	0.19441	0.62523
	B->Y (FF)	0.06740	0.19509	0.63407
AND2X2	A->Y (FF)	0.07282	0.19140	0.65844
	B->Y (FF)	0.07290	0.19114	0.66357

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
AND2X1	A	0.00000	0.00000	0.00000
	A	0.00284	0.00253	0.00351
	B	0.00000	0.00000	0.00000
	B	0.00291	0.00247	0.00310
AND2X2	A	0.00000	0.00000	0.00000
	A	0.00547	0.00523	0.00616
	B	0.00000	0.00000	0.00000
	B	0.00555	0.00530	0.00586

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
AND2X1	A	0.00000	0.00000	0.00000
	A	0.00751	0.00746	0.00883
	B	0.00000	0.00000	0.00000
	B	0.00819	0.00803	0.00935
AND2X2	A	0.00000	0.00000	0.00000
	A	0.00928	0.00960	0.01091
	B	0.00000	0.00000	0.00000
	B	0.01002	0.01011	0.01132

Passive power(pJ) for A rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
AND2X1	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00273	-0.00275	-0.00275
AND2X2	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00274	-0.00274	-0.00275

Passive power(pJ) for A falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
AND2X1	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00273	0.00276	0.00275
AND2X2	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00274	0.00276	0.00275

Passive power(pJ) for B rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
AND2X1	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00264	-0.00264	-0.00264
AND2X2	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00264	-0.00265	-0.00264

Passive power(pJ) for B falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
AND2X1	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00265	0.00266	0.00265
AND2X2	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00265	0.00266	0.00265

ANT

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Truth Table

INPUT
A
x

Footprint

Cell Name	Area
ANT	4.39560

Pin Capacitance Information

Cell Name	Pin Cap(pf)
	A
ANT	0.02722

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
ANT	0.00000	154503.00000	309006.00000

Passive Power Information

Passive power(pJ) for A rising :

Cell Name	Power(pJ)		
	first	mid	last
ANT	0.00000	0.00000	0.00000
	-0.00160	0.00520	0.03976

Passive power(pJ) for A falling :

Cell Name	Power(pJ)		
	first	mid	last
ANT	0.00000	0.00000	0.00000
	0.20282	0.17949	0.05865

AOI21

sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Cell Library: Process , Voltage 1.80, Temp 25.00

Truth Table

INPUT			OUTPUT
A0	A1	B0	Y
0	x	0	1
x	x	1	0
1	0	0	1
1	1	x	0

Footprint

Cell Name	Area
AOI21XL	8.30280

Pin Capacitance Information

Cell Name	Pin Cap(pf)			Max Cap(pf)
	A0	A1	B0	Y
AOI21XL	0.00253	0.00265	0.00281	0.03753

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
AOI21XL	0.00000	0.01431	0.02620

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
AOI21XL	A0->Y (FR)	0.08744	0.25413	0.76978
	A1->Y (FR)	0.07308	0.22557	0.71744
	B0->Y (FR)	0.06872	0.23251	0.78355

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
AOI21XL	A0->Y (RF)	0.05325	0.14697	0.45251
	A1->Y (RF)	0.05001	0.14952	0.49372
	B0->Y (RF)	0.02654	0.10733	0.38242

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
AOI21XL	A0	0.00000	0.00000	0.00000
	A0	0.00625	0.00619	0.00622
	A1	0.00000	0.00000	0.00000
	A1	0.00546	0.00535	0.00536
	B0	0.00490	0.00477	0.00510

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
AOI21XL	A0	0.00000	0.00000	0.00000
	A0	0.00123	0.00102	0.00105
	A1	0.00000	0.00000	0.00000
	A1	0.00129	0.00110	0.00116
	B0	-0.00051	-0.00056	-0.00043

Passive power(pJ) for A0 rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
AOI21XL	(A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A1 * B0 * !Y)	-0.00212	-0.00229	-0.00232
	(!A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !Y)	-0.00235	-0.00236	-0.00236
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00236	-0.00236	-0.00236

Passive power(pJ) for A0 falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
AOI21XL	(A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A1 * B0 * !Y)	0.00231	0.00233	0.00232
	(!A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !Y)	0.00235	0.00238	0.00237
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00236	0.00238	0.00237

Passive power(pJ) for A1 rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
AOI21XL	(A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * B0 * !Y)	-0.00207	-0.00223	-0.00224
	(!A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !Y)	-0.00228	-0.00229	-0.00228
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00248	-0.00248	-0.00248

Passive power(pJ) for A1 falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
AOI21XL	(A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * B0 * !Y)	0.00225	0.00224	0.00225
	(!A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !Y)	0.00228	0.00230	0.00230
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00248	0.00248	0.00249

Passive power(pJ) for B0 rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
AOI21XL	(A0 * A1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !Y)	-0.00104	-0.00104	-0.00104

Passive power(pJ) for B0 falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
AOI21XL	(A0 * A1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !Y)	0.00107	0.00106	0.00105

BUFx

sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Cell Library: Process , Voltage 1.80, Temp 25.00

Truth Table

INPUT	OUTPUT
A	Y
0	0
1	1

Footprint

Cell Name	Area
BUFX1	6.34920
BUFX2	8.30280
BUFX4	12.21000

Pin Capacitance Information

Cell Name	Pin Cap(pf)	Max Cap(pf)
	A	Y
BUFX1	0.00283	0.08470
BUFX2	0.00285	0.15518
BUFX4	0.00285	0.28563

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
BUFX1	0.00000	0.02819	0.02819
BUFX2	0.00000	0.04228	0.05439
BUFX4	0.00000	0.07046	0.10679

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
BUFX1	**A->Y (RR)**	0.06115	0.18922	0.58044
BUFX2	**A->Y (RR)**	0.06404	0.17865	0.60015
BUFX4	**A->Y (RR)**	0.08345	0.19363	0.67219

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
BUFX1	**A->Y (FF)**	0.06309	0.18628	0.59544
BUFX2	**A->Y (FF)**	0.07034	0.18274	0.61487
BUFX4	**A->Y (FF)**	0.09549	0.20698	0.67778

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
BUFX1	A	0.00000	0.00000	0.00000
	A	0.00273	0.00236	0.00332
BUFX2	A	0.00000	0.00000	0.00000
	A	0.00533	0.00516	0.00604
BUFX4	A	0.00000	0.00000	0.00000
	A	0.01131	0.01151	0.01230

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
BUFX1	A	0.00000	0.00000	0.00000
	A	0.00717	0.00702	0.00841
BUFX2	A	0.00000	0.00000	0.00000
	A	0.00902	0.00897	0.01027
BUFX4	A	0.00000	0.00000	0.00000
	A	0.01393	0.01422	0.01537

DFFSR

sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Cell Library: Process , Voltage 1.80, Temp 25.00

Truth Table

INPUT				OUTPUT	
D	RN	SN	CK	Q	QN
0	1	1	R	0	1
1	1	1	R	1	0
x	0	x	x	0	1
x	1	0	x	1	0
x	1	1	x	IQ	IQN

Footprint

Cell Name	Area
DFFSRX1	46.39800

Pin Capacitance Information

Cell Name	Pin Cap(pf)				Max Cap(pf)	
	D	RN	SN	CK	Q	QN
DFFSRX1	0.00253	0.00261	0.00595	0.00802	0.08910	0.08634

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
DFFSRX1	0.00000	0.10427	0.14088

Delay Information

Delay(ns) to Q rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
DFFSRX1	CK->Q (RR)	0.30610	0.58143	1.49133
	QN->Q (FR)	0.03358	0.19913	0.91179
	RN->Q (RR)	0.25639	0.53633	1.46045
	SN->Q (FR)	0.22962	0.51832	1.56063

Delay(ns) to Q falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
DFFSRX1	CK->Q (RF)	0.33700	0.60175	1.51326
	QN->Q (RF)	0.02662	0.15056	0.68479
	RN->Q (FF)	0.21882	0.49804	1.54075

Delay(ns) to QN rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
DFFSRX1	CK->QN (RR)	0.29962	0.43368	0.83750
	RN->QN (FR)	0.18224	0.33045	0.86565

Delay(ns) to QN falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
DFFSRX1	CK->QN (RF)	0.25769	0.38405	0.71354
	RN->QN (RF)	0.20780	0.33909	0.68288
	SN->QN (FF)	0.18114	0.32109	0.78331

Constraint Information

Constraints(ns) for D rising :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFSRX1	hold	CK (R)	-0.06586	-0.06403	-0.08277
	setup	CK (R)	0.21074	0.20394	0.28814

Constraints(ns) for D falling :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFSRX1	hold	CK (R)	-0.12233	-0.16183	-0.49861
	setup	CK (R)	0.15036	0.17909	0.51251

Constraints(ns) for D rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFSRX1	hold	CK (R)	-0.06586	-0.06403	-0.08277
	setup	CK (R)	0.21074	0.20394	0.28814

Constraints(ns) for D falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFSRX1	hold	CK (R)	-0.12233	-0.16183	-0.49861
	setup	CK (R)	0.15036	0.17909	0.51251

Constraints(ns) for RN rising :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFSRX1	recovery	CK (R)	0.16850	0.16515	0.25785
	removal	CK (R)	-0.03304	-0.03715	-0.04880
	hold	SN (R)	-0.17996	-0.20764	-0.43479
	setup	SN (R)	0.19640	0.22259	0.55740

Constraints(ns) for RN rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFSRX1	recovery	CK (R)	0.16850	0.16515	0.25785
	removal	CK (R)	-0.03304	-0.03715	-0.04880
	hold	SN (R)	-0.17996	-0.20764	-0.43479
	hold	SN (R)	-0.17996	-0.20764	-0.43479
	setup	SN (R)	0.19640	0.22259	0.55205
	setup	SN (R)	0.19640	0.22259	0.55740

Constraints(ns) for RN falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFSRX1	min_pulse_width	RN ()	0.13171	0.15928	0.97290
	min_pulse_width	RN ()	0.13210	0.16266	0.97290

Constraints(ns) for SN rising :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFSRX1	recovery	CK (R)	0.04477	0.04600	0.11962
	removal	CK (R)	-0.02160	-0.02782	-0.08376

Constraints(ns) for SN rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFSRX1	recovery	CK (R)	0.04477	0.04600	0.11962
	removal	CK (R)	-0.02160	-0.02782	-0.08376

Constraints(ns) for SN falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFSRX1	min_pulse_width	SN ()	0.16755	0.19980	0.97290
	min_pulse_width	SN ()	0.17035	0.20317	0.97290

Constraints(ns) for CK rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFSRX1	min_pulse_width	CK ()	0.13110	0.13903	0.97290
	min_pulse_width	CK ()	0.16637	0.15928	0.97290

Constraints(ns) for CK falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFSRX1	min_pulse_width	CK ()	0.26588	0.27407	0.97290
	min_pulse_width	CK ()	0.13570	0.15591	0.97290

Power Information

Internal switching power(pJ) to Q rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
DFFSRX1	CK	0.00000	0.00000	0.00000
	CK	0.00890	0.00838	0.00811
	RN	0.01676	0.01643	0.01575
	SN	-0.00175	-0.01630	-0.07217
	SN	0.01862	0.01832	0.01719

Internal switching power(pJ) to Q falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
DFFSRX1	CK	0.00000	0.00000	0.00000
	CK	0.00952	0.00899	0.00806
	RN	-0.00175	-0.01630	-0.07217
	RN	0.02000	0.01958	0.01863

Internal switching power(pJ) to QN rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
DFFSRX1	CK	0.00000	0.00000	0.00000
	CK	0.00951	0.00899	0.00810
	RN	-0.00175	-0.01600	-0.06994
	RN	0.01999	0.01959	0.01869

Internal switching power(pJ) to QN falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
DFFSRX1	CK	0.00000	0.00000	0.00000
	CK	0.00888	0.00836	0.00806
	RN	0.01674	0.01641	0.01579
	SN	-0.00175	-0.01600	-0.06992
	SN	0.01860	0.01830	0.01719

Passive power(pJ) for D rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
DFFSRX1	CK	0.00000	0.00000	0.00000
	CK	-0.00217	-0.00224	-0.00226
	(!CK * RN * SN * Q * !QN) + (!CK * RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * SN * Q * !QN) + (!CK * RN * SN * !Q * QN)	0.01094	0.01063	0.01089
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00402	0.00374	0.00408
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00404	0.00376	0.00409
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00408	0.00380	0.00414

Passive power(pJ) for D falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
DFFSRX1	CK	0.00000	0.00000	0.00000
	CK	0.00226	0.00227	0.00226
	(!CK * RN * SN * Q * !QN) + (!CK * RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * SN * Q * !QN) + (!CK * RN * SN * !Q * QN)	0.01608	0.01592	0.01608
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00709	0.00698	0.00732
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00708	0.00697	0.00731
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00703	0.00692	0.00726

Passive power(pJ) for RN rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
DFFSRX1	(CK * SN * !Q * QN) + (!CK * !D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * SN * !Q * QN) + (!CK * !D * SN * !Q * QN)	0.00225	0.00194	0.00267
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.00959	0.00917	0.00977

Passive power(pJ) for RN falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
DFFSRX1	(CK * SN * !Q * QN) + (!CK * !D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * SN * !Q * QN) + (!CK * !D * SN * !Q * QN)	0.00846	0.00829	0.00962
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.01635	0.01602	0.01711

Passive power(pJ) for SN rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
DFFSRX1	(CK * RN * Q * !QN) + (!CK * D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(CK * RN * Q * !QN) + (!CK * D * RN * Q * !QN)	-0.00543	-0.00546	-0.00545
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	-0.00599	-0.00618	-0.00621
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	-0.00565	-0.00573	-0.00576
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.00296	0.00265	0.00294

Passive power(pJ) for SN falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
DFFSRX1	(CK * RN * Q * !QN) + (!CK * D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(CK * RN * Q * !QN) + (!CK * D * RN * Q * !QN)	0.00543	0.00549	0.00545
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00620	0.00618	0.00622
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	0.00573	0.00573	0.00577
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.01215	0.01194	0.01203

Passive power(pJ) for CK rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
DFFSRX1	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	-0.00061	-0.00104	-0.00023
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.00465	0.00402	0.00462
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.00460	0.00399	0.00457
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	-0.00071	-0.00112	-0.00026
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.00289	0.00216	0.00371

Passive power(pJ) for CK falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
DFFSRX1	(D * RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * RN * SN * !Q * QN)	0.02470	0.02428	0.02510
	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.01055	0.01032	0.01173
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.01717	0.01692	0.01811
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.01721	0.01697	0.01815
	(!D * RN * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * Q * !QN)	0.02378	0.02327	0.02555
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.01185	0.01162	0.01285
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.01417	0.01375	0.01629

DFF

sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Cell Library: Process , Voltage 1.80, Temp 25.00

Truth Table

INPUT		OUTPUT	
D	CK	Q	QN
0	R	0	1
1	R	1	0
x	x	IQ	IQN

Footprint

Cell Name	Area
DFFX1	32.23440

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)	
	D	CK	Q	QN
DFFX1	0.00277	0.00780	0.08018	0.07802

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
DFFX1	0.00000	0.09325	0.11249

Delay Information

Delay(ns) to Q rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
DFFX1	CK->Q (RR)	0.21033	0.46405	1.30004
	QN->Q (FR)	0.03799	0.21324	0.94344

Delay(ns) to Q falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
DFFX1	CK->Q (RF)	0.28659	0.54110	1.39168
	QN->Q (RF)	0.02675	0.14456	0.64299

Delay(ns) to QN rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
DFFX1	CK->QN (RR)	0.24970	0.38020	0.77114

Delay(ns) to QN falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
DFFX1	CK->QN (RF)	0.16405	0.27065	0.56202

Constraint Information

Constraints(ns) for D rising :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFX1	hold	CK (R)	-0.04263	-0.04282	-0.06087
	setup	CK (R)	0.12428	0.11953	0.21628

Constraints(ns) for D falling :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFX1	hold	CK (R)	-0.10717	-0.15408	-0.48593
	setup	CK (R)	0.12574	0.16544	0.50013

Constraints(ns) for CK rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFX1	min_pulse_width	CK ()	0.08395	0.11202	0.97290
	min_pulse_width	CK ()	0.13941	0.13228	0.97290

Constraints(ns) for CK falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
DFFX1	min_pulse_width	CK ()	0.18778	0.19642	0.97290
	min_pulse_width	CK ()	0.10093	0.13565	0.97290

Power Information

Internal switching power(pJ) to Q rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
DFFX1	CK	0.00000	0.00000	0.00000
	CK	0.00768	0.00711	0.00704

Internal switching power(pJ) to Q falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
DFFX1	CK	0.00000	0.00000	0.00000
	CK	0.00830	0.00760	0.00631

Internal switching power(pJ) to QN rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
DFFX1	CK	0.00000	0.00000	0.00000
	CK	0.00829	0.00761	0.00639

Internal switching power(pJ) to QN falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
DFFX1	CK	0.00000	0.00000	0.00000
	CK	0.00765	0.00708	0.00695

Passive power(pJ) for D rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
DFFX1	CK	0.00000	0.00000	0.00000
	CK	-0.00198	-0.00225	-0.00226
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00772	0.00734	0.00762

Passive power(pJ) for D falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
DFFX1	CK	0.00000	0.00000	0.00000
	CK	0.00226	0.00227	0.00227
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.01449	0.01423	0.01458

Passive power(pJ) for CK rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
DFFX1	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	-0.00070	-0.00110	-0.00036
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00064	-0.00104	-0.00024

Passive power(pJ) for CK falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
DFFX1	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.01067	0.01041	0.01178
	(D * !Q * QN)	0.00000	0.00000	0.00000
	(D * !Q * QN)	0.02149	0.02103	0.02192
	(!D * Q * !QN)	0.00000	0.00000	0.00000
	(!D * Q * !QN)	0.02213	0.02159	0.02398
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01185	0.01159	0.01279

INVx

sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Cell Library: Process , Voltage 1.80, Temp 25.00

Truth Table

INPUT	OUTPUT
A	Y
0	1
1	0

Footprint

Cell Name	Area
INVX1	4.39560
INVX2	6.34920
INVX4	10.25640
INVX8	18.07080

Pin Capacitance Information

Cell Name	Pin Cap(pf)	Max Cap(pf)
	A	Y
INVX1	0.00265	0.08060
INVX2	0.00484	0.14838
INVX4	0.00940	0.27605
INVX8	0.01860	0.51469

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
INVX1	0.00000	0.01409	0.02620
INVX2	0.00000	0.02818	0.05241
INVX4	0.00000	0.05637	0.10481
INVX8	0.00000	0.11274	0.20962

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
INVX1	**A->Y (FR)**	0.03137	0.17780	0.79401
INVX2	**A->Y (FR)**	0.02271	0.14729	0.76667
INVX4	**A->Y (FR)**	0.02301	0.13286	0.77181
INVX8	**A->Y (FR)**	0.02775	0.12484	0.77703

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
INVX1	**A->Y (RF)**	0.02472	0.13405	0.59669
INVX2	**A->Y (RF)**	0.01796	0.11019	0.56805
INVX4	**A->Y (RF)**	0.01750	0.09611	0.55426
INVX8	**A->Y (RF)**	0.02229	0.08833	0.54160

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
INVX1	A	0.00000	0.00000	0.00000
	A	0.00378	0.00374	0.00402
INVX2	A	0.00000	0.00000	0.00000
	A	0.00646	0.00651	0.00719
INVX4	A	0.00000	0.00000	0.00000
	A	0.01252	0.01287	0.01420
INVX8	A	0.00000	0.00000	0.00000
	A	0.02430	0.02520	0.02810

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
INVX1	A	0.00000	0.00000	0.00000
	A	-0.00065	-0.00070	-0.00058
INVX2	A	0.00000	0.00000	0.00000
	A	-0.00216	-0.00221	-0.00186
INVX4	A	0.00000	0.00000	0.00000
	A	-0.00433	-0.00427	-0.00347
INVX8	A	0.00000	0.00000	0.00000
	A	-0.00886	-0.00856	-0.00659

NAND2

sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Cell Library: Process , Voltage 1.80, Temp 25.00

Truth Table

INPUT		OUTPUT
A	B	Y
0	x	1
1	0	1
1	1	0

Footprint

Cell Name	Area
NAND2X1	6.34920

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
NAND2X1	0.00264	0.00263	0.07872

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
NAND2X1	0.00000	0.01410	0.05241

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
NAND2X1	A->Y (FR)	0.03212	0.17679	0.78416
	B->Y (FR)	0.03670	0.18253	0.79194

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
NAND2X1	A->Y (RF)	0.03621	0.17624	0.74739
	B->Y (RF)	0.03957	0.17452	0.70921

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
NAND2X1	A	0.00000	0.00000	0.00000
	A	0.00397	0.00390	0.00418
	B	0.00000	0.00000	0.00000
	B	0.00474	0.00469	0.00493

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
NAND2X1	A	0.00000	0.00000	0.00000
	A	-0.00044	-0.00051	-0.00044
	B	0.00000	0.00000	0.00000
	B	-0.00040	-0.00052	-0.00044

Passive power(pJ) for A rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
NAND2X1	(!B * Y)	0.00000	0.00000	0.00000
	(!B * Y)	-0.00263	-0.00263	-0.00264

Passive power(pJ) for A falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
NAND2X1	(!B * Y)	0.00000	0.00000	0.00000
	(!B * Y)	0.00263	0.00265	0.00264

Passive power(pJ) for B rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
NAND2X1	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00246	-0.00246	-0.00246

Passive power(pJ) for B falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
NAND2X1	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00247	0.00246	0.00247

NOR2

sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Cell Library: Process , Voltage 1.80, Temp 25.00

Truth Table

INPUT		OUTPUT
A	B	Y
0	0	1
x	1	0
1	x	0

Footprint

Cell Name	Area
NOR2X1	6.34920

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
NOR2X1	0.00256	0.00286	0.04354

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
NOR2X1	0.00000	0.01111	0.02620

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
NOR2X1	A->Y (FR)	0.06581	0.23014	0.77796
	B->Y (FR)	0.05421	0.21642	0.78347

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
NOR2X1	A->Y (RF)	0.03190	0.11738	0.42595
	B->Y (RF)	0.02591	0.11051	0.41467

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
NOR2X1	A	0.00000	0.00000	0.00000
	A	0.00519	0.00511	0.00518
	B	0.00000	0.00000	0.00000
	B	0.00402	0.00391	0.00426

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
NOR2X1	A	0.00000	0.00000	0.00000
	A	0.00051	0.00035	0.00046
	B	0.00000	0.00000	0.00000
	B	-0.00050	-0.00051	-0.00040

Passive power(pJ) for A rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
NOR2X1	(B * !Y)	0.00000	0.00000	0.00000
	(B * !Y)	-0.00199	-0.00226	-0.00229

Passive power(pJ) for A falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
NOR2X1	(B * !Y)	0.00000	0.00000	0.00000
	(B * !Y)	0.00229	0.00229	0.00230

Passive power(pJ) for B rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
NOR2X1	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	-0.00105	-0.00105	-0.00105

Passive power(pJ) for B falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
NOR2X1	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00107	0.00106	0.00106

OAI21

sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Cell Library: Process , Voltage 1.80, Temp 25.00

Truth Table

INPUT			OUTPUT
A0	A1	B0	Y
0	0	x	1
x	1	0	1
x	1	1	0
1	x	0	1
1	x	1	0

Footprint

Cell Name	Area
OAI21XL	8.30280

Pin Capacitance Information

Cell Name	Pin Cap(pf)			Max Cap(pf)
	A0	A1	B0	Y
OAI21XL	0.00261	0.00269	0.00249	0.04156

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
OAI21XL	0.00000	0.08001	0.22282

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
OAI21XL	A0->Y (FR)	0.06949	0.22830	0.77758
	A1->Y (FR)	0.08414	0.24497	0.77512
	B0->Y (FR)	0.04086	0.16040	0.60790

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
OAI21XL	A0->Y (RF)	0.04725	0.14717	0.47612
	A1->Y (RF)	0.05620	0.15477	0.48330
	B0->Y (RF)	0.04003	0.14613	0.52641

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
OAI21XL	A0	0.00000	0.00000	0.00000
	A0	0.00528	0.00520	0.00547
	A1	0.00000	0.00000	0.00000
	A1	0.00651	0.00642	0.00647
	B0	0.00496	0.00490	0.00538

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
OAI21XL	A0	0.00000	0.00000	0.00000
	A0	0.00033	0.00025	0.00028
	A1	0.00000	0.00000	0.00000
	A1	0.00137	0.00118	0.00121
	B0	0.00163	0.00153	0.00162

Passive power(pJ) for A0 rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
OAI21XL	(A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A1 * B0 * !Y)	-0.00107	-0.00107	-0.00107
	(A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * Y)	-0.00223	-0.00230	-0.00232
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00236	-0.00236	-0.00237

Passive power(pJ) for A0 falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
OAI21XL	(A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A1 * B0 * !Y)	0.00108	0.00108	0.00108
	(A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * Y)	0.00231	0.00233	0.00232
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00237	0.00236	0.00237

Passive power(pJ) for A1 rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
OAI21XL	(A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * B0 * !Y)	-0.00192	-0.00220	-0.00221
	(A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * Y)	-0.00219	-0.00227	-0.00228
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00231	-0.00232	-0.00231

Passive power(pJ) for A1 falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
OAI21XL	(A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * B0 * !Y)	0.00221	0.00222	0.00222
	(A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * Y)	0.00227	0.00229	0.00229
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00231	0.00232	0.00233

Passive power(pJ) for B0 rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
OAI21XL	(!A0 * !A1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * Y)	-0.00226	-0.00226	-0.00227

Passive power(pJ) for B0 falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
OAI21XL	(!A0 * !A1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * Y)	0.00226	0.00226	0.00227

OR2x

sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Cell Library: Process , Voltage 1.80, Temp 25.00

Truth Table

INPUT		OUTPUT
A	B	Y
0	0	0
x	1	1
1	x	1

Footprint

Cell Name	Area
OR2X1	8.30280
OR2X2	10.25640

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
OR2X1	0.00290	0.00271	0.08181
OR2X2	0.00291	0.00270	0.16815

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
OR2X1	0.00000	0.01915	0.03017
OR2X2	0.00000	0.02718	0.05637

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
OR2X1	A->Y (RR)	0.07232	0.20521	0.60740
	B->Y (RR)	0.06292	0.19256	0.57629
OR2X2	A->Y (RR)	0.07430	0.19204	0.64292
	B->Y (RR)	0.06445	0.18036	0.61481

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
OR2X1	A->Y (FF)	0.11175	0.23707	0.65453
	B->Y (FF)	0.09402	0.21968	0.64261
OR2X2	A->Y (FF)	0.12623	0.24980	0.71941
	B->Y (FF)	0.10866	0.23225	0.71476

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
OR2X1	A	0.00000	0.00000	0.00000
	A	0.00398	0.00360	0.00414
	B	0.00000	0.00000	0.00000
	B	0.00300	0.00284	0.00363
OR2X2	A	0.00000	0.00000	0.00000
	A	0.00658	0.00640	0.00690
	B	0.00000	0.00000	0.00000
	B	0.00554	0.00567	0.00638

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
OR2X1	A	0.00000	0.00000	0.00000
	A	0.00873	0.00833	0.00873
	B	0.00000	0.00000	0.00000
	B	0.00720	0.00714	0.00828
OR2X2	A	0.00000	0.00000	0.00000
	A	0.01057	0.01041	0.01072
	B	0.00000	0.00000	0.00000
	B	0.00903	0.00911	0.01022

Passive power(pJ) for A rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
OR2X1	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00201	-0.00228	-0.00229
OR2X2	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00201	-0.00228	-0.00229

Passive power(pJ) for A falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
OR2X1	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00229	0.00231	0.00231
OR2X2	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00229	0.00231	0.00231

Passive power(pJ) for B rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
OR2X1	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00106	-0.00107	-0.00106
OR2X2	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00106	-0.00107	-0.00107

Passive power(pJ) for B falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
OR2X1	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00107	0.00107	0.00107
OR2X2	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00108	0.00109	0.00107

TBUFI

sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Cell Library: Process , Voltage 1.80, Temp 25.00

Truth Table

INPUT		OUTPUT
A	OE	Y
-	0	HiZ
0	1	1
1	1	0

Footprint

Cell Name	Area
TBUFIX1	8.30280

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	OE	Y
TBUFIX1	0.00283	0.00361	0.04335

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
TBUFIX1	0.00000	0.01502	0.05241

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
TBUFIX1	A->Y (FR)	0.05259	0.21461	0.77858
	OE->Y (FR)	0.04460	0.09234	0.37219
	OE->Y (RR)	0.08620	0.23087	0.57003

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
TBUFIX1	A->Y (RF)	0.03590	0.14036	0.51623
	OE->Y (FF)	0.04522	0.09233	0.37218
	OE->Y (RF)	0.03227	0.13220	0.46787

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
TBUFIX1	A	0.00000	0.00000	0.00000
	A	0.00385	0.00375	0.00402
	OE	0.00000	0.00000	0.00000
	OE	0.00377	0.00342	0.00451

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
TBUFIX1	A	0.00000	0.00000	0.00000
	A	-0.00049	-0.00052	-0.00045
	OE	0.00000	0.00000	0.00000
	OE	0.00241	0.00205	0.00328

Passive power(pJ) for A rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
TBUFIX1	(!OE * Y)	0.00000	0.00000	0.00000
	(!OE * Y)	-0.00188	-0.00187	-0.00188
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	-0.00166	-0.00167	-0.00167

Passive power(pJ) for A falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
TBUFIX1	(!OE * Y)	0.00000	0.00000	0.00000
	(!OE * Y)	0.00188	0.00187	0.00188
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	0.00168	0.00167	0.00167

Passive power(pJ) for OE rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
TBUFIX1	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00144	0.00112	0.00235
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00129	0.00097	0.00220

Passive power(pJ) for OE falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
TBUFIX1	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00455	0.00432	0.00584
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00464	0.00446	0.00597

TIEHI

sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Cell Library: Process , Voltage 1.80, Temp 25.00

Footprint

Cell Name	Area
TIEHI	4.39560

Pin Capacitance Information

Cell Name	Max Cap(pf)
	Y
TIEHI	0.17278

Leakage Information

Cell Name	Leakage(nW)		
	Min.	**Avg**	**Max.**
TIEHI	0.00000	0.00000	0.00000

TIELO

sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Cell Library: Process , Voltage 1.80, Temp 25.00

Footprint

Cell Name	Area
TIELO	4.39560

Pin Capacitance Information

Cell Name	Max Cap(pf)
	Y
TIELO	0.36130

Leakage Information

Cell Name	Leakage(nW)		
	Min.	**Avg**	**Max.**
TIELO	0.00000	0.00000	0.00000

XNOR2

sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Cell Library: Process , Voltage 1.80, Temp 25.00

Truth Table

INPUT		OUTPUT
A	B	Y
0	0	1
0	1	0
1	0	0
1	1	1

Footprint

Cell Name	Area
XNOR2XL	14.16360

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
XNOR2XL	0.00564	0.00477	0.04189

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
XNOR2XL	0.00000	0.04935	0.08059

Delay Information

Delay(ns) to Y rising (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
XNOR2XL	A->Y (RR)	B	0.10570	0.25054	0.58725
	A->Y (FR)	!B	0.06263	0.22196	0.77580
	B->Y (RR)	A	0.08637	0.23281	0.56930
	B->Y (FR)	!A	0.08365	0.24577	0.78097

Delay(ns) to Y falling (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
XNOR2XL	A->Y (FF)	B	0.09631	0.21247	0.53257
	A->Y (RF)	!B	0.04393	0.14130	0.46879
	B->Y (FF)	A	0.08697	0.20292	0.52309
	B->Y (RF)	!A	0.05520	0.15328	0.48358

Power Information

Internal switching power(pJ) to Y rising (conditional):

Cell Name	Input	When	Power(pJ)		
			first	mid	last
XNOR2XL	A	B	0.00000	0.00000	0.00000
	A	B	0.00374	0.00331	0.00425
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00911	0.00885	0.01063
	B	A	0.00000	0.00000	0.00000
	B	A	0.00147	0.00119	0.00232
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00969	0.00950	0.01112

Internal switching power(pJ) to Y falling (conditional):

Cell Name	Input	When	Power(pJ)		
			first	mid	last
XNOR2XL	A	B	0.00000	0.00000	0.00000
	A	B	0.01110	0.01075	0.01211
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00253	0.00208	0.00325
	B	A	0.00000	0.00000	0.00000
	B	A	0.01029	0.01023	0.01174
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00332	0.00280	0.00398

XOR2

sky130_osu_sc_12T_hs_TT_1P8_25C.ccs Cell Library: Process , Voltage 1.80, Temp 25.00

Truth Table

INPUT		OUTPUT
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

Footprint

Cell Name	Area
XOR2XL	14.16360

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
XOR2XL	0.00564	0.00481	0.04379

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
XOR2XL	0.00000	0.04935	0.07727

Delay Information

Delay(ns) to Y rising (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
XOR2XL	A->Y (RR)	!B	0.09720	0.23746	0.57610
	A->Y (FR)	B	0.07990	0.24272	0.79036
	B->Y (RR)	!A	0.08785	0.23686	0.58791
	B->Y (FR)	A	0.07726	0.23660	0.77232

Delay(ns) to Y falling (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
XOR2XL	A->Y (FF)	!B	0.08544	0.20344	0.53176
	A->Y (RF)	B	0.04947	0.15746	0.53890
	B->Y (FF)	!A	0.08076	0.19940	0.52773
	B->Y (RF)	A	0.05329	0.15490	0.49738

Power Information

Internal switching power(pJ) to Y rising (conditional):

Cell Name	Input	When	Power(pJ)		
			first	mid	last
XOR2XL	A	B	0.00000	0.00000	0.00000
	A	B	0.01089	0.01065	0.01228
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00167	0.00097	0.00196
	B	A	0.00000	0.00000	0.00000
	B	A	0.01079	0.01065	0.01236
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00129	0.00103	0.00217

Internal switching power(pJ) to Y falling (conditional):

Cell Name	Input	When	Power(pJ)		
			first	mid	last
XOR2XL	A	B	0.00000	0.00000	0.00000
	A	B	0.00208	0.00149	0.00268
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.01169	0.01153	0.01302
	B	A	0.00000	0.00000	0.00000
	B	A	0.00203	0.00151	0.00271
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.01040	0.01040	0.01196