sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs Library

Cell Groups
SKY130_OSU_SC_15T_MS__ADDFx
SKY130_OSU_SC_15T_MS__ADDHx
SKY130_OSU_SC_15T_MS__AND2x
SKY130_OSU_SC_15T_MS__AOI21
SKY130_OSU_SC_15T_MS__AOI22
SKY130_OSU_SC_15T_MS__BUFx
SKY130_OSU_SC_15T_MS__DFFRx
SKY130_OSU_SC_15T_MS__DFFSRx
SKY130_OSU_SC_15T_MS__DFFSx
SKY130_OSU_SC_15T_MS__DFFx
SKY130_OSU_SC_15T_MS__INVx
SKY130_OSU_SC_15T_MS__MUX2
SKY130_OSU_SC_15T_MS__NAND2x
SKY130_OSU_SC_15T_MS__NOR2x
SKY130_OSU_SC_15T_MS__OAI21
SKY130_OSU_SC_15T_MS__OAI22
SKY130_OSU_SC_15T_MS__OR2x
SKY130_OSU_SC_15T_MS__TBUFIx
SKY130_OSU_SC_15T_MS__TNBUFIx
SKY130_OSU_SC_15T_MS__XNOR2
SKY130_OSU_SC_15T_MS__XOR2
SKY130_OSU_SC_15T_MS_x

SKY130_OSU_SC_15T_MS__ADDFx

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

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
sky130_osu_sc_15T_ms__addf_1	39.07200
sky130_osu_sc_15T_ms__addf_l	39.07200

Pin Capacitance Information

Cell Name	Pin Cap(pf)			Max Cap(pf)		
	A	**B**	**CI**	**CO**	**CON**	**S**
sky130_osu_sc_15T_ms__addf_1	0.01455	0.01455	0.01126	2.53711	1.20040	2.39262
sky130_osu_sc_15T_ms__addf_l	0.01455	0.01455	0.01124	1.49364	1.20041	1.51888

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__addf_1	0.00000	0.06117	0.08502
sky130_osu_sc_15T_ms__addf_l	0.00000	0.06007	0.08392

Delay Information

Delay(ns) to CO rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__addf_1	A->CO (RR)	0.10099	1.41869	24.52750
	B->CO (RR)	0.08901	1.36015	23.57560
	CI->CO (RR)	0.09505	1.42862	24.78050
	CON->CO (FR)	0.01893	0.63765	10.91400
sky130_osu_sc_15T_ms__addf_1	A->CO (RR)	0.10598	1.31082	18.71840
	B->CO (RR)	0.09418	1.26324	18.15330
	CI->CO (RR)	0.10008	1.32265	19.04360
	CON->CO (FR)	0.02410	0.73081	11.06120

Delay(ns) to CO falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__addf_1	A->CO (FF)	0.13671	1.78039	30.60990
	B->CO (FF)	0.12085	1.69406	29.15010
	CI->CO (FF)	0.11953	1.76482	30.67930
	CON->CO (RF)	0.01731	0.53600	9.23046
sky130_osu_sc_15T_ms__addf_1	A->CO (FF)	0.12895	1.43828	20.34630
	B->CO (FF)	0.11396	1.37653	19.55340
	CI->CO (FF)	0.11183	1.42456	20.47010
	CON->CO (RF)	0.01765	0.49254	7.44659

Delay(ns) to CON rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__addf_1	A->CON (FR)	0.10521	0.80971	10.44580
	B->CON (FR)	0.08913	0.76294	10.01970
	CI->CON (FR)	0.08800	0.79767	10.59530
sky130_osu_sc_15T_ms__addf_l	A->CON (FR)	0.10003	0.80467	10.44050
	B->CON (FR)	0.08446	0.75859	10.01500
	CI->CON (FR)	0.08282	0.79253	10.59010

Delay(ns) to CON falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__addf_1	A->CON (RF)	0.06547	0.54254	7.05530
	B->CON (RF)	0.05364	0.52156	6.92600
	CI->CON (RF)	0.05955	0.55727	7.41484
sky130_osu_sc_15T_ms__addf_l	A->CON (RF)	0.06265	0.53967	7.05201
	B->CON (RF)	0.05109	0.51881	6.92316
	CI->CON (RF)	0.05672	0.55449	7.41184

Delay(ns) to S rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__addf_1	A->S (-R)	0.19889	1.58007	23.89690
	B->S (-R)	0.20206	1.55160	22.87990
	CI->S (-R)	0.18044	1.56205	23.97800
	CON->S (RR)	0.05731	0.51127	6.93979
sky130_osu_sc_15T_ms__addf_l	A->S (-R)	0.19323	1.45020	18.93780
	B->S (-R)	0.19649	1.43518	18.35890
	CI->S (-R)	0.17471	1.43383	19.05610
	CON->S (RR)	0.05929	0.57135	6.84944

Delay(ns) to S falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__addf_1	A->S (-F)	0.16429	1.26075	18.20820
	B->S (-F)	0.16605	1.22625	17.64300
	CI->S (-F)	0.15769	1.26749	18.46860
	CON->S (FF)	0.06875	0.55615	6.93384
sky130_osu_sc_15T_ms__addf_l	A->S (-F)	0.15147	1.09036	13.57690
	B->S (-F)	0.15395	1.06711	13.28280
	CI->S (-F)	0.14491	1.09950	13.89670
	CON->S (FF)	0.06299	0.52530	5.80688

Power Information

Internal switching power(pJ) to CO rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.00296	0.00372	0.02315
	B	0.00346	0.00415	0.02155
	CI	0.00445	0.00530	0.02500
sky130_osu_sc_15T_ms__addf_l	A	0.00222	0.00267	0.01389
	B	0.00274	0.00326	0.01316
	CI	0.00371	0.00424	0.01617

Internal switching power(pJ) to CO falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.01129	0.01230	0.04446
	B	0.01182	0.01257	0.04050
	CI	0.00956	0.01077	0.04386
sky130_osu_sc_15T_ms__addf_l	A	0.01060	0.01121	0.02976
	B	0.01112	0.01161	0.02758
	CI	0.00887	0.00968	0.02984

Internal switching power(pJ) to CON rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.01128	0.01180	0.02678
	B	0.01161	0.01201	0.02567
	CI	0.00955	0.01025	0.02707
sky130_osu_sc_15T_ms__addf_l	A	0.01059	0.01109	0.02606
	B	0.01093	0.01131	0.02493
	CI	0.00886	0.00955	0.02637

Internal switching power(pJ) to CON falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.00294	0.00341	0.01318
	B	0.00344	0.00382	0.01264
	CI	0.00443	0.00502	0.01559
sky130_osu_sc_15T_ms__addf_l	A	0.00220	0.00258	0.01176
	B	0.00272	0.00301	0.01134
	CI	0.00369	0.00415	0.01408

Internal switching power(pJ) to S rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.01129	0.01224	0.04238
	B	0.01181	0.01254	0.03891
	CI	0.00956	0.01072	0.04190
sky130_osu_sc_15T_ms__addf_l	A	0.01060	0.01122	0.03020
	B	-0.00496	-0.00510	0.02081
	CI	0.00887	0.00969	0.03020

Internal switching power(pJ) to S falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.02500	0.02524	0.04554
	B	0.02226	0.02293	0.05704
	CI	0.02029	0.02030	0.04053
sky130_osu_sc_15T_ms__addf_l	A	0.02401	0.02404	0.04482
	B	0.02128	0.02200	0.05763
	CI	0.01934	0.01937	0.04059

SKY130_OSU_SC_15T_MS__ADDHx

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__addh_1	23.19900
sky130_osu_sc_15T_ms__addh_l	23.19900

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)		
	A	B	CO	CON	S
sky130_osu_sc_15T_ms__addh_1	0.00713	0.00795	2.46561	1.32761	2.56741
sky130_osu_sc_15T_ms__addh_l	0.00713	0.00795	1.57462	1.32592	1.58656

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__addh_1	0.00000	0.07284	0.08496
sky130_osu_sc_15T_ms__addh_l	0.00000	0.07144	0.08385

Delay Information

Delay(ns) to CO rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__addh_1	A->CO (RR)	0.06733	0.51350	6.70310
	B->CO (RR)	0.07027	0.51837	6.83685
sky130_osu_sc_15T_ms__addh_l	A->CO (RR)	0.07056	0.58056	6.78626
	B->CO (RR)	0.07351	0.58554	6.87289

Delay(ns) to CO falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__addh_1	A->CO (FF)	0.05863	0.52924	6.91675
	B->CO (FF)	0.06312	0.54178	6.91449
sky130_osu_sc_15T_ms__addh_l	A->CO (FF)	0.05439	0.47000	5.22257
	B->CO (FF)	0.05854	0.48227	5.22314

Delay(ns) to CON rising (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
sky130_osu_sc_15T_ms__addh_1	A->CON (RR)	B	0.09344	0.41957	3.58230
	A->CON (FR)	!B	0.05576	0.74347	10.50780
	B->CON (RR)	A	0.09624	0.42373	3.71586
	B->CON (FR)	!A	0.06908	0.76147	10.53000
sky130_osu_sc_15T_ms__addh_l	A->CON (RR)	B	0.08648	0.40664	3.59786
	A->CON (FR)	!B	0.05113	0.73813	10.49430
	B->CON (RR)	A	0.08933	0.41125	3.68496
	B->CON (FR)	!A	0.06445	0.75599	10.51640

Delay(ns) to CON falling (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
sky130_osu_sc_15T_ms__addh_1	A->CON (FF)	B	0.09208	0.55181	5.66114
	A->CON (RF)	!B	0.03836	0.53803	7.66194
	B->CON (FF)	A	0.09111	0.57966	5.96436
	B->CON (RF)	!A	0.04543	0.52602	7.29360
sky130_osu_sc_15T_ms__addh_l	A->CON (FF)	B	0.08587	0.53739	5.60573
	A->CON (RF)	!B	0.03582	0.53559	7.65265
	B->CON (FF)	A	0.08486	0.56544	5.90397
	B->CON (RF)	!A	0.04292	0.52297	7.28500

Delay(ns) to S rising (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
sky130_osu_sc_15T_ms__addh_1	A->S (RR)	!B	0.07024	1.37855	24.49610
	A->S (FR)	B	0.12433	1.37641	22.24610
	B->S (RR)	!A	0.07743	1.32981	23.38590
	B->S (FR)	A	0.12379	1.43893	23.30230
	CON->S (FR)	-	0.02098	0.65798	11.28880
sky130_osu_sc_15T_ms__addh_l	A->S (RR)	!B	0.07219	1.27431	19.18260
	A->S (FR)	B	0.12271	1.26145	16.90630
	B->S (RR)	!A	0.07938	1.23621	18.41000
	B->S (FR)	A	0.12204	1.31528	17.62070
	CON->S (FR)	-	0.02456	0.73750	11.30140

Delay(ns) to S falling (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
sky130_osu_sc_15T_ms__addh_1	A->S (FF)	!B	0.08269	1.60540	28.51680
	A->S (RF)	B	0.11745	1.06998	16.70480
	B->S (FF)	!A	0.09602	1.62605	28.61290
	B->S (RF)	A	0.12025	1.07391	16.83690
	CON->S (RF)	-	0.01618	0.52595	9.06893
sky130_osu_sc_15T_ms__addh_l	A->S (FF)	!B	0.07655	1.33092	19.99120
	A->S (RF)	B	0.10942	0.89235	11.23880
	B->S (FF)	!A	0.08988	1.34966	20.03920
	B->S (RF)	A	0.11225	0.89766	11.32150
	CON->S (RF)	-	0.01654	0.49424	7.60231

Power Information

Internal switching power(pJ) to CO rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addh_1	A	0.00000	0.00000	0.00000
	A	0.00539	0.00536	0.01451
	B	0.00000	0.00000	0.00000
	B	0.00490	0.00474	0.01726
sky130_osu_sc_15T_ms__addh_l	A	0.00000	0.00000	0.00000
	A	0.00470	0.00465	0.01672
	B	0.00000	0.00000	0.00000
	B	0.00420	0.00403	0.01781

Internal switching power(pJ) to CO falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addh_1	A	0.00000	0.00000	0.00000
	A	0.00809	0.00835	0.02521
	B	0.00000	0.00000	0.00000
	B	0.00845	0.00934	0.02693
sky130_osu_sc_15T_ms__addh_l	A	0.00000	0.00000	0.00000
	A	0.00742	0.00765	0.02353
	B	0.00000	0.00000	0.00000
	B	0.00778	0.00854	0.02445

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

Cell Name	Input	When	Power(pJ)		
			first	mid	last
sky130_osu_sc_15T_ms__addh_1	A	B	0.00000	0.00000	0.00000
	A	B	0.00540	0.00538	0.01543
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00723	0.00765	0.01255
	B	A	0.00000	0.00000	0.00000
	B	A	0.00490	0.00476	0.01826
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00803	0.00805	0.01068
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00469	0.00466	0.01665
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00676	0.00715	0.01172
	B	A	0.00000	0.00000	0.00000
	B	A	0.00420	0.00402	0.01809
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00756	0.00752	0.00985

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

Cell Name	Input	When	Power(pJ)		
			first	mid	last
sky130_osu_sc_15T_ms__addh_1	A	B	0.00000	0.00000	0.00000
	A	B	0.00809	0.00835	0.02440
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00106	0.00122	0.00439
	B	A	0.00000	0.00000	0.00000
	B	A	0.00845	0.00930	0.02578
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00190	0.00198	0.00494
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00742	0.00766	0.02373
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00042	0.00053	0.00267
	B	A	0.00000	0.00000	0.00000
	B	A	0.00778	0.00855	0.02438
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00128	0.00124	0.00336

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

Cell Name	Input	When	Power(pJ)		
			first	mid	last
sky130_osu_sc_15T_ms__addh_1	A	B	0.00000	0.00000	0.00000
	A	B	0.00809	0.00837	0.02557
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00108	0.00133	0.00547
	B	A	0.00000	0.00000	0.00000
	B	A	0.00845	0.00935	0.02746
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00193	0.00204	0.00558
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00743	0.00767	0.02383
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00043	0.00056	0.00316
	B	A	0.00000	0.00000	0.00000
	B	A	0.00779	0.00856	0.02485
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00129	0.00127	0.00354

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

Cell Name	Input	When	Power(pJ)		
			first	mid	last
sky130_osu_sc_15T_ms__addh_1	A	B	0.00000	0.00000	0.00000
	A	B	0.00540	0.00535	0.01487
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00724	0.00773	0.01212
	B	A	0.00000	0.00000	0.00000
	B	A	0.00490	0.00473	0.01716
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00806	0.00817	0.01123
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00470	0.00467	0.01699
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00676	0.00718	0.01141
	B	A	0.00000	0.00000	0.00000
	B	A	0.00420	0.00403	0.01785
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00758	0.00758	0.00977

SKY130_OSU_SC_15T_MS__AND2x

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__and2_1	10.37850
sky130_osu_sc_15T_ms__and2_2	12.82050
sky130_osu_sc_15T_ms__and2_4	17.70450
sky130_osu_sc_15T_ms__and2_6	22.58850
sky130_osu_sc_15T_ms__and2_8	27.47250
sky130_osu_sc_15T_ms__and2_l	10.37850

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
sky130_osu_sc_15T_ms__and2_1	0.00385	0.00395	2.49427
sky130_osu_sc_15T_ms__and2_2	0.00386	0.00396	4.80396
sky130_osu_sc_15T_ms__and2_4	0.00386	0.00396	9.16934
sky130_osu_sc_15T_ms__and2_6	0.00389	0.00396	13.37845
sky130_osu_sc_15T_ms__and2_8	0.00387	0.00397	17.26619
sky130_osu_sc_15T_ms__and2_l	0.00296	0.00307	1.47888

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__and2_1	0.00000	0.03538	0.05655
sky130_osu_sc_15T_ms__and2_2	0.00000	0.05657	0.05662
sky130_osu_sc_15T_ms__and2_4	0.00000	0.09897	0.11307
sky130_osu_sc_15T_ms__and2_6	0.00000	0.14136	0.16954
sky130_osu_sc_15T_ms__and2_8	0.00000	0.18375	0.22602
sky130_osu_sc_15T_ms__and2_l	0.00000	0.03398	0.05430

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__and2_1	A->Y (RR)	0.05130	0.46473	6.72410
	B->Y (RR)	0.05517	0.47158	6.55411
sky130_osu_sc_15T_ms__and2_2	A->Y (RR)	0.05921	0.41723	6.67747
	B->Y (RR)	0.06311	0.42216	6.52425
sky130_osu_sc_15T_ms__and2_4	A->Y (RR)	0.08182	0.42567	6.85987
	B->Y (RR)	0.08569	0.42702	6.73951
sky130_osu_sc_15T_ms__and2_6	A->Y (RR)	0.10383	0.45261	6.97285
	B->Y (RR)	0.10761	0.45071	6.86638
sky130_osu_sc_15T_ms__and2_8	A->Y (RR)	0.12559	0.48427	7.10959
	B->Y (RR)	0.12947	0.47998	7.01728
sky130_osu_sc_15T_ms__and2_l	A->Y (RR)	0.05575	0.51395	6.13486
	B->Y (RR)	0.05970	0.52130	5.97372

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__and2_1	A->Y (FF)	0.04594	0.47386	6.50730
	B->Y (FF)	0.04855	0.48560	6.51442
sky130_osu_sc_15T_ms__and2_2	A->Y (FF)	0.05200	0.43939	6.43897
	B->Y (FF)	0.05495	0.44911	6.46882
sky130_osu_sc_15T_ms__and2_4	A->Y (FF)	0.07108	0.45246	6.53727
	B->Y (FF)	0.07369	0.45944	6.56706
sky130_osu_sc_15T_ms__and2_6	A->Y (FF)	0.09235	0.48261	6.61470
	B->Y (FF)	0.09447	0.48724	6.65046
sky130_osu_sc_15T_ms__and2_8	A->Y (FF)	0.11201	0.50982	6.60973
	B->Y (FF)	0.11389	0.51339	6.64525
sky130_osu_sc_15T_ms__and2_l	A->Y (FF)	0.05140	0.50191	5.78907
	B->Y (FF)	0.05564	0.51476	5.82286

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__and2_1	A	0.00000	0.00000	0.00000
	A	0.00376	0.00451	0.05373
	B	0.00000	0.00000	0.00000
	B	0.00382	0.00384	0.03214
sky130_osu_sc_15T_ms__and2_2	A	0.00000	0.00000	0.00000
	A	0.00748	0.00822	0.05579
	B	0.00000	0.00000	0.00000
	B	0.00756	0.00779	0.03516
sky130_osu_sc_15T_ms__and2_4	A	0.00000	0.00000	0.00000
	A	0.01583	0.01686	0.06133
	B	0.00000	0.00000	0.00000
	B	0.01591	0.01655	0.04099
sky130_osu_sc_15T_ms__and2_6	A	0.00000	0.00000	0.00000
	A	0.02491	0.02570	0.06768
	B	0.00000	0.00000	0.00000
	B	0.02493	0.02548	0.04893
sky130_osu_sc_15T_ms__and2_8	A	0.00000	0.00000	0.00000
	A	0.03435	0.03506	0.07553
	B	0.00000	0.00000	0.00000
	B	0.03445	0.03473	0.05545
sky130_osu_sc_15T_ms__and2_l	A	0.00000	0.00000	0.00000
	A	0.00273	0.00326	0.03740
	B	0.00000	0.00000	0.00000
	B	0.00280	0.00277	0.02277

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__and2_1	A	0.00000	0.00000	0.00000
	A	0.00990	0.01202	0.05502
	B	0.00000	0.00000	0.00000
	B	0.01121	0.01348	0.05241
sky130_osu_sc_15T_ms__and2_2	A	0.00000	0.00000	0.00000
	A	0.01270	0.01510	0.05768
	B	0.00000	0.00000	0.00000
	B	0.01405	0.01639	0.05546
sky130_osu_sc_15T_ms__and2_4	A	0.00000	0.00000	0.00000
	A	0.01989	0.02274	0.06474
	B	0.00000	0.00000	0.00000
	B	0.02116	0.02355	0.06230
sky130_osu_sc_15T_ms__and2_6	A	0.00000	0.00000	0.00000
	A	0.02747	0.03039	0.07173
	B	0.00000	0.00000	0.00000
	B	0.02856	0.03113	0.06952
sky130_osu_sc_15T_ms__and2_8	A	0.00000	0.00000	0.00000
	A	0.03587	0.03798	0.07953
	B	0.00000	0.00000	0.00000
	B	0.03700	0.03837	0.07623
sky130_osu_sc_15T_ms__and2_l	A	0.00000	0.00000	0.00000
	A	0.00762	0.00922	0.03724
	B	0.00000	0.00000	0.00000
	B	0.00859	0.00985	0.03588

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__and2_1	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00360	-0.00360	-0.00362
sky130_osu_sc_15T_ms__and2_2	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00359	-0.00360	-0.00362
sky130_osu_sc_15T_ms__and2_4	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00359	-0.00360	-0.00362
sky130_osu_sc_15T_ms__and2_6	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00362	-0.00363	-0.00364
sky130_osu_sc_15T_ms__and2_8	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00359	-0.00360	-0.00362
sky130_osu_sc_15T_ms__and2_l	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00254	-0.00255	-0.00256

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__and2_1	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00361	0.00369	0.00363
sky130_osu_sc_15T_ms__and2_2	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00361	0.00369	0.00363
sky130_osu_sc_15T_ms__and2_4	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00361	0.00369	0.00363
sky130_osu_sc_15T_ms__and2_6	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00364	0.00371	0.00366
sky130_osu_sc_15T_ms__and2_8	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00361	0.00369	0.00363
sky130_osu_sc_15T_ms__and2_l	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00256	0.00259	0.00257

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__and2_1	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00337	-0.00339	-0.00338
sky130_osu_sc_15T_ms__and2_2	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00337	-0.00339	-0.00338
sky130_osu_sc_15T_ms__and2_4	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00337	-0.00339	-0.00338
sky130_osu_sc_15T_ms__and2_6	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00337	-0.00339	-0.00338
sky130_osu_sc_15T_ms__and2_8	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00337	-0.00338	-0.00338
sky130_osu_sc_15T_ms__and2_l	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00239	-0.00240	-0.00240

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__and2_1	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00339	0.00342	0.00339
sky130_osu_sc_15T_ms__and2_2	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00340	0.00342	0.00339
sky130_osu_sc_15T_ms__and2_4	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00340	0.00342	0.00339
sky130_osu_sc_15T_ms__and2_6	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00340	0.00342	0.00339
sky130_osu_sc_15T_ms__and2_8	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00340	0.00342	0.00339
sky130_osu_sc_15T_ms__and2_l	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00243	0.00240	0.00241

SKY130_OSU_SC_15T_MS__AOI21

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

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
sky130_osu_sc_15T_ms__aoi21_l	10.37850

Pin Capacitance Information

Cell Name	Pin Cap(pf)			Max Cap(pf)
	A0	A1	B0	Y
sky130_osu_sc_15T_ms__aoi21_l	0.00363	0.00380	0.00369	1.14310

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__aoi21_l	0.00000	0.01267	0.02824

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__aoi21_l	A0->Y (FR)	0.05694	0.76635	10.34140
	A1->Y (FR)	0.04697	0.72241	9.89038
	B0->Y (FR)	0.04161	0.75825	10.51790

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__aoi21_l	A0->Y (RF)	0.03477	0.48569	6.55129
	A1->Y (RF)	0.03104	0.48527	6.64916
	B0->Y (RF)	0.02084	0.45099	6.28284

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi21_l	A0	0.00000	0.00000	0.00000
	A0	0.00869	0.00861	0.01200
	A1	0.00000	0.00000	0.00000
	A1	0.00721	0.00713	0.01040
	B0	0.00521	0.00590	0.01827

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi21_l	A0	0.00000	0.00000	0.00000
	A0	0.00176	0.00151	0.00348
	A1	0.00000	0.00000	0.00000
	A1	0.00180	0.00166	0.00452
	B0	-0.00087	-0.00059	0.00383

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi21_l	(A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A1 * B0 * !Y)	-0.00268	-0.00306	-0.00306
	(!A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !Y)	-0.00310	-0.00313	-0.00311
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00310	-0.00311	-0.00311

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi21_l	(A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A1 * B0 * !Y)	0.00304	0.00311	0.00306
	(!A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !Y)	0.00310	0.00315	0.00312
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00312	0.00315	0.00312

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi21_l	(A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * B0 * !Y)	-0.00266	-0.00300	-0.00301
	(!A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !Y)	-0.00305	-0.00307	-0.00305
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00335	-0.00337	-0.00338

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi21_l	(A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * B0 * !Y)	0.00299	0.00303	0.00301
	(!A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !Y)	0.00305	0.00307	0.00306
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00337	0.00344	0.00339

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi21_l	(A0 * A1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !Y)	-0.00145	-0.00148	-0.00145

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi21_l	(A0 * A1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !Y)	0.00156	0.00158	0.00148

SKY130_OSU_SC_15T_MS__AOI22

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

INPUT				OUTPUT
A0	A1	B0	B1	Y
0	x	0	x	1
0	x	1	0	1
x	x	1	1	0
1	0	0	x	1
1	0	1	0	1
1	1	x	x	0

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__aoi22_1	12.82050

Pin Capacitance Information

Cell Name	Pin Cap(pf)				Max Cap(pf)
	A0	A1	B0	B1	Y
sky130_osu_sc_15T_ms__aoi22_1	0.00362	0.00377	0.00391	0.00371	1.18616

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__aoi22_1	0.00000	0.01382	0.05648

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__aoi22_l	A0->Y (FR)	0.06936	0.77797	10.40560
	A1->Y (FR)	0.06143	0.75719	10.28600
	B0->Y (FR)	0.04203	0.74137	10.40460
	B1->Y (FR)	0.05014	0.76493	10.59520

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__aoi22_l	A0->Y (RF)	0.04511	0.50369	6.71410
	A1->Y (RF)	0.04133	0.50252	6.81514
	B0->Y (RF)	0.02339	0.48119	6.80056
	B1->Y (RF)	0.02716	0.48211	6.69954

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi22_l	A0	0.01054	0.01045	0.01381
	A1	0.00906	0.00896	0.01229
	B0	0.00569	0.00608	0.01568
	B1	0.00714	0.00778	0.01705

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi22_l	A0	0.00364	0.00336	0.00533
	A1	0.00368	0.00350	0.00638
	B0	-0.00061	-0.00049	0.00243
	B1	-0.00051	-0.00059	0.00145

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi22_l	(A1 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A1 * B0 * B1 * !Y)	-0.00276	-0.00307	-0.00306
	(!A1 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * B1 * !Y)	-0.00310	-0.00312	-0.00311
	(!A1 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !B1 * Y)	-0.00310	-0.00313	-0.00311
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00310	-0.00313	-0.00311

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi22_l	(A1 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A1 * B0 * B1 * !Y)	0.00304	0.00308	0.00306
	(!A1 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * B1 * !Y)	0.00311	0.00313	0.00312
	(!A1 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !B1 * Y)	0.00312	0.00315	0.00312
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00312	0.00315	0.00312

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi22_l	(A0 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * B0 * B1 * !Y)	-0.00273	-0.00301	-0.00301
	(!A0 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * B1 * !Y)	-0.00305	-0.00305	-0.00305
	(!A0 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !B1 * Y)	-0.00335	-0.00336	-0.00337
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00335	-0.00336	-0.00337

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi22_l	(A0 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * B0 * B1 * !Y)	0.00299	0.00301	0.00301
	(!A0 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * B1 * !Y)	0.00305	0.00309	0.00306
	(!A0 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !B1 * Y)	0.00336	0.00343	0.00338
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00336	0.00343	0.00338

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi22_l	(A0 * A1 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * B1 * !Y)	-0.00146	-0.00149	-0.00146
	(A0 * A1 * !B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B1 * !Y)	-0.00145	-0.00147	-0.00146
	(!A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B1 * Y)	-0.00348	-0.00351	-0.00350
	(!A0 * A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B1 * Y)	-0.00348	-0.00351	-0.00350

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi22_l	(A0 * A1 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * B1 * !Y)	0.00161	0.00163	0.00150
	(A0 * A1 * !B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B1 * !Y)	0.00146	0.00147	0.00146
	(!A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B1 * Y)	0.00349	0.00357	0.00351
	(!A0 * A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B1 * Y)	0.00349	0.00357	0.00351

Passive power(pJ) for B1 rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi22_l	(A0 * A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * B0 * !Y)	-0.00147	-0.00149	-0.00148
	(A0 * A1 * !B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B0 * !Y)	-0.00147	-0.00148	-0.00147
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00317	-0.00320	-0.00318
	(!A0 * A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B0 * Y)	-0.00317	-0.00319	-0.00318

Passive power(pJ) for B1 falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi22_l	(A0 * A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * B0 * !Y)	0.00162	0.00164	0.00151
	(A0 * A1 * !B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B0 * !Y)	0.00147	0.00148	0.00147
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00319	0.00321	0.00318
	(!A0 * A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B0 * Y)	0.00319	0.00320	0.00318

SKY130_OSU_SC_15T_MS__BUFx

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

INPUT	OUTPUT
A	Y
0	0
1	1

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__buf_1	7.93650
sky130_osu_sc_15T_ms__buf_2	10.37850
sky130_osu_sc_15T_ms__buf_4	15.26250
sky130_osu_sc_15T_ms__buf_6	20.14650
sky130_osu_sc_15T_ms__buf_8	25.03050
sky130_osu_sc_15T_ms__buf_l	7.93650

Pin Capacitance Information

Cell Name	Pin Cap(pf)	Max Cap(pf)
	A	Y
sky130_osu_sc_15T_ms__buf_1	0.00395	2.45157
sky130_osu_sc_15T_ms__buf_2	0.00399	4.78348
sky130_osu_sc_15T_ms__buf_4	0.00399	9.29347
sky130_osu_sc_15T_ms__buf_6	0.00090	1.80000
sky130_osu_sc_15T_ms__buf_8	0.00400	17.67270
sky130_osu_sc_15T_ms__buf_l	0.00310	1.47234

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__buf_1	0.00000	0.02831	0.02831
sky130_osu_sc_15T_ms__buf_2	0.00000	0.04246	0.05655
sky130_osu_sc_15T_ms__buf_4	0.00000	0.07077	0.11303
sky130_osu_sc_15T_ms__buf_6	0.00000	0.00000	0.00000
sky130_osu_sc_15T_ms__buf_8	0.00000	0.12739	0.22598
sky130_osu_sc_15T_ms__buf_l	0.00000	0.02721	0.02721

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__buf_1	**A->Y (RR)**	0.04140	0.44492	6.48108
sky130_osu_sc_15T_ms__buf_2	**A->Y (RR)**	0.04786	0.39294	6.44024
sky130_osu_sc_15T_ms__buf_4	**A->Y (RR)**	0.06526	0.39422	6.68831
sky130_osu_sc_15T_ms__buf_8	**A->Y (RR)**	0.09868	0.43921	6.92729
sky130_osu_sc_15T_ms__buf_l	**A->Y (RR)**	0.04621	0.48993	5.84609

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__buf_1	**A->Y (FF)**	0.04335	0.46427	6.41384
sky130_osu_sc_15T_ms__buf_2	**A->Y (FF)**	0.05074	0.44794	6.72402
sky130_osu_sc_15T_ms__buf_4	**A->Y (FF)**	0.07003	0.46369	7.02067
sky130_osu_sc_15T_ms__buf_8	**A->Y (FF)**	0.11091	0.52033	7.19380
sky130_osu_sc_15T_ms__buf_l	**A->Y (FF)**	0.04927	0.49398	5.74925

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__buf_1	A	0.00000	0.00000	0.00000
	A	0.00352	0.00414	0.03607
sky130_osu_sc_15T_ms__buf_2	A	0.00000	0.00000	0.00000
	A	0.00720	0.00768	0.03833
sky130_osu_sc_15T_ms__buf_4	A	0.00000	0.00000	0.00000
	A	0.01545	0.01639	0.04497
sky130_osu_sc_15T_ms__buf_8	A	0.00000	0.00000	0.00000
	A	0.03294	0.03424	0.06232
sky130_osu_sc_15T_ms__buf_l	A	0.00000	0.00000	0.00000
	A	0.00265	0.00307	0.02673

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__buf_1	A	0.00000	0.00000	0.00000
	A	0.00948	0.01203	0.05301
sky130_osu_sc_15T_ms__buf_2	A	0.00000	0.00000	0.00000
	A	0.01238	0.01497	0.05257
sky130_osu_sc_15T_ms__buf_4	A	0.00000	0.00000	0.00000
	A	0.01951	0.02207	0.05981
sky130_osu_sc_15T_ms__buf_8	A	0.00000	0.00000	0.00000
	A	0.03531	0.03696	0.07455
sky130_osu_sc_15T_ms__buf_l	A	0.00000	0.00000	0.00000
	A	0.00736	0.00889	0.03612

Passive power(pJ) for A rising :

Cell Name	Power(pJ)		
	first	mid	last
sky130_osu_sc_15T_ms__buf_6	0.00000	0.00000	0.00000
	-0.00068	-0.00069	-0.00067

Passive power(pJ) for A falling :

Cell Name	Power(pJ)		
	first	mid	last
sky130_osu_sc_15T_ms__buf_6	0.00000	0.00000	0.00000
	0.00068	0.00069	0.00067

SKY130_OSU_SC_15T_MS__DFFRx

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__dffr_1	53.11350
sky130_osu_sc_15T_ms__dffr_l	53.11350

Pin Capacitance Information

Cell Name	Pin Cap(pf)			Max Cap(pf)	
	D	RN	CK	Q	QN
sky130_osu_sc_15T_ms__dffr_1	0.00374	0.00371	0.01106	2.24860	2.21838
sky130_osu_sc_15T_ms__dffr_l	0.00374	0.00371	0.01105	1.49361	1.47677

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__dffr_1	0.00000	0.09130	0.13084
sky130_osu_sc_15T_ms__dffr_l	0.00000	0.09020	0.12974

Delay Information

Delay(ns) to Q rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffr_1	CK->Q (RR)	0.21541	1.11245	14.87470
	QN->Q (FR)	0.02465	0.76887	12.86340
sky130_osu_sc_15T_ms__dffr_l	CK->Q (RR)	0.20596	1.15973	13.58330
	QN->Q (FR)	0.02734	0.82114	12.43050

Delay(ns) to Q falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffr_1	CK->Q (RF)	0.20236	1.11680	15.31810
	QN->Q (RF)	0.01976	0.59777	9.93011
	RN->Q (FF)	0.14903	1.15635	16.53620
sky130_osu_sc_15T_ms__dffr_l	CK->Q (RF)	0.20542	1.18878	14.09920
	QN->Q (RF)	0.01913	0.55322	8.40543
	RN->Q (FF)	0.15235	1.22703	15.31690

Delay(ns) to QN rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffr_1	CK->QN (RR)	0.17885	0.60870	6.39418
	RN->QN (FR)	0.12550	0.64733	7.61237
sky130_osu_sc_15T_ms__dffr_l	CK->QN (RR)	0.18148	0.67505	6.43530
	RN->QN (FR)	0.12831	0.71336	7.64827

Delay(ns) to QN falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffr_1	**CK->QN (RF)**	0.18352	0.54935	5.04052
sky130_osu_sc_15T_ms__dffr_l	**CK->QN (RF)**	0.16936	0.52692	4.17975

Constraint Information

Constraints(ns) for D rising :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffr_1	hold	CK (R)	-0.04742	-0.06600	-0.09146
	setup	CK (R)	0.17540	0.21023	0.85087
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.04749	-0.06600	-0.08768
	setup	CK (R)	0.17714	0.21265	0.81612

Constraints(ns) for D falling :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffr_1	hold	CK (R)	-0.07741	-0.26123	-1.48843
	setup	CK (R)	0.09426	0.27112	3.02585
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.07704	-0.26063	-1.55978
	setup	CK (R)	0.09426	0.27112	3.02663

Constraints(ns) for D rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffr_1	hold	CK (R)	-0.04742	-0.06600	-0.09146
	setup	CK (R)	0.17540	0.21023	0.85087
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.04749	-0.06600	-0.08768
	setup	CK (R)	0.17714	0.21265	0.81612

Constraints(ns) for D falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffr_1	hold	CK (R)	-0.07741	-0.26123	-1.48843
	setup	CK (R)	0.09426	0.27112	3.02585
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.07704	-0.26063	-1.55978
	setup	CK (R)	0.09426	0.27112	3.02663

Constraints(ns) for RN rising :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffr_1	recovery	CK (R)	0.14955	0.18293	1.10707
	removal	CK (R)	-0.03710	-0.04416	-0.16247
sky130_osu_sc_15T_ms__dffr_l	recovery	CK (R)	0.15054	0.18509	1.05607
	removal	CK (R)	-0.03710	-0.04416	-0.16247

Constraints(ns) for RN rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffr_1	recovery	CK (R)	0.14955	0.18293	1.10707
	removal	CK (R)	-0.03710	-0.04416	-0.16247
sky130_osu_sc_15T_ms__dffr_l	recovery	CK (R)	0.15054	0.18509	1.05607
	removal	CK (R)	-0.03710	-0.04416	-0.16247

Constraints(ns) for RN falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffr_1	min_pulse_width	RN ()	0.08414	0.43823	13.33370
	min_pulse_width	RN ()	0.08414	0.43823	13.33370
sky130_osu_sc_15T_ms__dffr_l	min_pulse_width	RN ()	0.08414	0.43823	13.33370
	min_pulse_width	RN ()	0.08414	0.43823	13.33370

Constraints(ns) for CK rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffr_1	min_pulse_width	CK ()	0.10069	0.43823	13.33370
	min_pulse_width	CK ()	0.10400	0.43823	13.33370
sky130_osu_sc_15T_ms__dffr_l	min_pulse_width	CK ()	0.09407	0.43823	13.33370
	min_pulse_width	CK ()	0.10069	0.43823	13.33370

Constraints(ns) for CK falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffr_1	min_pulse_width	CK ()	0.21651	0.43823	13.33370
	min_pulse_width	CK ()	0.07752	0.43823	13.33370
sky130_osu_sc_15T_ms__dffr_l	min_pulse_width	CK ()	0.21651	0.43823	13.33370
	min_pulse_width	CK ()	0.07752	0.43823	13.33370

Power Information

Internal switching power(pJ) to Q rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffr_1	CK	0.00000	0.00000	0.00000
	CK	0.00961	0.00693	0.00000
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00847	0.00677	0.01208

Internal switching power(pJ) to Q falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffr_1	CK	0.00000	0.00000	0.00000
	CK	0.01100	0.00777	0.00000
	RN	-0.00126	-0.09639	-1.74132
	RN	0.02551	0.02302	-0.00707
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00987	0.00821	0.00973
	RN	-0.00126	-0.07541	-1.15665
	RN	0.02436	0.02342	0.02533

Internal switching power(pJ) to QN rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffr_1	CK	0.00000	0.00000	0.00000
	CK	0.01100	0.00780	0.00000
	RN	-0.00126	-0.09561	-1.71789
	RN	0.02550	0.02302	-0.00615
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00987	0.00823	0.01004
	RN	-0.00126	-0.07490	-1.14361
	RN	0.02436	0.02343	0.02579

Internal switching power(pJ) to QN falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffr_1	CK	0.00000	0.00000	0.00000
	CK	0.00957	0.00698	0.00000
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00844	0.00680	0.01160

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffr_1	CK	0.00000	0.00000	0.00000
	CK	-0.00259	-0.00303	-0.00304
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.01208	0.01171	0.03625
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00502	0.00477	0.02943
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	-0.00259	-0.00303	-0.00304
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.01207	0.01171	0.03625
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00502	0.00477	0.02943

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffr_1	CK	0.00000	0.00000	0.00000
	CK	0.00302	0.00305	0.00304
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.01904	0.01908	0.04499
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00924	0.00930	0.03443
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00302	0.00305	0.00304
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.01904	0.01908	0.04499
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00924	0.00930	0.03443

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffr_1	(CK * !Q * QN) + (!CK * !D * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !Q * QN) + (!CK * !D * !Q * QN)	0.00352	0.00412	0.05543
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.01081	0.01118	0.06354
sky130_osu_sc_15T_ms__dffr_l	(CK * !Q * QN) + (!CK * !D * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !Q * QN) + (!CK * !D * !Q * QN)	0.00352	0.00412	0.05544
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.01081	0.01117	0.06354

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffr_1	(CK * !Q * QN) + (!CK * !D * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !Q * QN) + (!CK * !D * !Q * QN)	0.00947	0.01166	0.06307
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.01927	0.02067	0.07343
sky130_osu_sc_15T_ms__dffr_l	(CK * !Q * QN) + (!CK * !D * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !Q * QN) + (!CK * !D * !Q * QN)	0.00946	0.01165	0.06307
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.01926	0.02067	0.07343

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffr_1	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	-0.00076	-0.00047	0.05085
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.00602	0.00546	0.05907
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00114	-0.00073	0.05024
sky130_osu_sc_15T_ms__dffr_l	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	-0.00076	-0.00047	0.05085
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.00602	0.00546	0.05907
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00114	-0.00073	0.05024

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffr_1	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.01421	0.01613	0.06803
	(D * RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * RN * !Q * QN)	0.03032	0.03107	0.09438
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.02282	0.02415	0.07716
	(!D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * Q * !QN)	0.02932	0.03282	0.11918
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01577	0.01774	0.06874
sky130_osu_sc_15T_ms__dffr_l	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.01421	0.01614	0.06803
	(D * RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * RN * !Q * QN)	0.03032	0.03112	0.09438
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.02282	0.02415	0.07716
	(!D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * Q * !QN)	0.02932	0.03283	0.11919
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01577	0.01774	0.06874

SKY130_OSU_SC_15T_MS__DFFSRx

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

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
sky130_osu_sc_15T_ms__dffsr_1	57.99750
sky130_osu_sc_15T_ms__dffsr_l	57.99750

Pin Capacitance Information

Cell Name	Pin Cap(pf)				Max Cap(pf)	
	D	**RN**	**SN**	**CK**	**Q**	**QN**
sky130_osu_sc_15T_ms__dffsr_1	0.00369	0.00372	0.00826	0.01132	2.54885	2.55085
sky130_osu_sc_15T_ms__dffsr_l	0.00369	0.00372	0.00825	0.01131	1.47966	1.48857

Leakage Information

Cell Name	Leakage(nW)		
	Min.	**Avg**	**Max.**
sky130_osu_sc_15T_ms__dffsr_1	0.00000	0.09345	0.13082
sky130_osu_sc_15T_ms__dffsr_l	0.00000	0.09235	0.12972

Delay Information

Delay(ns) to Q rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffsr_1	CK->Q (RR)	0.20780	1.13095	16.06730
	QN->Q (FR)	0.02122	0.70370	12.11580
	RN->Q (RR)	0.16918	1.10451	16.12350
	SN->Q (FR)	0.15189	1.19519	17.57110
sky130_osu_sc_15T_ms__dffsr_l	CK->Q (RR)	0.20594	1.15609	13.42480
	QN->Q (FR)	0.02736	0.81647	12.33140
	RN->Q (RR)	0.16878	1.13177	13.49050
	SN->Q (FR)	0.15064	1.21591	14.89590

Delay(ns) to Q falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffsr_1	CK->Q (RF)	0.23536	1.16627	16.35860
	QN->Q (RF)	0.01951	0.62524	10.76760
	RN->Q (FF)	0.15449	1.18169	17.57550
sky130_osu_sc_15T_ms__dffsr_l	CK->Q (RF)	0.24282	1.22415	14.01280
	QN->Q (RF)	0.01909	0.55137	8.34994
	RN->Q (FF)	0.16170	1.23957	15.22490

Delay(ns) to QN rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffsr_1	CK->QN (RR)	0.21179	0.63687	6.62396
	RN->QN (FR)	0.13135	0.65258	7.83878
sky130_osu_sc_15T_ms__dffsr_l	CK->QN (RR)	0.21859	0.71808	6.53583
	RN->QN (FR)	0.13756	0.73284	7.74740

Delay(ns) to QN falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffsr_1	CK->QN (RF)	0.17944	0.57102	5.79540
	RN->QN (RF)	0.14200	0.54667	5.86111
	SN->QN (FF)	0.12391	0.63499	7.28744
sky130_osu_sc_15T_ms__dffsr_l	CK->QN (RF)	0.17112	0.53093	4.19485
	RN->QN (RF)	0.13449	0.50748	4.25706
	SN->QN (FF)	0.11636	0.59019	5.66989

Constraint Information

Constraints(ns) for D rising :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	hold	CK (R)	-0.04401	-0.06846	-0.07750
	setup	CK (R)	0.16251	0.20015	0.87268
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.04391	-0.06858	-0.06932
	setup	CK (R)	0.16219	0.20033	0.85402

Constraints(ns) for D falling :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	hold	CK (R)	-0.09203	-0.28077	-1.58799
	setup	CK (R)	0.11854	0.29423	3.14223
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.08851	-0.28356	-1.66452
	setup	CK (R)	0.11833	0.29423	3.14386

Constraints(ns) for D rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	hold	CK (R)	-0.04401	-0.06846	-0.07750
	setup	CK (R)	0.16251	0.20015	0.87268
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.04391	-0.06858	-0.06932
	setup	CK (R)	0.16219	0.20033	0.85402

Constraints(ns) for D falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	hold	CK (R)	-0.09203	-0.28077	-1.58799
	setup	CK (R)	0.11854	0.29423	3.14223
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.08851	-0.28356	-1.66452
	setup	CK (R)	0.11833	0.29423	3.14386

Constraints(ns) for RN rising :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	recovery	CK (R)	0.12705	0.15817	1.01139
	removal	CK (R)	-0.01474	-0.02129	-0.08565
	hold	SN (R)	-0.12189	-0.25699	-1.18213
	setup	SN (R)	0.14252	0.30558	6.98905
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.12544	0.16152	0.99895
	removal	CK (R)	-0.01773	-0.02129	-0.08565
	hold	SN (R)	-0.11344	-0.24582	-1.11991
	setup	SN (R)	0.13877	0.29796	6.67301

Constraints(ns) for RN rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	recovery	CK (R)	0.12705	0.15817	1.01139
	removal	CK (R)	-0.01474	-0.02129	-0.08565
	hold	SN (R)	-0.12189	-0.25699	-1.18213
	hold	SN (R)	-0.12240	-0.25699	-1.18396
	setup	SN (R)	0.14252	0.30385	6.75844
	setup	SN (R)	0.13813	0.30558	6.98905
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.12544	0.16152	0.99895
	removal	CK (R)	-0.01773	-0.02129	-0.08565
	hold	SN (R)	-0.11344	-0.24582	-1.11991
	hold	SN (R)	-0.11392	-0.24582	-1.12067
	setup	SN (R)	0.13877	0.29344	6.40550
	setup	SN (R)	0.13628	0.29796	6.67301

Constraints(ns) for RN falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	min_pulse_width	RN ()	0.10069	0.43823	13.33370
	min_pulse_width	RN ()	0.10069	0.43823	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	RN ()	0.10069	0.43823	13.33370
	min_pulse_width	RN ()	0.09738	0.43823	13.33370

Constraints(ns) for SN rising :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	recovery	CK (R)	0.03066	0.06475	7.06171
	removal	CK (R)	-0.01231	-0.04842	-0.22512
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.03057	0.06427	7.14282
	removal	CK (R)	-0.01231	-0.04842	-0.22512

Constraints(ns) for SN rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	recovery	CK (R)	0.03066	0.06475	7.06171
	removal	CK (R)	-0.01231	-0.04842	-0.22512
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.03057	0.06427	7.14282
	removal	CK (R)	-0.01231	-0.04842	-0.22512

Constraints(ns) for SN falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	min_pulse_width	SN ()	0.12054	0.43823	13.33370
	min_pulse_width	SN ()	0.12054	0.43823	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	SN ()	0.12054	0.43823	13.33370
	min_pulse_width	SN ()	0.11724	0.43823	13.33370

Constraints(ns) for CK rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	min_pulse_width	CK ()	0.09407	0.43823	13.33370
	min_pulse_width	CK ()	0.12054	0.43823	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	CK ()	0.08745	0.43823	13.33370
	min_pulse_width	CK ()	0.12054	0.43823	13.33370

Constraints(ns) for CK falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	min_pulse_width	CK ()	0.20658	0.43823	13.33370
	min_pulse_width	CK ()	0.10069	0.43823	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	CK ()	0.20658	0.43823	13.33370
	min_pulse_width	CK ()	0.10069	0.43823	13.33370

Power Information

Internal switching power(pJ) to Q rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	CK	0.00000	0.00000	0.00000
	CK	0.01206	0.00900	0.00000
	RN	0.02222	0.01889	-0.01387
	SN	-0.00126	-0.10392	-1.97383
	SN	0.02470	0.02083	-0.02643
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.01107	0.00931	0.01434
	RN	0.02121	0.01934	0.01677
	SN	-0.00126	-0.07499	-1.14585
	SN	0.02370	0.02119	0.00918

Internal switching power(pJ) to Q falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	CK	0.00000	0.00000	0.00000
	CK	0.01276	0.01079	0.00000
	RN	-0.00126	-0.10392	-1.97382
	RN	0.02663	0.02528	0.01412
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.01170	0.01016	0.01206
	RN	-0.00126	-0.07499	-1.14585
	RN	0.02553	0.02459	0.02856

Internal switching power(pJ) to QN rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	CK	0.00000	0.00000	0.00000
	CK	0.01275	0.01080	0.00000
	RN	-0.00126	-0.10397	-1.97525
	RN	0.02662	0.02526	0.01396
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.01170	0.01015	0.01192
	RN	-0.00126	-0.07526	-1.15275
	RN	0.02553	0.02459	0.02855

Internal switching power(pJ) to QN falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	CK	0.00000	0.00000	0.00000
	CK	0.01203	0.00896	0.00000
	RN	0.02218	0.01887	-0.01381
	SN	-0.00126	-0.10397	-1.97530
	SN	0.02467	0.02079	-0.02637
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.01103	0.00931	0.01340
	RN	0.02117	0.01920	0.01604
	SN	-0.00126	-0.07526	-1.15272
	SN	0.02365	0.02115	0.00851

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	CK	0.00000	0.00000	0.00000
	CK	-0.00296	-0.00304	-0.00304
	(!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)	0.01561	0.01525	0.03954
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00568	0.00543	0.02979
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00568	0.00544	0.02981
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00573	0.00548	0.02984
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	-0.00296	-0.00304	-0.00304
	(!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)	0.01561	0.01525	0.03954
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00568	0.00543	0.02979
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00568	0.00544	0.02981
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00573	0.00548	0.02985

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	CK	0.00000	0.00000	0.00000
	CK	0.00304	0.00305	0.00304
	(!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)	0.02197	0.02186	0.04671
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00987	0.00998	0.03478
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00993	0.01001	0.03479
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00982	0.00993	0.03473
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00304	0.00305	0.00304
	(!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)	0.02196	0.02185	0.04671
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00986	0.00997	0.03478
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00992	0.00999	0.03478
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00981	0.00992	0.03472

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	(CK * SN * !Q * QN) + (!CK * !D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * SN * !Q * QN) + (!CK * !D * SN * !Q * QN)	0.00297	0.00344	0.05460
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.01316	0.01335	0.06667
sky130_osu_sc_15T_ms__dffsr_l	(CK * SN * !Q * QN) + (!CK * !D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * SN * !Q * QN) + (!CK * !D * SN * !Q * QN)	0.00297	0.00344	0.05461
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.01316	0.01336	0.06667

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	(CK * SN * !Q * QN) + (!CK * !D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * SN * !Q * QN) + (!CK * !D * SN * !Q * QN)	0.01024	0.01252	0.06404
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.02044	0.02179	0.07568
sky130_osu_sc_15T_ms__dffsr_l	(CK * SN * !Q * QN) + (!CK * !D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * SN * !Q * QN) + (!CK * !D * SN * !Q * QN)	0.01022	0.01251	0.06403
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.02042	0.02178	0.07567

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	(CK * RN * Q * !QN) + (!CK * D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(CK * RN * Q * !QN) + (!CK * D * RN * Q * !QN)	-0.00712	-0.00716	-0.00717
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	-0.00695	-0.00762	-0.00758
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	-0.00687	-0.00715	-0.00716
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.00451	0.00444	0.03136
sky130_osu_sc_15T_ms__dffsr_l	(CK * RN * Q * !QN) + (!CK * D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(CK * RN * Q * !QN) + (!CK * D * RN * Q * !QN)	-0.00712	-0.00716	-0.00717
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	-0.00693	-0.00760	-0.00756
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	-0.00686	-0.00715	-0.00716
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.00452	0.00445	0.03137

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	(CK * RN * Q * !QN) + (!CK * D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(CK * RN * Q * !QN) + (!CK * D * RN * Q * !QN)	0.00715	0.00730	0.00719
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00754	0.00762	0.00758
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	0.00715	0.00715	0.00718
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.01602	0.01574	0.04106
sky130_osu_sc_15T_ms__dffsr_l	(CK * RN * Q * !QN) + (!CK * D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(CK * RN * Q * !QN) + (!CK * D * RN * Q * !QN)	0.00715	0.00730	0.00719
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00752	0.00760	0.00756
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	0.00714	0.00715	0.00717
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.01600	0.01576	0.04105

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	-0.00077	-0.00047	0.05086
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.00691	0.00644	0.05989
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.00680	0.00629	0.05985
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	-0.00095	-0.00053	0.05045
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.00382	0.00482	0.09981
sky130_osu_sc_15T_ms__dffsr_l	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	-0.00077	-0.00047	0.05086
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.00690	0.00642	0.05988
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.00679	0.00628	0.05984
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	-0.00095	-0.00053	0.05045
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.00382	0.00482	0.09981

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

Cell Name	When	Power(pJ)		
		first	mid	last

sky130_osu_sc_15T_ms__dffsr_1	**(D * RN * SN * !Q * QN)**	0.00000	0.00000	0.00000
	(D * RN * SN * !Q * QN)	0.03403	0.03487	0.09803
	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.01424	0.01620	0.06810
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.02326	0.02464	0.07747
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.02331	0.02459	0.07754
	(!D * RN * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * Q * !QN)	0.03220	0.03532	0.12230
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.01562	0.01757	0.06861
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.01900	0.02248	0.11824
sky130_osu_sc_15T_ms__dffsr_l	**(D * RN * SN * !Q * QN)**	0.00000	0.00000	0.00000
	(D * RN * SN * !Q * QN)	0.03403	0.03487	0.09804
	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.01424	0.01620	0.06810
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.02326	0.02453	0.07747
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.02331	0.02459	0.07755
	(!D * RN * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * Q * !QN)	0.03219	0.03531	0.12229
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.01562	0.01757	0.06861
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.01899	0.02247	0.11823

SKY130_OSU_SC_15T_MS__DFFSx

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__dffs_1	48.22950
sky130_osu_sc_15T_ms__dffs_l	48.22950

Pin Capacitance Information

Cell Name	Pin Cap(pf)			Max Cap(pf)	
	D	**SN**	**CK**	**Q**	**QN**
sky130_osu_sc_15T_ms__dffs_1	0.00372	0.00663	0.01109	2.24508	2.23138
sky130_osu_sc_15T_ms__dffs_l	0.00372	0.00663	0.01109	1.47815	1.49003

Leakage Information

Cell Name	Leakage(nW)		
	Min.	**Avg**	**Max.**
sky130_osu_sc_15T_ms__dffs_1	0.00000	0.09707	0.16527
sky130_osu_sc_15T_ms__dffs_l	0.00000	0.09597	0.16417

Delay Information

Delay(ns) to Q rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffs_1	CK->Q (RR)	0.16965	1.05558	14.72980
	QN->Q (FR)	0.02461	0.76345	12.76770
	SN->Q (FR)	0.13633	1.18602	16.62670
sky130_osu_sc_15T_ms__dffs_l	CK->Q (RR)	0.16551	1.10463	13.34960
	QN->Q (FR)	0.02728	0.81420	12.29450
	SN->Q (FR)	0.13188	1.22805	15.20290

Delay(ns) to Q falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffs_1	CK->Q (RF)	0.21702	1.13080	15.25930
	QN->Q (RF)	0.01965	0.59503	9.86395
sky130_osu_sc_15T_ms__dffs_l	CK->Q (RF)	0.21965	1.19670	13.93310
	QN->Q (RF)	0.01904	0.54912	8.32657

Delay(ns) to QN rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffs_1	CK->QN (RR)	0.19298	0.62547	6.41953
sky130_osu_sc_15T_ms__dffs_l	CK->QN (RR)	0.19542	0.69198	6.48832

Delay(ns) to QN falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffs_1	CK->QN (RF)	0.14060	0.49752	4.98654
	SN->QN (FF)	0.10683	0.62718	6.87643
sky130_osu_sc_15T_ms__dffs_l	CK->QN (RF)	0.13204	0.48209	4.14503
	SN->QN (FF)	0.09798	0.60421	6.00529

Constraint Information

Constraints(ns) for D rising :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffs_1	hold	CK (R)	-0.03575	-0.05590	-0.06688
	setup	CK (R)	0.12910	0.17241	0.70912
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.03518	-0.05623	-0.07106
	setup	CK (R)	0.12861	0.17348	0.69591

Constraints(ns) for D falling :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffs_1	hold	CK (R)	-0.07706	-0.26356	-1.88288
	setup	CK (R)	0.10251	0.27561	3.04736
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.07659	-0.26341	-1.97202
	setup	CK (R)	0.10253	0.27561	3.04762

Constraints(ns) for D rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffs_1	hold	CK (R)	-0.03575	-0.05590	-0.06688
	setup	CK (R)	0.12910	0.17241	0.70912
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.03518	-0.05623	-0.07106
	setup	CK (R)	0.12861	0.17348	0.69591

Constraints(ns) for D falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffs_1	hold	CK (R)	-0.07706	-0.26356	-1.88288
	setup	CK (R)	0.10251	0.27561	3.04736
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.07659	-0.26341	-1.97202
	setup	CK (R)	0.10253	0.27561	3.04762

Constraints(ns) for SN rising :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffs_1	recovery	CK (R)	0.02485	0.03827	4.98066
	removal	CK (R)	-0.00976	-0.02235	0.31712
sky130_osu_sc_15T_ms__dffs_l	recovery	CK (R)	0.02452	0.03817	4.90030
	removal	CK (R)	-0.00976	-0.02235	0.31712

Constraints(ns) for SN rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffs_1	recovery	CK (R)	0.02485	0.03827	4.98066
	removal	CK (R)	-0.00976	-0.02235	0.31712
sky130_osu_sc_15T_ms__dffs_l	recovery	CK (R)	0.02452	0.03817	4.90030
	removal	CK (R)	-0.00976	-0.02235	0.31712

Constraints(ns) for SN falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffs_1	min_pulse_width	SN ()	0.09738	0.43823	13.33370
	min_pulse_width	SN ()	0.10400	0.43823	13.33370
sky130_osu_sc_15T_ms__dffs_l	min_pulse_width	SN ()	0.09738	0.43823	13.33370
	min_pulse_width	SN ()	0.09738	0.43823	13.33370

Constraints(ns) for CK rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffs_1	min_pulse_width	CK ()	0.07421	0.43823	13.33370
	min_pulse_width	CK ()	0.10731	0.43823	13.33370
sky130_osu_sc_15T_ms__dffs_l	min_pulse_width	CK ()	0.07091	0.43823	13.33370
	min_pulse_width	CK ()	0.10400	0.43823	13.33370

Constraints(ns) for CK falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffs_1	min_pulse_width	CK ()	0.17018	0.43823	13.33370
	min_pulse_width	CK ()	0.08745	0.43823	13.33370
sky130_osu_sc_15T_ms__dffs_l	min_pulse_width	CK ()	0.17349	0.43823	13.33370
	min_pulse_width	CK ()	0.08745	0.43823	13.33370

Power Information

Internal switching power(pJ) to Q rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffs_1	CK	0.00000	0.00000	0.00000
	CK	0.00959	0.00699	0.00000
	SN	-0.00126	-0.09630	-1.73859
	SN	0.02096	0.01841	-0.01015
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00845	0.00671	0.01298
	SN	-0.00126	-0.07494	-1.14468
	SN	0.01981	0.01828	0.01415

Internal switching power(pJ) to Q falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffs_1	CK	0.00000	0.00000	0.00000
	CK	0.01095	0.00783	0.00000
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00982	0.00824	0.01086

Internal switching power(pJ) to QN rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffs_1	CK	0.00000	0.00000	0.00000
	CK	0.01094	0.00785	0.00000
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00982	0.00824	0.01057

Internal switching power(pJ) to QN falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffs_1	CK	0.00000	0.00000	0.00000
	CK	0.00956	0.00699	0.00000
	SN	-0.00126	-0.09595	-1.72791
	SN	0.02092	0.01839	-0.01062
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00842	0.00650	0.01196
	SN	-0.00126	-0.07530	-1.15385
	SN	0.01977	0.01821	0.01333

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffs_1	CK	0.00000	0.00000	0.00000
	CK	-0.00302	-0.00310	-0.00309
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.01178	0.01140	0.03689
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00490	0.00464	0.02928
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	-0.00302	-0.00310	-0.00309
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.01178	0.01140	0.03689
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00490	0.00464	0.02928

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffs_1	CK	0.00000	0.00000	0.00000
	CK	0.00309	0.00310	0.00309
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.01878	0.01868	0.04410
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00940	0.00951	0.03468
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00309	0.00310	0.00309
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.01878	0.01868	0.04410
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00940	0.00951	0.03468

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffs_1	(CK * Q * !QN) + (!CK * D * Q * !QN)	0.00000	0.00000	0.00000
	(CK * Q * !QN) + (!CK * D * Q * !QN)	-0.00514	-0.00519	-0.00517
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00383	0.00386	0.03517
sky130_osu_sc_15T_ms__dffs_l	(CK * Q * !QN) + (!CK * D * Q * !QN)	0.00000	0.00000	0.00000
	(CK * Q * !QN) + (!CK * D * Q * !QN)	-0.00514	-0.00519	-0.00517
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00383	0.00386	0.03517

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffs_1	(CK * Q * !QN) + (!CK * D * Q * !QN)	0.00000	0.00000	0.00000
	(CK * Q * !QN) + (!CK * D * Q * !QN)	0.00518	0.00523	0.00519
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.01114	0.01167	0.04377
sky130_osu_sc_15T_ms__dffs_l	(CK * Q * !QN) + (!CK * D * Q * !QN)	0.00000	0.00000	0.00000
	(CK * Q * !QN) + (!CK * D * Q * !QN)	0.00518	0.00523	0.00519
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.01114	0.01167	0.04377

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffs_1	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	-0.00079	-0.00049	0.05089
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	-0.00109	-0.00069	0.05037
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.00300	0.00417	0.09978
sky130_osu_sc_15T_ms__dffs_l	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	-0.00079	-0.00049	0.05089
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	-0.00109	-0.00069	0.05037
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.00300	0.00415	0.09978

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dffs_1	(D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * SN * !Q * QN)	0.03017	0.03102	0.09502
	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.01420	0.01623	0.06811
	(!D * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * SN * Q * !QN)	0.02893	0.03215	0.11864
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	0.01570	0.01770	0.06874
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.01844	0.02209	0.11837
sky130_osu_sc_15T_ms__dffs_l	(D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * SN * !Q * QN)	0.03017	0.03102	0.09502
	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.01420	0.01624	0.06811
	(!D * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * SN * Q * !QN)	0.02893	0.03216	0.11864
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	0.01570	0.01770	0.06874
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.01844	0.02210	0.11837

SKY130_OSU_SC_15T_MS__DFFx

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__dff_1	40.29300
sky130_osu_sc_15T_ms__dff_l	40.29300

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)	
	D	CK	Q	QN
sky130_osu_sc_15T_ms__dff_1	0.00388	0.01087	2.55853	2.55797
sky130_osu_sc_15T_ms__dff_l	0.00388	0.01086	1.31505	1.31666

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__dff_1	0.00000	0.08689	0.11338
sky130_osu_sc_15T_ms__dff_l	0.00000	0.08579	0.11228

Delay Information

Delay(ns) to Q rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dff_1	CK->Q (RR)	0.13696	1.04750	15.96360
	QN->Q (FR)	0.02108	0.70190	12.09240
sky130_osu_sc_15T_ms__dff_l	CK->Q (RR)	0.14116	1.05828	12.38760
	QN->Q (FR)	0.03130	0.88067	12.89470

Delay(ns) to Q falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dff_1	CK->Q (RF)	0.19527	1.12205	16.33150
	QN->Q (RF)	0.01942	0.62372	10.76190
sky130_osu_sc_15T_ms__dff_l	CK->Q (RF)	0.20616	1.17143	13.13830
	QN->Q (RF)	0.01913	0.52882	7.79480

Delay(ns) to QN rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dff_1	CK->QN (RR)	0.17234	0.59225	6.56905
sky130_osu_sc_15T_ms__dff_l	CK->QN (RR)	0.18203	0.68850	6.33241

Delay(ns) to QN falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dff_1	CK->QN (RF)	0.11159	0.48907	5.66718
sky130_osu_sc_15T_ms__dff_l	CK->QN (RF)	0.10793	0.43382	3.55930

Constraint Information

Constraints(ns) for D rising :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dff_1	hold	CK (R)	-0.02911	-0.04842	-0.06983
	setup	CK (R)	0.09373	0.14512	0.63773
sky130_osu_sc_15T_ms__dff_l	hold	CK (R)	-0.03077	-0.04842	-0.06943
	setup	CK (R)	0.09360	0.14436	0.63828

Constraints(ns) for D falling :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dff_1	hold	CK (R)	-0.07353	-0.26816	-2.57601
	setup	CK (R)	0.09423	0.27934	3.10180
sky130_osu_sc_15T_ms__dff_l	hold	CK (R)	-0.07343	-0.26816	-2.58492
	setup	CK (R)	0.09423	0.27934	3.10195

Constraints(ns) for CK rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dff_1	min_pulse_width	CK ()	0.05767	0.43823	13.33370
	min_pulse_width	CK ()	0.10400	0.43823	13.33370
sky130_osu_sc_15T_ms__dff_l	min_pulse_width	CK ()	0.05767	0.43823	13.33370
	min_pulse_width	CK ()	0.10069	0.43823	13.33370

Constraints(ns) for CK falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dff_1	**min_pulse_width**	**CK ()**	0.13709	0.43823	13.33370
	min_pulse_width	**CK ()**	0.07091	0.43823	13.33370
sky130_osu_sc_15T_ms__dff_l	**min_pulse_width**	**CK ()**	0.13709	0.43823	13.33370
	min_pulse_width	**CK ()**	0.07091	0.43823	13.33370

Power Information

Internal switching power(pJ) to Q rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dff_1	CK	0.00000	0.00000	0.00000
	CK	0.01012	0.00702	0.00000
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00914	0.00758	0.01744

Internal switching power(pJ) to Q falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dff_1	CK	0.00000	0.00000	0.00000
	CK	0.01111	0.00923	0.00000
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.01003	0.00783	0.00267

Internal switching power(pJ) to QN rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dff_1	CK	0.00000	0.00000	0.00000
	CK	0.01110	0.00918	0.00000
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.01003	0.00782	0.00250

Internal switching power(pJ) to QN falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dff_1	CK	0.00000	0.00000	0.00000
	CK	0.01008	0.00703	0.00000
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00910	0.00757	0.01677

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dff_1	CK	0.00000	0.00000	0.00000
	CK	-0.00259	-0.00302	-0.00303
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.01075	0.01059	0.03652
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	-0.00259	-0.00302	-0.00303
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.01076	0.01060	0.03652

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dff_1	CK	0.00000	0.00000	0.00000
	CK	0.00301	0.00303	0.00303
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.01931	0.01928	0.04490
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00301	0.00303	0.00303
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.01932	0.01928	0.04490

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dff_1	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	-0.00079	-0.00048	0.05092
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00108	-0.00065	0.05042
sky130_osu_sc_15T_ms__dff_l	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	-0.00079	-0.00048	0.05092
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00108	-0.00065	0.05042

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__dff_1	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.01411	0.01612	0.06804
	(D * !Q * QN)	0.00000	0.00000	0.00000
	(D * !Q * QN)	0.02917	0.03017	0.09477
	(!D * Q * !QN)	0.00000	0.00000	0.00000
	(!D * Q * !QN)	0.02933	0.03272	0.12069
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01560	0.01758	0.06866
sky130_osu_sc_15T_ms__dff_l	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.01411	0.01613	0.06804
	(D * !Q * QN)	0.00000	0.00000	0.00000
	(D * !Q * QN)	0.02918	0.03018	0.09477
	(!D * Q * !QN)	0.00000	0.00000	0.00000
	(!D * Q * !QN)	0.02933	0.03275	0.12070
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01560	0.01758	0.06866

SKY130_OSU_SC_15T_MS__INVx

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

INPUT	OUTPUT
A	Y
0	1
1	0

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__inv_1	5.49450
sky130_osu_sc_15T_ms__inv_10	27.47250
sky130_osu_sc_15T_ms__inv_2	7.93650
sky130_osu_sc_15T_ms__inv_3	10.37850
sky130_osu_sc_15T_ms__inv_4	12.82050
sky130_osu_sc_15T_ms__inv_6	17.70450
sky130_osu_sc_15T_ms__inv_8	22.58850
sky130_osu_sc_15T_ms__inv_l	5.49450

Pin Capacitance Information

Cell Name	Pin Cap(pf)	Max Cap(pf)
	A	Y
sky130_osu_sc_15T_ms__inv_1	0.00376	2.36569
sky130_osu_sc_15T_ms__inv_10	0.03459	20.95941
sky130_osu_sc_15T_ms__inv_2	0.00711	4.66040
sky130_osu_sc_15T_ms__inv_3	0.01057	6.63352
sky130_osu_sc_15T_ms__inv_4	0.01395	8.89401
sky130_osu_sc_15T_ms__inv_6	0.02090	13.05747
sky130_osu_sc_15T_ms__inv_8	0.02775	17.18760
sky130_osu_sc_15T_ms__inv_l	0.00285	1.27517

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__inv_1	0.00000	0.01415	0.02824
sky130_osu_sc_15T_ms__inv_10	0.00000	0.14155	0.28238
sky130_osu_sc_15T_ms__inv_2	0.00000	0.02831	0.05648
sky130_osu_sc_15T_ms__inv_3	0.00000	0.04246	0.08472
sky130_osu_sc_15T_ms__inv_4	0.00000	0.05662	0.11295
sky130_osu_sc_15T_ms__inv_6	0.00000	0.08493	0.16943
sky130_osu_sc_15T_ms__inv_8	0.00000	0.11324	0.22591
sky130_osu_sc_15T_ms__inv_l	0.00000	0.01361	0.02709

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__inv_1	**A->Y (FR)**	0.01996	0.63574	10.69830
sky130_osu_sc_15T_ms__inv_10	**A->Y (FR)**	0.03106	0.42724	10.58440
sky130_osu_sc_15T_ms__inv_2	**A->Y (FR)**	0.01653	0.54900	10.62030
sky130_osu_sc_15T_ms__inv_3	**A->Y (FR)**	0.01848	0.51501	10.61870
sky130_osu_sc_15T_ms__inv_4	**A->Y (FR)**	0.01910	0.48551	10.56300
sky130_osu_sc_15T_ms__inv_6	**A->Y (FR)**	0.02217	0.45572	10.55670
sky130_osu_sc_15T_ms__inv_8	**A->Y (FR)**	0.02632	0.43790	10.56810
sky130_osu_sc_15T_ms__inv_l	**A->Y (FR)**	0.02645	0.73159	10.68280

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__inv_1	**A->Y (RF)**	0.01702	0.52304	8.85800
sky130_osu_sc_15T_ms__inv_10	**A->Y (RF)**	0.02681	0.32423	8.73568
sky130_osu_sc_15T_ms__inv_2	**A->Y (RF)**	0.01426	0.44741	8.84469
sky130_osu_sc_15T_ms__inv_3	**A->Y (RF)**	0.01587	0.41673	8.91185
sky130_osu_sc_15T_ms__inv_4	**A->Y (RF)**	0.01597	0.38790	8.86908
sky130_osu_sc_15T_ms__inv_6	**A->Y (RF)**	0.01971	0.35745	8.85873
sky130_osu_sc_15T_ms__inv_8	**A->Y (RF)**	0.02318	0.33831	8.84559
sky130_osu_sc_15T_ms__inv_l	**A->Y (RF)**	0.01720	0.46086	6.71659

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__inv_1	A	0.00000	0.00000	0.00000
	A	0.00487	0.00566	0.01245
sky130_osu_sc_15T_ms__inv_10	A	0.00000	0.00000	0.00000
	A	0.04158	0.05622	0.11872
sky130_osu_sc_15T_ms__inv_2	A	0.00000	0.00000	0.00000
	A	0.00855	0.01026	0.02357
sky130_osu_sc_15T_ms__inv_3	A	0.00000	0.00000	0.00000
	A	0.01314	0.01615	0.03574
sky130_osu_sc_15T_ms__inv_4	A	0.00000	0.00000	0.00000
	A	0.01684	0.02187	0.04699
sky130_osu_sc_15T_ms__inv_6	A	0.00000	0.00000	0.00000
	A	0.02502	0.03330	0.07057
sky130_osu_sc_15T_ms__inv_8	A	0.00000	0.00000	0.00000
	A	0.03318	0.04259	0.09433
sky130_osu_sc_15T_ms__inv_l	A	0.00000	0.00000	0.00000
	A	0.00364	0.00373	0.00988

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__inv_1	**A**	0.00000	0.00000	0.00000
	A	-0.00106	-0.00089	0.00119
sky130_osu_sc_15T_ms__inv_10	**A**	0.00000	0.00000	0.00000
	A	-0.01579	-0.01302	0.00918
sky130_osu_sc_15T_ms__inv_2	**A**	0.00000	0.00000	0.00000
	A	-0.00327	-0.00277	0.00147
sky130_osu_sc_15T_ms__inv_3	**A**	0.00000	0.00000	0.00000
	A	-0.00437	-0.00364	0.00283
sky130_osu_sc_15T_ms__inv_4	**A**	0.00000	0.00000	0.00000
	A	-0.00661	-0.00541	0.00317
sky130_osu_sc_15T_ms__inv_6	**A**	0.00000	0.00000	0.00000
	A	-0.01007	-0.00813	0.00480
sky130_osu_sc_15T_ms__inv_8	**A**	0.00000	0.00000	0.00000
	A	-0.01332	-0.01059	0.00657
sky130_osu_sc_15T_ms__inv_l	**A**	0.00000	0.00000	0.00000
	A	-0.00064	-0.00035	0.00178

SKY130_OSU_SC_15T_MS__MUX2

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

INPUT			OUTPUT
A0	**A1**	**S0**	**Y**
0	**0**	**x**	**0**
0	**1**	**0**	**0**
x	**1**	**1**	**1**
1	**x**	**0**	**1**
1	**0**	**1**	**0**

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__mux2_1	15.26250

Pin Capacitance Information

Cell Name	Pin Cap(pf)			Max Cap(pf)
	A0	**A1**	**S0**	**Y**
sky130_osu_sc_15T_ms__mux2_1	0.57947	0.57988	0.00770	0.59496

Leakage Information

Cell Name	Leakage(nW)		
	Min.	**Avg**	**Max.**
sky130_osu_sc_15T_ms__mux2_1	0.00000	0.02881	0.02999

Delay Information

Delay(ns) to Y rising (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
sky130_osu_sc_15T_ms__mux2_1	A0->Y (RR)	-	0.01024	0.23531	2.80554
	A1->Y (RR)	-	0.01117	0.23640	2.80839
	S0->Y (RR)	(!A0 * A1)	0.03509	0.22710	1.46691
	S0->Y (FR)	(A0 * !A1)	0.02660	0.32728	3.40463

Delay(ns) to Y falling (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
sky130_osu_sc_15T_ms__mux2_1	A0->Y (FF)	-	0.01034	0.24008	2.84181
	A1->Y (FF)	-	0.00995	0.23864	2.83396
	S0->Y (FF)	(!A0 * A1)	0.04311	0.30310	2.51886
	S0->Y (RF)	(A0 * !A1)	0.01986	0.25873	2.49610

Power Information

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

Cell Name	Input	When	Power(pJ)		
			first	mid	last
sky130_osu_sc_15T_ms__mux2_1	A0	-	0.00000	0.00000	0.00000
	A0	-	-0.00509	-0.00510	-0.00510
	A1	-	0.00000	0.00000	0.00000
	A1	-	-0.00332	-0.00332	-0.00332
	S0	(A0 * !A1)	0.00000	0.00000	0.00000
	S0	(A0 * !A1)	0.00616	0.00833	0.06138
	S0	(!A0 * A1)	0.00000	0.00000	0.00000
	S0	(!A0 * A1)	-0.00339	-0.00231	0.04982

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

Cell Name	Input	When	Power(pJ)		
			first	mid	last
sky130_osu_sc_15T_ms__mux2_1	A0	-	0.00000	0.00000	0.00000
	A0	-	0.00509	0.00510	0.00510
	A1	-	0.00000	0.00000	0.00000
	A1	-	0.00332	0.00332	0.00332
	S0	(A0 * !A1)	0.00000	0.00000	0.00000
	S0	(A0 * !A1)	0.00080	0.00211	0.05489
	S0	(!A0 * A1)	0.00000	0.00000	0.00000
	S0	(!A0 * A1)	0.01338	0.01535	0.06762

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__mux2_1	(A1 * S0 * Y) + (!A1 * S0 * !Y)	0.00000	0.00000	0.00000
	(A1 * S0 * Y) + (!A1 * S0 * !Y)	-0.00121	-0.00120	-0.00120

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__mux2_1	(A1 * S0 * Y) + (!A1 * S0 * !Y)	0.00000	0.00000	0.00000
	(A1 * S0 * Y) + (!A1 * S0 * !Y)	0.00121	0.00120	0.00120

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__mux2_1	(A0 * !S0 * Y) + (!A0 * !S0 * !Y)	0.00000	0.00000	0.00000
	(A0 * !S0 * Y) + (!A0 * !S0 * !Y)	-0.00145	-0.00145	-0.00145

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__mux2_1	(A0 * !S0 * Y) + (!A0 * !S0 * !Y)	0.00000	0.00000	0.00000
	(A0 * !S0 * Y) + (!A0 * !S0 * !Y)	0.00145	0.00145	0.00145

Passive power(pJ) for S0 rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__mux2_1	(A0 * A1 * Y)	0.00000	0.00000	0.00000
	(A0 * A1 * Y)	-0.00132	-0.00011	0.05224
	(!A0 * !A1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !Y)	-0.00127	-0.00025	0.05233

Passive power(pJ) for S0 falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__mux2_1	(A0 * A1 * Y)	0.00000	0.00000	0.00000
	(A0 * A1 * Y)	0.01017	0.01210	0.06453
	(!A0 * !A1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !Y)	0.00936	0.01155	0.06431

SKY130_OSU_SC_15T_MS__NAND2x

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__nand2_1	7.93650
sky130_osu_sc_15T_ms__nand2_l	7.93650

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
sky130_osu_sc_15T_ms__nand2_1	0.00377	0.00373	2.23253
sky130_osu_sc_15T_ms__nand2_l	0.00285	0.00285	1.26450

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__nand2_1	0.00000	0.01418	0.05648
sky130_osu_sc_15T_ms__nand2_l	0.00000	0.01363	0.05418

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__nand2_1	A->Y (FR)	0.02046	0.62817	10.41190
	B->Y (FR)	0.02432	0.61917	10.20830
sky130_osu_sc_15T_ms__nand2_l	A->Y (FR)	0.02708	0.73291	10.67260
	B->Y (FR)	0.03310	0.73620	10.64010

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__nand2_1	A->Y (RF)	0.02278	0.61705	10.40130
	B->Y (RF)	0.02652	0.62133	10.38070
sky130_osu_sc_15T_ms__nand2_l	A->Y (RF)	0.02264	0.54591	7.96471
	B->Y (RF)	0.02588	0.55261	7.88325

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__nand2_1	A	0.00000	0.00000	0.00000
	A	0.00518	0.00596	0.01226
	B	0.00000	0.00000	0.00000
	B	0.00668	0.00673	0.01368
sky130_osu_sc_15T_ms__nand2_1	A	0.00000	0.00000	0.00000
	A	0.00384	0.00397	0.00947
	B	0.00000	0.00000	0.00000
	B	0.00496	0.00483	0.01061

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__nand2_1	A	0.00000	0.00000	0.00000
	A	-0.00073	-0.00052	0.00127
	B	0.00000	0.00000	0.00000
	B	-0.00068	-0.00071	0.00061
sky130_osu_sc_15T_ms__nand2_1	A	0.00000	0.00000	0.00000
	A	-0.00046	-0.00023	0.00167
	B	0.00000	0.00000	0.00000
	B	-0.00043	-0.00045	0.00105

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__nand2_1	(!B * Y)	0.00000	0.00000	0.00000
	(!B * Y)	-0.00352	-0.00353	-0.00354
sky130_osu_sc_15T_ms__nand2_l	(!B * Y)	0.00000	0.00000	0.00000
	(!B * Y)	-0.00243	-0.00244	-0.00245

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__nand2_1	(!B * Y)	0.00000	0.00000	0.00000
	(!B * Y)	0.00353	0.00361	0.00355
sky130_osu_sc_15T_ms__nand2_l	(!B * Y)	0.00000	0.00000	0.00000
	(!B * Y)	0.00244	0.00248	0.00246

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__nand2_1	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00322	-0.00324	-0.00323
sky130_osu_sc_15T_ms__nand2_l	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00223	-0.00225	-0.00224

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__nand2_1	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00324	0.00325	0.00323
sky130_osu_sc_15T_ms__nand2_l	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00226	0.00226	0.00224

SKY130_OSU_SC_15T_MS__NOR2x

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__nor2_1	7.93650
sky130_osu_sc_15T_ms__nor2_l	7.93650

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
sky130_osu_sc_15T_ms__nor2_1	0.00374	0.00403	1.30634
sky130_osu_sc_15T_ms__nor2_l	0.00276	0.00307	0.77552

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__nor2_1	0.00000	0.00937	0.02824
sky130_osu_sc_15T_ms__nor2_l	0.00000	0.01002	0.02709

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__nor2_1	A->Y (FR)	0.04046	0.73246	10.49070
	B->Y (FR)	0.03093	0.71780	10.46120
sky130_osu_sc_15T_ms__nor2_l	A->Y (FR)	0.04995	0.85406	10.62750
	B->Y (FR)	0.04140	0.84102	10.67260

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__nor2_1	A->Y (RF)	0.02325	0.43464	6.22239
	B->Y (RF)	0.01817	0.42874	6.20653
sky130_osu_sc_15T_ms__nor2_l	A->Y (RF)	0.02146	0.39229	4.83052
	B->Y (RF)	0.01818	0.38277	4.81777

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__nor2_1	A	0.00000	0.00000	0.00000
	A	0.00701	0.00675	0.01042
	B	0.00000	0.00000	0.00000
	B	0.00536	0.00558	0.01503
sky130_osu_sc_15T_ms__nor2_l	A	0.00000	0.00000	0.00000
	A	0.00494	0.00491	0.00791
	B	0.00000	0.00000	0.00000
	B	0.00396	0.00406	0.01110

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__nor2_1	A	0.00000	0.00000	0.00000
	A	0.00071	0.00086	0.00357
	B	0.00000	0.00000	0.00000
	B	-0.00083	-0.00070	0.00225
sky130_osu_sc_15T_ms__nor2_l	A	0.00000	0.00000	0.00000
	A	0.00042	0.00042	0.00346
	B	0.00000	0.00000	0.00000
	B	-0.00046	-0.00014	0.00263

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__nor2_1	(B * !Y)	0.00000	0.00000	0.00000
	(B * !Y)	-0.00259	-0.00304	-0.00305
sky130_osu_sc_15T_ms__nor2_l	(B * !Y)	0.00000	0.00000	0.00000
	(B * !Y)	-0.00176	-0.00201	-0.00202

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__nor2_1	(B * !Y)	0.00000	0.00000	0.00000
	(B * !Y)	0.00303	0.00306	0.00305
sky130_osu_sc_15T_ms__nor2_l	(B * !Y)	0.00000	0.00000	0.00000
	(B * !Y)	0.00201	0.00204	0.00202

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__nor2_1	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	-0.00146	-0.00150	-0.00147
sky130_osu_sc_15T_ms__nor2_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	-0.00098	-0.00100	-0.00099

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__nor2_1	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00153	0.00154	0.00149
sky130_osu_sc_15T_ms__nor2_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00103	0.00104	0.00100

SKY130_OSU_SC_15T_MS__OAI21

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

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
sky130_osu_sc_15T_ms__oai21_l	10.37850

Pin Capacitance Information

Cell Name	Pin Cap(pf)			Max Cap(pf)
	A0	A1	B0	Y
sky130_osu_sc_15T_ms__oai21_l	0.00376	0.00385	0.00323	1.25627

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__oai21_l	0.00000	0.01488	0.05533

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__oai21_l	A0->Y (FR)	0.04351	0.73944	10.47060
	A1->Y (FR)	0.05617	0.75916	10.51650
	B0->Y (FR)	0.03160	0.69662	10.02680

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__oai21_l	A0->Y (RF)	0.03236	0.52265	7.31928
	A1->Y (RF)	0.03785	0.51468	7.11872
	B0->Y (RF)	0.02493	0.54219	7.81866

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai21_l	A0	0.00000	0.00000	0.00000
	A0	0.00744	0.00805	0.01581
	A1	0.00000	0.00000	0.00000
	A1	0.00910	0.00899	0.01220
	B0	0.00597	0.00618	0.01065

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai21_l	A0	0.00000	0.00000	0.00000
	A0	0.00017	0.00007	0.00192
	A1	0.00000	0.00000	0.00000
	A1	0.00170	0.00145	0.00328
	B0	0.00068	0.00068	0.00231

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai21_l	(A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A1 * B0 * !Y)	-0.00147	-0.00149	-0.00147
	(A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * Y)	-0.00301	-0.00310	-0.00308
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00312	-0.00315	-0.00313

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai21_l	(A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A1 * B0 * !Y)	0.00153	0.00155	0.00149
	(A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * Y)	0.00306	0.00310	0.00308
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00312	0.00318	0.00314

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai21_l	(A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * B0 * !Y)	-0.00252	-0.00297	-0.00298
	(A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * Y)	-0.00297	-0.00305	-0.00305
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00308	-0.00310	-0.00308

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai21_l	(A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * B0 * !Y)	0.00296	0.00298	0.00298
	(A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * Y)	0.00303	0.00306	0.00305
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00308	0.00312	0.00309

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai21_l	(!A0 * !A1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * Y)	-0.00252	-0.00254	-0.00256

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai21_l	(!A0 * !A1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * Y)	0.00256	0.00261	0.00257

SKY130_OSU_SC_15T_MS__OAI22

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

INPUT				OUTPUT
A0	A1	B0	B1	Y
0	0	x	x	1
x	1	0	0	1
x	1	x	1	0
x	1	1	x	0
1	x	0	0	1
1	x	x	1	0
1	x	1	x	0

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__oai22_1	12.82050

Pin Capacitance Information

Cell Name	Pin Cap(pf)				Max Cap(pf)
	A0	A1	B0	B1	Y
sky130_osu_sc_15T_ms__oai22_1	0.00364	0.00386	0.00398	0.00389	1.29585

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__oai22_1	0.00000	0.01408	0.05648

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__oai22_l	A0->Y (FR)	0.06025	0.75234	10.47990
	A1->Y (FR)	0.05063	0.73743	10.45420
	B0->Y (FR)	0.03368	0.72091	10.45100
	B1->Y (FR)	0.04531	0.74055	10.48250

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__oai22_l	A0->Y (RF)	0.05391	0.55770	7.54194
	A1->Y (RF)	0.04353	0.54278	7.47922
	B0->Y (RF)	0.03640	0.56129	7.98192
	B1->Y (RF)	0.04736	0.58079	8.10328

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai22_l	A0	0.01181	0.01138	0.01471
	A1	0.01012	0.01013	0.01819
	B0	0.00566	0.00577	0.01472
	B1	0.00914	0.00907	0.01206

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai22_l	A0	0.00278	0.00254	0.00429
	A1	-0.00031	-0.00039	0.00144
	B0	-0.00034	-0.00023	0.00245
	B1	0.00114	0.00119	0.00359

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai22_l	(A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A1 * B0 * !Y)	-0.00258	-0.00304	-0.00305
	(A1 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * B1 * !Y)	-0.00258	-0.00304	-0.00305
	(A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * !B1 * Y)	-0.00297	-0.00306	-0.00306
	(!A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * !B1 * Y)	-0.00309	-0.00310	-0.00309

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai22_l	(A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A1 * B0 * !Y)	0.00303	0.00307	0.00305
	(A1 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * B1 * !Y)	0.00303	0.00307	0.00305
	(A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * !B1 * Y)	0.00304	0.00307	0.00306
	(!A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * !B1 * Y)	0.00309	0.00315	0.00310

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai22_l	(A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * B0 * !Y)	-0.00145	-0.00148	-0.00145
	(A0 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * B1 * !Y)	-0.00145	-0.00148	-0.00145
	(A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * !B1 * Y)	-0.00295	-0.00302	-0.00302
	(!A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * !B1 * Y)	-0.00306	-0.00308	-0.00307

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai22_l	(A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * B0 * !Y)	0.00151	0.00153	0.00147
	(A0 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * B1 * !Y)	0.00152	0.00153	0.00147
	(A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * !B1 * Y)	0.00301	0.00302	0.00302
	(!A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * !B1 * Y)	0.00306	0.00310	0.00308

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai22_l	(A1 * B1 * !Y)	0.00000	0.00000	0.00000
	(A1 * B1 * !Y)	-0.00143	-0.00147	-0.00144
	(A0 * !A1 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B1 * !Y)	-0.00143	-0.00147	-0.00144
	(!A0 * !A1 * B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B1 * Y)	-0.00337	-0.00345	-0.00344
	(!A0 * !A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B1 * Y)	-0.00341	-0.00343	-0.00347

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai22_l	(A1 * B1 * !Y)	0.00000	0.00000	0.00000
	(A1 * B1 * !Y)	0.00149	0.00151	0.00146
	(A0 * !A1 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B1 * !Y)	0.00150	0.00151	0.00146
	(!A0 * !A1 * B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B1 * Y)	0.00347	0.00348	0.00344
	(!A0 * !A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B1 * Y)	0.00347	0.00354	0.00349

Passive power(pJ) for B1 rising (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai22_l	(A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A1 * B0 * !Y)	-0.00255	-0.00297	-0.00299
	(A0 * !A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B0 * !Y)	-0.00255	-0.00297	-0.00299
	(!A0 * !A1 * B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B0 * Y)	-0.00345	-0.00353	-0.00353
	(!A0 * !A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B0 * Y)	-0.00349	-0.00350	-0.00355

Passive power(pJ) for B1 falling (conditional):

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai22_l	(A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A1 * B0 * !Y)	0.00297	0.00300	0.00299
	(A0 * !A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B0 * !Y)	0.00297	0.00300	0.00299
	(!A0 * !A1 * B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B0 * Y)	0.00354	0.00357	0.00353
	(!A0 * !A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B0 * Y)	0.00355	0.00362	0.00356

SKY130_OSU_SC_15T_MS__OR2x

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__or2_1	10.37850
sky130_osu_sc_15T_ms__or2_2	12.82050
sky130_osu_sc_15T_ms__or2_4	17.70450
sky130_osu_sc_15T_ms__or2_8	27.47250
sky130_osu_sc_15T_ms__or2_l	10.37850

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
sky130_osu_sc_15T_ms__or2_1	0.00410	0.00386	2.43570
sky130_osu_sc_15T_ms__or2_2	0.00410	0.00386	4.74683
sky130_osu_sc_15T_ms__or2_4	0.00411	0.00386	9.18906
sky130_osu_sc_15T_ms__or2_8	0.00411	0.00388	17.23589
sky130_osu_sc_15T_ms__or2_l	0.00317	0.00291	1.31050

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__or2_1	0.00000	0.01649	0.02838
sky130_osu_sc_15T_ms__or2_2	0.00000	0.02360	0.05662
sky130_osu_sc_15T_ms__or2_4	0.00000	0.03782	0.11310
sky130_osu_sc_15T_ms__or2_8	0.00000	0.06628	0.22605
sky130_osu_sc_15T_ms__or2_l	0.00000	0.01688	0.02733

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__or2_1	A->Y (RR)	0.05075	0.47316	6.34590
	B->Y (RR)	0.04430	0.45132	6.37565
sky130_osu_sc_15T_ms__or2_2	A->Y (RR)	0.05635	0.41594	6.32974
	B->Y (RR)	0.04971	0.39719	6.33785
sky130_osu_sc_15T_ms__or2_4	A->Y (RR)	0.07396	0.41439	6.61545
	B->Y (RR)	0.06733	0.39833	6.60931
sky130_osu_sc_15T_ms__or2_8	A->Y (RR)	0.10733	0.45490	6.85094
	B->Y (RR)	0.10080	0.44303	6.82791
sky130_osu_sc_15T_ms__or2_l	A->Y (RR)	0.05435	0.52826	5.63551
	B->Y (RR)	0.04905	0.51042	5.63092

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__or2_1	A->Y (FF)	0.07626	0.54398	6.88034
	B->Y (FF)	0.06304	0.52008	6.95352
sky130_osu_sc_15T_ms__or2_2	A->Y (FF)	0.08945	0.51760	6.96296
	B->Y (FF)	0.07636	0.49756	6.99079
sky130_osu_sc_15T_ms__or2_4	A->Y (FF)	0.12441	0.54645	7.30167
	B->Y (FF)	0.11137	0.53234	7.27363
sky130_osu_sc_15T_ms__or2_8	A->Y (FF)	0.19712	0.62662	7.44985
	B->Y (FF)	0.18408	0.61885	7.38575
sky130_osu_sc_15T_ms__or2_l	A->Y (FF)	0.08939	0.54679	5.59432
	B->Y (FF)	0.07443	0.52842	5.66918

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__or2_1	A	0.00000	0.00000	0.00000
	A	0.00522	0.00492	0.02447
	B	0.00000	0.00000	0.00000
	B	0.00387	0.00467	0.03472
sky130_osu_sc_15T_ms__or2_2	A	0.00000	0.00000	0.00000
	A	0.00899	0.00898	0.02948
	B	0.00000	0.00000	0.00000
	B	0.00753	0.00856	0.03848
sky130_osu_sc_15T_ms__or2_4	A	0.00000	0.00000	0.00000
	A	0.01725	0.01781	0.03759
	B	0.00000	0.00000	0.00000
	B	0.01580	0.01754	0.04555
sky130_osu_sc_15T_ms__or2_8	A	0.00000	0.00000	0.00000
	A	0.03495	0.03527	0.05532
	B	0.00000	0.00000	0.00000
	B	0.03344	0.03548	0.06157
sky130_osu_sc_15T_ms__or2_l	A	0.00000	0.00000	0.00000
	A	0.00376	0.00370	0.01731
	B	0.00000	0.00000	0.00000
	B	0.00292	0.00344	0.02135

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__or2_1	A	0.00000	0.00000	0.00000
	A	0.01173	0.01178	0.03064
	B	0.00000	0.00000	0.00000
	B	0.00976	0.01211	0.05468
sky130_osu_sc_15T_ms__or2_2	A	0.00000	0.00000	0.00000
	A	0.01459	0.01490	0.03380
	B	0.00000	0.00000	0.00000
	B	0.01257	0.01506	0.05639
sky130_osu_sc_15T_ms__or2_4	A	0.00000	0.00000	0.00000
	A	0.02214	0.02246	0.04097
	B	0.00000	0.00000	0.00000
	B	0.02019	0.02253	0.06132
sky130_osu_sc_15T_ms__or2_8	A	0.00000	0.00000	0.00000
	A	0.04126	0.03727	0.05529
	B	0.00000	0.00000	0.00000
	B	0.03932	0.03692	0.07261
sky130_osu_sc_15T_ms__or2_l	A	0.00000	0.00000	0.00000
	A	0.00869	0.00852	0.02256
	B	0.00000	0.00000	0.00000
	B	0.00738	0.00874	0.03639

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__or2_1	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00263	-0.00306	-0.00307
sky130_osu_sc_15T_ms__or2_2	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00263	-0.00306	-0.00307
sky130_osu_sc_15T_ms__or2_4	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00261	-0.00306	-0.00307
sky130_osu_sc_15T_ms__or2_8	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00261	-0.00306	-0.00307
sky130_osu_sc_15T_ms__or2_l	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00178	-0.00204	-0.00204

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__or2_1	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00305	0.00309	0.00307
sky130_osu_sc_15T_ms__or2_2	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00305	0.00310	0.00307
sky130_osu_sc_15T_ms__or2_4	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00305	0.00310	0.00307
sky130_osu_sc_15T_ms__or2_8	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00305	0.00310	0.00307
sky130_osu_sc_15T_ms__or2_l	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00203	0.00206	0.00204

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__or2_1	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00147	-0.00149	-0.00147
sky130_osu_sc_15T_ms__or2_2	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00147	-0.00149	-0.00147
sky130_osu_sc_15T_ms__or2_4	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00147	-0.00149	-0.00147
sky130_osu_sc_15T_ms__or2_8	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00147	-0.00149	-0.00147
sky130_osu_sc_15T_ms__or2_l	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00101	-0.00102	-0.00101

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__or2_1	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00154	0.00155	0.00149
sky130_osu_sc_15T_ms__or2_2	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00154	0.00155	0.00149
sky130_osu_sc_15T_ms__or2_4	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00154	0.00155	0.00149
sky130_osu_sc_15T_ms__or2_8	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00154	0.00155	0.00149
sky130_osu_sc_15T_ms__or2_l	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00105	0.00107	0.00103

SKY130_OSU_SC_15T_MS__TBUFIx

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__tbufi_1	10.37850
sky130_osu_sc_15T_ms__tbufi_l	10.37850

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	OE	Y
sky130_osu_sc_15T_ms__tbufi_1	0.00401	0.00522	1.31900
sky130_osu_sc_15T_ms__tbufi_l	0.00307	0.00406	0.78265

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__tbufi_1	0.00000	0.01421	0.05648
sky130_osu_sc_15T_ms__tbufi_l	0.00000	0.01370	0.05418

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__tbufi_1	A->Y (FR)	0.02916	0.71707	10.44930
	OE->Y (FR)	0.03343	0.32710	5.01975
	OE->Y (RR)	0.05528	0.54375	6.49681
sky130_osu_sc_15T_ms__tbufi_l	A->Y (FR)	0.03966	0.84605	10.73980
	OE->Y (FR)	0.03897	0.32695	5.01963
	OE->Y (RR)	0.06241	0.62653	6.04437

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__tbufi_1	A->Y (RF)	0.02216	0.50895	7.44162
	OE->Y (FF)	0.03367	0.32710	5.01984
	OE->Y (RF)	0.02262	0.50856	7.35284
sky130_osu_sc_15T_ms__tbufi_l	A->Y (RF)	0.02236	0.46082	5.80822
	OE->Y (FF)	0.03915	0.32695	5.01968
	OE->Y (RF)	0.02246	0.45726	5.73015

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__tbufi_1	A	0.00000	0.00000	0.00000
	A	0.00497	0.00558	0.01373
	OE	0.00000	0.00000	0.00000
	OE	0.00486	0.00591	0.04906
sky130_osu_sc_15T_ms__tbufi_l	A	0.00000	0.00000	0.00000
	A	0.00368	0.00398	0.01020
	OE	0.00000	0.00000	0.00000
	OE	0.00341	0.00420	0.03482

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__tbufi_1	A	0.00000	0.00000	0.00000
	A	-0.00084	-0.00069	0.00190
	OE	0.00000	0.00000	0.00000
	OE	0.00308	0.00427	0.05622
sky130_osu_sc_15T_ms__tbufi_l	A	0.00000	0.00000	0.00000
	A	-0.00047	-0.00033	0.00229
	OE	0.00000	0.00000	0.00000
	OE	0.00209	0.00295	0.03966

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__tbufi_1	(!OE * Y)	0.00000	0.00000	0.00000
	(!OE * Y)	-0.00249	-0.00251	-0.00250
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	-0.00222	-0.00224	-0.00222
sky130_osu_sc_15T_ms__tbufi_l	(!OE * Y)	0.00000	0.00000	0.00000
	(!OE * Y)	-0.00182	-0.00183	-0.00183
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	-0.00165	-0.00166	-0.00165

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__tbufi_1	(!OE * Y)	0.00000	0.00000	0.00000
	(!OE * Y)	0.00249	0.00251	0.00250
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	0.00226	0.00229	0.00224
sky130_osu_sc_15T_ms__tbufi_l	(!OE * Y)	0.00000	0.00000	0.00000
	(!OE * Y)	0.00182	0.00183	0.00183
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	0.00168	0.00169	0.00166

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__tbufi_1	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00178	0.00313	0.05669
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00160	0.00299	0.05650
sky130_osu_sc_15T_ms__tbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00118	0.00216	0.03964
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00106	0.00199	0.03949

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__tbufi_1	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00593	0.00809	0.06128
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00593	0.00818	0.06133
sky130_osu_sc_15T_ms__tbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00453	0.00589	0.04311
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00458	0.00599	0.04318

SKY130_OSU_SC_15T_MS__TNBUFIx

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__tnbufi_1	10.37850
sky130_osu_sc_15T_ms__tnbufi_l	10.37850

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	OE	Y
sky130_osu_sc_15T_ms__tnbufi_1	0.00400	0.00604	1.31867
sky130_osu_sc_15T_ms__tnbufi_l	0.00307	0.00439	0.77438

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__tnbufi_1	0.00000	0.02360	0.02831
sky130_osu_sc_15T_ms__tnbufi_l	0.00000	0.02269	0.02721

Delay Information

Delay(ns) to Y rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__tnbufi_1	A->Y (FR)	0.02941	0.71697	10.44750
	OE->Y (RR)	0.02236	0.32760	5.02031
	OE->Y (FR)	0.03821	0.72975	10.47030
sky130_osu_sc_15T_ms__tnbufi_l	A->Y (FR)	0.03986	0.84233	10.66870
	OE->Y (RR)	0.02126	0.32754	5.02032
	OE->Y (FR)	0.04812	0.85248	10.61670

Delay(ns) to Y falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__tnbufi_1	A->Y (RF)	0.02179	0.50869	7.44027
	OE->Y (RF)	0.02209	0.32760	5.02037
	OE->Y (FF)	0.03991	0.43921	5.25352
sky130_osu_sc_15T_ms__tnbufi_l	A->Y (RF)	0.02190	0.45719	5.76615
	OE->Y (RF)	0.02107	0.32753	5.02025
	OE->Y (FF)	0.04458	0.44732	4.59987

Power Information

Internal switching power(pJ) to Y rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__tnbufi_1	A	0.00000	0.00000	0.00000
	A	0.00513	0.00573	0.01388
	OE	0.00000	0.00000	0.00000
	OE	0.01257	0.01516	0.06883
sky130_osu_sc_15T_ms__tnbufi_l	A	0.00000	0.00000	0.00000
	A	0.00384	0.00414	0.01035
	OE	0.00000	0.00000	0.00000
	OE	0.00908	0.01078	0.04814

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__tnbufi_1	A	0.00000	0.00000	0.00000
	A	-0.00105	-0.00089	0.00170
	OE	0.00000	0.00000	0.00000
	OE	0.01101	0.01405	0.05771
sky130_osu_sc_15T_ms__tnbufi_l	A	0.00000	0.00000	0.00000
	A	-0.00067	-0.00040	0.00210
	OE	0.00000	0.00000	0.00000
	OE	0.00792	0.00992	0.04122

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__tnbufi_1	(OE * Y)	0.00000	0.00000	0.00000
	(OE * Y)	-0.00209	-0.00210	-0.00209
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	-0.00184	-0.00185	-0.00184
sky130_osu_sc_15T_ms__tnbufi_l	(OE * Y)	0.00000	0.00000	0.00000
	(OE * Y)	-0.00144	-0.00144	-0.00144
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	-0.00128	-0.00129	-0.00128

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__tnbufi_1	(OE * Y)	0.00000	0.00000	0.00000
	(OE * Y)	0.00209	0.00210	0.00209
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	0.00187	0.00190	0.00186
sky130_osu_sc_15T_ms__tnbufi_l	(OE * Y)	0.00000	0.00000	0.00000
	(OE * Y)	0.00144	0.00144	0.00144
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	0.00130	0.00131	0.00128

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__tnbufi_1	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	-0.00360	-0.00248	0.05152
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00359	-0.00243	0.05157
sky130_osu_sc_15T_ms__tnbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	-0.00230	-0.00149	0.03628
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00227	-0.00147	0.03630

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

Cell Name	When	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__tnbufi_1	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00949	0.01239	0.06628
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00937	0.01265	0.06618
sky130_osu_sc_15T_ms__tnbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00684	0.00872	0.04635
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00676	0.00893	0.04627

SKY130_OSU_SC_15T_MS__XNOR2

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__xnor2_l	17.70450

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
sky130_osu_sc_15T_ms__xnor2_l	0.00794	0.00703	1.39840

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__xnor2_l	0.00000	0.04663	0.08479

Delay Information

Delay(ns) to Y rising (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
sky130_osu_sc_15T_ms__xnor2_l	A->Y (RR)	B	0.06960	0.58229	6.86828
	A->Y (FR)	!B	0.03832	0.73704	10.75270
	B->Y (RR)	A	0.05579	0.56773	6.92304
	B->Y (FR)	!A	0.05289	0.75174	10.79560

Delay(ns) to Y falling (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
sky130_osu_sc_15T_ms__xnor2_l	A->Y (FF)	B	0.06572	0.49826	5.69553
	A->Y (RF)	!B	0.03117	0.52565	7.62463
	B->Y (FF)	A	0.05759	0.49163	5.70284
	B->Y (RF)	!A	0.03850	0.53483	7.62126

Power Information

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

Cell Name	Input	When	Power(pJ)		
			first	mid	last
sky130_osu_sc_15T_ms__xnor2_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00498	0.00572	0.04940
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.01242	0.01470	0.07508
	B	A	0.00000	0.00000	0.00000
	B	A	0.00185	0.00318	0.05695
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.01345	0.01506	0.06969

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

Cell Name	Input	When	Power(pJ)		
			first	mid	last
sky130_osu_sc_15T_ms__xnor2_l	A	B	0.00000	0.00000	0.00000
	A	B	0.01531	0.01669	0.06847
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00327	0.00421	0.05778
	B	A	0.00000	0.00000	0.00000
	B	A	0.01381	0.01606	0.06982
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00442	0.00532	0.05836

SKY130_OSU_SC_15T_MS__XOR2

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__xor2_l	17.70450

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
sky130_osu_sc_15T_ms__xor2_l	0.00798	0.00708	1.32344

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__xor2_l	0.00000	0.04663	0.07293

Delay Information

Delay(ns) to Y rising (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
sky130_osu_sc_15T_ms__xor2_l	A->Y (RR)	!B	0.06956	0.56916	6.68734
	A->Y (FR)	B	0.04908	0.74637	10.61900
	B->Y (RR)	!A	0.05946	0.56676	6.71243
	B->Y (FR)	A	0.05383	0.75009	10.59080

Delay(ns) to Y falling (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
sky130_osu_sc_15T_ms__xor2_l	A->Y (FF)	!B	0.06070	0.49079	5.37005
	A->Y (RF)	B	0.03107	0.52562	7.45726
	B->Y (FF)	!A	0.05545	0.48342	5.47630
	B->Y (RF)	A	0.03874	0.52700	7.37684

Power Information

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

Cell Name	Input	When	Power(pJ)		
			first	mid	last
sky130_osu_sc_15T_ms__xor2_l	A	B	0.00000	0.00000	0.00000
	A	B	0.01468	0.01678	0.07228
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00270	0.00272	0.05401
	B	A	0.00000	0.00000	0.00000
	B	A	0.01501	0.01705	0.07078
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00169	0.00286	0.05602

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

Cell Name	Input	When	Power(pJ)		
			first	mid	last
sky130_osu_sc_15T_ms__xor2_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00271	0.00341	0.05860
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.01586	0.01824	0.06170
	B	A	0.00000	0.00000	0.00000
	B	A	0.00278	0.00350	0.05601
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.01404	0.01644	0.06963

SKY130_OSU_SC_15T_MS_x

sky130_osu_sc_15T_ms_ff_1P76_-40C.ccs
Cell Library: Process , Voltage 1.76, Temp -40.00

Truth Table

INPUT
A
x

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__ant	5.49450
sky130_osu_sc_15T_ms__tiehi	5.49450
sky130_osu_sc_15T_ms__tielo	5.49450

Pin Capacitance Information

Cell Name	Pin Cap(pf)
	A
sky130_osu_sc_15T_ms__ant	0.76414
sky130_osu_sc_15T_ms__tiehi	0.00000
sky130_osu_sc_15T_ms__tielo	0.00000

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__ant	0.00000	327149.00000	654298.00000
sky130_osu_sc_15T_ms__tiehi	0.00000	0.00000	0.00000
sky130_osu_sc_15T_ms__tielo	0.00000	0.00000	0.00000

Passive Power Information

Passive power(pJ) for A rising :

Cell Name	Power(pJ)		
	first	mid	last
sky130_osu_sc_15T_ms__ant	0.00000	0.00000	0.00000
	-0.00133	0.08072	1.20696

Passive power(pJ) for A falling :

Cell Name	Power(pJ)		
	first	mid	last
sky130_osu_sc_15T_ms__ant	0.00000	0.00000	0.00000
	5.69340	5.42538	1.45509