sky130_osu_sc_15T_ms_tt_1P80_100C.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_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.01601	0.01593	0.01228	2.21512	1.02907	2.13798
sky130_osu_sc_15T_ms__addf_l	0.01601	0.01592	0.01228	1.33461	1.03036	1.37474

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__addf_1	0.00000	30.59750	37.48970
sky130_osu_sc_15T_ms__addf_l	0.00000	22.07000	28.96230

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)	0.14851	1.74214	27.39350
	B->CO (RR)	0.14771	1.70797	26.67460
	CI->CO (RR)	0.14009	1.77696	28.01750
	CON->CO (FR)	0.02254	0.65416	10.31020
sky130_osu_sc_15T_ms__addf_1	A->CO (RR)	0.15336	1.58727	20.67370
	B->CO (RR)	0.15252	1.56874	20.44460
	CI->CO (RR)	0.14490	1.62344	21.32790
	CON->CO (FR)	0.02823	0.73993	10.30850

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)	0.17604	2.00708	31.57500
	B->CO (FF)	0.15757	1.93373	30.57970
	CI->CO (FF)	0.15501	2.01747	32.04870
	CON->CO (RF)	0.02440	0.65961	10.47940
sky130_osu_sc_15T_ms__addf_1	A->CO (FF)	0.17039	1.68254	21.77820
	B->CO (FF)	0.15238	1.63114	21.39190
	CI->CO (FF)	0.14933	1.69454	22.30850
	CON->CO (RF)	0.02611	0.64872	9.05497

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)	0.12605	0.81038	9.27292
	B->CON (FR)	0.10917	0.78948	9.34713
	CI->CON (FR)	0.10504	0.82089	9.83357
sky130_osu_sc_15T_ms__addf_l	A->CON (FR)	0.11925	0.80413	9.27431
	B->CON (FR)	0.10283	0.78370	9.34837
	CI->CON (FR)	0.09818	0.81447	9.83496

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)	0.10606	0.69893	8.08191
	B->CON (RF)	0.10589	0.71320	8.36858
	CI->CON (RF)	0.09766	0.73709	8.77469
sky130_osu_sc_15T_ms__addf_l	A->CON (RF)	0.10127	0.69455	8.08393
	B->CON (RF)	0.10134	0.70919	8.37041
	CI->CON (RF)	0.09283	0.73275	8.77664

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)	0.25852	1.77197	24.42070
	B->S (-R)	0.27807	1.76943	23.54870
	CI->S (-R)	0.23573	1.77854	24.90680
	CON->S (RR)	0.07796	0.60588	7.48521
sky130_osu_sc_15T_ms__addf_l	A->S (-R)	0.24887	1.60656	19.04700
	B->S (-R)	0.24073	1.57793	18.66040
	CI->S (-R)	0.22580	1.61454	19.56810
	CON->S (RR)	0.07940	0.66186	7.35267

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)	0.24251	1.62888	21.64540
	B->S (-F)	0.23794	1.56943	21.03430
	CI->S (-F)	0.23378	1.66104	22.28020
	CON->S (FF)	0.09275	0.65053	7.53327
sky130_osu_sc_15T_ms__addf_l	A->S (-F)	0.22733	1.43576	16.41970
	B->S (-F)	0.22362	1.39698	16.27040
	CI->S (-F)	0.21850	1.46913	17.08380
	CON->S (FF)	0.08812	0.64216	6.59079

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	0.00396	0.00629	0.05337
	B	0.00453	0.00662	0.05017
	CI	0.00593	0.00841	0.05581
sky130_osu_sc_15T_ms__addf_l	A	0.00281	0.00429	0.03149
	B	0.00475	0.00583	0.03079
	CI	0.00477	0.00643	0.03351

Internal switching power(pJ) to CO falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.01407	0.01692	0.07824
	B	0.01474	0.01704	0.07167
	CI	0.01192	0.01500	0.07716
sky130_osu_sc_15T_ms__addf_l	A	0.01287	0.01478	0.05095
	B	0.01356	0.01509	0.04752
	CI	0.01074	0.01290	0.05033

Internal switching power(pJ) to CON rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.01381	0.01547	0.04644
	B	0.01416	0.01564	0.04396
	CI	0.01169	0.01346	0.04602
sky130_osu_sc_15T_ms__addf_l	A	0.01279	0.01437	0.04384
	B	0.01317	0.01455	0.04154
	CI	0.01067	0.01235	0.04343

Internal switching power(pJ) to CON falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.00374	0.00520	0.02969
	B	0.00565	0.00672	0.02989
	CI	0.00569	0.00731	0.03227
sky130_osu_sc_15T_ms__addf_l	A	0.00270	0.00397	0.02620
	B	0.00464	0.00551	0.02655
	CI	0.00464	0.00607	0.02870

Internal switching power(pJ) to S rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.01394	0.01671	0.07560
	B	0.01464	0.01687	0.06965
	CI	0.01179	0.01481	0.07465
sky130_osu_sc_15T_ms__addf_l	A	-0.00081	-0.00229	0.05223
	B	0.00261	0.00133	0.05520
	CI	0.00455	0.00530	0.05681

Internal switching power(pJ) to S falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.03058	0.03193	0.08341
	B	0.02733	0.02942	0.08713
	CI	0.02340	0.02490	0.07344
sky130_osu_sc_15T_ms__addf_l	A	0.02902	0.03029	0.08315
	B	0.02560	0.02778	0.08748
	CI	0.02187	0.02318	0.07319

SKY130_OSU_SC_15T_MS__ADDHx

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00783	0.00866	2.18035	1.10523	2.22813
sky130_osu_sc_15T_ms__addh_l	0.00783	0.00866	1.41234	1.10677	1.43170

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__addh_1	0.00000	33.04190	37.48410
sky130_osu_sc_15T_ms__addh_l	0.00000	22.37970	28.95680

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)	0.09746	0.63285	7.48135
	B->CO (RR)	0.10136	0.61996	7.52951
sky130_osu_sc_15T_ms__addh_l	A->CO (RR)	0.10058	0.69603	7.51306
	B->CO (RR)	0.10451	0.68410	7.50345

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)	0.07740	0.60624	7.35564
	B->CO (FF)	0.08276	0.62268	7.44519
sky130_osu_sc_15T_ms__addh_l	A->CO (FF)	0.07377	0.55619	5.71555
	B->CO (FF)	0.07882	0.57245	5.80558

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	0.13253	0.52587	4.20362
	A->CON (FR)	!B	0.06816	0.76550	9.68077
	B->CON (RR)	A	0.13562	0.51158	4.24335
	B->CON (FR)	!A	0.08489	0.75629	9.27446
sky130_osu_sc_15T_ms__addh_l	A->CON (RR)	B	0.12195	0.50988	4.22444
	A->CON (FR)	!B	0.06204	0.75948	9.68307
	B->CON (RR)	A	0.12518	0.49662	4.21630
	B->CON (FR)	!A	0.07875	0.75015	9.27677

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	0.13035	0.66799	6.08121
	A->CON (RF)	!B	0.06190	0.70432	8.96630
	B->CON (FF)	A	0.12563	0.69762	6.46434
	B->CON (RF)	!A	0.07644	0.70037	8.69172
sky130_osu_sc_15T_ms__addh_l	A->CON (FF)	B	0.12096	0.64918	6.01773
	A->CON (RF)	!B	0.05739	0.69983	8.96791
	B->CON (FF)	A	0.11631	0.67938	6.39982
	B->CON (RF)	!A	0.07199	0.69623	8.69448

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	0.10058	1.70849	27.70570
	A->S (FR)	B	0.17022	1.66317	24.67490
	B->S (RR)	!A	0.11613	1.67794	26.82590
	B->S (FR)	A	0.16494	1.72012	25.66210
	CON->S (FR)	-	0.02461	0.67108	10.58000
sky130_osu_sc_15T_ms__addh_l	A->S (RR)	!B	0.10176	1.57694	21.89890
	A->S (FR)	B	0.16692	1.51770	18.80930
	B->S (RR)	!A	0.11767	1.55376	21.28260
	B->S (FR)	A	0.16133	1.56726	19.52860
	CON->S (FR)	-	0.02857	0.75038	10.63980

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	0.11029	1.85146	30.08840
	A->S (RF)	B	0.16913	1.33701	18.92130
	B->S (FF)	!A	0.12707	1.84685	29.75120
	B->S (RF)	A	0.17226	1.32250	18.96990
	CON->S (RF)	-	0.02322	0.64937	10.30890
sky130_osu_sc_15T_ms__addh_l	A->S (FF)	!B	0.10482	1.60682	22.28370
	A->S (RF)	B	0.15917	1.18644	14.06580
	B->S (FF)	!A	0.12158	1.60113	21.90810
	B->S (RF)	A	0.16234	1.17252	14.05440
	CON->S (RF)	-	0.02481	0.65562	9.33030

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	0.00662	0.00734	0.02844
	B	0.00000	0.00000	0.00000
	B	0.00593	0.00645	0.03271
sky130_osu_sc_15T_ms__addh_l	A	0.00000	0.00000	0.00000
	A	0.00567	0.00631	0.02903
	B	0.00000	0.00000	0.00000
	B	0.00497	0.00545	0.03138

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	0.00981	0.01115	0.04521
	B	0.00000	0.00000	0.00000
	B	0.01018	0.01221	0.04853
sky130_osu_sc_15T_ms__addh_l	A	0.00000	0.00000	0.00000
	A	0.00885	0.00993	0.03839
	B	0.00000	0.00000	0.00000
	B	0.00922	0.01085	0.04063

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	0.00647	0.00720	0.02843
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00879	0.00984	0.02402
	B	A	0.00000	0.00000	0.00000
	B	A	0.00579	0.00630	0.03232
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00992	0.01049	0.02306
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00556	0.00620	0.02897
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00794	0.00881	0.02073
	B	A	0.00000	0.00000	0.00000
	B	A	0.00486	0.00535	0.03118
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00907	0.00946	0.01969

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	0.00977	0.01100	0.04090
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00187	0.00281	0.01523
	B	A	0.00000	0.00000	0.00000
	B	A	0.01015	0.01196	0.04317
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00271	0.00339	0.01592
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00886	0.00993	0.03795
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00097	0.00161	0.01038
	B	A	0.00000	0.00000	0.00000
	B	A	0.00924	0.01084	0.04003
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00180	0.00219	0.01113

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	0.00998	0.01135	0.04585
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00224	0.00339	0.02098
	B	A	0.00000	0.00000	0.00000
	B	A	0.01040	0.01245	0.04932
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00303	0.00391	0.02014
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00897	0.01005	0.03888
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00117	0.00180	0.01108
	B	A	0.00000	0.00000	0.00000
	B	A	0.00937	0.01101	0.04117
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00197	0.00237	0.01121

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	0.00672	0.00745	0.02959
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00900	0.01020	0.02741
	B	A	0.00000	0.00000	0.00000
	B	A	0.00602	0.00656	0.03274
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.01014	0.01099	0.02678
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00568	0.00634	0.02913
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00797	0.00881	0.02083
	B	A	0.00000	0.00000	0.00000
	B	A	0.00498	0.00546	0.03157
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00911	0.00958	0.01961

SKY130_OSU_SC_15T_MS__AND2x

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00422	0.00434	2.18212
sky130_osu_sc_15T_ms__and2_2	0.00422	0.00434	4.19984
sky130_osu_sc_15T_ms__and2_4	0.00422	0.00434	8.05747
sky130_osu_sc_15T_ms__and2_6	0.00425	0.00434	11.85868
sky130_osu_sc_15T_ms__and2_8	0.00423	0.00435	15.50900
sky130_osu_sc_15T_ms__and2_l	0.00318	0.00330	1.33203

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__and2_1	0.00000	15.61820	24.97850
sky130_osu_sc_15T_ms__and2_2	0.00000	24.97950	24.99350
sky130_osu_sc_15T_ms__and2_4	0.00000	43.70850	49.94010
sky130_osu_sc_15T_ms__and2_6	0.00000	62.43740	74.90060
sky130_osu_sc_15T_ms__and2_8	0.00000	81.16600	99.86130
sky130_osu_sc_15T_ms__and2_l	0.00000	4.95669	7.92186

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)	0.07413	0.57334	7.44338
	B->Y (RR)	0.07947	0.56299	7.17912
sky130_osu_sc_15T_ms__and2_2	A->Y (RR)	0.08586	0.52870	7.39791
	B->Y (RR)	0.09128	0.51368	7.13240
sky130_osu_sc_15T_ms__and2_4	A->Y (RR)	0.11891	0.55065	7.59756
	B->Y (RR)	0.12431	0.52804	7.33712
sky130_osu_sc_15T_ms__and2_6	A->Y (RR)	0.15286	0.59283	7.76313
	B->Y (RR)	0.15817	0.56361	7.50989
sky130_osu_sc_15T_ms__and2_8	A->Y (RR)	0.18625	0.63624	7.97318
	B->Y (RR)	0.19162	0.60450	7.71217
sky130_osu_sc_15T_ms__and2_l	A->Y (RR)	0.08230	0.64541	7.16909
	B->Y (RR)	0.08778	0.63383	6.90408

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)	0.06094	0.54242	6.94444
	B->Y (FF)	0.06388	0.55623	7.01464
sky130_osu_sc_15T_ms__and2_2	A->Y (FF)	0.06807	0.49160	6.84189
	B->Y (FF)	0.07149	0.50364	6.92537
sky130_osu_sc_15T_ms__and2_4	A->Y (FF)	0.09334	0.50291	6.94558
	B->Y (FF)	0.09646	0.51219	7.02661
sky130_osu_sc_15T_ms__and2_6	A->Y (FF)	0.12125	0.53879	7.05331
	B->Y (FF)	0.12391	0.54504	7.14659
sky130_osu_sc_15T_ms__and2_8	A->Y (FF)	0.14766	0.57388	7.11691
	B->Y (FF)	0.15003	0.57899	7.20180
sky130_osu_sc_15T_ms__and2_l	A->Y (FF)	0.06842	0.57930	6.15060
	B->Y (FF)	0.07276	0.59549	6.24613

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	0.00513	0.00805	0.08690
	B	0.00000	0.00000	0.00000
	B	0.00519	0.00694	0.06518
sky130_osu_sc_15T_ms__and2_2	A	0.00000	0.00000	0.00000
	A	0.00983	0.01253	0.09107
	B	0.00000	0.00000	0.00000
	B	0.00991	0.01159	0.06872
sky130_osu_sc_15T_ms__and2_4	A	0.00000	0.00000	0.00000
	A	0.02101	0.02319	0.09763
	B	0.00000	0.00000	0.00000
	B	0.02118	0.02223	0.07791
sky130_osu_sc_15T_ms__and2_6	A	0.00000	0.00000	0.00000
	A	0.03461	0.03587	0.10990
	B	0.00000	0.00000	0.00000
	B	0.03478	0.03357	0.08653
sky130_osu_sc_15T_ms__and2_8	A	0.00000	0.00000	0.00000
	A	0.04989	0.04698	0.11809
	B	0.00000	0.00000	0.00000
	B	0.04977	0.04507	0.09988
sky130_osu_sc_15T_ms__and2_l	A	0.00000	0.00000	0.00000
	A	0.00341	0.00544	0.05877
	B	0.00000	0.00000	0.00000
	B	0.00349	0.00465	0.04358

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	0.01178	0.01620	0.08950
	B	0.00000	0.00000	0.00000
	B	0.01329	0.01741	0.08770
sky130_osu_sc_15T_ms__and2_2	A	0.00000	0.00000	0.00000
	A	0.01533	0.01987	0.09272
	B	0.00000	0.00000	0.00000
	B	0.01685	0.02106	0.09115
sky130_osu_sc_15T_ms__and2_4	A	0.00000	0.00000	0.00000
	A	0.02507	0.02919	0.10075
	B	0.00000	0.00000	0.00000
	B	0.02646	0.02986	0.09925
sky130_osu_sc_15T_ms__and2_6	A	0.00000	0.00000	0.00000
	A	0.03593	0.03882	0.10973
	B	0.00000	0.00000	0.00000
	B	0.03723	0.03935	0.10762
sky130_osu_sc_15T_ms__and2_8	A	0.00000	0.00000	0.00000
	A	0.04886	0.04855	0.11858
	B	0.00000	0.00000	0.00000
	B	0.05000	0.04866	0.11578
sky130_osu_sc_15T_ms__and2_l	A	0.00000	0.00000	0.00000
	A	0.00878	0.01158	0.05957
	B	0.00000	0.00000	0.00000
	B	0.00983	0.01240	0.05818

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)	-0.00420	-0.00421	-0.00423
sky130_osu_sc_15T_ms__and2_2	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00409	-0.00410	-0.00412
sky130_osu_sc_15T_ms__and2_4	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00387	-0.00389	-0.00391
sky130_osu_sc_15T_ms__and2_6	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00369	-0.00369	-0.00372
sky130_osu_sc_15T_ms__and2_8	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00344	-0.00345	-0.00347
sky130_osu_sc_15T_ms__and2_l	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00299	-0.00299	-0.00301

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)	0.00444	0.00454	0.00446
sky130_osu_sc_15T_ms__and2_2	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00455	0.00465	0.00457
sky130_osu_sc_15T_ms__and2_4	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00477	0.00486	0.00479
sky130_osu_sc_15T_ms__and2_6	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00502	0.00511	0.00503
sky130_osu_sc_15T_ms__and2_8	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00521	0.00529	0.00522
sky130_osu_sc_15T_ms__and2_l	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00308	0.00314	0.00309

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)	-0.00399	-0.00401	-0.00399
sky130_osu_sc_15T_ms__and2_2	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00388	-0.00391	-0.00389
sky130_osu_sc_15T_ms__and2_4	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00367	-0.00368	-0.00367
sky130_osu_sc_15T_ms__and2_6	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00345	-0.00346	-0.00345
sky130_osu_sc_15T_ms__and2_8	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00323	-0.00324	-0.00324
sky130_osu_sc_15T_ms__and2_l	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00285	-0.00287	-0.00285

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)	0.00430	0.00428	0.00422
sky130_osu_sc_15T_ms__and2_2	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00441	0.00439	0.00433
sky130_osu_sc_15T_ms__and2_4	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00463	0.00461	0.00455
sky130_osu_sc_15T_ms__and2_6	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00484	0.00483	0.00477
sky130_osu_sc_15T_ms__and2_8	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00506	0.00504	0.00499
sky130_osu_sc_15T_ms__and2_l	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00299	0.00298	0.00293

SKY130_OSU_SC_15T_MS__AOI21

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00402	0.00416	0.00402	0.98038

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__aoi21_l	0.00000	6.54522	13.57250

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)	0.06819	0.75330	9.11587
	A1->Y (FR)	0.05706	0.71459	8.77652
	B0->Y (FR)	0.04918	0.76958	9.67856

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)	0.05812	0.62016	7.50857
	A1->Y (RF)	0.05323	0.65012	8.09079
	B0->Y (RF)	0.03093	0.58836	7.59700

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	0.01038	0.01069	0.02512
	A1	0.00000	0.00000	0.00000
	A1	0.00872	0.00901	0.02306
	B0	0.00616	0.00757	0.02825

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	0.00266	0.00268	0.01289
	A1	0.00000	0.00000	0.00000
	A1	0.00272	0.00308	0.01454
	B0	-0.00081	0.00004	0.01218

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)	-0.00281	-0.00362	-0.00367
	(!A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !Y)	-0.00371	-0.00373	-0.00371
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00382	-0.00382	-0.00382

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)	0.00391	0.00391	0.00392
	(!A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !Y)	0.00392	0.00397	0.00394
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00391	0.00387	0.00383

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)	-0.00280	-0.00356	-0.00362
	(!A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !Y)	-0.00365	-0.00366	-0.00365
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00404	-0.00407	-0.00409

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)	0.00384	0.00386	0.00386
	(!A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !Y)	0.00386	0.00390	0.00388
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00408	0.00411	0.00410

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)	-0.00164	-0.00166	-0.00164

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)	0.00193	0.00193	0.00177

SKY130_OSU_SC_15T_MS__AOI22

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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_l	12.82050

Pin Capacitance Information

Cell Name	Pin Cap(pf)				Max Cap(pf)
	A0	A1	B0	B1	Y
sky130_osu_sc_15T_ms__aoi22_l	0.00401	0.00413	0.00428	0.00409	0.99125

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__aoi22_l	0.00000	7.36910	24.95260

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)	0.08294	0.76187	9.04483
	A1->Y (FR)	0.07393	0.74540	8.95322
	B0->Y (FR)	0.04987	0.75357	9.49582
	B1->Y (FR)	0.05903	0.77478	9.64743

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)	0.07759	0.64282	7.58734
	A1->Y (RF)	0.07260	0.67149	8.16577
	B0->Y (RF)	0.03667	0.63546	8.13169
	B1->Y (RF)	0.04183	0.60315	7.55248

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	0.01277	0.01298	0.02774
	A1	0.01111	0.01133	0.02563
	B0	0.00672	0.00812	0.02932
	B1	0.00837	0.00959	0.03046

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi22_l	A0	0.00520	0.00518	0.01593
	A1	0.00525	0.00556	0.01746
	B0	-0.00022	0.00039	0.01224
	B1	-0.00015	0.00018	0.01067

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)	-0.00261	-0.00352	-0.00357
	(!A1 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * B1 * !Y)	-0.00359	-0.00362	-0.00360
	(!A1 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !B1 * Y)	-0.00382	-0.00384	-0.00382
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00382	-0.00384	-0.00382

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)	0.00402	0.00404	0.00403
	(!A1 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * B1 * !Y)	0.00403	0.00408	0.00405
	(!A1 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !B1 * Y)	0.00391	0.00387	0.00383
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00391	0.00387	0.00383

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)	-0.00260	-0.00347	-0.00351
	(!A0 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * B1 * !Y)	-0.00354	-0.00354	-0.00354
	(!A0 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !B1 * Y)	-0.00403	-0.00407	-0.00408
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00403	-0.00407	-0.00408

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)	0.00396	0.00398	0.00397
	(!A0 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * B1 * !Y)	0.00397	0.00401	0.00398
	(!A0 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !B1 * Y)	0.00407	0.00409	0.00409
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00407	0.00409	0.00409

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)	-0.00165	-0.00166	-0.00165
	(A0 * A1 * !B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B1 * !Y)	-0.00149	-0.00151	-0.00154
	(!A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B1 * Y)	-0.00417	-0.00418	-0.00422
	(!A0 * A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B1 * Y)	-0.00417	-0.00419	-0.00422

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)	0.00201	0.00201	0.00179
	(A0 * A1 * !B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B1 * !Y)	0.00175	0.00176	0.00176
	(!A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B1 * Y)	0.00421	0.00424	0.00423
	(!A0 * A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B1 * Y)	0.00421	0.00424	0.00423

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)	-0.00166	-0.00166	-0.00167
	(A0 * A1 * !B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B0 * !Y)	-0.00150	-0.00151	-0.00155
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00389	-0.00389	-0.00389
	(!A0 * A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B0 * Y)	-0.00389	-0.00391	-0.00389

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)	0.00203	0.00204	0.00180
	(A0 * A1 * !B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B0 * !Y)	0.00176	0.00178	0.00177
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00398	0.00389	0.00390
	(!A0 * A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B0 * Y)	0.00398	0.00392	0.00390

SKY130_OSU_SC_15T_MS__BUFx

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00432	2.14400
sky130_osu_sc_15T_ms__buf_2	0.00436	4.18983
sky130_osu_sc_15T_ms__buf_4	0.00436	8.19859
sky130_osu_sc_15T_ms__buf_6	0.00091	1.80000
sky130_osu_sc_15T_ms__buf_8	0.00437	15.62985
sky130_osu_sc_15T_ms__buf_l	0.00332	1.35074

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__buf_1	0.00000	12.50310	12.50330
sky130_osu_sc_15T_ms__buf_2	0.00000	18.74900	24.98010
sky130_osu_sc_15T_ms__buf_4	0.00000	31.24620	49.94130
sky130_osu_sc_15T_ms__buf_6	0.00000	0.00000	0.00000
sky130_osu_sc_15T_ms__buf_8	0.00000	56.24050	99.86330
sky130_osu_sc_15T_ms__buf_l	0.00000	3.97562	3.97565

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)**	0.05528	0.53107	7.01560
sky130_osu_sc_15T_ms__buf_2	**A->Y (RR)**	0.06347	0.47986	7.00448
sky130_osu_sc_15T_ms__buf_4	**A->Y (RR)**	0.08579	0.48795	7.26934
sky130_osu_sc_15T_ms__buf_8	**A->Y (RR)**	0.13021	0.54726	7.50175
sky130_osu_sc_15T_ms__buf_l	**A->Y (RR)**	0.06224	0.60183	6.83161

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)**	0.05760	0.53409	6.94089
sky130_osu_sc_15T_ms__buf_2	**A->Y (FF)**	0.06635	0.50145	7.18574
sky130_osu_sc_15T_ms__buf_4	**A->Y (FF)**	0.09183	0.51616	7.49636
sky130_osu_sc_15T_ms__buf_8	**A->Y (FF)**	0.14625	0.58415	7.65567
sky130_osu_sc_15T_ms__buf_l	**A->Y (FF)**	0.06557	0.57869	6.33105

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	0.00449	0.00744	0.07064
sky130_osu_sc_15T_ms__buf_2	A	0.00000	0.00000	0.00000
	A	0.00898	0.01164	0.07256
sky130_osu_sc_15T_ms__buf_4	A	0.00000	0.00000	0.00000
	A	0.01938	0.02251	0.08348
sky130_osu_sc_15T_ms__buf_8	A	0.00000	0.00000	0.00000
	A	0.04351	0.04497	0.10247
sky130_osu_sc_15T_ms__buf_l	A	0.00000	0.00000	0.00000
	A	0.00320	0.00524	0.04996

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	0.01129	0.01588	0.09152
sky130_osu_sc_15T_ms__buf_2	A	0.00000	0.00000	0.00000
	A	0.01493	0.01943	0.08894
sky130_osu_sc_15T_ms__buf_4	A	0.00000	0.00000	0.00000
	A	0.02450	0.02863	0.09747
sky130_osu_sc_15T_ms__buf_8	A	0.00000	0.00000	0.00000
	A	0.04809	0.04758	0.11529
sky130_osu_sc_15T_ms__buf_l	A	0.00000	0.00000	0.00000
	A	0.00848	0.01138	0.06127

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
	-0.00076	-0.00076	-0.00073

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
	0.00076	0.00076	0.00073

SKY130_OSU_SC_15T_MS__DFFRx

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00412	0.00408	0.01188	1.97255	1.97889
sky130_osu_sc_15T_ms__dffr_l	0.00412	0.00408	0.01187	1.33750	1.34423

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__dffr_1	0.00000	38.56260	65.06580
sky130_osu_sc_15T_ms__dffr_l	0.00000	30.03520	56.53860

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)	0.28484	1.37375	16.64420
	QN->Q (FR)	0.02842	0.76658	11.79420
sky130_osu_sc_15T_ms__dffr_l	CK->Q (RR)	0.27778	1.47042	15.96470
	QN->Q (FR)	0.03143	0.81898	11.43570

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)	0.27873	1.38954	17.24750
	QN->Q (RF)	0.02713	0.70825	10.86590
	RN->Q (FF)	0.20438	1.32968	17.24950
sky130_osu_sc_15T_ms__dffr_l	CK->Q (RF)	0.28282	1.51140	16.64080
	QN->Q (RF)	0.02771	0.70420	9.83930
	RN->Q (FF)	0.20899	1.45189	16.63800

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)	0.24399	0.75037	7.04734
	RN->QN (FR)	0.16950	0.69096	7.04843
sky130_osu_sc_15T_ms__dffr_l	CK->QN (RR)	0.24517	0.81775	7.13344
	RN->QN (FR)	0.17109	0.75845	7.12959

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)**	0.24845	0.75512	6.78563
sky130_osu_sc_15T_ms__dffr_l	**CK->QN (RF)**	0.23541	0.75633	6.18256

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)	-0.07690	-0.08234	0.04358
	setup	CK (R)	0.22626	0.24942	0.48281
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.07864	-0.08360	0.04364
	setup	CK (R)	0.22676	0.25108	0.49261

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)	-0.10208	-0.25419	-2.28276
	setup	CK (R)	0.12532	0.26441	2.33615
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.10028	-0.25285	-2.28005
	setup	CK (R)	0.12525	0.26441	2.33615

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)	-0.07690	-0.08234	0.04358
	setup	CK (R)	0.22626	0.24942	0.48281
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.07864	-0.08360	0.04364
	setup	CK (R)	0.22676	0.25108	0.49261

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)	-0.10208	-0.25419	-2.28276
	setup	CK (R)	0.12532	0.26441	2.33615
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.10028	-0.25285	-2.28005
	setup	CK (R)	0.12525	0.26441	2.33615

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)	0.18684	0.21680	0.89101
	removal	CK (R)	-0.04511	-0.05467	-0.13701
sky130_osu_sc_15T_ms__dffr_l	recovery	CK (R)	0.18787	0.21794	0.90045
	removal	CK (R)	-0.04511	-0.05467	-0.13701

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)	0.18684	0.21680	0.89101
	removal	CK (R)	-0.04511	-0.05467	-0.13701
sky130_osu_sc_15T_ms__dffr_l	recovery	CK (R)	0.18787	0.21794	0.90045
	removal	CK (R)	-0.04511	-0.05467	-0.13701

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 ()	0.11693	0.48584	13.33370
	min_pulse_width	RN ()	0.11693	0.48584	13.33370
sky130_osu_sc_15T_ms__dffr_l	min_pulse_width	RN ()	0.11328	0.48584	13.33370
	min_pulse_width	RN ()	0.11328	0.48584	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 ()	0.13884	0.48584	13.33370
	min_pulse_width	CK ()	0.14615	0.48584	13.33370
sky130_osu_sc_15T_ms__dffr_l	min_pulse_width	CK ()	0.12789	0.48584	13.33370
	min_pulse_width	CK ()	0.14250	0.48584	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 ()	0.28130	0.48584	13.33370
	min_pulse_width	CK ()	0.10597	0.48584	13.33370
sky130_osu_sc_15T_ms__dffr_l	min_pulse_width	CK ()	0.28130	0.48584	13.33370
	min_pulse_width	CK ()	0.10597	0.48584	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	0.01233	0.01300	0.04220
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.01072	0.01214	0.05806

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	0.01368	0.01198	0.00963
	RN	-0.00142	-0.09616	-1.59774
	RN	0.03018	0.02912	0.02790
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.01213	0.01185	0.03630
	RN	-0.00142	-0.07617	-1.08337
	RN	0.02862	0.02900	0.05468

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	0.01354	0.01182	0.00888
	RN	-0.00142	-0.09635	-1.60238
	RN	0.03009	0.02900	0.02728
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.01205	0.01178	0.03606
	RN	-0.00142	-0.07640	-1.08874
	RN	0.02858	0.02893	0.05437

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	0.01203	0.01272	0.04139
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.01044	0.01190	0.05695

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	-0.00241	-0.00308	-0.00318
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.01483	0.01583	0.07418
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00634	0.00745	0.06492
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	-0.00249	-0.00316	-0.00326
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.01476	0.01575	0.07410
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00627	0.00738	0.06485

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	0.00433	0.00435	0.00434
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.02342	0.02502	0.08519
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.01131	0.01293	0.07153
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00426	0.00428	0.00427
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.02335	0.02495	0.08512
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.01124	0.01286	0.07146

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)	0.00434	0.00724	0.09424
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.01274	0.01545	0.10510
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)	0.00427	0.00716	0.09417
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.01266	0.01538	0.10502

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)	0.01100	0.01522	0.10300
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.02282	0.02666	0.11680
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)	0.01092	0.01514	0.10292
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.02274	0.02658	0.11667

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)	-0.00055	0.00206	0.08909
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.00714	0.00934	0.10081
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00099	0.00184	0.08819
sky130_osu_sc_15T_ms__dffr_l	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	-0.00063	0.00199	0.08902
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.00707	0.00927	0.10073
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00107	0.00177	0.08812

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)	0.01634	0.02074	0.10873
	(D * RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * RN * !Q * QN)	0.03573	0.03902	0.14692
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.02705	0.03077	0.12150
	(!D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * Q * !QN)	0.03459	0.04244	0.18439
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01867	0.02284	0.11000
sky130_osu_sc_15T_ms__dffr_l	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.01627	0.02067	0.10866
	(D * RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * RN * !Q * QN)	0.03566	0.03894	0.14684
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.02697	0.03069	0.12142
	(!D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * Q * !QN)	0.03452	0.04237	0.18431
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01859	0.02276	0.10992

SKY130_OSU_SC_15T_MS__DFFSRx

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00408	0.00408	0.00900	0.01215	2.22784	2.23495
sky130_osu_sc_15T_ms__dffsr_l	0.00408	0.00408	0.00899	0.01215	1.34137	1.34557

Leakage Information

Cell Name	Leakage(nW)		
	Min.	**Avg**	**Max.**
sky130_osu_sc_15T_ms__dffsr_1	0.00000	47.40540	65.05190
sky130_osu_sc_15T_ms__dffsr_l	0.00000	38.87780	56.52440

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)	0.27993	1.40348	18.04250
	QN->Q (FR)	0.02487	0.71309	11.30030
	RN->Q (RR)	0.22667	1.36375	18.08480
	SN->Q (FR)	0.19586	1.34549	18.14660
sky130_osu_sc_15T_ms__dffsr_l	CK->Q (RR)	0.28114	1.47481	15.98650
	QN->Q (FR)	0.03143	0.81804	11.43510
	RN->Q (RR)	0.22831	1.43511	16.02220
	SN->Q (FR)	0.19920	1.41226	16.08130

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)	0.32903	1.47278	18.54620
	QN->Q (RF)	0.02678	0.74143	11.76620
	RN->Q (FF)	0.21113	1.37132	18.53910
sky130_osu_sc_15T_ms__dffsr_l	CK->Q (RF)	0.33832	1.57532	16.74590
	QN->Q (RF)	0.02766	0.70436	9.84708
	RN->Q (FF)	0.22037	1.47472	16.73500

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)	0.29379	0.80208	7.28961
	RN->QN (FR)	0.17650	0.70174	7.27954
sky130_osu_sc_15T_ms__dffsr_l	CK->QN (RR)	0.29969	0.88024	7.20424
	RN->QN (FR)	0.18227	0.77973	7.19099

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)	0.24677	0.77993	7.57448
	RN->QN (RF)	0.19377	0.74043	7.61553
	SN->QN (FF)	0.16473	0.72110	7.67954
sky130_osu_sc_15T_ms__dffsr_l	CK->QN (RF)	0.23999	0.76028	6.17775
	RN->QN (RF)	0.18750	0.72116	6.21472
	SN->QN (FF)	0.15843	0.69769	6.27165

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)	-0.07643	-0.08594	0.01983
	setup	CK (R)	0.21731	0.24005	0.56325
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.07783	-0.08460	0.01882
	setup	CK (R)	0.21673	0.24003	0.56475

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)	-0.12031	-0.27395	-2.35247
	setup	CK (R)	0.15732	0.28753	2.40810
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.11900	-0.27607	-2.35185
	setup	CK (R)	0.15686	0.28753	2.40810

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)	-0.07643	-0.08594	0.01983
	setup	CK (R)	0.21731	0.24005	0.56325
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.07783	-0.08460	0.01882
	setup	CK (R)	0.21673	0.24003	0.56475

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)	-0.12031	-0.27395	-2.35247
	setup	CK (R)	0.15732	0.28753	2.40810
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.11900	-0.27607	-2.35185
	setup	CK (R)	0.15686	0.28753	2.40810

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)	0.15706	0.18813	0.87161
	removal	CK (R)	-0.02443	-0.02690	-0.06599
	hold	SN (R)	-0.15802	-0.30099	-1.15751
	setup	SN (R)	0.18639	0.34910	3.31392
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.15683	0.18790	0.87358
	removal	CK (R)	-0.02443	-0.02690	-0.06599
	hold	SN (R)	-0.15338	-0.29026	-1.10965
	setup	SN (R)	0.18728	0.34029	3.20952

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)	0.15706	0.18813	0.87161
	removal	CK (R)	-0.02443	-0.02690	-0.06599
	hold	SN (R)	-0.15879	-0.30099	-1.15751
	hold	SN (R)	-0.15802	-0.30345	-1.16029
	setup	SN (R)	0.18639	0.34629	3.05363
	setup	SN (R)	0.18618	0.34910	3.31392
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.15683	0.18790	0.87358
	removal	CK (R)	-0.02443	-0.02690	-0.06599
	hold	SN (R)	-0.15338	-0.29026	-1.10965
	hold	SN (R)	-0.15571	-0.29334	-1.11252
	setup	SN (R)	0.18728	0.33500	2.95797
	setup	SN (R)	0.17911	0.34029	3.20952

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 ()	0.13519	0.48584	13.33370
	min_pulse_width	RN ()	0.13519	0.48584	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	RN ()	0.13519	0.48584	13.33370
	min_pulse_width	RN ()	0.13154	0.48584	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)	0.04852	0.08474	3.09012
	removal	CK (R)	-0.02620	-0.06459	-0.32699
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.04753	0.08474	2.97276
	removal	CK (R)	-0.02620	-0.06459	-0.32699

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)	0.04852	0.08474	3.09012
	removal	CK (R)	-0.02620	-0.06459	-0.32699
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.04753	0.08474	2.97276
	removal	CK (R)	-0.02620	-0.06459	-0.32699

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 ()	0.15711	0.48584	13.33370
	min_pulse_width	SN ()	0.15711	0.48584	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	SN ()	0.15346	0.48584	13.33370
	min_pulse_width	SN ()	0.14980	0.48584	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 ()	0.13154	0.48584	13.33370
	min_pulse_width	CK ()	0.16441	0.48584	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	CK ()	0.12789	0.48584	13.33370
	min_pulse_width	CK ()	0.16441	0.48584	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 ()	0.27034	0.48584	13.33370
	min_pulse_width	CK ()	0.13884	0.48584	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	CK ()	0.27034	0.48584	13.33370
	min_pulse_width	CK ()	0.13884	0.48584	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	0.01528	0.01560	0.03765
	RN	0.02707	0.02632	0.03544
	SN	-0.00142	-0.10345	-1.80454
	SN	0.02531	0.02400	0.03519
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.01380	0.01510	0.06084
	RN	0.02558	0.02589	0.05711
	SN	-0.00142	-0.07630	-1.08651
	SN	0.02386	0.02356	0.05640

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	0.01637	0.01594	0.03043
	RN	-0.00142	-0.10345	-1.80452
	RN	0.03185	0.03192	0.04901
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.01477	0.01459	0.03920
	RN	-0.00142	-0.07630	-1.08650
	RN	0.03030	0.03061	0.05799

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	0.01609	0.01566	0.02991
	RN	-0.00142	-0.10365	-1.80857
	RN	0.03169	0.03175	0.04863
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.01464	0.01447	0.03884
	RN	-0.00142	-0.07644	-1.08983
	RN	0.03023	0.03053	0.05752

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	0.01501	0.01533	0.03852
	RN	0.02680	0.02610	0.03449
	SN	-0.00142	-0.10365	-1.81014
	SN	0.02514	0.02382	0.03458
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.01352	0.01486	0.05976
	RN	0.02529	0.02561	0.05656
	SN	-0.00142	-0.07644	-1.08984
	SN	0.02370	0.02339	0.05648

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	-0.00318	-0.00321	-0.00320
	(!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)	0.01885	0.01981	0.07815
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00732	0.00839	0.06549
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00733	0.00840	0.06554
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00744	0.00850	0.06562
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	-0.00325	-0.00328	-0.00327
	(!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)	0.01878	0.01973	0.07808
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00725	0.00832	0.06542
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00726	0.00833	0.06547
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00737	0.00843	0.06555

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	0.00440	0.00437	0.00432
	(!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)	0.02713	0.02851	0.08812
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.01201	0.01361	0.07199
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.01235	0.01381	0.07203
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.01199	0.01359	0.07201
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00433	0.00429	0.00424
	(!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)	0.02704	0.02842	0.08803
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.01193	0.01352	0.07191
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.01226	0.01376	0.07195
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.01190	0.01350	0.07192

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)	0.00388	0.00666	0.09341
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.01549	0.01811	0.10872
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)	0.00380	0.00659	0.09334
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.01542	0.01804	0.10865

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)	0.01166	0.01601	0.10410
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.02407	0.02789	0.11907
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)	0.01157	0.01593	0.10401
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.02398	0.02776	0.11895

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)	-0.00804	-0.00812	-0.00814
	(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	-0.00849	-0.00861
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	-0.00729	-0.00805	-0.00812
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.00645	0.00758	0.06578
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)	-0.00817	-0.00820	-0.00822
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	-0.00701	-0.00855	-0.00866
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	-0.00736	-0.00812	-0.00819
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.00638	0.00751	0.06572

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)	0.00905	0.00911	0.00910
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00949	0.00956	0.00955
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	0.00912	0.00917	0.00916
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.01919	0.02004	0.07778
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)	0.00898	0.00903	0.00902
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00939	0.00946	0.00945
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	0.00904	0.00909	0.00908
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.01911	0.01996	0.07770

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)	-0.00055	0.00206	0.08912
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.00835	0.01058	0.10182
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.00801	0.01020	0.10167
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	-0.00064	0.00220	0.08859
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.00507	0.01037	0.16694
sky130_osu_sc_15T_ms__dffsr_l	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	-0.00062	0.00199	0.08904
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.00827	0.01049	0.10173
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.00793	0.01012	0.10158
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	-0.00072	0.00212	0.08851
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.00500	0.01030	0.16687

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)	0.04023	0.04365	0.15126
	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.01640	0.02079	0.10882
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.02782	0.03155	0.12219
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.02792	0.03164	0.12226
	(!D * RN * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * Q * !QN)	0.03826	0.04555	0.18836
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.01874	0.02291	0.11008
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.02196	0.02968	0.18815
sky130_osu_sc_15T_ms__dffsr_l	**(D * RN * SN * !Q * QN)**	0.00000	0.00000	0.00000
	(D * RN * SN * !Q * QN)	0.04016	0.04358	0.15119
	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.01633	0.02072	0.10874
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.02774	0.03147	0.12212
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.02784	0.03156	0.12219
	(!D * RN * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * Q * !QN)	0.03817	0.04546	0.18827
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.01867	0.02283	0.11001
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.02188	0.02955	0.18806

SKY130_OSU_SC_15T_MS__DFFSx

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00411	0.00708	0.01193	1.98188	1.99264
sky130_osu_sc_15T_ms__dffs_l	0.00411	0.00708	0.01193	1.35683	1.34807

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__dffs_1	0.00000	36.81500	52.53530
sky130_osu_sc_15T_ms__dffs_l	0.00000	28.28780	44.00810

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)	0.22771	1.30476	16.58390
	QN->Q (FR)	0.02837	0.76519	11.76480
	SN->Q (FR)	0.17008	1.32167	16.98470
sky130_osu_sc_15T_ms__dffs_l	CK->Q (RR)	0.22589	1.41615	16.06600
	QN->Q (FR)	0.03137	0.81985	11.49590
	SN->Q (FR)	0.16871	1.42665	16.43910

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)	0.31259	1.43329	17.32680
	QN->Q (RF)	0.02699	0.70636	10.85990
sky130_osu_sc_15T_ms__dffs_l	CK->Q (RF)	0.31537	1.55871	16.87870
	QN->Q (RF)	0.02760	0.70515	9.89882

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)	0.27639	0.79326	7.10906
sky130_osu_sc_15T_ms__dffs_l	CK->QN (RR)	0.27651	0.85691	7.17256

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)	0.19380	0.68781	6.72368
	SN->QN (FF)	0.13566	0.70498	7.12153
sky130_osu_sc_15T_ms__dffs_l	CK->QN (RF)	0.18634	0.69547	6.10478
	SN->QN (FF)	0.12852	0.70579	6.47452

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)	-0.06335	-0.07165	0.05078
	setup	CK (R)	0.17186	0.20017	0.51138
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.06334	-0.07206	0.05136
	setup	CK (R)	0.17184	0.20026	0.52419

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)	-0.10726	-0.25706	-2.29820
	setup	CK (R)	0.13915	0.26693	2.35716
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.10650	-0.25653	-2.29602
	setup	CK (R)	0.13883	0.26693	2.35716

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)	-0.06335	-0.07165	0.05078
	setup	CK (R)	0.17186	0.20017	0.51138
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.06334	-0.07206	0.05136
	setup	CK (R)	0.17184	0.20026	0.52419

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)	-0.10726	-0.25706	-2.29820
	setup	CK (R)	0.13915	0.26693	2.35716
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.10650	-0.25653	-2.29602
	setup	CK (R)	0.13883	0.26693	2.35716

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)	0.04300	0.06990	1.83956
	removal	CK (R)	-0.02064	-0.05165	-0.14197
sky130_osu_sc_15T_ms__dffs_l	recovery	CK (R)	0.04300	0.06990	1.73744
	removal	CK (R)	-0.02064	-0.05165	-0.14197

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)	0.04300	0.06990	1.83956
	removal	CK (R)	-0.02064	-0.05165	-0.14197
sky130_osu_sc_15T_ms__dffs_l	recovery	CK (R)	0.04300	0.06990	1.73744
	removal	CK (R)	-0.02064	-0.05165	-0.14197

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 ()	0.11693	0.48584	13.33370
	min_pulse_width	SN ()	0.12058	0.48584	13.33370
sky130_osu_sc_15T_ms__dffs_l	min_pulse_width	SN ()	0.11693	0.48584	13.33370
	min_pulse_width	SN ()	0.11328	0.48584	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 ()	0.10597	0.48584	13.33370
	min_pulse_width	CK ()	0.15711	0.48584	13.33370
sky130_osu_sc_15T_ms__dffs_l	min_pulse_width	CK ()	0.10232	0.48584	13.33370
	min_pulse_width	CK ()	0.14980	0.48584	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 ()	0.22285	0.48584	13.33370
	min_pulse_width	CK ()	0.12423	0.48584	13.33370
sky130_osu_sc_15T_ms__dffs_l	min_pulse_width	CK ()	0.22651	0.48584	13.33370
	min_pulse_width	CK ()	0.12423	0.48584	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	0.01202	0.01277	0.04210
	SN	-0.00142	-0.09644	-1.60531
	SN	0.02061	0.02035	0.03551
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.01046	0.01193	0.05752
	SN	-0.00142	-0.07683	-1.09903
	SN	0.01907	0.01956	0.05055

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	0.01358	0.01199	0.01047
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.01201	0.01183	0.03674

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	0.01344	0.01185	0.01007
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.01193	0.01176	0.03668

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	0.01178	0.01259	0.04147
	SN	-0.00142	-0.09675	-1.61389
	SN	0.02048	0.02020	0.03508
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.01025	0.01177	0.05698
	SN	-0.00142	-0.07653	-1.09186
	SN	0.01898	0.01947	0.05035

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	-0.00344	-0.00347	-0.00346
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.01389	0.01498	0.07482
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00620	0.00730	0.06481
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	-0.00352	-0.00355	-0.00354
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.01381	0.01490	0.07475
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00613	0.00722	0.06474

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	0.00425	0.00421	0.00416
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.02268	0.02416	0.08413
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.01137	0.01306	0.07179
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00417	0.00414	0.00409
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.02260	0.02408	0.08406
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.01130	0.01298	0.07171

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)	-0.00577	-0.00579	-0.00579
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00505	0.00614	0.05701
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)	-0.00584	-0.00587	-0.00587
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00498	0.00607	0.05694

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)	0.00658	0.00655	0.00652
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.01319	0.01482	0.06657
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)	0.00650	0.00648	0.00645
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.01311	0.01475	0.06650

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)	-0.00069	0.00193	0.08905
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	-0.00097	0.00187	0.08832
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.00389	0.00942	0.16670
sky130_osu_sc_15T_ms__dffs_l	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	-0.00077	0.00186	0.08897
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	-0.00104	0.00180	0.08824
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.00381	0.00934	0.16663

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)	0.03529	0.03870	0.14749
	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.01625	0.02066	0.10873
	(!D * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * SN * Q * !QN)	0.03377	0.04124	0.18324
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	0.01857	0.02283	0.10999
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.02122	0.02913	0.18821
sky130_osu_sc_15T_ms__dffs_l	(D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * SN * !Q * QN)	0.03521	0.03863	0.14742
	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.01618	0.02058	0.10866
	(!D * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * SN * Q * !QN)	0.03370	0.04117	0.18316
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	0.01850	0.02272	0.10992
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.02115	0.02906	0.18814

SKY130_OSU_SC_15T_MS__DFFx

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00426	0.01180	2.25107	2.24602
sky130_osu_sc_15T_ms__dff_l	0.00426	0.01180	1.21910	1.21098

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__dff_1	0.00000	42.07770	52.52860
sky130_osu_sc_15T_ms__dff_l	0.00000	33.55010	44.00110

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)	0.19149	1.30636	18.06710
	QN->Q (FR)	0.02472	0.71289	11.33440
sky130_osu_sc_15T_ms__dff_l	CK->Q (RR)	0.19858	1.35683	14.95570
	QN->Q (FR)	0.03534	0.87677	11.92900

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)	0.26479	1.40367	18.62690
	QN->Q (RF)	0.02667	0.74233	11.83850
sky130_osu_sc_15T_ms__dff_l	CK->Q (RF)	0.27801	1.49405	15.90720
	QN->Q (RF)	0.02775	0.67980	9.28807

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)	0.23110	0.72898	7.22844
sky130_osu_sc_15T_ms__dff_l	CK->QN (RR)	0.24008	0.82107	6.99238

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)	0.16104	0.67953	7.46952
sky130_osu_sc_15T_ms__dff_l	CK->QN (RF)	0.15852	0.64086	5.48977

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)	-0.05245	-0.06483	0.05483
	setup	CK (R)	0.13398	0.16886	0.54361
sky130_osu_sc_15T_ms__dff_l	hold	CK (R)	-0.05438	-0.06540	0.05400
	setup	CK (R)	0.13227	0.16745	0.54309

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)	-0.09748	-0.25835	-2.29932
	setup	CK (R)	0.11766	0.26844	2.37014
sky130_osu_sc_15T_ms__dff_l	hold	CK (R)	-0.09517	-0.25835	-2.29837
	setup	CK (R)	0.11766	0.26844	2.36941

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 ()	0.09136	0.48584	13.33370
	min_pulse_width	CK ()	0.14250	0.48584	13.33370
sky130_osu_sc_15T_ms__dff_l	min_pulse_width	CK ()	0.08771	0.48584	13.33370
	min_pulse_width	CK ()	0.13884	0.48584	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 ()**	0.18633	0.48584	13.33370
	min_pulse_width	**CK ()**	0.09501	0.48584	13.33370
sky130_osu_sc_15T_ms__dff_l	**min_pulse_width**	**CK ()**	0.18633	0.48584	13.33370
	min_pulse_width	**CK ()**	0.09501	0.48584	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	0.01266	0.01319	0.03822
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.01124	0.01286	0.06013

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	0.01402	0.01368	0.02908
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.01242	0.01148	0.02766

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	0.01379	0.01346	0.02884
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.01235	0.01142	0.02759

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	0.01245	0.01304	0.03749
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.01102	0.01262	0.06053

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	-0.00252	-0.00321	-0.00328
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.01319	0.01444	0.07564
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	-0.00260	-0.00329	-0.00335
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.01312	0.01440	0.07557

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	0.00421	0.00424	0.00422
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.02355	0.02511	0.08584
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00414	0.00416	0.00415
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.02348	0.02504	0.08577

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)	-0.00069	0.00195	0.08908
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00087	0.00199	0.08844
sky130_osu_sc_15T_ms__dff_l	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	-0.00077	0.00187	0.08900
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00095	0.00191	0.08837

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)	0.01616	0.02058	0.10866
	(D * !Q * QN)	0.00000	0.00000	0.00000
	(D * !Q * QN)	0.03461	0.03814	0.14774
	(!D * Q * !QN)	0.00000	0.00000	0.00000
	(!D * Q * !QN)	0.03439	0.04210	0.18643
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01855	0.02281	0.10999
sky130_osu_sc_15T_ms__dff_l	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.01608	0.02051	0.10858
	(D * !Q * QN)	0.00000	0.00000	0.00000
	(D * !Q * QN)	0.03454	0.03808	0.14768
	(!D * Q * !QN)	0.00000	0.00000	0.00000
	(!D * Q * !QN)	0.03432	0.04204	0.18637
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01848	0.02273	0.10991

SKY130_OSU_SC_15T_MS__INVx

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00413	2.04412
sky130_osu_sc_15T_ms__inv_10	0.03822	18.16125
sky130_osu_sc_15T_ms__inv_2	0.00783	3.96673
sky130_osu_sc_15T_ms__inv_3	0.01166	5.74033
sky130_osu_sc_15T_ms__inv_4	0.01540	7.68356
sky130_osu_sc_15T_ms__inv_6	0.02308	11.30657
sky130_osu_sc_15T_ms__inv_8	0.03065	14.85878
sky130_osu_sc_15T_ms__inv_l	0.00307	1.13405

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__inv_1	0.00000	6.25147	12.48460
sky130_osu_sc_15T_ms__inv_10	0.00000	62.48420	124.80200
sky130_osu_sc_15T_ms__inv_2	0.00000	12.49720	24.96110
sky130_osu_sc_15T_ms__inv_3	0.00000	18.74840	37.44510
sky130_osu_sc_15T_ms__inv_4	0.00000	24.99410	49.92160
sky130_osu_sc_15T_ms__inv_6	0.00000	37.49090	74.88200
sky130_osu_sc_15T_ms__inv_8	0.00000	49.98770	99.84230
sky130_osu_sc_15T_ms__inv_l	0.00000	1.98777	3.95180

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)**	0.02361	0.64724	9.99431
sky130_osu_sc_15T_ms__inv_10	**A->Y (FR)**	0.03330	0.41318	9.78919
sky130_osu_sc_15T_ms__inv_2	**A->Y (FR)**	0.01927	0.55131	9.81877
sky130_osu_sc_15T_ms__inv_3	**A->Y (FR)**	0.02125	0.51368	9.86410
sky130_osu_sc_15T_ms__inv_4	**A->Y (FR)**	0.02168	0.48184	9.81705
sky130_osu_sc_15T_ms__inv_6	**A->Y (FR)**	0.02462	0.44538	9.80295
sky130_osu_sc_15T_ms__inv_8	**A->Y (FR)**	0.02868	0.42528	9.78849
sky130_osu_sc_15T_ms__inv_l	**A->Y (FR)**	0.03062	0.73328	9.80995

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)**	0.02414	0.64372	9.97037
sky130_osu_sc_15T_ms__inv_10	**A->Y (RF)**	0.03477	0.40600	9.71243
sky130_osu_sc_15T_ms__inv_2	**A->Y (RF)**	0.01973	0.54895	9.83223
sky130_osu_sc_15T_ms__inv_3	**A->Y (RF)**	0.02163	0.51270	9.93142
sky130_osu_sc_15T_ms__inv_4	**A->Y (RF)**	0.02150	0.47898	9.88730
sky130_osu_sc_15T_ms__inv_6	**A->Y (RF)**	0.02600	0.44398	9.86523
sky130_osu_sc_15T_ms__inv_8	**A->Y (RF)**	0.03023	0.42239	9.82858
sky130_osu_sc_15T_ms__inv_l	**A->Y (RF)**	0.02569	0.61180	8.21933

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	0.00579	0.00736	0.02369
sky130_osu_sc_15T_ms__inv_10	A	0.00000	0.00000	0.00000
	A	0.05006	0.07448	0.23294
sky130_osu_sc_15T_ms__inv_2	A	0.00000	0.00000	0.00000
	A	0.01023	0.01413	0.04656
sky130_osu_sc_15T_ms__inv_3	A	0.00000	0.00000	0.00000
	A	0.01571	0.02183	0.07020
sky130_osu_sc_15T_ms__inv_4	A	0.00000	0.00000	0.00000
	A	0.02015	0.02842	0.09259
sky130_osu_sc_15T_ms__inv_6	A	0.00000	0.00000	0.00000
	A	0.03003	0.04587	0.13906
sky130_osu_sc_15T_ms__inv_8	A	0.00000	0.00000	0.00000
	A	0.03992	0.05937	0.18581
sky130_osu_sc_15T_ms__inv_l	A	0.00000	0.00000	0.00000
	A	0.00430	0.00538	0.01812

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	-0.00098	-0.00010	0.00897
sky130_osu_sc_15T_ms__inv_10	A	0.00000	0.00000	0.00000
	A	-0.01562	-0.00180	0.08770
sky130_osu_sc_15T_ms__inv_2	A	0.00000	0.00000	0.00000
	A	-0.00336	-0.00123	0.01703
sky130_osu_sc_15T_ms__inv_3	A	0.00000	0.00000	0.00000
	A	-0.00436	-0.00097	0.02617
sky130_osu_sc_15T_ms__inv_4	A	0.00000	0.00000	0.00000
	A	-0.00671	-0.00081	0.03426
sky130_osu_sc_15T_ms__inv_6	A	0.00000	0.00000	0.00000
	A	-0.01028	-0.00184	0.05091
sky130_osu_sc_15T_ms__inv_8	A	0.00000	0.00000	0.00000
	A	-0.01345	-0.00257	0.06953
sky130_osu_sc_15T_ms__inv_l	A	0.00000	0.00000	0.00000
	A	-0.00072	-0.00012	0.00806

SKY130_OSU_SC_15T_MS__MUX2

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.05254	0.05239	0.00843	0.04618

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__mux2_1	0.00000	12.50770	12.50770

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)	-	0.01371	0.09046	0.33545
	A1->Y (RR)	-	0.01487	0.09154	0.33577
	S0->Y (RR)	(!A0 * A1)	0.04780	0.18726	0.55673
	S0->Y (FR)	(A0 * !A1)	0.03058	0.18658	0.94130

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)	-	0.01343	0.09665	0.35569
	A1->Y (FF)	-	0.01259	0.09574	0.35525
	S0->Y (FF)	(!A0 * A1)	0.05291	0.19770	0.61693
	S0->Y (RF)	(A0 * !A1)	0.02760	0.18230	0.89355

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	-	-0.00584	-0.00584	-0.00585
	A1	-	0.00000	0.00000	0.00000
	A1	-	-0.00368	-0.00370	-0.00370
	S0	(A0 * !A1)	0.00000	0.00000	0.00000
	S0	(A0 * !A1)	0.00689	0.01174	0.10044
	S0	(!A0 * A1)	0.00000	0.00000	0.00000
	S0	(!A0 * A1)	-0.00404	-0.00066	0.08685

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	-	0.00584	0.00584	0.00585
	A1	-	0.00000	0.00000	0.00000
	A1	-	0.00426	0.00426	0.00427
	S0	(A0 * !A1)	0.00000	0.00000	0.00000
	S0	(A0 * !A1)	0.00112	0.00503	0.09325
	S0	(!A0 * A1)	0.00000	0.00000	0.00000
	S0	(!A0 * A1)	0.01567	0.02015	0.10800

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)	-0.00128	-0.00127	-0.00128

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)	0.00149	0.00149	0.00149

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)	-0.00164	-0.00163	-0.00164

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)	0.00164	0.00163	0.00164

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)	-0.00146	0.00253	0.08995
	(!A0 * !A1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !Y)	-0.00142	0.00217	0.09023

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)	0.01191	0.01643	0.10451
	(!A0 * !A1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !Y)	0.01068	0.01556	0.10404

SKY130_OSU_SC_15T_MS__NAND2x

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00413	0.00411	1.42361
sky130_osu_sc_15T_ms__nand2_l	0.00307	0.00307	1.04531

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__nand2_1	0.00000	6.25000	24.96010
sky130_osu_sc_15T_ms__nand2_l	0.00000	1.98681	7.89800

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)	0.02435	0.57816	8.14579
	B->Y (FR)	0.02863	0.57544	8.03370
sky130_osu_sc_15T_ms__nand2_l	A->Y (FR)	0.03145	0.71366	9.36113
	B->Y (FR)	0.03765	0.71871	9.34181

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)	0.03574	0.73669	10.35270
	B->Y (RF)	0.04080	0.70675	9.83489
sky130_osu_sc_15T_ms__nand2_l	A->Y (RF)	0.03829	0.78344	10.16930
	B->Y (RF)	0.04278	0.75184	9.60040

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	0.00616	0.00786	0.02573
	B	0.00000	0.00000	0.00000
	B	0.00785	0.00923	0.02820
sky130_osu_sc_15T_ms__nand2_1	A	0.00000	0.00000	0.00000
	A	0.00452	0.00552	0.01687
	B	0.00000	0.00000	0.00000
	B	0.00573	0.00650	0.01831

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	-0.00024	0.00031	0.01005
	B	0.00000	0.00000	0.00000
	B	-0.00021	0.00011	0.00898
sky130_osu_sc_15T_ms__nand2_1	A	0.00000	0.00000	0.00000
	A	-0.00038	0.00013	0.00725
	B	0.00000	0.00000	0.00000
	B	-0.00035	-0.00012	0.00656

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)	-0.00422	-0.00423	-0.00425
sky130_osu_sc_15T_ms__nand2_l	(!B * Y)	0.00000	0.00000	0.00000
	(!B * Y)	-0.00291	-0.00291	-0.00293

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)	0.00425	0.00434	0.00427
sky130_osu_sc_15T_ms__nand2_l	(!B * Y)	0.00000	0.00000	0.00000
	(!B * Y)	0.00292	0.00299	0.00293

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)	-0.00394	-0.00396	-0.00394
sky130_osu_sc_15T_ms__nand2_l	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00271	-0.00273	-0.00272

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)	0.00403	0.00399	0.00395
sky130_osu_sc_15T_ms__nand2_l	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00279	0.00275	0.00272

SKY130_OSU_SC_15T_MS__NOR2x

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00411	0.00439	1.10167
sky130_osu_sc_15T_ms__nor2_l	0.00297	0.00329	0.68553

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__nor2_1	0.00000	5.09127	12.48170
sky130_osu_sc_15T_ms__nor2_l	0.00000	1.65725	3.95131

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)	0.04984	0.72525	9.30523
	B->Y (FR)	0.03748	0.73933	9.71582
sky130_osu_sc_15T_ms__nor2_l	A->Y (FR)	0.05946	0.82853	9.28936
	B->Y (FR)	0.04837	0.84900	9.79699

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)	0.03435	0.53832	6.98878
	B->Y (RF)	0.02602	0.52603	6.96885
sky130_osu_sc_15T_ms__nor2_l	A->Y (RF)	0.03356	0.52759	6.14861
	B->Y (RF)	0.02735	0.51795	6.13117

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	0.00848	0.00894	0.02410
	B	0.00000	0.00000	0.00000
	B	0.00631	0.00777	0.02847
sky130_osu_sc_15T_ms__nor2_l	A	0.00000	0.00000	0.00000
	A	0.00596	0.00627	0.01822
	B	0.00000	0.00000	0.00000
	B	0.00462	0.00548	0.02055

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	0.00116	0.00183	0.01433
	B	0.00000	0.00000	0.00000
	B	-0.00075	0.00022	0.01229
sky130_osu_sc_15T_ms__nor2_l	A	0.00000	0.00000	0.00000
	A	0.00066	0.00122	0.01171
	B	0.00000	0.00000	0.00000
	B	-0.00049	0.00018	0.01026

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)	-0.00289	-0.00362	-0.00365
sky130_osu_sc_15T_ms__nor2_l	(B * !Y)	0.00000	0.00000	0.00000
	(B * !Y)	-0.00199	-0.00243	-0.00246

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)	0.00389	0.00393	0.00390
sky130_osu_sc_15T_ms__nor2_l	(B * !Y)	0.00000	0.00000	0.00000
	(B * !Y)	0.00254	0.00256	0.00254

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)	-0.00167	-0.00168	-0.00167
sky130_osu_sc_15T_ms__nor2_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	-0.00109	-0.00109	-0.00109

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)	0.00182	0.00181	0.00173
sky130_osu_sc_15T_ms__nor2_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00116	0.00117	0.00112

SKY130_OSU_SC_15T_MS__OAI21

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00414	0.00424	0.00348	1.05533

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__oai21_l	0.00000	4.03497	16.43250

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)	0.05254	0.75555	9.63523
	A1->Y (FR)	0.06808	0.74742	9.24971
	B0->Y (FR)	0.03772	0.69204	8.99119

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)	0.05004	0.65715	8.26332
	A1->Y (RF)	0.06188	0.65025	8.02362
	B0->Y (RF)	0.03832	0.69586	9.02233

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	0.00879	0.01002	0.02762
	A1	0.00000	0.00000	0.00000
	A1	0.01095	0.01126	0.02493
	B0	0.00506	0.00603	0.02064

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	0.00052	0.00076	0.01015
	A1	0.00000	0.00000	0.00000
	A1	0.00240	0.00239	0.01211
	B0	0.00089	0.00138	0.01044

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)	-0.00164	-0.00168	-0.00164
	(A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * Y)	-0.00378	-0.00382	-0.00380
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00383	-0.00384	-0.00384

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)	0.00185	0.00187	0.00177
	(A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * Y)	0.00378	0.00382	0.00380
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00389	0.00386	0.00385

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)	-0.00276	-0.00349	-0.00354
	(A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * Y)	-0.00374	-0.00379	-0.00376
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00378	-0.00381	-0.00379

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)	0.00384	0.00386	0.00386
	(A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * Y)	0.00374	0.00379	0.00376
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00383	0.00382	0.00380

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)	-0.00298	-0.00299	-0.00304

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)	0.00304	0.00307	0.00305

SKY130_OSU_SC_15T_MS__OAI22

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00403	0.00423	0.00435	0.00425	1.08712

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__oai22_1	0.00000	7.63291	24.95450

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)	0.07362	0.74795	9.25642
	A1->Y (FR)	0.06115	0.76009	9.66058
	B0->Y (FR)	0.04321	0.74574	9.64944
	B1->Y (FR)	0.05427	0.72772	9.24592

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)	0.08840	0.71180	8.52983
	A1->Y (RF)	0.07016	0.68758	8.45272
	B0->Y (RF)	0.05947	0.72769	9.22308
	B1->Y (RF)	0.07834	0.75248	9.33321

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	0.01432	0.01463	0.02740
	A1	0.01213	0.01315	0.03072
	B0	0.00665	0.00793	0.02602
	B1	0.00898	0.00936	0.02297

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai22_l	A0	0.00173	0.00172	0.01150
	A1	-0.00007	0.00016	0.00961
	B0	-0.00009	0.00053	0.01166
	B1	0.00175	0.00222	0.01311

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)	-0.00288	-0.00361	-0.00365
	(A1 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * B1 * !Y)	-0.00283	-0.00356	-0.00359
	(A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * !B1 * Y)	-0.00375	-0.00380	-0.00377
	(!A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * !B1 * Y)	-0.00379	-0.00381	-0.00380

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)	0.00390	0.00394	0.00390
	(A1 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * B1 * !Y)	0.00396	0.00400	0.00396
	(A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * !B1 * Y)	0.00375	0.00381	0.00377
	(!A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * !B1 * Y)	0.00383	0.00383	0.00381

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)	-0.00165	-0.00166	-0.00165
	(A0 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * B1 * !Y)	-0.00159	-0.00160	-0.00159
	(A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * !B1 * Y)	-0.00372	-0.00376	-0.00374
	(!A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * !B1 * Y)	-0.00377	-0.00380	-0.00378

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)	0.00181	0.00181	0.00172
	(A0 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * B1 * !Y)	0.00187	0.00186	0.00178
	(A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * !B1 * Y)	0.00372	0.00376	0.00374
	(!A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * !B1 * Y)	0.00381	0.00380	0.00379

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)	-0.00163	-0.00164	-0.00163
	(A0 * !A1 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B1 * !Y)	-0.00157	-0.00159	-0.00158
	(!A0 * !A1 * B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B1 * Y)	-0.00416	-0.00419	-0.00416
	(!A0 * !A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B1 * Y)	-0.00408	-0.00411	-0.00418

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)	0.00179	0.00180	0.00171
	(A0 * !A1 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B1 * !Y)	0.00184	0.00186	0.00177
	(!A0 * !A1 * B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B1 * Y)	0.00417	0.00419	0.00416
	(!A0 * !A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B1 * Y)	0.00418	0.00421	0.00420

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)	-0.00283	-0.00355	-0.00358
	(A0 * !A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B0 * !Y)	-0.00277	-0.00349	-0.00352
	(!A0 * !A1 * B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B0 * Y)	-0.00424	-0.00427	-0.00425
	(!A0 * !A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B0 * Y)	-0.00417	-0.00418	-0.00426

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)	0.00382	0.00388	0.00384
	(A0 * !A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B0 * !Y)	0.00388	0.00390	0.00389
	(!A0 * !A1 * B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B0 * Y)	0.00424	0.00429	0.00425
	(!A0 * !A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B0 * Y)	0.00427	0.00428	0.00428

SKY130_OSU_SC_15T_MS__OR2x

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00446	0.00423	2.14511
sky130_osu_sc_15T_ms__or2_2	0.00447	0.00423	4.19635
sky130_osu_sc_15T_ms__or2_4	0.00447	0.00423	8.06163
sky130_osu_sc_15T_ms__or2_8	0.00448	0.00424	15.45232
sky130_osu_sc_15T_ms__or2_l	0.00339	0.00313	1.20610

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__or2_1	0.00000	8.22635	12.51820
sky130_osu_sc_15T_ms__or2_2	0.00000	11.35680	24.99510
sky130_osu_sc_15T_ms__or2_4	0.00000	17.62210	49.95630
sky130_osu_sc_15T_ms__or2_8	0.00000	30.15250	99.87830
sky130_osu_sc_15T_ms__or2_l	0.00000	2.66312	3.99684

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)	0.06979	0.56910	6.97398
	B->Y (RR)	0.05892	0.53597	6.87088
sky130_osu_sc_15T_ms__or2_2	A->Y (RR)	0.07700	0.51303	6.97379
	B->Y (RR)	0.06587	0.48289	6.86572
sky130_osu_sc_15T_ms__or2_4	A->Y (RR)	0.09957	0.51436	7.16362
	B->Y (RR)	0.08824	0.48857	7.05591
sky130_osu_sc_15T_ms__or2_8	A->Y (RR)	0.14425	0.56937	7.48644
	B->Y (RR)	0.13264	0.55036	7.39136
sky130_osu_sc_15T_ms__or2_l	A->Y (RR)	0.07539	0.64343	6.57120
	B->Y (RR)	0.06555	0.61218	6.42712

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)	0.10134	0.61747	7.39794
	B->Y (FF)	0.08479	0.60978	7.58525
sky130_osu_sc_15T_ms__or2_2	A->Y (FF)	0.11824	0.57600	7.45518
	B->Y (FF)	0.10183	0.57490	7.63061
sky130_osu_sc_15T_ms__or2_4	A->Y (FF)	0.16588	0.60483	7.69784
	B->Y (FF)	0.14955	0.61318	7.85438
sky130_osu_sc_15T_ms__or2_8	A->Y (FF)	0.26519	0.70713	7.94006
	B->Y (FF)	0.24892	0.72269	8.09092
sky130_osu_sc_15T_ms__or2_l	A->Y (FF)	0.11678	0.62342	6.00093
	B->Y (FF)	0.09850	0.62214	6.18602

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	0.00667	0.00817	0.05543
	B	0.00000	0.00000	0.00000
	B	0.00494	0.00759	0.06441
sky130_osu_sc_15T_ms__or2_2	A	0.00000	0.00000	0.00000
	A	0.01128	0.01299	0.06036
	B	0.00000	0.00000	0.00000
	B	0.00944	0.01235	0.06836
sky130_osu_sc_15T_ms__or2_4	A	0.00000	0.00000	0.00000
	A	0.02182	0.02373	0.07191
	B	0.00000	0.00000	0.00000
	B	0.01983	0.02303	0.07764
sky130_osu_sc_15T_ms__or2_8	A	0.00000	0.00000	0.00000
	A	0.04626	0.04677	0.09626
	B	0.00000	0.00000	0.00000
	B	0.04408	0.04617	0.09946
sky130_osu_sc_15T_ms__or2_l	A	0.00000	0.00000	0.00000
	A	0.00468	0.00579	0.03700
	B	0.00000	0.00000	0.00000
	B	0.00353	0.00529	0.03935

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	0.01412	0.01582	0.06583
	B	0.00000	0.00000	0.00000
	B	0.01160	0.01556	0.08796
sky130_osu_sc_15T_ms__or2_2	A	0.00000	0.00000	0.00000
	A	0.01800	0.01960	0.06932
	B	0.00000	0.00000	0.00000
	B	0.01546	0.01915	0.09016
sky130_osu_sc_15T_ms__or2_4	A	0.00000	0.00000	0.00000
	A	0.02944	0.02887	0.07748
	B	0.00000	0.00000	0.00000
	B	0.02694	0.02868	0.09613
sky130_osu_sc_15T_ms__or2_8	A	0.00000	0.00000	0.00000
	A	0.06120	0.04950	0.09444
	B	0.00000	0.00000	0.00000
	B	0.05873	0.04835	0.11084
sky130_osu_sc_15T_ms__or2_l	A	0.00000	0.00000	0.00000
	A	0.01021	0.01111	0.04734
	B	0.00000	0.00000	0.00000
	B	0.00848	0.01081	0.05753

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)	-0.00290	-0.00363	-0.00367
sky130_osu_sc_15T_ms__or2_2	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00290	-0.00363	-0.00367
sky130_osu_sc_15T_ms__or2_4	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00290	-0.00363	-0.00367
sky130_osu_sc_15T_ms__or2_8	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00290	-0.00363	-0.00367
sky130_osu_sc_15T_ms__or2_l	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00199	-0.00244	-0.00248

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)	0.00391	0.00396	0.00392
sky130_osu_sc_15T_ms__or2_2	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00391	0.00396	0.00392
sky130_osu_sc_15T_ms__or2_4	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00391	0.00396	0.00392
sky130_osu_sc_15T_ms__or2_8	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00391	0.00397	0.00392
sky130_osu_sc_15T_ms__or2_l	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00255	0.00257	0.00257

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)	-0.00168	-0.00168	-0.00167
sky130_osu_sc_15T_ms__or2_2	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00168	-0.00167	-0.00167
sky130_osu_sc_15T_ms__or2_4	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00167	-0.00167	-0.00167
sky130_osu_sc_15T_ms__or2_8	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00167	-0.00168	-0.00167
sky130_osu_sc_15T_ms__or2_l	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00112	-0.00114	-0.00112

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)	0.00183	0.00185	0.00174
sky130_osu_sc_15T_ms__or2_2	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00183	0.00185	0.00174
sky130_osu_sc_15T_ms__or2_4	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00183	0.00185	0.00174
sky130_osu_sc_15T_ms__or2_8	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00183	0.00185	0.00174
sky130_osu_sc_15T_ms__or2_l	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00119	0.00121	0.00115

SKY130_OSU_SC_15T_MS__TBUFIx

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00437	0.00561	1.11076
sky130_osu_sc_15T_ms__tbufi_l	0.00329	0.00427	0.68406

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__tbufi_1	0.00000	6.26414	24.96550
sky130_osu_sc_15T_ms__tbufi_l	0.00000	2.00408	7.90298

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)	0.03578	0.73506	9.69412
	OE->Y (FR)	0.04168	0.36070	5.09357
	OE->Y (RR)	0.07280	0.63579	6.86777
sky130_osu_sc_15T_ms__tbufi_l	A->Y (FR)	0.04668	0.84277	9.74532
	OE->Y (FR)	0.04726	0.36045	5.09339
	OE->Y (RR)	0.08121	0.72719	6.60923

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)	0.03527	0.66764	8.83611
	OE->Y (FF)	0.04253	0.36063	5.09356
	OE->Y (RF)	0.03335	0.63274	8.26119
sky130_osu_sc_15T_ms__tbufi_l	A->Y (RF)	0.03826	0.66319	7.80269
	OE->Y (FF)	0.04827	0.36046	5.09338
	OE->Y (RF)	0.03546	0.62300	7.12495

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	0.00628	0.00756	0.02523
	OE	0.00000	0.00000	0.00000
	OE	0.00628	0.00970	0.08684
sky130_osu_sc_15T_ms__tbufi_l	A	0.00000	0.00000	0.00000
	A	0.00447	0.00489	0.01629
	OE	0.00000	0.00000	0.00000
	OE	0.00427	0.00664	0.05917

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	-0.00042	0.00035	0.01054
	OE	0.00000	0.00000	0.00000
	OE	0.00430	0.00799	0.09550
sky130_osu_sc_15T_ms__tbufi_l	A	0.00000	0.00000	0.00000
	A	-0.00041	0.00012	0.00874
	OE	0.00000	0.00000	0.00000
	OE	0.00266	0.00522	0.06528

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)	-0.00289	-0.00293	-0.00289
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	-0.00247	-0.00248	-0.00247
sky130_osu_sc_15T_ms__tbufi_l	(!OE * Y)	0.00000	0.00000	0.00000
	(!OE * Y)	-0.00208	-0.00210	-0.00207
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	-0.00179	-0.00181	-0.00179

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)	0.00289	0.00293	0.00289
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	0.00256	0.00257	0.00252
sky130_osu_sc_15T_ms__tbufi_l	(!OE * Y)	0.00000	0.00000	0.00000
	(!OE * Y)	0.00208	0.00210	0.00207
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	0.00183	0.00185	0.00180

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)	0.00257	0.00645	0.09556
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00210	0.00603	0.09514
sky130_osu_sc_15T_ms__tbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00159	0.00426	0.06487
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00133	0.00403	0.06459

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)	0.00720	0.01194	0.10099
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00700	0.01183	0.10089
sky130_osu_sc_15T_ms__tbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00540	0.00852	0.06886
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00535	0.00845	0.06888

SKY130_OSU_SC_15T_MS__TNBUFIx

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00436	0.00676	1.11021
sky130_osu_sc_15T_ms__tnbufi_l	0.00328	0.00484	0.68412

Leakage Information

Cell Name	Leakage(nW)		
	Min.	**Avg**	**Max.**
sky130_osu_sc_15T_ms__tnbufi_1	0.00000	10.41970	12.50100
sky130_osu_sc_15T_ms__tnbufi_l	0.00000	3.31348	3.97501

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)	0.03603	0.73488	9.69073
	OE->Y (RR)	0.03116	0.36137	5.09428
	OE->Y (FR)	0.04646	0.71803	9.21318
sky130_osu_sc_15T_ms__tnbufi_l	A->Y (FR)	0.04701	0.84280	9.74678
	OE->Y (RR)	0.03111	0.36132	5.09417
	OE->Y (FR)	0.05648	0.82374	9.17851

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)	0.03472	0.66730	8.83298
	OE->Y (RF)	0.03094	0.36138	5.09427
	OE->Y (FF)	0.05382	0.53116	5.80752
sky130_osu_sc_15T_ms__tnbufi_l	A->Y (RF)	0.03758	0.66293	7.80306
	OE->Y (RF)	0.03077	0.36133	5.09425
	OE->Y (FF)	0.06079	0.55824	5.12965

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	0.00610	0.00737	0.02509
	OE	0.00000	0.00000	0.00000
	OE	0.01496	0.02024	0.10982
sky130_osu_sc_15T_ms__tnbufi_l	A	0.00000	0.00000	0.00000
	A	0.00453	0.00494	0.01646
	OE	0.00000	0.00000	0.00000
	OE	0.01072	0.01415	0.07466

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	-0.00094	-0.00015	0.01006
	OE	0.00000	0.00000	0.00000
	OE	0.01322	0.01862	0.09787
sky130_osu_sc_15T_ms__tnbufi_l	A	0.00000	0.00000	0.00000
	A	-0.00071	-0.00017	0.00845
	OE	0.00000	0.00000	0.00000
	OE	0.00928	0.01283	0.06826

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)	-0.00256	-0.00260	-0.00256
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	-0.00196	-0.00199	-0.00196
sky130_osu_sc_15T_ms__tnbufi_l	(OE * Y)	0.00000	0.00000	0.00000
	(OE * Y)	-0.00168	-0.00171	-0.00169
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	-0.00136	-0.00138	-0.00136

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)	0.00256	0.00260	0.00256
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	0.00226	0.00227	0.00223
sky130_osu_sc_15T_ms__tnbufi_l	(OE * Y)	0.00000	0.00000	0.00000
	(OE * Y)	0.00168	0.00171	0.00169
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	0.00147	0.00148	0.00145

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)	-0.00414	-0.00050	0.08923
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00440	-0.00058	0.08915
sky130_osu_sc_15T_ms__tnbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	-0.00271	-0.00021	0.06073
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00282	-0.00024	0.06071

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)	0.01144	0.01696	0.10696
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.01109	0.01666	0.10669
sky130_osu_sc_15T_ms__tnbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00809	0.01172	0.07274
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00790	0.01154	0.07255

SKY130_OSU_SC_15T_MS__XNOR2

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00868	0.00778	1.14078

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__xnor2_l	0.00000	22.34990	37.45770

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	0.09108	0.67034	7.04562
	A->Y (FR)	!B	0.04730	0.74972	9.79591
	B->Y (RR)	A	0.07333	0.65562	7.15772
	B->Y (FR)	!A	0.06404	0.74061	9.40577

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	0.09703	0.61291	6.21039
	A->Y (RF)	!B	0.04834	0.65361	8.46387
	B->Y (FF)	A	0.08071	0.59896	6.21496
	B->Y (RF)	!A	0.06233	0.66972	8.46762

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	0.00675	0.00980	0.08808
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.01473	0.02041	0.12585
	B	A	0.00000	0.00000	0.00000
	B	A	0.00254	0.00642	0.09629
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.01620	0.02121	0.12073

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	0.01875	0.02288	0.11042
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00466	0.00839	0.10488
	B	A	0.00000	0.00000	0.00000
	B	A	0.01704	0.02216	0.11188
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00584	0.00949	0.10535

SKY130_OSU_SC_15T_MS__XOR2

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.00871	0.00783	1.12214

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__xor2_l	0.00000	22.34980	39.33650

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	0.08898	0.66764	7.14926
	A->Y (FR)	B	0.06006	0.74081	9.45722
	B->Y (RR)	!A	0.07688	0.66307	7.17112
	B->Y (FR)	A	0.06576	0.74577	9.43455

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	0.08336	0.59778	5.99299
	A->Y (RF)	B	0.05323	0.69489	8.89683
	B->Y (FF)	!A	0.07869	0.59713	6.14803
	B->Y (RF)	A	0.06160	0.66754	8.38264

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	0.01772	0.02281	0.12324
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00334	0.00591	0.09277
	B	A	0.00000	0.00000	0.00000
	B	A	0.01826	0.02334	0.12166
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00207	0.00574	0.09499

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	0.00431	0.00786	0.10560
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.01892	0.02376	0.10212
	B	A	0.00000	0.00000	0.00000
	B	A	0.00433	0.00777	0.10235
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.01703	0.02225	0.11130

SKY130_OSU_SC_15T_MS_x

sky130_osu_sc_15T_ms_tt_1P80_100C.ccs
Cell Library: Process , Voltage 1.80, Temp 100.00

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	0.76689
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	301257.00000	602513.00000
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
	-0.00147	0.09059	1.25917

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
	5.24275	4.98539	1.48908