sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs Library

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

SKY130_OSU_SC_15T_MS__ADDFx

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__addf_1	39.07200
sky130_osu_sc_15T_ms__addf_l	39.07200

Pin Capacitance Information

Cell Name	Pin Cap(pf)			Max Cap(pf)		
	A	B	CI	CO	CON	S
sky130_osu_sc_15T_ms__addf_1	0.01399	0.01402	0.01103	0.30779	0.10985	0.30146
sky130_osu_sc_15T_ms__addf_l	0.01397	0.01402	0.01103	0.18352	0.11076	0.18668

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__addf_1	0.00000	0.00024	0.00025
sky130_osu_sc_15T_ms__addf_l	0.00000	0.00024	0.00026

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)	0.48469	2.80061	20.53500
	B->CO (RR)	0.46658	2.73695	20.19370
	CI->CO (RR)	0.46495	2.78517	20.64380
	CON->CO (FR)	0.12487	1.51166	13.38200
sky130_osu_sc_15T_ms__addf_1	A->CO (RR)	0.52180	2.75331	17.43670
	B->CO (RR)	0.49849	2.68824	17.25910
	CI->CO (RR)	0.50224	2.73801	17.57300
	CON->CO (FR)	0.17809	1.75987	13.59550

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)	1.51193	6.52803	43.20180
	B->CO (FF)	1.41408	6.34580	42.49180
	CI->CO (FF)	1.38830	6.33031	42.48610
	CON->CO (RF)	0.04990	0.78851	7.85471
sky130_osu_sc_15T_ms__addf_1	A->CO (FF)	1.50679	5.56304	30.76510
	B->CO (FF)	1.40710	5.41374	30.30330
	CI->CO (FF)	1.38228	5.36455	30.03870
	CON->CO (RF)	0.06195	0.84891	7.92181

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)	1.00477	2.78057	14.28770
	B->CON (FR)	0.92164	2.66609	14.06670
	CI->CON (FR)	0.88047	2.58199	13.60000
sky130_osu_sc_15T_ms__addf_l	A->CON (FR)	0.95179	2.73397	14.28960
	B->CON (FR)	0.87067	2.62013	14.06900
	CI->CON (FR)	0.82764	2.53527	13.60220

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)	0.20966	0.91986	6.80796
	B->CON (RF)	0.19575	0.89902	6.81934
	CI->CON (RF)	0.18999	0.90634	6.91021
sky130_osu_sc_15T_ms__addf_l	A->CON (RF)	0.19960	0.91113	6.80959
	B->CON (RF)	0.18617	0.89095	6.82106
	CI->CON (RF)	0.17992	0.89772	6.91196

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)	1.96839	6.97406	40.99470
	B->S (-R)	1.88731	6.83752	40.54320
	CI->S (-R)	1.83655	6.76187	40.23020
	CON->S (RR)	0.29070	1.61646	10.81660
sky130_osu_sc_15T_ms__addf_l	A->S (-R)	1.88216	6.14812	31.54330
	B->S (-R)	1.80389	6.03340	31.25640
	CI->S (-R)	1.74958	5.93576	30.79990
	CON->S (RR)	0.32522	1.83216	10.90810

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)	1.12898	2.90823	15.68430
	B->S (-F)	1.24788	2.93154	15.43420
	CI->S (-F)	1.10787	2.88413	15.77260
	CON->S (FF)	0.57691	1.45013	8.83128
sky130_osu_sc_15T_ms__addf_l	A->S (-F)	1.06361	2.63951	12.91920
	B->S (-F)	1.18056	2.64683	12.76920
	CI->S (-F)	1.04219	2.61041	13.04040
	CON->S (FF)	0.55000	1.47179	8.74868

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	0.00178	0.00176	0.00170
	B	0.00203	0.00207	0.00204
	CI	0.00217	0.00221	0.00217
sky130_osu_sc_15T_ms__addf_l	A	0.00136	0.00131	0.00124
	B	0.00162	0.00163	0.00155
	CI	0.00175	0.00176	0.00172

Internal switching power(pJ) to CO falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.00614	0.00613	0.00610
	B	0.00604	0.00606	0.00602
	CI	0.00528	0.00541	0.00536
sky130_osu_sc_15T_ms__addf_l	A	0.00574	0.00572	0.00568
	B	0.00564	0.00563	0.00558
	CI	0.00488	0.00498	0.00493

Internal switching power(pJ) to CON rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.00614	0.00612	0.00600
	B	0.00604	0.00601	0.00597
	CI	0.00528	0.00535	0.00533
sky130_osu_sc_15T_ms__addf_l	A	0.00575	0.00572	0.00559
	B	0.00564	0.00562	0.00557
	CI	0.00488	0.00495	0.00493

Internal switching power(pJ) to CON falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.00176	0.00173	0.00162
	B	0.00200	0.00204	0.00192
	CI	0.00216	0.00219	0.00211
sky130_osu_sc_15T_ms__addf_l	A	0.00134	0.00131	0.00116
	B	0.00160	0.00161	0.00146
	CI	0.00175	0.00176	0.00166

Internal switching power(pJ) to S rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.00614	0.00614	0.00611
	B	0.00604	0.00606	0.00602
	CI	0.00529	0.00542	0.00536
sky130_osu_sc_15T_ms__addf_l	A	0.00575	0.00573	0.00570
	B	0.00565	0.00564	0.00560
	CI	0.00489	0.00498	0.00495

Internal switching power(pJ) to S falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.01249	0.01254	0.01249
	B	0.01155	0.01145	0.01130
	CI	0.01008	0.01009	0.01005
sky130_osu_sc_15T_ms__addf_l	A	0.01190	0.01189	0.01180
	B	0.01100	0.01082	0.01066
	CI	0.00952	0.00947	0.00942

SKY130_OSU_SC_15T_MS__ADDHx

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__addh_1	23.19900
sky130_osu_sc_15T_ms__addh_l	23.19900

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)		
	A	B	CO	CON	S
sky130_osu_sc_15T_ms__addh_1	0.00696	0.00760	0.30469	0.11666	0.30752
sky130_osu_sc_15T_ms__addh_l	0.00696	0.00760	0.19051	0.11762	0.18905

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__addh_1	0.00000	0.00019	0.00022
sky130_osu_sc_15T_ms__addh_l	0.00000	0.00019	0.00022

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)	0.36245	1.66651	10.84900
	B->CO (RR)	0.36853	1.66867	11.03080
sky130_osu_sc_15T_ms__addh_l	A->CO (RR)	0.40027	1.89507	11.04960
	B->CO (RR)	0.40625	1.89638	11.24440

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)	0.44445	1.28667	8.69893
	B->CO (FF)	0.46474	1.30823	8.74849
sky130_osu_sc_15T_ms__addh_l	A->CO (FF)	0.43039	1.26091	8.32684
	B->CO (FF)	0.45063	1.28284	8.37972

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	0.52104	1.42746	6.88021
	A->CON (FR)	!B	0.63007	2.29832	13.56940
	B->CON (RR)	A	0.52719	1.42898	7.05271
	B->CON (FR)	!A	0.72067	2.50608	14.23580
sky130_osu_sc_15T_ms__addh_l	A->CON (RR)	B	0.47937	1.38856	6.78298
	A->CON (FR)	!B	0.57693	2.29060	13.57200
	B->CON (RR)	A	0.48542	1.38881	6.96949
	B->CON (FR)	!A	0.66740	2.45822	14.23810

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	0.56939	1.37765	8.23877
	A->CON (RF)	!B	0.13442	0.84827	6.91091
	B->CON (FF)	A	0.58661	1.40538	8.33942
	B->CON (RF)	!A	0.15135	0.86362	6.86688
sky130_osu_sc_15T_ms__addh_l	A->CON (FF)	B	0.52015	1.32779	8.13479
	A->CON (RF)	!B	0.12466	0.84196	6.91269
	B->CON (FF)	A	0.53744	1.35644	8.24019
	B->CON (RF)	!A	0.14169	0.85612	6.86863

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	0.37214	2.65059	20.34320
	A->S (FR)	B	0.81392	3.16015	21.37780
	B->S (RR)	!A	0.38854	2.63293	20.03270
	B->S (FR)	A	0.83399	3.22236	21.76720
	CON->S (FR)	-	0.12823	1.52571	13.47360
sky130_osu_sc_15T_ms__addh_l	A->S (RR)	!B	0.39896	2.60667	17.53450
	A->S (FR)	B	0.80278	3.08493	18.50910
	B->S (RR)	!A	0.41633	2.60097	17.35760
	B->S (FR)	A	0.82141	3.13510	18.76520
	CON->S (FR)	-	0.17458	1.76526	13.73110

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	1.03783	5.76854	41.08420
	A->S (RF)	B	0.74898	3.12615	19.90180
	B->S (FF)	!A	1.12836	5.96057	41.79970
	B->S (RF)	A	0.75499	3.12741	20.08750
	CON->S (RF)	-	0.04751	0.77843	7.79457
sky130_osu_sc_15T_ms__addh_l	A->S (FF)	!B	1.00458	4.86405	29.68020
	A->S (RF)	B	0.71966	2.75511	14.98240
	B->S (FF)	!A	1.09483	5.06208	30.37430
	B->S (RF)	A	0.72610	2.75629	15.17370
	CON->S (RF)	-	0.05908	0.84440	7.94878

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	0.00281	0.00273	0.00264
	B	0.00000	0.00000	0.00000
	B	0.00266	0.00259	0.00251
sky130_osu_sc_15T_ms__addh_l	A	0.00000	0.00000	0.00000
	A	0.00241	0.00232	0.00222
	B	0.00000	0.00000	0.00000
	B	0.00226	0.00218	0.00209

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	0.00435	0.00428	0.00402
	B	0.00000	0.00000	0.00000
	B	0.00452	0.00453	0.00429
sky130_osu_sc_15T_ms__addh_l	A	0.00000	0.00000	0.00000
	A	0.00395	0.00388	0.00368
	B	0.00000	0.00000	0.00000
	B	0.00413	0.00412	0.00395

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	0.00280	0.00273	0.00262
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00384	0.00374	0.00379
	B	A	0.00000	0.00000	0.00000
	B	A	0.00265	0.00259	0.00248
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00409	0.00406	0.00402
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00240	0.00232	0.00221
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00356	0.00353	0.00351
	B	A	0.00000	0.00000	0.00000
	B	A	0.00225	0.00218	0.00207
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00382	0.00377	0.00373

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	0.00434	0.00429	0.00420
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00069	0.00069	0.00060
	B	A	0.00000	0.00000	0.00000
	B	A	0.00452	0.00453	0.00446
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00107	0.00104	0.00098
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00396	0.00389	0.00374
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00033	0.00033	0.00023
	B	A	0.00000	0.00000	0.00000
	B	A	0.00413	0.00412	0.00401
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00071	0.00068	0.00059

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	0.00435	0.00429	0.00422
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00069	0.00071	0.00069
	B	A	0.00000	0.00000	0.00000
	B	A	0.00452	0.00453	0.00449
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00108	0.00106	0.00103
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00396	0.00389	0.00382
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00033	0.00034	0.00031
	B	A	0.00000	0.00000	0.00000
	B	A	0.00414	0.00413	0.00409
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00073	0.00069	0.00066

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	0.00280	0.00273	0.00263
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00384	0.00386	0.00383
	B	A	0.00000	0.00000	0.00000
	B	A	0.00265	0.00259	0.00251
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00409	0.00408	0.00406
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00241	0.00232	0.00223
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00356	0.00356	0.00352
	B	A	0.00000	0.00000	0.00000
	B	A	0.00226	0.00218	0.00209
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00381	0.00378	0.00376

SKY130_OSU_SC_15T_MS__AND2x

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

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

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	**B**	**Y**
sky130_osu_sc_15T_ms__and2_1	0.00371	0.00378	0.30511
sky130_osu_sc_15T_ms__and2_2	0.00371	0.00378	0.61209
sky130_osu_sc_15T_ms__and2_4	0.00371	0.00378	1.17411
sky130_osu_sc_15T_ms__and2_6	0.00374	0.00378	1.75075
sky130_osu_sc_15T_ms__and2_8	0.00371	0.00377	2.31893
sky130_osu_sc_15T_ms__and2_l	0.00279	0.00288	0.18161

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__and2_1	0.00000	0.00008	0.00010
sky130_osu_sc_15T_ms__and2_2	0.00000	0.00012	0.00014
sky130_osu_sc_15T_ms__and2_4	0.00000	0.00019	0.00020
sky130_osu_sc_15T_ms__and2_6	0.00000	0.00026	0.00027
sky130_osu_sc_15T_ms__and2_8	0.00000	0.00033	0.00034
sky130_osu_sc_15T_ms__and2_l	0.00000	0.00008	0.00011

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)	0.27858	1.56241	10.37410
	B->Y (RR)	0.28931	1.57080	10.65270
sky130_osu_sc_15T_ms__and2_2	A->Y (RR)	0.30939	1.42676	10.80430
	B->Y (RR)	0.31987	1.43129	10.99920
sky130_osu_sc_15T_ms__and2_4	A->Y (RR)	0.43012	1.42046	11.21170
	B->Y (RR)	0.44044	1.42667	11.35110
sky130_osu_sc_15T_ms__and2_6	A->Y (RR)	0.55354	1.49767	11.67870
	B->Y (RR)	0.56382	1.50528	11.75130
sky130_osu_sc_15T_ms__and2_8	A->Y (RR)	0.67390	1.60026	12.06630
	B->Y (RR)	0.68443	1.60931	12.11050
sky130_osu_sc_15T_ms__and2_l	A->Y (RR)	0.37877	1.86654	10.93660
	B->Y (RR)	0.39148	1.87514	11.19540

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)	0.31927	1.13471	8.24561
	B->Y (FF)	0.34304	1.15942	8.32192
sky130_osu_sc_15T_ms__and2_2	A->Y (FF)	0.40878	1.20078	8.60814
	B->Y (FF)	0.43247	1.22206	8.66774
sky130_osu_sc_15T_ms__and2_4	A->Y (FF)	0.61284	1.40817	9.09502
	B->Y (FF)	0.63592	1.43368	9.14843
sky130_osu_sc_15T_ms__and2_6	A->Y (FF)	0.81824	1.63140	9.51821
	B->Y (FF)	0.84057	1.65551	9.55128
sky130_osu_sc_15T_ms__and2_8	A->Y (FF)	1.01436	1.85032	9.83850
	B->Y (FF)	1.03642	1.87343	9.86872
sky130_osu_sc_15T_ms__and2_l	A->Y (FF)	0.39886	1.25737	8.41262
	B->Y (FF)	0.43056	1.29064	8.50618

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	0.00228	0.00217	0.00206
	B	0.00000	0.00000	0.00000
	B	0.00233	0.00222	0.00211
sky130_osu_sc_15T_ms__and2_2	A	0.00000	0.00000	0.00000
	A	0.00430	0.00428	0.00425
	B	0.00000	0.00000	0.00000
	B	0.00434	0.00434	0.00429
sky130_osu_sc_15T_ms__and2_4	A	0.00000	0.00000	0.00000
	A	0.00880	0.00902	0.00900
	B	0.00000	0.00000	0.00000
	B	0.00883	0.00911	0.00907
sky130_osu_sc_15T_ms__and2_6	A	0.00000	0.00000	0.00000
	A	0.01328	0.01375	0.01378
	B	0.00000	0.00000	0.00000
	B	0.01334	0.01383	0.01392
sky130_osu_sc_15T_ms__and2_8	A	0.00000	0.00000	0.00000
	A	0.01773	0.01841	0.01867
	B	0.00000	0.00000	0.00000
	B	0.01777	0.01844	0.01892
sky130_osu_sc_15T_ms__and2_l	A	0.00000	0.00000	0.00000
	A	0.00165	0.00158	0.00148
	B	0.00000	0.00000	0.00000
	B	0.00170	0.00161	0.00153

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	0.00541	0.00529	0.00520
	B	0.00000	0.00000	0.00000
	B	0.00603	0.00591	0.00582
sky130_osu_sc_15T_ms__and2_2	A	0.00000	0.00000	0.00000
	A	0.00682	0.00691	0.00682
	B	0.00000	0.00000	0.00000
	B	0.00744	0.00751	0.00742
sky130_osu_sc_15T_ms__and2_4	A	0.00000	0.00000	0.00000
	A	0.01033	0.01080	0.01075
	B	0.00000	0.00000	0.00000
	B	0.01094	0.01142	0.01136
sky130_osu_sc_15T_ms__and2_6	A	0.00000	0.00000	0.00000
	A	0.01389	0.01476	0.01483
	B	0.00000	0.00000	0.00000
	B	0.01449	0.01533	0.01538
sky130_osu_sc_15T_ms__and2_8	A	0.00000	0.00000	0.00000
	A	0.01728	0.01848	0.01875
	B	0.00000	0.00000	0.00000
	B	0.01791	0.01905	0.01928
sky130_osu_sc_15T_ms__and2_l	A	0.00000	0.00000	0.00000
	A	0.00409	0.00399	0.00391
	B	0.00000	0.00000	0.00000
	B	0.00451	0.00441	0.00434

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)	-0.00184	-0.00186	-0.00186
sky130_osu_sc_15T_ms__and2_2	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00185	-0.00185	-0.00186
sky130_osu_sc_15T_ms__and2_4	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00185	-0.00186	-0.00186
sky130_osu_sc_15T_ms__and2_6	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00185	-0.00187	-0.00187
sky130_osu_sc_15T_ms__and2_8	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00184	-0.00186	-0.00186
sky130_osu_sc_15T_ms__and2_l	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00129	-0.00130	-0.00130

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)	0.00186	0.00189	0.00186
sky130_osu_sc_15T_ms__and2_2	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00186	0.00188	0.00186
sky130_osu_sc_15T_ms__and2_4	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00186	0.00188	0.00186
sky130_osu_sc_15T_ms__and2_6	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00187	0.00189	0.00188
sky130_osu_sc_15T_ms__and2_8	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00186	0.00188	0.00186
sky130_osu_sc_15T_ms__and2_l	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00131	0.00132	0.00131

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)	-0.00174	-0.00175	-0.00175
sky130_osu_sc_15T_ms__and2_2	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00174	-0.00175	-0.00175
sky130_osu_sc_15T_ms__and2_4	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00174	-0.00175	-0.00175
sky130_osu_sc_15T_ms__and2_6	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00174	-0.00176	-0.00175
sky130_osu_sc_15T_ms__and2_8	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00174	-0.00175	-0.00175
sky130_osu_sc_15T_ms__and2_l	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00123	-0.00123	-0.00123

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)	0.00174	0.00176	0.00175
sky130_osu_sc_15T_ms__and2_2	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00174	0.00176	0.00175
sky130_osu_sc_15T_ms__and2_4	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00174	0.00176	0.00175
sky130_osu_sc_15T_ms__and2_6	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00174	0.00176	0.00175
sky130_osu_sc_15T_ms__and2_8	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00174	0.00176	0.00175
sky130_osu_sc_15T_ms__and2_l	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00123	0.00124	0.00124

SKY130_OSU_SC_15T_MS__AOI21

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__aoi21_l	10.37850

Pin Capacitance Information

Cell Name	Pin Cap(pf)			Max Cap(pf)
	A0	A1	B0	Y
sky130_osu_sc_15T_ms__aoi21_l	0.00340	0.00361	0.00352	0.11556

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__aoi21_l	0.00000	0.00005	0.00008

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)	0.51536	2.35436	14.23970
	A1->Y (FR)	0.44318	2.24323	14.01210
	B0->Y (FR)	0.41637	2.17453	13.56890

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)	0.10193	0.80994	6.71438
	A1->Y (RF)	0.09271	0.80275	6.77227
	B0->Y (RF)	0.07195	0.78795	7.06866

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	0.00412	0.00406	0.00397
	A1	0.00000	0.00000	0.00000
	A1	0.00350	0.00342	0.00339
	B0	0.00356	0.00348	0.00345

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	0.00050	0.00042	0.00033
	A1	0.00000	0.00000	0.00000
	A1	0.00050	0.00042	0.00033
	B0	-0.00039	-0.00038	-0.00044

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)	-0.00153	-0.00157	-0.00155
	(!A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !Y)	-0.00160	-0.00161	-0.00160
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00160	-0.00161	-0.00160

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)	0.00155	0.00157	0.00155
	(!A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !Y)	0.00160	0.00161	0.00161
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00160	0.00161	0.00161

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)	-0.00150	-0.00154	-0.00152
	(!A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !Y)	-0.00156	-0.00158	-0.00157
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00171	-0.00173	-0.00173

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)	0.00151	0.00155	0.00152
	(!A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !Y)	0.00157	0.00158	0.00158
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00173	0.00176	0.00174

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)	-0.00105	-0.00106	-0.00105

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)	0.00114	0.00115	0.00107

SKY130_OSU_SC_15T_MS__AOI22

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__aoi22_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	0.00339	0.00358	0.00377	0.00354	0.11664

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__aoi22_l	0.00000	0.00008	0.00010

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)	0.64503	2.48637	14.39310
	A1->Y (FR)	0.57877	2.40310	14.27380
	B0->Y (FR)	0.43831	2.17990	13.54320
	B1->Y (FR)	0.50339	2.22717	13.67360

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)	0.12322	0.83532	6.76575
	A1->Y (RF)	0.11391	0.82826	6.82658
	B0->Y (RF)	0.08556	0.79271	6.76563
	B1->Y (RF)	0.09386	0.79840	6.70819

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	0.00506	0.00500	0.00491
	A1	0.00445	0.00436	0.00426
	B0	0.00384	0.00371	0.00366
	B1	0.00441	0.00425	0.00429

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi22_l	A0	0.00122	0.00115	0.00103
	A1	0.00123	0.00116	0.00103
	B0	-0.00022	-0.00022	-0.00027
	B1	-0.00022	-0.00021	-0.00026

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)	-0.00153	-0.00156	-0.00155
	(!A1 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * B1 * !Y)	-0.00160	-0.00161	-0.00160
	(!A1 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !B1 * Y)	-0.00160	-0.00161	-0.00160
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00160	-0.00161	-0.00160

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)	0.00154	0.00156	0.00155
	(!A1 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * B1 * !Y)	0.00160	0.00161	0.00161
	(!A1 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !B1 * Y)	0.00160	0.00161	0.00161
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00160	0.00161	0.00161

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)	-0.00151	-0.00153	-0.00152
	(!A0 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * B1 * !Y)	-0.00157	-0.00157	-0.00157
	(!A0 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !B1 * Y)	-0.00171	-0.00172	-0.00173
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00171	-0.00172	-0.00173

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)	0.00152	0.00154	0.00152
	(!A0 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * B1 * !Y)	0.00157	0.00158	0.00158
	(!A0 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !B1 * Y)	0.00173	0.00175	0.00173
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00173	0.00175	0.00173

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)	-0.00105	-0.00107	-0.00105
	(A0 * A1 * !B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B1 * !Y)	-0.00105	-0.00105	-0.00105
	(!A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B1 * Y)	-0.00178	-0.00180	-0.00180
	(!A0 * A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B1 * Y)	-0.00178	-0.00180	-0.00180

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)	0.00114	0.00115	0.00107
	(A0 * A1 * !B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B1 * !Y)	0.00105	0.00105	0.00105
	(!A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B1 * Y)	0.00179	0.00182	0.00180
	(!A0 * A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B1 * Y)	0.00179	0.00182	0.00180

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)	-0.00106	-0.00108	-0.00106
	(A0 * A1 * !B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B0 * !Y)	-0.00105	-0.00106	-0.00106
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00163	-0.00164	-0.00164
	(!A0 * A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B0 * Y)	-0.00163	-0.00164	-0.00164

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)	0.00115	0.00116	0.00108
	(A0 * A1 * !B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B0 * !Y)	0.00105	0.00106	0.00106
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00163	0.00164	0.00164
	(!A0 * A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B0 * Y)	0.00163	0.00164	0.00164

SKY130_OSU_SC_15T_MS__BUFx

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

INPUT	OUTPUT
A	Y
0	0
1	1

Footprint

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

Pin Capacitance Information

Cell Name	Pin Cap(pf)	Max Cap(pf)
	A	Y
sky130_osu_sc_15T_ms__buf_1	0.00380	0.29861
sky130_osu_sc_15T_ms__buf_2	0.00384	0.60045
sky130_osu_sc_15T_ms__buf_4	0.00383	1.19568
sky130_osu_sc_15T_ms__buf_6	0.00091	1.80000
sky130_osu_sc_15T_ms__buf_8	0.00384	2.31047
sky130_osu_sc_15T_ms__buf_l	0.00293	0.18359

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__buf_1	0.00000	0.00007	0.00007
sky130_osu_sc_15T_ms__buf_2	0.00000	0.00010	0.00010
sky130_osu_sc_15T_ms__buf_4	0.00000	0.00017	0.00018
sky130_osu_sc_15T_ms__buf_6	0.00000	0.00000	0.00000
sky130_osu_sc_15T_ms__buf_8	0.00000	0.00031	0.00032
sky130_osu_sc_15T_ms__buf_l	0.00000	0.00007	0.00007

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)**	0.20322	1.48316	10.17420
sky130_osu_sc_15T_ms__buf_2	**A->Y (RR)**	0.20918	1.32768	10.52850
sky130_osu_sc_15T_ms__buf_4	**A->Y (RR)**	0.27795	1.28237	11.09640
sky130_osu_sc_15T_ms__buf_8	**A->Y (RR)**	0.42146	1.33553	11.65480
sky130_osu_sc_15T_ms__buf_l	**A->Y (RR)**	0.27425	1.77671	10.83540

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)**	0.30384	1.11397	8.14533
sky130_osu_sc_15T_ms__buf_2	**A->Y (FF)**	0.39732	1.19058	8.61235
sky130_osu_sc_15T_ms__buf_4	**A->Y (FF)**	0.60309	1.40510	9.21911
sky130_osu_sc_15T_ms__buf_8	**A->Y (FF)**	1.00759	1.84726	9.94078
sky130_osu_sc_15T_ms__buf_l	**A->Y (FF)**	0.38700	1.24420	8.38178

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	0.00217	0.00201	0.00186
sky130_osu_sc_15T_ms__buf_2	A	0.00000	0.00000	0.00000
	A	0.00418	0.00411	0.00402
sky130_osu_sc_15T_ms__buf_4	A	0.00000	0.00000	0.00000
	A	0.00871	0.00882	0.00882
sky130_osu_sc_15T_ms__buf_8	A	0.00000	0.00000	0.00000
	A	0.01770	0.01822	0.01831
sky130_osu_sc_15T_ms__buf_l	A	0.00000	0.00000	0.00000
	A	0.00164	0.00151	0.00139

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	0.00532	0.00519	0.00511
sky130_osu_sc_15T_ms__buf_2	A	0.00000	0.00000	0.00000
	A	0.00675	0.00679	0.00670
sky130_osu_sc_15T_ms__buf_4	A	0.00000	0.00000	0.00000
	A	0.01027	0.01072	0.01066
sky130_osu_sc_15T_ms__buf_8	A	0.00000	0.00000	0.00000
	A	0.01730	0.01843	0.01867
sky130_osu_sc_15T_ms__buf_l	A	0.00000	0.00000	0.00000
	A	0.00408	0.00395	0.00387

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
	-0.00037	-0.00036	-0.00036

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
	0.00037	0.00036	0.00036

SKY130_OSU_SC_15T_MS__DFFRx

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__dffr_1	53.11350
sky130_osu_sc_15T_ms__dffr_l	53.11350

Pin Capacitance Information

Cell Name	Pin Cap(pf)			Max Cap(pf)	
	D	**RN**	**CK**	**Q**	**QN**
sky130_osu_sc_15T_ms__dffr_1	0.00350	0.00357	0.01121	0.29584	0.29517
sky130_osu_sc_15T_ms__dffr_l	0.00350	0.00357	0.01121	0.18292	0.18535

Leakage Information

Cell Name	Leakage(nW)		
	Min.	**Avg**	**Max.**
sky130_osu_sc_15T_ms__dffr_1	0.00000	0.00039	0.00044
sky130_osu_sc_15T_ms__dffr_l	0.00000	0.00040	0.00044

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)	2.03461	3.94851	16.19680
	QN->Q (FR)	0.14274	1.62906	14.13890
sky130_osu_sc_15T_ms__dffr_l	CK->Q (RR)	2.01174	4.16882	16.26200
	QN->Q (FR)	0.18548	1.82400	13.99670

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)	1.62373	4.02456	20.57800
	QN->Q (RF)	0.05576	0.83283	8.22978
	RN->Q (FF)	1.06520	3.56926	22.55760
sky130_osu_sc_15T_ms__dffr_l	CK->Q (RF)	1.72398	4.49307	20.65700
	QN->Q (RF)	0.06585	0.88148	8.20873
	RN->Q (FF)	1.16867	4.04618	22.63260

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)	1.42638	2.74298	11.82710
	RN->QN (FR)	0.86434	2.28610	13.80980
sky130_osu_sc_15T_ms__dffr_l	CK->QN (RR)	1.46782	2.96788	12.02540
	RN->QN (FR)	0.90796	2.51289	14.00280

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)**	1.76336	2.60285	7.34739
sky130_osu_sc_15T_ms__dffr_l	**CK->QN (RF)**	1.69227	2.54252	7.21778

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)	-0.19460	-0.22223	-1.18803
	setup	CK (R)	1.58834	1.57301	2.19741
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.19770	-0.22272	-1.18639
	setup	CK (R)	1.58787	1.57522	2.20267

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)	-0.81573	-1.29927	-12.80230
	setup	CK (R)	0.93663	1.39169	12.96310
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.81440	-1.29700	-12.80240
	setup	CK (R)	0.93453	1.39148	12.96310

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)	-0.19460	-0.22223	-1.18803
	setup	CK (R)	1.58834	1.57301	2.19741
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.19770	-0.22272	-1.18639
	setup	CK (R)	1.58787	1.57522	2.20267

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)	-0.81573	-1.29927	-12.80230
	setup	CK (R)	0.93663	1.39169	12.96310
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.81440	-1.29700	-12.80240
	setup	CK (R)	0.93453	1.39148	12.96310

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)	1.49478	1.48513	1.88645
	removal	CK (R)	-0.21838	-0.25700	-0.16359
sky130_osu_sc_15T_ms__dffr_l	recovery	CK (R)	1.49739	1.48666	1.89525
	removal	CK (R)	-0.21838	-0.25700	-0.16359

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)	1.49478	1.48513	1.88645
	removal	CK (R)	-0.21838	-0.25700	-0.16359
sky130_osu_sc_15T_ms__dffr_l	recovery	CK (R)	1.49739	1.48666	1.89525
	removal	CK (R)	-0.21838	-0.25700	-0.16359

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 ()	0.68386	1.06616	13.33370
	min_pulse_width	RN ()	0.68252	1.06403	13.33370
sky130_osu_sc_15T_ms__dffr_l	min_pulse_width	RN ()	0.69314	1.05548	13.33370
	min_pulse_width	RN ()	0.69114	1.05548	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 ()	0.96470	1.07257	13.33370
	min_pulse_width	CK ()	0.98087	0.87823	13.33370
sky130_osu_sc_15T_ms__dffr_l	min_pulse_width	CK ()	0.85639	0.97860	13.33370
	min_pulse_width	CK ()	0.95391	0.85473	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 ()	1.98969	2.02079	13.33370
	min_pulse_width	CK ()	0.78724	1.18362	13.33370
sky130_osu_sc_15T_ms__dffr_l	min_pulse_width	CK ()	1.98820	2.02720	13.33370
	min_pulse_width	CK ()	0.78499	1.18362	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	0.00519	0.00498	0.00353
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00454	0.00435	0.00369

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	0.00583	0.00569	0.00516
	RN	-0.00078	-0.01608	-0.12118
	RN	0.01302	0.01294	0.01231
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00516	0.00503	0.00472
	RN	-0.00078	-0.01205	-0.07492
	RN	0.01234	0.01227	0.01186

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	0.00584	0.00569	0.00517
	RN	-0.00078	-0.01606	-0.12090
	RN	0.01302	0.01294	0.01231
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00517	0.00503	0.00472
	RN	-0.00078	-0.01215	-0.07592
	RN	0.01235	0.01227	0.01186

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	0.00517	0.00496	0.00340
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00451	0.00432	0.00353

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	-0.00151	-0.00154	-0.00154
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00568	0.00556	0.00537
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00230	0.00219	0.00203
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	-0.00151	-0.00154	-0.00154
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00568	0.00556	0.00537
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00230	0.00219	0.00203

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	0.00153	0.00154	0.00154
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00940	0.00930	0.00914
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00445	0.00434	0.00430
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00153	0.00154	0.00154
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00940	0.00930	0.00914
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00445	0.00434	0.00430

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)	0.00200	0.00186	0.00172
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.00571	0.00548	0.00523
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)	0.00200	0.00186	0.00172
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.00571	0.00548	0.00523

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)	0.00489	0.00473	0.00468
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.00998	0.00979	0.00959
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)	0.00489	0.00473	0.00467
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.00998	0.00979	0.00959

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)	-0.00035	-0.00051	-0.00071
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.00276	0.00250	0.00208
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00047	-0.00067	-0.00085
sky130_osu_sc_15T_ms__dffr_l	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	-0.00035	-0.00051	-0.00071
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.00276	0.00250	0.00208
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00047	-0.00067	-0.00085

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)	0.00813	0.00793	0.00781
	(D * RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * RN * !Q * QN)	0.01557	0.01535	0.01475
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.01186	0.01171	0.01145
	(!D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * Q * !QN)	0.01576	0.01544	0.01510
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.00850	0.00830	0.00822
sky130_osu_sc_15T_ms__dffr_l	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.00813	0.00793	0.00781
	(D * RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * RN * !Q * QN)	0.01557	0.01535	0.01475
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.01186	0.01171	0.01145
	(!D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * Q * !QN)	0.01576	0.01544	0.01510
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.00850	0.00830	0.00822

SKY130_OSU_SC_15T_MS__DFFSRx

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__dffsr_1	57.99750
sky130_osu_sc_15T_ms__dffsr_l	57.99750

Pin Capacitance Information

Cell Name	Pin Cap(pf)				Max Cap(pf)	
	D	**RN**	**SN**	**CK**	**Q**	**QN**
sky130_osu_sc_15T_ms__dffsr_1	0.00346	0.00358	0.00773	0.01142	0.30792	0.30767
sky130_osu_sc_15T_ms__dffsr_l	0.00346	0.00358	0.00774	0.01142	0.18339	0.18508

Leakage Information

Cell Name	Leakage(nW)		
	Min.	**Avg**	**Max.**
sky130_osu_sc_15T_ms__dffsr_1	0.00000	0.00041	0.00047
sky130_osu_sc_15T_ms__dffsr_l	0.00000	0.00041	0.00047

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)	1.79808	3.68931	16.26680
	QN->Q (FR)	0.13063	1.56074	13.77830
	RN->Q (RR)	1.50054	3.41332	16.10330
	SN->Q (FR)	1.49385	3.50239	18.91820
sky130_osu_sc_15T_ms__dffsr_l	CK->Q (RR)	1.83477	3.98181	16.24920
	QN->Q (FR)	0.18546	1.82190	14.00550
	RN->Q (RR)	1.54401	3.70551	16.09360
	SN->Q (FR)	1.53877	3.79525	18.89560

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)	1.75018	4.14591	20.82980
	QN->Q (RF)	0.05503	0.84002	8.32879
	RN->Q (FF)	1.13776	3.62689	22.80680
sky130_osu_sc_15T_ms__dffsr_l	CK->Q (RF)	1.87361	4.66601	20.85990
	QN->Q (RF)	0.06570	0.88126	8.21100
	RN->Q (FF)	1.26438	4.14715	22.83330

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)	1.55568	2.86756	11.95070
	RN->QN (FR)	0.94475	2.34915	13.93860
sky130_osu_sc_15T_ms__dffsr_l	CK->QN (RR)	1.61326	3.12420	12.17770
	RN->QN (FR)	1.00327	2.60769	14.15850

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)	1.56238	2.38296	7.34021
	RN->QN (RF)	1.26049	2.11564	7.18413
	SN->QN (FF)	1.25436	2.20451	10.00060
sky130_osu_sc_15T_ms__dffsr_l	CK->QN (RF)	1.53600	2.36878	7.18466
	RN->QN (RF)	1.23644	2.10321	7.03086
	SN->QN (FF)	1.23111	2.19286	9.83607

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)	-0.22138	-0.23736	-1.31617
	setup	CK (R)	1.38397	1.36459	1.95309
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.22110	-0.23829	-1.31285
	setup	CK (R)	1.37768	1.36201	1.94324

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)	-0.91958	-1.38713	-13.01720
	setup	CK (R)	1.04876	1.46724	13.11470
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.92193	-1.38315	-13.01560
	setup	CK (R)	1.04448	1.46646	13.11420

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)	-0.22138	-0.23736	-1.31617
	setup	CK (R)	1.38397	1.36459	1.95309
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.22110	-0.23829	-1.31285
	setup	CK (R)	1.37768	1.36201	1.94324

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)	-0.91958	-1.38713	-13.01720
	setup	CK (R)	1.04876	1.46724	13.11470
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.92193	-1.38315	-13.01560
	setup	CK (R)	1.04448	1.46646	13.11420

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)	1.19846	1.19013	1.51548
	removal	CK (R)	-0.10430	-0.12743	-0.13125
	hold	SN (R)	-1.23039	-1.57015	-11.02120
	setup	SN (R)	1.27749	1.64683	11.80910
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	1.19323	1.18659	1.51450
	removal	CK (R)	-0.10430	-0.12743	-0.12651
	hold	SN (R)	-1.14060	-1.48161	-10.93360
	setup	SN (R)	1.27137	1.61953	11.76600

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)	1.19846	1.19013	1.51548
	removal	CK (R)	-0.10430	-0.12743	-0.13125
	hold	SN (R)	-1.24983	-1.57166	-11.02120
	hold	SN (R)	-1.23039	-1.57015	-11.03450
	setup	SN (R)	1.27749	1.63635	11.78730
	setup	SN (R)	1.25661	1.64683	11.80910
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	1.19323	1.18659	1.51450
	removal	CK (R)	-0.10430	-0.12743	-0.12651
	hold	SN (R)	-1.23853	-1.54386	-10.96110
	hold	SN (R)	-1.14060	-1.48161	-10.93360
	setup	SN (R)	1.27137	1.59731	11.71900
	setup	SN (R)	1.17950	1.61953	11.76600

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 ()	0.79301	1.13023	13.33370
	min_pulse_width	RN ()	0.79946	1.13023	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	RN ()	0.83712	1.12596	13.33370
	min_pulse_width	RN ()	0.82856	1.12596	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)	0.09370	0.11000	0.78676
	removal	CK (R)	-0.01616	-0.04795	-0.57176
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.08989	0.10600	0.78577
	removal	CK (R)	-0.01616	-0.04795	-0.57970

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)	0.09370	0.11000	0.78676
	removal	CK (R)	-0.01616	-0.04795	-0.57176
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.08989	0.10600	0.78577
	removal	CK (R)	-0.01616	-0.04795	-0.57970

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 ()	1.25254	1.66841	13.94240
	min_pulse_width	SN ()	1.25252	1.67268	13.94570
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	SN ()	1.24722	1.62783	13.84480
	min_pulse_width	SN ()	1.17346	1.64705	13.90340

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 ()	0.78977	0.88677	13.33370
	min_pulse_width	CK ()	1.01219	0.91240	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	CK ()	0.72545	0.83551	13.33370
	min_pulse_width	CK ()	0.99368	0.89958	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 ()	1.79208	1.82004	13.33370
	min_pulse_width	CK ()	0.91193	1.26691	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	CK ()	1.78649	1.81790	13.33370
	min_pulse_width	CK ()	0.90469	1.26691	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	0.00619	0.00599	0.00444
	RN	0.01171	0.01153	0.01011
	SN	-0.00078	-0.01647	-0.12613
	SN	0.01247	0.01230	0.01094
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00561	0.00544	0.00473
	RN	0.01112	0.01098	0.01031
	SN	-0.00078	-0.01207	-0.07512
	SN	0.01188	0.01174	0.01119

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	0.00654	0.00645	0.00610
	RN	-0.00078	-0.01647	-0.12613
	RN	0.01364	0.01359	0.01310
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00593	0.00583	0.00552
	RN	-0.00078	-0.01207	-0.07512
	RN	0.01302	0.01296	0.01252

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	0.00655	0.00646	0.00610
	RN	-0.00078	-0.01646	-0.12602
	RN	0.01364	0.01360	0.01311
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00594	0.00584	0.00552
	RN	-0.00078	-0.01214	-0.07581
	RN	0.01303	0.01296	0.01252

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	0.00616	0.00596	0.00429
	RN	0.01168	0.01150	0.00987
	SN	-0.00078	-0.01646	-0.12601
	SN	0.01244	0.01227	0.01072
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00558	0.00541	0.00456
	RN	0.01109	0.01094	0.01019
	SN	-0.00078	-0.01214	-0.07580
	SN	0.01185	0.01171	0.01101

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	-0.00151	-0.00154	-0.00154
	(!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)	0.00722	0.00711	0.00694
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00264	0.00254	0.00238
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00264	0.00254	0.00237
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00267	0.00257	0.00241
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	-0.00151	-0.00154	-0.00154
	(!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)	0.00722	0.00711	0.00694
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00264	0.00254	0.00238
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00264	0.00254	0.00237
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00267	0.00257	0.00241

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	0.00153	0.00154	0.00154
	(!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)	0.01062	0.01053	0.01027
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00483	0.00473	0.00469
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00485	0.00475	0.00470
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00480	0.00471	0.00466
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00153	0.00154	0.00154
	(!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)	0.01062	0.01053	0.01026
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00483	0.00473	0.00468
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00484	0.00474	0.00470
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00480	0.00470	0.00466

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)	0.00226	0.00211	0.00188
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.00717	0.00693	0.00660
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)	0.00226	0.00212	0.00188
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.00717	0.00693	0.00660

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)	0.00539	0.00522	0.00517
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.01067	0.01048	0.01022
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)	0.00538	0.00521	0.00516
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.01066	0.01047	0.01021

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)	-0.00364	-0.00366	-0.00368
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	-0.00387	-0.00393	-0.00390
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	-0.00367	-0.00370	-0.00370
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.00183	0.00174	0.00147
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)	-0.00366	-0.00366	-0.00368
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	-0.00386	-0.00392	-0.00389
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	-0.00367	-0.00369	-0.00370
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.00184	0.00175	0.00148

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)	0.00367	0.00375	0.00369
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00387	0.00393	0.00390
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	0.00368	0.00373	0.00370
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.00786	0.00772	0.00770
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)	0.00367	0.00375	0.00369
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00389	0.00392	0.00389
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	0.00368	0.00373	0.00370
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.00785	0.00771	0.00769

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)	-0.00036	-0.00051	-0.00071
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.00327	0.00302	0.00262
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.00323	0.00299	0.00257
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	-0.00036	-0.00057	-0.00075
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.00243	0.00212	0.00174
sky130_osu_sc_15T_ms__dffsr_l	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	-0.00036	-0.00051	-0.00071
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.00327	0.00302	0.00261
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.00323	0.00299	0.00257
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	-0.00036	-0.00057	-0.00075
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.00244	0.00212	0.00174

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)	0.01723	0.01702	0.01649
	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.00816	0.00795	0.00784
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.01209	0.01196	0.01170
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.01209	0.01200	0.01173
	(!D * RN * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * Q * !QN)	0.01695	0.01660	0.01613
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00842	0.00822	0.00814
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.01058	0.01018	0.01001
sky130_osu_sc_15T_ms__dffsr_l	**(D * RN * SN * !Q * QN)**	0.00000	0.00000	0.00000
	(D * RN * SN * !Q * QN)	0.01724	0.01702	0.01649
	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.00816	0.00795	0.00784
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.01209	0.01196	0.01170
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.01209	0.01200	0.01173
	(!D * RN * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * Q * !QN)	0.01694	0.01660	0.01612
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00842	0.00822	0.00814
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.01058	0.01018	0.01001

SKY130_OSU_SC_15T_MS__DFFSx

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__dffs_1	48.22950
sky130_osu_sc_15T_ms__dffs_l	48.22950

Pin Capacitance Information

Cell Name	Pin Cap(pf)			Max Cap(pf)	
	D	SN	CK	Q	QN
sky130_osu_sc_15T_ms__dffs_1	0.00349	0.00631	0.01119	0.29079	0.29266
sky130_osu_sc_15T_ms__dffs_l	0.00349	0.00631	0.01119	0.18409	0.18522

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__dffs_1	0.00000	0.00036	0.00042
sky130_osu_sc_15T_ms__dffs_l	0.00000	0.00036	0.00042

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)	1.14710	2.96917	15.09590
	QN->Q (FR)	0.14319	1.61628	13.98450
	SN->Q (FR)	1.00171	2.93155	17.95090
sky130_osu_sc_15T_ms__dffs_l	CK->Q (RR)	1.18069	3.28463	15.48190
	QN->Q (FR)	0.18568	1.82321	14.02490
	SN->Q (FR)	1.04331	3.24744	18.29760

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)	1.79909	4.17891	20.46990
	QN->Q (RF)	0.05532	0.82909	8.18027
sky130_osu_sc_15T_ms__dffs_l	CK->Q (RF)	1.88367	4.67107	20.89880
	QN->Q (RF)	0.06553	0.88099	8.21263

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)	1.59363	2.91066	11.93400
sky130_osu_sc_15T_ms__dffs_l	CK->QN (RR)	1.62160	3.12440	12.17510

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)	0.93366	1.68774	6.42004
	SN->QN (FF)	0.77892	1.65944	9.27920
sky130_osu_sc_15T_ms__dffs_l	CK->QN (RF)	0.91120	1.69108	6.38364
	SN->QN (FF)	0.75901	1.66222	9.21561

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)	-0.15055	-0.17757	-1.11386
	setup	CK (R)	0.83009	0.81877	1.58580
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.15007	-0.17799	-1.11405
	setup	CK (R)	0.82739	0.81593	1.58086

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)	-0.85251	-1.32105	-12.89920
	setup	CK (R)	1.08065	1.43575	13.05100
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.85235	-1.32414	-12.90350
	setup	CK (R)	1.07024	1.43504	13.05100

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)	-0.15055	-0.17757	-1.11386
	setup	CK (R)	0.83009	0.81877	1.58580
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.15007	-0.17799	-1.11405
	setup	CK (R)	0.82739	0.81593	1.58086

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)	-0.85251	-1.32105	-12.89920
	setup	CK (R)	1.08065	1.43575	13.05100
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.85235	-1.32414	-12.90350
	setup	CK (R)	1.07024	1.43504	13.05100

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)	0.19739	0.20499	1.47019
	removal	CK (R)	-0.05883	-0.10581	-1.16341
sky130_osu_sc_15T_ms__dffs_l	recovery	CK (R)	0.19144	0.20184	1.46857
	removal	CK (R)	-0.05883	-0.10581	-1.16341

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)	0.19739	0.20499	1.47019
	removal	CK (R)	-0.05883	-0.10581	-1.16341
sky130_osu_sc_15T_ms__dffs_l	recovery	CK (R)	0.19144	0.20184	1.46857
	removal	CK (R)	-0.05883	-0.10581	-1.16341

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 ()	0.73961	1.34593	13.33370
	min_pulse_width	SN ()	0.75287	1.33739	13.33370
sky130_osu_sc_15T_ms__dffs_l	min_pulse_width	SN ()	0.72271	1.30535	13.33370
	min_pulse_width	SN ()	0.70452	1.31817	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 ()	0.35614	0.71378	13.33370
	min_pulse_width	CK ()	1.04740	0.94443	13.33370
sky130_osu_sc_15T_ms__dffs_l	min_pulse_width	CK ()	0.33023	0.70951	13.33370
	min_pulse_width	CK ()	1.01219	0.91240	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 ()	1.23241	1.27118	13.33370
	min_pulse_width	CK ()	0.94627	1.23274	13.33370
sky130_osu_sc_15T_ms__dffs_l	min_pulse_width	CK ()	1.22862	1.26478	13.33370
	min_pulse_width	CK ()	0.93996	1.23061	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	0.00517	0.00494	0.00318
	SN	-0.00078	-0.01591	-0.11911
	SN	0.01086	0.01073	0.00939
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00451	0.00431	0.00336
	SN	-0.00078	-0.01210	-0.07540
	SN	0.01019	0.01009	0.00943

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	0.00582	0.00570	0.00519
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00516	0.00504	0.00473

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	0.00582	0.00570	0.00519
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00516	0.00504	0.00474

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	0.00514	0.00492	0.00336
	SN	-0.00078	-0.01598	-0.11987
	SN	0.01083	0.01069	0.00914
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00448	0.00428	0.00347
	SN	-0.00078	-0.01214	-0.07586
	SN	0.01016	0.01006	0.00922

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	-0.00154	-0.00157	-0.00157
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00564	0.00551	0.00527
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00224	0.00213	0.00197
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	-0.00154	-0.00157	-0.00157
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00564	0.00551	0.00527
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00224	0.00213	0.00197

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	0.00156	0.00157	0.00157
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00946	0.00936	0.00925
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00457	0.00446	0.00442
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00156	0.00157	0.00157
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00946	0.00936	0.00925
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00457	0.00446	0.00442

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)	-0.00263	-0.00265	-0.00265
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00205	0.00193	0.00181
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)	-0.00263	-0.00265	-0.00265
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00205	0.00193	0.00181

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)	0.00265	0.00265	0.00265
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00569	0.00553	0.00545
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)	0.00265	0.00265	0.00265
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00569	0.00553	0.00545

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)	-0.00037	-0.00052	-0.00072
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	-0.00044	-0.00065	-0.00083
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.00203	0.00169	0.00133
sky130_osu_sc_15T_ms__dffs_l	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	-0.00037	-0.00052	-0.00072
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	-0.00044	-0.00064	-0.00083
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.00203	0.00169	0.00133

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)	0.01557	0.01535	0.01486
	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.00814	0.00794	0.00782
	(!D * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * SN * Q * !QN)	0.01578	0.01540	0.01508
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	0.00850	0.00827	0.00818
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.01029	0.00989	0.00970
sky130_osu_sc_15T_ms__dffs_l	(D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * SN * !Q * QN)	0.01557	0.01535	0.01486
	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.00814	0.00794	0.00782
	(!D * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * SN * Q * !QN)	0.01578	0.01540	0.01508
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	0.00850	0.00827	0.00818
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.01029	0.00989	0.00970

SKY130_OSU_SC_15T_MS__DFFx

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__dff_1	40.29300
sky130_osu_sc_15T_ms__dff_l	40.29300

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)	
	D	CK	Q	QN
sky130_osu_sc_15T_ms__dff_1	0.00366	0.01115	0.30944	0.30795
sky130_osu_sc_15T_ms__dff_l	0.00366	0.01115	0.17966	0.17885

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__dff_1	0.00000	0.00033	0.00034
sky130_osu_sc_15T_ms__dff_l	0.00000	0.00033	0.00034

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)	0.87896	2.69225	15.24710
	QN->Q (FR)	0.12997	1.56329	13.79570
sky130_osu_sc_15T_ms__dff_l	CK->Q (RR)	0.95204	3.05149	15.26800
	QN->Q (FR)	0.19848	1.88667	14.33900

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)	1.54828	3.93841	20.65410
	QN->Q (RF)	0.05485	0.84086	8.33040
sky130_osu_sc_15T_ms__dff_l	CK->Q (RF)	1.69593	4.51191	20.77580
	QN->Q (RF)	0.06579	0.88065	8.16332

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)	1.35909	2.65995	11.73260
sky130_osu_sc_15T_ms__dff_l	CK->QN (RR)	1.43342	2.95118	11.99290

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)	0.68976	1.41970	6.30328
sky130_osu_sc_15T_ms__dff_l	CK->QN (RF)	0.69005	1.43947	6.13588

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)	-0.14942	-0.18002	-1.16911
	setup	CK (R)	0.56831	0.55038	1.51172
sky130_osu_sc_15T_ms__dff_l	hold	CK (R)	-0.15279	-0.18050	-1.17104
	setup	CK (R)	0.56398	0.54270	1.50606

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)	-0.80992	-1.30938	-12.87230
	setup	CK (R)	0.96015	1.44189	13.09470
sky130_osu_sc_15T_ms__dff_l	hold	CK (R)	-0.81257	-1.31164	-12.87420
	setup	CK (R)	0.95680	1.44080	13.09480

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 ()	0.27984	0.70951	13.33370
	min_pulse_width	CK ()	0.93537	0.84405	13.33370
sky130_osu_sc_15T_ms__dff_l	min_pulse_width	CK ()	0.27453	0.70951	13.33370
	min_pulse_width	CK ()	0.91668	0.82911	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 ()**	0.96923	1.06189	13.33370
	min_pulse_width	**CK ()**	0.80029	1.22847	13.33370
sky130_osu_sc_15T_ms__dff_l	**min_pulse_width**	**CK ()**	0.96326	1.05975	13.33370
	min_pulse_width	**CK ()**	0.79796	1.22847	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	0.00549	0.00518	0.00362
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00491	0.00466	0.00385

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	0.00593	0.00584	0.00548
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00534	0.00521	0.00480

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	0.00593	0.00584	0.00549
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00534	0.00521	0.00481

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	0.00547	0.00515	0.00350
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00488	0.00463	0.00378

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	-0.00150	-0.00154	-0.00153
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00546	0.00535	0.00511
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	-0.00150	-0.00154	-0.00153
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00546	0.00535	0.00512

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	0.00153	0.00154	0.00153
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00995	0.00982	0.00967
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00153	0.00154	0.00153
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00995	0.00982	0.00968

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)	-0.00037	-0.00052	-0.00072
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00046	-0.00063	-0.00081
sky130_osu_sc_15T_ms__dff_l	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	-0.00037	-0.00052	-0.00072
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00046	-0.00063	-0.00081

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)	0.00810	0.00789	0.00777
	(D * !Q * QN)	0.00000	0.00000	0.00000
	(D * !Q * QN)	0.01537	0.01515	0.01470
	(!D * Q * !QN)	0.00000	0.00000	0.00000
	(!D * Q * !QN)	0.01613	0.01574	0.01539
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.00841	0.00821	0.00813
sky130_osu_sc_15T_ms__dff_l	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.00810	0.00789	0.00777
	(D * !Q * QN)	0.00000	0.00000	0.00000
	(D * !Q * QN)	0.01537	0.01516	0.01470
	(!D * Q * !QN)	0.00000	0.00000	0.00000
	(!D * Q * !QN)	0.01614	0.01575	0.01540
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.00841	0.00821	0.00813

SKY130_OSU_SC_15T_MS__INVx

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

INPUT	OUTPUT
A	Y
0	1
1	0

Footprint

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

Pin Capacitance Information

Cell Name	Pin Cap(pf)	Max Cap(pf)
	A	Y
sky130_osu_sc_15T_ms__inv_1	0.00362	0.29852
sky130_osu_sc_15T_ms__inv_10	0.03317	2.91446
sky130_osu_sc_15T_ms__inv_2	0.00682	0.59955
sky130_osu_sc_15T_ms__inv_3	0.01015	0.87896
sky130_osu_sc_15T_ms__inv_4	0.01338	1.18009
sky130_osu_sc_15T_ms__inv_6	0.02005	1.78587
sky130_osu_sc_15T_ms__inv_8	0.02662	2.33345
sky130_osu_sc_15T_ms__inv_l	0.00269	0.17947

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__inv_1	0.00000	0.00003	0.00004
sky130_osu_sc_15T_ms__inv_10	0.00000	0.00034	0.00036
sky130_osu_sc_15T_ms__inv_2	0.00000	0.00007	0.00007
sky130_osu_sc_15T_ms__inv_3	0.00000	0.00010	0.00011
sky130_osu_sc_15T_ms__inv_4	0.00000	0.00014	0.00014
sky130_osu_sc_15T_ms__inv_6	0.00000	0.00021	0.00022
sky130_osu_sc_15T_ms__inv_8	0.00000	0.00028	0.00029
sky130_osu_sc_15T_ms__inv_l	0.00000	0.00004	0.00004

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)**	0.12763	1.50606	13.26630
sky130_osu_sc_15T_ms__inv_10	**A->Y (FR)**	0.11418	1.00617	13.37200
sky130_osu_sc_15T_ms__inv_2	**A->Y (FR)**	0.09031	1.28041	13.26640
sky130_osu_sc_15T_ms__inv_3	**A->Y (FR)**	0.09310	1.19305	13.27270
sky130_osu_sc_15T_ms__inv_4	**A->Y (FR)**	0.08728	1.13511	13.27200
sky130_osu_sc_15T_ms__inv_6	**A->Y (FR)**	0.09157	1.07121	13.38900
sky130_osu_sc_15T_ms__inv_8	**A->Y (FR)**	0.10117	1.02897	13.30540
sky130_osu_sc_15T_ms__inv_l	**A->Y (FR)**	0.18430	1.76423	13.67420

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)**	0.04956	0.78041	7.79325
sky130_osu_sc_15T_ms__inv_10	**A->Y (RF)**	0.06074	0.63883	7.88956
sky130_osu_sc_15T_ms__inv_2	**A->Y (RF)**	0.03978	0.71980	7.80613
sky130_osu_sc_15T_ms__inv_3	**A->Y (RF)**	0.04226	0.70175	7.86146
sky130_osu_sc_15T_ms__inv_4	**A->Y (RF)**	0.04117	0.67959	7.85256
sky130_osu_sc_15T_ms__inv_6	**A->Y (RF)**	0.04662	0.66030	7.90613
sky130_osu_sc_15T_ms__inv_8	**A->Y (RF)**	0.05318	0.64648	7.88101
sky130_osu_sc_15T_ms__inv_l	**A->Y (RF)**	0.06092	0.84164	7.87172

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	0.00274	0.00268	0.00267
sky130_osu_sc_15T_ms__inv_10	A	0.00000	0.00000	0.00000
	A	0.02338	0.02312	0.02370
sky130_osu_sc_15T_ms__inv_2	A	0.00000	0.00000	0.00000
	A	0.00484	0.00471	0.00476
sky130_osu_sc_15T_ms__inv_3	A	0.00000	0.00000	0.00000
	A	0.00743	0.00728	0.00734
sky130_osu_sc_15T_ms__inv_4	A	0.00000	0.00000	0.00000
	A	0.00953	0.00938	0.00944
sky130_osu_sc_15T_ms__inv_6	A	0.00000	0.00000	0.00000
	A	0.01418	0.01402	0.01418
sky130_osu_sc_15T_ms__inv_8	A	0.00000	0.00000	0.00000
	A	0.01880	0.01856	0.01904
sky130_osu_sc_15T_ms__inv_l	A	0.00000	0.00000	0.00000
	A	0.00204	0.00190	0.00198

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	-0.00043	-0.00046	-0.00048
sky130_osu_sc_15T_ms__inv_10	A	0.00000	0.00000	0.00000
	A	-0.00765	-0.00760	-0.00729
sky130_osu_sc_15T_ms__inv_2	A	0.00000	0.00000	0.00000
	A	-0.00146	-0.00150	-0.00152
sky130_osu_sc_15T_ms__inv_3	A	0.00000	0.00000	0.00000
	A	-0.00187	-0.00195	-0.00192
sky130_osu_sc_15T_ms__inv_4	A	0.00000	0.00000	0.00000
	A	-0.00293	-0.00300	-0.00296
sky130_osu_sc_15T_ms__inv_6	A	0.00000	0.00000	0.00000
	A	-0.00442	-0.00451	-0.00440
sky130_osu_sc_15T_ms__inv_8	A	0.00000	0.00000	0.00000
	A	-0.00601	-0.00608	-0.00585
sky130_osu_sc_15T_ms__inv_l	A	0.00000	0.00000	0.00000
	A	-0.00027	-0.00029	-0.00031

SKY130_OSU_SC_15T_MS__MUX2

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__mux2_1	15.26250

Pin Capacitance Information

Cell Name	Pin Cap(pf)			Max Cap(pf)
	A0	**A1**	**S0**	**Y**
sky130_osu_sc_15T_ms__mux2_1	0.18011	0.18139	0.00742	0.27418

Leakage Information

Cell Name	Leakage(nW)		
	Min.	**Avg**	**Max.**
sky130_osu_sc_15T_ms__mux2_1	0.00000	0.00012	0.00012

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)	-	0.07360	1.02729	9.68344
	A1->Y (RR)	-	0.08654	1.03434	9.70176
	S0->Y (RR)	(!A0 * A1)	0.16673	1.20316	9.26073
	S0->Y (FR)	(A0 * !A1)	0.14078	1.40552	10.98730

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)	-	0.05282	0.75286	7.56877
	A1->Y (FF)	-	0.04319	0.74567	7.54988
	S0->Y (FF)	(!A0 * A1)	0.31267	1.08940	8.07790
	S0->Y (RF)	(A0 * !A1)	0.05434	0.77860	7.42404

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	-	-0.00274	-0.00274	-0.00274
	A1	-	0.00000	0.00000	0.00000
	A1	-	-0.00190	-0.00190	-0.00190
	S0	(A0 * !A1)	0.00000	0.00000	0.00000
	S0	(A0 * !A1)	0.00374	0.00355	0.00347
	S0	(!A0 * A1)	0.00000	0.00000	0.00000
	S0	(!A0 * A1)	-0.00168	-0.00188	-0.00204

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	-	0.00274	0.00274	0.00275
	A1	-	0.00000	0.00000	0.00000
	A1	-	0.00190	0.00190	0.00190
	S0	(A0 * !A1)	0.00000	0.00000	0.00000
	S0	(A0 * !A1)	0.00060	0.00041	0.00027
	S0	(!A0 * A1)	0.00000	0.00000	0.00000
	S0	(!A0 * A1)	0.00716	0.00697	0.00689

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)	-0.00076	-0.00076	-0.00076

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)	0.00076	0.00076	0.00076

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)	-0.00092	-0.00091	-0.00091

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)	0.00092	0.00091	0.00091

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)	-0.00054	-0.00075	-0.00088
	(!A0 * !A1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !Y)	-0.00054	-0.00074	-0.00088

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)	0.00553	0.00534	0.00526
	(!A0 * !A1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !Y)	0.00536	0.00518	0.00511

SKY130_OSU_SC_15T_MS__NAND2x

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__nand2_1	7.93650
sky130_osu_sc_15T_ms__nand2_l	7.93650

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
sky130_osu_sc_15T_ms__nand2_1	0.00362	0.00357	0.29700
sky130_osu_sc_15T_ms__nand2_l	0.00269	0.00266	0.18079

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__nand2_1	0.00000	0.00005	0.00007
sky130_osu_sc_15T_ms__nand2_l	0.00000	0.00005	0.00008

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)	0.13520	1.50151	13.27020
	B->Y (FR)	0.15701	1.52846	13.21010
sky130_osu_sc_15T_ms__nand2_l	A->Y (FR)	0.19084	1.78789	13.74330
	B->Y (FR)	0.21854	1.80515	13.75770

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)	0.08326	0.99407	9.13774
	B->Y (RF)	0.09261	1.00218	9.06346
sky130_osu_sc_15T_ms__nand2_l	A->Y (RF)	0.11229	1.14897	9.45826
	B->Y (RF)	0.12184	1.15903	9.38446

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	0.00290	0.00284	0.00282
	B	0.00000	0.00000	0.00000
	B	0.00350	0.00343	0.00342
sky130_osu_sc_15T_ms__nand2_1	A	0.00000	0.00000	0.00000
	A	0.00212	0.00208	0.00206
	B	0.00000	0.00000	0.00000
	B	0.00252	0.00241	0.00246

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	-0.00026	-0.00029	-0.00030
	B	0.00000	0.00000	0.00000
	B	-0.00024	-0.00027	-0.00028
sky130_osu_sc_15T_ms__nand2_1	A	0.00000	0.00000	0.00000
	A	-0.00017	-0.00019	-0.00021
	B	0.00000	0.00000	0.00000
	B	-0.00016	-0.00018	-0.00020

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)	-0.00180	-0.00181	-0.00182
sky130_osu_sc_15T_ms__nand2_l	(!B * Y)	0.00000	0.00000	0.00000
	(!B * Y)	-0.00124	-0.00125	-0.00125

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)	0.00181	0.00184	0.00182
sky130_osu_sc_15T_ms__nand2_l	(!B * Y)	0.00000	0.00000	0.00000
	(!B * Y)	0.00124	0.00126	0.00125

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)	-0.00166	-0.00167	-0.00167
sky130_osu_sc_15T_ms__nand2_l	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00114	-0.00115	-0.00115

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)	0.00166	0.00168	0.00167
sky130_osu_sc_15T_ms__nand2_l	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00114	0.00115	0.00115

SKY130_OSU_SC_15T_MS__NOR2x

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__nor2_1	7.93650
sky130_osu_sc_15T_ms__nor2_l	7.93650

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
sky130_osu_sc_15T_ms__nor2_1	0.00356	0.00388	0.12238
sky130_osu_sc_15T_ms__nor2_l	0.00256	0.00291	0.07872

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__nor2_1	0.00000	0.00005	0.00007
sky130_osu_sc_15T_ms__nor2_l	0.00000	0.00005	0.00007

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)	0.39436	2.22865	14.28970
	B->Y (FR)	0.34580	2.09953	13.65750
sky130_osu_sc_15T_ms__nor2_l	A->Y (FR)	0.48897	2.53745	14.33180
	B->Y (FR)	0.45606	2.40717	13.86460

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)	0.05612	0.68936	6.19766
	B->Y (RF)	0.05163	0.68085	6.17747
sky130_osu_sc_15T_ms__nor2_l	A->Y (RF)	0.06746	0.73910	6.45677
	B->Y (RF)	0.06370	0.73282	6.43933

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	0.00344	0.00337	0.00335
	B	0.00000	0.00000	0.00000
	B	0.00301	0.00290	0.00288
sky130_osu_sc_15T_ms__nor2_1	A	0.00000	0.00000	0.00000
	A	0.00243	0.00238	0.00236
	B	0.00000	0.00000	0.00000
	B	0.00220	0.00213	0.00209

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	0.00014	0.00007	-0.00001
	B	0.00000	0.00000	0.00000
	B	-0.00040	-0.00040	-0.00045
sky130_osu_sc_15T_ms__nor2_1	A	0.00000	0.00000	0.00000
	A	0.00009	0.00005	0.00000
	B	0.00000	0.00000	0.00000
	B	-0.00021	-0.00022	-0.00027

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)	-0.00152	-0.00156	-0.00155
sky130_osu_sc_15T_ms__nor2_l	(B * !Y)	0.00000	0.00000	0.00000
	(B * !Y)	-0.00100	-0.00102	-0.00102

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)	0.00154	0.00156	0.00155
sky130_osu_sc_15T_ms__nor2_l	(B * !Y)	0.00000	0.00000	0.00000
	(B * !Y)	0.00101	0.00102	0.00102

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)	-0.00105	-0.00106	-0.00106
sky130_osu_sc_15T_ms__nor2_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	-0.00068	-0.00068	-0.00067

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)	0.00107	0.00108	0.00106
sky130_osu_sc_15T_ms__nor2_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00069	0.00069	0.00068

SKY130_OSU_SC_15T_MS__OAI21

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__oai21_l	10.37850

Pin Capacitance Information

Cell Name	Pin Cap(pf)			Max Cap(pf)
	A0	A1	B0	Y
sky130_osu_sc_15T_ms__oai21_l	0.00359	0.00362	0.00309	0.11735

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__oai21_l	0.00000	0.00005	0.00009

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)	0.46960	2.17793	13.56800
	A1->Y (FR)	0.53293	2.35484	14.18630
	B0->Y (FR)	0.23408	1.55175	11.20870

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)	0.10831	0.83183	6.80362
	A1->Y (RF)	0.11588	0.83099	6.79190
	B0->Y (RF)	0.09108	0.82028	6.94059

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	0.00383	0.00364	0.00369
	A1	0.00000	0.00000	0.00000
	A1	0.00431	0.00424	0.00394
	B0	0.00292	0.00281	0.00276

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	0.00015	0.00015	0.00010
	A1	0.00000	0.00000	0.00000
	A1	0.00071	0.00064	0.00058
	B0	0.00112	0.00109	0.00103

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)	-0.00106	-0.00107	-0.00106
	(A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * Y)	-0.00153	-0.00157	-0.00156
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00161	-0.00161	-0.00161

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)	0.00107	0.00108	0.00106
	(A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * Y)	0.00155	0.00157	0.00156
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00161	0.00161	0.00162

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)	-0.00147	-0.00152	-0.00151
	(A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * Y)	-0.00151	-0.00155	-0.00155
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00158	-0.00160	-0.00159

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)	0.00151	0.00152	0.00151
	(A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * Y)	0.00153	0.00156	0.00155
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00159	0.00162	0.00159

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)	-0.00126	-0.00127	-0.00130

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)	0.00130	0.00132	0.00131

SKY130_OSU_SC_15T_MS__OAI22

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__oai22_1	12.82050

Pin Capacitance Information

Cell Name	Pin Cap(pf)				Max Cap(pf)
	A0	A1	B0	B1	Y
sky130_osu_sc_15T_ms__oai22_1	0.00341	0.00368	0.00384	0.00371	0.11950

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__oai22_1	0.00000	0.00008	0.00010

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)	0.58761	2.41724	14.32980
	A1->Y (FR)	0.53141	2.23878	13.69990
	B0->Y (FR)	0.37448	2.10964	13.51700
	B1->Y (FR)	0.43782	2.25227	14.16600

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)	0.14381	0.88148	6.90700
	A1->Y (RF)	0.12679	0.85903	6.87356
	B0->Y (RF)	0.10766	0.84511	7.00984
	B1->Y (RF)	0.12593	0.86745	7.06374

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	0.00535	0.00527	0.00523
	A1	0.00483	0.00473	0.00469
	B0	0.00365	0.00354	0.00350
	B1	0.00419	0.00410	0.00405

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai22_l	A0	0.00097	0.00090	0.00081
	A1	0.00045	0.00046	0.00037
	B0	0.00046	0.00046	0.00037
	B1	0.00099	0.00092	0.00082

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)	-0.00151	-0.00156	-0.00154
	(A1 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * B1 * !Y)	-0.00151	-0.00156	-0.00154
	(A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * !B1 * Y)	-0.00152	-0.00156	-0.00155
	(!A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * !B1 * Y)	-0.00159	-0.00161	-0.00160

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)	0.00154	0.00156	0.00154
	(A1 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * B1 * !Y)	0.00154	0.00156	0.00154
	(A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * !B1 * Y)	0.00154	0.00156	0.00155
	(!A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * !B1 * Y)	0.00159	0.00162	0.00160

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)	-0.00105	-0.00106	-0.00105
	(A0 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * B1 * !Y)	-0.00105	-0.00106	-0.00105
	(A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * !B1 * Y)	-0.00150	-0.00153	-0.00153
	(!A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * !B1 * Y)	-0.00158	-0.00159	-0.00158

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)	0.00106	0.00107	0.00105
	(A0 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * B1 * !Y)	0.00106	0.00108	0.00105
	(A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * !B1 * Y)	0.00153	0.00153	0.00153
	(!A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * !B1 * Y)	0.00158	0.00161	0.00159

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)	-0.00104	-0.00106	-0.00104
	(A0 * !A1 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B1 * !Y)	-0.00104	-0.00106	-0.00104
	(!A0 * !A1 * B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B1 * Y)	-0.00171	-0.00174	-0.00173
	(!A0 * !A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B1 * Y)	-0.00172	-0.00173	-0.00178

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)	0.00106	0.00107	0.00105
	(A0 * !A1 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B1 * !Y)	0.00106	0.00106	0.00105
	(!A0 * !A1 * B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B1 * Y)	0.00174	0.00174	0.00173
	(!A0 * !A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B1 * Y)	0.00178	0.00181	0.00179

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)	-0.00148	-0.00152	-0.00151
	(A0 * !A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B0 * !Y)	-0.00148	-0.00151	-0.00151
	(!A0 * !A1 * B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B0 * Y)	-0.00175	-0.00179	-0.00178
	(!A0 * !A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B0 * Y)	-0.00176	-0.00178	-0.00182

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)	0.00151	0.00153	0.00151
	(A0 * !A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B0 * !Y)	0.00151	0.00151	0.00151
	(!A0 * !A1 * B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B0 * Y)	0.00178	0.00180	0.00178
	(!A0 * !A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B0 * Y)	0.00182	0.00184	0.00183

SKY130_OSU_SC_15T_MS__OR2x

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

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

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
sky130_osu_sc_15T_ms__or2_1	0.00391	0.00371	0.30362
sky130_osu_sc_15T_ms__or2_2	0.00389	0.00371	0.59729
sky130_osu_sc_15T_ms__or2_4	0.00387	0.00371	1.20055
sky130_osu_sc_15T_ms__or2_8	0.00387	0.00371	2.29480
sky130_osu_sc_15T_ms__or2_l	0.00296	0.00274	0.18164

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__or2_1	0.00000	0.00008	0.00010
sky130_osu_sc_15T_ms__or2_2	0.00000	0.00011	0.00014
sky130_osu_sc_15T_ms__or2_4	0.00000	0.00018	0.00021
sky130_osu_sc_15T_ms__or2_8	0.00000	0.00031	0.00035
sky130_osu_sc_15T_ms__or2_l	0.00000	0.00008	0.00010

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)	0.22102	1.52128	10.44950
	B->Y (RR)	0.21130	1.50475	10.33140
sky130_osu_sc_15T_ms__or2_2	A->Y (RR)	0.22424	1.34874	10.62100
	B->Y (RR)	0.21348	1.33358	10.52900
sky130_osu_sc_15T_ms__or2_4	A->Y (RR)	0.29314	1.30285	11.24180
	B->Y (RR)	0.28212	1.29061	11.16040
sky130_osu_sc_15T_ms__or2_8	A->Y (RR)	0.43619	1.35150	11.71140
	B->Y (RR)	0.42476	1.33916	11.65910
sky130_osu_sc_15T_ms__or2_l	A->Y (RR)	0.29518	1.83957	11.18710
	B->Y (RR)	0.28326	1.82155	11.05170

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)	0.78055	1.66605	9.28738
	B->Y (FF)	0.70012	1.51511	8.67242
sky130_osu_sc_15T_ms__or2_2	A->Y (FF)	1.01581	1.90927	9.70468
	B->Y (FF)	0.93583	1.75737	9.15958
sky130_osu_sc_15T_ms__or2_4	A->Y (FF)	1.52351	2.47544	10.55510
	B->Y (FF)	1.44291	2.32136	10.03770
sky130_osu_sc_15T_ms__or2_8	A->Y (FF)	2.51911	3.58636	11.90040
	B->Y (FF)	2.43842	3.40121	11.33230
sky130_osu_sc_15T_ms__or2_l	A->Y (FF)	0.93151	1.84101	9.31610
	B->Y (FF)	0.84124	1.69520	8.83706

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	0.00277	0.00264	0.00248
	B	0.00000	0.00000	0.00000
	B	0.00222	0.00213	0.00197
sky130_osu_sc_15T_ms__or2_2	A	0.00000	0.00000	0.00000
	A	0.00481	0.00478	0.00464
	B	0.00000	0.00000	0.00000
	B	0.00423	0.00429	0.00416
sky130_osu_sc_15T_ms__or2_4	A	0.00000	0.00000	0.00000
	A	0.00935	0.00947	0.00945
	B	0.00000	0.00000	0.00000
	B	0.00878	0.00903	0.00901
sky130_osu_sc_15T_ms__or2_8	A	0.00000	0.00000	0.00000
	A	0.01837	0.01891	0.01913
	B	0.00000	0.00000	0.00000
	B	0.01778	0.01846	0.01862
sky130_osu_sc_15T_ms__or2_l	A	0.00000	0.00000	0.00000
	A	0.00201	0.00193	0.00180
	B	0.00000	0.00000	0.00000
	B	0.00166	0.00160	0.00147

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	0.00604	0.00599	0.00593
	B	0.00000	0.00000	0.00000
	B	0.00538	0.00536	0.00529
sky130_osu_sc_15T_ms__or2_2	A	0.00000	0.00000	0.00000
	A	0.00741	0.00758	0.00755
	B	0.00000	0.00000	0.00000
	B	0.00676	0.00693	0.00688
sky130_osu_sc_15T_ms__or2_4	A	0.00000	0.00000	0.00000
	A	0.01086	0.01138	0.01150
	B	0.00000	0.00000	0.00000
	B	0.01020	0.01072	0.01082
sky130_osu_sc_15T_ms__or2_8	A	0.00000	0.00000	0.00000
	A	0.01771	0.01868	0.01946
	B	0.00000	0.00000	0.00000
	B	0.01706	0.01806	0.01871
sky130_osu_sc_15T_ms__or2_l	A	0.00000	0.00000	0.00000
	A	0.00450	0.00441	0.00437
	B	0.00000	0.00000	0.00000
	B	0.00402	0.00398	0.00392

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)	-0.00153	-0.00157	-0.00156
sky130_osu_sc_15T_ms__or2_2	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00153	-0.00157	-0.00156
sky130_osu_sc_15T_ms__or2_4	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00153	-0.00157	-0.00156
sky130_osu_sc_15T_ms__or2_8	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00153	-0.00157	-0.00156
sky130_osu_sc_15T_ms__or2_l	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00101	-0.00103	-0.00103

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)	0.00156	0.00157	0.00156
sky130_osu_sc_15T_ms__or2_2	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00156	0.00157	0.00156
sky130_osu_sc_15T_ms__or2_4	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00155	0.00157	0.00156
sky130_osu_sc_15T_ms__or2_8	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00155	0.00157	0.00156
sky130_osu_sc_15T_ms__or2_l	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00103	0.00104	0.00103

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)	-0.00106	-0.00107	-0.00106
sky130_osu_sc_15T_ms__or2_2	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00106	-0.00107	-0.00106
sky130_osu_sc_15T_ms__or2_4	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00106	-0.00107	-0.00106
sky130_osu_sc_15T_ms__or2_8	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00106	-0.00107	-0.00106
sky130_osu_sc_15T_ms__or2_l	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00070	-0.00069	-0.00069

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)	0.00109	0.00109	0.00107
sky130_osu_sc_15T_ms__or2_2	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00108	0.00109	0.00107
sky130_osu_sc_15T_ms__or2_4	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00108	0.00109	0.00107
sky130_osu_sc_15T_ms__or2_8	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00108	0.00109	0.00107
sky130_osu_sc_15T_ms__or2_l	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00070	0.00071	0.00069

SKY130_OSU_SC_15T_MS__TBUFIx

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__tbufi_1	10.37850
sky130_osu_sc_15T_ms__tbufi_l	10.37850

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	OE	Y
sky130_osu_sc_15T_ms__tbufi_1	0.00387	0.00495	0.12289
sky130_osu_sc_15T_ms__tbufi_l	0.00291	0.00375	0.07802

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__tbufi_1	0.00000	0.00006	0.00007
sky130_osu_sc_15T_ms__tbufi_l	0.00000	0.00006	0.00008

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)	0.32433	2.07945	13.64430
	OE->Y (FR)	0.19552	0.75575	5.88592
	OE->Y (RR)	0.40889	2.11093	10.93220
sky130_osu_sc_15T_ms__tbufi_l	A->Y (FR)	0.43294	2.38011	13.78230
	OE->Y (FR)	0.24239	0.79997	6.08566
	OE->Y (RR)	0.50715	2.44691	11.36120

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)	0.07973	0.80035	6.89396
	OE->Y (FF)	0.19574	0.75659	5.88941
	OE->Y (RF)	0.08028	0.79775	6.82026
sky130_osu_sc_15T_ms__tbufi_l	A->Y (RF)	0.10997	0.90485	7.25123
	OE->Y (FF)	0.24308	0.80110	6.08882
	OE->Y (RF)	0.10521	0.90455	7.14969

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	0.00277	0.00266	0.00263
	OE	0.00000	0.00000	0.00000
	OE	0.00242	0.00222	0.00211
sky130_osu_sc_15T_ms__tbufi_l	A	0.00000	0.00000	0.00000
	A	0.00203	0.00196	0.00192
	OE	0.00000	0.00000	0.00000
	OE	0.00172	0.00157	0.00148

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	-0.00039	-0.00040	-0.00045
	OE	0.00000	0.00000	0.00000
	OE	0.00187	0.00167	0.00155
sky130_osu_sc_15T_ms__tbufi_l	A	0.00000	0.00000	0.00000
	A	-0.00022	-0.00022	-0.00026
	OE	0.00000	0.00000	0.00000
	OE	0.00127	0.00111	0.00102

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)	-0.00152	-0.00153	-0.00151
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	-0.00144	-0.00147	-0.00145
sky130_osu_sc_15T_ms__tbufi_l	(!OE * Y)	0.00000	0.00000	0.00000
	(!OE * Y)	-0.00107	-0.00107	-0.00106
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	-0.00101	-0.00103	-0.00102

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)	0.00152	0.00153	0.00151
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	0.00148	0.00149	0.00147
sky130_osu_sc_15T_ms__tbufi_l	(!OE * Y)	0.00000	0.00000	0.00000
	(!OE * Y)	0.00107	0.00107	0.00106
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	0.00103	0.00104	0.00103

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)	0.00102	0.00082	0.00069
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00092	0.00072	0.00060
sky130_osu_sc_15T_ms__tbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00068	0.00053	0.00044
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00061	0.00046	0.00036

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)	0.00319	0.00297	0.00289
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00329	0.00308	0.00298
sky130_osu_sc_15T_ms__tbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00248	0.00230	0.00224
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00255	0.00239	0.00230

SKY130_OSU_SC_15T_MS__TNBUFIx

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__tnbufi_1	10.37850
sky130_osu_sc_15T_ms__tnbufi_l	10.37850

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	OE	Y
sky130_osu_sc_15T_ms__tnbufi_1	0.00386	0.00582	0.12290
sky130_osu_sc_15T_ms__tnbufi_l	0.00290	0.00415	0.07846

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__tnbufi_1	0.00000	0.00006	0.00007
sky130_osu_sc_15T_ms__tnbufi_l	0.00000	0.00006	0.00007

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)	0.32692	2.07902	13.64440
	OE->Y (RR)	0.05611	0.45945	3.77759
	OE->Y (FR)	0.34844	2.18747	14.25640
sky130_osu_sc_15T_ms__tnbufi_l	A->Y (FR)	0.43603	2.38458	13.82180
	OE->Y (RR)	0.06460	0.50193	3.77839
	OE->Y (FR)	0.43643	2.48913	14.26640

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)	0.07764	0.79806	6.89357
	OE->Y (RF)	0.05585	0.45780	3.77756
	OE->Y (FF)	0.24036	1.06158	7.40245
sky130_osu_sc_15T_ms__tnbufi_l	A->Y (RF)	0.10685	0.90986	7.26206
	OE->Y (RF)	0.06416	0.49939	3.77829
	OE->Y (FF)	0.31381	1.20359	7.74965

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	0.00286	0.00275	0.00272
	OE	0.00000	0.00000	0.00000
	OE	0.00649	0.00632	0.00628
sky130_osu_sc_15T_ms__tnbufi_l	A	0.00000	0.00000	0.00000
	A	0.00212	0.00205	0.00201
	OE	0.00000	0.00000	0.00000
	OE	0.00467	0.00453	0.00450

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	-0.00050	-0.00050	-0.00056
	OE	0.00000	0.00000	0.00000
	OE	0.00602	0.00584	0.00579
sky130_osu_sc_15T_ms__tnbufi_l	A	0.00000	0.00000	0.00000
	A	-0.00032	-0.00032	-0.00037
	OE	0.00000	0.00000	0.00000
	OE	0.00426	0.00413	0.00408

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)	-0.00131	-0.00132	-0.00131
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	-0.00124	-0.00125	-0.00124
sky130_osu_sc_15T_ms__tnbufi_l	(OE * Y)	0.00000	0.00000	0.00000
	(OE * Y)	-0.00087	-0.00087	-0.00087
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	-0.00082	-0.00083	-0.00082

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)	0.00131	0.00132	0.00131
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	0.00128	0.00128	0.00126
sky130_osu_sc_15T_ms__tnbufi_l	(OE * Y)	0.00000	0.00000	0.00000
	(OE * Y)	0.00087	0.00087	0.00087
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	0.00084	0.00084	0.00083

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)	-0.00186	-0.00212	-0.00225
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00180	-0.00206	-0.00222
sky130_osu_sc_15T_ms__tnbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	-0.00117	-0.00134	-0.00143
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00112	-0.00131	-0.00141

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)	0.00509	0.00493	0.00488
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00500	0.00483	0.00480
sky130_osu_sc_15T_ms__tnbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00363	0.00351	0.00346
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00357	0.00344	0.00340

SKY130_OSU_SC_15T_MS__XNOR2

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__xnor2_l	17.70450

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
sky130_osu_sc_15T_ms__xnor2_l	0.00763	0.00666	0.11952

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__xnor2_l	0.00000	0.00015	0.00017

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_1	A->Y (RR)	B	0.53530	2.22343	10.99210
	A->Y (FR)	!B	0.43688	2.17825	13.56930
	B->Y (RR)	A	0.45800	2.14229	10.83110
	B->Y (FR)	!A	0.48725	2.30343	14.18070

Delay(ns) to Y falling (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
sky130_osu_sc_15T_ms__xnor2_1	A->Y (FF)	B	0.37086	1.18852	7.77774
	A->Y (RF)	!B	0.11259	0.82089	6.79290
	B->Y (FF)	A	0.35966	1.17515	7.75877
	B->Y (RF)	!A	0.11953	0.82906	6.81139

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	0.00227	0.00206	0.00186
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00688	0.00654	0.00645
	B	A	0.00000	0.00000	0.00000
	B	A	0.00137	0.00117	0.00099
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00699	0.00675	0.00669

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	0.00790	0.00770	0.00753
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00179	0.00159	0.00142
	B	A	0.00000	0.00000	0.00000
	B	A	0.00737	0.00726	0.00716
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00218	0.00193	0.00173

SKY130_OSU_SC_15T_MS__XOR2

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__xor2_l	17.70450

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
sky130_osu_sc_15T_ms__xor2_l	0.00765	0.00671	0.11909

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__xor2_l	0.00000	0.00015	0.00017

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	0.56889	2.25243	10.97100
	A->Y (FR)	B	0.45187	2.25642	14.13850
	B->Y (RR)	!A	0.46949	2.15763	10.86850
	B->Y (FR)	A	0.49445	2.31563	14.20560

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	0.38084	1.19353	7.80763
	A->Y (RF)	B	0.09872	0.81879	6.87306
	B->Y (FF)	!A	0.36103	1.17680	7.76284
	B->Y (RF)	A	0.11091	0.82580	6.80874

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	0.00767	0.00738	0.00729
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00164	0.00133	0.00108
	B	A	0.00000	0.00000	0.00000
	B	A	0.00770	0.00747	0.00740
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00123	0.00105	0.00086

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	0.00145	0.00118	0.00095
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00836	0.00820	0.00812
	B	A	0.00000	0.00000	0.00000
	B	A	0.00145	0.00119	0.00099
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00755	0.00743	0.00735

SKY130_OSU_SC_15T_MS_x

sky130_osu_sc_15T_ms_ss_1P28_-40C.ccs
Cell Library: Process , Voltage 1.28, Temp -40.00

Truth Table

INPUT
A
x

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__ant	5.49450
sky130_osu_sc_15T_ms__tiehi	5.49450
sky130_osu_sc_15T_ms__tielo	5.49450

Pin Capacitance Information

Cell Name	Pin Cap(pf)
	A
sky130_osu_sc_15T_ms__ant	0.04245
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	22838.50000	45677.00000
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
	-0.00185	0.00129	0.03289

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
	0.39875	0.37035	0.05367