sky130_osu_sc_15T_ms_ss_1P60_-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_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.01513	0.01510	0.01177	0.88335	0.38716	0.86919
sky130_osu_sc_15T_ms__addf_l	0.01512	0.01509	0.01176	0.55816	0.38644	0.56752

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__addf_1	0.00000	0.00063	0.00072
sky130_osu_sc_15T_ms__addf_l	0.00000	0.00071	0.00078

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)	0.22834	2.01511	22.15820
	B->CO (RR)	0.21035	1.94719	21.54370
	CI->CO (RR)	0.21796	2.03131	22.55900
	CON->CO (FR)	0.05036	1.01692	12.47190
sky130_osu_sc_15T_ms__addf_1	A->CO (RR)	0.23970	1.94415	18.44060
	B->CO (RR)	0.22769	1.89154	18.20990
	CI->CO (RR)	0.22922	1.96027	18.87550
	CON->CO (FR)	0.06619	1.16804	12.79930

Delay(ns) to CO falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__addf_1	A->CO (FF)	0.47029	3.35910	35.66010
	B->CO (FF)	0.43032	3.23940	34.64390
	CI->CO (FF)	0.42456	3.28455	35.42650
	CON->CO (RF)	0.02988	0.64536	8.12264
sky130_osu_sc_15T_ms__addf_1	A->CO (FF)	0.46715	2.94271	26.61560
	B->CO (FF)	0.42793	2.84554	25.93920
	CI->CO (FF)	0.42120	2.86773	26.39560
	CON->CO (RF)	0.03481	0.69498	8.10382

Delay(ns) to CON rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__addf_1	A->CON (FR)	0.34118	1.55093	12.85070
	B->CON (FR)	0.30512	1.47908	12.55440
	CI->CON (FR)	0.29557	1.47582	12.65660
sky130_osu_sc_15T_ms__addf_l	A->CON (FR)	0.32211	1.53048	12.81820
	B->CON (FR)	0.28678	1.45965	12.52250
	CI->CON (FR)	0.27592	1.45612	12.62390

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)	0.11810	0.70154	6.63885
	B->CON (RF)	0.11128	0.69979	6.82909
	CI->CON (RF)	0.10756	0.71951	7.07764
sky130_osu_sc_15T_ms__addf_l	A->CON (RF)	0.11271	0.69574	6.62631
	B->CON (RF)	0.10626	0.69460	6.81774
	CI->CON (RF)	0.10219	0.71381	7.06568

Delay(ns) to S rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__addf_1	A->S (-R)	0.64454	3.40988	31.19800
	B->S (-R)	0.63320	3.36238	30.74930
	CI->S (-R)	0.59556	3.32905	30.92100
	CON->S (RR)	0.13311	1.00077	8.82479
sky130_osu_sc_15T_ms__addf_l	A->S (-R)	0.61554	3.08240	25.08720
	B->S (-R)	0.60508	3.04749	24.83160
	CI->S (-R)	0.56641	3.00122	24.83820
	CON->S (RR)	0.14051	1.10795	8.80701

Delay(ns) to S falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__addf_1	A->S (-F)	0.42888	1.87501	16.02910
	B->S (-F)	0.46012	1.83498	15.68150
	CI->S (-F)	0.41773	1.88499	16.43500
	CON->S (FF)	0.20105	0.89736	7.05538
sky130_osu_sc_15T_ms__addf_l	A->S (-F)	0.40595	1.69867	13.16230
	B->S (-F)	0.40600	1.62878	13.05520
	CI->S (-F)	0.39436	1.70916	13.57820
	CON->S (FF)	0.18822	0.93217	6.94178

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	0.00286	0.00274	0.00266
	B	0.00346	0.00349	0.00342
	CI	0.00363	0.00371	0.00367
sky130_osu_sc_15T_ms__addf_l	A	0.00218	0.00199	0.00189
	B	0.00279	0.00272	0.00261
	CI	0.00295	0.00296	0.00290

Internal switching power(pJ) to CO falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.01034	0.01035	0.01028
	B	0.01013	0.01025	0.01019
	CI	0.00890	0.00915	0.00911
sky130_osu_sc_15T_ms__addf_l	A	0.00970	0.00966	0.00958
	B	0.00948	0.00956	0.00949
	CI	0.00824	0.00845	0.00839

Internal switching power(pJ) to CON rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.01034	0.01033	0.01023
	B	0.01012	0.01022	0.01013
	CI	0.00889	0.00911	0.00905
sky130_osu_sc_15T_ms__addf_l	A	0.00969	0.00965	0.00955
	B	0.00947	0.00955	0.00945
	CI	0.00824	0.00844	0.00836

Internal switching power(pJ) to CON falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.00282	0.00273	0.00259
	B	0.00342	0.00342	0.00323
	CI	0.00362	0.00369	0.00358
sky130_osu_sc_15T_ms__addf_l	A	0.00215	0.00199	0.00183
	B	0.00276	0.00269	0.00245
	CI	0.00294	0.00295	0.00283

Internal switching power(pJ) to S rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.01034	0.01035	0.01030
	B	0.01013	0.01025	0.01021
	CI	0.00890	0.00915	0.00910
sky130_osu_sc_15T_ms__addf_l	A	0.00970	0.00967	0.00961
	B	0.00948	0.00956	0.00950
	CI	0.00825	0.00846	0.00837

Internal switching power(pJ) to S falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.02140	0.02155	0.02147
	B	0.01941	0.01913	0.01898
	CI	0.01725	0.01728	0.01720
sky130_osu_sc_15T_ms__addf_l	A	0.02048	0.02047	0.02040
	B	0.01852	0.01809	0.01793
	CI	0.01635	0.01628	0.01618

SKY130_OSU_SC_15T_MS__ADDHx

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00746	0.00817	0.88433	0.41354	0.89183
sky130_osu_sc_15T_ms__addh_l	0.00746	0.00818	0.57490	0.41454	0.57972

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__addh_1	0.00000	0.00056	0.00066
sky130_osu_sc_15T_ms__addh_l	0.00000	0.00066	0.00074

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)	0.16315	1.02713	8.73189
	B->CO (RR)	0.16724	1.02133	8.90617
sky130_osu_sc_15T_ms__addh_l	A->CO (RR)	0.17289	1.13651	8.72838
	B->CO (RR)	0.17700	1.13322	8.91937

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)	0.16717	0.84697	7.05218
	B->CO (FF)	0.17704	0.86126	7.11174
sky130_osu_sc_15T_ms__addh_l	A->CO (FF)	0.16190	0.82489	6.39319
	B->CO (FF)	0.17148	0.83945	6.45584

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	0.23149	0.86607	5.06251
	A->CON (FR)	!B	0.19990	1.36914	12.65380
	B->CON (RR)	A	0.23561	0.85964	5.22983
	B->CON (FR)	!A	0.23477	1.43201	12.88660
sky130_osu_sc_15T_ms__addh_l	A->CON (RR)	B	0.21229	0.84065	4.99988
	A->CON (FR)	!B	0.18126	1.35118	12.65230
	B->CON (RR)	A	0.21627	0.83652	5.15570
	B->CON (FR)	!A	0.21603	1.41389	12.88500

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	0.22780	0.90426	6.38796
	A->CON (RF)	!B	0.07252	0.68451	7.13847
	B->CON (FF)	A	0.23229	0.93083	6.59212
	B->CON (RF)	!A	0.08410	0.68324	6.98183
sky130_osu_sc_15T_ms__addh_l	A->CON (FF)	B	0.20922	0.87961	6.27622
	A->CON (RF)	!B	0.06739	0.67908	7.13935
	B->CON (FF)	A	0.21364	0.90696	6.48630
	B->CON (RF)	!A	0.07908	0.67854	6.98267

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	0.16814	1.95546	22.36350
	A->S (FR)	B	0.32480	2.15178	21.30630
	B->S (RR)	!A	0.17902	1.91322	21.71740
	B->S (FR)	A	0.33112	2.21803	22.01730
	CON->S (FR)	-	0.05314	1.03517	12.67070
sky130_osu_sc_15T_ms__addh_l	A->S (RR)	!B	0.17377	1.88077	18.87760
	A->S (FR)	B	0.31735	2.06350	17.78440
	B->S (RR)	!A	0.18495	1.84925	18.44690
	B->S (FR)	A	0.32333	2.11930	18.28910
	CON->S (FR)	-	0.06556	1.17172	12.95410

Delay(ns) to S falling (conditional):

Cell Name	Timing Arc(Dir)	When	Delay(ns)		
			First	Mid	Last
sky130_osu_sc_15T_ms__addh_1	A->S (FF)	!B	0.30472	3.03158	34.07340
	A->S (RF)	B	0.30445	1.87250	17.56110
	B->S (FF)	!A	0.33974	3.09348	34.35200
	B->S (RF)	A	0.30853	1.86514	17.70560
	CON->S (RF)	-	0.02819	0.63580	8.04482
sky130_osu_sc_15T_ms__addh_l	A->S (FF)	!B	0.29524	2.66402	26.03860
	A->S (RF)	B	0.29128	1.69272	13.43890
	B->S (FF)	!A	0.33041	2.73116	26.28860
	B->S (RF)	A	0.29545	1.68875	13.58730
	CON->S (RF)	-	0.03294	0.69230	8.15393

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	0.00462	0.00441	0.00411
	B	0.00000	0.00000	0.00000
	B	0.00429	0.00408	0.00382
sky130_osu_sc_15T_ms__addh_l	A	0.00000	0.00000	0.00000
	A	0.00397	0.00370	0.00355
	B	0.00000	0.00000	0.00000
	B	0.00364	0.00338	0.00326

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	0.00714	0.00689	0.00647
	B	0.00000	0.00000	0.00000
	B	0.00744	0.00745	0.00705
sky130_osu_sc_15T_ms__addh_l	A	0.00000	0.00000	0.00000
	A	0.00650	0.00623	0.00594
	B	0.00000	0.00000	0.00000
	B	0.00680	0.00675	0.00650

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	0.00462	0.00440	0.00428
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00631	0.00628	0.00623
	B	A	0.00000	0.00000	0.00000
	B	A	0.00428	0.00408	0.00395
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00685	0.00682	0.00667
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00397	0.00370	0.00358
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00587	0.00582	0.00577
	B	A	0.00000	0.00000	0.00000
	B	A	0.00363	0.00338	0.00320
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00642	0.00635	0.00621

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	0.00714	0.00692	0.00658
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00101	0.00101	-0.00045
	B	A	0.00000	0.00000	0.00000
	B	A	0.00744	0.00744	0.00734
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00168	0.00160	0.00126
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00650	0.00625	0.00599
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00042	0.00039	-0.00043
	B	A	0.00000	0.00000	0.00000
	B	A	0.00681	0.00676	0.00650
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00109	0.00099	0.00073

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	0.00714	0.00691	0.00671
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00102	0.00103	0.00097
	B	A	0.00000	0.00000	0.00000
	B	A	0.00744	0.00745	0.00732
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00170	0.00163	0.00154
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00651	0.00624	0.00605
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00042	0.00040	0.00034
	B	A	0.00000	0.00000	0.00000
	B	A	0.00681	0.00677	0.00667
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00110	0.00100	0.00090

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	0.00461	0.00440	0.00419
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00630	0.00632	0.00628
	B	A	0.00000	0.00000	0.00000
	B	A	0.00429	0.00408	0.00385
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00686	0.00684	0.00683
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00396	0.00370	0.00353
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00586	0.00584	0.00580
	B	A	0.00000	0.00000	0.00000
	B	A	0.00364	0.00338	0.00320
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00641	0.00637	0.00631

SKY130_OSU_SC_15T_MS__AND2x

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00399	0.00407	0.89186
sky130_osu_sc_15T_ms__and2_2	0.00399	0.00407	1.76320
sky130_osu_sc_15T_ms__and2_4	0.00399	0.00407	3.38930
sky130_osu_sc_15T_ms__and2_6	0.00402	0.00407	5.07649
sky130_osu_sc_15T_ms__and2_8	0.00399	0.00408	6.62715
sky130_osu_sc_15T_ms__and2_l	0.00297	0.00307	0.55829

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__and2_1	0.00000	0.00026	0.00037
sky130_osu_sc_15T_ms__and2_2	0.00000	0.00039	0.00043
sky130_osu_sc_15T_ms__and2_4	0.00000	0.00066	0.00073
sky130_osu_sc_15T_ms__and2_6	0.00000	0.00093	0.00105
sky130_osu_sc_15T_ms__and2_8	0.00000	0.00120	0.00137
sky130_osu_sc_15T_ms__and2_l	0.00000	0.00035	0.00053

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)	0.12474	0.95031	8.38526
	B->Y (RR)	0.13072	0.95642	8.58750
sky130_osu_sc_15T_ms__and2_2	A->Y (RR)	0.14142	0.86887	8.64901
	B->Y (RR)	0.14736	0.86562	8.83482
sky130_osu_sc_15T_ms__and2_4	A->Y (RR)	0.19580	0.86869	9.06234
	B->Y (RR)	0.20175	0.85689	9.20250
sky130_osu_sc_15T_ms__and2_6	A->Y (RR)	0.24973	0.90880	9.53467
	B->Y (RR)	0.25570	0.89303	9.61348
sky130_osu_sc_15T_ms__and2_8	A->Y (RR)	0.30277	0.95650	9.83105
	B->Y (RR)	0.30875	0.93888	9.86726
sky130_osu_sc_15T_ms__and2_l	A->Y (RR)	0.16015	1.13020	8.81836
	B->Y (RR)	0.16716	1.13039	8.99925

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)	0.12389	0.76617	6.57570
	B->Y (FF)	0.13276	0.78539	6.68399
sky130_osu_sc_15T_ms__and2_2	A->Y (FF)	0.15154	0.76358	6.88836
	B->Y (FF)	0.16067	0.77987	6.96623
sky130_osu_sc_15T_ms__and2_4	A->Y (FF)	0.22113	0.82151	7.33106
	B->Y (FF)	0.22957	0.83262	7.39888
sky130_osu_sc_15T_ms__and2_6	A->Y (FF)	0.29288	0.89614	7.73717
	B->Y (FF)	0.30066	0.90472	7.78919
sky130_osu_sc_15T_ms__and2_8	A->Y (FF)	0.36085	0.96690	7.97264
	B->Y (FF)	0.36835	0.97542	8.02438
sky130_osu_sc_15T_ms__and2_l	A->Y (FF)	0.14624	0.84836	6.70724
	B->Y (FF)	0.15803	0.86779	6.81784

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	0.00360	0.00314	0.00303
	B	0.00000	0.00000	0.00000
	B	0.00366	0.00322	0.00307
sky130_osu_sc_15T_ms__and2_2	A	0.00000	0.00000	0.00000
	A	0.00697	0.00678	0.00670
	B	0.00000	0.00000	0.00000
	B	0.00702	0.00689	0.00686
sky130_osu_sc_15T_ms__and2_4	A	0.00000	0.00000	0.00000
	A	0.01438	0.01469	0.01504
	B	0.00000	0.00000	0.00000
	B	0.01444	0.01483	0.01523
sky130_osu_sc_15T_ms__and2_6	A	0.00000	0.00000	0.00000
	A	0.02172	0.02247	0.02321
	B	0.00000	0.00000	0.00000
	B	0.02182	0.02274	0.02327
sky130_osu_sc_15T_ms__and2_8	A	0.00000	0.00000	0.00000
	A	0.02907	0.03036	0.03088
	B	0.00000	0.00000	0.00000
	B	0.02913	0.02970	0.03097
sky130_osu_sc_15T_ms__and2_l	A	0.00000	0.00000	0.00000
	A	0.00260	0.00228	0.00221
	B	0.00000	0.00000	0.00000
	B	0.00267	0.00234	0.00222

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	0.00881	0.00862	0.00861
	B	0.00000	0.00000	0.00000
	B	0.00989	0.00969	0.00967
sky130_osu_sc_15T_ms__and2_2	A	0.00000	0.00000	0.00000
	A	0.01102	0.01134	0.01136
	B	0.00000	0.00000	0.00000
	B	0.01211	0.01239	0.01236
sky130_osu_sc_15T_ms__and2_4	A	0.00000	0.00000	0.00000
	A	0.01648	0.01773	0.01800
	B	0.00000	0.00000	0.00000
	B	0.01758	0.01873	0.01891
sky130_osu_sc_15T_ms__and2_6	A	0.00000	0.00000	0.00000
	A	0.02208	0.02423	0.02483
	B	0.00000	0.00000	0.00000
	B	0.02315	0.02514	0.02563
sky130_osu_sc_15T_ms__and2_8	A	0.00000	0.00000	0.00000
	A	0.02735	0.03048	0.03143
	B	0.00000	0.00000	0.00000
	B	0.02846	0.03129	0.03211
sky130_osu_sc_15T_ms__and2_l	A	0.00000	0.00000	0.00000
	A	0.00662	0.00644	0.00637
	B	0.00000	0.00000	0.00000
	B	0.00735	0.00715	0.00708

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)	-0.00314	-0.00318	-0.00318
sky130_osu_sc_15T_ms__and2_2	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00315	-0.00318	-0.00318
sky130_osu_sc_15T_ms__and2_4	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00315	-0.00318	-0.00318
sky130_osu_sc_15T_ms__and2_6	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00317	-0.00320	-0.00320
sky130_osu_sc_15T_ms__and2_8	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00315	-0.00317	-0.00318
sky130_osu_sc_15T_ms__and2_l	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00220	-0.00221	-0.00221

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)	0.00317	0.00319	0.00319
sky130_osu_sc_15T_ms__and2_2	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00317	0.00319	0.00319
sky130_osu_sc_15T_ms__and2_4	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00317	0.00319	0.00319
sky130_osu_sc_15T_ms__and2_6	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00319	0.00321	0.00321
sky130_osu_sc_15T_ms__and2_8	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00317	0.00319	0.00319
sky130_osu_sc_15T_ms__and2_l	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00220	0.00222	0.00222

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)	-0.00300	-0.00302	-0.00300
sky130_osu_sc_15T_ms__and2_2	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00299	-0.00301	-0.00301
sky130_osu_sc_15T_ms__and2_4	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00299	-0.00301	-0.00301
sky130_osu_sc_15T_ms__and2_6	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00300	-0.00302	-0.00301
sky130_osu_sc_15T_ms__and2_8	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00299	-0.00302	-0.00301
sky130_osu_sc_15T_ms__and2_l	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00209	-0.00211	-0.00210

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)	0.00300	0.00304	0.00301
sky130_osu_sc_15T_ms__and2_2	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00300	0.00304	0.00301
sky130_osu_sc_15T_ms__and2_4	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00300	0.00302	0.00301
sky130_osu_sc_15T_ms__and2_6	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00300	0.00302	0.00301
sky130_osu_sc_15T_ms__and2_8	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00300	0.00302	0.00301
sky130_osu_sc_15T_ms__and2_l	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00210	0.00211	0.00211

SKY130_OSU_SC_15T_MS__AOI21

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00371	0.00390	0.00378	0.38813

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__aoi21_l	0.00000	0.00014	0.00016

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)	0.17642	1.40726	12.85120
	A1->Y (FR)	0.14758	1.33817	12.54300
	B0->Y (FR)	0.13750	1.33803	12.67560

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)	0.06029	0.62969	6.45112
	A1->Y (RF)	0.05473	0.64371	6.77326
	B0->Y (RF)	0.04075	0.64111	7.06984

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	0.00723	0.00714	0.00667
	A1	0.00000	0.00000	0.00000
	A1	0.00610	0.00597	0.00593
	B0	0.00600	0.00586	0.00581

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	0.00109	0.00087	0.00074
	A1	0.00000	0.00000	0.00000
	A1	0.00110	0.00084	0.00073
	B0	-0.00071	-0.00073	-0.00084

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)	-0.00263	-0.00272	-0.00271
	(!A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !Y)	-0.00278	-0.00279	-0.00278
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00278	-0.00279	-0.00278

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)	0.00270	0.00272	0.00271
	(!A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !Y)	0.00278	0.00280	0.00279
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00278	0.00280	0.00279

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)	-0.00259	-0.00267	-0.00267
	(!A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !Y)	-0.00273	-0.00274	-0.00273
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00295	-0.00299	-0.00298

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)	0.00265	0.00267	0.00267
	(!A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !Y)	0.00273	0.00276	0.00274
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00298	0.00300	0.00299

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)	-0.00158	-0.00160	-0.00159

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)	0.00171	0.00172	0.00163

SKY130_OSU_SC_15T_MS__AOI22

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__aoi22_1	12.82050

Pin Capacitance Information

Cell Name	Pin Cap(pf)				Max Cap(pf)
	A0	A1	B0	B1	Y
sky130_osu_sc_15T_ms__aoi22_1	0.00370	0.00387	0.00405	0.00383	0.39187

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__aoi22_1	0.00000	0.00019	0.00032

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)	0.21962	1.44828	12.85870
	A1->Y (FR)	0.19451	1.41061	12.77180
	B0->Y (FR)	0.14189	1.32329	12.55210
	B1->Y (FR)	0.16675	1.36204	12.67650

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)	0.07687	0.64946	6.49955
	A1->Y (RF)	0.07122	0.66370	6.82402
	B0->Y (RF)	0.04543	0.63251	6.78408
	B1->Y (RF)	0.05077	0.61751	6.46147

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	0.00889	0.00878	0.00832
	A1	0.00779	0.00763	0.00757
	B0	0.00644	0.00623	0.00617
	B1	0.00750	0.00733	0.00729

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi22_l	A0	0.00250	0.00229	0.00212
	A1	0.00252	0.00230	0.00212
	B0	-0.00048	-0.00050	-0.00060
	B1	-0.00046	-0.00046	-0.00057

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)	-0.00263	-0.00271	-0.00271
	(!A1 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * B1 * !Y)	-0.00277	-0.00279	-0.00278
	(!A1 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !B1 * Y)	-0.00277	-0.00279	-0.00278
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00277	-0.00279	-0.00278

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)	0.00270	0.00271	0.00271
	(!A1 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * B1 * !Y)	0.00278	0.00280	0.00279
	(!A1 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !B1 * Y)	0.00278	0.00280	0.00279
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00278	0.00280	0.00279

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)	-0.00259	-0.00268	-0.00267
	(!A0 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * B1 * !Y)	-0.00272	-0.00273	-0.00273
	(!A0 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !B1 * Y)	-0.00294	-0.00298	-0.00297
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00294	-0.00298	-0.00297

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)	0.00265	0.00268	0.00267
	(!A0 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * B1 * !Y)	0.00273	0.00275	0.00274
	(!A0 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !B1 * Y)	0.00297	0.00299	0.00298
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00297	0.00299	0.00298

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)	-0.00159	-0.00161	-0.00160
	(A0 * A1 * !B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B1 * !Y)	-0.00159	-0.00161	-0.00160
	(!A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B1 * Y)	-0.00305	-0.00307	-0.00308
	(!A0 * A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B1 * Y)	-0.00305	-0.00307	-0.00308

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)	0.00177	0.00177	0.00164
	(A0 * A1 * !B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B1 * !Y)	0.00159	0.00161	0.00160
	(!A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B1 * Y)	0.00308	0.00311	0.00309
	(!A0 * A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B1 * Y)	0.00308	0.00312	0.00309

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)	-0.00160	-0.00161	-0.00161
	(A0 * A1 * !B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B0 * !Y)	-0.00160	-0.00161	-0.00161
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00283	-0.00284	-0.00284
	(!A0 * A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B0 * Y)	-0.00283	-0.00284	-0.00284

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)	0.00178	0.00179	0.00165
	(A0 * A1 * !B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B0 * !Y)	0.00160	0.00161	0.00161
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00283	0.00287	0.00284
	(!A0 * A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B0 * Y)	0.00283	0.00287	0.00284

SKY130_OSU_SC_15T_MS__BUFx

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00408	0.87832
sky130_osu_sc_15T_ms__buf_2	0.00412	1.75883
sky130_osu_sc_15T_ms__buf_4	0.00412	3.39649
sky130_osu_sc_15T_ms__buf_6	0.00092	1.80000
sky130_osu_sc_15T_ms__buf_8	0.00412	6.63132
sky130_osu_sc_15T_ms__buf_l	0.00311	0.56264

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__buf_1	0.00000	0.00021	0.00021
sky130_osu_sc_15T_ms__buf_2	0.00000	0.00032	0.00037
sky130_osu_sc_15T_ms__buf_4	0.00000	0.00053	0.00070
sky130_osu_sc_15T_ms__buf_6	0.00000	0.00000	0.00000
sky130_osu_sc_15T_ms__buf_8	0.00000	0.00096	0.00134
sky130_osu_sc_15T_ms__buf_l	0.00000	0.00029	0.00029

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)**	0.09335	0.90794	8.29359
sky130_osu_sc_15T_ms__buf_2	**A->Y (RR)**	0.10273	0.81681	8.59105
sky130_osu_sc_15T_ms__buf_4	**A->Y (RR)**	0.13834	0.79736	8.95875
sky130_osu_sc_15T_ms__buf_8	**A->Y (RR)**	0.20909	0.84505	9.56253
sky130_osu_sc_15T_ms__buf_l	**A->Y (RR)**	0.11649	1.07615	8.74715

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)**	0.11777	0.75464	6.47404
sky130_osu_sc_15T_ms__buf_2	**A->Y (FF)**	0.14734	0.76780	7.00395
sky130_osu_sc_15T_ms__buf_4	**A->Y (FF)**	0.21796	0.82904	7.53453
sky130_osu_sc_15T_ms__buf_8	**A->Y (FF)**	0.35835	0.97310	8.20645
sky130_osu_sc_15T_ms__buf_l	**A->Y (FF)**	0.14161	0.83989	6.67691

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	0.00342	0.00288	0.00275
sky130_osu_sc_15T_ms__buf_2	A	0.00000	0.00000	0.00000
	A	0.00678	0.00640	0.00625
sky130_osu_sc_15T_ms__buf_4	A	0.00000	0.00000	0.00000
	A	0.01426	0.01435	0.01458
sky130_osu_sc_15T_ms__buf_8	A	0.00000	0.00000	0.00000
	A	0.02898	0.02993	0.03073
sky130_osu_sc_15T_ms__buf_l	A	0.00000	0.00000	0.00000
	A	0.00257	0.00214	0.00202

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	0.00859	0.00835	0.00835
sky130_osu_sc_15T_ms__buf_2	A	0.00000	0.00000	0.00000
	A	0.01084	0.01103	0.01103
sky130_osu_sc_15T_ms__buf_4	A	0.00000	0.00000	0.00000
	A	0.01637	0.01742	0.01764
sky130_osu_sc_15T_ms__buf_8	A	0.00000	0.00000	0.00000
	A	0.02733	0.03014	0.03093
sky130_osu_sc_15T_ms__buf_l	A	0.00000	0.00000	0.00000
	A	0.00653	0.00627	0.00621

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
	-0.00056	-0.00057	-0.00057

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
	0.00056	0.00057	0.00057

SKY130_OSU_SC_15T_MS__DFFRx

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00382	0.00385	0.01162	0.84091	0.83475
sky130_osu_sc_15T_ms__dffr_l	0.00382	0.00385	0.01159	0.55994	0.56382

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__dffr_1	0.00000	0.00111	0.00122
sky130_osu_sc_15T_ms__dffr_l	0.00000	0.00118	0.00129

Delay Information

Delay(ns) to Q rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffr_1	CK->Q (RR)	0.65583	2.02476	14.69960
	QN->Q (FR)	0.06050	1.14137	13.76200
sky130_osu_sc_15T_ms__dffr_l	CK->Q (RR)	0.65217	2.21718	14.97190
	QN->Q (FR)	0.07131	1.23453	13.59350

Delay(ns) to Q falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffr_1	CK->Q (RF)	0.58968	2.15302	17.56270
	QN->Q (RF)	0.03370	0.70321	8.76021
	RN->Q (FF)	0.41650	2.11995	19.41540
sky130_osu_sc_15T_ms__dffr_l	CK->Q (RF)	0.61254	2.41326	17.77530
	QN->Q (RF)	0.03746	0.74461	8.65932
	RN->Q (FF)	0.44010	2.38277	19.62120

Delay(ns) to QN rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffr_1	CK->QN (RR)	0.52203	1.37046	8.97575
	RN->QN (FR)	0.34784	1.33754	10.83500
sky130_osu_sc_15T_ms__dffr_l	CK->QN (RR)	0.52987	1.48852	9.14506
	RN->QN (FR)	0.35638	1.45617	10.99650

Delay(ns) to QN falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffr_1	**CK->QN (RF)**	0.56079	1.13074	5.00090
sky130_osu_sc_15T_ms__dffr_l	**CK->QN (RF)**	0.54006	1.13871	4.97054

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)	-0.09458	-0.12322	-0.66833
	setup	CK (R)	0.50754	0.50457	1.57413
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.09509	-0.12305	-0.66961
	setup	CK (R)	0.50806	0.50359	1.59295

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)	-0.26441	-0.62357	-7.30585
	setup	CK (R)	0.31056	0.64601	7.35733
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.26593	-0.62297	-7.30752
	setup	CK (R)	0.31056	0.64601	7.35716

Constraints(ns) for D rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffr_1	hold	CK (R)	-0.09458	-0.12322	-0.66833
	setup	CK (R)	0.50754	0.50457	1.57413
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.09509	-0.12305	-0.66961
	setup	CK (R)	0.50806	0.50359	1.59295

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)	-0.26441	-0.62357	-7.30585
	setup	CK (R)	0.31056	0.64601	7.35733
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.26593	-0.62297	-7.30752
	setup	CK (R)	0.31056	0.64601	7.35716

Constraints(ns) for RN rising :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffr_1	recovery	CK (R)	0.45746	0.45969	1.34032
	removal	CK (R)	-0.08994	-0.10763	-0.13330
sky130_osu_sc_15T_ms__dffr_l	recovery	CK (R)	0.45781	0.45961	1.34498
	removal	CK (R)	-0.09064	-0.10763	-0.13330

Constraints(ns) for RN rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffr_1	recovery	CK (R)	0.45746	0.45969	1.34032
	removal	CK (R)	-0.08994	-0.10763	-0.13330
sky130_osu_sc_15T_ms__dffr_l	recovery	CK (R)	0.45781	0.45961	1.34498
	removal	CK (R)	-0.09064	-0.10763	-0.13330

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 ()	0.25876	0.58140	13.33370
	min_pulse_width	RN ()	0.25657	0.58140	13.33370
sky130_osu_sc_15T_ms__dffr_l	min_pulse_width	RN ()	0.25783	0.57920	13.33370
	min_pulse_width	RN ()	0.25564	0.57920	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 ()	0.29105	0.50903	13.33370
	min_pulse_width	CK ()	0.32929	0.50903	13.33370
sky130_osu_sc_15T_ms__dffr_l	min_pulse_width	CK ()	0.26428	0.50903	13.33370
	min_pulse_width	CK ()	0.32165	0.50903	13.33370

Constraints(ns) for CK falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffr_1	min_pulse_width	CK ()	0.64667	0.69981	13.33370
	min_pulse_width	CK ()	0.25575	0.55947	13.33370
sky130_osu_sc_15T_ms__dffr_l	min_pulse_width	CK ()	0.64464	0.69762	13.33370
	min_pulse_width	CK ()	0.25479	0.55728	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	0.00831	0.00700	-0.00253
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00726	0.00623	0.00149

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	0.00957	0.00869	0.00253
	RN	-0.00118	-0.04648	-0.53818
	RN	0.02176	0.02105	0.01452
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00848	0.00780	0.00479
	RN	-0.00118	-0.03642	-0.35836
	RN	0.02066	0.02014	0.01683

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	0.00957	0.00870	0.00257
	RN	-0.00118	-0.04628	-0.53424
	RN	0.02177	0.02106	0.01462
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00848	0.00781	0.00479
	RN	-0.00118	-0.03657	-0.36085
	RN	0.02067	0.02014	0.01681

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	0.00829	0.00698	-0.00257
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00722	0.00620	0.00147

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	-0.00254	-0.00270	-0.00270
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00967	0.00919	0.00890
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00401	0.00361	0.00336
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	-0.00254	-0.00270	-0.00270
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00967	0.00919	0.00890
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00401	0.00361	0.00336

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	0.00268	0.00270	0.00270
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.01621	0.01594	0.01571
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00770	0.00748	0.00742
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00268	0.00270	0.00270
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.01621	0.01594	0.01571
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00770	0.00748	0.00742

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)	0.00318	0.00264	0.00247
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.00926	0.00850	0.00814
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)	0.00318	0.00264	0.00247
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.00925	0.00850	0.00814

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)	0.00801	0.00767	0.00766
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.01658	0.01606	0.01569
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)	0.00801	0.00767	0.00766
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.01658	0.01606	0.01568

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)	-0.00062	-0.00125	-0.00151
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.00474	0.00371	0.00307
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00091	-0.00153	-0.00181
sky130_osu_sc_15T_ms__dffr_l	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	-0.00062	-0.00125	-0.00151
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.00474	0.00371	0.00307
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00091	-0.00152	-0.00181

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)	0.01305	0.01266	0.01246
	(D * RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * RN * !Q * QN)	0.02587	0.02506	0.02423
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.01976	0.01925	0.01862
	(!D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * Q * !QN)	0.02604	0.02520	0.02479
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01405	0.01363	0.01356
sky130_osu_sc_15T_ms__dffr_l	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.01305	0.01266	0.01246
	(D * RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * RN * !Q * QN)	0.02587	0.02505	0.02423
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.01976	0.01925	0.01862
	(!D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * Q * !QN)	0.02604	0.02520	0.02479
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01405	0.01363	0.01356

SKY130_OSU_SC_15T_MS__DFFSRx

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00377	0.00386	0.00843	0.01188	0.88402	0.89366
sky130_osu_sc_15T_ms__dffsr_l	0.00377	0.00386	0.00841	0.01188	0.55938	0.56535

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__dffsr_1	0.00000	0.00105	0.00128
sky130_osu_sc_15T_ms__dffsr_l	0.00000	0.00112	0.00135

Delay Information

Delay(ns) to Q rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffsr_1	CK->Q (RR)	0.62409	1.99147	14.97100
	QN->Q (FR)	0.05402	1.07184	13.12300
	RN->Q (RR)	0.51059	1.89236	15.02880
	SN->Q (FR)	0.48871	1.98457	17.61680
sky130_osu_sc_15T_ms__dffsr_l	CK->Q (RR)	0.63854	2.20970	15.05680
	QN->Q (FR)	0.07130	1.23244	13.57000
	RN->Q (RR)	0.52615	2.11094	15.10530
	SN->Q (FR)	0.50261	2.20475	17.66640

Delay(ns) to Q falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffsr_1	CK->Q (RF)	0.64122	2.19127	17.67750
	QN->Q (RF)	0.03342	0.71349	8.96164
	RN->Q (FF)	0.44101	2.12815	19.59950
sky130_osu_sc_15T_ms__dffsr_l	CK->Q (RF)	0.67461	2.48293	17.82200
	QN->Q (RF)	0.03738	0.74380	8.65101
	RN->Q (FF)	0.47488	2.41833	19.73450

Delay(ns) to QN rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffsr_1	CK->QN (RR)	0.57482	1.41631	9.04337
	RN->QN (FR)	0.37504	1.35257	10.96670
sky130_osu_sc_15T_ms__dffsr_l	CK->QN (RR)	0.59068	1.55821	9.23381
	RN->QN (FR)	0.39093	1.49446	11.14960

Delay(ns) to QN falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffsr_1	CK->QN (RF)	0.53804	1.12087	5.30182
	RN->QN (RF)	0.42441	1.02339	5.35956
	SN->QN (FF)	0.40273	1.11602	7.93304
sky130_osu_sc_15T_ms__dffsr_l	CK->QN (RF)	0.53075	1.13499	5.07361
	RN->QN (RF)	0.41741	1.03839	5.12889
	SN->QN (FF)	0.39505	1.13193	7.67569

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)	-0.10384	-0.13198	-0.76096
	setup	CK (R)	0.46980	0.46261	1.53233
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.10431	-0.13300	-0.76056
	setup	CK (R)	0.47042	0.46205	1.53031

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)	-0.29741	-0.64972	-7.48290
	setup	CK (R)	0.35224	0.66875	7.51667
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.30011	-0.64997	-7.48016
	setup	CK (R)	0.35145	0.66875	7.51615

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)	-0.10384	-0.13198	-0.76096
	setup	CK (R)	0.46980	0.46261	1.53233
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.10431	-0.13300	-0.76056
	setup	CK (R)	0.47042	0.46205	1.53031

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)	-0.29741	-0.64972	-7.48290
	setup	CK (R)	0.35224	0.66875	7.51667
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.30011	-0.64997	-7.48016
	setup	CK (R)	0.35145	0.66875	7.51615

Constraints(ns) for RN rising :

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	recovery	CK (R)	0.38783	0.38499	1.27330
	removal	CK (R)	-0.04764	-0.05391	-0.10167
	hold	SN (R)	-0.39935	-0.65627	-5.56731
	setup	SN (R)	0.42140	0.70225	7.07194
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.38585	0.38351	1.27100
	removal	CK (R)	-0.04599	-0.05530	-0.09974
	hold	SN (R)	-0.38184	-0.64284	-5.50726
	setup	SN (R)	0.42340	0.69118	7.00360

Constraints(ns) for RN rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	recovery	CK (R)	0.38783	0.38499	1.27330
	removal	CK (R)	-0.04764	-0.05391	-0.10167
	hold	SN (R)	-0.40389	-0.65627	-5.56731
	hold	SN (R)	-0.39935	-0.65726	-5.57982
	setup	SN (R)	0.42140	0.70074	7.03816
	setup	SN (R)	0.42048	0.70225	7.07194
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.38585	0.38351	1.27100
	removal	CK (R)	-0.04599	-0.05530	-0.09974
	hold	SN (R)	-0.39830	-0.64464	-5.50726
	hold	SN (R)	-0.38184	-0.64284	-5.52261
	setup	SN (R)	0.42340	0.68741	6.93544
	setup	SN (R)	0.39952	0.69118	7.00360

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 ()	0.29294	0.60771	13.33370
	min_pulse_width	RN ()	0.30443	0.60771	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	RN ()	0.30108	0.60552	13.33370
	min_pulse_width	RN ()	0.29879	0.60552	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)	0.05681	0.08773	1.39953
	removal	CK (R)	-0.01628	-0.05576	-0.57503
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.05654	0.08704	1.28000
	removal	CK (R)	-0.01628	-0.05576	-0.57397

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)	0.05681	0.08773	1.39953
	removal	CK (R)	-0.01628	-0.05576	-0.57503
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.05654	0.08704	1.28000
	removal	CK (R)	-0.01628	-0.05576	-0.57397

Constraints(ns) for SN falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	min_pulse_width	SN ()	0.39688	0.71955	13.33370
	min_pulse_width	SN ()	0.39688	0.71955	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	SN ()	0.39516	0.70639	13.33370
	min_pulse_width	SN ()	0.37709	0.71297	13.33370

Constraints(ns) for CK rising (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	min_pulse_width	CK ()	0.26428	0.50903	13.33370
	min_pulse_width	CK ()	0.34077	0.50903	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	CK ()	0.25281	0.50903	13.33370
	min_pulse_width	CK ()	0.33312	0.50903	13.33370

Constraints(ns) for CK falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffsr_1	min_pulse_width	CK ()	0.61278	0.66034	13.33370
	min_pulse_width	CK ()	0.29931	0.58798	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	CK ()	0.60872	0.65595	13.33370
	min_pulse_width	CK ()	0.29931	0.58798	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	0.01022	0.00885	-0.00244
	RN	0.01929	0.01819	0.00674
	SN	-0.00118	-0.04790	-0.56578
	SN	0.02096	0.01994	0.00880
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00926	0.00827	0.00363
	RN	0.01831	0.01760	0.01289
	SN	-0.00118	-0.03640	-0.35801
	SN	0.01998	0.01936	0.01460

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	0.01090	0.01034	0.00660
	RN	-0.00118	-0.04790	-0.56578
	RN	0.02273	0.02221	0.01818
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00990	0.00929	0.00635
	RN	-0.00118	-0.03640	-0.35801
	RN	0.02170	0.02114	0.01786

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	0.01090	0.01035	0.00656
	RN	-0.00118	-0.04821	-0.57194
	RN	0.02273	0.02221	0.01808
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00991	0.00930	0.00633
	RN	-0.00118	-0.03663	-0.36183
	RN	0.02170	0.02114	0.01783

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	0.01018	0.00881	-0.00272
	RN	0.01926	0.01816	0.00658
	SN	-0.00118	-0.04821	-0.57191
	SN	0.02092	0.01991	0.00847
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00922	0.00823	0.00347
	RN	0.01828	0.01756	0.01256
	SN	-0.00118	-0.03663	-0.36180
	SN	0.01995	0.01933	0.01454

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	-0.00261	-0.00271	-0.00270
	(!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)	0.01251	0.01208	0.01179
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00465	0.00425	0.00402
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00463	0.00425	0.00401
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00469	0.00429	0.00406
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	-0.00261	-0.00271	-0.00270
	(!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)	0.01251	0.01208	0.01179
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00465	0.00425	0.00402
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00463	0.00425	0.00401
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00469	0.00429	0.00406

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	0.00268	0.00271	0.00270
	(!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)	0.01849	0.01825	0.01788
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00832	0.00812	0.00805
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00834	0.00815	0.00807
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00828	0.00807	0.00800
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00268	0.00271	0.00270
	(!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)	0.01848	0.01824	0.01787
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00831	0.00811	0.00804
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00833	0.00814	0.00806
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00827	0.00806	0.00799

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)	0.00327	0.00274	0.00246
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.01156	0.01081	0.01036
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)	0.00327	0.00274	0.00246
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.01156	0.01081	0.01036

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)	0.00878	0.00841	0.00842
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.01768	0.01707	0.01664
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)	0.00877	0.00840	0.00841
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.01767	0.01706	0.01662

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)	-0.00625	-0.00631	-0.00630
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	-0.00657	-0.00669	-0.00666
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	-0.00630	-0.00637	-0.00634
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.00352	0.00305	0.00268
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)	-0.00625	-0.00631	-0.00630
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	-0.00655	-0.00667	-0.00664
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	-0.00629	-0.00637	-0.00633
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.00353	0.00306	0.00269

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)	0.00630	0.00635	0.00632
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00662	0.00671	0.00666
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	0.00631	0.00637	0.00634
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.01339	0.01307	0.01303
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)	0.00630	0.00635	0.00632
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00661	0.00670	0.00664
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	0.00630	0.00637	0.00634
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.01338	0.01306	0.01303

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)	-0.00063	-0.00125	-0.00151
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.00553	0.00456	0.00390
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.00548	0.00451	0.00383
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	-0.00075	-0.00139	-0.00164
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.00376	0.00262	0.00213
sky130_osu_sc_15T_ms__dffsr_l	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	-0.00063	-0.00125	-0.00151
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.00552	0.00455	0.00389
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.00547	0.00451	0.00382
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	-0.00075	-0.00139	-0.00164
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.00376	0.00262	0.00213

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)	0.02889	0.02812	0.02725
	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.01309	0.01270	0.01253
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.02021	0.01961	0.01910
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.02024	0.01977	0.01917
	(!D * RN * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * Q * !QN)	0.02824	0.02734	0.02682
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.01393	0.01350	0.01343
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.01716	0.01637	0.01621
sky130_osu_sc_15T_ms__dffsr_l	**(D * RN * SN * !Q * QN)**	0.00000	0.00000	0.00000
	(D * RN * SN * !Q * QN)	0.02889	0.02812	0.02725
	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.01309	0.01270	0.01253
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.02021	0.01961	0.01909
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.02024	0.01977	0.01917
	(!D * RN * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * Q * !QN)	0.02823	0.02734	0.02682
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.01393	0.01350	0.01343
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.01715	0.01636	0.01620

SKY130_OSU_SC_15T_MS__DFFSx

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00380	0.00667	0.01166	0.83817	0.83989
sky130_osu_sc_15T_ms__dffs_l	0.00380	0.00667	0.01166	0.56118	0.56686

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__dffs_1	0.00000	0.00110	0.00158
sky130_osu_sc_15T_ms__dffs_l	0.00000	0.00118	0.00166

Delay Information

Delay(ns) to Q rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffs_1	CK->Q (RR)	0.44367	1.77688	14.41340
	QN->Q (FR)	0.06057	1.13678	13.68800
	SN->Q (FR)	0.36952	1.86639	17.05870
sky130_osu_sc_15T_ms__dffs_l	CK->Q (RR)	0.45352	1.99392	14.78390
	QN->Q (FR)	0.07134	1.24173	13.57730
	SN->Q (FR)	0.37900	2.08489	17.38940

Delay(ns) to Q falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffs_1	CK->Q (RF)	0.66492	2.22835	17.54910
	QN->Q (RF)	0.03351	0.70002	8.72451
sky130_osu_sc_15T_ms__dffs_l	CK->Q (RF)	0.68331	2.48816	17.85200
	QN->Q (RF)	0.03728	0.74302	8.64964

Delay(ns) to QN rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dffs_1	CK->QN (RR)	0.59392	1.45045	9.07630
sky130_osu_sc_15T_ms__dffs_l	CK->QN (RR)	0.59784	1.56293	9.24457

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)	0.36129	0.89622	4.80124
	SN->QN (FF)	0.28576	0.98761	7.44545
sky130_osu_sc_15T_ms__dffs_l	CK->QN (RF)	0.35348	0.92255	4.78924
	SN->QN (FF)	0.27723	1.01449	7.38899

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)	-0.07619	-0.10338	-0.63875
	setup	CK (R)	0.32011	0.32220	1.47276
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.07293	-0.10349	-0.63513
	setup	CK (R)	0.31790	0.32073	1.47329

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)	-0.27259	-0.62695	-7.35843
	setup	CK (R)	0.35705	0.65202	7.41993
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.27633	-0.62960	-7.35764
	setup	CK (R)	0.35644	0.65191	7.41973

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)	-0.07619	-0.10338	-0.63875
	setup	CK (R)	0.32011	0.32220	1.47276
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.07293	-0.10349	-0.63513
	setup	CK (R)	0.31790	0.32073	1.47329

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)	-0.27259	-0.62695	-7.35843
	setup	CK (R)	0.35705	0.65202	7.41993
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.27633	-0.62960	-7.35764
	setup	CK (R)	0.35644	0.65191	7.41973

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)	0.08845	0.12804	1.40595
	removal	CK (R)	-0.03364	-0.08905	-0.96592
sky130_osu_sc_15T_ms__dffs_l	recovery	CK (R)	0.08983	0.12779	1.33384
	removal	CK (R)	-0.03364	-0.08905	-0.96592

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)	0.08845	0.12804	1.40595
	removal	CK (R)	-0.03364	-0.08905	-0.96592
sky130_osu_sc_15T_ms__dffs_l	recovery	CK (R)	0.08983	0.12779	1.33384
	removal	CK (R)	-0.03364	-0.08905	-0.96592

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 ()	0.26449	0.68665	13.33370
	min_pulse_width	SN ()	0.26888	0.68446	13.33370
sky130_osu_sc_15T_ms__dffs_l	min_pulse_width	SN ()	0.25885	0.67130	13.33370
	min_pulse_width	SN ()	0.25455	0.67350	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 ()	0.16868	0.50903	13.33370
	min_pulse_width	CK ()	0.34841	0.50903	13.33370
sky130_osu_sc_15T_ms__dffs_l	min_pulse_width	CK ()	0.15720	0.50903	13.33370
	min_pulse_width	CK ()	0.34077	0.50903	13.33370

Constraints(ns) for CK falling (conditional):

Cell Name	Timing Check	Ref Pin(trans)	Reference Slew Rate(ns)		
			first	mid	last
sky130_osu_sc_15T_ms__dffs_1	min_pulse_width	CK ()	0.45769	0.57482	13.33370
	min_pulse_width	CK ()	0.30789	0.57043	13.33370
sky130_osu_sc_15T_ms__dffs_l	min_pulse_width	CK ()	0.45552	0.57482	13.33370
	min_pulse_width	CK ()	0.30574	0.57043	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	0.00831	0.00691	-0.00267
	SN	-0.00118	-0.04639	-0.53643
	SN	0.01792	0.01683	0.00646
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00723	0.00617	0.00163
	SN	-0.00118	-0.03647	-0.35915
	SN	0.01682	0.01607	0.01100

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	0.00952	0.00871	0.00267
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00844	0.00780	0.00486

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	0.00952	0.00871	0.00269
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00844	0.00781	0.00485

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	0.00828	0.00690	-0.00269
	SN	-0.00118	-0.04645	-0.53750
	SN	0.01790	0.01680	0.00625
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00720	0.00613	0.00145
	SN	-0.00118	-0.03669	-0.36276
	SN	0.01680	0.01604	0.01109

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	-0.00266	-0.00275	-0.00274
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00949	0.00902	0.00863
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00392	0.00351	0.00328
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	-0.00266	-0.00275	-0.00274
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00949	0.00902	0.00863
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00392	0.00351	0.00328

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	0.00273	0.00275	0.00274
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.01613	0.01584	0.01561
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00789	0.00769	0.00762
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00273	0.00275	0.00274
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.01613	0.01584	0.01561
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00789	0.00769	0.00762

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)	-0.00446	-0.00449	-0.00449
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00347	0.00306	0.00285
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)	-0.00446	-0.00449	-0.00449
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00347	0.00306	0.00287

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)	0.00447	0.00452	0.00450
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00941	0.00906	0.00892
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)	0.00447	0.00452	0.00450
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00941	0.00906	0.00892

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)	-0.00065	-0.00128	-0.00153
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	-0.00087	-0.00151	-0.00177
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.00300	0.00183	0.00137
sky130_osu_sc_15T_ms__dffs_l	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	-0.00065	-0.00128	-0.00153
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	-0.00087	-0.00151	-0.00176
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.00300	0.00183	0.00137

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)	0.02576	0.02499	0.02408
	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.01306	0.01266	0.01247
	(!D * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * SN * Q * !QN)	0.02586	0.02492	0.02449
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	0.01400	0.01358	0.01350
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.01666	0.01590	0.01570
sky130_osu_sc_15T_ms__dffs_l	(D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * SN * !Q * QN)	0.02576	0.02499	0.02408
	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.01306	0.01266	0.01247
	(!D * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * SN * Q * !QN)	0.02586	0.02492	0.02449
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	0.01400	0.01358	0.01350
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.01666	0.01590	0.01570

SKY130_OSU_SC_15T_MS__DFFx

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00396	0.01144	0.89550	0.89289
sky130_osu_sc_15T_ms__dff_l	0.00396	0.01144	0.53154	0.53134

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__dff_1	0.00000	0.00090	0.00096
sky130_osu_sc_15T_ms__dff_l	0.00000	0.00097	0.00103

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)	0.35703	1.69289	14.78170
	QN->Q (FR)	0.05362	1.07346	13.19050
sky130_osu_sc_15T_ms__dff_l	CK->Q (RR)	0.38282	1.91992	14.46260
	QN->Q (FR)	0.07836	1.30781	14.07000

Delay(ns) to Q falling :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dff_1	CK->Q (RF)	0.55301	2.10686	17.74520
	QN->Q (RF)	0.03330	0.71433	8.99217
sky130_osu_sc_15T_ms__dff_l	CK->Q (RF)	0.59584	2.41749	17.59820
	QN->Q (RF)	0.03738	0.73240	8.47647

Delay(ns) to QN rising :

Cell Name	Timing Arc(Dir)	Delay(ns)		
		First	Mid	Last
sky130_osu_sc_15T_ms__dff_1	CK->QN (RR)	0.48868	1.32292	8.92240
sky130_osu_sc_15T_ms__dff_l	CK->QN (RR)	0.51126	1.48923	9.11691

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)	0.28314	0.82029	4.95883
sky130_osu_sc_15T_ms__dff_l	CK->QN (RF)	0.28344	0.83633	4.56555

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)	-0.07122	-0.09997	-0.66749
	setup	CK (R)	0.23020	0.24154	1.44307
sky130_osu_sc_15T_ms__dff_l	hold	CK (R)	-0.07244	-0.09996	-0.66587
	setup	CK (R)	0.22803	0.23763	1.43822

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)	-0.25814	-0.63061	-7.38699
	setup	CK (R)	0.30521	0.65437	7.46025
sky130_osu_sc_15T_ms__dff_l	hold	CK (R)	-0.25889	-0.62866	-7.39092
	setup	CK (R)	0.30411	0.65586	7.45963

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 ()	0.13808	0.50903	13.33370
	min_pulse_width	CK ()	0.30635	0.50903	13.33370
sky130_osu_sc_15T_ms__dff_l	min_pulse_width	CK ()	0.13426	0.50903	13.33370
	min_pulse_width	CK ()	0.29870	0.50903	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 ()**	0.36955	0.55289	13.33370
	min_pulse_width	**CK ()**	0.24673	0.56824	13.33370
sky130_osu_sc_15T_ms__dff_l	**min_pulse_width**	**CK ()**	0.36746	0.55289	13.33370
	min_pulse_width	**CK ()**	0.24459	0.56824	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	0.00884	0.00727	-0.00373
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00788	0.00676	0.00243

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	0.00971	0.00916	0.00543
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00871	0.00794	0.00363

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	0.00971	0.00916	0.00544
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00871	0.00795	0.00364

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	0.00881	0.00725	-0.00397
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00785	0.00673	0.00235

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	-0.00254	-0.00270	-0.00269
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00903	0.00864	0.00831
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	-0.00254	-0.00270	-0.00269
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00904	0.00864	0.00832

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	0.00267	0.00270	0.00269
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.01685	0.01649	0.01620
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00267	0.00270	0.00269
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.01686	0.01649	0.01621

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)	-0.00064	-0.00127	-0.00152
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00086	-0.00150	-0.00175
sky130_osu_sc_15T_ms__dff_l	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	-0.00064	-0.00127	-0.00152
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00086	-0.00150	-0.00175

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)	0.01299	0.01259	0.01242
	(D * !Q * QN)	0.00000	0.00000	0.00000
	(D * !Q * QN)	0.02532	0.02453	0.02374
	(!D * Q * !QN)	0.00000	0.00000	0.00000
	(!D * Q * !QN)	0.02637	0.02536	0.02493
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01392	0.01346	0.01342
sky130_osu_sc_15T_ms__dff_l	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.01299	0.01260	0.01242
	(D * !Q * QN)	0.00000	0.00000	0.00000
	(D * !Q * QN)	0.02533	0.02453	0.02375
	(!D * Q * !QN)	0.00000	0.00000	0.00000
	(!D * Q * !QN)	0.02638	0.02537	0.02494
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01392	0.01346	0.01342

SKY130_OSU_SC_15T_MS__INVx

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00390	0.87946
sky130_osu_sc_15T_ms__inv_10	0.03596	8.17992
sky130_osu_sc_15T_ms__inv_2	0.00738	1.75933
sky130_osu_sc_15T_ms__inv_3	0.01098	2.54430
sky130_osu_sc_15T_ms__inv_4	0.01450	3.42052
sky130_osu_sc_15T_ms__inv_6	0.02173	5.02569
sky130_osu_sc_15T_ms__inv_8	0.02885	6.65479
sky130_osu_sc_15T_ms__inv_l	0.00287	0.53155

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__inv_1	0.00000	0.00011	0.00016
sky130_osu_sc_15T_ms__inv_10	0.00000	0.00106	0.00162
sky130_osu_sc_15T_ms__inv_2	0.00000	0.00021	0.00032
sky130_osu_sc_15T_ms__inv_3	0.00000	0.00032	0.00048
sky130_osu_sc_15T_ms__inv_4	0.00000	0.00043	0.00065
sky130_osu_sc_15T_ms__inv_6	0.00000	0.00064	0.00097
sky130_osu_sc_15T_ms__inv_8	0.00000	0.00085	0.00129
sky130_osu_sc_15T_ms__inv_l	0.00000	0.00014	0.00024

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)**	0.05219	1.02841	12.59360
sky130_osu_sc_15T_ms__inv_10	**A->Y (FR)**	0.06290	0.69599	12.48290
sky130_osu_sc_15T_ms__inv_2	**A->Y (FR)**	0.03956	0.87893	12.55210
sky130_osu_sc_15T_ms__inv_3	**A->Y (FR)**	0.04253	0.82322	12.56210
sky130_osu_sc_15T_ms__inv_4	**A->Y (FR)**	0.04209	0.78019	12.52240
sky130_osu_sc_15T_ms__inv_6	**A->Y (FR)**	0.04659	0.73410	12.46880
sky130_osu_sc_15T_ms__inv_8	**A->Y (FR)**	0.05401	0.70984	12.48390
sky130_osu_sc_15T_ms__inv_l	**A->Y (FR)**	0.07033	1.18627	12.85830

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)**	0.02949	0.64523	8.11847
sky130_osu_sc_15T_ms__inv_10	**A->Y (RF)**	0.04238	0.47456	8.15395
sky130_osu_sc_15T_ms__inv_2	**A->Y (RF)**	0.02421	0.57767	8.13653
sky130_osu_sc_15T_ms__inv_3	**A->Y (RF)**	0.02631	0.55331	8.21317
sky130_osu_sc_15T_ms__inv_4	**A->Y (RF)**	0.02611	0.52806	8.19583
sky130_osu_sc_15T_ms__inv_6	**A->Y (RF)**	0.03132	0.50162	8.18578
sky130_osu_sc_15T_ms__inv_8	**A->Y (RF)**	0.03671	0.48529	8.19592
sky130_osu_sc_15T_ms__inv_l	**A->Y (RF)**	0.03414	0.68412	7.94564

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	0.00451	0.00444	0.00445
sky130_osu_sc_15T_ms__inv_10	A	0.00000	0.00000	0.00000
	A	0.03818	0.03858	0.01772
sky130_osu_sc_15T_ms__inv_2	A	0.00000	0.00000	0.00000
	A	0.00796	0.00756	0.00351
sky130_osu_sc_15T_ms__inv_3	A	0.00000	0.00000	0.00000
	A	0.01224	0.01217	0.01234
sky130_osu_sc_15T_ms__inv_4	A	0.00000	0.00000	0.00000
	A	0.01568	0.01565	0.00572
sky130_osu_sc_15T_ms__inv_6	A	0.00000	0.00000	0.00000
	A	0.02327	0.02328	0.00973
sky130_osu_sc_15T_ms__inv_8	A	0.00000	0.00000	0.00000
	A	0.03078	0.03093	0.01392
sky130_osu_sc_15T_ms__inv_l	A	0.00000	0.00000	0.00000
	A	0.00333	0.00326	0.00321

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	-0.00085	-0.00091	-0.00094
sky130_osu_sc_15T_ms__inv_10	A	0.00000	0.00000	0.00000
	A	-0.01499	-0.01442	-0.01316
sky130_osu_sc_15T_ms__inv_2	A	0.00000	0.00000	0.00000
	A	-0.00272	-0.00277	-0.00272
sky130_osu_sc_15T_ms__inv_3	A	0.00000	0.00000	0.00000
	A	-0.00360	-0.00373	-0.00354
sky130_osu_sc_15T_ms__inv_4	A	0.00000	0.00000	0.00000
	A	-0.00562	-0.00556	-0.00533
sky130_osu_sc_15T_ms__inv_6	A	0.00000	0.00000	0.00000
	A	-0.00853	-0.00847	-0.00795
sky130_osu_sc_15T_ms__inv_8	A	0.00000	0.00000	0.00000
	A	-0.01167	-0.01167	-0.01055
sky130_osu_sc_15T_ms__inv_l	A	0.00000	0.00000	0.00000
	A	-0.00051	-0.00057	-0.00061

SKY130_OSU_SC_15T_MS__MUX2

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.51551	0.51833	0.00797	0.76748

Leakage Information

Cell Name	Leakage(nW)		
	Min.	**Avg**	**Max.**
sky130_osu_sc_15T_ms__mux2_1	0.00000	0.00034	0.00048

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)	-	0.02764	0.64616	8.11010
	A1->Y (RR)	-	0.03191	0.64973	8.12954
	S0->Y (RR)	(!A0 * A1)	0.07761	0.74802	7.17785
	S0->Y (FR)	(A0 * !A1)	0.06222	0.84548	8.88244

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)	-	0.02587	0.56763	7.02944
	A1->Y (FF)	-	0.02298	0.56303	7.00853
	S0->Y (FF)	(!A0 * A1)	0.12074	0.72949	6.29818
	S0->Y (RF)	(A0 * !A1)	0.03329	0.60724	6.89687

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	-	-0.00443	-0.00443	-0.00444
	A1	-	0.00000	0.00000	0.00000
	A1	-	-0.00303	-0.00303	-0.00303
	S0	(A0 * !A1)	0.00000	0.00000	0.00000
	S0	(A0 * !A1)	0.00589	0.00550	0.00553
	S0	(!A0 * A1)	0.00000	0.00000	0.00000
	S0	(!A0 * A1)	-0.00291	-0.00350	-0.00366

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	-	0.00443	0.00443	0.00444
	A1	-	0.00000	0.00000	0.00000
	A1	-	0.00303	0.00303	0.00303
	S0	(A0 * !A1)	0.00000	0.00000	0.00000
	S0	(A0 * !A1)	0.00084	0.00026	0.00010
	S0	(!A0 * A1)	0.00000	0.00000	0.00000
	S0	(!A0 * A1)	0.01186	0.01148	0.01145

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)	-0.00115	-0.00114	-0.00114

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)	0.00115	0.00114	0.00114

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)	-0.00137	-0.00137	-0.00137

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)	0.00137	0.00137	0.00137

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)	-0.00106	-0.00166	-0.00179
	(!A0 * !A1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !Y)	-0.00103	-0.00165	-0.00178

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)	0.00912	0.00875	0.00873
	(!A0 * !A1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !Y)	0.00862	0.00825	0.00826

SKY130_OSU_SC_15T_MS__NAND2x

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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_1	7.93650

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
sky130_osu_sc_15T_ms__nand2_1	0.00390	0.00386	0.87113
sky130_osu_sc_15T_ms__nand2_1	0.00287	0.00285	0.53062

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__nand2_1	0.00000	0.00013	0.00032
sky130_osu_sc_15T_ms__nand2_1	0.00000	0.00016	0.00047

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)	0.05460	1.02818	12.54910
	B->Y (FR)	0.06480	1.03062	12.41870
sky130_osu_sc_15T_ms__nand2_l	A->Y (FR)	0.07231	1.19417	12.87730
	B->Y (FR)	0.08507	1.20512	12.86490

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)	0.04460	0.80527	9.85956
	B->Y (RF)	0.05019	0.79509	9.56614
sky130_osu_sc_15T_ms__nand2_l	A->Y (RF)	0.05638	0.91699	9.97813
	B->Y (RF)	0.06176	0.90197	9.63790

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	0.00478	0.00471	0.00205
	B	0.00000	0.00000	0.00000
	B	0.00589	0.00578	0.00314
sky130_osu_sc_15T_ms__nand2_1	A	0.00000	0.00000	0.00000
	A	0.00348	0.00343	0.00337
	B	0.00000	0.00000	0.00000
	B	0.00423	0.00415	0.00411

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	-0.00057	-0.00065	-0.00068
	B	0.00000	0.00000	0.00000
	B	-0.00054	-0.00061	-0.00064
sky130_osu_sc_15T_ms__nand2_1	A	0.00000	0.00000	0.00000
	A	-0.00036	-0.00043	-0.00047
	B	0.00000	0.00000	0.00000
	B	-0.00034	-0.00041	-0.00044

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)	-0.00308	-0.00311	-0.00311
sky130_osu_sc_15T_ms__nand2_l	(!B * Y)	0.00000	0.00000	0.00000
	(!B * Y)	-0.00210	-0.00211	-0.00212

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)	0.00310	0.00313	0.00312
sky130_osu_sc_15T_ms__nand2_l	(!B * Y)	0.00000	0.00000	0.00000
	(!B * Y)	0.00211	0.00213	0.00213

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)	-0.00287	-0.00289	-0.00288
sky130_osu_sc_15T_ms__nand2_l	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00196	-0.00197	-0.00197

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)	0.00287	0.00290	0.00288
sky130_osu_sc_15T_ms__nand2_l	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00196	0.00198	0.00197

SKY130_OSU_SC_15T_MS__NOR2x

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00385	0.00416	0.41046
sky130_osu_sc_15T_ms__nor2_l	0.00275	0.00309	0.27128

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__nor2_1	0.00000	0.00012	0.00016
sky130_osu_sc_15T_ms__nor2_l	0.00000	0.00016	0.00024

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)	0.12996	1.32967	12.79310
	B->Y (FR)	0.10796	1.27942	12.56250
sky130_osu_sc_15T_ms__nor2_l	A->Y (FR)	0.15345	1.49772	12.87400
	B->Y (FR)	0.13658	1.45488	12.73100

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)	0.03634	0.55118	6.01029
	B->Y (RF)	0.03104	0.54198	5.99219
sky130_osu_sc_15T_ms__nor2_l	A->Y (RF)	0.04027	0.59426	6.18715
	B->Y (RF)	0.03567	0.58717	6.17234

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	0.00596	0.00581	0.00583
	B	0.00000	0.00000	0.00000
	B	0.00492	0.00477	0.00474
sky130_osu_sc_15T_ms__nor2_l	A	0.00000	0.00000	0.00000
	A	0.00417	0.00410	0.00396
	B	0.00000	0.00000	0.00000
	B	0.00358	0.00341	0.00296

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	0.00037	0.00014	0.00006
	B	0.00000	0.00000	0.00000
	B	-0.00073	-0.00076	-0.00086
sky130_osu_sc_15T_ms__nor2_l	A	0.00000	0.00000	0.00000
	A	0.00023	0.00010	0.00003
	B	0.00000	0.00000	0.00000
	B	-0.00040	-0.00044	-0.00053

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)	-0.00255	-0.00271	-0.00271
sky130_osu_sc_15T_ms__nor2_l	(B * !Y)	0.00000	0.00000	0.00000
	(B * !Y)	-0.00170	-0.00178	-0.00177

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)	0.00270	0.00271	0.00271
sky130_osu_sc_15T_ms__nor2_l	(B * !Y)	0.00000	0.00000	0.00000
	(B * !Y)	0.00177	0.00179	0.00177

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)	-0.00160	-0.00161	-0.00160
sky130_osu_sc_15T_ms__nor2_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	-0.00102	-0.00103	-0.00103

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)	0.00166	0.00167	0.00162
sky130_osu_sc_15T_ms__nor2_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00106	0.00107	0.00104

SKY130_OSU_SC_15T_MS__OAI21

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00388	0.00393	0.00329	0.40580

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__oai21_l	0.00000	0.00018	0.00040

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)	0.15156	1.33300	12.66310
	A1->Y (FR)	0.18007	1.39392	12.90260
	B0->Y (FR)	0.08601	1.06129	10.91730

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)	0.05998	0.65626	6.74357
	A1->Y (RF)	0.06733	0.65074	6.66334
	B0->Y (RF)	0.04846	0.67519	7.25381

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	0.00649	0.00632	0.00628
	A1	0.00000	0.00000	0.00000
	A1	0.00759	0.00746	0.00726
	B0	0.00506	0.00489	0.00486

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	0.00013	0.00009	-0.00001
	A1	0.00000	0.00000	0.00000
	A1	0.00125	0.00105	0.00096
	B0	0.00192	0.00183	0.00174

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)	-0.00160	-0.00164	-0.00161
	(A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * Y)	-0.00264	-0.00275	-0.00273
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00279	-0.00281	-0.00280

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)	0.00166	0.00167	0.00163
	(A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * Y)	0.00272	0.00275	0.00273
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00279	0.00281	0.00280

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)	-0.00249	-0.00265	-0.00265
	(A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * Y)	-0.00262	-0.00271	-0.00271
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00275	-0.00278	-0.00276

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)	0.00263	0.00265	0.00265
	(A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * Y)	0.00269	0.00271	0.00271
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00275	0.00278	0.00277

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)	-0.00216	-0.00218	-0.00221

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)	0.00221	0.00223	0.00222

SKY130_OSU_SC_15T_MS__OAI22

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00372	0.00398	0.00412	0.00399	0.41435

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__oai22_1	0.00000	0.00020	0.00032

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)	0.19857	1.41005	12.92510
	A1->Y (FR)	0.17506	1.35579	12.71350
	B0->Y (FR)	0.11783	1.29587	12.65690
	B1->Y (FR)	0.14342	1.35025	12.86920

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)	0.09081	0.70032	6.87091
	A1->Y (RF)	0.07579	0.68054	6.82910
	B0->Y (RF)	0.06439	0.69825	7.34273
	B1->Y (RF)	0.08032	0.71984	7.41627

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	0.00960	0.00948	0.00881
	A1	0.00846	0.00828	0.00823
	B0	0.00631	0.00615	0.00609
	B1	0.00750	0.00736	0.00680

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai22_l	A0	0.00195	0.00176	0.00163
	A1	0.00092	0.00087	0.00073
	B0	0.00092	0.00085	0.00071
	B1	0.00198	0.00175	0.00163

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)	-0.00254	-0.00271	-0.00270
	(A1 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * B1 * !Y)	-0.00254	-0.00271	-0.00270
	(A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * !B1 * Y)	-0.00262	-0.00271	-0.00271
	(!A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * !B1 * Y)	-0.00276	-0.00278	-0.00277

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)	0.00270	0.00271	0.00270
	(A1 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * B1 * !Y)	0.00270	0.00271	0.00270
	(A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * !B1 * Y)	0.00270	0.00271	0.00271
	(!A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * !B1 * Y)	0.00276	0.00278	0.00278

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)	-0.00158	-0.00160	-0.00159
	(A0 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * B1 * !Y)	-0.00158	-0.00160	-0.00159
	(A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * !B1 * Y)	-0.00260	-0.00270	-0.00268
	(!A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * !B1 * Y)	-0.00274	-0.00275	-0.00275

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)	0.00165	0.00166	0.00161
	(A0 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * B1 * !Y)	0.00165	0.00166	0.00161
	(A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * !B1 * Y)	0.00266	0.00270	0.00268
	(!A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * !B1 * Y)	0.00274	0.00276	0.00275

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)	-0.00157	-0.00159	-0.00158
	(A0 * !A1 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B1 * !Y)	-0.00157	-0.00159	-0.00158
	(!A0 * !A1 * B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B1 * Y)	-0.00292	-0.00301	-0.00300
	(!A0 * !A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B1 * Y)	-0.00298	-0.00300	-0.00306

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)	0.00164	0.00165	0.00160
	(A0 * !A1 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B1 * !Y)	0.00164	0.00165	0.00160
	(!A0 * !A1 * B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B1 * Y)	0.00300	0.00301	0.00300
	(!A0 * !A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B1 * Y)	0.00306	0.00308	0.00307

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)	-0.00250	-0.00266	-0.00265
	(A0 * !A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B0 * !Y)	-0.00250	-0.00266	-0.00265
	(!A0 * !A1 * B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B0 * Y)	-0.00299	-0.00309	-0.00308
	(!A0 * !A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B0 * Y)	-0.00304	-0.00305	-0.00312

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)	0.00265	0.00266	0.00265
	(A0 * !A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B0 * !Y)	0.00265	0.00266	0.00265
	(!A0 * !A1 * B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B0 * Y)	0.00308	0.00309	0.00308
	(!A0 * !A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B0 * Y)	0.00312	0.00314	0.00313

SKY130_OSU_SC_15T_MS__OR2x

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00420	0.00399	0.87649
sky130_osu_sc_15T_ms__or2_2	0.00420	0.00399	1.75925
sky130_osu_sc_15T_ms__or2_4	0.00419	0.00399	3.42677
sky130_osu_sc_15T_ms__or2_8	0.00419	0.00400	6.51126
sky130_osu_sc_15T_ms__or2_l	0.00316	0.00292	0.52613

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__or2_1	0.00000	0.00020	0.00026
sky130_osu_sc_15T_ms__or2_2	0.00000	0.00028	0.00043
sky130_osu_sc_15T_ms__or2_4	0.00000	0.00044	0.00075
sky130_osu_sc_15T_ms__or2_8	0.00000	0.00076	0.00140
sky130_osu_sc_15T_ms__or2_l	0.00000	0.00026	0.00034

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)	0.10642	0.94328	8.47965
	B->Y (RR)	0.09844	0.91844	8.32218
sky130_osu_sc_15T_ms__or2_2	A->Y (RR)	0.11411	0.84517	8.74851
	B->Y (RR)	0.10529	0.82428	8.62672
sky130_osu_sc_15T_ms__or2_4	A->Y (RR)	0.15011	0.82080	9.16098
	B->Y (RR)	0.14113	0.80622	9.06601
sky130_osu_sc_15T_ms__or2_8	A->Y (RR)	0.22064	0.85915	9.57302
	B->Y (RR)	0.21152	0.84817	9.50889
sky130_osu_sc_15T_ms__or2_l	A->Y (RR)	0.13029	1.12354	8.89263
	B->Y (RR)	0.12159	1.09886	8.74180

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)	0.24991	0.93424	7.39444
	B->Y (FF)	0.21713	0.88208	6.85643
sky130_osu_sc_15T_ms__or2_2	A->Y (FF)	0.31543	0.97254	7.77281
	B->Y (FF)	0.28300	0.91806	7.30010
sky130_osu_sc_15T_ms__or2_4	A->Y (FF)	0.46511	1.12183	8.39262
	B->Y (FF)	0.43243	1.06605	7.98928
sky130_osu_sc_15T_ms__or2_8	A->Y (FF)	0.76226	1.44611	9.07158
	B->Y (FF)	0.72976	1.37944	8.79592
sky130_osu_sc_15T_ms__or2_l	A->Y (FF)	0.29032	0.99598	7.16243
	B->Y (FF)	0.25472	0.94597	6.71450

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	0.00463	0.00405	0.00381
	B	0.00000	0.00000	0.00000
	B	0.00360	0.00315	0.00299
sky130_osu_sc_15T_ms__or2_2	A	0.00000	0.00000	0.00000
	A	0.00805	0.00767	0.00740
	B	0.00000	0.00000	0.00000
	B	0.00695	0.00685	0.00672
sky130_osu_sc_15T_ms__or2_4	A	0.00000	0.00000	0.00000
	A	0.01552	0.01563	0.01589
	B	0.00000	0.00000	0.00000
	B	0.01443	0.01493	0.01495
sky130_osu_sc_15T_ms__or2_8	A	0.00000	0.00000	0.00000
	A	0.03028	0.03124	0.03197
	B	0.00000	0.00000	0.00000
	B	0.02917	0.03061	0.03179
sky130_osu_sc_15T_ms__or2_l	A	0.00000	0.00000	0.00000
	A	0.00334	0.00296	0.00280
	B	0.00000	0.00000	0.00000
	B	0.00268	0.00237	0.00222

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	0.01005	0.00995	0.00991
	B	0.00000	0.00000	0.00000
	B	0.00868	0.00863	0.00865
sky130_osu_sc_15T_ms__or2_2	A	0.00000	0.00000	0.00000
	A	0.01222	0.01265	0.01262
	B	0.00000	0.00000	0.00000
	B	0.01086	0.01125	0.01134
sky130_osu_sc_15T_ms__or2_4	A	0.00000	0.00000	0.00000
	A	0.01763	0.01900	0.01922
	B	0.00000	0.00000	0.00000
	B	0.01626	0.01759	0.01788
sky130_osu_sc_15T_ms__or2_8	A	0.00000	0.00000	0.00000
	A	0.02839	0.03108	0.03249
	B	0.00000	0.00000	0.00000
	B	0.02704	0.02961	0.03102
sky130_osu_sc_15T_ms__or2_l	A	0.00000	0.00000	0.00000
	A	0.00741	0.00719	0.00714
	B	0.00000	0.00000	0.00000
	B	0.00645	0.00633	0.00630

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)	-0.00258	-0.00273	-0.00272
sky130_osu_sc_15T_ms__or2_2	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00258	-0.00273	-0.00272
sky130_osu_sc_15T_ms__or2_4	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00258	-0.00274	-0.00272
sky130_osu_sc_15T_ms__or2_8	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00258	-0.00274	-0.00272
sky130_osu_sc_15T_ms__or2_l	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00173	-0.00180	-0.00179

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)	0.00271	0.00274	0.00272
sky130_osu_sc_15T_ms__or2_2	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00271	0.00274	0.00272
sky130_osu_sc_15T_ms__or2_4	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00272	0.00274	0.00272
sky130_osu_sc_15T_ms__or2_8	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00272	0.00274	0.00272
sky130_osu_sc_15T_ms__or2_l	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00179	0.00180	0.00179

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)	-0.00160	-0.00164	-0.00161
sky130_osu_sc_15T_ms__or2_2	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00160	-0.00164	-0.00161
sky130_osu_sc_15T_ms__or2_4	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00160	-0.00164	-0.00161
sky130_osu_sc_15T_ms__or2_8	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00160	-0.00164	-0.00161
sky130_osu_sc_15T_ms__or2_l	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00104	-0.00107	-0.00105

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)	0.00168	0.00168	0.00163
sky130_osu_sc_15T_ms__or2_2	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00168	0.00168	0.00163
sky130_osu_sc_15T_ms__or2_4	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00168	0.00168	0.00163
sky130_osu_sc_15T_ms__or2_8	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00168	0.00168	0.00163
sky130_osu_sc_15T_ms__or2_l	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00109	0.00108	0.00106

SKY130_OSU_SC_15T_MS__TBUFIx

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00415	0.00530	0.41457
sky130_osu_sc_15T_ms__tbufi_l	0.00309	0.00398	0.27117

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__tbufi_1	0.00000	0.00014	0.00032
sky130_osu_sc_15T_ms__tbufi_l	0.00000	0.00018	0.00047

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)	0.10186	1.27474	12.58810
	OE->Y (FR)	0.08488	0.44852	4.68839
	OE->Y (RR)	0.15153	1.18462	8.60326
sky130_osu_sc_15T_ms__tbufi_l	A->Y (FR)	0.13065	1.45103	12.72620
	OE->Y (FR)	0.09854	0.48121	4.68819
	OE->Y (RR)	0.17736	1.37777	8.95138

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)	0.04308	0.64704	7.02746
	OE->Y (FF)	0.08596	0.45019	4.68838
	OE->Y (RF)	0.04272	0.62772	6.70081
sky130_osu_sc_15T_ms__tbufi_l	A->Y (RF)	0.05553	0.73772	7.38490
	OE->Y (FF)	0.09886	0.48546	4.68829
	OE->Y (RF)	0.05277	0.71352	6.99543

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	0.00458	0.00443	0.00438
	OE	0.00000	0.00000	0.00000
	OE	0.00419	0.00361	0.00351
sky130_osu_sc_15T_ms__tbufi_l	A	0.00000	0.00000	0.00000
	A	0.00334	0.00319	0.00262
	OE	0.00000	0.00000	0.00000
	OE	0.00293	0.00250	0.00242

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	-0.00073	-0.00077	-0.00086
	OE	0.00000	0.00000	0.00000
	OE	0.00295	0.00240	0.00226
sky130_osu_sc_15T_ms__tbufi_l	A	0.00000	0.00000	0.00000
	A	-0.00041	-0.00044	-0.00053
	OE	0.00000	0.00000	0.00000
	OE	0.00199	0.00157	0.00146

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)	-0.00237	-0.00241	-0.00238
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	-0.00221	-0.00224	-0.00222
sky130_osu_sc_15T_ms__tbufi_l	(!OE * Y)	0.00000	0.00000	0.00000
	(!OE * Y)	-0.00167	-0.00169	-0.00167
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	-0.00156	-0.00157	-0.00156

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)	0.00237	0.00241	0.00238
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	0.00227	0.00228	0.00225
sky130_osu_sc_15T_ms__tbufi_l	(!OE * Y)	0.00000	0.00000	0.00000
	(!OE * Y)	0.00167	0.00169	0.00167
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	0.00159	0.00159	0.00157

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)	0.00169	0.00112	0.00100
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00152	0.00094	0.00082
sky130_osu_sc_15T_ms__tbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00112	0.00071	0.00059
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00099	0.00056	0.00046

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)	0.00522	0.00479	0.00477
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00541	0.00496	0.00489
sky130_osu_sc_15T_ms__tbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00400	0.00365	0.00360
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00414	0.00379	0.00369

SKY130_OSU_SC_15T_MS__TNBUFIx

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00414	0.00633	0.41330
sky130_osu_sc_15T_ms__tnbufi_l	0.00308	0.00448	0.27119

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__tnbufi_1	0.00000	0.00018	0.00021
sky130_osu_sc_15T_ms__tnbufi_l	0.00000	0.00024	0.00029

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)	0.10279	1.27308	12.56770
	OE->Y (RR)	0.03577	0.34521	4.68906
	OE->Y (FR)	0.11803	1.31892	12.78590
sky130_osu_sc_15T_ms__tnbufi_l	A->Y (FR)	0.13175	1.45216	12.72510
	OE->Y (RR)	0.03873	0.34516	4.68901
	OE->Y (FR)	0.14142	1.48749	12.86410

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)	0.04226	0.64620	7.01796
	OE->Y (RF)	0.03559	0.34523	4.68904
	OE->Y (FF)	0.09665	0.71784	5.54868
sky130_osu_sc_15T_ms__tnbufi_l	A->Y (RF)	0.05430	0.73725	7.38495
	OE->Y (RF)	0.03847	0.34516	4.68894
	OE->Y (FF)	0.11976	0.83097	5.92454

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	0.00471	0.00456	0.00451
	OE	0.00000	0.00000	0.00000
	OE	0.01099	0.01070	0.01078
sky130_osu_sc_15T_ms__tnbufi_l	A	0.00000	0.00000	0.00000
	A	0.00348	0.00337	0.00272
	OE	0.00000	0.00000	0.00000
	OE	0.00783	0.00761	0.00749

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	-0.00090	-0.00093	-0.00102
	OE	0.00000	0.00000	0.00000
	OE	0.00991	0.00963	0.00969
sky130_osu_sc_15T_ms__tnbufi_l	A	0.00000	0.00000	0.00000
	A	-0.00057	-0.00060	-0.00069
	OE	0.00000	0.00000	0.00000
	OE	0.00698	0.00675	0.00674

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)	-0.00204	-0.00207	-0.00205
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	-0.00190	-0.00192	-0.00191
sky130_osu_sc_15T_ms__tnbufi_l	(OE * Y)	0.00000	0.00000	0.00000
	(OE * Y)	-0.00135	-0.00136	-0.00136
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	-0.00125	-0.00126	-0.00125

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)	0.00204	0.00207	0.00205
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	0.00194	0.00195	0.00193
sky130_osu_sc_15T_ms__tnbufi_l	(OE * Y)	0.00000	0.00000	0.00000
	(OE * Y)	0.00135	0.00136	0.00136
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	0.00128	0.00128	0.00126

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)	-0.00329	-0.00406	-0.00417
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00317	-0.00397	-0.00411
sky130_osu_sc_15T_ms__tnbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	-0.00207	-0.00259	-0.00270
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00197	-0.00253	-0.00266

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)	0.00849	0.00823	0.00829
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00836	0.00808	0.00815
sky130_osu_sc_15T_ms__tnbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00602	0.00578	0.00577
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00592	0.00568	0.00567

SKY130_OSU_SC_15T_MS__XNOR2

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00820	0.00725	0.41300

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__xnor2_l	0.00000	0.00040	0.00054

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	0.19429	1.23773	8.73390
	A->Y (FR)	!B	0.13911	1.31295	12.56950
	B->Y (RR)	A	0.16097	1.20132	8.65478
	B->Y (FR)	!A	0.16753	1.36410	12.78560

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	0.15787	0.81166	5.93838
	A->Y (RF)	!B	0.06037	0.64074	6.69529
	B->Y (FF)	A	0.14700	0.80047	5.92796
	B->Y (RF)	!A	0.06897	0.65190	6.70741

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	0.00401	0.00337	0.00320
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.01132	0.01077	0.01074
	B	A	0.00000	0.00000	0.00000
	B	A	0.00194	0.00139	0.00126
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.01187	0.01144	0.01143

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	0.01323	0.01261	0.01246
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00288	0.00227	0.00202
	B	A	0.00000	0.00000	0.00000
	B	A	0.01222	0.01202	0.01204
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00359	0.00288	0.00261

SKY130_OSU_SC_15T_MS__XOR2

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.00822	0.00730	0.40943

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__xor2_l	0.00000	0.00040	0.00048

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	0.20327	1.24106	8.71157
	A->Y (FR)	B	0.15299	1.34927	12.79340
	B->Y (RR)	!A	0.16751	1.21225	8.67511
	B->Y (FR)	A	0.17036	1.37135	12.79150

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	0.15307	0.80663	5.92713
	A->Y (RF)	B	0.05672	0.66417	7.01334
	B->Y (FF)	!A	0.14546	0.80004	5.91606
	B->Y (RF)	A	0.06659	0.65193	6.69067

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	0.01285	0.01235	0.01233
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00254	0.00149	0.00125
	B	A	0.00000	0.00000	0.00000
	B	A	0.01306	0.01266	0.01205
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00175	0.00119	0.00104

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	0.00233	0.00150	0.00122
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.01387	0.01356	0.01355
	B	A	0.00000	0.00000	0.00000
	B	A	0.00235	0.00160	0.00134
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.01246	0.01229	0.01231

SKY130_OSU_SC_15T_MS_x

sky130_osu_sc_15T_ms_ss_1P60_-40C.ccs
Cell Library: Process , Voltage 1.60, 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	0.17661
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	93982.60000	187965.00000
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
	-0.00255	0.01523	0.22962

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
	1.63706	1.54344	0.30512