sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs Library

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

SKY130_OSU_SC_15T_MS__ADDFx

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.01415	0.01419	0.01102	2.04537	0.94950	1.93623
sky130_osu_sc_15T_ms__addf_l	0.01415	0.01419	0.01103	1.18291	0.94799	1.21476

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__addf_1	0.00000	0.02726	0.03779
sky130_osu_sc_15T_ms__addf_l	0.00000	0.02875	0.03928

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)	0.12198	1.59094	25.10480
	B->CO (RR)	0.10901	1.52637	24.15910
	CI->CO (RR)	0.11497	1.59254	25.25540
	CON->CO (FR)	0.02301	0.71594	11.42640
sky130_osu_sc_15T_ms__addf_1	A->CO (RR)	0.12851	1.46618	19.12050
	B->CO (RR)	0.11592	1.41690	18.57240
	CI->CO (RR)	0.12167	1.47184	19.33700
	CON->CO (FR)	0.02997	0.82244	11.56720

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)	0.17819	2.09087	32.74870
	B->CO (FF)	0.15890	1.99458	31.30310
	CI->CO (FF)	0.15690	2.05591	32.59490
	CON->CO (RF)	0.01974	0.57922	9.21212
sky130_osu_sc_15T_ms__addf_1	A->CO (FF)	0.16707	1.65997	21.33950
	B->CO (FF)	0.14874	1.59055	20.56260
	CI->CO (FF)	0.14572	1.62615	21.22540
	CON->CO (RF)	0.01995	0.52538	7.39963

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)	0.13260	0.94959	11.29430
	B->CON (FR)	0.11396	0.89921	10.88550
	CI->CON (FR)	0.11138	0.91776	11.19810
sky130_osu_sc_15T_ms__addf_l	A->CON (FR)	0.12616	0.94241	11.27740
	B->CON (FR)	0.10806	0.89255	10.86810
	CI->CON (FR)	0.10491	0.91065	11.18040

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)	0.07486	0.60311	7.34488
	B->CON (RF)	0.06203	0.57978	7.22020
	CI->CON (RF)	0.06788	0.60933	7.59492
sky130_osu_sc_15T_ms__addf_l	A->CON (RF)	0.07175	0.60006	7.33489
	B->CON (RF)	0.05919	0.57651	7.21069
	CI->CON (RF)	0.06475	0.60568	7.58494

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)	0.25628	1.90101	25.48700
	B->S (-R)	0.25719	1.86998	24.57650
	CI->S (-R)	0.23334	1.86218	25.33190
	CON->S (RR)	0.06924	0.61355	7.24931
sky130_osu_sc_15T_ms__addf_l	A->S (-R)	0.24942	1.73661	20.20350
	B->S (-R)	0.25036	1.71873	19.69880
	CI->S (-R)	0.22635	1.69910	20.07630
	CON->S (RR)	0.07243	0.68671	7.20222

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)	0.20305	1.41688	18.03290
	B->S (-F)	0.20695	1.37875	17.49080
	CI->S (-F)	0.19530	1.41572	18.17920
	CON->S (FF)	0.08622	0.63183	6.68781
sky130_osu_sc_15T_ms__addf_l	A->S (-F)	0.18583	1.21742	13.47480
	B->S (-F)	0.19108	1.19128	13.19980
	CI->S (-F)	0.17828	1.21631	13.67980
	CON->S (FF)	0.07803	0.59150	5.52031

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	0.00232	0.00245	0.00625
	B	0.00341	0.00342	0.00631
	CI	0.00342	0.00361	0.00746
sky130_osu_sc_15T_ms__addf_l	A	0.00176	0.00178	0.00394
	B	0.00286	0.00274	0.00451
	CI	0.00286	0.00292	0.00518

Internal switching power(pJ) to CO falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.00863	0.00881	0.01579
	B	0.00905	0.00925	0.01493
	CI	0.00733	0.00754	0.01470
sky130_osu_sc_15T_ms__addf_l	A	0.00810	0.00821	0.01190
	B	0.00852	0.00864	0.01149
	CI	0.00681	0.00691	0.01099

Internal switching power(pJ) to CON rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.00862	0.00867	0.01135
	B	0.00891	0.00898	0.01115
	CI	0.00796	0.00823	0.01059
sky130_osu_sc_15T_ms__addf_l	A	0.00810	0.00812	0.01092
	B	0.00840	0.00843	0.01070
	CI	0.00744	0.00768	0.01008

Internal switching power(pJ) to CON falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.00230	0.00237	0.00407
	B	0.00338	0.00332	0.00476
	CI	0.00340	0.00353	0.00535
sky130_osu_sc_15T_ms__addf_l	A	0.00175	0.00176	0.00340
	B	0.00284	0.00271	0.00409
	CI	0.00285	0.00291	0.00468

Internal switching power(pJ) to S rising :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.00863	0.00880	0.01526
	B	0.00905	0.00924	0.01461
	CI	0.00733	0.00754	0.01426
sky130_osu_sc_15T_ms__addf_l	A	0.00810	0.00821	0.01212
	B	0.00853	0.00864	0.01156
	CI	0.00681	0.00692	0.01108

Internal switching power(pJ) to S falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__addf_1	A	0.01904	0.01913	0.02176
	B	0.01705	0.01697	0.02463
	CI	0.01547	0.01539	0.01811
sky130_osu_sc_15T_ms__addf_l	A	0.01827	0.01822	0.02078
	B	0.01630	0.01618	0.02418
	CI	0.01474	0.01461	0.01746

SKY130_OSU_SC_15T_MS__ADDHx

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00697	0.00775	2.00975	1.05455	2.04526
sky130_osu_sc_15T_ms__addh_l	0.00697	0.00775	1.24617	1.05603	1.25978

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__addh_1	0.00000	0.03240	0.03774
sky130_osu_sc_15T_ms__addh_l	0.00000	0.03423	0.03922

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)	0.08250	0.62184	7.10750
	B->CO (RR)	0.08578	0.63179	7.22875
sky130_osu_sc_15T_ms__addh_l	A->CO (RR)	0.08707	0.69726	7.08670
	B->CO (RR)	0.09024	0.70849	7.18925

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)	0.07258	0.60700	6.73400
	B->CO (FF)	0.07752	0.61993	6.74690
sky130_osu_sc_15T_ms__addh_l	A->CO (FF)	0.06688	0.53648	4.99052
	B->CO (FF)	0.07143	0.54988	5.00551

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	0.11313	0.51515	3.84991
	A->CON (FR)	!B	0.07230	0.86227	11.23780
	B->CON (RR)	A	0.11632	0.52382	3.97468
	B->CON (FR)	!A	0.08856	0.89769	11.45670
sky130_osu_sc_15T_ms__addh_l	A->CON (RR)	B	0.10469	0.49962	3.82710
	A->CON (FR)	!B	0.06629	0.85640	11.24120
	B->CON (RR)	A	0.10798	0.51067	3.93382
	B->CON (FR)	!A	0.08253	0.89163	11.46010

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	0.11116	0.64125	5.65931
	A->CON (RF)	!B	0.04447	0.58997	7.84310
	B->CON (FF)	A	0.11086	0.66973	5.94008
	B->CON (RF)	!A	0.05235	0.57913	7.52949
sky130_osu_sc_15T_ms__addh_l	A->CON (FF)	B	0.10377	0.62575	5.60320
	A->CON (RF)	!B	0.04160	0.58704	7.84557
	B->CON (FF)	A	0.10334	0.65439	5.88108
	B->CON (RF)	!A	0.04955	0.57651	7.53235

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	0.08607	1.52740	24.73500
	A->S (FR)	B	0.15299	1.56088	22.29240
	B->S (RR)	!A	0.09374	1.47881	23.69100
	B->S (FR)	A	0.15342	1.62739	23.30480
	CON->S (FR)	-	0.02520	0.73344	11.69520
sky130_osu_sc_15T_ms__addh_l	A->S (RR)	!B	0.08906	1.42208	19.56270
	A->S (FR)	B	0.15152	1.44401	17.08960
	B->S (RR)	!A	0.09684	1.38331	18.85030
	B->S (FR)	A	0.15174	1.50011	17.76660
	CON->S (FR)	-	0.03029	0.83060	11.85160

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	0.10970	1.86869	30.24660
	A->S (RF)	B	0.14419	1.23547	16.96780
	B->S (FF)	!A	0.12599	1.90612	30.51530
	B->S (RF)	A	0.14736	1.24507	17.08880
	CON->S (RF)	-	0.01844	0.56615	9.00571
sky130_osu_sc_15T_ms__addh_l	A->S (FF)	!B	0.10032	1.52428	20.90540
	A->S (RF)	B	0.13365	1.02257	11.24010
	B->S (FF)	!A	0.11653	1.56044	21.13800
	B->S (RF)	A	0.13684	1.03302	11.34090
	CON->S (RF)	-	0.01870	0.52761	7.55198

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	0.00418	0.00394	0.00497
	B	0.00000	0.00000	0.00000
	B	0.00383	0.00357	0.00475
sky130_osu_sc_15T_ms__addh_l	A	0.00000	0.00000	0.00000
	A	0.00365	0.00338	0.00540
	B	0.00000	0.00000	0.00000
	B	0.00329	0.00302	0.00506

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	0.00627	0.00609	0.00906
	B	0.00000	0.00000	0.00000
	B	0.00654	0.00664	0.00977
sky130_osu_sc_15T_ms__addh_l	A	0.00000	0.00000	0.00000
	A	0.00576	0.00556	0.00850
	B	0.00000	0.00000	0.00000
	B	0.00603	0.00607	0.00904

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	0.00418	0.00395	0.00553
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00557	0.00562	0.00620
	B	A	0.00000	0.00000	0.00000
	B	A	0.00383	0.00358	0.00547
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00615	0.00611	0.00618
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00364	0.00338	0.00543
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00521	0.00524	0.00582
	B	A	0.00000	0.00000	0.00000
	B	A	0.00329	0.00301	0.00516
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00579	0.00571	0.00582

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	0.00627	0.00610	0.00924
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00088	0.00087	0.00093
	B	A	0.00000	0.00000	0.00000
	B	A	0.00654	0.00664	0.00954
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00154	0.00146	0.00166
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00576	0.00557	0.00864
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00040	0.00037	0.00038
	B	A	0.00000	0.00000	0.00000
	B	A	0.00603	0.00607	0.00906
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00106	0.00097	0.00105

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	0.00628	0.00609	0.00913
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00089	0.00091	0.00121
	B	A	0.00000	0.00000	0.00000
	B	A	0.00654	0.00666	0.00988
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00156	0.00150	0.00172
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00577	0.00557	0.00880
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00040	0.00037	0.00057
	B	A	0.00000	0.00000	0.00000
	B	A	0.00603	0.00608	0.00904
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00107	0.00098	0.00103

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	0.00418	0.00395	0.00500
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00557	0.00565	0.00606
	B	A	0.00000	0.00000	0.00000
	B	A	0.00383	0.00358	0.00484
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00616	0.00617	0.00621
sky130_osu_sc_15T_ms__addh_l	A	B	0.00000	0.00000	0.00000
	A	B	0.00365	0.00338	0.00547
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00521	0.00527	0.00581
	B	A	0.00000	0.00000	0.00000
	B	A	0.00329	0.00302	0.00507
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00580	0.00576	0.00587

SKY130_OSU_SC_15T_MS__AND2x

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00376	0.00385	2.03371
sky130_osu_sc_15T_ms__and2_2	0.00376	0.00385	3.90670
sky130_osu_sc_15T_ms__and2_4	0.00376	0.00386	7.44762
sky130_osu_sc_15T_ms__and2_6	0.00379	0.00386	10.93287
sky130_osu_sc_15T_ms__and2_8	0.00377	0.00386	14.16288
sky130_osu_sc_15T_ms__and2_l	0.00290	0.00300	1.18062

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__and2_1	0.00000	0.01571	0.02509
sky130_osu_sc_15T_ms__and2_2	0.00000	0.02511	0.02515
sky130_osu_sc_15T_ms__and2_4	0.00000	0.04392	0.05016
sky130_osu_sc_15T_ms__and2_6	0.00000	0.06272	0.07520
sky130_osu_sc_15T_ms__and2_8	0.00000	0.08153	0.10024
sky130_osu_sc_15T_ms__and2_l	0.00000	0.01755	0.02803

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)	0.06267	0.56485	6.97809
	B->Y (RR)	0.06719	0.58050	6.96986
sky130_osu_sc_15T_ms__and2_2	A->Y (RR)	0.07248	0.51272	6.95527
	B->Y (RR)	0.07688	0.52357	6.96993
sky130_osu_sc_15T_ms__and2_4	A->Y (RR)	0.10036	0.52302	7.22085
	B->Y (RR)	0.10477	0.52865	7.26807
sky130_osu_sc_15T_ms__and2_6	A->Y (RR)	0.12735	0.55387	7.45022
	B->Y (RR)	0.13166	0.55411	7.50763
sky130_osu_sc_15T_ms__and2_8	A->Y (RR)	0.15370	0.58897	7.66622
	B->Y (RR)	0.15809	0.58660	7.73053
sky130_osu_sc_15T_ms__and2_l	A->Y (RR)	0.06806	0.62022	6.32155
	B->Y (RR)	0.07253	0.63526	6.32506

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)	0.05612	0.54363	6.33011
	B->Y (FF)	0.05937	0.55773	6.35606
sky130_osu_sc_15T_ms__and2_2	A->Y (FF)	0.06462	0.51509	6.33456
	B->Y (FF)	0.06816	0.52640	6.37163
sky130_osu_sc_15T_ms__and2_4	A->Y (FF)	0.08988	0.53665	6.54577
	B->Y (FF)	0.09299	0.54480	6.58399
sky130_osu_sc_15T_ms__and2_6	A->Y (FF)	0.11702	0.57134	6.74677
	B->Y (FF)	0.11963	0.57803	6.78427
sky130_osu_sc_15T_ms__and2_8	A->Y (FF)	0.14203	0.60406	6.83280
	B->Y (FF)	0.14439	0.60792	6.87113
sky130_osu_sc_15T_ms__and2_l	A->Y (FF)	0.06340	0.56830	5.62036
	B->Y (FF)	0.06885	0.58490	5.67182

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	0.00302	0.00271	0.01230
	B	0.00000	0.00000	0.00000
	B	0.00309	0.00264	0.00728
sky130_osu_sc_15T_ms__and2_2	A	0.00000	0.00000	0.00000
	A	0.00587	0.00579	0.01441
	B	0.00000	0.00000	0.00000
	B	0.00593	0.00574	0.00975
sky130_osu_sc_15T_ms__and2_4	A	0.00000	0.00000	0.00000
	A	0.01214	0.01243	0.02032
	B	0.00000	0.00000	0.00000
	B	0.01223	0.01253	0.01655
sky130_osu_sc_15T_ms__and2_6	A	0.00000	0.00000	0.00000
	A	0.01851	0.01912	0.02684
	B	0.00000	0.00000	0.00000
	B	0.01857	0.01918	0.02268
sky130_osu_sc_15T_ms__and2_8	A	0.00000	0.00000	0.00000
	A	0.02493	0.02594	0.03406
	B	0.00000	0.00000	0.00000
	B	0.02502	0.02587	0.03135
sky130_osu_sc_15T_ms__and2_l	A	0.00000	0.00000	0.00000
	A	0.00219	0.00196	0.00901
	B	0.00000	0.00000	0.00000
	B	0.00226	0.00190	0.00562

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	0.00772	0.00800	0.01804
	B	0.00000	0.00000	0.00000
	B	0.00872	0.00893	0.01803
sky130_osu_sc_15T_ms__and2_2	A	0.00000	0.00000	0.00000
	A	0.00980	0.01050	0.02019
	B	0.00000	0.00000	0.00000
	B	0.01084	0.01129	0.02021
sky130_osu_sc_15T_ms__and2_4	A	0.00000	0.00000	0.00000
	A	0.01490	0.01633	0.02576
	B	0.00000	0.00000	0.00000
	B	0.01594	0.01701	0.02565
sky130_osu_sc_15T_ms__and2_6	A	0.00000	0.00000	0.00000
	A	0.02008	0.02233	0.03167
	B	0.00000	0.00000	0.00000
	B	0.02115	0.02290	0.03136
sky130_osu_sc_15T_ms__and2_8	A	0.00000	0.00000	0.00000
	A	0.02542	0.02794	0.03744
	B	0.00000	0.00000	0.00000
	B	0.02627	0.02838	0.03685
sky130_osu_sc_15T_ms__and2_l	A	0.00000	0.00000	0.00000
	A	0.00594	0.00611	0.01267
	B	0.00000	0.00000	0.00000
	B	0.00670	0.00671	0.01279

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)	-0.00273	-0.00274	-0.00276
sky130_osu_sc_15T_ms__and2_2	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00273	-0.00273	-0.00276
sky130_osu_sc_15T_ms__and2_4	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00273	-0.00274	-0.00276
sky130_osu_sc_15T_ms__and2_6	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00275	-0.00275	-0.00278
sky130_osu_sc_15T_ms__and2_8	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00273	-0.00273	-0.00275
sky130_osu_sc_15T_ms__and2_l	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	-0.00193	-0.00194	-0.00195

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)	0.00275	0.00281	0.00276
sky130_osu_sc_15T_ms__and2_2	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00275	0.00281	0.00276
sky130_osu_sc_15T_ms__and2_4	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00275	0.00281	0.00276
sky130_osu_sc_15T_ms__and2_6	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00277	0.00283	0.00279
sky130_osu_sc_15T_ms__and2_8	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00275	0.00281	0.00276
sky130_osu_sc_15T_ms__and2_l	(!B * !Y)	0.00000	0.00000	0.00000
	(!B * !Y)	0.00196	0.00199	0.00196

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)	-0.00256	-0.00258	-0.00257
sky130_osu_sc_15T_ms__and2_2	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00256	-0.00257	-0.00257
sky130_osu_sc_15T_ms__and2_4	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00256	-0.00258	-0.00257
sky130_osu_sc_15T_ms__and2_6	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00256	-0.00257	-0.00257
sky130_osu_sc_15T_ms__and2_8	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00256	-0.00257	-0.00257
sky130_osu_sc_15T_ms__and2_l	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	-0.00182	-0.00184	-0.00183

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)	0.00258	0.00262	0.00258
sky130_osu_sc_15T_ms__and2_2	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00258	0.00262	0.00258
sky130_osu_sc_15T_ms__and2_4	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00258	0.00262	0.00258
sky130_osu_sc_15T_ms__and2_6	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00258	0.00262	0.00258
sky130_osu_sc_15T_ms__and2_8	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00258	0.00262	0.00258
sky130_osu_sc_15T_ms__and2_l	(!A * !Y)	0.00000	0.00000	0.00000
	(!A * !Y)	0.00184	0.00185	0.00183

SKY130_OSU_SC_15T_MS__AOI21

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00352	0.00370	0.00360	0.91787

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__aoi21_l	0.00000	0.00565	0.01252

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)	0.07182	0.89870	11.25230
	A1->Y (FR)	0.05970	0.84998	10.81340
	B0->Y (FR)	0.05307	0.86813	11.16780

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)	0.03963	0.54373	6.93293
	A1->Y (RF)	0.03545	0.53798	6.97035
	B0->Y (RF)	0.02326	0.48471	6.40203

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	0.00659	0.00652	0.00667
	A1	0.00000	0.00000	0.00000
	A1	0.00549	0.00540	0.00560
	B0	0.00405	0.00411	0.00615

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	0.00137	0.00115	0.00125
	A1	0.00000	0.00000	0.00000
	A1	0.00140	0.00117	0.00138
	B0	-0.00061	-0.00064	-0.00014

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)	-0.00211	-0.00232	-0.00231
	(!A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !Y)	-0.00234	-0.00236	-0.00235
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00235	-0.00236	-0.00235

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)	0.00230	0.00233	0.00231
	(!A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !Y)	0.00235	0.00240	0.00236
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00236	0.00240	0.00236

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)	-0.00208	-0.00228	-0.00227
	(!A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !Y)	-0.00230	-0.00232	-0.00231
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00254	-0.00256	-0.00257

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)	0.00226	0.00228	0.00227
	(!A0 * B0 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !Y)	0.00231	0.00233	0.00232
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00256	0.00262	0.00257

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)	-0.00116	-0.00118	-0.00116

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)	0.00126	0.00127	0.00119

SKY130_OSU_SC_15T_MS__AOI22

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00352	0.00367	0.00382	0.00361	0.93994

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__aoi22_1	0.00000	0.00616	0.02504

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)	0.08782	0.91072	11.25410
	A1->Y (FR)	0.07797	0.89013	11.13810
	B0->Y (FR)	0.05384	0.85112	11.01170
	B1->Y (FR)	0.06383	0.87216	11.18270

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)	0.05095	0.56079	7.03621
	A1->Y (RF)	0.04668	0.55342	7.07542
	B0->Y (RF)	0.02735	0.53131	7.05798
	B1->Y (RF)	0.03158	0.53704	7.01908

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	0.00794	0.00786	0.00809
	A1	0.00684	0.00674	0.00694
	B0	0.00565	0.00556	0.00682
	B1	0.00668	0.00640	0.00789

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__aoi22_l	A0	0.00280	0.00257	0.00264
	A1	0.00282	0.00260	0.00277
	B0	-0.00039	-0.00045	-0.00020
	B1	-0.00032	-0.00042	-0.00029

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)	-0.00216	-0.00231	-0.00231
	(!A1 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * B1 * !Y)	-0.00235	-0.00237	-0.00235
	(!A1 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !B1 * Y)	-0.00235	-0.00236	-0.00235
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00235	-0.00236	-0.00235

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)	0.00230	0.00231	0.00231
	(!A1 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * B1 * !Y)	0.00235	0.00241	0.00236
	(!A1 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * B0 * !B1 * Y)	0.00236	0.00240	0.00236
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00236	0.00240	0.00236

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)	-0.00212	-0.00228	-0.00227
	(!A0 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * B1 * !Y)	-0.00230	-0.00231	-0.00231
	(!A0 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !B1 * Y)	-0.00253	-0.00255	-0.00256
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00253	-0.00255	-0.00256

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)	0.00225	0.00229	0.00227
	(!A0 * B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * B1 * !Y)	0.00231	0.00232	0.00231
	(!A0 * B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * B0 * !B1 * Y)	0.00255	0.00261	0.00257
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00255	0.00261	0.00257

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)	-0.00116	-0.00119	-0.00117
	(A0 * A1 * !B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B1 * !Y)	-0.00116	-0.00118	-0.00117
	(!A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B1 * Y)	-0.00265	-0.00267	-0.00266
	(!A0 * A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B1 * Y)	-0.00264	-0.00267	-0.00266

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)	0.00131	0.00132	0.00120
	(A0 * A1 * !B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B1 * !Y)	0.00116	0.00118	0.00117
	(!A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B1 * Y)	0.00266	0.00267	0.00267
	(!A0 * A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B1 * Y)	0.00266	0.00268	0.00267

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)	-0.00117	-0.00120	-0.00118
	(A0 * A1 * !B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B0 * !Y)	-0.00117	-0.00119	-0.00118
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00240	-0.00241	-0.00241
	(!A0 * A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B0 * Y)	-0.00240	-0.00241	-0.00241

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)	0.00132	0.00133	0.00121
	(A0 * A1 * !B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * A1 * !B0 * !Y)	0.00117	0.00119	0.00118
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00242	0.00244	0.00241
	(!A0 * A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * A1 * !B0 * Y)	0.00242	0.00241	0.00241

SKY130_OSU_SC_15T_MS__BUFx

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00386	1.96527
sky130_osu_sc_15T_ms__buf_2	0.00389	3.91766
sky130_osu_sc_15T_ms__buf_4	0.00389	7.48698
sky130_osu_sc_15T_ms__buf_6	0.00090	1.80000
sky130_osu_sc_15T_ms__buf_8	0.00390	14.33689
sky130_osu_sc_15T_ms__buf_l	0.00303	1.18262

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__buf_1	0.00000	0.01257	0.01257
sky130_osu_sc_15T_ms__buf_2	0.00000	0.01886	0.02509
sky130_osu_sc_15T_ms__buf_4	0.00000	0.03143	0.05013
sky130_osu_sc_15T_ms__buf_6	0.00000	0.00000	0.00000
sky130_osu_sc_15T_ms__buf_8	0.00000	0.05658	0.10021
sky130_osu_sc_15T_ms__buf_l	0.00000	0.01406	0.01406

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)**	0.04934	0.53873	6.74407
sky130_osu_sc_15T_ms__buf_2	**A->Y (RR)**	0.05696	0.48696	6.89168
sky130_osu_sc_15T_ms__buf_4	**A->Y (RR)**	0.07774	0.48542	7.11435
sky130_osu_sc_15T_ms__buf_8	**A->Y (RR)**	0.11763	0.53369	7.51271
sky130_osu_sc_15T_ms__buf_l	**A->Y (RR)**	0.05547	0.59484	6.19304

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)**	0.05314	0.52928	6.12601
sky130_osu_sc_15T_ms__buf_2	**A->Y (FF)**	0.06302	0.52417	6.62261
sky130_osu_sc_15T_ms__buf_4	**A->Y (FF)**	0.08852	0.54548	6.91746
sky130_osu_sc_15T_ms__buf_8	**A->Y (FF)**	0.14086	0.61361	7.30394
sky130_osu_sc_15T_ms__buf_l	**A->Y (FF)**	0.06096	0.56147	5.59632

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	0.00284	0.00247	0.00854
sky130_osu_sc_15T_ms__buf_2	A	0.00000	0.00000	0.00000
	A	0.00567	0.00536	0.01068
sky130_osu_sc_15T_ms__buf_4	A	0.00000	0.00000	0.00000
	A	0.01197	0.01211	0.01722
sky130_osu_sc_15T_ms__buf_8	A	0.00000	0.00000	0.00000
	A	0.02463	0.02553	0.03150
sky130_osu_sc_15T_ms__buf_l	A	0.00000	0.00000	0.00000
	A	0.00214	0.00185	0.00702

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	0.00744	0.00775	0.01729
sky130_osu_sc_15T_ms__buf_2	A	0.00000	0.00000	0.00000
	A	0.00960	0.01011	0.01900
sky130_osu_sc_15T_ms__buf_4	A	0.00000	0.00000	0.00000
	A	0.01474	0.01590	0.02442
sky130_osu_sc_15T_ms__buf_8	A	0.00000	0.00000	0.00000
	A	0.02518	0.02736	0.03595
sky130_osu_sc_15T_ms__buf_l	A	0.00000	0.00000	0.00000
	A	0.00577	0.00584	0.01225

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
	-0.00053	-0.00053	-0.00052

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
	0.00053	0.00053	0.00052

SKY130_OSU_SC_15T_MS__DFFRx

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00363	0.00362	0.01092	1.81459	1.82975
sky130_osu_sc_15T_ms__dffr_l	0.00363	0.00362	0.01091	1.18060	1.18976

Leakage Information

Cell Name	Leakage(nW)		
	Min.	**Avg**	**Max.**
sky130_osu_sc_15T_ms__dffr_1	0.00000	0.04173	0.05830
sky130_osu_sc_15T_ms__dffr_l	0.00000	0.04321	0.05978

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)	0.27983	1.29245	15.00680
	QN->Q (FR)	0.02950	0.84411	13.13530
sky130_osu_sc_15T_ms__dffr_l	CK->Q (RR)	0.26586	1.33144	13.51870
	QN->Q (FR)	0.03362	0.90898	12.79210

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)	0.25005	1.31172	15.86700
	QN->Q (RF)	0.02249	0.63675	9.84316
	RN->Q (FF)	0.18113	1.33981	16.99740
sky130_osu_sc_15T_ms__dffr_l	CK->Q (RF)	0.25513	1.38841	14.47410
	QN->Q (RF)	0.02159	0.58340	8.26244
	RN->Q (FF)	0.18656	1.41673	15.60300

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)	0.22011	0.74523	6.90121
	RN->QN (FR)	0.15111	0.77400	8.03139
sky130_osu_sc_15T_ms__dffr_l	CK->QN (RR)	0.22440	0.82401	6.93573
	RN->QN (FR)	0.15558	0.85238	8.05920

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)**	0.23831	0.66318	5.08597
sky130_osu_sc_15T_ms__dffr_l	**CK->QN (RF)**	0.21837	0.62615	4.12351

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)	-0.05352	-0.08488	-0.35304
	setup	CK (R)	0.22407	0.26296	1.12312
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.05555	-0.08493	-0.35361
	setup	CK (R)	0.22794	0.26273	1.15362

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)	-0.09424	-0.33696	-3.19619
	setup	CK (R)	0.11778	0.34997	3.29026
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.09449	-0.33762	-3.18556
	setup	CK (R)	0.11765	0.34997	3.29028

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)	-0.05352	-0.08488	-0.35304
	setup	CK (R)	0.22407	0.26296	1.12312
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.05555	-0.08493	-0.35361
	setup	CK (R)	0.22794	0.26273	1.15362

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)	-0.09424	-0.33696	-3.19619
	setup	CK (R)	0.11778	0.34997	3.29026
sky130_osu_sc_15T_ms__dffr_l	hold	CK (R)	-0.09449	-0.33762	-3.18556
	setup	CK (R)	0.11765	0.34997	3.29028

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)	0.19502	0.22572	1.19256
	removal	CK (R)	-0.04648	-0.05702	-0.19402
sky130_osu_sc_15T_ms__dffr_l	recovery	CK (R)	0.19921	0.22923	1.21644
	removal	CK (R)	-0.04648	-0.05702	-0.19402

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)	0.19502	0.22572	1.19256
	removal	CK (R)	-0.04648	-0.05702	-0.19402
sky130_osu_sc_15T_ms__dffr_l	recovery	CK (R)	0.19921	0.22923	1.21644
	removal	CK (R)	-0.04648	-0.05702	-0.19402

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 ()	0.10513	0.45532	13.33370
	min_pulse_width	RN ()	0.10513	0.45532	13.33370
sky130_osu_sc_15T_ms__dffr_l	min_pulse_width	RN ()	0.10513	0.45532	13.33370
	min_pulse_width	RN ()	0.10170	0.45532	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 ()	0.12917	0.45532	13.33370
	min_pulse_width	CK ()	0.12917	0.45532	13.33370
sky130_osu_sc_15T_ms__dffr_l	min_pulse_width	CK ()	0.11887	0.45532	13.33370
	min_pulse_width	CK ()	0.12573	0.45532	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 ()	0.28023	0.45532	13.33370
	min_pulse_width	CK ()	0.09483	0.45532	13.33370
sky130_osu_sc_15T_ms__dffr_l	min_pulse_width	CK ()	0.28023	0.45532	13.33370
	min_pulse_width	CK ()	0.09483	0.45532	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	0.00753	0.00519	0.00000
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00666	0.00485	0.00000

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	0.00856	0.00641	0.00000
	RN	-0.00100	-0.06701	-1.10399
	RN	0.01967	0.01767	-0.00509
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00767	0.00639	0.00000
	RN	-0.00100	-0.05178	-0.71828
	RN	0.01878	0.01764	0.01088

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	0.00855	0.00643	0.00000
	RN	-0.00100	-0.06735	-1.11321
	RN	0.01967	0.01766	-0.00555
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00767	0.00639	0.00000
	RN	-0.00100	-0.05202	-0.72385
	RN	0.01878	0.01764	0.01073

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	0.00751	0.00515	0.00000
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00663	0.00483	0.00000

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	-0.00199	-0.00229	-0.00229
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00925	0.00873	0.01164
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00387	0.00342	0.00644
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	-0.00199	-0.00229	-0.00229
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00925	0.00873	0.01164
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00387	0.00342	0.00644

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	0.00228	0.00229	0.00229
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.01451	0.01420	0.01757
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00702	0.00678	0.01017
sky130_osu_sc_15T_ms__dffr_l	CK	0.00000	0.00000	0.00000
	CK	0.00228	0.00229	0.00229
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * RN * Q * !QN) + (!CK * RN * !Q * QN)	0.01451	0.01420	0.01757
	(!CK * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !Q * QN)	0.00702	0.00678	0.01017

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)	0.00280	0.00234	0.01162
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.00843	0.00776	0.01682
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)	0.00280	0.00234	0.01162
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.00843	0.00776	0.01681

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)	0.00732	0.00739	0.01810
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.01483	0.01472	0.02520
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)	0.00732	0.00739	0.01810
	(!CK * D * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !Q * QN)	0.01482	0.01471	0.02520

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)	-0.00050	-0.00107	0.00800
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.00463	0.00336	0.01258
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00079	-0.00131	0.00767
sky130_osu_sc_15T_ms__dffr_l	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	-0.00050	-0.00107	0.00800
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.00463	0.00339	0.01258
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00079	-0.00131	0.00767

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)	0.01112	0.01117	0.02192
	(D * RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * RN * !Q * QN)	0.02336	0.02263	0.03365
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.01755	0.01725	0.02736
	(!D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * Q * !QN)	0.02273	0.02261	0.04223
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01221	0.01224	0.02261
sky130_osu_sc_15T_ms__dffr_l	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.01112	0.01117	0.02192
	(D * RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * RN * !Q * QN)	0.02336	0.02263	0.03365
	(D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !Q * QN)	0.01755	0.01725	0.02736
	(!D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * Q * !QN)	0.02273	0.02262	0.04224
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01221	0.01223	0.02261

SKY130_OSU_SC_15T_MS__DFFSRx

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00358	0.00362	0.00806	0.01117	2.04193	2.04517
sky130_osu_sc_15T_ms__dffsr_l	0.00358	0.00362	0.00804	0.01117	1.19760	1.19160

Leakage Information

Cell Name	Leakage(nW)		
	Min.	**Avg**	**Max.**
sky130_osu_sc_15T_ms__dffsr_1	0.00000	0.04167	0.05830
sky130_osu_sc_15T_ms__dffsr_l	0.00000	0.04315	0.05978

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)	0.26391	1.30631	16.14850
	QN->Q (FR)	0.02552	0.77954	12.47590
	RN->Q (RR)	0.21497	1.27102	16.17790
	SN->Q (FR)	0.19494	1.37239	17.73940
sky130_osu_sc_15T_ms__dffsr_l	CK->Q (RR)	0.26028	1.33842	13.70670
	QN->Q (FR)	0.03366	0.91392	12.87510
	RN->Q (RR)	0.21188	1.30489	13.73750
	SN->Q (FR)	0.19185	1.40126	15.25020

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)	0.29224	1.36641	16.81060
	QN->Q (RF)	0.02222	0.66281	10.56040
	RN->Q (FF)	0.18836	1.36458	17.94360
sky130_osu_sc_15T_ms__dffsr_l	CK->Q (RF)	0.30266	1.44812	14.73940
	QN->Q (RF)	0.02154	0.58537	8.31477
	RN->Q (FF)	0.19876	1.44712	15.86690

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)	0.26235	0.77805	7.00737
	RN->QN (FR)	0.15925	0.77720	8.13446
sky130_osu_sc_15T_ms__dffsr_l	CK->QN (RR)	0.27137	0.87527	7.01068
	RN->QN (FR)	0.16781	0.87449	8.13236

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)	0.22703	0.67493	5.65962
	RN->QN (RF)	0.17858	0.64073	5.68896
	SN->QN (FF)	0.15850	0.74184	7.24298
sky130_osu_sc_15T_ms__dffsr_l	CK->QN (RF)	0.21544	0.62692	4.13903
	RN->QN (RF)	0.16769	0.59374	4.16280
	SN->QN (FF)	0.14764	0.69017	5.68862

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)	-0.05151	-0.08623	-0.39155
	setup	CK (R)	0.20544	0.23759	1.16175
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.05048	-0.08618	-0.39266
	setup	CK (R)	0.20597	0.24177	1.17604

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)	-0.11271	-0.36347	-3.38847
	setup	CK (R)	0.14870	0.37518	3.47994
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.11618	-0.36193	-3.38354
	setup	CK (R)	0.14808	0.37518	3.47911

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)	-0.05151	-0.08623	-0.39155
	setup	CK (R)	0.20544	0.23759	1.16175
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.05048	-0.08618	-0.39266
	setup	CK (R)	0.20597	0.24177	1.17604

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)	-0.11271	-0.36347	-3.38847
	setup	CK (R)	0.14870	0.37518	3.47994
sky130_osu_sc_15T_ms__dffsr_l	hold	CK (R)	-0.11618	-0.36193	-3.38354
	setup	CK (R)	0.14808	0.37518	3.47911

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)	0.16259	0.18670	1.10322
	removal	CK (R)	-0.02147	-0.02575	-0.10300
	hold	SN (R)	-0.15401	-0.34016	-1.80218
	setup	SN (R)	0.17796	0.39053	5.45525
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.16181	0.18655	1.11474
	removal	CK (R)	-0.02147	-0.02575	-0.10300
	hold	SN (R)	-0.14746	-0.32573	-1.71316
	setup	SN (R)	0.17690	0.37914	5.37838

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)	0.16259	0.18670	1.10322
	removal	CK (R)	-0.02147	-0.02575	-0.10300
	hold	SN (R)	-0.15495	-0.34059	-1.80218
	hold	SN (R)	-0.15401	-0.34016	-1.80737
	setup	SN (R)	0.17796	0.38859	5.24234
	setup	SN (R)	0.17575	0.39053	5.45525
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.16181	0.18655	1.11474
	removal	CK (R)	-0.02147	-0.02575	-0.10300
	hold	SN (R)	-0.14746	-0.32651	-1.71316
	hold	SN (R)	-0.14845	-0.32573	-1.71560
	setup	SN (R)	0.17690	0.37914	5.12408
	setup	SN (R)	0.16971	0.37846	5.37838

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 ()	0.12230	0.45532	13.33370
	min_pulse_width	RN ()	0.12230	0.45532	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	RN ()	0.12230	0.45532	13.33370
	min_pulse_width	RN ()	0.11887	0.45532	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)	0.03501	0.06993	4.54315
	removal	CK (R)	-0.01227	-0.05000	-0.30535
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.03512	0.06966	4.37429
	removal	CK (R)	-0.01242	-0.05384	-0.30842

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)	0.03501	0.06993	4.54315
	removal	CK (R)	-0.01227	-0.05000	-0.30535
sky130_osu_sc_15T_ms__dffsr_l	recovery	CK (R)	0.03512	0.06966	4.37429
	removal	CK (R)	-0.01242	-0.05384	-0.30842

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 ()	0.15663	0.45532	13.33370
	min_pulse_width	SN ()	0.15663	0.45532	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	SN ()	0.15663	0.45532	13.33370
	min_pulse_width	SN ()	0.14977	0.45532	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 ()	0.11887	0.45532	13.33370
	min_pulse_width	CK ()	0.15320	0.45532	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	CK ()	0.11200	0.45532	13.33370
	min_pulse_width	CK ()	0.14977	0.45532	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 ()	0.25963	0.45532	13.33370
	min_pulse_width	CK ()	0.12573	0.45532	13.33370
sky130_osu_sc_15T_ms__dffsr_l	min_pulse_width	CK ()	0.25963	0.45532	13.33370
	min_pulse_width	CK ()	0.12573	0.45532	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	0.00937	0.00681	0.00000
	RN	0.01726	0.01487	-0.00509
	SN	-0.00100	-0.07193	-1.24231
	SN	0.01901	0.01658	-0.01780
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00861	0.00680	-0.00042
	RN	0.01647	0.01484	0.00205
	SN	-0.00100	-0.05222	-0.72862
	SN	0.01824	0.01656	0.00114

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	0.00991	0.00849	0.00000
	RN	-0.00100	-0.07193	-1.24231
	RN	0.02051	0.01914	0.00526
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00908	0.00787	0.00042
	RN	-0.00100	-0.05222	-0.72862
	RN	0.01967	0.01850	0.01199

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	0.00990	0.00849	0.00000
	RN	-0.00100	-0.07200	-1.24426
	RN	0.02051	0.01914	0.00533
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00909	0.00789	0.00050
	RN	-0.00100	-0.05207	-0.72497
	RN	0.01967	0.01850	0.01207

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	0.00934	0.00679	0.00000
	RN	0.01723	0.01482	-0.00509
	SN	-0.00100	-0.07200	-1.24425
	SN	0.01899	0.01655	-0.01697
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00857	0.00678	-0.00050
	RN	0.01643	0.01480	0.00192
	SN	-0.00100	-0.05207	-0.72495
	SN	0.01820	0.01653	0.00164

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	-0.00223	-0.00230	-0.00229
	(!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)	0.01191	0.01141	0.01424
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00436	0.00392	0.00685
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00435	0.00392	0.00685
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00440	0.00396	0.00690
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	-0.00223	-0.00230	-0.00229
	(!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)	0.01191	0.01141	0.01424
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00436	0.00392	0.00685
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00435	0.00392	0.00685
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00440	0.00396	0.00690

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	0.00229	0.00230	0.00229
	(!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)	0.01675	0.01642	0.01949
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00752	0.00733	0.01059
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00755	0.00734	0.01061
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00747	0.00729	0.01055
sky130_osu_sc_15T_ms__dffsr_l	CK	0.00000	0.00000	0.00000
	CK	0.00229	0.00230	0.00229
	(!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)	0.01674	0.01640	0.01950
	(!CK * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * RN * !SN * Q * !QN)	0.00751	0.00732	0.01059
	(!CK * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * SN * !Q * QN)	0.00754	0.00733	0.01061
	(!CK * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * !RN * !SN * !Q * QN)	0.00747	0.00728	0.01054

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)	0.00248	0.00200	0.01108
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.01027	0.00954	0.01867
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)	0.00248	0.00201	0.01109
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.01027	0.00959	0.01867

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)	0.00795	0.00809	0.01883
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.01575	0.01556	0.02607
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)	0.00794	0.00808	0.01882
	(!CK * D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * SN * !Q * QN)	0.01574	0.01555	0.02606

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)	-0.00542	-0.00545	-0.00546
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	-0.00546	-0.00578	-0.00577
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	-0.00529	-0.00547	-0.00545
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.00342	0.00293	0.00652
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)	-0.00542	-0.00545	-0.00546
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	-0.00545	-0.00577	-0.00576
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	-0.00529	-0.00546	-0.00545
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.00343	0.00290	0.00653

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)	0.00544	0.00557	0.00547
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00576	0.00579	0.00578
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	0.00543	0.00548	0.00546
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.01221	0.01188	0.01484
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)	0.00545	0.00557	0.00547
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN)	0.00574	0.00578	0.00576
	(!CK * D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * D * !RN * !Q * QN)	0.00543	0.00548	0.00546
	(!CK * !D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * RN * Q * !QN)	0.01220	0.01187	0.01483

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)	-0.00050	-0.00107	0.00799
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.00531	0.00416	0.01326
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.00525	0.00405	0.01322
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	-0.00064	-0.00115	0.00781
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.00312	0.00220	0.02026
sky130_osu_sc_15T_ms__dffsr_l	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	-0.00050	-0.00107	0.00799
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.00531	0.00414	0.01325
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.00524	0.00409	0.01321
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	-0.00064	-0.00115	0.00781
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.00312	0.00220	0.02027

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)	0.02615	0.02547	0.03646
	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.01117	0.01122	0.02196
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.01787	0.01755	0.02772
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.01791	0.01753	0.02782
	(!D * RN * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * Q * !QN)	0.02492	0.02466	0.04422
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.01209	0.01212	0.02249
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.01483	0.01484	0.03556
sky130_osu_sc_15T_ms__dffsr_l	**(D * RN * SN * !Q * QN)**	0.00000	0.00000	0.00000
	(D * RN * SN * !Q * QN)	0.02615	0.02547	0.03646
	(D * RN * Q * !QN)	0.00000	0.00000	0.00000
	(D * RN * Q * !QN)	0.01117	0.01122	0.02196
	(D * !RN * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * SN * !Q * QN)	0.01787	0.01756	0.02772
	(D * !RN * !SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * !RN * !SN * !Q * QN)	0.01791	0.01753	0.02782
	(!D * RN * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * Q * !QN)	0.02491	0.02466	0.04422
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)	0.01209	0.01212	0.02249
	(!D * RN * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * RN * !SN * Q * !QN)	0.01482	0.01483	0.03555

SKY130_OSU_SC_15T_MS__DFFSx

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00361	0.00650	0.01089	1.81714	1.83804
sky130_osu_sc_15T_ms__dffs_l	0.00361	0.00650	0.01089	1.18222	1.19570

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__dffs_1	0.00000	0.04578	0.08125
sky130_osu_sc_15T_ms__dffs_l	0.00000	0.04727	0.08273

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)	0.21118	1.21291	14.89950
	QN->Q (FR)	0.02948	0.83971	13.07150
	SN->Q (FR)	0.17038	1.34640	16.82540
sky130_osu_sc_15T_ms__dffs_l	CK->Q (RR)	0.20528	1.26190	13.43140
	QN->Q (FR)	0.03357	0.90556	12.75060
	SN->Q (FR)	0.16368	1.38721	15.30950

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)	0.26956	1.33146	15.85850
	QN->Q (RF)	0.02235	0.63436	9.81105
sky130_osu_sc_15T_ms__dffs_l	CK->Q (RF)	0.27405	1.40762	14.47990
	QN->Q (RF)	0.02150	0.58108	8.24215

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)	0.23877	0.76645	6.92357
sky130_osu_sc_15T_ms__dffs_l	CK->QN (RR)	0.24272	0.84471	6.96833

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)	0.17394	0.58694	5.00858
	SN->QN (FF)	0.13231	0.72122	6.92985
sky130_osu_sc_15T_ms__dffs_l	CK->QN (RF)	0.16243	0.55975	4.05748
	SN->QN (FF)	0.12037	0.68595	5.93967

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)	-0.04273	-0.07147	-0.32398
	setup	CK (R)	0.15824	0.20242	1.12589
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.03963	-0.07216	-0.32501
	setup	CK (R)	0.15774	0.20170	1.14472

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)	-0.09851	-0.33902	-3.19295
	setup	CK (R)	0.12901	0.35382	3.32031
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.09798	-0.34228	-3.17943
	setup	CK (R)	0.12871	0.35382	3.32025

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)	-0.04273	-0.07147	-0.32398
	setup	CK (R)	0.15824	0.20242	1.12589
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.03963	-0.07216	-0.32501
	setup	CK (R)	0.15774	0.20170	1.14472

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)	-0.09851	-0.33902	-3.19295
	setup	CK (R)	0.12901	0.35382	3.32031
sky130_osu_sc_15T_ms__dffs_l	hold	CK (R)	-0.09798	-0.34228	-3.17943
	setup	CK (R)	0.12871	0.35382	3.32025

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)	0.03125	0.04521	3.34674
	removal	CK (R)	-0.00814	-0.01923	0.29214
sky130_osu_sc_15T_ms__dffs_l	recovery	CK (R)	0.03141	0.04506	3.26321
	removal	CK (R)	-0.00814	-0.01923	0.29214

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)	0.03125	0.04521	3.34674
	removal	CK (R)	-0.00814	-0.01923	0.29214
sky130_osu_sc_15T_ms__dffs_l	recovery	CK (R)	0.03141	0.04506	3.26321
	removal	CK (R)	-0.00814	-0.01923	0.29214

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 ()	0.12230	0.45532	13.33370
	min_pulse_width	SN ()	0.12917	0.45532	13.33370
sky130_osu_sc_15T_ms__dffs_l	min_pulse_width	SN ()	0.12230	0.45532	13.33370
	min_pulse_width	SN ()	0.12230	0.45532	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 ()	0.09140	0.45532	13.33370
	min_pulse_width	CK ()	0.13603	0.45532	13.33370
sky130_osu_sc_15T_ms__dffs_l	min_pulse_width	CK ()	0.08453	0.45532	13.33370
	min_pulse_width	CK ()	0.13260	0.45532	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 ()	0.21156	0.45532	13.33370
	min_pulse_width	CK ()	0.10857	0.45532	13.33370
sky130_osu_sc_15T_ms__dffs_l	min_pulse_width	CK ()	0.21156	0.45532	13.33370
	min_pulse_width	CK ()	0.10857	0.45532	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	0.00754	0.00514	0.00000
	SN	-0.00100	-0.06707	-1.10555
	SN	0.01626	0.01405	-0.01057
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00666	0.00481	0.00000
	SN	-0.00100	-0.05182	-0.71926
	SN	0.01537	0.01372	0.00251

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	0.00852	0.00644	0.00000
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00764	0.00641	0.00000

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	0.00852	0.00644	0.00000
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00764	0.00640	0.00000

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	0.00751	0.00513	0.00000
	SN	-0.00100	-0.06753	-1.11823
	SN	0.01623	0.01401	-0.01130
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00663	0.00481	0.00000
	SN	-0.00100	-0.05217	-0.72744
	SN	0.01534	0.01368	0.00203

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	-0.00227	-0.00234	-0.00234
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00908	0.00851	0.01150
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00378	0.00332	0.00633
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	-0.00227	-0.00234	-0.00234
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00908	0.00851	0.01150
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00378	0.00332	0.00633

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	0.00233	0.00234	0.00234
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.01436	0.01399	0.01729
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00716	0.00695	0.01034
sky130_osu_sc_15T_ms__dffs_l	CK	0.00000	0.00000	0.00000
	CK	0.00233	0.00234	0.00234
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * SN * Q * !QN) + (!CK * SN * !Q * QN)	0.01436	0.01399	0.01729
	(!CK * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !SN * Q * !QN)	0.00716	0.00695	0.01034

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)	-0.00392	-0.00395	-0.00394
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00294	0.00256	0.00798
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)	-0.00392	-0.00395	-0.00394
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00294	0.00256	0.00798

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)	0.00396	0.00397	0.00395
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00856	0.00824	0.01477
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)	0.00396	0.00397	0.00395
	(!CK * !D * Q * !QN)	0.00000	0.00000	0.00000
	(!CK * !D * Q * !QN)	0.00856	0.00824	0.01477

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)	-0.00052	-0.00110	0.00799
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	-0.00075	-0.00126	0.00775
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.00251	0.00162	0.02002
sky130_osu_sc_15T_ms__dffs_l	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	-0.00052	-0.00110	0.00799
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	-0.00075	-0.00126	0.00775
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.00251	0.00162	0.02002

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)	0.02328	0.02257	0.03372
	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.01113	0.01119	0.02194
	(!D * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * SN * Q * !QN)	0.02248	0.02223	0.04188
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	0.01215	0.01219	0.02257
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.01440	0.01445	0.03540
sky130_osu_sc_15T_ms__dffs_l	(D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(D * SN * !Q * QN)	0.02328	0.02257	0.03372
	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.01113	0.01119	0.02194
	(!D * SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * SN * Q * !QN)	0.02248	0.02223	0.04188
	(!D * SN * !Q * QN)	0.00000	0.00000	0.00000
	(!D * SN * !Q * QN)	0.01215	0.01219	0.02257
	(!D * !SN * Q * !QN)	0.00000	0.00000	0.00000
	(!D * !SN * Q * !QN)	0.01440	0.01445	0.03540

SKY130_OSU_SC_15T_MS__DFFx

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00377	0.01076	2.07347	2.05871
sky130_osu_sc_15T_ms__dff_l	0.00377	0.01073	1.07568	1.07848

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__dff_1	0.00000	0.03866	0.05040
sky130_osu_sc_15T_ms__dff_l	0.00000	0.04014	0.05189

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)	0.16844	1.20086	16.17880
	QN->Q (FR)	0.02535	0.78095	12.54440
sky130_osu_sc_15T_ms__dff_l	CK->Q (RR)	0.17309	1.21553	12.72980
	QN->Q (FR)	0.03829	0.97931	13.40680

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)	0.24308	1.31994	16.95690
	QN->Q (RF)	0.02211	0.66325	10.62700
sky130_osu_sc_15T_ms__dff_l	CK->Q (RF)	0.25797	1.39149	13.97580
	QN->Q (RF)	0.02157	0.56427	7.85327

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)	0.21421	0.72522	6.96361
sky130_osu_sc_15T_ms__dff_l	CK->QN (RR)	0.22667	0.84216	6.89812

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)	0.13600	0.56568	5.50700
sky130_osu_sc_15T_ms__dff_l	CK->QN (RF)	0.13083	0.50783	3.59203

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)	-0.03399	-0.06538	-0.31315
	setup	CK (R)	0.11555	0.16341	1.21432
sky130_osu_sc_15T_ms__dff_l	hold	CK (R)	-0.03397	-0.06538	-0.31859
	setup	CK (R)	0.11577	0.16281	1.22690

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)	-0.09269	-0.34528	-2.99474
	setup	CK (R)	0.11761	0.36151	3.40990
sky130_osu_sc_15T_ms__dff_l	hold	CK (R)	-0.09635	-0.34528	-3.11927
	setup	CK (R)	0.11761	0.36151	3.40974

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 ()	0.07080	0.45532	13.33370
	min_pulse_width	CK ()	0.13260	0.45532	13.33370
sky130_osu_sc_15T_ms__dff_l	min_pulse_width	CK ()	0.07080	0.45532	13.33370
	min_pulse_width	CK ()	0.12917	0.45532	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 ()**	0.16693	0.45532	13.33370
	min_pulse_width	**CK ()**	0.09483	0.45532	13.33370
sky130_osu_sc_15T_ms__dff_l	**min_pulse_width**	**CK ()**	0.16693	0.45532	13.33370
	min_pulse_width	**CK ()**	0.09140	0.45532	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	0.00796	0.00526	0.00000
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00721	0.00535	0.00000

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	0.00864	0.00723	0.00000
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00781	0.00621	0.00000

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	0.00863	0.00724	0.00000
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00781	0.00622	0.00000

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	0.00794	0.00528	0.00000
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00717	0.00536	0.00000

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	-0.00198	-0.00229	-0.00229
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00835	0.00790	0.01098
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	-0.00198	-0.00229	-0.00229
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00835	0.00791	0.01099

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	0.00227	0.00229	0.00229
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.01483	0.01444	0.01777
sky130_osu_sc_15T_ms__dff_l	CK	0.00000	0.00000	0.00000
	CK	0.00227	0.00229	0.00229
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.00000	0.00000	0.00000
	(!CK * Q * !QN) + (!CK * !Q * QN)	0.01483	0.01445	0.01777

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)	-0.00052	-0.00109	0.00802
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00074	-0.00125	0.00775
sky130_osu_sc_15T_ms__dff_l	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	-0.00052	-0.00109	0.00802
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	-0.00074	-0.00125	0.00775

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)	0.01106	0.01113	0.02188
	(D * !Q * QN)	0.00000	0.00000	0.00000
	(D * !Q * QN)	0.02256	0.02194	0.03329
	(!D * Q * !QN)	0.00000	0.00000	0.00000
	(!D * Q * !QN)	0.02280	0.02252	0.04232
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01208	0.01211	0.02250
sky130_osu_sc_15T_ms__dff_l	(D * Q * !QN)	0.00000	0.00000	0.00000
	(D * Q * !QN)	0.01106	0.01113	0.02188
	(D * !Q * QN)	0.00000	0.00000	0.00000
	(D * !Q * QN)	0.02256	0.02195	0.03329
	(!D * Q * !QN)	0.00000	0.00000	0.00000
	(!D * Q * !QN)	0.02281	0.02252	0.04233
	(!D * !Q * QN)	0.00000	0.00000	0.00000
	(!D * !Q * QN)	0.01208	0.01211	0.02250

SKY130_OSU_SC_15T_MS__INVx

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00367	1.90552
sky130_osu_sc_15T_ms__inv_10	0.03363	17.17320
sky130_osu_sc_15T_ms__inv_2	0.00691	3.76248
sky130_osu_sc_15T_ms__inv_3	0.01028	5.39268
sky130_osu_sc_15T_ms__inv_4	0.01357	7.26301
sky130_osu_sc_15T_ms__inv_6	0.02032	10.69355
sky130_osu_sc_15T_ms__inv_8	0.02698	14.26322
sky130_osu_sc_15T_ms__inv_l	0.00279	1.04010

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__inv_1	0.00000	0.00629	0.01252
sky130_osu_sc_15T_ms__inv_10	0.00000	0.06287	0.12519
sky130_osu_sc_15T_ms__inv_2	0.00000	0.01257	0.02504
sky130_osu_sc_15T_ms__inv_3	0.00000	0.01886	0.03756
sky130_osu_sc_15T_ms__inv_4	0.00000	0.02515	0.05008
sky130_osu_sc_15T_ms__inv_6	0.00000	0.03772	0.07512
sky130_osu_sc_15T_ms__inv_8	0.00000	0.05030	0.10015
sky130_osu_sc_15T_ms__inv_l	0.00000	0.00703	0.01397

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)**	0.02415	0.71310	11.16640
sky130_osu_sc_15T_ms__inv_10	**A->Y (FR)**	0.03596	0.49266	11.12200
sky130_osu_sc_15T_ms__inv_2	**A->Y (FR)**	0.01971	0.61543	11.10630
sky130_osu_sc_15T_ms__inv_3	**A->Y (FR)**	0.02187	0.58051	11.13550
sky130_osu_sc_15T_ms__inv_4	**A->Y (FR)**	0.02243	0.55224	11.10560
sky130_osu_sc_15T_ms__inv_6	**A->Y (FR)**	0.02579	0.52228	11.10870
sky130_osu_sc_15T_ms__inv_8	**A->Y (FR)**	0.03055	0.50513	11.18800
sky130_osu_sc_15T_ms__inv_l	**A->Y (FR)**	0.03267	0.82966	11.31530

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)**	0.01945	0.56259	8.86889
sky130_osu_sc_15T_ms__inv_10	**A->Y (RF)**	0.02961	0.37129	8.82998
sky130_osu_sc_15T_ms__inv_2	**A->Y (RF)**	0.01619	0.48854	8.86276
sky130_osu_sc_15T_ms__inv_3	**A->Y (RF)**	0.01785	0.46171	8.95383
sky130_osu_sc_15T_ms__inv_4	**A->Y (RF)**	0.01788	0.43380	8.93948
sky130_osu_sc_15T_ms__inv_6	**A->Y (RF)**	0.02181	0.40297	8.94338
sky130_osu_sc_15T_ms__inv_8	**A->Y (RF)**	0.02566	0.38778	8.99724
sky130_osu_sc_15T_ms__inv_l	**A->Y (RF)**	0.01947	0.50156	6.86045

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	0.00379	0.00389	0.00156
sky130_osu_sc_15T_ms__inv_10	A	0.00000	0.00000	0.00000
	A	0.03189	0.03554	0.03519
sky130_osu_sc_15T_ms__inv_2	A	0.00000	0.00000	0.00000
	A	0.00666	0.00656	0.00681
sky130_osu_sc_15T_ms__inv_3	A	0.00000	0.00000	0.00000
	A	0.01023	0.01079	0.01432
sky130_osu_sc_15T_ms__inv_4	A	0.00000	0.00000	0.00000
	A	0.01309	0.01422	0.01392
sky130_osu_sc_15T_ms__inv_6	A	0.00000	0.00000	0.00000
	A	0.01939	0.02112	0.02098
sky130_osu_sc_15T_ms__inv_8	A	0.00000	0.00000	0.00000
	A	0.02564	0.02773	0.01179
sky130_osu_sc_15T_ms__inv_l	A	0.00000	0.00000	0.00000
	A	0.00284	0.00285	0.00366

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	-0.00073	-0.00074	-0.00054
sky130_osu_sc_15T_ms__inv_10	A	0.00000	0.00000	0.00000
	A	-0.01256	-0.01197	-0.00824
sky130_osu_sc_15T_ms__inv_2	A	0.00000	0.00000	0.00000
	A	-0.00238	-0.00228	-0.00177
sky130_osu_sc_15T_ms__inv_3	A	0.00000	0.00000	0.00000
	A	-0.00315	-0.00304	-0.00220
sky130_osu_sc_15T_ms__inv_4	A	0.00000	0.00000	0.00000
	A	-0.00487	-0.00443	-0.00345
sky130_osu_sc_15T_ms__inv_6	A	0.00000	0.00000	0.00000
	A	-0.00743	-0.00705	-0.00511
sky130_osu_sc_15T_ms__inv_8	A	0.00000	0.00000	0.00000
	A	-0.01007	-0.00955	-0.00674
sky130_osu_sc_15T_ms__inv_l	A	0.00000	0.00000	0.00000
	A	-0.00044	-0.00044	-0.00022

SKY130_OSU_SC_15T_MS__MUX2

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.26523	0.26517	0.00751	0.26278

Leakage Information

Cell Name	Leakage(nW)		
	Min.	**Avg**	**Max.**
sky130_osu_sc_15T_ms__mux2_1	0.00000	0.01273	0.01294

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)	-	0.01305	0.28100	3.11583
	A1->Y (RR)	-	0.01436	0.28253	3.12137
	S0->Y (RR)	(!A0 * A1)	0.04231	0.25183	0.98512
	S0->Y (FR)	(A0 * !A1)	0.03127	0.36576	3.05038

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)	-	0.01323	0.26054	2.75932
	A1->Y (FF)	-	0.01250	0.25904	2.75275
	S0->Y (FF)	(!A0 * A1)	0.05359	0.33192	2.00333
	S0->Y (RF)	(A0 * !A1)	0.02235	0.27631	2.08451

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	-	-0.00398	-0.00398	-0.00399
	A1	-	0.00000	0.00000	0.00000
	A1	-	-0.00262	-0.00262	-0.00262
	S0	(A0 * !A1)	0.00000	0.00000	0.00000
	S0	(A0 * !A1)	0.00484	0.00500	0.01656
	S0	(!A0 * A1)	0.00000	0.00000	0.00000
	S0	(!A0 * A1)	-0.00255	-0.00297	0.00725

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	-	0.00398	0.00398	0.00399
	A1	-	0.00000	0.00000	0.00000
	A1	-	0.00262	0.00262	0.00262
	S0	(A0 * !A1)	0.00000	0.00000	0.00000
	S0	(A0 * !A1)	0.00072	0.00052	0.01097
	S0	(!A0 * A1)	0.00000	0.00000	0.00000
	S0	(!A0 * A1)	0.01036	0.01040	0.02157

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)	-0.00097	-0.00097	-0.00097

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)	0.00097	0.00097	0.00097

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)	-0.00116	-0.00116	-0.00116

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)	0.00116	0.00116	0.00116

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)	-0.00094	-0.00133	0.00915
	(!A0 * !A1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !Y)	-0.00090	-0.00130	0.00922

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)	0.00788	0.00806	0.01916
	(!A0 * !A1 * !Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !Y)	0.00732	0.00758	0.01893

SKY130_OSU_SC_15T_MS__NAND2x

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, Temp -40.00

Truth Table

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

Footprint

Cell Name	Area
sky130_osu_sc_15T_ms__nand2_1	7.93650
sky130_osu_sc_15T_ms__nand2_l	7.93650

Pin Capacitance Information

Cell Name	Pin Cap(pf)		Max Cap(pf)
	A	B	Y
sky130_osu_sc_15T_ms__nand2_1	0.00367	0.00363	1.88023
sky130_osu_sc_15T_ms__nand2_l	0.00279	0.00278	1.03235

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__nand2_1	0.00000	0.00631	0.02504
sky130_osu_sc_15T_ms__nand2_l	0.00000	0.00705	0.02794

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)	0.02489	0.71167	11.15510
	B->Y (FR)	0.02940	0.70462	10.97670
sky130_osu_sc_15T_ms__nand2_l	A->Y (FR)	0.03354	0.83228	11.30960
	B->Y (FR)	0.04073	0.83617	11.28000

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)	0.02682	0.68752	10.81420
	B->Y (RF)	0.03104	0.69549	10.85750
sky130_osu_sc_15T_ms__nand2_l	A->Y (RF)	0.02626	0.59894	8.13599
	B->Y (RF)	0.02990	0.60549	8.10770

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	0.00403	0.00365	0.00167
	B	0.00000	0.00000	0.00000
	B	0.00514	0.00462	0.00602
sky130_osu_sc_15T_ms__nand2_1	A	0.00000	0.00000	0.00000
	A	0.00299	0.00301	0.00374
	B	0.00000	0.00000	0.00000
	B	0.00383	0.00379	0.00452

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	-0.00046	-0.00050	-0.00032
	B	0.00000	0.00000	0.00000
	B	-0.00043	-0.00049	-0.00039
sky130_osu_sc_15T_ms__nand2_1	A	0.00000	0.00000	0.00000
	A	-0.00030	-0.00031	-0.00010
	B	0.00000	0.00000	0.00000
	B	-0.00028	-0.00034	-0.00019

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)	-0.00267	-0.00270	-0.00269
sky130_osu_sc_15T_ms__nand2_l	(!B * Y)	0.00000	0.00000	0.00000
	(!B * Y)	-0.00184	-0.00185	-0.00187

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)	0.00268	0.00274	0.00270
sky130_osu_sc_15T_ms__nand2_l	(!B * Y)	0.00000	0.00000	0.00000
	(!B * Y)	0.00187	0.00189	0.00187

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)	-0.00244	-0.00244	-0.00245
sky130_osu_sc_15T_ms__nand2_l	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00169	-0.00171	-0.00170

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)	0.00246	0.00244	0.00245
sky130_osu_sc_15T_ms__nand2_l	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00171	0.00172	0.00170

SKY130_OSU_SC_15T_MS__NOR2x

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00365	0.00393	1.03380
sky130_osu_sc_15T_ms__nor2_l	0.00269	0.00301	0.61371

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__nor2_1	0.00000	0.00416	0.01252
sky130_osu_sc_15T_ms__nor2_l	0.00000	0.00518	0.01397

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)	0.05145	0.85984	11.37150
	B->Y (FR)	0.04015	0.83010	11.14610
sky130_osu_sc_15T_ms__nor2_l	A->Y (FR)	0.06499	1.00668	11.61940
	B->Y (FR)	0.05485	0.97581	11.44300

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)	0.02585	0.47860	6.41736
	B->Y (RF)	0.02065	0.46821	6.40186
sky130_osu_sc_15T_ms__nor2_l	A->Y (RF)	0.02369	0.42705	5.04552
	B->Y (RF)	0.02048	0.42128	5.03323

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	0.00534	0.00528	0.00546
	B	0.00000	0.00000	0.00000
	B	0.00419	0.00419	0.00547
sky130_osu_sc_15T_ms__nor2_1	A	0.00000	0.00000	0.00000
	A	0.00377	0.00371	0.00389
	B	0.00000	0.00000	0.00000
	B	0.00309	0.00294	0.00408

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	0.00058	0.00042	0.00064
	B	0.00000	0.00000	0.00000
	B	-0.00058	-0.00060	-0.00034
sky130_osu_sc_15T_ms__nor2_1	A	0.00000	0.00000	0.00000
	A	0.00034	0.00028	0.00059
	B	0.00000	0.00000	0.00000
	B	-0.00032	-0.00030	-0.00001

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)	-0.00201	-0.00230	-0.00230
sky130_osu_sc_15T_ms__nor2_l	(B * !Y)	0.00000	0.00000	0.00000
	(B * !Y)	-0.00135	-0.00153	-0.00152

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)	0.00229	0.00232	0.00230
sky130_osu_sc_15T_ms__nor2_l	(B * !Y)	0.00000	0.00000	0.00000
	(B * !Y)	0.00152	0.00153	0.00152

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)	-0.00117	-0.00119	-0.00117
sky130_osu_sc_15T_ms__nor2_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	-0.00078	-0.00080	-0.00079

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)	0.00122	0.00124	0.00119
sky130_osu_sc_15T_ms__nor2_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00082	0.00083	0.00080

SKY130_OSU_SC_15T_MS__OAI21

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00366	0.00374	0.00316	0.99686

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__oai21_l	0.00000	0.00735	0.02649

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)	0.05611	0.85310	11.14910
	A1->Y (FR)	0.07102	0.88877	11.38600
	B0->Y (FR)	0.03908	0.78434	10.54330

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)	0.03762	0.58065	7.59713
	A1->Y (RF)	0.04338	0.57119	7.40560
	B0->Y (RF)	0.02934	0.59031	7.96074

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	0.00571	0.00571	0.00684
	A1	0.00000	0.00000	0.00000
	A1	0.00690	0.00678	0.00696
	B0	0.00457	0.00448	0.00508

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	0.00021	0.00011	0.00023
	A1	0.00000	0.00000	0.00000
	A1	0.00136	0.00116	0.00126
	B0	0.00186	0.00178	0.00190

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)	-0.00117	-0.00119	-0.00118
	(A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * Y)	-0.00227	-0.00234	-0.00233
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	-0.00236	-0.00237	-0.00237

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)	0.00123	0.00124	0.00119
	(A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * Y)	0.00232	0.00234	0.00233
	(!A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * Y)	0.00236	0.00237	0.00238

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)	-0.00194	-0.00224	-0.00225
	(A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * Y)	-0.00223	-0.00231	-0.00230
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	-0.00233	-0.00234	-0.00233

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)	0.00223	0.00228	0.00225
	(A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * Y)	0.00228	0.00233	0.00230
	(!A0 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * Y)	0.00233	0.00238	0.00234

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)	-0.00191	-0.00192	-0.00195

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)	0.00195	0.00200	0.00196

SKY130_OSU_SC_15T_MS__OAI22

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00353	0.00375	0.00389	0.00379	1.01390

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__oai22_1	0.00000	0.00626	0.02504

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)	0.07653	0.88195	11.28280
	A1->Y (FR)	0.06491	0.85123	11.06160
	B0->Y (FR)	0.04477	0.83072	11.05380
	B1->Y (FR)	0.05731	0.86225	11.27850

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)	0.06072	0.61515	7.74088
	A1->Y (RF)	0.04961	0.59880	7.68180
	B0->Y (RF)	0.04149	0.60757	8.04854
	B1->Y (RF)	0.05323	0.62892	8.15569

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	0.00890	0.00880	0.00895
	A1	0.00769	0.00762	0.00877
	B0	0.00563	0.00562	0.00677
	B1	0.00690	0.00681	0.00696

Internal switching power(pJ) to Y falling :

Cell Name	Input	Power(pJ)		
		first	mid	last
sky130_osu_sc_15T_ms__oai22_l	A0	0.00215	0.00196	0.00203
	A1	0.00112	0.00098	0.00107
	B0	-0.00020	-0.00025	-0.00002
	B1	0.00218	0.00199	0.00215

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)	-0.00200	-0.00230	-0.00230
	(A1 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * B1 * !Y)	-0.00200	-0.00230	-0.00230
	(A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * !B1 * Y)	-0.00224	-0.00231	-0.00231
	(!A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * !B1 * Y)	-0.00234	-0.00235	-0.00234

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)	0.00229	0.00231	0.00230
	(A1 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * B1 * !Y)	0.00229	0.00231	0.00230
	(A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A1 * !B0 * !B1 * Y)	0.00230	0.00232	0.00231
	(!A1 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A1 * !B0 * !B1 * Y)	0.00234	0.00239	0.00235

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)	-0.00116	-0.00118	-0.00116
	(A0 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * B1 * !Y)	-0.00116	-0.00118	-0.00116
	(A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * !B1 * Y)	-0.00222	-0.00229	-0.00228
	(!A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * !B1 * Y)	-0.00232	-0.00233	-0.00232

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)	0.00121	0.00123	0.00118
	(A0 * !B0 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * B1 * !Y)	0.00121	0.00123	0.00118
	(A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(A0 * !B0 * !B1 * Y)	0.00227	0.00229	0.00228
	(!A0 * !B0 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !B0 * !B1 * Y)	0.00232	0.00233	0.00233

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)	-0.00115	-0.00117	-0.00115
	(A0 * !A1 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B1 * !Y)	-0.00115	-0.00117	-0.00115
	(!A0 * !A1 * B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B1 * Y)	-0.00255	-0.00262	-0.00261
	(!A0 * !A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B1 * Y)	-0.00259	-0.00261	-0.00264

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)	0.00120	0.00122	0.00117
	(A0 * !A1 * B1 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B1 * !Y)	0.00120	0.00120	0.00117
	(!A0 * !A1 * B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B1 * Y)	0.00262	0.00264	0.00261
	(!A0 * !A1 * !B1 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B1 * Y)	0.00264	0.00270	0.00265

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)	-0.00196	-0.00225	-0.00225
	(A0 * !A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B0 * !Y)	-0.00196	-0.00225	-0.00225
	(!A0 * !A1 * B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B0 * Y)	-0.00260	-0.00268	-0.00268
	(!A0 * !A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B0 * Y)	-0.00265	-0.00267	-0.00270

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)	0.00224	0.00227	0.00225
	(A0 * !A1 * B0 * !Y)	0.00000	0.00000	0.00000
	(A0 * !A1 * B0 * !Y)	0.00224	0.00229	0.00225
	(!A0 * !A1 * B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * B0 * Y)	0.00269	0.00271	0.00268
	(!A0 * !A1 * !B0 * Y)	0.00000	0.00000	0.00000
	(!A0 * !A1 * !B0 * Y)	0.00270	0.00276	0.00271

SKY130_OSU_SC_15T_MS__OR2x

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00400	0.00376	1.96515
sky130_osu_sc_15T_ms__or2_2	0.00401	0.00376	3.92070
sky130_osu_sc_15T_ms__or2_4	0.00401	0.00377	7.43500
sky130_osu_sc_15T_ms__or2_8	0.00401	0.00378	14.11885
sky130_osu_sc_15T_ms__or2_l	0.00310	0.00284	1.06401

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__or2_1	0.00000	0.00733	0.01263
sky130_osu_sc_15T_ms__or2_2	0.00000	0.01050	0.02515
sky130_osu_sc_15T_ms__or2_4	0.00000	0.01685	0.05019
sky130_osu_sc_15T_ms__or2_8	0.00000	0.02953	0.10026
sky130_osu_sc_15T_ms__or2_l	0.00000	0.00874	0.01415

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)	0.05942	0.57246	6.76132
	B->Y (RR)	0.05269	0.54801	6.74422
sky130_osu_sc_15T_ms__or2_2	A->Y (RR)	0.06589	0.51376	6.94422
	B->Y (RR)	0.05890	0.49257	6.90985
sky130_osu_sc_15T_ms__or2_4	A->Y (RR)	0.08687	0.50639	7.15847
	B->Y (RR)	0.07990	0.49064	7.11911
sky130_osu_sc_15T_ms__or2_8	A->Y (RR)	0.12663	0.54982	7.55945
	B->Y (RR)	0.11974	0.53793	7.51687
sky130_osu_sc_15T_ms__or2_l	A->Y (RR)	0.06408	0.63843	6.13978
	B->Y (RR)	0.05867	0.61918	6.11142

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)	0.09781	0.63848	6.77944
	B->Y (FF)	0.08192	0.59376	6.56305
sky130_osu_sc_15T_ms__or2_2	A->Y (FF)	0.11688	0.62209	7.07031
	B->Y (FF)	0.10111	0.58503	6.80330
sky130_osu_sc_15T_ms__or2_4	A->Y (FF)	0.16475	0.65933	7.42828
	B->Y (FF)	0.14901	0.63022	7.11285
sky130_osu_sc_15T_ms__or2_8	A->Y (FF)	0.26105	0.76079	7.84669
	B->Y (FF)	0.24536	0.73491	7.51359
sky130_osu_sc_15T_ms__or2_l	A->Y (FF)	0.11600	0.64360	5.62115
	B->Y (FF)	0.09780	0.60490	5.42923

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	0.00412	0.00344	0.00937
	B	0.00000	0.00000	0.00000
	B	0.00307	0.00280	0.00875
sky130_osu_sc_15T_ms__or2_2	A	0.00000	0.00000	0.00000
	A	0.00699	0.00656	0.00967
	B	0.00000	0.00000	0.00000
	B	0.00589	0.00602	0.01135
sky130_osu_sc_15T_ms__or2_4	A	0.00000	0.00000	0.00000
	A	0.01330	0.01328	0.01697
	B	0.00000	0.00000	0.00000
	B	0.01218	0.01281	0.01825
sky130_osu_sc_15T_ms__or2_8	A	0.00000	0.00000	0.00000
	A	0.02590	0.02663	0.02969
	B	0.00000	0.00000	0.00000
	B	0.02475	0.02639	0.03317
sky130_osu_sc_15T_ms__or2_l	A	0.00000	0.00000	0.00000
	A	0.00297	0.00256	0.00563
	B	0.00000	0.00000	0.00000
	B	0.00230	0.00219	0.00656

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	0.00904	0.00884	0.01175
	B	0.00000	0.00000	0.00000
	B	0.00762	0.00800	0.01756
sky130_osu_sc_15T_ms__or2_2	A	0.00000	0.00000	0.00000
	A	0.01111	0.01132	0.01406
	B	0.00000	0.00000	0.00000
	B	0.00968	0.01038	0.01934
sky130_osu_sc_15T_ms__or2_4	A	0.00000	0.00000	0.00000
	A	0.01624	0.01715	0.01977
	B	0.00000	0.00000	0.00000
	B	0.01480	0.01615	0.02439
sky130_osu_sc_15T_ms__or2_8	A	0.00000	0.00000	0.00000
	A	0.02709	0.02844	0.03146
	B	0.00000	0.00000	0.00000
	B	0.02564	0.02751	0.03532
sky130_osu_sc_15T_ms__or2_l	A	0.00000	0.00000	0.00000
	A	0.00673	0.00643	0.00876
	B	0.00000	0.00000	0.00000
	B	0.00576	0.00592	0.01218

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)	-0.00203	-0.00232	-0.00232
sky130_osu_sc_15T_ms__or2_2	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00203	-0.00233	-0.00232
sky130_osu_sc_15T_ms__or2_4	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00203	-0.00233	-0.00232
sky130_osu_sc_15T_ms__or2_8	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00203	-0.00232	-0.00232
sky130_osu_sc_15T_ms__or2_l	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	-0.00138	-0.00154	-0.00154

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)	0.00231	0.00233	0.00232
sky130_osu_sc_15T_ms__or2_2	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00231	0.00233	0.00232
sky130_osu_sc_15T_ms__or2_4	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00231	0.00233	0.00232
sky130_osu_sc_15T_ms__or2_8	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00231	0.00233	0.00232
sky130_osu_sc_15T_ms__or2_l	(B * Y)	0.00000	0.00000	0.00000
	(B * Y)	0.00154	0.00155	0.00154

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)	-0.00117	-0.00119	-0.00118
sky130_osu_sc_15T_ms__or2_2	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00117	-0.00119	-0.00118
sky130_osu_sc_15T_ms__or2_4	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00117	-0.00119	-0.00118
sky130_osu_sc_15T_ms__or2_8	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00117	-0.00119	-0.00118
sky130_osu_sc_15T_ms__or2_l	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	-0.00081	-0.00082	-0.00081

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)	0.00124	0.00125	0.00119
sky130_osu_sc_15T_ms__or2_2	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00124	0.00125	0.00119
sky130_osu_sc_15T_ms__or2_4	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00124	0.00125	0.00119
sky130_osu_sc_15T_ms__or2_8	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00124	0.00125	0.00119
sky130_osu_sc_15T_ms__or2_l	(A * Y)	0.00000	0.00000	0.00000
	(A * Y)	0.00085	0.00086	0.00082

SKY130_OSU_SC_15T_MS__TBUFIx

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00391	0.00510	1.02328
sky130_osu_sc_15T_ms__tbufi_l	0.00301	0.00398	0.59743

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__tbufi_1	0.00000	0.00633	0.02504
sky130_osu_sc_15T_ms__tbufi_l	0.00000	0.00710	0.02794

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)	0.03766	0.82001	11.00880
	OE->Y (FR)	0.03820	0.30918	4.59498
	OE->Y (RR)	0.06817	0.66528	6.85596
sky130_osu_sc_15T_ms__tbufi_l	A->Y (FR)	0.05235	0.96437	11.25480
	OE->Y (FR)	0.04552	0.30941	4.59476
	OE->Y (RR)	0.07830	0.76138	6.34417

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)	0.02596	0.55432	7.55042
	OE->Y (FF)	0.03876	0.30918	4.59488
	OE->Y (RF)	0.02666	0.55887	7.51728
sky130_osu_sc_15T_ms__tbufi_l	A->Y (RF)	0.02584	0.49543	5.88067
	OE->Y (FF)	0.04580	0.30941	4.59469
	OE->Y (RF)	0.02615	0.49705	5.85887

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	0.00386	0.00388	0.00508
	OE	0.00000	0.00000	0.00000
	OE	0.00373	0.00340	0.01220
sky130_osu_sc_15T_ms__tbufi_l	A	0.00000	0.00000	0.00000
	A	0.00287	0.00271	0.00318
	OE	0.00000	0.00000	0.00000
	OE	0.00263	0.00240	0.00888

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	-0.00059	-0.00060	-0.00037
	OE	0.00000	0.00000	0.00000
	OE	0.00245	0.00210	0.01284
sky130_osu_sc_15T_ms__tbufi_l	A	0.00000	0.00000	0.00000
	A	-0.00032	-0.00034	-0.00003
	OE	0.00000	0.00000	0.00000
	OE	0.00166	0.00145	0.00906

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)	-0.00195	-0.00196	-0.00196
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	-0.00175	-0.00177	-0.00176
sky130_osu_sc_15T_ms__tbufi_l	(!OE * Y)	0.00000	0.00000	0.00000
	(!OE * Y)	-0.00142	-0.00145	-0.00143
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	-0.00131	-0.00131	-0.00131

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)	0.00195	0.00196	0.00196
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	0.00180	0.00183	0.00179
sky130_osu_sc_15T_ms__tbufi_l	(!OE * Y)	0.00000	0.00000	0.00000
	(!OE * Y)	0.00142	0.00145	0.00143
	(!OE * !Y)	0.00000	0.00000	0.00000
	(!OE * !Y)	0.00133	0.00135	0.00132

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)	0.00140	0.00107	0.01205
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00127	0.00097	0.01190
sky130_osu_sc_15T_ms__tbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00093	0.00073	0.00847
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00084	0.00064	0.00837

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)	0.00459	0.00459	0.01606
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00463	0.00470	0.01612
sky130_osu_sc_15T_ms__tbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00353	0.00349	0.01146
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00357	0.00357	0.01151

SKY130_OSU_SC_15T_MS__TNBUFIx

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00391	0.00587	1.04378
sky130_osu_sc_15T_ms__tnbufi_l	0.00300	0.00427	0.60751

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__tnbufi_1	0.00000	0.01049	0.01257
sky130_osu_sc_15T_ms__tnbufi_l	0.00000	0.01173	0.01407

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)	0.03811	0.82559	11.14450
	OE->Y (RR)	0.02461	0.30958	4.59538
	OE->Y (FR)	0.04816	0.85429	11.36970
sky130_osu_sc_15T_ms__tnbufi_l	A->Y (FR)	0.05268	0.97116	11.38070
	OE->Y (RR)	0.02317	0.30952	4.59536
	OE->Y (FR)	0.06192	1.00045	11.56290

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)	0.02548	0.55781	7.63358
	OE->Y (RF)	0.02430	0.30958	4.59535
	OE->Y (FF)	0.04848	0.50413	5.13711
sky130_osu_sc_15T_ms__tnbufi_l	A->Y (RF)	0.02528	0.49812	5.94042
	OE->Y (RF)	0.02298	0.30953	4.59540
	OE->Y (FF)	0.05442	0.50973	4.49447

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	0.00399	0.00401	0.00521
	OE	0.00000	0.00000	0.00000
	OE	0.00964	0.00998	0.02198
sky130_osu_sc_15T_ms__tnbufi_l	A	0.00000	0.00000	0.00000
	A	0.00300	0.00286	0.00389
	OE	0.00000	0.00000	0.00000
	OE	0.00697	0.00719	0.01544

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	-0.00075	-0.00075	-0.00053
	OE	0.00000	0.00000	0.00000
	OE	0.00852	0.00896	0.01949
sky130_osu_sc_15T_ms__tnbufi_l	A	0.00000	0.00000	0.00000
	A	-0.00048	-0.00049	-0.00019
	OE	0.00000	0.00000	0.00000
	OE	0.00614	0.00636	0.01368

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)	-0.00163	-0.00164	-0.00164
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	-0.00145	-0.00147	-0.00146
sky130_osu_sc_15T_ms__tnbufi_l	(OE * Y)	0.00000	0.00000	0.00000
	(OE * Y)	-0.00112	-0.00114	-0.00113
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	-0.00101	-0.00102	-0.00101

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)	0.00163	0.00164	0.00164
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	0.00150	0.00152	0.00148
sky130_osu_sc_15T_ms__tnbufi_l	(OE * Y)	0.00000	0.00000	0.00000
	(OE * Y)	0.00112	0.00114	0.00113
	(OE * !Y)	0.00000	0.00000	0.00000
	(OE * !Y)	0.00104	0.00105	0.00102

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)	-0.00267	-0.00327	0.00813
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00265	-0.00321	0.00819
sky130_osu_sc_15T_ms__tnbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	-0.00170	-0.00206	0.00592
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	-0.00168	-0.00203	0.00594

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)	0.00730	0.00773	0.01966
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00720	0.00765	0.01956
sky130_osu_sc_15T_ms__tnbufi_l	(A * !Y)	0.00000	0.00000	0.00000
	(A * !Y)	0.00527	0.00551	0.01376
	(!A * Y)	0.00000	0.00000	0.00000
	(!A * Y)	0.00520	0.00548	0.01372

SKY130_OSU_SC_15T_MS__XNOR2

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00774	0.00683	1.06962

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__xnor2_l	0.00000	0.02080	0.03761

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	0.08635	0.70876	7.17240
	A->Y (FR)	!B	0.04970	0.84099	11.24830
	B->Y (RR)	A	0.06945	0.68872	7.15889
	B->Y (FR)	!A	0.06664	0.87423	11.47410

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	0.07820	0.56795	5.38898
	A->Y (RF)	!B	0.03663	0.57411	7.70019
	B->Y (FF)	A	0.06962	0.56000	5.38927
	B->Y (RF)	!A	0.04394	0.58414	7.70251

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	0.00383	0.00340	0.01190
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00965	0.00982	0.02238
	B	A	0.00000	0.00000	0.00000
	B	A	0.00160	0.00141	0.01206
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.01033	0.01039	0.02196

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	0.01186	0.01166	0.02255
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00263	0.00217	0.01261
	B	A	0.00000	0.00000	0.00000
	B	A	0.01069	0.01103	0.02239
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00354	0.00301	0.01343

SKY130_OSU_SC_15T_MS__XOR2

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.00778	0.00687	1.04367

Leakage Information

Cell Name	Leakage(nW)		
	Min.	Avg	Max.
sky130_osu_sc_15T_ms__xor2_l	0.00000	0.02080	0.03264

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	0.08651	0.70154	7.13639
	A->Y (FR)	B	0.06225	0.87193	11.46650
	B->Y (RR)	!A	0.07362	0.69650	7.14817
	B->Y (FR)	A	0.06790	0.87810	11.45540

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	0.07405	0.56725	5.29301
	A->Y (RF)	B	0.03575	0.57524	7.64217
	B->Y (FF)	!A	0.06761	0.55667	5.30581
	B->Y (RF)	A	0.04391	0.58178	7.61023

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	0.01132	0.01141	0.02309
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.00222	0.00124	0.01137
	B	A	0.00000	0.00000	0.00000
	B	A	0.01151	0.01163	0.02311
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.00148	0.00124	0.01180

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	0.00226	0.00161	0.01218
	A	!B	0.00000	0.00000	0.00000
	A	!B	0.01228	0.01251	0.02260
	B	A	0.00000	0.00000	0.00000
	B	A	0.00230	0.00171	0.01204
	B	!A	0.00000	0.00000	0.00000
	B	!A	0.01086	0.01129	0.02261

SKY130_OSU_SC_15T_MS_x

sky130_osu_sc_15T_ms_ff_1P56_-40C.ccs
Cell Library: Process , Voltage 1.56, 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	0.54336
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	207621.00000	415242.00000
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
	-0.00137	0.04599	0.67656

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
	3.61338	3.43321	0.83500