# sky130_osu_sc_12T_hs_ff_1P95_150C.ccs Library

| Cell Groups |
| --- |
| SKY130_OSU_SC_12T_HS__ADDFx |
| SKY130_OSU_SC_12T_HS__ADDHx |
| SKY130_OSU_SC_12T_HS__AND2x |
| SKY130_OSU_SC_12T_HS__AOI21 |
| SKY130_OSU_SC_12T_HS__AOI22 |
| SKY130_OSU_SC_12T_HS__BUFx |
| SKY130_OSU_SC_12T_HS__DFFRx |
| SKY130_OSU_SC_12T_HS__DFFSRx |
| SKY130_OSU_SC_12T_HS__DFFSx |
| SKY130_OSU_SC_12T_HS__DFFx |
| SKY130_OSU_SC_12T_HS__INVx |
| SKY130_OSU_SC_12T_HS__MUX2 |
| SKY130_OSU_SC_12T_HS__NAND2x |
| SKY130_OSU_SC_12T_HS__NOR2x |
| SKY130_OSU_SC_12T_HS__OAI21 |
| SKY130_OSU_SC_12T_HS__OAI22 |
| SKY130_OSU_SC_12T_HS__OR2x |
| SKY130_OSU_SC_12T_HS__TBUFIx |
| SKY130_OSU_SC_12T_HS__TNBUFIx |
| SKY130_OSU_SC_12T_HS__XNOR2 |
| SKY130_OSU_SC_12T_HS__XOR2 |
| SKY130_OSU_SC_12T_HS_x |

# SKY130_OSU_SC_12T_HS__ADDFx

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## 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_12T_hs__addf_1 | 31.25760 |
| sky130_osu_sc_12T_hs__addf_l | 31.25760 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) | | |
|---|---|---|---|---|---|---|
| | A | B | CI | CO | CON | S |
| sky130_osu_sc_12T_hs__addf_1 | 0.01127 | 0.01123 | 0.00861 | 1.95120 | 0.86717 | 1.69624 |
| sky130_osu_sc_12T_hs__addf_l | 0.01127 | 0.01123 | 0.00862 | 1.29624 | 0.86778 | 1.69623 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_12T_hs__addf_1** | 0.00000 | 1100.15000 | 1277.47000 |
| **sky130_osu_sc_12T_hs__addf_l** | 0.00000 | 1549.98000 | 2181.25000 |

# Delay Information

**Delay(ns) to CO rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__addf_1 | A->CO (RR) | 0.09472 | 1.21285 | 21.75480 |
| | B->CO (RR) | 0.09520 | 1.21228 | 21.58910 |
| | CI->CO (RR) | 0.08845 | 1.25617 | 22.56750 |
| | CON->CO (FR) | 0.01469 | 0.50986 | 9.23501 |
| sky130_osu_sc_12T_hs__addf_l | A->CO (RR) | 0.09599 | 1.12424 | 17.26830 |
| | B->CO (RR) | 0.09653 | 1.13285 | 17.39320 |
| | CI->CO (RR) | 0.08973 | 1.16854 | 18.09920 |
| | CON->CO (FR) | 0.01783 | 0.55989 | 9.12050 |

**Delay(ns) to CO falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__addf_1 | A->CO (FF) | 0.11895 | 1.48946 | 26.67190 |
| | B->CO (FF) | 0.10665 | 1.42049 | 25.43360 |
| | CI->CO (FF) | 0.10415 | 1.52386 | 27.46450 |
| | CON->CO (RF) | 0.01593 | 0.48453 | 8.80852 |
| sky130_osu_sc_12T_hs__addf_l | A->CO (FF) | 0.11683 | 1.31760 | 20.16150 |
| | B->CO (FF) | 0.10174 | 1.26465 | 19.54040 |
| | CI->CO (FF) | 0.10204 | 1.35323 | 20.97000 |
| | CON->CO (RF) | 0.01750 | 0.49487 | 8.06152 |

**Delay(ns) to CON rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__addf_1 | A->CON (FR) | 0.09435 | 0.61502 | 7.93042 |
| | B->CON (FR) | 0.07908 | 0.59799 | 8.01551 |
| | CI->CON (FR) | 0.07957 | 0.65137 | 8.75375 |
| sky130_osu_sc_12T_hs__addf_l | A->CON (FR) | 0.08965 | 0.61088 | 7.93080 |
| | B->CON (FR) | 0.07502 | 0.59454 | 8.01528 |
| | CI->CON (FR) | 0.07487 | 0.64727 | 8.75354 |

**Delay(ns) to CON falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__addf_1 | A->CON (RF) | 0.06876 | 0.45117 | 5.77106 |
| | B->CON (RF) | 0.06948 | 0.48246 | 6.27163 |
| | CI->CON (RF) | 0.06249 | 0.49712 | 6.60960 |
| sky130_osu_sc_12T_hs__addf_l | A->CON (RF) | 0.06645 | 0.44901 | 5.77176 |
| | B->CON (RF) | 0.06726 | 0.48030 | 6.27232 |
| | CI->CON (RF) | 0.06018 | 0.49594 | 6.61033 |

**Delay(ns) to S rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__addf_1 | A->S (-R) | 0.17638 | 1.32644 | 20.74640 |
| | B->S (-R) | 0.18436 | 1.30241 | 19.78830 |
| | CI->S (-R) | 0.16053 | 1.35976 | 21.54940 |
| | CON->S (RR) | 0.05266 | 0.45289 | 6.57347 |
| sky130_osu_sc_12T_hs__addf_l | A->S (-R) | 0.17047 | 1.32124 | 20.74210 |
| | B->S (-R) | 0.17847 | 1.29815 | 19.78360 |
| | CI->S (-R) | 0.15460 | 1.35503 | 21.54430 |
| | CON->S (RR) | 0.05267 | 0.45288 | 6.57302 |

**Delay(ns) to S falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__addf_1 | A->S (-F) | 0.15732 | 1.14441 | 17.38470 |
| | B->S (-F) | 0.15185 | 1.10735 | 16.99860 |
| | CI->S (-F) | 0.15268 | 1.18908 | 18.21140 |
| | CON->S (FF) | 0.06378 | 0.50679 | 7.13471 |
| sky130_osu_sc_12T_hs__addf_l | A->S (-F) | 0.15353 | 1.14093 | 17.37950 |
| | B->S (-F) | 0.14838 | 1.10472 | 16.99510 |
| | CI->S (-F) | 0.14880 | 1.18604 | 18.20760 |
| | CON->S (FF) | 0.06381 | 0.50675 | 7.13379 |

# Power Information

**Internal switching power(pJ) to CO rising :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__addf_1 | A | 0.01893 | 0.02713 | 0.19748 |
| | B | 0.02054 | 0.02797 | 0.18365 |
| | CI | 0.02069 | 0.02897 | 0.19675 |
| sky130_osu_sc_12T_hs__addf_l | A | 0.01677 | 0.02310 | 0.14421 |
| | B | 0.01718 | 0.02310 | 0.13811 |
| | CI | 0.01855 | 0.02501 | 0.14424 |

**Internal switching power(pJ) to CO falling :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__addf_1 | A | 0.03056 | 0.04467 | 0.32732 |
| | B | 0.02827 | 0.04027 | 0.28901 |
| | CI | 0.02908 | 0.04345 | 0.32534 |
| sky130_osu_sc_12T_hs__addf_l | A | 0.03698 | 0.04697 | 0.22592 |
| | B | 0.03496 | 0.04337 | 0.20072 |
| | CI | 0.03564 | 0.04586 | 0.22359 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__addf_1 | A | 0.02393 | 0.03311 | 0.18443 |
| | B | 0.02240 | 0.03023 | 0.16639 |
| | CI | 0.02262 | 0.03205 | 0.18250 |
| sky130_osu_sc_12T_hs__addf_l | A | 0.03154 | 0.03966 | 0.17562 |
| | B | 0.02955 | 0.03639 | 0.15826 |
| | CI | 0.03049 | 0.03883 | 0.17362 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__addf_1 | A | 0.01194 | 0.01769 | 0.12491 |
| | B | 0.01297 | 0.01842 | 0.12464 |
| | CI | 0.01393 | 0.01982 | 0.12683 |
| sky130_osu_sc_12T_hs__addf_l | A | 0.01142 | 0.01687 | 0.11921 |
| | B | 0.01246 | 0.01763 | 0.11925 |
| | CI | 0.01341 | 0.01904 | 0.12096 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__addf_1 | A | 0.02692 | 0.03467 | 0.28463 |
| | B | 0.02930 | 0.03593 | 0.25433 |
| | CI | 0.03035 | 0.03902 | 0.26226 |
| sky130_osu_sc_12T_hs__addf_l | A | 0.02681 | 0.03455 | 0.28448 |
| | B | 0.02918 | 0.03581 | 0.25418 |
| | CI | 0.03024 | 0.03891 | 0.26211 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__addf_1 | A | 0.05282 | 0.06243 | 0.28641 |
| | B | 0.04594 | 0.05450 | 0.25203 |
| | CI | 0.04210 | 0.05149 | 0.25455 |
| sky130_osu_sc_12T_hs__addf_l | A | 0.06504 | 0.07142 | 0.29116 |
| | B | 0.06274 | 0.07027 | 0.26545 |
| | CI | 0.06049 | 0.06772 | 0.26238 |

# SKY130_OSU_SC_12T_HS__ADDHx

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_12T_hs__addh_1 | 18.55920 |
| sky130_osu_sc_12T_hs__addh_l | 18.55920 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) | | |
|---|---|---|---|---|---|
| | A | B | CO | CON | S |
| sky130_osu_sc_12T_hs__addh_1 | 0.00560 | 0.00595 | 1.86223 | 1.91490 | 1.97513 |
| sky130_osu_sc_12T_hs__addh_l | 0.00546 | 0.00584 | 1.28870 | 1.91611 | 1.33201 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_12T_hs__addh_1 | 0.00000 | 1214.56000 | 1261.89000 |
| sky130_osu_sc_12T_hs__addh_l | 0.00000 | 2126.78000 | 2172.03000 |

# Delay Information

**Delay(ns) to CO rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__addh_1 | A->CO (RR) | 0.06998 | 0.50903 | 7.33502 |
| | B->CO (RR) | 0.07297 | 0.50015 | 7.43045 |
| sky130_osu_sc_12T_hs__addh_l | A->CO (RR) | 0.06238 | 0.51606 | 6.96572 |
| | B->CO (RR) | 0.06484 | 0.50686 | 6.94677 |

**Delay(ns) to CO falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__addh_1 | A->CO (FF) | 0.05509 | 0.48998 | 7.38344 |
| | B->CO (FF) | 0.05935 | 0.51053 | 7.66246 |
| sky130_osu_sc_12T_hs__addh_l | A->CO (FF) | 0.05115 | 0.48351 | 6.58221 |
| | B->CO (FF) | 0.05483 | 0.50513 | 6.89504 |

**Delay(ns) to CON rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__addh_1 | A->CON (RR) | 0.09677 | 0.52031 | 7.28536 |
| | B->CON (RR) | 0.09887 | 0.51100 | 7.41252 |
| sky130_osu_sc_12T_hs__addh_l | A->CON (RR) | 0.07976 | 0.46956 | 6.87099 |
| | B->CON (RR) | 0.08140 | 0.46089 | 6.91482 |

**Delay(ns) to CON falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__addh_1 | A->CON (FF) | 0.08316 | 0.51565 | 7.57675 |
| | B->CON (FF) | 0.08041 | 0.52771 | 7.80040 |
| sky130_osu_sc_12T_hs__addh_l | A->CON (FF) | 0.07071 | 0.48013 | 7.23067 |
| | B->CON (FF) | 0.06844 | 0.49269 | 7.46719 |

**Delay(ns) to S rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__addh_1 | A->S (FR) | 0.10635 | 1.04105 | 17.54190 |
| | B->S (FR) | 0.10333 | 1.05490 | 17.84000 |
| | CON->S (FR) | 0.01614 | 0.51816 | 9.40541 |
| sky130_osu_sc_12T_hs__addh_l | A->S (FR) | 0.09641 | 0.94103 | 13.71890 |
| | B->S (FR) | 0.09360 | 0.95386 | 13.97810 |
| | CON->S (FR) | 0.01848 | 0.57006 | 9.34957 |

**Delay(ns) to S falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__addh_1 | A->S (RF) | 0.12289 | 1.09676 | 18.22930 |
| | B->S (RF) | 0.12496 | 1.08686 | 18.33180 |
| | CON->S (RF) | 0.01748 | 0.54302 | 9.88353 |
| sky130_osu_sc_12T_hs__addh_l | A->S (RF) | 0.10321 | 0.90231 | 12.93990 |
| | B->S (RF) | 0.10487 | 0.89185 | 12.93100 |
| | CON->S (RF) | 0.01712 | 0.50166 | 8.24504 |

# Power Information

**Internal switching power(pJ) to CO rising :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__addh_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01743 | 0.02107 | 0.09908 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01689 | 0.02086 | 0.11713 |
| sky130_osu_sc_12T_hs__addh_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02461 | 0.02903 | 0.11910 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02405 | 0.02898 | 0.13715 |

**Internal switching power(pJ) to CO falling :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__addh_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01799 | 0.02242 | 0.11868 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01984 | 0.02517 | 0.12976 |
| sky130_osu_sc_12T_hs__addh_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02268 | 0.02786 | 0.13146 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02439 | 0.03043 | 0.14410 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__addh_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01746 | 0.02111 | 0.09938 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01694 | 0.02091 | 0.11718 |
| sky130_osu_sc_12T_hs__addh_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02459 | 0.02901 | 0.12028 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02406 | 0.02900 | 0.13839 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__addh_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01808 | 0.02251 | 0.11897 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01993 | 0.02527 | 0.13048 |
| sky130_osu_sc_12T_hs__addh_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02386 | 0.02911 | 0.13634 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02559 | 0.03178 | 0.15008 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__addh_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02115 | 0.02560 | 0.12313 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02333 | 0.02868 | 0.13520 |
| sky130_osu_sc_12T_hs__addh_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02854 | 0.03369 | 0.13788 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.03050 | 0.03657 | 0.15059 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__addh_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02099 | 0.02471 | 0.10633 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02043 | 0.02443 | 0.12150 |
| sky130_osu_sc_12T_hs__addh_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02521 | 0.02964 | 0.12023 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02463 | 0.02956 | 0.13807 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__addh_1 | (!B * !CO * !CON * S) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !CO * !CON * S) | 2.89496 | 2.79464 | 1.20421 |
| sky130_osu_sc_12T_hs__addh_l | (!B * !CO * !CON * S) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !CO * !CON * S) | 2.92879 | 2.82739 | 1.21919 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__addh_1 | (!A * !CO * !CON * S) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !CO * !CON * S) | 2.89502 | 2.79991 | 1.30998 |
| sky130_osu_sc_12T_hs__addh_l | (!A * !CO * !CON * S) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !CO * !CON * S) | 2.92890 | 2.83270 | 1.32462 |

# SKY130_OSU_SC_12T_HS__AND2x

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_12T_hs__and2_1 | 8.30280 |
| sky130_osu_sc_12T_hs__and2_2 | 10.25640 |
| sky130_osu_sc_12T_hs__and2_4 | 14.16360 |
| sky130_osu_sc_12T_hs__and2_6 | 18.07080 |
| sky130_osu_sc_12T_hs__and2_8 | 21.97800 |
| sky130_osu_sc_12T_hs__and2_l | 8.30280 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_12T_hs__and2_1 | 0.00295 | 0.00309 | 1.85477 |
| sky130_osu_sc_12T_hs__and2_2 | 0.00295 | 0.00309 | 3.62122 |
| sky130_osu_sc_12T_hs__and2_4 | 0.00295 | 0.00309 | 7.00639 |
| sky130_osu_sc_12T_hs__and2_6 | 0.00298 | 0.00309 | 10.26550 |
| sky130_osu_sc_12T_hs__and2_8 | 0.00295 | 0.00310 | 13.52749 |
| sky130_osu_sc_12T_hs__and2_l | 0.00228 | 0.00237 | 1.27406 |

# Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_12T_hs__and2_1** | 0.00000 | 531.36500 | 847.43200 |
| **sky130_osu_sc_12T_hs__and2_2** | 0.00000 | 848.63500 | 855.78400 |
| **sky130_osu_sc_12T_hs__and2_4** | 0.00000 | 1482.94000 | 1688.63000 |
| **sky130_osu_sc_12T_hs__and2_6** | 0.00000 | 2117.22000 | 2529.16000 |
| **sky130_osu_sc_12T_hs__and2_8** | 0.00000 | 2751.25000 | 3369.47000 |
| **sky130_osu_sc_12T_hs__and2_l** | 0.00000 | 1654.73000 | 2633.49000 |

# Delay Information

**Delay(ns) to Y rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__and2_1 | A->Y (RR) | 0.04682 | 0.43304 | 6.88287 |
| | B->Y (RR) | 0.05031 | 0.41333 | 6.44262 |
| sky130_osu_sc_12T_hs__and2_2 | A->Y (RR) | 0.05383 | 0.37973 | 6.84352 |
| | B->Y (RR) | 0.05740 | 0.35685 | 6.36612 |
| sky130_osu_sc_12T_hs__and2_4 | A->Y (RR) | 0.07613 | 0.37242 | 6.93495 |
| | B->Y (RR) | 0.07972 | 0.34655 | 6.43667 |
| sky130_osu_sc_12T_hs__and2_6 | A->Y (RR) | 0.09976 | 0.38823 | 6.96511 |
| | B->Y (RR) | 0.10326 | 0.36040 | 6.45545 |
| sky130_osu_sc_12T_hs__and2_8 | A->Y (RR) | 0.12249 | 0.41169 | 7.09813 |
| | B->Y (RR) | 0.12608 | 0.38175 | 6.57265 |
| sky130_osu_sc_12T_hs__and2_1 | A->Y (RR) | 0.05134 | 0.49679 | 7.06523 |
| | B->Y (RR) | 0.05505 | 0.47267 | 6.59996 |

**Delay(ns) to Y falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_12T_hs__and2_1** | **A->Y (FF)** | 0.04211 | 0.42961 | 6.67491 |
| | **B->Y (FF)** | 0.04236 | 0.43490 | 6.77221 |
| **sky130_osu_sc_12T_hs__and2_2** | **A->Y (FF)** | 0.04687 | 0.37639 | 6.60790 |
| | **B->Y (FF)** | 0.04698 | 0.38171 | 6.73811 |
| **sky130_osu_sc_12T_hs__and2_4** | **A->Y (FF)** | 0.06547 | 0.36808 | 6.66468 |
| | **B->Y (FF)** | 0.06417 | 0.37044 | 6.79970 |
| **sky130_osu_sc_12T_hs__and2_6** | **A->Y (FF)** | 0.08583 | 0.38429 | 6.67473 |
| | **B->Y (FF)** | 0.08295 | 0.38334 | 6.80585 |
| **sky130_osu_sc_12T_hs__and2_8** | **A->Y (FF)** | 0.10524 | 0.40484 | 6.70974 |
| | **B->Y (FF)** | 0.10112 | 0.40126 | 6.83455 |
| **sky130_osu_sc_12T_hs__and2_1** | **A->Y (FF)** | 0.04330 | 0.44234 | 6.08727 |
| | **B->Y (FF)** | 0.04614 | 0.45868 | 6.33285 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__and2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02603 | 0.04039 | 0.31851 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02577 | 0.03746 | 0.27059 |
| sky130_osu_sc_12T_hs__and2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03073 | 0.04465 | 0.34071 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.03048 | 0.04179 | 0.27766 |
| sky130_osu_sc_12T_hs__and2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.04396 | 0.05535 | 0.34498 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.04371 | 0.05274 | 0.29127 |
| sky130_osu_sc_12T_hs__and2_6 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.06294 | 0.06958 | 0.36673 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.06269 | 0.06582 | 0.30666 |
| sky130_osu_sc_12T_hs__and2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.08626 | 0.08496 | 0.38863 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.08596 | 0.08104 | 0.31988 |
| sky130_osu_sc_12T_hs__and2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.07257 | 0.08405 | 0.30869 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.07192 | 0.08180 | 0.28502 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__and2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01942 | 0.03434 | 0.29252 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02059 | 0.03553 | 0.29621 |
| sky130_osu_sc_12T_hs__and2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03302 | 0.04689 | 0.30331 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.03414 | 0.04817 | 0.30711 |
| sky130_osu_sc_12T_hs__and2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.06542 | 0.07447 | 0.32465 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.06608 | 0.07566 | 0.32751 |
| sky130_osu_sc_12T_hs__and2_6 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.10177 | 0.10360 | 0.34748 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.10163 | 0.10439 | 0.34945 |
| sky130_osu_sc_12T_hs__and2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.14313 | 0.13457 | 0.37137 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.14215 | 0.13481 | 0.37138 |
| sky130_osu_sc_12T_hs__and2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03582 | 0.04834 | 0.26621 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.03701 | 0.04946 | 0.26950 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__and2_1 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00042 | 0.00039 | 0.00036 |
| sky130_osu_sc_12T_hs__and2_2 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00408 | 0.00404 | 0.00401 |
| sky130_osu_sc_12T_hs__and2_4 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.01138 | 0.01135 | 0.01131 |
| sky130_osu_sc_12T_hs__and2_6 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.01865 | 0.01862 | 0.01857 |
| sky130_osu_sc_12T_hs__and2_8 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.02598 | 0.02595 | 0.02591 |
| sky130_osu_sc_12T_hs__and2_l | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00923 | 0.00920 | 0.00917 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__and2_1 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00702 | 0.00704 | 0.00702 |
| sky130_osu_sc_12T_hs__and2_2 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.01069 | 0.01070 | 0.01068 |
| sky130_osu_sc_12T_hs__and2_4 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.01800 | 0.01803 | 0.01801 |
| sky130_osu_sc_12T_hs__and2_6 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.02536 | 0.02539 | 0.02537 |
| sky130_osu_sc_12T_hs__and2_8 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.03265 | 0.03267 | 0.03267 |
| sky130_osu_sc_12T_hs__and2_l | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.01394 | 0.01396 | 0.01395 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__and2_1 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00059 | 0.00057 | 0.00057 |
| sky130_osu_sc_12T_hs__and2_2 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00423 | 0.00422 | 0.00422 |
| sky130_osu_sc_12T_hs__and2_4 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.01153 | 0.01149 | 0.01152 |
| sky130_osu_sc_12T_hs__and2_6 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.01882 | 0.01878 | 0.01881 |
| sky130_osu_sc_12T_hs__and2_8 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.02611 | 0.02608 | 0.02611 |
| sky130_osu_sc_12T_hs__and2_1 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00932 | 0.00930 | 0.00931 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__and2_1 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00706 | 0.00694 | 0.00690 |
| sky130_osu_sc_12T_hs__and2_2 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.01072 | 0.01060 | 0.01057 |
| sky130_osu_sc_12T_hs__and2_4 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.01805 | 0.01793 | 0.01790 |
| sky130_osu_sc_12T_hs__and2_6 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.02538 | 0.02526 | 0.02522 |
| sky130_osu_sc_12T_hs__and2_8 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.03271 | 0.03259 | 0.03254 |
| sky130_osu_sc_12T_hs__and2_l | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.01397 | 0.01388 | 0.01384 |

# SKY130_OSU_SC_12T_HS__AOI21

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## 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_12T_hs__aoi21_l | 8.30280 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) |
|---|---|---|---|---|
| | A0 | A1 | B0 | Y |
| sky130_osu_sc_12T_hs__aoi21_l | 0.00274 | 0.00289 | 0.00288 | 0.77395 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_12T_hs__aoi21_l | 0.00000 | 237.42200 | 528.77600 |

# Delay Information

**Delay(ns) to Y rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__aoi21_l | A0->Y (FR) | 0.04804 | 0.56450 | 7.54039 |
| | A1->Y (FR) | 0.03763 | 0.51092 | 6.93388 |
| | B0->Y (FR) | 0.03583 | 0.61331 | 8.51540 |

**Delay(ns) to Y falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__aoi21_l | A0->Y (RF) | 0.03544 | 0.39077 | 5.12270 |
| | A1->Y (RF) | 0.03255 | 0.42630 | 5.75314 |
| | B0->Y (RF) | 0.02092 | 0.40947 | 5.69674 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.00852 | 0.01346 | 0.12179 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.00711 | 0.01194 | 0.11640 |
| | B0 | 0.00498 | 0.01135 | 0.12403 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.01149 | 0.01516 | 0.09978 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.01202 | 0.01623 | 0.10234 |
| | B0 | 0.00714 | 0.01167 | 0.09547 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | -0.00107 | -0.00157 | 0.00053 |
| | (!A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !Y) | 0.00091 | 0.00088 | 0.00089 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00265 | -0.00268 | -0.00266 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.00643 | 0.00640 | 0.00595 |
| | (!A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !Y) | 0.00640 | 0.00641 | 0.00639 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00304 | 0.00293 | 0.00288 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | -0.00104 | -0.00156 | 0.00054 |
| | (!A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !Y) | 0.00090 | 0.00084 | 0.00088 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | -0.00293 | -0.00293 | -0.00299 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | 0.00645 | 0.00640 | 0.00596 |
| | (!A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !Y) | 0.00640 | 0.00643 | 0.00639 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | 0.00309 | 0.00313 | 0.00311 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi21_l | (A0 * A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !Y) | -0.00073 | -0.00072 | 0.00017 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi21_l | (A0 * A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !Y) | 0.00664 | 0.00650 | 0.00435 |

# SKY130_OSU_SC_12T_HS__AOI22

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## 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_12T_hs__aoi22_l | 10.25640 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | | Max Cap(pf) |
|---|---|---|---|---|---|
| | A0 | A1 | B0 | B1 | Y |
| sky130_osu_sc_12T_hs__aoi22_l | 0.00274 | 0.00288 | 0.00301 | 0.00283 | 0.76018 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_12T_hs__aoi22_l | 0.00000 | 268.16400 | 830.90700 |

# Delay Information

**Delay(ns) to Y rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__aoi22_l | A0->Y (FR) | 0.06091 | 0.57841 | 7.52594 |
| | A1->Y (FR) | 0.05458 | 0.56722 | 7.43546 |
| | B0->Y (FR) | 0.03735 | 0.61443 | 8.47706 |
| | B1->Y (FR) | 0.04392 | 0.62695 | 8.58063 |

**Delay(ns) to Y falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__aoi22_l | A0->Y (RF) | 0.04579 | 0.40099 | 5.09353 |
| | A1->Y (RF) | 0.04279 | 0.43598 | 5.70990 |
| | B0->Y (RF) | 0.02305 | 0.41218 | 5.66316 |
| | B1->Y (RF) | 0.02665 | 0.37724 | 5.03181 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi22_l | A0 | 0.01038 | 0.01532 | 0.12984 |
| | A1 | 0.00898 | 0.01384 | 0.12320 |
| | B0 | 0.00544 | 0.01199 | 0.13066 |
| | B1 | 0.00687 | 0.01313 | 0.12862 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi22_l | A0 | 0.01375 | 0.01749 | 0.10750 |
| | A1 | 0.01428 | 0.01843 | 0.10784 |
| | B0 | 0.01545 | 0.01997 | 0.10259 |
| | B1 | 0.01477 | 0.01871 | 0.09907 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi22_l | (A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * B1 * !Y) | -0.00063 | -0.00111 | 0.00344 |
| | (!A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * B1 * !Y) | 0.00449 | 0.00445 | 0.00447 |
| | (!A1 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !B1 * Y) | -0.00262 | -0.00264 | -0.00263 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00261 | -0.00263 | -0.00262 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi22_l | (A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * B1 * !Y) | 0.01001 | 0.00988 | 0.00877 |
| | (!A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * B1 * !Y) | 0.00998 | 0.00999 | 0.00996 |
| | (!A1 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !B1 * Y) | 0.00307 | 0.00296 | 0.00291 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00308 | 0.00297 | 0.00292 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi22_l | (A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * B1 * !Y) | -0.00062 | -0.00109 | 0.00345 |
| | (!A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * B1 * !Y) | 0.00447 | 0.00441 | 0.00445 |
| | (!A0 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !B1 * Y) | -0.00289 | -0.00290 | -0.00295 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | -0.00289 | -0.00289 | -0.00294 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi22_l | (A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * B1 * !Y) | 0.01004 | 0.00994 | 0.00879 |
| | (!A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * B1 * !Y) | 0.00998 | 0.01001 | 0.00996 |
| | (!A0 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !B1 * Y) | 0.00311 | 0.00315 | 0.00313 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | 0.00312 | 0.00316 | 0.00314 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi22_l | (A0 * A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B1 * !Y) | -0.00067 | -0.00066 | -0.00003 |
| | (A0 * A1 * !B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B1 * !Y) | 0.00366 | 0.00364 | 0.00366 |
| | (!A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B1 * Y) | -0.00302 | -0.00304 | -0.00308 |
| | (!A0 * A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B1 * Y) | -0.00303 | -0.00305 | -0.00309 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi22_l | (A0 * A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B1 * !Y) | 0.00681 | 0.00668 | 0.00459 |
| | (A0 * A1 * !B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B1 * !Y) | 0.00579 | 0.00579 | 0.00557 |
| | (!A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B1 * Y) | 0.00326 | 0.00326 | 0.00327 |
| | (!A0 * A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B1 * Y) | 0.00325 | 0.00326 | 0.00326 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi22_l | (A0 * A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B0 * !Y) | -0.00069 | -0.00068 | -0.00005 |
| | (A0 * A1 * !B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B0 * !Y) | 0.00364 | 0.00363 | 0.00365 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00276 | -0.00277 | -0.00277 |
| | (!A0 * A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B0 * Y) | -0.00277 | -0.00278 | -0.00278 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__aoi22_l | (A0 * A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B0 * !Y) | 0.00682 | 0.00670 | 0.00460 |
| | (A0 * A1 * !B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B0 * !Y) | 0.00580 | 0.00580 | 0.00559 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00322 | 0.00311 | 0.00307 |
| | (!A0 * A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B0 * Y) | 0.00321 | 0.00310 | 0.00306 |

# SKY130_OSU_SC_12T_HS__BUFx

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## Truth Table

| INPUT | OUTPUT |
|---|---|
| A | Y |
| 0 | 0 |
| 1 | 1 |

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_12T_hs__buf_1 | 6.34920 |
| sky130_osu_sc_12T_hs__buf_2 | 8.30280 |
| sky130_osu_sc_12T_hs__buf_4 | 12.21000 |
| sky130_osu_sc_12T_hs__buf_6 | 16.11720 |
| sky130_osu_sc_12T_hs__buf_8 | 20.02440 |
| sky130_osu_sc_12T_hs__buf_l | 6.34920 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | Max Cap(pf) |
|---|---|---|
| | A | Y |
| sky130_osu_sc_12T_hs__buf_1 | 0.00309 | 1.73160 |
| sky130_osu_sc_12T_hs__buf_2 | 0.00309 | 3.56698 |
| sky130_osu_sc_12T_hs__buf_4 | 0.00308 | 7.01205 |
| sky130_osu_sc_12T_hs__buf_6 | 0.00082 | 1.80000 |
| sky130_osu_sc_12T_hs__buf_8 | 0.00309 | 13.68149 |
| sky130_osu_sc_12T_hs__buf_l | 0.00233 | 1.29400 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_12T_hs__buf_1** | 0.00000 | 428.48500 | 428.77900 |
| **sky130_osu_sc_12T_hs__buf_2** | 0.00000 | 642.96300 | 849.45100 |
| **sky130_osu_sc_12T_hs__buf_4** | 0.00000 | 1071.74000 | 1690.50000 |
| **sky130_osu_sc_12T_hs__buf_6** | 0.00000 | 0.00000 | 0.00000 |
| **sky130_osu_sc_12T_hs__buf_8** | 0.00000 | 1929.13000 | 3372.33000 |
| **sky130_osu_sc_12T_hs__buf_l** | 0.00000 | 1329.62000 | 1331.25000 |

# Delay Information

**Delay(ns) to Y rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_12T_hs__buf_1** | **A->Y (RR)** | 0.03825 | 0.39587 | 6.09685 |
| **sky130_osu_sc_12T_hs__buf_2** | **A->Y (RR)** | 0.04157 | 0.33118 | 6.05831 |
| **sky130_osu_sc_12T_hs__buf_4** | **A->Y (RR)** | 0.05706 | 0.31548 | 6.11016 |
| **sky130_osu_sc_12T_hs__buf_8** | **A->Y (RR)** | 0.09022 | 0.34560 | 6.24363 |
| **sky130_osu_sc_12T_hs__buf_l** | **A->Y (RR)** | 0.04065 | 0.44912 | 6.40842 |

**Delay(ns) to Y falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_12T_hs__buf_1** | **A->Y (FF)** | 0.03862 | 0.42066 | 6.50348 |
| **sky130_osu_sc_12T_hs__buf_2** | **A->Y (FF)** | 0.04374 | 0.38074 | 6.80985 |
| **sky130_osu_sc_12T_hs__buf_4** | **A->Y (FF)** | 0.06212 | 0.37433 | 6.96530 |
| **sky130_osu_sc_12T_hs__buf_8** | **A->Y (FF)** | 0.10132 | 0.40988 | 7.06864 |
| **sky130_osu_sc_12T_hs__buf_l** | **A->Y (FF)** | 0.04171 | 0.45888 | 6.53045 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__buf_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01452 | 0.02627 | 0.23487 |
| sky130_osu_sc_12T_hs__buf_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01857 | 0.03082 | 0.24382 |
| sky130_osu_sc_12T_hs__buf_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02922 | 0.04163 | 0.26073 |
| sky130_osu_sc_12T_hs__buf_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.06152 | 0.06862 | 0.30040 |
| sky130_osu_sc_12T_hs__buf_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03752 | 0.04953 | 0.27396 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__buf_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01830 | 0.03335 | 0.29353 |
| sky130_osu_sc_12T_hs__buf_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03205 | 0.04621 | 0.30520 |
| sky130_osu_sc_12T_hs__buf_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.06432 | 0.07381 | 0.32588 |
| sky130_osu_sc_12T_hs__buf_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.14239 | 0.13404 | 0.36887 |
| sky130_osu_sc_12T_hs__buf_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03621 | 0.04951 | 0.28081 |

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

| Cell Name | Power(pJ) | | |
|---|---|---|---|
| | first | mid | last |
| sky130_osu_sc_12T_hs__buf_6 | 0.00000 | 0.00000 | 0.00000 |
| | -0.00081 | -0.00081 | -0.00076 |

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

| Cell Name | Power(pJ) | | |
|---|---|---|---|
| | first | mid | last |
| sky130_osu_sc_12T_hs__buf_6 | 0.00000 | 0.00000 | 0.00000 |
| | 0.00081 | 0.00081 | 0.00076 |

# SKY130_OSU_SC_12T_HS__DFFRx

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

## 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_12T_hs__dffr_1 | 42.49080 |
| sky130_osu_sc_12T_hs__dffr_l | 42.49080 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) | |
|---|---|---|---|---|---|
| | D | RN | CK | Q | QN |
| sky130_osu_sc_12T_hs__dffr_1 | 0.00287 | 0.00281 | 0.00862 | 1.87512 | 1.84144 |
| sky130_osu_sc_12T_hs__dffr_l | 0.00287 | 0.00281 | 0.00860 | 1.30993 | 1.29621 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_12T_hs__dffr_1 | 0.00000 | 2061.60000 | 3216.12000 |
| sky130_osu_sc_12T_hs__dffr_l | 0.00000 | 2962.99000 | 4118.25000 |

# Delay Information

**Delay(ns) to Q rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__dffr_1 | CK->Q (RR) | 0.17304 | 0.98431 | 14.44670 |
| | QN->Q (FR) | 0.01729 | 0.58396 | 10.48250 |
| sky130_osu_sc_12T_hs__dffr_l | CK->Q (RR) | 0.17328 | 1.06271 | 13.87590 |
| | QN->Q (FR) | 0.01941 | 0.61090 | 9.98893 |

**Delay(ns) to Q falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__dffr_1 | CK->Q (RF) | 0.18478 | 1.00429 | 14.98310 |
| | QN->Q (RF) | 0.01712 | 0.52275 | 9.38007 |
| | RN->Q (FF) | 0.13981 | 1.02104 | 15.84770 |
| sky130_osu_sc_12T_hs__dffr_l | CK->Q (RF) | 0.18846 | 1.10545 | 14.67350 |
| | QN->Q (RF) | 0.01832 | 0.53359 | 8.71225 |
| | RN->Q (FF) | 0.14369 | 1.12078 | 15.52580 |

**Delay(ns) to QN rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__dffr_1 | CK->QN (RR) | 0.16557 | 0.53597 | 6.21568 |
| | RN->QN (FR) | 0.12054 | 0.55223 | 7.08317 |
| sky130_osu_sc_12T_hs__dffr_l | CK->QN (RR) | 0.16662 | 0.58995 | 6.32767 |
| | RN->QN (FR) | 0.12173 | 0.60525 | 7.18481 |

**Delay(ns) to QN falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_12T_hs__dffr_1** | **CK->QN (RF)** | 0.15185 | 0.51188 | 5.62029 |
| **sky130_osu_sc_12T_hs__dffr_l** | **CK->QN (RF)** | 0.14874 | 0.52686 | 5.19205 |

# Constraint Information

**Constraints(ns) for D rising :**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | hold | CK (R) | -0.04271 | -0.03533 | 1.38883 |
| | setup | CK (R) | 0.13111 | 0.16377 | 0.40069 |
| sky130_osu_sc_12T_hs__dffr_l | hold | CK (R) | -0.04271 | -0.03533 | 1.25466 |
| | setup | CK (R) | 0.13437 | 0.16377 | 0.39137 |

**Constraints(ns) for D falling :**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | hold | CK (R) | -0.06969 | -0.18105 | -2.39282 |
| | setup | CK (R) | 0.08980 | 0.19451 | 4.06892 |
| sky130_osu_sc_12T_hs__dffr_l | hold | CK (R) | -0.07052 | -0.18141 | -2.35187 |
| | setup | CK (R) | 0.08980 | 0.19451 | 4.06917 |

**Constraints(ns) for D rising (conditional):**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | hold | CK (R) | -0.04271 | -0.03533 | 1.38883 |
| | setup | CK (R) | 0.13111 | 0.16377 | 0.40069 |
| sky130_osu_sc_12T_hs__dffr_l | hold | CK (R) | -0.04271 | -0.03533 | 1.25466 |
| | setup | CK (R) | 0.13437 | 0.16377 | 0.39137 |

**Constraints(ns) for D falling (conditional):**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | hold | CK (R) | -0.06969 | -0.18105 | -2.39282 |
| | setup | CK (R) | 0.08980 | 0.19451 | 4.06892 |
| sky130_osu_sc_12T_hs__dffr_l | hold | CK (R) | -0.07052 | -0.18141 | -2.35187 |
| | setup | CK (R) | 0.08980 | 0.19451 | 4.06917 |

**Constraints(ns) for RN rising :**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | recovery | CK (R) | 0.11564 | 0.16067 | 1.08003 |
| | removal | CK (R) | -0.02629 | -0.03040 | -0.03111 |
| sky130_osu_sc_12T_hs__dffr_l | recovery | CK (R) | 0.11366 | 0.16088 | 1.08343 |
| | removal | CK (R) | -0.02629 | -0.03040 | -0.03111 |

**Constraints(ns) for RN rising (conditional):**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | recovery | CK (R) | 0.11564 | 0.16067 | 1.08003 |
| | removal | CK (R) | -0.02629 | -0.03040 | -0.03111 |
| sky130_osu_sc_12T_hs__dffr_l | recovery | CK (R) | 0.11366 | 0.16088 | 1.08343 |
| | removal | CK (R) | -0.02629 | -0.03040 | -0.03111 |

**Constraints(ns) for RN falling (conditional):**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | min_pulse_width | RN () | 0.08476 | 0.39917 | 13.33370 |
| | min_pulse_width | RN () | 0.08476 | 0.39917 | 13.33370 |
| sky130_osu_sc_12T_hs__dffr_l | min_pulse_width | RN () | 0.08174 | 0.39917 | 13.33370 |
| | min_pulse_width | RN () | 0.08174 | 0.39917 | 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_12T_hs__dffr_1 | min_pulse_width | CK () | 0.08779 | 0.39917 | 13.33370 |
| | min_pulse_width | CK () | 0.09686 | 0.39917 | 13.33370 |
| sky130_osu_sc_12T_hs__dffr_l | min_pulse_width | CK () | 0.08476 | 0.39917 | 13.33370 |
| | min_pulse_width | CK () | 0.09383 | 0.39917 | 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_12T_hs__dffr_1 | min_pulse_width | CK () | 0.16941 | 0.39917 | 13.33370 |
| | min_pulse_width | CK () | 0.07267 | 0.39917 | 13.33370 |
| sky130_osu_sc_12T_hs__dffr_l | min_pulse_width | CK () | 0.16941 | 0.39917 | 13.33370 |
| | min_pulse_width | CK () | 0.07267 | 0.39917 | 13.33370 |

# Power Information

**Internal switching power(pJ) to Q rising :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.04216 | 0.05432 | 0.26210 |
| sky130_osu_sc_12T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.05485 | 0.06780 | 0.28950 |

**Internal switching power(pJ) to Q falling :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.06181 | 0.06839 | 0.21474 |
| | RN | -0.00111 | -0.09289 | -1.78219 |
| | RN | 0.06085 | 0.06817 | 0.22314 |
| sky130_osu_sc_12T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.07232 | 0.07991 | 0.24727 |
| | RN | -0.00110 | -0.07486 | -1.24427 |
| | RN | 0.07197 | 0.08044 | 0.25591 |

**Internal switching power(pJ) to QN rising :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.05320 | 0.05970 | 0.20629 |
| | RN | -0.00111 | -0.09189 | -1.75001 |
| | RN | 0.05408 | 0.06144 | 0.21466 |
| sky130_osu_sc_12T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.06419 | 0.07179 | 0.23945 |
| | RN | -0.00110 | -0.07439 | -1.23117 |
| | RN | 0.06522 | 0.07368 | 0.24788 |

**Internal switching power(pJ) to QN falling :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.03215 | 0.04431 | 0.24792 |
| sky130_osu_sc_12T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.03943 | 0.05234 | 0.27284 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01489 | 0.01448 | 0.01691 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.02612 | 0.03926 | 0.32868 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.02650 | 0.03795 | 0.29142 |
| sky130_osu_sc_12T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.02272 | 0.02231 | 0.02474 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.03396 | 0.04709 | 0.33653 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.03435 | 0.04581 | 0.29928 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.02289 | 0.02285 | 0.02238 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.03752 | 0.05099 | 0.33357 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.01439 | 0.02769 | 0.29675 |
| sky130_osu_sc_12T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.03073 | 0.03068 | 0.03021 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.04536 | 0.05882 | 0.34142 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.02224 | 0.03555 | 0.30461 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.03178 | 0.04725 | 0.36125 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.03305 | 0.05051 | 0.40417 |
| sky130_osu_sc_12T_hs__dffr_l | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.03964 | 0.05511 | 0.36911 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.04091 | 0.05838 | 0.41203 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.01815 | 0.03599 | 0.36778 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.04088 | 0.05873 | 0.41004 |
| sky130_osu_sc_12T_hs__dffr_1 | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.02600 | 0.04385 | 0.37563 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.04874 | 0.06659 | 0.41791 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | 0.01633 | 0.03227 | 0.35965 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.01555 | 0.03300 | 0.40148 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.02710 | 0.04317 | 0.37141 |
| sky130_osu_sc_12T_hs__dffr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | 0.02415 | 0.04010 | 0.36749 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.02341 | 0.04085 | 0.40934 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.03496 | 0.05103 | 0.37926 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | 0.02702 | 0.04488 | 0.37616 |
| | (D * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * !Q * QN) | 0.05151 | 0.06997 | 0.52924 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.04384 | 0.06133 | 0.41602 |
| | (!D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * Q * !QN) | 0.04772 | 0.07919 | 0.58923 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.03957 | 0.05702 | 0.38892 |
| sky130_osu_sc_12T_hs__dffr_l | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | 0.03487 | 0.05273 | 0.38402 |
| | (D * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * !Q * QN) | 0.05937 | 0.07783 | 0.53709 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.05169 | 0.06919 | 0.42388 |
| | (!D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * Q * !QN) | 0.05558 | 0.08704 | 0.59712 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.04742 | 0.06487 | 0.39677 |

# SKY130_OSU_SC_12T_HS__DFFSRx

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## 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_12T_hs__dffsr_1** | 46.39800 |
| **sky130_osu_sc_12T_hs__dffsr_l** | 46.39800 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | | Max Cap(pf) | |
|---|---|---|---|---|---|---|
| | **D** | **RN** | **SN** | **CK** | **Q** | **QN** |
| **sky130_osu_sc_12T_hs__dffsr_1** | 0.00283 | 0.00282 | 0.00658 | 0.00876 | 1.97306 | 1.95520 |
| **sky130_osu_sc_12T_hs__dffsr_l** | 0.00283 | 0.00282 | 0.00658 | 0.00876 | 1.30226 | 1.29743 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | **Min.** | **Avg** | **Max.** |
| **sky130_osu_sc_12T_hs__dffsr_1** | 0.00000 | 1717.71000 | 2350.22000 |
| **sky130_osu_sc_12T_hs__dffsr_l** | 0.00000 | 2618.89000 | 3252.41000 |

# Delay Information

**Delay(ns) to Q rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__dffsr_1 | CK->Q (RR) | 0.18253 | 1.00037 | 14.91050 |
| | QN->Q (FR) | 0.01615 | 0.55922 | 10.17140 |
| | RN->Q (RR) | 0.15184 | 0.99022 | 15.22570 |
| | SN->Q (FR) | 0.13253 | 1.01268 | 15.91890 |
| sky130_osu_sc_12T_hs__dffsr_l | CK->Q (RR) | 0.18527 | 1.07110 | 13.79160 |
| | QN->Q (FR) | 0.01936 | 0.60968 | 9.95104 |
| | RN->Q (RR) | 0.15472 | 1.05991 | 14.10030 |
| | SN->Q (FR) | 0.13538 | 1.08271 | 14.78260 |

**Delay(ns) to Q falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__dffsr_1 | CK->Q (RF) | 0.21209 | 1.04706 | 15.52070 |
| | QN->Q (RF) | 0.01696 | 0.53298 | 9.71420 |
| | RN->Q (FF) | 0.14161 | 1.03935 | 16.46450 |
| sky130_osu_sc_12T_hs__dffsr_l | CK->Q (RF) | 0.21717 | 1.13378 | 14.61230 |
| | QN->Q (RF) | 0.01821 | 0.53163 | 8.66741 |
| | RN->Q (FF) | 0.14647 | 1.12596 | 15.54320 |

**Delay(ns) to QN rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__dffsr_1 | CK->QN (RR) | 0.19253 | 0.56498 | 6.34789 |
| | RN->QN (FR) | 0.12225 | 0.55765 | 7.28482 |
| sky130_osu_sc_12T_hs__dffsr_l | CK->QN (RR) | 0.19519 | 0.62226 | 6.36492 |
| | RN->QN (FR) | 0.12464 | 0.61435 | 7.29128 |

**Delay(ns) to QN falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__dffsr_1 | CK->QN (RF) | 0.16209 | 0.53124 | 5.97823 |
| | RN->QN (RF) | 0.13169 | 0.52048 | 6.29382 |
| | SN->QN (FF) | 0.11241 | 0.54378 | 6.98386 |
| sky130_osu_sc_12T_hs__dffsr_l | CK->QN (RF) | 0.16079 | 0.53752 | 5.18879 |
| | RN->QN (RF) | 0.13059 | 0.52704 | 5.50529 |
| | SN->QN (FF) | 0.11128 | 0.54986 | 6.19071 |

# Constraint Information

**Constraints(ns) for D rising :**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | hold | CK (R) | -0.04375 | -0.04025 | 0.62748 |
| | setup | CK (R) | 0.13853 | 0.17298 | 0.43379 |
| sky130_osu_sc_12T_hs__dffsr_l | hold | CK (R) | -0.04375 | -0.04025 | 0.55583 |
| | setup | CK (R) | 0.13823 | 0.17197 | 0.43450 |

**Constraints(ns) for D falling :**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | hold | CK (R) | -0.08181 | -0.19213 | -2.43409 |
| | setup | CK (R) | 0.10208 | 0.20493 | 4.09780 |
| sky130_osu_sc_12T_hs__dffsr_l | hold | CK (R) | -0.08179 | -0.19214 | -2.55630 |
| | setup | CK (R) | 0.10208 | 0.20493 | 4.09711 |

**Constraints(ns) for D rising (conditional):**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | hold | CK (R) | -0.04375 | -0.04025 | 0.62748 |
| | setup | CK (R) | 0.13853 | 0.17298 | 0.43379 |
| sky130_osu_sc_12T_hs__dffsr_l | hold | CK (R) | -0.04375 | -0.04025 | 0.55583 |
| | setup | CK (R) | 0.13823 | 0.17197 | 0.43450 |

**Constraints(ns) for D falling (conditional):**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | hold | CK (R) | -0.08181 | -0.19213 | -2.43409 |
| | setup | CK (R) | 0.10208 | 0.20493 | 4.09780 |
| sky130_osu_sc_12T_hs__dffsr_l | hold | CK (R) | -0.08179 | -0.19214 | -2.55630 |
| | setup | CK (R) | 0.10208 | 0.20493 | 4.09711 |

**Constraints(ns) for RN rising :**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | recovery | CK (R) | 0.10707 | 0.15492 | 1.18113 |
| | removal | CK (R) | -0.02045 | -0.02065 | 0.01291 |
| | hold | SN (R) | -0.10398 | -0.19403 | -0.80771 |
| | setup | SN (R) | 0.12849 | 0.23301 | 6.80786 |
| sky130_osu_sc_12T_hs__dffsr_l | recovery | CK (R) | 0.10716 | 0.15345 | 1.19846 |
| | removal | CK (R) | -0.02045 | -0.02065 | 0.01291 |
| | hold | SN (R) | -0.10323 | -0.18927 | -0.79191 |
| | setup | SN (R) | 0.12897 | 0.22898 | 6.74272 |

**Constraints(ns) for RN rising (conditional):**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | recovery | CK (R) | 0.10707 | 0.15492 | 1.18113 |
| | removal | CK (R) | -0.02045 | -0.02065 | 0.01291 |
| | hold | SN (R) | -0.10398 | -0.19403 | -0.80904 |
| | hold | SN (R) | -0.10633 | -0.19641 | -0.80771 |
| | setup | SN (R) | 0.12604 | 0.23008 | 6.35173 |
| | setup | SN (R) | 0.12849 | 0.23301 | 6.80786 |
| sky130_osu_sc_12T_hs__dffsr_l | recovery | CK (R) | 0.10716 | 0.15345 | 1.19846 |
| | removal | CK (R) | -0.02045 | -0.02065 | 0.01291 |
| | hold | SN (R) | -0.10515 | -0.18927 | -0.80848 |
| | hold | SN (R) | -0.10323 | -0.19047 | -0.79191 |
| | setup | SN (R) | 0.12897 | 0.22498 | 6.36157 |
| | setup | SN (R) | 0.12302 | 0.22898 | 6.74272 |

**Constraints(ns) for RN falling (conditional):**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | min_pulse_width | RN () | 0.09686 | 0.39917 | 13.33370 |
| | min_pulse_width | RN () | 0.09988 | 0.39917 | 13.33370 |
| sky130_osu_sc_12T_hs__dffsr_l | min_pulse_width | RN () | 0.09686 | 0.39917 | 13.33370 |
| | min_pulse_width | RN () | 0.09686 | 0.39917 | 13.33370 |

**Constraints(ns) for SN rising :**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | recovery | CK (R) | 0.03023 | 0.05557 | 6.79199 |
| | removal | CK (R) | -0.01852 | -0.03821 | -0.23339 |
| sky130_osu_sc_12T_hs__dffsr_l | recovery | CK (R) | 0.03093 | 0.05157 | 6.47908 |
| | removal | CK (R) | -0.01503 | -0.03821 | -0.23339 |

**Constraints(ns) for SN rising (conditional):**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | recovery | CK (R) | 0.03023 | 0.05557 | 6.79199 |
| | removal | CK (R) | -0.01852 | -0.03821 | -0.23339 |
| sky130_osu_sc_12T_hs__dffsr_l | recovery | CK (R) | 0.03093 | 0.05157 | 6.47908 |
| | removal | CK (R) | -0.01503 | -0.03821 | -0.23339 |

**Constraints(ns) for SN falling (conditional):**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | min_pulse_width | SN () | 0.10593 | 0.39917 | 13.33370 |
| | min_pulse_width | SN () | 0.10895 | 0.39917 | 13.33370 |
| sky130_osu_sc_12T_hs__dffsr_l | min_pulse_width | SN () | 0.10593 | 0.39917 | 13.33370 |
| | min_pulse_width | SN () | 0.10290 | 0.39917 | 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_12T_hs__dffsr_1 | min_pulse_width | CK () | 0.08779 | 0.39917 | 13.33370 |
| | min_pulse_width | CK () | 0.10895 | 0.39917 | 13.33370 |
| sky130_osu_sc_12T_hs__dffsr_l | min_pulse_width | CK () | 0.08476 | 0.39917 | 13.33370 |
| | min_pulse_width | CK () | 0.10895 | 0.39917 | 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_12T_hs__dffsr_1 | min_pulse_width | CK () | 0.17243 | 0.39917 | 13.33370 |
| | min_pulse_width | CK () | 0.08779 | 0.39917 | 13.33370 |
| sky130_osu_sc_12T_hs__dffsr_l | min_pulse_width | CK () | 0.17243 | 0.39917 | 13.33370 |
| | min_pulse_width | CK () | 0.08779 | 0.39917 | 13.33370 |

# Power Information

**Internal switching power(pJ) to Q rising :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.04497 | 0.05664 | 0.26129 |
| | RN | 0.05507 | 0.06328 | 0.24327 |
| | SN | -0.00111 | -0.09577 | -1.87528 |
| | SN | 0.04260 | 0.05204 | 0.23803 |
| sky130_osu_sc_12T_hs__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.05725 | 0.06971 | 0.28875 |
| | RN | 0.06753 | 0.07656 | 0.27093 |
| | SN | -0.00110 | -0.07459 | -1.23698 |
| | SN | 0.05555 | 0.06581 | 0.26374 |

**Internal switching power(pJ) to Q falling :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.05111 | 0.05828 | 0.22217 |
| | RN | -0.00111 | -0.09577 | -1.87528 |
| | RN | 0.05423 | 0.06279 | 0.24356 |
| sky130_osu_sc_12T_hs__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.06083 | 0.06834 | 0.23835 |
| | RN | -0.00110 | -0.07460 | -1.23700 |
| | RN | 0.06497 | 0.07388 | 0.26425 |

**Internal switching power(pJ) to QN rising :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.04400 | 0.05116 | 0.21410 |
| | RN | -0.00111 | -0.09525 | -1.85796 |
| | RN | 0.04903 | 0.05759 | 0.23730 |
| sky130_osu_sc_12T_hs__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.05475 | 0.06229 | 0.23255 |
| | RN | -0.00110 | -0.07443 | -1.23236 |
| | RN | 0.06003 | 0.06897 | 0.25605 |

**Internal switching power(pJ) to QN falling :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.03568 | 0.04731 | 0.25194 |
| | RN | 0.04586 | 0.05408 | 0.23316 |
| | SN | -0.00111 | -0.09525 | -1.85821 |
| | SN | 0.03681 | 0.04627 | 0.23168 |
| sky130_osu_sc_12T_hs__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.04194 | 0.05438 | 0.27237 |
| | RN | 0.05223 | 0.06124 | 0.25455 |
| | SN | -0.00110 | -0.07443 | -1.23237 |
| | SN | 0.04413 | 0.05436 | 0.25238 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01766 | 0.01764 | 0.01765 |
| | (!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) | 0.03085 | 0.04337 | 0.33439 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.01887 | 0.03040 | 0.28919 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.01974 | 0.03111 | 0.28736 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.02259 | 0.03405 | 0.29131 |
| sky130_osu_sc_12T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.02551 | 0.02550 | 0.02550 |
| | (!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) | 0.03871 | 0.05123 | 0.34225 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.02670 | 0.03823 | 0.29701 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.02760 | 0.03898 | 0.29522 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.03044 | 0.04190 | 0.29917 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.02343 | 0.02332 | 0.02328 |
| | (!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) | 0.03820 | 0.05136 | 0.33772 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.02033 | 0.03296 | 0.29477 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.01590 | 0.02861 | 0.29317 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.02102 | 0.03376 | 0.29694 |
| sky130_osu_sc_12T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.03128 | 0.03117 | 0.03113 |
| | (!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) | 0.04605 | 0.05921 | 0.34557 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.02816 | 0.04080 | 0.30262 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.02375 | 0.03646 | 0.30102 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.02888 | 0.04161 | 0.30479 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__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) | 0.02468 | 0.04030 | 0.35746 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.02920 | 0.04630 | 0.39810 |
| sky130_osu_sc_12T_hs__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) | 0.03254 | 0.04815 | 0.36532 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.03705 | 0.05416 | 0.40596 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__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) | 0.01826 | 0.03594 | 0.36354 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.03384 | 0.05165 | 0.40194 |
| sky130_osu_sc_12T_hs__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) | 0.02611 | 0.04379 | 0.37139 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.04169 | 0.05950 | 0.40979 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__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) | 0.01000 | 0.00997 | 0.00987 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00371 | 0.00263 | 0.00677 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | 0.00844 | 0.00786 | 0.00995 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.02206 | 0.03205 | 0.27193 |
| sky130_osu_sc_12T_hs__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) | 0.01781 | 0.01779 | 0.01767 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.01157 | 0.01049 | 0.01462 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | 0.01629 | 0.01572 | 0.01781 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.02986 | 0.03986 | 0.27974 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__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) | 0.02381 | 0.02389 | 0.02384 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.02251 | 0.02243 | 0.02153 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | 0.02430 | 0.02429 | 0.02382 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.02723 | 0.03776 | 0.28511 |
| sky130_osu_sc_12T_hs__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) | 0.03168 | 0.03176 | 0.03170 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.03036 | 0.03029 | 0.02939 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | 0.03216 | 0.03214 | 0.03167 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.03510 | 0.04562 | 0.29298 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffsr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | 0.01632 | 0.03223 | 0.35974 |
| | (D * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * SN * !Q * QN) | 0.01719 | 0.03431 | 0.39911 |
| | (D * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !SN * !Q * QN) | 0.02237 | 0.03940 | 0.40308 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | 0.01967 | 0.03568 | 0.36372 |
| | (!D * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * !SN * Q * !QN) | 0.02406 | 0.05235 | 0.62408 |
| sky130_osu_sc_12T_hs__dffsr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | 0.02414 | 0.04005 | 0.36760 |
| | (D * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * SN * !Q * QN) | 0.02505 | 0.04216 | 0.40696 |
| | (D * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !SN * !Q * QN) | 0.03023 | 0.04725 | 0.41093 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | 0.02753 | 0.04354 | 0.37158 |
| | (!D * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * !SN * Q * !QN) | 0.03189 | 0.06017 | 0.63196 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |

| | | | | |
|---|---|---|---|---|
| **sky130_osu_sc_12T_hs__dffsr_1** | **(D * RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * SN * !Q * QN)** | 0.04844 | 0.06676 | 0.51805 |
| | **(D * RN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * Q * !QN)** | 0.02735 | 0.04517 | 0.37661 |
| | **(D * !RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * SN * !Q * QN)** | 0.03710 | 0.05482 | 0.41313 |
| | **(D * !RN * !SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * !SN * !Q * QN)** | 0.03989 | 0.05771 | 0.41737 |
| | **(!D * RN * SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * Q * !QN)** | 0.04974 | 0.08095 | 0.59510 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.03204 | 0.04949 | 0.38116 |
| | **(!D * RN * !SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * !SN * Q * !QN)** | 0.02955 | 0.06078 | 0.64197 |
| **sky130_osu_sc_12T_hs__dffsr_l** | **(D * RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * SN * !Q * QN)** | 0.05630 | 0.07463 | 0.52590 |
| | **(D * RN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * Q * !QN)** | 0.03520 | 0.05302 | 0.38449 |
| | **(D * !RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * SN * !Q * QN)** | 0.04496 | 0.06268 | 0.42098 |
| | **(D * !RN * !SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * !SN * !Q * QN)** | 0.04775 | 0.06556 | 0.42523 |
| | **(!D * RN * SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * Q * !QN)** | 0.05759 | 0.08880 | 0.60300 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.03990 | 0.05734 | 0.38902 |
| | **(!D * RN * !SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * !SN * Q * !QN)** | 0.03739 | 0.06862 | 0.64987 |

# SKY130_OSU_SC_12T_HS__DFFSx

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## 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_12T_hs__dffs_1 | 38.58360 |
| sky130_osu_sc_12T_hs__dffs_l | 38.58360 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) | |
|---|---|---|---|---|---|
| | D | SN | CK | Q | QN |
| sky130_osu_sc_12T_hs__dffs_1 | 0.00284 | 0.00548 | 0.00868 | 1.85842 | 1.84478 |
| sky130_osu_sc_12T_hs__dffs_l | 0.00285 | 0.00548 | 0.00868 | 1.31338 | 1.29506 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_12T_hs__dffs_1 | 0.00000 | 2903.03000 | 6117.56000 |
| sky130_osu_sc_12T_hs__dffs_l | 0.00000 | 3803.45000 | 7019.49000 |

# Delay Information

**Delay(ns) to Q rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__dffs_1 | CK->Q (RR) | 0.13988 | 0.93521 | 14.14550 |
| | QN->Q (FR) | 0.01723 | 0.57913 | 10.36470 |
| | SN->Q (FR) | 0.10547 | 0.97913 | 15.26840 |
| sky130_osu_sc_12T_hs__dffs_l | CK->Q (RR) | 0.14208 | 1.02279 | 13.74850 |
| | QN->Q (FR) | 0.01936 | 0.60951 | 9.96888 |
| | SN->Q (FR) | 0.10785 | 1.06348 | 14.85940 |

**Delay(ns) to Q falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__dffs_1 | CK->Q (RF) | 0.20310 | 1.02380 | 14.87730 |
| | QN->Q (RF) | 0.01705 | 0.51708 | 9.29694 |
| sky130_osu_sc_12T_hs__dffs_l | CK->Q (RF) | 0.20600 | 1.12893 | 14.74270 |
| | QN->Q (RF) | 0.01827 | 0.53283 | 8.70813 |

**Delay(ns) to QN rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__dffs_1 | CK->QN (RR) | 0.18359 | 0.55970 | 6.25585 |
| sky130_osu_sc_12T_hs__dffs_l | CK->QN (RR) | 0.18383 | 0.61149 | 6.35462 |

**Delay(ns) to QN falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__dffs_1 | CK->QN (RF) | 0.12002 | 0.46891 | 5.47227 |
| | SN->QN (FF) | 0.08538 | 0.51145 | 6.59673 |
| sky130_osu_sc_12T_hs__dffs_l | CK->QN (RF) | 0.11896 | 0.48623 | 5.03139 |
| | SN->QN (FF) | 0.08448 | 0.52708 | 6.15114 |

# Constraint Information

**Constraints(ns) for D rising :**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | hold | CK (R) | -0.03374 | -0.02738 | 1.18651 |
| | setup | CK (R) | 0.10336 | 0.14161 | 0.28802 |
| sky130_osu_sc_12T_hs__dffs_l | hold | CK (R) | -0.03198 | -0.02779 | 1.05932 |
| | setup | CK (R) | 0.10347 | 0.14095 | 0.28762 |

**Constraints(ns) for D falling :**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | hold | CK (R) | -0.07231 | -0.18409 | -3.32551 |
| | setup | CK (R) | 0.09752 | 0.19798 | 4.13338 |
| sky130_osu_sc_12T_hs__dffs_l | hold | CK (R) | -0.07419 | -0.18409 | -3.34677 |
| | setup | CK (R) | 0.09747 | 0.19798 | 4.13297 |

**Constraints(ns) for D rising (conditional):**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | hold | CK (R) | -0.03374 | -0.02738 | 1.18651 |
| | setup | CK (R) | 0.10336 | 0.14161 | 0.28802 |
| sky130_osu_sc_12T_hs__dffs_l | hold | CK (R) | -0.03198 | -0.02779 | 1.05932 |
| | setup | CK (R) | 0.10347 | 0.14095 | 0.28762 |

**Constraints(ns) for D falling (conditional):**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | hold | CK (R) | -0.07231 | -0.18409 | -3.32551 |
| | setup | CK (R) | 0.09752 | 0.19798 | 4.13338 |
| sky130_osu_sc_12T_hs__dffs_l | hold | CK (R) | -0.07419 | -0.18409 | -3.34677 |
| | setup | CK (R) | 0.09747 | 0.19798 | 4.13297 |

**Constraints(ns) for SN rising :**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | recovery | CK (R) | 0.03320 | 0.06530 | 6.43470 |
| | removal | CK (R) | -0.01866 | -0.04863 | -0.58096 |
| sky130_osu_sc_12T_hs__dffs_l | recovery | CK (R) | 0.03314 | 0.06495 | 6.29215 |
| | removal | CK (R) | -0.01866 | -0.04863 | -0.58096 |

**Constraints(ns) for SN rising (conditional):**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | recovery | CK (R) | 0.03320 | 0.06530 | 6.43470 |
| | removal | CK (R) | -0.01866 | -0.04863 | -0.58096 |
| sky130_osu_sc_12T_hs__dffs_l | recovery | CK (R) | 0.03314 | 0.06495 | 6.29215 |
| | removal | CK (R) | -0.01866 | -0.04863 | -0.58096 |

**Constraints(ns) for SN falling (conditional):**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | min_pulse_width | SN () | 0.07267 | 0.39917 | 13.33370 |
| | min_pulse_width | SN () | 0.07569 | 0.39917 | 13.33370 |
| sky130_osu_sc_12T_hs__dffs_l | min_pulse_width | SN () | 0.07267 | 0.39917 | 13.33370 |
| | min_pulse_width | SN () | 0.06965 | 0.39917 | 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_12T_hs__dffs_1 | min_pulse_width | CK () | 0.06662 | 0.39917 | 13.33370 |
| | min_pulse_width | CK () | 0.10593 | 0.39917 | 13.33370 |
| sky130_osu_sc_12T_hs__dffs_l | min_pulse_width | CK () | 0.06360 | 0.39917 | 13.33370 |
| | min_pulse_width | CK () | 0.10290 | 0.39917 | 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_12T_hs__dffs_1 | min_pulse_width | CK () | 0.14220 | 0.39917 | 13.33370 |
| | min_pulse_width | CK () | 0.08174 | 0.39917 | 13.33370 |
| sky130_osu_sc_12T_hs__dffs_l | min_pulse_width | CK () | 0.13918 | 0.39917 | 13.33370 |
| | min_pulse_width | CK () | 0.08174 | 0.39917 | 13.33370 |

# Power Information

**Internal switching power(pJ) to Q rising :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.03422 | 0.04673 | 0.25673 |
| | SN | -0.00111 | -0.09239 | -1.76632 |
| | SN | 0.03072 | 0.04217 | 0.23984 |
| sky130_osu_sc_12T_hs__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.04743 | 0.06061 | 0.28276 |
| | SN | -0.00110 | -0.07498 | -1.24754 |
| | SN | 0.04427 | 0.05639 | 0.26679 |

**Internal switching power(pJ) to Q falling :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.10661 | 0.11288 | 0.25946 |
| sky130_osu_sc_12T_hs__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.11616 | 0.12353 | 0.29064 |

**Internal switching power(pJ) to QN rising :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.09116 | 0.09741 | 0.24433 |
| sky130_osu_sc_12T_hs__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.10209 | 0.10948 | 0.27659 |

**Internal switching power(pJ) to QN falling :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.02669 | 0.03918 | 0.24816 |
| | SN | -0.00111 | -0.09199 | -1.75328 |
| | SN | 0.02682 | 0.03824 | 0.23548 |
| sky130_osu_sc_12T_hs__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.03426 | 0.04746 | 0.26871 |
| | SN | -0.00110 | -0.07435 | -1.23012 |
| | SN | 0.03505 | 0.04716 | 0.25693 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.05040 | 0.05040 | 0.05040 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.04191 | 0.05622 | 0.36032 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.01461 | 0.02636 | 0.28577 |
| sky130_osu_sc_12T_hs__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.05826 | 0.05825 | 0.05825 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.04976 | 0.06407 | 0.36817 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.02244 | 0.03419 | 0.29362 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.05627 | 0.05616 | 0.05611 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.06769 | 0.08057 | 0.36246 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.01587 | 0.02876 | 0.29115 |
| sky130_osu_sc_12T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.06412 | 0.06401 | 0.06397 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.07554 | 0.08842 | 0.37031 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.02370 | 0.03660 | 0.29900 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00794 | 0.00789 | 0.00788 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.03610 | 0.04497 | 0.26212 |
| sky130_osu_sc_12T_hs__dffs_1 | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.01577 | 0.01572 | 0.01571 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.04393 | 0.05279 | 0.26994 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.01848 | 0.01845 | 0.01837 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.01851 | 0.03046 | 0.27168 |
| sky130_osu_sc_12T_hs__dffs_l | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.02632 | 0.02629 | 0.02621 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.02635 | 0.03830 | 0.27952 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.01259 | 0.02856 | 0.35628 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | 0.05245 | 0.06852 | 0.39705 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.01987 | 0.04854 | 0.62142 |
| sky130_osu_sc_12T_hs__dffs_l | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.02042 | 0.03639 | 0.36415 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | 0.06030 | 0.07637 | 0.40490 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.02770 | 0.05637 | 0.62930 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dffs_1 | (D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * SN * !Q * QN) | 0.05955 | 0.07889 | 0.55122 |
| | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.02329 | 0.04117 | 0.37279 |
| | (!D * SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * Q * !QN) | 0.06070 | 0.09155 | 0.59547 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | 0.06474 | 0.08224 | 0.41438 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.02478 | 0.05642 | 0.63876 |
| sky130_osu_sc_12T_hs__dffs_l | (D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * SN * !Q * QN) | 0.06740 | 0.08674 | 0.55907 |
| | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.03113 | 0.04902 | 0.38067 |
| | (!D * SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * Q * !QN) | 0.06854 | 0.09933 | 0.60337 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | 0.07259 | 0.09009 | 0.42223 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.03262 | 0.06428 | 0.64665 |

# SKY130_OSU_SC_12T_HS__DFFx

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## Truth Table

| INPUT | | OUTPUT |
|---|---|---|
| D | CK | Q |
| 0 | R | 0 |
| 1 | R | 1 |
| x | x | IQ |

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_12T_hs__dff_1 | 32.23440 |
| sky130_osu_sc_12T_hs__dff_l | 32.23440 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | D | CK | Q |
| sky130_osu_sc_12T_hs__dff_1 | 0.00300 | 0.00846 | 1.63689 |
| sky130_osu_sc_12T_hs__dff_l | 0.00300 | 0.00846 | 1.19766 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_12T_hs__dff_1 | 0.00000 | 1500.83000 | 1887.71000 |
| sky130_osu_sc_12T_hs__dff_l | 0.00000 | 2399.54000 | 2784.13000 |

# Delay Information

**Delay(ns) to Q rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_12T_hs__dff_1** | **CK->Q (RR)** | 0.11851 | 0.48736 | 5.70702 |
| **sky130_osu_sc_12T_hs__dff_l** | **CK->Q (RR)** | 0.12004 | 0.54001 | 5.83212 |

**Delay(ns) to Q falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_12T_hs__dff_1** | **CK->Q (RF)** | 0.17166 | 0.50680 | 5.30791 |
| **sky130_osu_sc_12T_hs__dff_l** | **CK->Q (RF)** | 0.17383 | 0.53546 | 5.12959 |

# Constraint Information

**Constraints(ns) for D rising :**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dff_1 | hold | CK (R) | -0.02964 | -0.02418 | 1.53819 |
| | setup | CK (R) | 0.08459 | 0.12865 | 0.25956 |
| sky130_osu_sc_12T_hs__dff_l | hold | CK (R) | -0.02963 | -0.02420 | 1.54058 |
| | setup | CK (R) | 0.08456 | 0.12842 | 0.26094 |

**Constraints(ns) for D falling :**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dff_1 | hold | CK (R) | -0.06451 | -0.18409 | -2.98111 |
| | setup | CK (R) | 0.08041 | 0.19451 | 4.14111 |
| sky130_osu_sc_12T_hs__dff_l | hold | CK (R) | -0.06464 | -0.18409 | -2.94237 |
| | setup | CK (R) | 0.08030 | 0.19451 | 4.14199 |

**Constraints(ns) for CK rising (conditional):**

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__dff_1 | min_pulse_width | CK () | 0.05755 | 0.39917 | 13.33370 |
| | min_pulse_width | CK () | 0.09383 | 0.39917 | 13.33370 |
| sky130_osu_sc_12T_hs__dff_l | min_pulse_width | CK () | 0.05453 | 0.39917 | 13.33370 |
| | min_pulse_width | CK () | 0.09081 | 0.39917 | 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_12T_hs__dff_1** | **min_pulse_width** | **CK ()** | 0.12104 | 0.39917 | 13.33370 |
| | **min_pulse_width** | **CK ()** | 0.06360 | 0.39917 | 13.33370 |
| **sky130_osu_sc_12T_hs__dff_l** | **min_pulse_width** | **CK ()** | 0.12104 | 0.39917 | 13.33370 |
| | **min_pulse_width** | **CK ()** | 0.06360 | 0.39917 | 13.33370 |

# Power Information

**Internal switching power(pJ) to Q rising :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.05940 | 0.08635 | 0.53489 |
| sky130_osu_sc_12T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.08082 | 0.10742 | 0.54999 |

**Internal switching power(pJ) to Q falling :**

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.05817 | 0.07481 | 0.43536 |
| sky130_osu_sc_12T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.07371 | 0.09020 | 0.44673 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01126 | 0.01084 | 0.01328 |
| | !CK | 0.00000 | 0.00000 | 0.00000 |
| | !CK | 0.02161 | 0.03513 | 0.33135 |
| sky130_osu_sc_12T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01906 | 0.01864 | 0.02108 |
| | !CK | 0.00000 | 0.00000 | 0.00000 |
| | !CK | 0.02945 | 0.04297 | 0.33919 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01924 | 0.01919 | 0.01872 |
| | !CK | 0.00000 | 0.00000 | 0.00000 |
| | !CK | 0.03023 | 0.04399 | 0.33736 |
| sky130_osu_sc_12T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.02704 | 0.02699 | 0.02652 |
| | !CK | 0.00000 | 0.00000 | 0.00000 |
| | !CK | 0.03808 | 0.05184 | 0.34520 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dff_1 | (D * Q) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q) | 0.01264 | 0.02862 | 0.35633 |
| | (!D * !Q) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q) | 0.01410 | 0.03020 | 0.35853 |
| sky130_osu_sc_12T_hs__dff_l | (D * Q) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q) | 0.02043 | 0.03642 | 0.36417 |
| | (!D * !Q) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q) | 0.02194 | 0.03804 | 0.36635 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__dff_1 | (D * Q) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q) | 0.02332 | 0.04121 | 0.37282 |
| | (D * !Q) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !Q) | 0.03920 | 0.05815 | 0.52112 |
| | (!D * Q) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * Q) | 0.04226 | 0.07450 | 0.59721 |
| | (!D * !Q) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q) | 0.02628 | 0.04380 | 0.37571 |
| sky130_osu_sc_12T_hs__dff_l | (D * Q) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q) | 0.03114 | 0.04902 | 0.38068 |
| | (D * !Q) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !Q) | 0.04704 | 0.06600 | 0.52899 |
| | (!D * Q) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * Q) | 0.05008 | 0.08232 | 0.60506 |
| | (!D * !Q) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q) | 0.03412 | 0.05164 | 0.38356 |

# SKY130_OSU_SC_12T_HS__INVx

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## Truth Table

| INPUT | OUTPUT |
|---|---|
| A | Y |
| 0 | 1 |
| 1 | 0 |

## Footprint

| Cell Name | Area |
|---|---|
| **sky130_osu_sc_12T_hs__inv_1** | 4.39560 |
| **sky130_osu_sc_12T_hs__inv_10** | 21.97800 |
| **sky130_osu_sc_12T_hs__inv_2** | 6.34920 |
| **sky130_osu_sc_12T_hs__inv_3** | 8.30280 |
| **sky130_osu_sc_12T_hs__inv_4** | 10.25640 |
| **sky130_osu_sc_12T_hs__inv_6** | 14.16360 |
| **sky130_osu_sc_12T_hs__inv_8** | 18.07080 |
| **sky130_osu_sc_12T_hs__inv_l** | 4.38570 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | Max Cap(pf) |
|---|---|---|
| | A | Y |
| sky130_osu_sc_12T_hs__inv_1 | 0.00285 | 1.59403 |
| sky130_osu_sc_12T_hs__inv_10 | 0.02551 | 15.53866 |
| sky130_osu_sc_12T_hs__inv_2 | 0.00530 | 3.18461 |
| sky130_osu_sc_12T_hs__inv_3 | 0.00784 | 4.79955 |
| sky130_osu_sc_12T_hs__inv_4 | 0.01033 | 6.29271 |
| sky130_osu_sc_12T_hs__inv_6 | 0.01546 | 9.36265 |
| sky130_osu_sc_12T_hs__inv_8 | 0.02049 | 12.41524 |
| sky130_osu_sc_12T_hs__inv_l | 0.00228 | 1.08636 |

# Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_12T_hs__inv_1 | 0.00000 | 214.09300 | 419.94100 |
| sky130_osu_sc_12T_hs__inv_10 | 0.00000 | 2140.06000 | 4198.24000 |
| sky130_osu_sc_12T_hs__inv_2 | 0.00000 | 428.17700 | 839.97600 |
| sky130_osu_sc_12T_hs__inv_3 | 0.00000 | 642.17500 | 1259.73000 |
| sky130_osu_sc_12T_hs__inv_4 | 0.00000 | 856.26300 | 1679.77000 |
| sky130_osu_sc_12T_hs__inv_6 | 0.00000 | 1284.30000 | 2519.46000 |
| sky130_osu_sc_12T_hs__inv_8 | 0.00000 | 1712.29000 | 3359.08000 |
| sky130_osu_sc_12T_hs__inv_l | 0.00000 | 662.20700 | 1320.56000 |

# Delay Information

**Delay(ns) to Y rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_12T_hs__inv_1** | **A->Y (FR)** | 0.01651 | 0.51089 | 8.75288 |
| **sky130_osu_sc_12T_hs__inv_10** | **A->Y (FR)** | 0.02070 | 0.30136 | 8.59856 |
| **sky130_osu_sc_12T_hs__inv_2** | **A->Y (FR)** | 0.01260 | 0.41733 | 8.50384 |
| **sky130_osu_sc_12T_hs__inv_3** | **A->Y (FR)** | 0.01368 | 0.38747 | 8.68220 |
| **sky130_osu_sc_12T_hs__inv_4** | **A->Y (FR)** | 0.01360 | 0.35528 | 8.48825 |
| **sky130_osu_sc_12T_hs__inv_6** | **A->Y (FR)** | 0.01533 | 0.32612 | 8.49079 |
| **sky130_osu_sc_12T_hs__inv_8** | **A->Y (FR)** | 0.01773 | 0.30930 | 8.49958 |
| **sky130_osu_sc_12T_hs__inv_l** | **A->Y (FR)** | 0.01946 | 0.54824 | 8.51396 |

**Delay(ns) to Y falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_12T_hs__inv_1** | **A->Y (RF)** | 0.01603 | 0.44519 | 7.64326 |
| **sky130_osu_sc_12T_hs__inv_10** | **A->Y (RF)** | 0.02090 | 0.25533 | 7.80547 |
| **sky130_osu_sc_12T_hs__inv_2** | **A->Y (RF)** | 0.01268 | 0.36944 | 7.67291 |
| **sky130_osu_sc_12T_hs__inv_3** | **A->Y (RF)** | 0.01375 | 0.34092 | 7.89660 |
| **sky130_osu_sc_12T_hs__inv_4** | **A->Y (RF)** | 0.01353 | 0.31229 | 7.76634 |
| **sky130_osu_sc_12T_hs__inv_6** | **A->Y (RF)** | 0.01587 | 0.28384 | 7.78419 |
| **sky130_osu_sc_12T_hs__inv_8** | **A->Y (RF)** | 0.01822 | 0.26655 | 7.78718 |
| **sky130_osu_sc_12T_hs__inv_l** | **A->Y (RF)** | 0.01757 | 0.46102 | 7.12206 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__inv_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00473 | 0.01220 | 0.12356 |
| sky130_osu_sc_12T_hs__inv_10 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.04232 | 0.15172 | 1.18268 |
| sky130_osu_sc_12T_hs__inv_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00824 | 0.02571 | 0.24447 |
| sky130_osu_sc_12T_hs__inv_3 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01269 | 0.04006 | 0.35517 |
| sky130_osu_sc_12T_hs__inv_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01624 | 0.05509 | 0.48036 |
| sky130_osu_sc_12T_hs__inv_6 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02445 | 0.08595 | 0.71669 |
| sky130_osu_sc_12T_hs__inv_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03299 | 0.11820 | 0.95266 |
| sky130_osu_sc_12T_hs__inv_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00370 | 0.01007 | 0.11477 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| **sky130_osu_sc_12T_hs__inv_1** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | 0.00888 | 0.01401 | 0.09057 |
| **sky130_osu_sc_12T_hs__inv_10** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | 0.09090 | 0.17239 | 0.88277 |
| **sky130_osu_sc_12T_hs__inv_2** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | 0.01699 | 0.02934 | 0.18067 |
| **sky130_osu_sc_12T_hs__inv_3** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | 0.02675 | 0.04725 | 0.26377 |
| **sky130_osu_sc_12T_hs__inv_4** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | 0.03460 | 0.06336 | 0.35664 |
| **sky130_osu_sc_12T_hs__inv_6** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | 0.05207 | 0.09866 | 0.53452 |
| **sky130_osu_sc_12T_hs__inv_8** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | 0.07053 | 0.13433 | 0.71103 |
| **sky130_osu_sc_12T_hs__inv_l** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | 0.02845 | 0.03141 | 0.08124 |

# SKY130_OSU_SC_12T_HS__MUX2

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## 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_12T_hs__mux2_1** | 12.21000 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) |
|---|---|---|---|---|
| | **A0** | **A1** | **S0** | **Y** |
| **sky130_osu_sc_12T_hs__mux2_1** | 0.07743 | 0.07732 | 0.00588 | 0.07254 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | **Min.** | **Avg** | **Max.** |
| **sky130_osu_sc_12T_hs__mux2_1** | 0.00000 | 427.97100 | 428.48500 |

# Delay Information

**Delay(ns) to Y rising (conditional):**

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_12T_hs__mux2_1 | A0->Y (RR) | - | 0.00712 | 0.04010 | 0.18705 |
| | A1->Y (RR) | - | 0.00797 | 0.04033 | 0.18678 |
| | S0->Y (RR) | (!A0 * A1) | 0.02993 | 0.10049 | 0.00068 |
| | S0->Y (FR) | (A0 * !A1) | 0.01861 | 0.15684 | 1.36588 |

**Delay(ns) to Y falling (conditional):**

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_12T_hs__mux2_1 | A0->Y (FF) | - | 0.00800 | 0.04293 | 0.19304 |
| | A1->Y (FF) | - | 0.00745 | 0.04253 | 0.19260 |
| | S0->Y (FF) | (!A0 * A1) | 0.03356 | 0.16373 | 1.08641 |
| | S0->Y (RF) | (A0 * !A1) | 0.01791 | 0.10047 | 0.34005 |

# Power Information

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__mux2_1 | A0 | - | 0.00000 | 0.00000 | 0.00000 |
| | A0 | - | -0.00434 | -0.00435 | -0.00436 |
| | A1 | - | 0.00000 | 0.00000 | 0.00000 |
| | A1 | - | 0.00691 | 0.00690 | 0.00689 |
| | S0 | (A0 * !A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (A0 * !A1) | 0.00567 | 0.02427 | 0.34665 |
| | S0 | (!A0 * A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (!A0 * A1) | -0.00050 | 0.01649 | 0.33598 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__mux2_1 | A0 | - | 0.00000 | 0.00000 | 0.00000 |
| | A0 | - | 0.00472 | 0.00473 | 0.00474 |
| | A1 | - | 0.00000 | 0.00000 | 0.00000 |
| | A1 | - | 0.01244 | 0.01244 | 0.01244 |
| | S0 | (A0 * !A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (A0 * !A1) | 0.00433 | 0.02186 | 0.34089 |
| | S0 | (!A0 * A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (!A0 * A1) | 0.01241 | 0.03017 | 0.35216 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__mux2_1 | (A1 * S0 * Y) + (!A1 * S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * S0 * Y) + (!A1 * S0 * !Y) | 0.00265 | 0.00265 | 0.00265 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__mux2_1 | (A1 * S0 * Y) + (!A1 * S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * S0 * Y) + (!A1 * S0 * !Y) | 0.00465 | 0.00465 | 0.00465 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__mux2_1 | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | -0.00111 | -0.00111 | -0.00112 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__mux2_1 | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | 0.00125 | 0.00125 | 0.00125 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__mux2_1 | (A0 * A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * Y) | 0.00251 | 0.01990 | 0.33832 |
| | (!A0 * !A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !Y) | 0.00255 | 0.01999 | 0.33858 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__mux2_1 | (A0 * A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * Y) | 0.00955 | 0.02770 | 0.34955 |
| | (!A0 * !A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !Y) | 0.00865 | 0.02721 | 0.34927 |

# SKY130_OSU_SC_12T_HS__NAND2x

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| **sky130_osu_sc_12T_hs__nand2_1** | 6.34920 |
| **sky130_osu_sc_12T_hs__nand2_l** | 6.34920 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | **A** | **B** | **Y** |
| **sky130_osu_sc_12T_hs__nand2_1** | 0.00284 | 0.00285 | 1.47351 |
| **sky130_osu_sc_12T_hs__nand2_l** | 0.00223 | 0.00227 | 1.06999 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | **Min.** | **Avg** | **Max.** |
| **sky130_osu_sc_12T_hs__nand2_1** | 0.00000 | 213.93100 | 839.11700 |
| **sky130_osu_sc_12T_hs__nand2_l** | 0.00000 | 657.31600 | 2621.52000 |

# Delay Information

**Delay(ns) to Y rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__nand2_1 | A->Y (FR) | 0.01715 | 0.49422 | 8.28462 |
| | B->Y (FR) | 0.01923 | 0.47090 | 7.84724 |
| sky130_osu_sc_12T_hs__nand2_l | A->Y (FR) | 0.01948 | 0.53853 | 8.31644 |
| | B->Y (FR) | 0.02340 | 0.54189 | 8.32202 |

**Delay(ns) to Y falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__nand2_1 | A->Y (RF) | 0.02208 | 0.54016 | 9.06279 |
| | B->Y (RF) | 0.02515 | 0.50875 | 8.48818 |
| sky130_osu_sc_12T_hs__nand2_l | A->Y (RF) | 0.02459 | 0.58888 | 9.02663 |
| | B->Y (RF) | 0.02780 | 0.55232 | 8.34509 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__nand2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00498 | 0.01130 | 0.10676 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00640 | 0.01317 | 0.11736 |
| sky130_osu_sc_12T_hs__nand2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00375 | 0.00892 | 0.09495 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00483 | 0.01015 | 0.10085 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__nand2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02260 | 0.02659 | 0.08837 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02208 | 0.02601 | 0.09305 |
| sky130_osu_sc_12T_hs__nand2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.07242 | 0.07346 | 0.09526 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.07065 | 0.07165 | 0.09703 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__nand2_1 | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | -0.00311 | -0.00314 | -0.00318 |
| sky130_osu_sc_12T_hs__nand2_l | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | -0.00224 | -0.00226 | -0.00229 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__nand2_1 | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | 0.00322 | 0.00325 | 0.00323 |
| sky130_osu_sc_12T_hs__nand2_l | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | 0.00230 | 0.00233 | 0.00231 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__nand2_1 | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | -0.00288 | -0.00291 | -0.00290 |
| sky130_osu_sc_12T_hs__nand2_l | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | -0.00209 | -0.00211 | -0.00210 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__nand2_1 | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00320 | 0.00308 | 0.00305 |
| sky130_osu_sc_12T_hs__nand2_l | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00231 | 0.00222 | 0.00218 |

# SKY130_OSU_SC_12T_HS__NOR2x

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_12T_hs__nor2_1 | 6.34920 |
| sky130_osu_sc_12T_hs__nor2_l | 6.34920 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_12T_hs__nor2_1 | 0.00281 | 0.00307 | 0.94772 |
| sky130_osu_sc_12T_hs__nor2_l | 0.00216 | 0.00236 | 0.67670 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_12T_hs__nor2_1 | 0.00000 | 190.31300 | 417.56000 |
| sky130_osu_sc_12T_hs__nor2_l | 0.00000 | 496.64200 | 1291.15000 |

# Delay Information

**Delay(ns) to Y rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__nor2_1 | A->Y (FR) | 0.03389 | 0.55782 | 8.12354 |
| | B->Y (FR) | 0.02541 | 0.58805 | 8.74939 |
| sky130_osu_sc_12T_hs__nor2_l | A->Y (FR) | 0.03667 | 0.60441 | 7.98792 |
| | B->Y (FR) | 0.02967 | 0.63288 | 8.56703 |

**Delay(ns) to Y falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__nor2_1 | A->Y (RF) | 0.02229 | 0.36477 | 5.25911 |
| | B->Y (RF) | 0.01730 | 0.35688 | 5.21329 |
| sky130_osu_sc_12T_hs__nor2_l | A->Y (RF) | 0.02279 | 0.38494 | 5.06533 |
| | B->Y (RF) | 0.01870 | 0.37788 | 5.01820 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__nor2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00706 | 0.01277 | 0.12511 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00534 | 0.01209 | 0.12827 |
| sky130_osu_sc_12T_hs__nor2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00505 | 0.00976 | 0.10673 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00397 | 0.00985 | 0.11692 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__nor2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00580 | 0.01087 | 0.10499 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00696 | 0.01193 | 0.09770 |
| sky130_osu_sc_12T_hs__nor2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01177 | 0.01521 | 0.08730 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02260 | 0.02572 | 0.08666 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__nor2_1 | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | -0.00152 | -0.00199 | 0.00046 |
| sky130_osu_sc_12T_hs__nor2_l | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | -0.00077 | -0.00068 | 0.00697 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__nor2_1 | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | 0.00645 | 0.00642 | 0.00594 |
| sky130_osu_sc_12T_hs__nor2_l | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | 0.01318 | 0.01298 | 0.01090 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__nor2_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | -0.00087 | -0.00087 | -0.00033 |
| sky130_osu_sc_12T_hs__nor2_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | -0.00044 | -0.00041 | 0.00094 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__nor2_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00391 | 0.00385 | 0.00271 |
| sky130_osu_sc_12T_hs__nor2_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00664 | 0.00644 | 0.00334 |

# SKY130_OSU_SC_12T_HS__OAI21

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## 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_12T_hs__oai21_l | 8.30280 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) |
|---|---|---|---|---|
| | A0 | A1 | B0 | Y |
| sky130_osu_sc_12T_hs__oai21_l | 0.00285 | 0.00297 | 0.00248 | 0.91256 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_12T_hs__oai21_l | 0.00000 | 591.73100 | 1729.61000 |

# Delay Information

**Delay(ns) to Y rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__oai21_l | A0->Y (FR) | 0.03636 | 0.58762 | 8.49557 |
| | A1->Y (FR) | 0.04666 | 0.56053 | 7.88215 |
| | B0->Y (FR) | 0.02376 | 0.51660 | 7.63990 |

**Delay(ns) to Y falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__oai21_l | A0->Y (RF) | 0.03096 | 0.42119 | 5.91216 |
| | A1->Y (RF) | 0.03758 | 0.42145 | 5.83453 |
| | B0->Y (RF) | 0.02355 | 0.46559 | 6.78181 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.00749 | 0.01317 | 0.11550 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.00924 | 0.01427 | 0.11831 |
| | B0 | 0.00434 | 0.01162 | 0.13858 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.03624 | 0.03914 | 0.10176 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.03367 | 0.03661 | 0.10698 |
| | B0 | 0.02732 | 0.03099 | 0.09855 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.01062 | 0.01062 | 0.01115 |
| | (A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * Y) | -0.00276 | -0.00279 | -0.00277 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00278 | -0.00279 | -0.00278 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.01536 | 0.01530 | 0.01419 |
| | (A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * Y) | 0.00292 | 0.00294 | 0.00292 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00313 | 0.00299 | 0.00293 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | 0.01006 | 0.00959 | 0.01200 |
| | (A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * Y) | -0.00273 | -0.00276 | -0.00274 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | -0.00274 | -0.00275 | -0.00274 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | 0.01778 | 0.01775 | 0.01728 |
| | (A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * Y) | 0.00287 | 0.00291 | 0.00289 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | 0.00309 | 0.00297 | 0.00290 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai21_l | (!A0 * !A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * Y) | -0.00224 | -0.00226 | -0.00235 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai21_l | (!A0 * !A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * Y) | 0.00244 | 0.00249 | 0.00246 |

# SKY130_OSU_SC_12T_HS__OAI22

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## 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_12T_hs__oai22_l | 10.25640 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | | Max Cap(pf) |
|---|---|---|---|---|---|
| | A0 | A1 | B0 | B1 | Y |
| sky130_osu_sc_12T_hs__oai22_l | 0.00271 | 0.00281 | 0.00297 | 0.00295 | 1.00081 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_12T_hs__oai22_l | 0.00000 | 285.07800 | 834.71300 |

# Delay Information

**Delay(ns) to Y rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__oai22_l | A0->Y (FR) | 0.04805 | 0.55824 | 8.04242 |
| | A1->Y (FR) | 0.04019 | 0.59260 | 8.73133 |
| | B0->Y (FR) | 0.02621 | 0.57922 | 8.70911 |
| | B1->Y (FR) | 0.03477 | 0.54506 | 8.01287 |

**Delay(ns) to Y falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__oai22_l | A0->Y (RF) | 0.05128 | 0.46440 | 6.45319 |
| | A1->Y (RF) | 0.04187 | 0.45202 | 6.38094 |
| | B0->Y (RF) | 0.03527 | 0.49756 | 7.27557 |
| | B1->Y (RF) | 0.04508 | 0.51199 | 7.37119 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai22_l | A0 | 0.01110 | 0.01606 | 0.11766 |
| | A1 | 0.00937 | 0.01544 | 0.12314 |
| | B0 | 0.00565 | 0.01183 | 0.11671 |
| | B1 | 0.00751 | 0.01248 | 0.11008 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai22_l | A0 | 0.01643 | 0.01990 | 0.09644 |
| | A1 | 0.01752 | 0.02104 | 0.09104 |
| | B0 | 0.00936 | 0.01373 | 0.08977 |
| | B1 | 0.00800 | 0.01222 | 0.09244 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | -0.00108 | -0.00150 | 0.00095 |
| | (A1 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * B1 * !Y) | 0.00092 | 0.00050 | 0.00294 |
| | (A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * !B1 * Y) | -0.00258 | -0.00259 | -0.00258 |
| | (!A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * !B1 * Y) | -0.00259 | -0.00260 | -0.00260 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.00682 | 0.00680 | 0.00631 |
| | (A1 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * B1 * !Y) | 0.00881 | 0.00879 | 0.00831 |
| | (A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * !B1 * Y) | 0.00286 | 0.00288 | 0.00287 |
| | (!A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * !B1 * Y) | 0.00312 | 0.00292 | 0.00289 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai22_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | -0.00042 | -0.00042 | 0.00012 |
| | (A0 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * B1 * !Y) | 0.00158 | 0.00158 | 0.00212 |
| | (A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * !B1 * Y) | -0.00257 | -0.00259 | -0.00258 |
| | (!A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * !B1 * Y) | -0.00258 | -0.00260 | -0.00259 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai22_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | 0.00431 | 0.00424 | 0.00311 |
| | (A0 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * B1 * !Y) | 0.00630 | 0.00624 | 0.00511 |
| | (A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * !B1 * Y) | 0.00285 | 0.00289 | 0.00287 |
| | (!A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * !B1 * Y) | 0.00313 | 0.00295 | 0.00288 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai22_l | (A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B1 * !Y) | -0.00042 | -0.00043 | 0.00011 |
| | (A0 * !A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B1 * !Y) | 0.00157 | 0.00156 | 0.00211 |
| | (!A0 * !A1 * B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B1 * Y) | -0.00316 | -0.00319 | -0.00314 |
| | (!A0 * !A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B1 * Y) | -0.00295 | -0.00299 | -0.00310 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai22_l | (A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B1 * !Y) | 0.00432 | 0.00426 | 0.00312 |
| | (A0 * !A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B1 * !Y) | 0.00631 | 0.00625 | 0.00512 |
| | (!A0 * !A1 * B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B1 * Y) | 0.00341 | 0.00345 | 0.00337 |
| | (!A0 * !A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B1 * Y) | 0.00319 | 0.00325 | 0.00321 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | -0.00106 | -0.00148 | 0.00096 |
| | (A0 * !A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B0 * !Y) | 0.00093 | 0.00051 | 0.00296 |
| | (!A0 * !A1 * B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B0 * Y) | -0.00322 | -0.00324 | -0.00319 |
| | (!A0 * !A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B0 * Y) | -0.00301 | -0.00304 | -0.00316 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.00681 | 0.00678 | 0.00630 |
| | (A0 * !A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B0 * !Y) | 0.00880 | 0.00876 | 0.00829 |
| | (!A0 * !A1 * B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B0 * Y) | 0.00347 | 0.00349 | 0.00343 |
| | (!A0 * !A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B0 * Y) | 0.00324 | 0.00328 | 0.00327 |

# SKY130_OSU_SC_12T_HS__OR2x

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_12T_hs__or2_1 | 8.30280 |
| sky130_osu_sc_12T_hs__or2_2 | 10.25640 |
| sky130_osu_sc_12T_hs__or2_4 | 14.16360 |
| sky130_osu_sc_12T_hs__or2_8 | 21.97800 |
| sky130_osu_sc_12T_hs__or2_l | 8.30280 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_12T_hs__or2_1 | 0.00319 | 0.00294 | 1.73329 |
| sky130_osu_sc_12T_hs__or2_2 | 0.00319 | 0.00294 | 3.53286 |
| sky130_osu_sc_12T_hs__or2_4 | 0.00319 | 0.00294 | 6.87413 |
| sky130_osu_sc_12T_hs__or2_8 | 0.00320 | 0.00295 | 13.50554 |
| sky130_osu_sc_12T_hs__or2_l | 0.00244 | 0.00228 | 1.18378 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_12T_hs__or2_1** | 0.00000 | 301.66500 | 437.02000 |
| **sky130_osu_sc_12T_hs__or2_2** | 0.00000 | 413.01800 | 857.81700 |
| **sky130_osu_sc_12T_hs__or2_4** | 0.00000 | 635.67600 | 1699.12000 |
| **sky130_osu_sc_12T_hs__or2_8** | 0.00000 | 1080.91000 | 3381.46000 |
| **sky130_osu_sc_12T_hs__or2_l** | 0.00000 | 830.00800 | 1333.84000 |

# Delay Information

**Delay(ns) to Y rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__or2_1 | A->Y (RR) | 0.04681 | 0.40447 | 5.86806 |
| | B->Y (RR) | 0.03937 | 0.38066 | 5.65599 |
| sky130_osu_sc_12T_hs__or2_2 | A->Y (RR) | 0.05065 | 0.33915 | 5.78094 |
| | B->Y (RR) | 0.04299 | 0.31623 | 5.55504 |
| sky130_osu_sc_12T_hs__or2_4 | A->Y (RR) | 0.06649 | 0.32305 | 5.79332 |
| | B->Y (RR) | 0.05848 | 0.30207 | 5.56590 |
| sky130_osu_sc_12T_hs__or2_8 | A->Y (RR) | 0.09983 | 0.35322 | 6.00433 |
| | B->Y (RR) | 0.09153 | 0.33615 | 5.78714 |
| sky130_osu_sc_12T_hs__or2_l | A->Y (RR) | 0.04935 | 0.45200 | 5.78549 |
| | B->Y (RR) | 0.04288 | 0.43251 | 5.62349 |

**Delay(ns) to Y falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__or2_1 | A->Y (FF) | 0.06507 | 0.46430 | 6.83640 |
| | B->Y (FF) | 0.05350 | 0.48054 | 7.27609 |
| sky130_osu_sc_12T_hs__or2_2 | A->Y (FF) | 0.07621 | 0.42684 | 7.07973 |
| | B->Y (FF) | 0.06478 | 0.44470 | 7.52546 |
| sky130_osu_sc_12T_hs__or2_4 | A->Y (FF) | 0.10840 | 0.42855 | 7.19412 |
| | B->Y (FF) | 0.09699 | 0.44995 | 7.63981 |
| sky130_osu_sc_12T_hs__or2_8 | A->Y (FF) | 0.17567 | 0.48219 | 7.35739 |
| | B->Y (FF) | 0.16430 | 0.50946 | 7.79707 |
| sky130_osu_sc_12T_hs__or2_l | A->Y (FF) | 0.07062 | 0.49118 | 6.46135 |
| | B->Y (FF) | 0.05979 | 0.50502 | 6.83855 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__or2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01255 | 0.02173 | 0.19528 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01480 | 0.02499 | 0.20470 |
| sky130_osu_sc_12T_hs__or2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01689 | 0.02659 | 0.20537 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01885 | 0.02950 | 0.21276 |
| sky130_osu_sc_12T_hs__or2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02809 | 0.03822 | 0.22334 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02955 | 0.04065 | 0.22800 |
| sky130_osu_sc_12T_hs__or2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.06164 | 0.06660 | 0.26942 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.06219 | 0.06863 | 0.26071 |
| sky130_osu_sc_12T_hs__or2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02038 | 0.02840 | 0.18859 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.03647 | 0.04525 | 0.21052 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__or2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02116 | 0.03155 | 0.24756 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01922 | 0.03197 | 0.27320 |
| sky130_osu_sc_12T_hs__or2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03652 | 0.04458 | 0.25905 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.03466 | 0.04491 | 0.28468 |
| sky130_osu_sc_12T_hs__or2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.07427 | 0.07276 | 0.27802 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.07261 | 0.07332 | 0.30393 |
| sky130_osu_sc_12T_hs__or2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.17354 | 0.13808 | 0.31917 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.17242 | 0.14025 | 0.34631 |
| sky130_osu_sc_12T_hs__or2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03639 | 0.04458 | 0.21736 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.03530 | 0.04549 | 0.24044 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__or2_1 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00145 | -0.00194 | 0.00051 |
| sky130_osu_sc_12T_hs__or2_2 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00138 | -0.00187 | 0.00058 |
| sky130_osu_sc_12T_hs__or2_4 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00124 | -0.00172 | 0.00073 |
| sky130_osu_sc_12T_hs__or2_8 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00095 | -0.00144 | 0.00101 |
| sky130_osu_sc_12T_hs__or2_l | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00070 | -0.00066 | 0.00699 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__or2_1 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00656 | 0.00653 | 0.00604 |
| sky130_osu_sc_12T_hs__or2_2 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00663 | 0.00660 | 0.00611 |
| sky130_osu_sc_12T_hs__or2_4 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00677 | 0.00674 | 0.00626 |
| sky130_osu_sc_12T_hs__or2_8 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00705 | 0.00703 | 0.00654 |
| sky130_osu_sc_12T_hs__or2_l | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.01320 | 0.01300 | 0.01091 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__or2_1 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00080 | -0.00080 | -0.00030 |
| sky130_osu_sc_12T_hs__or2_2 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00073 | -0.00073 | -0.00023 |
| sky130_osu_sc_12T_hs__or2_4 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00058 | -0.00059 | -0.00008 |
| sky130_osu_sc_12T_hs__or2_8 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00030 | -0.00030 | 0.00021 |
| sky130_osu_sc_12T_hs__or2_l | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00040 | -0.00037 | 0.00096 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__or2_1 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00402 | 0.00395 | 0.00282 |
| sky130_osu_sc_12T_hs__or2_2 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00408 | 0.00402 | 0.00289 |
| sky130_osu_sc_12T_hs__or2_4 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00423 | 0.00416 | 0.00303 |
| sky130_osu_sc_12T_hs__or2_8 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00451 | 0.00445 | 0.00332 |
| sky130_osu_sc_12T_hs__or2_l | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00669 | 0.00650 | 0.00339 |

# SKY130_OSU_SC_12T_HS__TBUFIx

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_12T_hs__tbufi_1 | 8.30280 |
| sky130_osu_sc_12T_hs__tbufi_l | 8.30280 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | OE | Y |
| sky130_osu_sc_12T_hs__tbufi_1 | 0.00304 | 0.00402 | 0.99380 |
| sky130_osu_sc_12T_hs__tbufi_l | 0.00237 | 0.00315 | 0.66562 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_12T_hs__tbufi_1 | 0.00000 | 219.21000 | 837.09100 |
| sky130_osu_sc_12T_hs__tbufi_l | 0.00000 | 659.13000 | 2603.68000 |

# Delay Information

**Delay(ns) to Y rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__tbufi_1 | A->Y (FR) | 0.02380 | 0.57252 | 8.61955 |
| | OE->Y (FR) | 0.03014 | 0.32300 | 5.34255 |
| | OE->Y (RR) | 0.04656 | 0.45917 | 5.85236 |
| sky130_osu_sc_12T_hs__tbufi_l | A->Y (FR) | 0.02885 | 0.61970 | 8.32638 |
| | OE->Y (FR) | 0.03120 | 0.32299 | 5.34253 |
| | OE->Y (RR) | 0.05046 | 0.51421 | 5.68166 |

**Delay(ns) to Y falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__tbufi_1 | A->Y (RF) | 0.02194 | 0.45794 | 6.83126 |
| | OE->Y (FF) | 0.03049 | 0.32298 | 5.34255 |
| | OE->Y (RF) | 0.02009 | 0.40248 | 5.86387 |
| sky130_osu_sc_12T_hs__tbufi_l | A->Y (RF) | 0.02469 | 0.48227 | 6.43664 |
| | OE->Y (FF) | 0.03154 | 0.32298 | 5.34254 |
| | OE->Y (RF) | 0.02277 | 0.42206 | 5.34086 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__tbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01637 | 0.02202 | 0.11798 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.01530 | 0.03113 | 0.31939 |
| sky130_osu_sc_12T_hs__tbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03941 | 0.04392 | 0.12966 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.03566 | 0.04865 | 0.28827 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__tbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01768 | 0.02192 | 0.09261 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.02031 | 0.03769 | 0.35780 |
| sky130_osu_sc_12T_hs__tbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.05449 | 0.05669 | 0.10256 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.05402 | 0.06735 | 0.31481 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__tbufi_1 | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | -0.00232 | -0.00235 | -0.00228 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | -0.00163 | -0.00166 | -0.00143 |
| sky130_osu_sc_12T_hs__tbufi_l | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | -0.00186 | -0.00187 | -0.00182 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | -0.00111 | -0.00109 | -0.00035 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__tbufi_1 | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | 0.00266 | 0.00267 | 0.00249 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | 0.00295 | 0.00296 | 0.00274 |
| sky130_osu_sc_12T_hs__tbufi_l | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | 0.00212 | 0.00212 | 0.00190 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | 0.00319 | 0.00334 | 0.00305 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__tbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00915 | 0.02721 | 0.35632 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00541 | 0.02356 | 0.35423 |
| sky130_osu_sc_12T_hs__tbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.02396 | 0.03808 | 0.29561 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.01269 | 0.02713 | 0.28952 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__tbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00619 | 0.02535 | 0.36057 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00564 | 0.02479 | 0.35855 |
| sky130_osu_sc_12T_hs__tbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00491 | 0.02094 | 0.29854 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00430 | 0.02006 | 0.29270 |

# SKY130_OSU_SC_12T_HS__TNBUFIx

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_12T_hs__tnbufi_1 | 8.30280 |
| sky130_osu_sc_12T_hs__tnbufi_l | 8.30280 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | OE | Y |
| sky130_osu_sc_12T_hs__tnbufi_1 | 0.00304 | 0.00452 | 0.99377 |
| sky130_osu_sc_12T_hs__tnbufi_l | 0.00227 | 0.00345 | 0.66720 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_12T_hs__tnbufi_1 | 0.00000 | 356.71200 | 427.32400 |
| sky130_osu_sc_12T_hs__tnbufi_l | 0.00000 | 1100.72000 | 1327.40000 |

# Delay Information

**Delay(ns) to Y rising :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__tnbufi_1 | A->Y (FR) | 0.02388 | 0.57235 | 8.61552 |
| | OE->Y (RR) | 0.02198 | 0.32332 | 5.34293 |
| | OE->Y (FR) | 0.03045 | 0.51683 | 7.46198 |
| sky130_osu_sc_12T_hs__tnbufi_l | A->Y (FR) | 0.02825 | 0.61916 | 8.33233 |
| | OE->Y (RR) | 0.02394 | 0.32305 | 5.34261 |
| | OE->Y (FR) | 0.03374 | 0.56261 | 7.08016 |

**Delay(ns) to Y falling :**

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_12T_hs__tnbufi_1 | A->Y (RF) | 0.02153 | 0.45787 | 6.83289 |
| | OE->Y (RF) | 0.02177 | 0.32333 | 5.34290 |
| | OE->Y (FF) | 0.03492 | 0.39987 | 5.28213 |
| sky130_osu_sc_12T_hs__tnbufi_l | A->Y (RF) | 0.02361 | 0.48169 | 6.44857 |
| | OE->Y (RF) | 0.02371 | 0.32305 | 5.34259 |
| | OE->Y (FF) | 0.03914 | 0.43022 | 4.98568 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__tnbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00526 | 0.01102 | 0.10848 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.01230 | 0.03138 | 0.35651 |
| sky130_osu_sc_12T_hs__tnbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00389 | 0.00870 | 0.09811 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00930 | 0.02511 | 0.29321 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__tnbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00845 | 0.01272 | 0.08365 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.01822 | 0.03641 | 0.33984 |
| sky130_osu_sc_12T_hs__tnbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02663 | 0.02887 | 0.07529 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.03111 | 0.04575 | 0.29344 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__tnbufi_1 | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | 0.00166 | 0.00165 | 0.00173 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | 0.00237 | 0.00235 | 0.00255 |
| sky130_osu_sc_12T_hs__tnbufi_l | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | 0.01000 | 0.00999 | 0.01005 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | 0.01073 | 0.01075 | 0.01146 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__tnbufi_1 | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | 0.00585 | 0.00586 | 0.00568 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | 0.00614 | 0.00615 | 0.00592 |
| sky130_osu_sc_12T_hs__tnbufi_l | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | 0.01324 | 0.01323 | 0.01302 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | 0.01427 | 0.01441 | 0.01412 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__tnbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00110 | 0.01946 | 0.35204 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00030 | 0.01904 | 0.34975 |
| sky130_osu_sc_12T_hs__tnbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00994 | 0.02467 | 0.29232 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00915 | 0.02376 | 0.28616 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_12T_hs__tnbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.01273 | 0.03245 | 0.36562 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00904 | 0.02910 | 0.36310 |
| sky130_osu_sc_12T_hs__tnbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.01833 | 0.03415 | 0.30250 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00703 | 0.02333 | 0.29612 |

# SKY130_OSU_SC_12T_HS__XNOR2

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## 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_12T_hs__xnor2_l | 14.16360 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_12T_hs__xnor2_l | 0.00612 | 0.00525 | 1.02993 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_12T_hs__xnor2_l | 0.00000 | 783.94400 | 1263.20000 |

# Delay Information

**Delay(ns) to Y rising (conditional):**

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_12T_hs__xnor2_1 | A->Y (RR) | B | 0.05819 | 0.48045 | 6.02154 |
| | A->Y (FR) | !B | 0.03070 | 0.57382 | 8.64173 |
| | B->Y (RR) | A | 0.04771 | 0.48089 | 6.28522 |
| | B->Y (FR) | !A | 0.03982 | 0.54733 | 8.03327 |

**Delay(ns) to Y falling (conditional):**

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_12T_hs__xnor2_1 | A->Y (FF) | B | 0.05898 | 0.44674 | 5.69303 |
| | A->Y (RF) | !B | 0.02925 | 0.43887 | 6.46587 |
| | B->Y (FF) | A | 0.05093 | 0.44203 | 5.72775 |
| | B->Y (RF) | !A | 0.03575 | 0.44551 | 6.44824 |

# Power Information

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__xnor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.02670 | 0.04284 | 0.34931 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.01243 | 0.03671 | 0.46512 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.02352 | 0.04199 | 0.38370 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.01342 | 0.03648 | 0.45257 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__xnor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.03348 | 0.05138 | 0.38156 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.03031 | 0.05137 | 0.44631 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.03783 | 0.05671 | 0.39240 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.02531 | 0.04643 | 0.44004 |

# SKY130_OSU_SC_12T_HS__XOR2

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## 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_12T_hs__xor2_l | 14.16360 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_12T_hs__xor2_l | 0.00614 | 0.00529 | 0.97348 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_12T_hs__xor2_l | 0.00000 | 783.11000 | 1393.83000 |

# Delay Information

**Delay(ns) to Y rising (conditional):**

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_12T_hs__xor2_1 | A->Y (RR) | !B | 0.05893 | 0.49263 | 6.20721 |
| | A->Y (FR) | B | 0.04263 | 0.57642 | 8.34770 |
| | B->Y (RR) | !A | 0.05037 | 0.49260 | 6.24924 |
| | B->Y (FR) | A | 0.04567 | 0.57653 | 8.29990 |

**Delay(ns) to Y falling (conditional):**

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_12T_hs__xor2_1 | A->Y (FF) | !B | 0.05524 | 0.43804 | 5.33903 |
| | A->Y (RF) | B | 0.03184 | 0.46144 | 6.65277 |
| | B->Y (FF) | !A | 0.05263 | 0.44333 | 5.60235 |
| | B->Y (RF) | A | 0.03562 | 0.43158 | 6.10043 |

# Power Information

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__xor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.02617 | 0.04784 | 0.44248 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.01418 | 0.03037 | 0.35243 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.02641 | 0.04788 | 0.43642 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.01329 | 0.03077 | 0.35979 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_12T_hs__xor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.03277 | 0.05251 | 0.42484 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.03089 | 0.04757 | 0.34094 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.03168 | 0.05095 | 0.41776 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.02930 | 0.04738 | 0.36905 |

# SKY130_OSU_SC_12T_HS_x

*sky130_osu_sc_12T_hs_ff_1P95_150C.ccs*
*Cell Library: Process , Voltage 1.95, Temp 150.00*

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## Truth Table

| INPUT |
|---|
| A |
| x |

## Footprint

| Cell Name | Area |
|---|---|
| **sky130_osu_sc_12T_hs__ant** | 4.39560 |
| **sky130_osu_sc_12T_hs__tiehi** | 4.39560 |
| **sky130_osu_sc_12T_hs__tielo** | 4.39560 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) |
|---|---|
| | A |
| **sky130_osu_sc_12T_hs__ant** | 0.86661 |
| **sky130_osu_sc_12T_hs__tiehi** | 0.00000 |
| **sky130_osu_sc_12T_hs__tielo** | 0.00000 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_12T_hs__ant** | 0.00000 | 327021.00000 | 654042.00000 |
| **sky130_osu_sc_12T_hs__tiehi** | 0.00000 | 0.00000 | 0.00000 |
| **sky130_osu_sc_12T_hs__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_12T_hs__ant | 0.00000 | 0.00000 | 0.00000 |
| | -0.00083 | 0.10309 | 1.66271 |

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

| Cell Name | Power(pJ) | | |
|---|---|---|---|
| | first | mid | last |
| sky130_osu_sc_12T_hs__ant | 0.00000 | 0.00000 | 0.00000 |
| | 5.69216 | 5.46898 | 1.91023 |