# sky130_osu_sc_18T_hs_tt_1P80_100C.ccs Library

| Cell Groups |
| --- |
| SKY130_OSU_SC_18T_HS__ADDFx |
| SKY130_OSU_SC_18T_HS__ADDHx |
| SKY130_OSU_SC_18T_HS__AND2x |
| SKY130_OSU_SC_18T_HS__AOI21 |
| SKY130_OSU_SC_18T_HS__AOI22 |
| SKY130_OSU_SC_18T_HS__BUFx |
| SKY130_OSU_SC_18T_HS__DFFRx |
| SKY130_OSU_SC_18T_HS__DFFSRx |
| SKY130_OSU_SC_18T_HS__DFFSx |
| SKY130_OSU_SC_18T_HS__DFFx |
| SKY130_OSU_SC_18T_HS__INVx |
| SKY130_OSU_SC_18T_HS__MUX2 |
| SKY130_OSU_SC_18T_HS__NAND2x |
| SKY130_OSU_SC_18T_HS__NOR2x |
| SKY130_OSU_SC_18T_HS__OAI21 |
| SKY130_OSU_SC_18T_HS__OAI22 |
| SKY130_OSU_SC_18T_HS__OR2x |
| SKY130_OSU_SC_18T_HS__TBUFIx |
| SKY130_OSU_SC_18T_HS__TNBUFIx |
| SKY130_OSU_SC_18T_HS__XNOR2 |
| SKY130_OSU_SC_18T_HS__XOR2 |
| SKY130_OSU_SC_18T_HS_x |

# SKY130_OSU_SC_18T_HS__ADDFx

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__addf_1** | 46.88640 |
| **sky130_osu_sc_18T_hs__addf_l** | 46.88640 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) | | |
|---|---|---|---|---|---|---|
| | **A** | **B** | **CI** | **CO** | **CON** | **S** |
| **sky130_osu_sc_18T_hs__addf_1** | 0.02176 | 0.02159 | 0.01653 | 3.18837 | 1.49573 | 3.08952 |
| **sky130_osu_sc_18T_hs__addf_l** | 0.02174 | 0.02157 | 0.01651 | 2.20219 | 1.49963 | 2.20507 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_18T_hs__addf_1** | 0.00000 | 47.65530 | 60.47530 |
| **sky130_osu_sc_18T_hs__addf_l** | 0.00000 | 40.23750 | 53.05740 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__addf_1 | A->CO (RR) | 0.13175 | 1.57878 | 25.66380 |
| | B->CO (RR) | 0.12911 | 1.53284 | 24.61830 |
| | CI->CO (RR) | 0.12589 | 1.63077 | 26.45280 |
| | CON->CO (FR) | 0.02386 | 0.65225 | 10.29630 |
| sky130_osu_sc_18T_hs__addf_l | A->CO (RR) | 0.13292 | 1.47423 | 20.82660 |
| | B->CO (RR) | 0.13040 | 1.44240 | 20.26670 |
| | CI->CO (RR) | 0.12704 | 1.52748 | 21.64280 |
| | CON->CO (FR) | 0.02665 | 0.71083 | 10.30160 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__addf_1 | A->CO (FF) | 0.15783 | 1.82328 | 29.44740 |
| | B->CO (FF) | 0.13904 | 1.76109 | 28.57780 |
| | CI->CO (FF) | 0.13565 | 1.82806 | 29.81820 |
| | CON->CO (RF) | 0.02290 | 0.60356 | 9.63871 |
| sky130_osu_sc_18T_hs__addf_l | A->CO (FF) | 0.15539 | 1.65621 | 23.24420 |
| | B->CO (FF) | 0.13684 | 1.60575 | 22.74700 |
| | CI->CO (FF) | 0.13322 | 1.66274 | 23.65520 |
| | CON->CO (RF) | 0.02437 | 0.62873 | 9.13061 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__addf_1 | A->CON (FR) | 0.12043 | 0.79625 | 9.32810 |
| | B->CON (FR) | 0.10223 | 0.77406 | 9.33145 |
| | CI->CON (FR) | 0.09827 | 0.80546 | 9.78815 |
| sky130_osu_sc_18T_hs__addf_l | A->CON (FR) | 0.11402 | 0.79094 | 9.33866 |
| | B->CON (FR) | 0.09630 | 0.76907 | 9.34097 |
| | CI->CON (FR) | 0.09183 | 0.79997 | 9.79838 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__addf_1 | A->CON (RF) | 0.09076 | 0.60347 | 7.05014 |
| | B->CON (RF) | 0.08931 | 0.62268 | 7.33654 |
| | CI->CON (RF) | 0.08487 | 0.65873 | 7.92181 |
| sky130_osu_sc_18T_hs__addf_l | A->CON (RF) | 0.08703 | 0.60101 | 7.05953 |
| | B->CON (RF) | 0.08589 | 0.61976 | 7.34526 |
| | CI->CON (RF) | 0.08114 | 0.65580 | 7.93111 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__addf_1 | A->S (-R) | 0.23386 | 1.64440 | 23.58940 |
| | B->S (-R) | 0.24926 | 1.63765 | 22.67950 |
| | CI->S (-R) | 0.20968 | 1.64653 | 23.96930 |
| | CON->S (RR) | 0.07338 | 0.54533 | 7.07694 |
| sky130_osu_sc_18T_hs__addf_l | A->S (-R) | 0.22420 | 1.52849 | 19.57640 |
| | B->S (-R) | 0.24014 | 1.53158 | 18.98670 |
| | CI->S (-R) | 0.20000 | 1.53189 | 19.98490 |
| | CON->S (RR) | 0.07334 | 0.58693 | 7.02474 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__addf_1 | A->S (-F) | 0.21045 | 1.46329 | 20.43420 |
| | B->S (-F) | 0.20186 | 1.39372 | 19.60940 |
| | CI->S (-F) | 0.20404 | 1.51263 | 21.23390 |
| | CON->S (FF) | 0.08341 | 0.61765 | 7.60547 |
| sky130_osu_sc_18T_hs__addf_l | A->S (-F) | 0.20054 | 1.34406 | 16.68930 |
| | B->S (-F) | 0.19489 | 1.29530 | 16.26530 |
| | CI->S (-F) | 0.19408 | 1.39442 | 17.51350 |
| | CON->S (FF) | 0.08131 | 0.63481 | 7.26209 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__addf_1 | A | 0.00531 | 0.00993 | 0.10299 |
| | B | 0.00594 | 0.01004 | 0.09344 |
| | CI | 0.00821 | 0.01298 | 0.10602 |
| sky130_osu_sc_18T_hs__addf_l | A | 0.00383 | 0.00717 | 0.06739 |
| | B | 0.00451 | 0.00739 | 0.06171 |
| | CI | 0.00672 | 0.01023 | 0.07034 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__addf_1 | A | 0.01970 | 0.02538 | 0.14768 |
| | B | 0.02063 | 0.02526 | 0.13495 |
| | CI | 0.01660 | 0.02278 | 0.14712 |
| sky130_osu_sc_18T_hs__addf_l | A | 0.01815 | 0.02233 | 0.10309 |
| | B | 0.01909 | 0.02250 | 0.09555 |
| | CI | 0.01505 | 0.01979 | 0.10305 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__addf_1 | A | 0.01934 | 0.02286 | 0.08672 |
| | B | 0.01964 | 0.02294 | 0.08331 |
| | CI | 0.01626 | 0.02039 | 0.08754 |
| sky130_osu_sc_18T_hs__addf_l | A | 0.01796 | 0.02129 | 0.08111 |
| | B | 0.01830 | 0.02140 | 0.07802 |
| | CI | 0.01488 | 0.01877 | 0.08185 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__addf_1 | A | 0.00497 | 0.00800 | 0.05870 |
| | B | 0.00551 | 0.00820 | 0.05477 |
| | CI | 0.00787 | 0.01105 | 0.06278 |
| sky130_osu_sc_18T_hs__addf_l | A | 0.00360 | 0.00636 | 0.05201 |
| | B | 0.00422 | 0.00654 | 0.04885 |
| | CI | 0.00650 | 0.00941 | 0.05587 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__addf_1 | A | 0.01953 | 0.02509 | 0.14339 |
| | B | -0.00571 | -0.00194 | 0.09127 |
| | CI | 0.01642 | 0.02249 | 0.14283 |
| sky130_osu_sc_18T_hs__addf_l | A | -0.00168 | -0.00168 | 0.11073 |
| | B | -0.00788 | -0.00384 | 0.09796 |
| | CI | 0.00630 | 0.00939 | 0.11482 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__addf_1 | A | 0.04317 | 0.04661 | 0.14668 |
| | B | 0.03824 | 0.04342 | 0.16176 |
| | CI | 0.03246 | 0.03619 | 0.13018 |
| sky130_osu_sc_18T_hs__addf_l | A | 0.04122 | 0.04476 | 0.14883 |
| | B | 0.03610 | 0.04155 | 0.16269 |
| | CI | 0.03058 | 0.03437 | 0.13229 |

# SKY130_OSU_SC_18T_HS__ADDHx

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_hs__addh_1 | 27.83880 |
| sky130_osu_sc_18T_hs__addh_l | 27.83880 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) | | |
|---|---|---|---|---|---|
| | A | B | CO | CON | S |
| sky130_osu_sc_18T_hs__addh_1 | 0.01056 | 0.01161 | 3.13838 | 1.59761 | 3.19807 |
| sky130_osu_sc_18T_hs__addh_l | 0.01056 | 0.01162 | 1.88357 | 1.59982 | 1.91008 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_hs__addh_1 | 0.00000 | 52.77940 | 60.20910 |
| sky130_osu_sc_18T_hs__addh_l | 0.00000 | 40.59210 | 50.49390 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__addh_1 | A->CO (RR) | 0.08710 | 0.56498 | 7.05238 |
| | B->CO (RR) | 0.09047 | 0.55196 | 7.09901 |
| sky130_osu_sc_18T_hs__addh_l | A->CO (RR) | 0.08725 | 0.62860 | 7.00718 |
| | B->CO (RR) | 0.09064 | 0.61645 | 6.98442 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__addh_1 | A->CO (FF) | 0.07213 | 0.57864 | 7.43808 |
| | B->CO (FF) | 0.07764 | 0.59487 | 7.56098 |
| sky130_osu_sc_18T_hs__addh_l | A->CO (FF) | 0.07186 | 0.61114 | 6.89321 |
| | B->CO (FF) | 0.07717 | 0.62757 | 7.01929 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_hs__addh_1 | A->CON (RR) | B | 0.11979 | 0.46337 | 3.77592 |
| | A->CON (FR) | !B | 0.06480 | 0.75228 | 9.64199 |
| | B->CON (RR) | A | 0.12245 | 0.44979 | 3.83120 |
| | B->CON (FR) | !A | 0.08289 | 0.74976 | 9.35279 |
| sky130_osu_sc_18T_hs__addh_l | A->CON (RR) | B | 0.10718 | 0.44298 | 3.80640 |
| | A->CON (FR) | !B | 0.05736 | 0.74464 | 9.64237 |
| | B->CON (RR) | A | 0.10993 | 0.43037 | 3.79788 |
| | B->CON (FR) | !A | 0.07544 | 0.74189 | 9.35317 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_hs__addh_1 | A->CON (FF) | B | 0.11631 | 0.61451 | 5.96279 |
| | A->CON (RF) | !B | 0.05304 | 0.62509 | 8.00822 |
| | B->CON (FF) | A | 0.11285 | 0.64934 | 6.45779 |
| | B->CON (RF) | !A | 0.06425 | 0.61011 | 7.62803 |
| sky130_osu_sc_18T_hs__addh_l | A->CON (FF) | B | 0.10525 | 0.58727 | 5.81779 |
| | A->CON (RF) | !B | 0.04863 | 0.62045 | 8.01022 |
| | B->CON (FF) | A | 0.10200 | 0.62193 | 6.31264 |
| | B->CON (RF) | !A | 0.05986 | 0.60571 | 7.62916 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_hs__addh_1 | A->S (RR) | !B | 0.09101 | 1.55917 | 25.92360 |
| | A->S (FR) | B | 0.15533 | 1.53663 | 23.66380 |
| | B->S (RR) | !A | 0.10306 | 1.50937 | 24.76080 |
| | B->S (FR) | A | 0.15166 | 1.60701 | 24.95130 |
| | CON->S (FR) | - | 0.02686 | 0.67480 | 10.64150 |
| sky130_osu_sc_18T_hs__addh_l | A->S (RR) | !B | 0.09021 | 1.41516 | 19.61460 |
| | A->S (FR) | B | 0.14810 | 1.37467 | 17.28080 |
| | B->S (RR) | !A | 0.10250 | 1.37788 | 18.85250 |
| | B->S (FR) | A | 0.14442 | 1.43232 | 18.16430 |
| | CON->S (FR) | - | 0.02991 | 0.75016 | 10.50200 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_hs__addh_1 | A->S (FF) | !B | 0.09790 | 1.67887 | 27.91530 |
| | A->S (RF) | B | 0.15033 | 1.17519 | 17.29230 |
| | B->S (FF) | !A | 0.11600 | 1.68285 | 27.71110 |
| | B->S (RF) | A | 0.15301 | 1.16107 | 17.33840 |
| | CON->S (RF) | - | 0.02173 | 0.58805 | 9.38792 |
| sky130_osu_sc_18T_hs__addh_l | A->S (FF) | !B | 0.09386 | 1.48360 | 20.57050 |
| | A->S (RF) | B | 0.14026 | 1.05681 | 12.73400 |
| | B->S (FF) | !A | 0.11197 | 1.48393 | 20.30580 |
| | B->S (RF) | A | 0.14300 | 1.04378 | 12.70670 |
| | CON->S (RF) | - | 0.02404 | 0.63246 | 8.87587 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__addh_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00896 | 0.01105 | 0.05654 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00790 | 0.00994 | 0.06612 |
| sky130_osu_sc_18T_hs__addh_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00723 | 0.00927 | 0.05725 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00618 | 0.00812 | 0.06313 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__addh_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01362 | 0.01684 | 0.08676 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01411 | 0.01850 | 0.09451 |
| sky130_osu_sc_18T_hs__addh_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01188 | 0.01459 | 0.07238 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01237 | 0.01595 | 0.07678 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__addh_1 | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00872 | 0.01077 | 0.05548 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.01216 | 0.01456 | 0.04686 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00768 | 0.00970 | 0.06509 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.01384 | 0.01527 | 0.04308 |
| sky130_osu_sc_18T_hs__addh_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00704 | 0.00909 | 0.05700 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.01070 | 0.01258 | 0.03792 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00599 | 0.00796 | 0.06290 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.01238 | 0.01329 | 0.03400 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__addh_1 | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.01355 | 0.01646 | 0.07848 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00254 | 0.00459 | 0.03189 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.01405 | 0.01806 | 0.08421 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00366 | 0.00531 | 0.03232 |
| sky130_osu_sc_18T_hs__addh_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.01185 | 0.01454 | 0.07171 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00107 | 0.00242 | 0.02063 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.01235 | 0.01591 | 0.07606 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00218 | 0.00318 | 0.02165 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__addh_1 | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.01388 | 0.01712 | 0.08793 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00312 | 0.00552 | 0.04176 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.01445 | 0.01888 | 0.09568 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00414 | 0.00612 | 0.03876 |
| sky130_osu_sc_18T_hs__addh_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.01204 | 0.01475 | 0.07289 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00140 | 0.00276 | 0.02090 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.01258 | 0.01619 | 0.07744 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00245 | 0.00356 | 0.02101 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__addh_1 | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00908 | 0.01118 | 0.05768 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.01245 | 0.01504 | 0.05323 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00802 | 0.01008 | 0.06737 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.01415 | 0.01600 | 0.05082 |
| sky130_osu_sc_18T_hs__addh_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00724 | 0.00931 | 0.05761 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.01076 | 0.01256 | 0.03689 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00618 | 0.00814 | 0.06321 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.01246 | 0.01348 | 0.03358 |

# SKY130_OSU_SC_18T_HS__AND2x

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__and2_1 | 12.45420 |
| sky130_osu_sc_18T_hs__and2_2 | 15.38460 |
| sky130_osu_sc_18T_hs__and2_4 | 21.24540 |
| sky130_osu_sc_18T_hs__and2_6 | 27.10620 |
| sky130_osu_sc_18T_hs__and2_8 | 32.96700 |
| sky130_osu_sc_18T_hs__and2_l | 12.45420 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_18T_hs__and2_1 | 0.00572 | 0.00586 | 3.14325 |
| sky130_osu_sc_18T_hs__and2_2 | 0.00572 | 0.00586 | 6.00027 |
| sky130_osu_sc_18T_hs__and2_4 | 0.00573 | 0.00587 | 11.42775 |
| sky130_osu_sc_18T_hs__and2_6 | 0.00576 | 0.00587 | 16.76421 |
| sky130_osu_sc_18T_hs__and2_8 | 0.00574 | 0.00589 | 21.51768 |
| sky130_osu_sc_18T_hs__and2_l | 0.00440 | 0.00453 | 2.18634 |

# Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_18T_hs__and2_1** | 0.00000 | 25.08130 | 40.06760 |
| **sky130_osu_sc_18T_hs__and2_2** | 0.00000 | 40.06560 | 40.35520 |
| **sky130_osu_sc_18T_hs__and2_4** | 0.00000 | 70.04320 | 79.84600 |
| **sky130_osu_sc_18T_hs__and2_6** | 0.00000 | 100.02100 | 119.62200 |
| **sky130_osu_sc_18T_hs__and2_8** | 0.00000 | 129.99700 | 159.39700 |
| **sky130_osu_sc_18T_hs__and2_l** | 0.00000 | 15.81850 | 25.24460 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__and2_1 | A->Y (RR) | 0.06677 | 0.51038 | 7.03233 |
| | B->Y (RR) | 0.07094 | 0.49455 | 6.69533 |
| sky130_osu_sc_18T_hs__and2_2 | A->Y (RR) | 0.07686 | 0.46524 | 6.97264 |
| | B->Y (RR) | 0.08110 | 0.44635 | 6.61823 |
| sky130_osu_sc_18T_hs__and2_4 | A->Y (RR) | 0.10624 | 0.48317 | 7.12599 |
| | B->Y (RR) | 0.11052 | 0.45853 | 6.77059 |
| sky130_osu_sc_18T_hs__and2_6 | A->Y (RR) | 0.13708 | 0.52092 | 7.26570 |
| | B->Y (RR) | 0.14128 | 0.49094 | 6.90970 |
| sky130_osu_sc_18T_hs__and2_8 | A->Y (RR) | 0.16769 | 0.56205 | 7.38776 |
| | B->Y (RR) | 0.17195 | 0.52898 | 7.01485 |
| sky130_osu_sc_18T_hs__and2_l | A->Y (RR) | 0.07247 | 0.57156 | 6.96166 |
| | B->Y (RR) | 0.07687 | 0.55615 | 6.66463 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__and2_1 | A->Y (FF) | 0.05709 | 0.51529 | 6.91034 |
| | B->Y (FF) | 0.06024 | 0.52803 | 7.01215 |
| sky130_osu_sc_18T_hs__and2_2 | A->Y (FF) | 0.06356 | 0.46823 | 6.77143 |
| | B->Y (FF) | 0.06733 | 0.48078 | 6.89569 |
| sky130_osu_sc_18T_hs__and2_4 | A->Y (FF) | 0.08658 | 0.47964 | 6.85444 |
| | B->Y (FF) | 0.09035 | 0.49006 | 6.98066 |
| sky130_osu_sc_18T_hs__and2_6 | A->Y (FF) | 0.11274 | 0.51341 | 6.95050 |
| | B->Y (FF) | 0.11639 | 0.52251 | 7.07443 |
| sky130_osu_sc_18T_hs__and2_8 | A->Y (FF) | 0.13713 | 0.54551 | 6.89015 |
| | B->Y (FF) | 0.14092 | 0.55336 | 7.00623 |
| sky130_osu_sc_18T_hs__and2_l | A->Y (FF) | 0.06117 | 0.56138 | 6.64157 |
| | B->Y (FF) | 0.06505 | 0.57605 | 6.77107 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__and2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00703 | 0.01499 | 0.17786 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00707 | 0.01274 | 0.13910 |
| sky130_osu_sc_18T_hs__and2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01377 | 0.02092 | 0.18377 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01385 | 0.01913 | 0.14292 |
| sky130_osu_sc_18T_hs__and2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02980 | 0.03553 | 0.19476 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02988 | 0.03392 | 0.15116 |
| sky130_osu_sc_18T_hs__and2_6 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.05055 | 0.05165 | 0.20741 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.05072 | 0.05073 | 0.16381 |
| sky130_osu_sc_18T_hs__and2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.07393 | 0.06975 | 0.22084 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.07403 | 0.06693 | 0.17250 |
| sky130_osu_sc_18T_hs__and2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00504 | 0.00990 | 0.11411 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00512 | 0.00860 | 0.09263 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__and2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01603 | 0.02589 | 0.17116 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01799 | 0.02757 | 0.16832 |
| sky130_osu_sc_18T_hs__and2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02142 | 0.03096 | 0.17606 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02336 | 0.03252 | 0.17329 |
| sky130_osu_sc_18T_hs__and2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03740 | 0.04413 | 0.18737 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.03919 | 0.04545 | 0.18413 |
| sky130_osu_sc_18T_hs__and2_6 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.05457 | 0.05870 | 0.19949 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.05629 | 0.05931 | 0.19566 |
| sky130_osu_sc_18T_hs__and2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.07695 | 0.07303 | 0.21211 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.07859 | 0.07353 | 0.20673 |
| sky130_osu_sc_18T_hs__and2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01230 | 0.01846 | 0.10865 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01377 | 0.01974 | 0.10890 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__and2_1 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00594 | -0.00597 | -0.00599 |
| sky130_osu_sc_18T_hs__and2_2 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00577 | -0.00580 | -0.00582 |
| sky130_osu_sc_18T_hs__and2_4 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00542 | -0.00545 | -0.00547 |
| sky130_osu_sc_18T_hs__and2_6 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00510 | -0.00514 | -0.00515 |
| sky130_osu_sc_18T_hs__and2_8 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00473 | -0.00476 | -0.00478 |
| sky130_osu_sc_18T_hs__and2_l | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00437 | -0.00439 | -0.00441 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__and2_1 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00632 | 0.00636 | 0.00635 |
| sky130_osu_sc_18T_hs__and2_2 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00649 | 0.00654 | 0.00653 |
| sky130_osu_sc_18T_hs__and2_4 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00684 | 0.00688 | 0.00687 |
| sky130_osu_sc_18T_hs__and2_6 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00722 | 0.00726 | 0.00725 |
| sky130_osu_sc_18T_hs__and2_8 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00754 | 0.00758 | 0.00757 |
| sky130_osu_sc_18T_hs__and2_l | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00462 | 0.00466 | 0.00464 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__and2_1 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00564 | -0.00569 | -0.00565 |
| sky130_osu_sc_18T_hs__and2_2 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00547 | -0.00551 | -0.00548 |
| sky130_osu_sc_18T_hs__and2_4 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00513 | -0.00517 | -0.00514 |
| sky130_osu_sc_18T_hs__and2_6 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00478 | -0.00482 | -0.00479 |
| sky130_osu_sc_18T_hs__and2_8 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00443 | -0.00447 | -0.00445 |
| sky130_osu_sc_18T_hs__and2_l | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00416 | -0.00417 | -0.00417 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__and2_1 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00619 | 0.00607 | 0.00603 |
| sky130_osu_sc_18T_hs__and2_2 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00637 | 0.00624 | 0.00620 |
| sky130_osu_sc_18T_hs__and2_4 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00671 | 0.00659 | 0.00655 |
| sky130_osu_sc_18T_hs__and2_6 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00706 | 0.00694 | 0.00690 |
| sky130_osu_sc_18T_hs__and2_8 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00741 | 0.00728 | 0.00724 |
| sky130_osu_sc_18T_hs__and2_l | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00454 | 0.00443 | 0.00441 |

# SKY130_OSU_SC_18T_HS__AOI21

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__aoi21_l | 12.45420 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) |
|---|---|---|---|---|
| | A0 | A1 | B0 | Y |
| sky130_osu_sc_18T_hs__aoi21_l | 0.00549 | 0.00565 | 0.00546 | 1.47565 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_hs__aoi21_l | 0.00000 | 10.08560 | 19.89180 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__aoi21_l | A0->Y (FR) | 0.06499 | 0.73770 | 9.21952 |
| | A1->Y (FR) | 0.05641 | 0.70427 | 8.88823 |
| | B0->Y (FR) | 0.04551 | 0.74780 | 9.65183 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__aoi21_l | A0->Y (RF) | 0.04999 | 0.53590 | 6.59138 |
| | A1->Y (RF) | 0.04585 | 0.57772 | 7.23742 |
| | B0->Y (RF) | 0.02840 | 0.54868 | 7.13343 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.01433 | 0.01538 | 0.04580 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.01209 | 0.01315 | 0.04272 |
| | B0 | 0.00831 | 0.01076 | 0.04987 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.00370 | 0.00452 | 0.02844 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.00378 | 0.00503 | 0.03108 |
| | B0 | -0.00117 | 0.00047 | 0.02275 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | -0.00411 | -0.00521 | -0.00532 |
| | (!A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !Y) | -0.00535 | -0.00539 | -0.00537 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00552 | -0.00556 | -0.00553 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.00567 | 0.00569 | 0.00571 |
| | (!A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !Y) | 0.00570 | 0.00574 | 0.00573 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00573 | 0.00559 | 0.00556 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | -0.00406 | -0.00514 | -0.00526 |
| | (!A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !Y) | -0.00530 | -0.00533 | -0.00531 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | -0.00584 | -0.00589 | -0.00591 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | 0.00561 | 0.00568 | 0.00565 |
| | (!A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !Y) | 0.00564 | 0.00568 | 0.00567 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | 0.00590 | 0.00595 | 0.00593 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi21_l | (A0 * A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !Y) | -0.00233 | -0.00236 | -0.00233 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi21_l | (A0 * A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !Y) | 0.00273 | 0.00274 | 0.00250 |

# SKY130_OSU_SC_18T_HS__AOI22

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__aoi22_l | 15.38460 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | | Max Cap(pf) |
|---|---|---|---|---|---|
| | A0 | A1 | B0 | B1 | Y |
| sky130_osu_sc_18T_hs__aoi22_l | 0.00550 | 0.00565 | 0.00582 | 0.00561 | 1.40383 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_hs__aoi22_l | 0.00000 | 11.29630 | 39.76200 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__aoi22_l | A0->Y (FR) | 0.08133 | 0.75351 | 9.08414 |
| | A1->Y (FR) | 0.07314 | 0.73267 | 8.91675 |
| | B0->Y (FR) | 0.04760 | 0.73873 | 9.38642 |
| | B1->Y (FR) | 0.05581 | 0.76531 | 9.63774 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__aoi22_l | A0->Y (RF) | 0.06709 | 0.54517 | 6.38486 |
| | A1->Y (RF) | 0.06297 | 0.58658 | 7.02975 |
| | B0->Y (RF) | 0.03180 | 0.54981 | 6.99704 |
| | B1->Y (RF) | 0.03605 | 0.50760 | 6.35349 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi22_l | A0 | 0.01782 | 0.01874 | 0.05088 |
| | A1 | 0.01560 | 0.01651 | 0.04833 |
| | B0 | 0.00901 | 0.01230 | 0.05915 |
| | B1 | 0.01123 | 0.01454 | 0.06032 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi22_l | A0 | 0.00730 | 0.00806 | 0.03384 |
| | A1 | 0.00738 | 0.00861 | 0.03660 |
| | B0 | -0.00027 | 0.00148 | 0.02890 |
| | B1 | -0.00023 | 0.00112 | 0.02605 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi22_l | (A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * B1 * !Y) | -0.00379 | -0.00505 | -0.00514 |
| | (!A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * B1 * !Y) | -0.00518 | -0.00522 | -0.00519 |
| | (!A1 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !B1 * Y) | -0.00552 | -0.00556 | -0.00553 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00552 | -0.00556 | -0.00553 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi22_l | (A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * B1 * !Y) | 0.00585 | 0.00590 | 0.00587 |
| | (!A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * B1 * !Y) | 0.00587 | 0.00591 | 0.00590 |
| | (!A1 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !B1 * Y) | 0.00573 | 0.00559 | 0.00556 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00573 | 0.00559 | 0.00556 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi22_l | (A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * B1 * !Y) | -0.00377 | -0.00499 | -0.00509 |
| | (!A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * B1 * !Y) | -0.00513 | -0.00515 | -0.00514 |
| | (!A0 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !B1 * Y) | -0.00583 | -0.00588 | -0.00590 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | -0.00583 | -0.00588 | -0.00590 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi22_l | (A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * B1 * !Y) | 0.00580 | 0.00584 | 0.00581 |
| | (!A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * B1 * !Y) | 0.00581 | 0.00585 | 0.00584 |
| | (!A0 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !B1 * Y) | 0.00589 | 0.00594 | 0.00592 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | 0.00590 | 0.00594 | 0.00592 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi22_l | (A0 * A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B1 * !Y) | -0.00234 | -0.00236 | -0.00235 |
| | (A0 * A1 * !B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B1 * !Y) | -0.00211 | -0.00214 | -0.00217 |
| | (!A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B1 * Y) | -0.00598 | -0.00601 | -0.00604 |
| | (!A0 * A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B1 * Y) | -0.00598 | -0.00602 | -0.00604 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi22_l | (A0 * A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B1 * !Y) | 0.00284 | 0.00285 | 0.00253 |
| | (A0 * A1 * !B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B1 * !Y) | 0.00246 | 0.00249 | 0.00248 |
| | (!A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B1 * Y) | 0.00603 | 0.00609 | 0.00606 |
| | (!A0 * A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B1 * Y) | 0.00603 | 0.00609 | 0.00606 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi22_l | (A0 * A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B0 * !Y) | -0.00236 | -0.00237 | -0.00236 |
| | (A0 * A1 * !B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B0 * !Y) | -0.00212 | -0.00215 | -0.00219 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00559 | -0.00564 | -0.00561 |
| | (!A0 * A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B0 * Y) | -0.00560 | -0.00564 | -0.00561 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__aoi22_l | (A0 * A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B0 * !Y) | 0.00285 | 0.00286 | 0.00254 |
| | (A0 * A1 * !B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B0 * !Y) | 0.00248 | 0.00250 | 0.00249 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00581 | 0.00567 | 0.00564 |
| | (!A0 * A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B0 * Y) | 0.00581 | 0.00567 | 0.00563 |

# SKY130_OSU_SC_18T_HS__BUFx

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| **sky130_osu_sc_18T_hs__buf_1** | 9.52380 |
| **sky130_osu_sc_18T_hs__buf_2** | 12.45420 |
| **sky130_osu_sc_18T_hs__buf_4** | 18.31500 |
| **sky130_osu_sc_18T_hs__buf_6** | 24.17580 |
| **sky130_osu_sc_18T_hs__buf_8** | 30.03660 |
| **sky130_osu_sc_18T_hs__buf_l** | 9.52380 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | Max Cap(pf) |
|---|---|---|
| | A | Y |
| **sky130_osu_sc_18T_hs__buf_1** | 0.00584 | 3.13043 |
| **sky130_osu_sc_18T_hs__buf_2** | 0.00584 | 6.08252 |
| **sky130_osu_sc_18T_hs__buf_4** | 0.00584 | 11.65511 |
| **sky130_osu_sc_18T_hs__buf_6** | 0.00097 | 1.80000 |
| **sky130_osu_sc_18T_hs__buf_8** | 0.00586 | 22.07857 |
| **sky130_osu_sc_18T_hs__buf_l** | 0.00455 | 2.21332 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_18T_hs__buf_1** | 0.00000 | 20.18680 | 20.18710 |
| **sky130_osu_sc_18T_hs__buf_2** | 0.00000 | 30.27230 | 40.07060 |
| **sky130_osu_sc_18T_hs__buf_4** | 0.00000 | 50.45070 | 79.84840 |
| **sky130_osu_sc_18T_hs__buf_6** | 0.00000 | 0.00000 | 0.00000 |
| **sky130_osu_sc_18T_hs__buf_8** | 0.00000 | 90.80700 | 159.40300 |
| **sky130_osu_sc_18T_hs__buf_l** | 0.00000 | 12.76900 | 12.76910 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_18T_hs__buf_1** | **A->Y (RR)** | 0.05206 | 0.46664 | 6.55957 |
| **sky130_osu_sc_18T_hs__buf_2** | **A->Y (RR)** | 0.05802 | 0.41512 | 6.54414 |
| **sky130_osu_sc_18T_hs__buf_4** | **A->Y (RR)** | 0.07778 | 0.41961 | 6.68549 |
| **sky130_osu_sc_18T_hs__buf_8** | **A->Y (RR)** | 0.11853 | 0.47664 | 6.89796 |
| **sky130_osu_sc_18T_hs__buf_l** | **A->Y (RR)** | 0.05711 | 0.53003 | 6.60868 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_18T_hs__buf_1** | **A->Y (FF)** | 0.05433 | 0.51337 | 7.02424 |
| **sky130_osu_sc_18T_hs__buf_2** | **A->Y (FF)** | 0.06152 | 0.47127 | 7.03142 |
| **sky130_osu_sc_18T_hs__buf_4** | **A->Y (FF)** | 0.08460 | 0.48237 | 7.12218 |
| **sky130_osu_sc_18T_hs__buf_8** | **A->Y (FF)** | 0.13507 | 0.54733 | 7.18053 |
| **sky130_osu_sc_18T_hs__buf_l** | **A->Y (FF)** | 0.05909 | 0.56386 | 6.85273 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__buf_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00605 | 0.01381 | 0.15202 |
| sky130_osu_sc_18T_hs__buf_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01248 | 0.02009 | 0.15766 |
| sky130_osu_sc_18T_hs__buf_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02697 | 0.03463 | 0.16999 |
| sky130_osu_sc_18T_hs__buf_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.06283 | 0.06771 | 0.19471 |
| sky130_osu_sc_18T_hs__buf_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00450 | 0.00933 | 0.10151 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__buf_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01533 | 0.02586 | 0.17700 |
| sky130_osu_sc_18T_hs__buf_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02064 | 0.03082 | 0.18104 |
| sky130_osu_sc_18T_hs__buf_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03635 | 0.04361 | 0.19207 |
| sky130_osu_sc_18T_hs__buf_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.07590 | 0.07194 | 0.21477 |
| sky130_osu_sc_18T_hs__buf_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01187 | 0.01849 | 0.11306 |

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

| Cell Name | Power(pJ) | | |
|---|---|---|---|
| | first | mid | last |
| sky130_osu_sc_18T_hs__buf_6 | 0.00000 | 0.00000 | 0.00000 |
| | -0.00080 | -0.00080 | -0.00078 |

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

| Cell Name | Power(pJ) | | |
|---|---|---|---|
| | first | mid | last |
| sky130_osu_sc_18T_hs__buf_6 | 0.00000 | 0.00000 | 0.00000 |
| | 0.00080 | 0.00080 | 0.00078 |

# SKY130_OSU_SC_18T_HS__DFFRx

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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## 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_18T_hs__dffr_1 | 63.73620 |
| sky130_osu_sc_18T_hs__dffr_l | 63.73620 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) | |
|---|---|---|---|---|---|
| | D | RN | CK | Q | QN |
| sky130_osu_sc_18T_hs__dffr_1 | 0.00566 | 0.00556 | 0.01585 | 3.07766 | 3.03267 |
| sky130_osu_sc_18T_hs__dffr_l | 0.00566 | 0.00556 | 0.01585 | 2.19994 | 2.21097 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_hs__dffr_1 | 0.00000 | 65.08940 | 101.36400 |
| sky130_osu_sc_18T_hs__dffr_l | 0.00000 | 57.67160 | 93.94670 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__dffr_1 | CK->Q (RR) | 0.23771 | 1.23564 | 16.40440 |
| | QN->Q (FR) | 0.02786 | 0.73514 | 11.57440 |
| sky130_osu_sc_18T_hs__dffr_l | CK->Q (RR) | 0.23468 | 1.32121 | 15.83490 |
| | QN->Q (FR) | 0.02934 | 0.77123 | 11.21920 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__dffr_1 | CK->Q (RF) | 0.24624 | 1.23079 | 16.46130 |
| | QN->Q (RF) | 0.02615 | 0.69693 | 11.02350 |
| | RN->Q (FF) | 0.18500 | 1.24984 | 17.46930 |
| sky130_osu_sc_18T_hs__dffr_l | CK->Q (RF) | 0.24867 | 1.33552 | 16.07480 |
| | QN->Q (RF) | 0.02661 | 0.70384 | 10.27260 |
| | RN->Q (FF) | 0.18797 | 1.35396 | 17.07800 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__dffr_1 | CK->QN (RR) | 0.21690 | 0.65274 | 6.51482 |
| | RN->QN (FR) | 0.15565 | 0.67224 | 7.52458 |
| sky130_osu_sc_18T_hs__dffr_l | CK->QN (RR) | 0.21654 | 0.70136 | 6.55789 |
| | RN->QN (FR) | 0.15564 | 0.72082 | 7.56326 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_18T_hs__dffr_1** | **CK->QN (RF)** | 0.20420 | 0.64090 | 6.20389 |
| **sky130_osu_sc_18T_hs__dffr_l** | **CK->QN (RF)** | 0.19753 | 0.65929 | 5.92877 |

# Constraint Information

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | hold | CK (R) | -0.06524 | -0.06427 | 0.16896 |
| | setup | CK (R) | 0.18801 | 0.22332 | 11.18210 |
| sky130_osu_sc_18T_hs__dffr_l | hold | CK (R) | -0.06707 | -0.06716 | 0.16812 |
| | setup | CK (R) | 0.18808 | 0.22395 | 10.92820 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | hold | CK (R) | -0.09871 | -0.26391 | 1.96797 |
| | setup | CK (R) | 0.12203 | 0.27815 | 3.40469 |
| sky130_osu_sc_18T_hs__dffr_l | hold | CK (R) | -0.10031 | -0.26558 | 1.54903 |
| | setup | CK (R) | 0.12203 | 0.27815 | 3.40332 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | hold | CK (R) | -0.06524 | -0.06427 | 0.16896 |
| | setup | CK (R) | 0.18801 | 0.22332 | 11.18210 |
| sky130_osu_sc_18T_hs__dffr_l | hold | CK (R) | -0.06707 | -0.06716 | 0.16812 |
| | setup | CK (R) | 0.18808 | 0.22395 | 10.92820 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | hold | CK (R) | -0.09871 | -0.26391 | 1.96797 |
| | setup | CK (R) | 0.12203 | 0.27815 | 3.40469 |
| sky130_osu_sc_18T_hs__dffr_l | hold | CK (R) | -0.10031 | -0.26558 | 1.54903 |
| | setup | CK (R) | 0.12203 | 0.27815 | 3.40332 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | recovery | CK (R) | 0.14908 | 0.19181 | 8.91735 |
| | removal | CK (R) | -0.03305 | -0.04000 | -0.10038 |
| sky130_osu_sc_18T_hs__dffr_l | recovery | CK (R) | 0.14973 | 0.19218 | 8.40621 |
| | removal | CK (R) | -0.03305 | -0.04000 | -0.10038 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | recovery | CK (R) | 0.14908 | 0.19181 | 8.91735 |
| | removal | CK (R) | -0.03305 | -0.04000 | -0.10038 |
| sky130_osu_sc_18T_hs__dffr_l | recovery | CK (R) | 0.14973 | 0.19218 | 8.40621 |
| | removal | CK (R) | -0.03305 | -0.04000 | -0.10038 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | min_pulse_width | RN () | 0.10771 | 0.51025 | 13.33370 |
| | min_pulse_width | RN () | 0.10771 | 0.51025 | 13.33370 |
| sky130_osu_sc_18T_hs__dffr_l | min_pulse_width | RN () | 0.10387 | 0.51025 | 13.33370 |
| | min_pulse_width | RN () | 0.10387 | 0.51025 | 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_18T_hs__dffr_1 | min_pulse_width | CK () | 0.11538 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.12688 | 0.51025 | 13.33370 |
| sky130_osu_sc_18T_hs__dffr_l | min_pulse_width | CK () | 0.10771 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.12304 | 0.51025 | 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_18T_hs__dffr_1 | min_pulse_width | CK () | 0.24189 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.10004 | 0.51025 | 13.33370 |
| sky130_osu_sc_18T_hs__dffr_l | min_pulse_width | CK () | 0.24189 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.10004 | 0.51025 | 13.33370 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01699 | 0.02004 | 0.07003 |
| sky130_osu_sc_18T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01495 | 0.01971 | 0.10439 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01901 | 0.01982 | 0.06120 |
| | RN | -0.00187 | -0.14020 | -2.49280 |
| | RN | 0.04125 | 0.04325 | 0.08855 |
| sky130_osu_sc_18T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01705 | 0.01927 | 0.08913 |
| | RN | -0.00187 | -0.11462 | -1.78191 |
| | RN | 0.03930 | 0.04266 | 0.11555 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01872 | 0.01958 | 0.06190 |
| | RN | -0.00187 | -0.13897 | -2.45457 |
| | RN | 0.04108 | 0.04309 | 0.08882 |
| sky130_osu_sc_18T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01685 | 0.01908 | 0.08892 |
| | RN | -0.00187 | -0.11497 | -1.79033 |
| | RN | 0.03919 | 0.04252 | 0.11536 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01651 | 0.01964 | 0.06933 |
| sky130_osu_sc_18T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01453 | 0.01925 | 0.10284 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00346 | -0.00445 | -0.00457 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.02035 | 0.02440 | 0.14697 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.00934 | 0.01356 | 0.13396 |
| sky130_osu_sc_18T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00353 | -0.00452 | -0.00463 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.02028 | 0.02434 | 0.14690 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.00928 | 0.01349 | 0.13390 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00637 | 0.00645 | 0.00638 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.03310 | 0.03789 | 0.16303 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.01541 | 0.02004 | 0.14157 |
| sky130_osu_sc_18T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00631 | 0.00638 | 0.00631 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.03304 | 0.03782 | 0.16296 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.01535 | 0.01997 | 0.14150 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00645 | 0.01519 | 0.20151 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.01708 | 0.02561 | 0.21828 |
| sky130_osu_sc_18T_hs__dffr_l | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00638 | 0.01512 | 0.20145 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.01702 | 0.02555 | 0.21822 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.01441 | 0.02523 | 0.21202 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.03129 | 0.04167 | 0.23456 |
| sky130_osu_sc_18T_hs__dffr_l | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.01434 | 0.02517 | 0.21195 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.03122 | 0.04160 | 0.23450 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | -0.00066 | 0.00772 | 0.19296 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.00953 | 0.01716 | 0.21351 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | -0.00120 | 0.00738 | 0.19151 |
| sky130_osu_sc_18T_hs__dffr_l | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | -0.00073 | 0.00766 | 0.19289 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.00946 | 0.01709 | 0.21345 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | -0.00127 | 0.00732 | 0.19145 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | 0.02142 | 0.03239 | 0.21856 |
| | (D * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * !Q * QN) | 0.04864 | 0.05806 | 0.29191 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.03738 | 0.04719 | 0.24229 |
| | (!D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * Q * !QN) | 0.04711 | 0.06631 | 0.35919 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.02508 | 0.03549 | 0.22043 |
| sky130_osu_sc_18T_hs__dffr_l | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | 0.02136 | 0.03233 | 0.21849 |
| | (D * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * !Q * QN) | 0.04857 | 0.05800 | 0.29184 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.03732 | 0.04712 | 0.24223 |
| | (!D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * Q * !QN) | 0.04705 | 0.06625 | 0.35913 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.02502 | 0.03542 | 0.22036 |

# SKY130_OSU_SC_18T_HS__DFFSRx

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__dffsr_1** | 69.59700 |
| **sky130_osu_sc_18T_hs__dffsr_l** | 69.59700 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | | Max Cap(pf) | |
|---|---|---|---|---|---|---|
| | **D** | **RN** | **SN** | **CK** | **Q** | **QN** |
| **sky130_osu_sc_18T_hs__dffsr_1** | 0.00561 | 0.00556 | 0.01195 | 0.01613 | 3.20412 | 3.20038 |
| **sky130_osu_sc_18T_hs__dffsr_l** | 0.00561 | 0.00556 | 0.01194 | 0.01613 | 2.20535 | 2.21386 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | **Min.** | **Avg** | **Max.** |
| **sky130_osu_sc_18T_hs__dffsr_1** | 0.00000 | 73.52940 | 101.27300 |
| **sky130_osu_sc_18T_hs__dffsr_l** | 0.00000 | 66.11150 | 93.85560 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__dffsr_1 | CK->Q (RR) | 0.24716 | 1.22987 | 16.39220 |
| | QN->Q (FR) | 0.02646 | 0.71589 | 11.36090 |
| | RN->Q (RR) | 0.19754 | 1.18929 | 16.43680 |
| | SN->Q (FR) | 0.17921 | 1.24508 | 17.48040 |
| sky130_osu_sc_18T_hs__dffsr_l | CK->Q (RR) | 0.25050 | 1.33833 | 15.87530 |
| | QN->Q (FR) | 0.02928 | 0.76990 | 11.20100 |
| | RN->Q (RR) | 0.20124 | 1.29811 | 15.91930 |
| | SN->Q (FR) | 0.18262 | 1.35167 | 16.97330 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__dffsr_1 | CK->Q (RF) | 0.28237 | 1.25623 | 16.44900 |
| | QN->Q (RF) | 0.02404 | 0.65555 | 10.49570 |
| | RN->Q (FF) | 0.18880 | 1.24299 | 17.44930 |
| sky130_osu_sc_18T_hs__dffsr_l | CK->Q (RF) | 0.28861 | 1.38219 | 16.14240 |
| | QN->Q (RF) | 0.02656 | 0.70630 | 10.27620 |
| | RN->Q (FF) | 0.18873 | 1.36224 | 17.14320 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__dffsr_1 | CK->QN (RR) | 0.25377 | 0.69431 | 6.65846 |
| | RN->QN (FR) | 0.16074 | 0.68215 | 7.66277 |
| sky130_osu_sc_18T_hs__dffsr_l | CK->QN (RR) | 0.25601 | 0.74683 | 6.60112 |
| | RN->QN (FR) | 0.16266 | 0.73389 | 7.60273 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__dffsr_1 | CK->QN (RF) | 0.21521 | 0.64653 | 6.25011 |
| | RN->QN (RF) | 0.16586 | 0.60616 | 6.29572 |
| | SN->QN (FF) | 0.14759 | 0.66179 | 7.34526 |
| sky130_osu_sc_18T_hs__dffsr_l | CK->QN (RF) | 0.21389 | 0.67623 | 5.95218 |
| | RN->QN (RF) | 0.16486 | 0.63654 | 5.99582 |
| | SN->QN (FF) | 0.14638 | 0.68961 | 7.04797 |

# Constraint Information

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | hold | CK (R) | -0.06818 | -0.07176 | 0.12646 |
| | setup | CK (R) | 0.19147 | 0.22587 | 11.80350 |
| sky130_osu_sc_18T_hs__dffsr_l | hold | CK (R) | -0.06928 | -0.07364 | 0.12363 |
| | setup | CK (R) | 0.18891 | 0.22090 | 8.71863 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | hold | CK (R) | -0.11212 | -0.27988 | 1.85418 |
| | setup | CK (R) | 0.14147 | 0.29291 | 3.42441 |
| sky130_osu_sc_18T_hs__dffsr_l | hold | CK (R) | -0.11256 | -0.27788 | 1.81734 |
| | setup | CK (R) | 0.14225 | 0.29291 | 3.42518 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | hold | CK (R) | -0.06818 | -0.07176 | 0.12646 |
| | setup | CK (R) | 0.19147 | 0.22587 | 11.80350 |
| sky130_osu_sc_18T_hs__dffsr_l | hold | CK (R) | -0.06928 | -0.07364 | 0.12363 |
| | setup | CK (R) | 0.18891 | 0.22090 | 8.71863 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | hold | CK (R) | -0.11212 | -0.27988 | 1.85418 |
| | setup | CK (R) | 0.14147 | 0.29291 | 3.42441 |
| sky130_osu_sc_18T_hs__dffsr_l | hold | CK (R) | -0.11256 | -0.27788 | 1.81734 |
| | setup | CK (R) | 0.14225 | 0.29291 | 3.42518 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | recovery | CK (R) | 0.13665 | 0.17526 | 7.98112 |
| | removal | CK (R) | -0.01679 | -0.02215 | -0.04993 |
| | hold | SN (R) | -0.13661 | -0.26096 | -1.02174 |
| | setup | SN (R) | 0.16322 | 0.30923 | 7.46449 |
| sky130_osu_sc_18T_hs__dffsr_l | recovery | CK (R) | 0.13571 | 0.17470 | 6.42616 |
| | removal | CK (R) | -0.01679 | -0.02215 | -0.04993 |
| | hold | SN (R) | -0.13378 | -0.25671 | -0.99206 |
| | setup | SN (R) | 0.16129 | 0.30424 | 7.45865 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | recovery | CK (R) | 0.13665 | 0.17526 | 7.98112 |
| | removal | CK (R) | -0.01679 | -0.02215 | -0.04993 |
| | hold | SN (R) | -0.13661 | -0.26096 | -1.02874 |
| | hold | SN (R) | -0.13961 | -0.26340 | -1.02174 |
| | setup | SN (R) | 0.16322 | 0.30877 | 7.46449 |
| | setup | SN (R) | 0.15942 | 0.30923 | 7.45392 |
| sky130_osu_sc_18T_hs__dffsr_l | recovery | CK (R) | 0.13571 | 0.17470 | 6.42616 |
| | removal | CK (R) | -0.01679 | -0.02215 | -0.04993 |
| | hold | SN (R) | -0.13378 | -0.25671 | -1.01457 |
| | hold | SN (R) | -0.13586 | -0.25708 | -0.99206 |
| | setup | SN (R) | 0.16129 | 0.29940 | 7.45865 |
| | setup | SN (R) | 0.15181 | 0.30424 | 7.43148 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | min_pulse_width | RN () | 0.12304 | 0.51025 | 13.33370 |
| | min_pulse_width | RN () | 0.12688 | 0.51025 | 13.33370 |
| sky130_osu_sc_18T_hs__dffsr_l | min_pulse_width | RN () | 0.12304 | 0.51025 | 13.33370 |
| | min_pulse_width | RN () | 0.12304 | 0.51025 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | recovery | CK (R) | 0.04423 | 0.07927 | 6.59306 |
| | removal | CK (R) | -0.01957 | -0.05900 | -0.30345 |
| sky130_osu_sc_18T_hs__dffsr_l | recovery | CK (R) | 0.04284 | 0.07903 | 6.41344 |
| | removal | CK (R) | -0.01878 | -0.05900 | -0.30345 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | recovery | CK (R) | 0.04423 | 0.07927 | 6.59306 |
| | removal | CK (R) | -0.01957 | -0.05900 | -0.30345 |
| sky130_osu_sc_18T_hs__dffsr_l | recovery | CK (R) | 0.04284 | 0.07903 | 6.41344 |
| | removal | CK (R) | -0.01878 | -0.05900 | -0.30345 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | min_pulse_width | SN () | 0.14221 | 0.51025 | 13.33370 |
| | min_pulse_width | SN () | 0.14221 | 0.51025 | 13.33370 |
| sky130_osu_sc_18T_hs__dffsr_l | min_pulse_width | SN () | 0.14221 | 0.51025 | 13.33370 |
| | min_pulse_width | SN () | 0.13454 | 0.51025 | 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_18T_hs__dffsr_1 | min_pulse_width | CK () | 0.11538 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.14221 | 0.51025 | 13.33370 |
| sky130_osu_sc_18T_hs__dffsr_l | min_pulse_width | CK () | 0.11154 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.13838 | 0.51025 | 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_18T_hs__dffsr_1 | min_pulse_width | CK () | 0.24189 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.12304 | 0.51025 | 13.33370 |
| sky130_osu_sc_18T_hs__dffsr_l | min_pulse_width | CK () | 0.24189 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.12304 | 0.51025 | 13.33370 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.02098 | 0.02560 | 0.10427 |
| | RN | 0.03699 | 0.03861 | 0.09319 |
| | SN | -0.00187 | -0.14363 | -2.59532 |
| | SN | 0.03448 | 0.03501 | 0.08717 |
| sky130_osu_sc_18T_hs__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01910 | 0.02370 | 0.10878 |
| | RN | 0.03514 | 0.03671 | 0.09789 |
| | SN | -0.00187 | -0.11479 | -1.78632 |
| | SN | 0.03264 | 0.03310 | 0.09154 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.02233 | 0.02375 | 0.07409 |
| | RN | -0.00187 | -0.14363 | -2.59528 |
| | RN | 0.04201 | 0.04458 | 0.10304 |
| sky130_osu_sc_18T_hs__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.02047 | 0.02279 | 0.09396 |
| | RN | -0.00187 | -0.11479 | -1.78629 |
| | RN | 0.04018 | 0.04361 | 0.12116 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.02202 | 0.02345 | 0.07421 |
| | RN | -0.00187 | -0.14353 | -2.59119 |
| | RN | 0.04174 | 0.04433 | 0.10150 |
| sky130_osu_sc_18T_hs__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.02022 | 0.02254 | 0.09354 |
| | RN | -0.00187 | -0.11506 | -1.79267 |
| | RN | 0.03998 | 0.04341 | 0.12056 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.02052 | 0.02521 | 0.10275 |
| | RN | 0.03652 | 0.03822 | 0.09186 |
| | SN | -0.00187 | -0.14353 | -2.59195 |
| | SN | 0.03418 | 0.03472 | 0.08795 |
| sky130_osu_sc_18T_hs__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01867 | 0.02323 | 0.10724 |
| | RN | 0.03469 | 0.03626 | 0.09675 |
| | SN | -0.00187 | -0.11506 | -1.79297 |
| | SN | 0.03237 | 0.03282 | 0.09050 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00456 | -0.00459 | -0.00461 |
| | (!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) | 0.02550 | 0.02944 | 0.15263 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.01061 | 0.01472 | 0.13467 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.01055 | 0.01466 | 0.13473 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.01073 | 0.01482 | 0.13482 |
| sky130_osu_sc_18T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00463 | -0.00466 | -0.00468 |
| | (!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) | 0.02544 | 0.02937 | 0.15256 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.01055 | 0.01466 | 0.13461 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.01048 | 0.01459 | 0.13467 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.01066 | 0.01475 | 0.13476 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00647 | 0.00635 | 0.00630 |
| | (!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) | 0.03784 | 0.04222 | 0.16738 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.01607 | 0.02062 | 0.14184 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.01663 | 0.02100 | 0.14190 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.01607 | 0.02066 | 0.14192 |
| sky130_osu_sc_18T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00640 | 0.00629 | 0.00624 |
| | (!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) | 0.03776 | 0.04214 | 0.16731 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.01600 | 0.02055 | 0.14177 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.01656 | 0.02092 | 0.14183 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.01600 | 0.02058 | 0.14184 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_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) | 0.00515 | 0.01381 | 0.20007 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.02001 | 0.02837 | 0.22315 |
| sky130_osu_sc_18T_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) | 0.00509 | 0.01375 | 0.20001 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.01995 | 0.02831 | 0.22310 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_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) | 0.01496 | 0.02618 | 0.21352 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.03263 | 0.04315 | 0.23779 |
| sky130_osu_sc_18T_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) | 0.01488 | 0.02611 | 0.21344 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.03255 | 0.04307 | 0.23772 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_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) | -0.01138 | -0.01150 | -0.01153 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | -0.00936 | -0.01156 | -0.01181 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | -0.01006 | -0.01111 | -0.01129 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.00970 | 0.01370 | 0.13442 |
| sky130_osu_sc_18T_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) | -0.01145 | -0.01156 | -0.01160 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | -0.00941 | -0.01160 | -0.01185 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | -0.01012 | -0.01117 | -0.01135 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.00964 | 0.01365 | 0.13436 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_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) | 0.01292 | 0.01302 | 0.01298 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.01324 | 0.01339 | 0.01332 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | 0.01287 | 0.01287 | 0.01294 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.02579 | 0.02899 | 0.14896 |
| sky130_osu_sc_18T_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) | 0.01286 | 0.01296 | 0.01292 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.01316 | 0.01331 | 0.01324 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | 0.01280 | 0.01280 | 0.01287 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.02571 | 0.02891 | 0.14889 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffsr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | -0.00066 | 0.00772 | 0.19309 |
| | (D * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * SN * !Q * QN) | 0.01097 | 0.01863 | 0.21454 |
| | (D * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !SN * !Q * QN) | 0.01044 | 0.01812 | 0.21429 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | -0.00085 | 0.00776 | 0.19202 |
| | (!D * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * !SN * Q * !QN) | 0.00749 | 0.02306 | 0.35051 |
| sky130_osu_sc_18T_hs__dffsr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | -0.00072 | 0.00766 | 0.19302 |
| | (D * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * SN * !Q * QN) | 0.01089 | 0.01855 | 0.21447 |
| | (D * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !SN * !Q * QN) | 0.01036 | 0.01804 | 0.21422 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | -0.00092 | 0.00770 | 0.19196 |
| | (!D * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * !SN * Q * !QN) | 0.00743 | 0.02299 | 0.35045 |

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

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

| | | | | |
|---|---|---|---|---|
| **sky130_osu_sc_18T_hs__dffsr_1** | **(D * RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * SN * !Q * QN)** | 0.05443 | 0.06391 | 0.29714 |
| | **(D * RN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * Q * !QN)** | 0.02148 | 0.03237 | 0.21875 |
| | **(D * !RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * SN * !Q * QN)** | 0.03824 | 0.04821 | 0.24314 |
| | **(D * !RN * !SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * !SN * !Q * QN)** | 0.03841 | 0.04829 | 0.24321 |
| | **(!D * RN * SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * Q * !QN)** | 0.05179 | 0.07031 | 0.36492 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.02511 | 0.03551 | 0.22055 |
| | **(!D * RN * !SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * !SN * Q * !QN)** | 0.02842 | 0.04729 | 0.37716 |
| **sky130_osu_sc_18T_hs__dffsr_l** | **(D * RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * SN * !Q * QN)** | 0.05436 | 0.06385 | 0.29708 |
| | **(D * RN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * Q * !QN)** | 0.02142 | 0.03230 | 0.21868 |
| | **(D * !RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * SN * !Q * QN)** | 0.03818 | 0.04815 | 0.24307 |
| | **(D * !RN * !SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * !SN * !Q * QN)** | 0.03834 | 0.04822 | 0.24315 |
| | **(!D * RN * SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * Q * !QN)** | 0.05171 | 0.07023 | 0.36485 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.02504 | 0.03545 | 0.22049 |
| | **(!D * RN * !SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * !SN * Q * !QN)** | 0.02834 | 0.04721 | 0.37708 |

# SKY130_OSU_SC_18T_HS__DFFSx

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__dffs_1 | 57.87540 |
| sky130_osu_sc_18T_hs__dffs_l | 57.87540 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) | |
|---|---|---|---|---|---|
| | D | SN | CK | Q | QN |
| sky130_osu_sc_18T_hs__dffs_1 | 0.00564 | 0.00944 | 0.01591 | 3.05266 | 3.05227 |
| sky130_osu_sc_18T_hs__dffs_l | 0.00564 | 0.00944 | 0.01591 | 2.22665 | 2.22061 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_hs__dffs_1 | 0.00000 | 65.32970 | 90.80710 |
| sky130_osu_sc_18T_hs__dffs_l | 0.00000 | 57.91200 | 83.38920 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__dffs_1 | CK->Q (RR) | 0.18838 | 1.16636 | 16.11640 |
| | QN->Q (FR) | 0.02769 | 0.72716 | 11.41130 |
| | SN->Q (FR) | 0.14038 | 1.22930 | 17.22150 |
| sky130_osu_sc_18T_hs__dffs_l | CK->Q (RR) | 0.18855 | 1.26890 | 15.89690 |
| | QN->Q (FR) | 0.02919 | 0.77084 | 11.23070 |
| | SN->Q (FR) | 0.14107 | 1.32832 | 16.99100 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__dffs_1 | CK->Q (RF) | 0.27146 | 1.25604 | 16.30380 |
| | QN->Q (RF) | 0.02596 | 0.69220 | 10.91300 |
| sky130_osu_sc_18T_hs__dffs_l | CK->Q (RF) | 0.27281 | 1.37088 | 16.25320 |
| | QN->Q (RF) | 0.02646 | 0.70701 | 10.31500 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__dffs_1 | CK->QN (RR) | 0.24143 | 0.68482 | 6.55019 |
| sky130_osu_sc_18T_hs__dffs_l | CK->QN (RR) | 0.23997 | 0.73089 | 6.58693 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__dffs_1 | CK->QN (RF) | 0.15703 | 0.58127 | 6.13522 |
| | SN->QN (FF) | 0.10857 | 0.64424 | 7.24063 |
| sky130_osu_sc_18T_hs__dffs_l | CK->QN (RF) | 0.15373 | 0.60438 | 5.85183 |
| | SN->QN (FF) | 0.10600 | 0.66334 | 6.94685 |

# Constraint Information

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | hold | CK (R) | -0.04903 | -0.04937 | 0.18324 |
| | setup | CK (R) | 0.13819 | 0.17649 | 2.55021 |
| sky130_osu_sc_18T_hs__dffs_l | hold | CK (R) | -0.04827 | -0.05057 | 0.18359 |
| | setup | CK (R) | 0.13810 | 0.17662 | 2.47774 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | hold | CK (R) | -0.09963 | -0.26599 | 0.23273 |
| | setup | CK (R) | 0.13165 | 0.27815 | 3.41845 |
| sky130_osu_sc_18T_hs__dffs_l | hold | CK (R) | -0.09974 | -0.26600 | 0.18739 |
| | setup | CK (R) | 0.13154 | 0.27815 | 3.41780 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | hold | CK (R) | -0.04903 | -0.04937 | 0.18324 |
| | setup | CK (R) | 0.13819 | 0.17649 | 2.55021 |
| sky130_osu_sc_18T_hs__dffs_l | hold | CK (R) | -0.04827 | -0.05057 | 0.18359 |
| | setup | CK (R) | 0.13810 | 0.17662 | 2.47774 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | hold | CK (R) | -0.09963 | -0.26599 | 0.23273 |
| | setup | CK (R) | 0.13165 | 0.27815 | 3.41845 |
| sky130_osu_sc_18T_hs__dffs_l | hold | CK (R) | -0.09974 | -0.26600 | 0.18739 |
| | setup | CK (R) | 0.13154 | 0.27815 | 3.41780 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | recovery | CK (R) | 0.04054 | 0.07699 | 5.95939 |
| | removal | CK (R) | -0.02084 | -0.05900 | -0.46561 |
| sky130_osu_sc_18T_hs__dffs_l | recovery | CK (R) | 0.04019 | 0.07700 | 5.79757 |
| | removal | CK (R) | -0.02084 | -0.05900 | -0.46561 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | recovery | CK (R) | 0.04054 | 0.07699 | 5.95939 |
| | removal | CK (R) | -0.02084 | -0.05900 | -0.46561 |
| sky130_osu_sc_18T_hs__dffs_l | recovery | CK (R) | 0.04019 | 0.07700 | 5.79757 |
| | removal | CK (R) | -0.02084 | -0.05900 | -0.46561 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | min_pulse_width | SN () | 0.09621 | 0.51025 | 13.33370 |
| | min_pulse_width | SN () | 0.09621 | 0.51025 | 13.33370 |
| sky130_osu_sc_18T_hs__dffs_l | min_pulse_width | SN () | 0.09621 | 0.51025 | 13.33370 |
| | min_pulse_width | SN () | 0.08854 | 0.51025 | 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_18T_hs__dffs_1 | min_pulse_width | CK () | 0.08471 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.13454 | 0.51025 | 13.33370 |
| sky130_osu_sc_18T_hs__dffs_l | min_pulse_width | CK () | 0.08471 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.13071 | 0.51025 | 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_18T_hs__dffs_1 | min_pulse_width | CK () | 0.18822 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.11154 | 0.51025 | 13.33370 |
| sky130_osu_sc_18T_hs__dffs_l | min_pulse_width | CK () | 0.18822 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.11154 | 0.51025 | 13.33370 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01646 | 0.01966 | 0.07134 |
| | SN | -0.00187 | -0.13952 | -2.47263 |
| | SN | 0.02801 | 0.02829 | 0.04976 |
| sky130_osu_sc_18T_hs__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01455 | 0.01918 | 0.10407 |
| | SN | -0.00187 | -0.11546 | -1.80357 |
| | SN | 0.02612 | 0.02799 | 0.08196 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01907 | 0.02010 | 0.06616 |
| sky130_osu_sc_18T_hs__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01709 | 0.01944 | 0.09180 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01877 | 0.01980 | 0.06596 |
| sky130_osu_sc_18T_hs__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01685 | 0.01923 | 0.09149 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01611 | 0.01926 | 0.07095 |
| | SN | -0.00187 | -0.13951 | -2.47178 |
| | SN | 0.02782 | 0.02812 | 0.04982 |
| sky130_osu_sc_18T_hs__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01423 | 0.01895 | 0.10299 |
| | SN | -0.00187 | -0.11527 | -1.79844 |
| | SN | 0.02596 | 0.02784 | 0.08227 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00468 | -0.00471 | -0.00473 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.01895 | 0.02328 | 0.14905 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.00908 | 0.01330 | 0.13390 |
| sky130_osu_sc_18T_hs__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00475 | -0.00478 | -0.00480 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.01889 | 0.02322 | 0.14898 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.00902 | 0.01323 | 0.13384 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00646 | 0.00634 | 0.00630 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.03176 | 0.03635 | 0.16179 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.01529 | 0.02008 | 0.14195 |
| sky130_osu_sc_18T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00639 | 0.00628 | 0.00623 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.03169 | 0.03629 | 0.16172 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.01523 | 0.02002 | 0.14188 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | -0.00843 | -0.00851 | -0.00849 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.00732 | 0.01080 | 0.11430 |
| sky130_osu_sc_18T_hs__dffs_1 | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | -0.00849 | -0.00849 | -0.00856 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.00726 | 0.01073 | 0.11424 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00970 | 0.00964 | 0.00959 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.01782 | 0.02231 | 0.12773 |
| sky130_osu_sc_18T_hs__dffs_l | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00964 | 0.00957 | 0.00952 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.01776 | 0.02224 | 0.12767 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | -0.00086 | 0.00754 | 0.19307 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | -0.00100 | 0.00760 | 0.19204 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.00589 | 0.02181 | 0.35067 |
| sky130_osu_sc_18T_hs__dffs_l | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | -0.00093 | 0.00748 | 0.19301 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | -0.00107 | 0.00754 | 0.19198 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.00583 | 0.02175 | 0.35061 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dffs_1 | (D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * SN * !Q * QN) | 0.04784 | 0.05730 | 0.29287 |
| | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.02125 | 0.03225 | 0.21870 |
| | (!D * SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * Q * !QN) | 0.04555 | 0.06447 | 0.35798 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | 0.02503 | 0.03546 | 0.22070 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.02752 | 0.04677 | 0.37792 |
| sky130_osu_sc_18T_hs__dffs_l | (D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * SN * !Q * QN) | 0.04777 | 0.05724 | 0.29280 |
| | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.02119 | 0.03218 | 0.21864 |
| | (!D * SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * Q * !QN) | 0.04549 | 0.06432 | 0.35792 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | 0.02497 | 0.03539 | 0.22063 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.02745 | 0.04671 | 0.37785 |

# SKY130_OSU_SC_18T_HS__DFFx

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_hs__dff_1 | 48.35160 |
| sky130_osu_sc_18T_hs__dff_l | 48.35160 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) | |
|---|---|---|---|---|
| | D | CK | Q | QN |
| sky130_osu_sc_18T_hs__dff_1 | 0.00579 | 0.01584 | 3.25489 | 3.21577 |
| sky130_osu_sc_18T_hs__dff_l | 0.00579 | 0.01584 | 2.18220 | 2.18277 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_hs__dff_1 | 0.00000 | 66.10260 | 80.92370 |
| sky130_osu_sc_18T_hs__dff_l | 0.00000 | 58.68460 | 73.50580 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__dff_1 | CK->Q (RR) | 0.17019 | 1.14667 | 16.49630 |
| | QN->Q (FR) | 0.02627 | 0.71461 | 11.41710 |
| sky130_osu_sc_18T_hs__dff_l | CK->Q (RR) | 0.17553 | 1.25085 | 15.65360 |
| | QN->Q (FR) | 0.02978 | 0.77850 | 11.29770 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__dff_1 | CK->Q (RF) | 0.23081 | 1.20326 | 16.61260 |
| | QN->Q (RF) | 0.02393 | 0.65940 | 10.56900 |
| sky130_osu_sc_18T_hs__dff_l | CK->Q (RF) | 0.23816 | 1.32529 | 16.02850 |
| | QN->Q (RF) | 0.02653 | 0.69868 | 10.18270 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__dff_1 | CK->QN (RR) | 0.20294 | 0.63489 | 6.60928 |
| sky130_osu_sc_18T_hs__dff_l | CK->QN (RR) | 0.20618 | 0.69158 | 6.53911 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__dff_1 | CK->QN (RF) | 0.14055 | 0.55878 | 6.15039 |
| sky130_osu_sc_18T_hs__dff_l | CK->QN (RF) | 0.14098 | 0.58808 | 5.74581 |

# Constraint Information

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dff_1 | hold | CK (R) | -0.04455 | -0.04657 | 0.16819 |
| | setup | CK (R) | 0.11609 | 0.16114 | 2.64582 |
| sky130_osu_sc_18T_hs__dff_l | hold | CK (R) | -0.04503 | -0.04657 | 0.15999 |
| | setup | CK (R) | 0.11509 | 0.15677 | 2.63220 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dff_1 | hold | CK (R) | -0.08938 | -0.26270 | 0.17968 |
| | setup | CK (R) | 0.10960 | 0.27605 | 3.39516 |
| sky130_osu_sc_18T_hs__dff_l | hold | CK (R) | -0.08956 | -0.26374 | 0.34105 |
| | setup | CK (R) | 0.10960 | 0.27605 | 3.39435 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__dff_1 | min_pulse_width | CK () | 0.07704 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.11921 | 0.51025 | 13.33370 |
| sky130_osu_sc_18T_hs__dff_l | min_pulse_width | CK () | 0.07704 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.11921 | 0.51025 | 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_18T_hs__dff_1 | min_pulse_width | CK () | 0.16905 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.08471 | 0.51025 | 13.33370 |
| sky130_osu_sc_18T_hs__dff_l | min_pulse_width | CK () | 0.16905 | 0.51025 | 13.33370 |
| | min_pulse_width | CK () | 0.08471 | 0.51025 | 13.33370 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01722 | 0.02230 | 0.10391 |
| sky130_osu_sc_18T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01544 | 0.02037 | 0.10636 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01925 | 0.02092 | 0.07336 |
| sky130_osu_sc_18T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01749 | 0.01973 | 0.08914 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01898 | 0.02068 | 0.07392 |
| sky130_osu_sc_18T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01730 | 0.01955 | 0.08899 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01686 | 0.02203 | 0.10454 |
| sky130_osu_sc_18T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01512 | 0.02002 | 0.10832 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00365 | -0.00462 | -0.00474 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.01786 | 0.02245 | 0.15072 |
| sky130_osu_sc_18T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00371 | -0.00469 | -0.00480 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.01780 | 0.02239 | 0.15066 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00618 | 0.00622 | 0.00619 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.03270 | 0.03756 | 0.16556 |
| sky130_osu_sc_18T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00612 | 0.00615 | 0.00612 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.03264 | 0.03750 | 0.16550 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dff_1 | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | -0.00088 | 0.00755 | 0.19306 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | -0.00108 | 0.00757 | 0.19197 |
| sky130_osu_sc_18T_hs__dff_l | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | -0.00094 | 0.00748 | 0.19299 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | -0.00114 | 0.00750 | 0.19190 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__dff_1 | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.02118 | 0.03211 | 0.21861 |
| | (D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !Q * QN) | 0.04686 | 0.05651 | 0.29332 |
| | (!D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * Q * !QN) | 0.04635 | 0.06579 | 0.36445 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.02485 | 0.03530 | 0.22049 |
| sky130_osu_sc_18T_hs__dff_l | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.02111 | 0.03205 | 0.21854 |
| | (D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !Q * QN) | 0.04680 | 0.05645 | 0.29325 |
| | (!D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * Q * !QN) | 0.04629 | 0.06574 | 0.36441 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.02479 | 0.03523 | 0.22043 |

# SKY130_OSU_SC_18T_HS__INVx

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_hs__inv_1 | 6.59340 |
| sky130_osu_sc_18T_hs__inv_10 | 32.96700 |
| sky130_osu_sc_18T_hs__inv_2 | 9.52380 |
| sky130_osu_sc_18T_hs__inv_3 | 12.45420 |
| sky130_osu_sc_18T_hs__inv_4 | 15.38460 |
| sky130_osu_sc_18T_hs__inv_6 | 21.24540 |
| sky130_osu_sc_18T_hs__inv_8 | 27.10620 |
| sky130_osu_sc_18T_hs__inv_l | 6.59340 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | Max Cap(pf) |
|---|---|---|
| | A | Y |
| **sky130_osu_sc_18T_hs__inv_1** | 0.00560 | 2.98866 |
| **sky130_osu_sc_18T_hs__inv_10** | 0.05299 | 25.88964 |
| **sky130_osu_sc_18T_hs__inv_2** | 0.01079 | 5.70736 |
| **sky130_osu_sc_18T_hs__inv_3** | 0.01609 | 8.22007 |
| **sky130_osu_sc_18T_hs__inv_4** | 0.02131 | 10.97370 |
| **sky130_osu_sc_18T_hs__inv_6** | 0.03195 | 16.13493 |
| **sky130_osu_sc_18T_hs__inv_8** | 0.04248 | 21.20692 |
| **sky130_osu_sc_18T_hs__inv_l** | 0.00430 | 2.04228 |

# Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_18T_hs__inv_1** | 0.00000 | 10.09330 | 19.89490 |
| **sky130_osu_sc_18T_hs__inv_10** | 0.00000 | 100.88800 | 198.88100 |
| **sky130_osu_sc_18T_hs__inv_2** | 0.00000 | 20.17840 | 39.77780 |
| **sky130_osu_sc_18T_hs__inv_3** | 0.00000 | 30.27100 | 59.67140 |
| **sky130_osu_sc_18T_hs__inv_4** | 0.00000 | 40.35610 | 79.55430 |
| **sky130_osu_sc_18T_hs__inv_6** | 0.00000 | 60.53360 | 119.33000 |
| **sky130_osu_sc_18T_hs__inv_8** | 0.00000 | 80.71100 | 159.10600 |
| **sky130_osu_sc_18T_hs__inv_l** | 0.00000 | 6.38439 | 12.48470 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_18T_hs__inv_1** | **A->Y (FR)** | 0.02475 | 0.64303 | 9.97024 |
| **sky130_osu_sc_18T_hs__inv_10** | **A->Y (FR)** | 0.03943 | 0.42533 | 9.83792 |
| **sky130_osu_sc_18T_hs__inv_2** | **A->Y (FR)** | 0.02088 | 0.55046 | 9.78142 |
| **sky130_osu_sc_18T_hs__inv_3** | **A->Y (FR)** | 0.02340 | 0.51431 | 9.82843 |
| **sky130_osu_sc_18T_hs__inv_4** | **A->Y (FR)** | 0.02445 | 0.48261 | 9.77398 |
| **sky130_osu_sc_18T_hs__inv_6** | **A->Y (FR)** | 0.02815 | 0.45090 | 9.78445 |
| **sky130_osu_sc_18T_hs__inv_8** | **A->Y (FR)** | 0.03335 | 0.43319 | 9.79549 |
| **sky130_osu_sc_18T_hs__inv_l** | **A->Y (FR)** | 0.02757 | 0.69749 | 9.91747 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_18T_hs__inv_1** | **A->Y (RF)** | 0.02165 | 0.57083 | 8.93465 |
| **sky130_osu_sc_18T_hs__inv_10** | **A->Y (RF)** | 0.03713 | 0.33937 | 8.51502 |
| **sky130_osu_sc_18T_hs__inv_2** | **A->Y (RF)** | 0.01856 | 0.47455 | 8.71963 |
| **sky130_osu_sc_18T_hs__inv_3** | **A->Y (RF)** | 0.02050 | 0.43611 | 8.73453 |
| **sky130_osu_sc_18T_hs__inv_4** | **A->Y (RF)** | 0.02086 | 0.40469 | 8.69578 |
| **sky130_osu_sc_18T_hs__inv_6** | **A->Y (RF)** | 0.02643 | 0.37229 | 8.66410 |
| **sky130_osu_sc_18T_hs__inv_8** | **A->Y (RF)** | 0.03151 | 0.35271 | 8.62921 |
| **sky130_osu_sc_18T_hs__inv_l** | **A->Y (RF)** | 0.02378 | 0.60986 | 8.68208 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__inv_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00777 | 0.01174 | 0.04915 |
| sky130_osu_sc_18T_hs__inv_10 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.07089 | 0.12760 | 0.49018 |
| sky130_osu_sc_18T_hs__inv_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01404 | 0.02314 | 0.09731 |
| sky130_osu_sc_18T_hs__inv_3 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02145 | 0.03570 | 0.14598 |
| sky130_osu_sc_18T_hs__inv_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02780 | 0.05020 | 0.19393 |
| sky130_osu_sc_18T_hs__inv_6 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.04153 | 0.07490 | 0.29165 |
| sky130_osu_sc_18T_hs__inv_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.05570 | 0.10030 | 0.38973 |
| sky130_osu_sc_18T_hs__inv_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00599 | 0.00819 | 0.03186 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| **sky130_osu_sc_18T_hs__inv_1** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00138 | 0.00075 | 0.02258 |
| **sky130_osu_sc_18T_hs__inv_10** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.01434 | 0.01354 | 0.22646 |
| **sky130_osu_sc_18T_hs__inv_2** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00467 | 0.00040 | 0.04422 |
| **sky130_osu_sc_18T_hs__inv_3** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00593 | 0.00270 | 0.06697 |
| **sky130_osu_sc_18T_hs__inv_4** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00889 | 0.00292 | 0.08859 |
| **sky130_osu_sc_18T_hs__inv_6** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.01349 | 0.00510 | 0.13312 |
| **sky130_osu_sc_18T_hs__inv_8** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.01582 | 0.00979 | 0.17882 |
| **sky130_osu_sc_18T_hs__inv_l** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00105 | 0.00024 | 0.01516 |

# SKY130_OSU_SC_18T_HS__MUX2

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__mux2_1** | 18.31500 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) |
|---|---|---|---|---|
| | **A0** | **A1** | **S0** | **Y** |
| **sky130_osu_sc_18T_hs__mux2_1** | 0.28079 | 0.28070 | 0.01137 | 0.27534 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | **Min.** | **Avg** | **Max.** |
| **sky130_osu_sc_18T_hs__mux2_1** | 0.00000 | 20.19290 | 20.19290 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_hs__mux2_1 | A0->Y (RR) | - | 0.01230 | 0.11719 | 0.77906 |
| | A1->Y (RR) | - | 0.01330 | 0.11729 | 0.77664 |
| | S0->Y (RR) | (!A0 * A1) | 0.04188 | 0.17818 | 0.51963 |
| | S0->Y (FR) | (A0 * !A1) | 0.03707 | 0.25379 | 1.99226 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_hs__mux2_1 | A0->Y (FF) | - | 0.01121 | 0.12704 | 0.84777 |
| | A1->Y (FF) | - | 0.01113 | 0.12655 | 0.84413 |
| | S0->Y (FF) | (!A0 * A1) | 0.05349 | 0.25079 | 1.53378 |
| | S0->Y (RF) | (A0 * !A1) | 0.02637 | 0.19398 | 1.14333 |

# Power Information

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__mux2_1 | A0 | - | 0.00000 | 0.00000 | 0.00000 |
| | A0 | - | -0.00829 | -0.00832 | -0.00831 |
| | A1 | - | 0.00000 | 0.00000 | 0.00000 |
| | A1 | - | -0.00528 | -0.00529 | -0.00529 |
| | S0 | (A0 * !A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (A0 * !A1) | 0.00854 | 0.02044 | 0.20683 |
| | S0 | (!A0 * A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (!A0 * A1) | -0.00565 | 0.00443 | 0.18915 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__mux2_1 | A0 | - | 0.00000 | 0.00000 | 0.00000 |
| | A0 | - | 0.00831 | 0.00832 | 0.00833 |
| | A1 | - | 0.00000 | 0.00000 | 0.00000 |
| | A1 | - | 0.00621 | 0.00622 | 0.00621 |
| | S0 | (A0 * !A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (A0 * !A1) | 0.00191 | 0.01237 | 0.19838 |
| | S0 | (!A0 * A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (!A0 * A1) | 0.02124 | 0.03221 | 0.21760 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__mux2_1 | (A1 * S0 * Y) + (!A1 * S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * S0 * Y) + (!A1 * S0 * !Y) | -0.00187 | -0.00185 | -0.00185 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__mux2_1 | (A1 * S0 * Y) + (!A1 * S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * S0 * Y) + (!A1 * S0 * !Y) | 0.00220 | 0.00220 | 0.00220 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__mux2_1 | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | -0.00239 | -0.00238 | -0.00238 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__mux2_1 | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | 0.00239 | 0.00238 | 0.00238 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__mux2_1 | (A0 * A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * Y) | -0.00187 | 0.00833 | 0.19372 |
| | (!A0 * !A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !Y) | -0.00187 | 0.00829 | 0.19417 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__mux2_1 | (A0 * A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * Y) | 0.01584 | 0.02687 | 0.21261 |
| | (!A0 * !A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !Y) | 0.01400 | 0.02574 | 0.21204 |

# SKY130_OSU_SC_18T_HS__NAND2x

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__nand2_1 | 9.52380 |
| sky130_osu_sc_18T_hs__nand2_l | 9.52380 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_18T_hs__nand2_1 | 0.00562 | 0.00561 | 2.29359 |
| sky130_osu_sc_18T_hs__nand2_l | 0.00431 | 0.00430 | 1.67032 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_hs__nand2_1 | 0.00000 | 10.08690 | 39.77590 |
| sky130_osu_sc_18T_hs__nand2_l | 0.00000 | 6.38379 | 24.96030 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__nand2_1 | A->Y (FR) | 0.02527 | 0.59534 | 8.59450 |
| | B->Y (FR) | 0.02956 | 0.59366 | 8.50632 |
| sky130_osu_sc_18T_hs__nand2_l | A->Y (FR) | 0.02800 | 0.65513 | 8.84989 |
| | B->Y (FR) | 0.03316 | 0.65693 | 8.81342 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__nand2_1 | A->Y (RF) | 0.03042 | 0.65802 | 9.65287 |
| | B->Y (RF) | 0.03431 | 0.61865 | 9.05401 |
| sky130_osu_sc_18T_hs__nand2_l | A->Y (RF) | 0.03341 | 0.72182 | 9.73528 |
| | B->Y (RF) | 0.03711 | 0.68049 | 9.10195 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__nand2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00829 | 0.01185 | 0.05036 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01056 | 0.01402 | 0.05317 |
| sky130_osu_sc_18T_hs__nand2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00635 | 0.00839 | 0.03165 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00802 | 0.01000 | 0.03395 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__nand2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00028 | 0.00146 | 0.02314 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | -0.00028 | 0.00108 | 0.02131 |
| sky130_osu_sc_18T_hs__nand2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00034 | 0.00067 | 0.01487 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | -0.00033 | 0.00045 | 0.01421 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__nand2_1 | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | -0.00602 | -0.00605 | -0.00607 |
| sky130_osu_sc_18T_hs__nand2_l | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | -0.00438 | -0.00439 | -0.00441 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__nand2_1 | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | 0.00605 | 0.00610 | 0.00609 |
| sky130_osu_sc_18T_hs__nand2_l | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | 0.00440 | 0.00445 | 0.00442 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__nand2_1 | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | -0.00564 | -0.00568 | -0.00565 |
| sky130_osu_sc_18T_hs__nand2_l | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | -0.00410 | -0.00412 | -0.00411 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__nand2_1 | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00584 | 0.00573 | 0.00568 |
| sky130_osu_sc_18T_hs__nand2_l | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00426 | 0.00417 | 0.00413 |

# SKY130_OSU_SC_18T_HS__NOR2x

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__nor2_1 | 9.52380 |
| sky130_osu_sc_18T_hs__nor2_l | 9.52380 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_18T_hs__nor2_1 | 0.00562 | 0.00592 | 1.62184 |
| sky130_osu_sc_18T_hs__nor2_l | 0.00423 | 0.00457 | 1.12032 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_hs__nor2_1 | 0.00000 | 7.73558 | 19.88990 |
| sky130_osu_sc_18T_hs__nor2_l | 0.00000 | 5.22419 | 12.48190 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__nor2_1 | A->Y (FR) | 0.04982 | 0.71744 | 9.41389 |
| | B->Y (FR) | 0.03612 | 0.72747 | 9.71508 |
| sky130_osu_sc_18T_hs__nor2_l | A->Y (FR) | 0.05460 | 0.78851 | 9.33176 |
| | B->Y (FR) | 0.04249 | 0.80551 | 9.75389 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__nor2_1 | A->Y (RF) | 0.03014 | 0.46812 | 6.06984 |
| | B->Y (RF) | 0.02319 | 0.45573 | 6.04601 |
| sky130_osu_sc_18T_hs__nor2_l | A->Y (RF) | 0.03165 | 0.50116 | 5.96320 |
| | B->Y (RF) | 0.02537 | 0.49113 | 5.94253 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__nor2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01172 | 0.01278 | 0.04575 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00838 | 0.01209 | 0.05779 |
| sky130_osu_sc_18T_hs__nor2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00852 | 0.00939 | 0.03146 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00638 | 0.00844 | 0.03579 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__nor2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00157 | 0.00338 | 0.03282 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | -0.00101 | 0.00111 | 0.02940 |
| sky130_osu_sc_18T_hs__nor2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00106 | 0.00225 | 0.02229 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | -0.00072 | 0.00061 | 0.01984 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__nor2_1 | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | -0.00422 | -0.00523 | -0.00529 |
| sky130_osu_sc_18T_hs__nor2_l | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | -0.00307 | -0.00372 | -0.00376 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__nor2_1 | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | 0.00567 | 0.00570 | 0.00568 |
| sky130_osu_sc_18T_hs__nor2_l | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | 0.00399 | 0.00400 | 0.00401 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__nor2_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | -0.00235 | -0.00237 | -0.00235 |
| sky130_osu_sc_18T_hs__nor2_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | -0.00175 | -0.00177 | -0.00176 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__nor2_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00255 | 0.00256 | 0.00244 |
| sky130_osu_sc_18T_hs__nor2_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00190 | 0.00191 | 0.00182 |

# SKY130_OSU_SC_18T_HS__OAI21

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__oai21_l | 12.45420 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) |
|---|---|---|---|---|
| | A0 | A1 | B0 | Y |
| sky130_osu_sc_18T_hs__oai21_l | 0.00569 | 0.00578 | 0.00476 | 1.58548 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_hs__oai21_l | 0.00000 | 8.65291 | 32.37200 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__oai21_l | A0->Y (FR) | 0.04832 | 0.73681 | 9.62446 |
| | A1->Y (FR) | 0.06544 | 0.73349 | 9.34124 |
| | B0->Y (FR) | 0.03378 | 0.64500 | 8.54332 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__oai21_l | A0->Y (RF) | 0.04323 | 0.56825 | 7.31512 |
| | A1->Y (RF) | 0.05366 | 0.56685 | 7.13088 |
| | B0->Y (RF) | 0.03326 | 0.61645 | 8.17229 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.01177 | 0.01453 | 0.05252 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.01505 | 0.01615 | 0.04513 |
| | B0 | 0.00691 | 0.00979 | 0.04543 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.00092 | 0.00200 | 0.02366 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.00350 | 0.00423 | 0.02671 |
| | B0 | 0.00129 | 0.00284 | 0.02516 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | -0.00226 | -0.00227 | -0.00225 |
| | (A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * Y) | -0.00547 | -0.00548 | -0.00550 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00555 | -0.00559 | -0.00555 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.00266 | 0.00267 | 0.00256 |
| | (A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * Y) | 0.00548 | 0.00548 | 0.00550 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00570 | 0.00559 | 0.00558 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | -0.00402 | -0.00503 | -0.00510 |
| | (A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * Y) | -0.00543 | -0.00543 | -0.00546 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | -0.00550 | -0.00554 | -0.00551 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | 0.00570 | 0.00575 | 0.00571 |
| | (A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * Y) | 0.00543 | 0.00543 | 0.00546 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | 0.00565 | 0.00557 | 0.00553 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai21_l | (!A0 * !A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * Y) | -0.00444 | -0.00447 | -0.00454 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai21_l | (!A0 * !A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * Y) | 0.00453 | 0.00457 | 0.00455 |

# SKY130_OSU_SC_18T_HS__OAI22

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__oai22_l | 15.38460 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | | Max Cap(pf) |
|---|---|---|---|---|---|
| | A0 | A1 | B0 | B1 | Y |
| sky130_osu_sc_18T_hs__oai22_l | 0.00556 | 0.00580 | 0.00592 | 0.00580 | 1.60338 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_hs__oai22_l | 0.00000 | 11.58110 | 39.76590 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__oai22_l | A0->Y (FR) | 0.07000 | 0.73779 | 9.36962 |
| | A1->Y (FR) | 0.05642 | 0.74439 | 9.67274 |
| | B0->Y (FR) | 0.03998 | 0.72924 | 9.66958 |
| | B1->Y (FR) | 0.05387 | 0.72042 | 9.36710 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__oai22_l | A0->Y (RF) | 0.07867 | 0.61960 | 7.54480 |
| | A1->Y (RF) | 0.06106 | 0.59523 | 7.42727 |
| | B0->Y (RF) | 0.05192 | 0.64392 | 8.27202 |
| | B1->Y (RF) | 0.07042 | 0.68069 | 8.53226 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai22_l | A0 | 0.01979 | 0.02083 | 0.04743 |
| | A1 | 0.01455 | 0.01750 | 0.05888 |
| | B0 | 0.00898 | 0.01217 | 0.05291 |
| | B1 | 0.01244 | 0.01326 | 0.04172 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai22_l | A0 | 0.00242 | 0.00315 | 0.02625 |
| | A1 | -0.00015 | 0.00093 | 0.02303 |
| | B0 | -0.00007 | 0.00162 | 0.02654 |
| | B1 | 0.00243 | 0.00377 | 0.02823 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | -0.00421 | -0.00523 | -0.00528 |
| | (A1 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * B1 * !Y) | -0.00413 | -0.00514 | -0.00520 |
| | (A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * !B1 * Y) | -0.00544 | -0.00551 | -0.00547 |
| | (!A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * !B1 * Y) | -0.00550 | -0.00554 | -0.00551 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.00568 | 0.00575 | 0.00569 |
| | (A1 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * B1 * !Y) | 0.00576 | 0.00583 | 0.00577 |
| | (A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * !B1 * Y) | 0.00544 | 0.00551 | 0.00547 |
| | (!A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * !B1 * Y) | 0.00568 | 0.00557 | 0.00554 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai22_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | -0.00233 | -0.00235 | -0.00233 |
| | (A0 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * B1 * !Y) | -0.00225 | -0.00227 | -0.00225 |
| | (A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * !B1 * Y) | -0.00542 | -0.00548 | -0.00545 |
| | (!A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * !B1 * Y) | -0.00549 | -0.00553 | -0.00550 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai22_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | 0.00254 | 0.00255 | 0.00243 |
| | (A0 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * B1 * !Y) | 0.00262 | 0.00264 | 0.00251 |
| | (A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * !B1 * Y) | 0.00543 | 0.00548 | 0.00545 |
| | (!A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * !B1 * Y) | 0.00567 | 0.00557 | 0.00553 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai22_l | (A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B1 * !Y) | -0.00232 | -0.00234 | -0.00232 |
| | (A0 * !A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B1 * !Y) | -0.00223 | -0.00226 | -0.00224 |
| | (!A0 * !A1 * B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B1 * Y) | -0.00595 | -0.00600 | -0.00599 |
| | (!A0 * !A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B1 * Y) | -0.00588 | -0.00593 | -0.00602 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai22_l | (A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B1 * !Y) | 0.00253 | 0.00254 | 0.00242 |
| | (A0 * !A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B1 * !Y) | 0.00261 | 0.00263 | 0.00250 |
| | (!A0 * !A1 * B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B1 * Y) | 0.00602 | 0.00605 | 0.00599 |
| | (!A0 * !A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B1 * Y) | 0.00602 | 0.00607 | 0.00605 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | -0.00415 | -0.00516 | -0.00522 |
| | (A0 * !A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B0 * !Y) | -0.00408 | -0.00508 | -0.00514 |
| | (!A0 * !A1 * B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B0 * Y) | -0.00603 | -0.00609 | -0.00606 |
| | (!A0 * !A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B0 * Y) | -0.00596 | -0.00599 | -0.00609 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.00561 | 0.00562 | 0.00562 |
| | (A0 * !A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B0 * !Y) | 0.00569 | 0.00575 | 0.00570 |
| | (!A0 * !A1 * B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B0 * Y) | 0.00609 | 0.00615 | 0.00607 |
| | (!A0 * !A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B0 * Y) | 0.00609 | 0.00614 | 0.00612 |

# SKY130_OSU_SC_18T_HS__OR2x

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__or2_1 | 12.45420 |
| sky130_osu_sc_18T_hs__or2_2 | 15.38460 |
| sky130_osu_sc_18T_hs__or2_4 | 21.24540 |
| sky130_osu_sc_18T_hs__or2_8 | 32.96700 |
| sky130_osu_sc_18T_hs__or2_l | 12.45420 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_18T_hs__or2_1 | 0.00596 | 0.00576 | 3.13701 |
| sky130_osu_sc_18T_hs__or2_2 | 0.00596 | 0.00576 | 5.99063 |
| sky130_osu_sc_18T_hs__or2_4 | 0.00597 | 0.00576 | 11.49347 |
| sky130_osu_sc_18T_hs__or2_8 | 0.00599 | 0.00579 | 21.59763 |
| sky130_osu_sc_18T_hs__or2_l | 0.00464 | 0.00440 | 2.17711 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_18T_hs__or2_1** | 0.00000 | 12.92830 | 20.47450 |
| **sky130_osu_sc_18T_hs__or2_2** | 0.00000 | 18.11480 | 40.35830 |
| **sky130_osu_sc_18T_hs__or2_4** | 0.00000 | 28.49360 | 80.13640 |
| **sky130_osu_sc_18T_hs__or2_8** | 0.00000 | 49.25090 | 159.69200 |
| **sky130_osu_sc_18T_hs__or2_l** | 0.00000 | 8.55863 | 13.04990 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__or2_1 | A->Y (RR) | 0.06327 | 0.49404 | 6.39621 |
| | B->Y (RR) | 0.05382 | 0.46274 | 6.33532 |
| sky130_osu_sc_18T_hs__or2_2 | A->Y (RR) | 0.06986 | 0.43931 | 6.31879 |
| | B->Y (RR) | 0.06001 | 0.40980 | 6.23687 |
| sky130_osu_sc_18T_hs__or2_4 | A->Y (RR) | 0.09024 | 0.44288 | 6.52418 |
| | B->Y (RR) | 0.07996 | 0.41829 | 6.43872 |
| sky130_osu_sc_18T_hs__or2_8 | A->Y (RR) | 0.13142 | 0.49649 | 6.76641 |
| | B->Y (RR) | 0.12059 | 0.47639 | 6.67419 |
| sky130_osu_sc_18T_hs__or2_l | A->Y (RR) | 0.06817 | 0.55891 | 6.45092 |
| | B->Y (RR) | 0.05927 | 0.52941 | 6.35824 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__or2_1 | A->Y (FF) | 0.09244 | 0.57684 | 7.30785 |
| | B->Y (FF) | 0.07450 | 0.57024 | 7.52800 |
| sky130_osu_sc_18T_hs__or2_2 | A->Y (FF) | 0.10830 | 0.53848 | 7.21216 |
| | B->Y (FF) | 0.09049 | 0.53626 | 7.41664 |
| sky130_osu_sc_18T_hs__or2_4 | A->Y (FF) | 0.15138 | 0.56615 | 7.36464 |
| | B->Y (FF) | 0.13364 | 0.57156 | 7.55051 |
| sky130_osu_sc_18T_hs__or2_8 | A->Y (FF) | 0.24219 | 0.66095 | 7.42259 |
| | B->Y (FF) | 0.22448 | 0.67341 | 7.59585 |
| sky130_osu_sc_18T_hs__or2_l | A->Y (FF) | 0.10042 | 0.62189 | 7.01248 |
| | B->Y (FF) | 0.08308 | 0.62093 | 7.26529 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__or2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00911 | 0.01407 | 0.11549 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00671 | 0.01371 | 0.13813 |
| sky130_osu_sc_18T_hs__or2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01571 | 0.02103 | 0.12330 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01313 | 0.02026 | 0.14419 |
| sky130_osu_sc_18T_hs__or2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03044 | 0.03619 | 0.13634 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02768 | 0.03506 | 0.15565 |
| sky130_osu_sc_18T_hs__or2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.06687 | 0.06876 | 0.16422 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.06369 | 0.06875 | 0.18026 |
| sky130_osu_sc_18T_hs__or2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00670 | 0.00973 | 0.07780 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00508 | 0.00961 | 0.09007 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__or2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01933 | 0.02406 | 0.13017 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01568 | 0.02504 | 0.17575 |
| sky130_osu_sc_18T_hs__or2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02542 | 0.02915 | 0.13424 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02179 | 0.02999 | 0.17822 |
| sky130_osu_sc_18T_hs__or2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.04484 | 0.04230 | 0.14427 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.04119 | 0.04340 | 0.18535 |
| sky130_osu_sc_18T_hs__or2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.09909 | 0.07354 | 0.16615 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.09567 | 0.07321 | 0.20280 |
| sky130_osu_sc_18T_hs__or2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01451 | 0.01748 | 0.08577 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01201 | 0.01768 | 0.11370 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__or2_1 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00420 | -0.00524 | -0.00531 |
| sky130_osu_sc_18T_hs__or2_2 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00419 | -0.00524 | -0.00531 |
| sky130_osu_sc_18T_hs__or2_4 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00419 | -0.00524 | -0.00530 |
| sky130_osu_sc_18T_hs__or2_8 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00417 | -0.00523 | -0.00529 |
| sky130_osu_sc_18T_hs__or2_l | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00305 | -0.00372 | -0.00377 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__or2_1 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00569 | 0.00574 | 0.00571 |
| sky130_osu_sc_18T_hs__or2_2 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00569 | 0.00574 | 0.00571 |
| sky130_osu_sc_18T_hs__or2_4 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00570 | 0.00575 | 0.00571 |
| sky130_osu_sc_18T_hs__or2_8 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00571 | 0.00576 | 0.00572 |
| sky130_osu_sc_18T_hs__or2_l | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00401 | 0.00406 | 0.00402 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__or2_1 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00237 | -0.00238 | -0.00236 |
| sky130_osu_sc_18T_hs__or2_2 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00237 | -0.00237 | -0.00236 |
| sky130_osu_sc_18T_hs__or2_4 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00235 | -0.00237 | -0.00235 |
| sky130_osu_sc_18T_hs__or2_8 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00234 | -0.00236 | -0.00234 |
| sky130_osu_sc_18T_hs__or2_l | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00179 | -0.00180 | -0.00178 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__or2_1 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00259 | 0.00258 | 0.00245 |
| sky130_osu_sc_18T_hs__or2_2 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00259 | 0.00258 | 0.00246 |
| sky130_osu_sc_18T_hs__or2_4 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00259 | 0.00259 | 0.00246 |
| sky130_osu_sc_18T_hs__or2_8 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00260 | 0.00260 | 0.00247 |
| sky130_osu_sc_18T_hs__or2_l | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00195 | 0.00195 | 0.00186 |

# SKY130_OSU_SC_18T_HS__TBUFIx

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__tbufi_1 | 12.45420 |
| sky130_osu_sc_18T_hs__tbufi_l | 12.45420 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | OE | Y |
| sky130_osu_sc_18T_hs__tbufi_1 | 0.00592 | 0.00745 | 1.62369 |
| sky130_osu_sc_18T_hs__tbufi_l | 0.00458 | 0.00579 | 1.11786 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_hs__tbufi_1 | 0.00000 | 10.28190 | 39.78300 |
| sky130_osu_sc_18T_hs__tbufi_l | 0.00000 | 6.57515 | 24.96580 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__tbufi_1 | A->Y (FR) | 0.03522 | 0.72321 | 9.68887 |
| | OE->Y (FR) | 0.04456 | 0.37576 | 5.09402 |
| | OE->Y (RR) | 0.06987 | 0.56879 | 6.39241 |
| sky130_osu_sc_18T_hs__tbufi_l | A->Y (FR) | 0.04148 | 0.80369 | 9.74068 |
| | OE->Y (FR) | 0.04725 | 0.37552 | 5.09382 |
| | OE->Y (RR) | 0.07557 | 0.64913 | 6.37669 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__tbufi_1 | A->Y (RF) | 0.03015 | 0.57751 | 7.68662 |
| | OE->Y (FF) | 0.04531 | 0.37572 | 5.09400 |
| | OE->Y (RF) | 0.02738 | 0.52707 | 6.98641 |
| sky130_osu_sc_18T_hs__tbufi_l | A->Y (RF) | 0.03343 | 0.61627 | 7.49369 |
| | OE->Y (FF) | 0.04796 | 0.37550 | 5.09382 |
| | OE->Y (RF) | 0.03116 | 0.56805 | 6.76190 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__tbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00852 | 0.01146 | 0.05072 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00899 | 0.01827 | 0.18342 |
| sky130_osu_sc_18T_hs__tbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00644 | 0.00823 | 0.03285 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00634 | 0.01217 | 0.11954 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__tbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00054 | 0.00130 | 0.02521 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00642 | 0.01646 | 0.20089 |
| sky130_osu_sc_18T_hs__tbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00042 | 0.00069 | 0.01698 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00439 | 0.01055 | 0.12770 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__tbufi_1 | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | -0.00409 | -0.00416 | -0.00410 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | -0.00347 | -0.00348 | -0.00348 |
| sky130_osu_sc_18T_hs__tbufi_l | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | -0.00314 | -0.00319 | -0.00314 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | -0.00272 | -0.00278 | -0.00273 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__tbufi_1 | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | 0.00409 | 0.00416 | 0.00410 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | 0.00360 | 0.00363 | 0.00355 |
| sky130_osu_sc_18T_hs__tbufi_l | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | 0.00314 | 0.00319 | 0.00314 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | 0.00282 | 0.00284 | 0.00278 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__tbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00392 | 0.01436 | 0.20261 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00326 | 0.01387 | 0.20191 |
| sky130_osu_sc_18T_hs__tbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00264 | 0.00917 | 0.12890 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00220 | 0.00873 | 0.12844 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__tbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00954 | 0.02100 | 0.20902 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00929 | 0.02086 | 0.20888 |
| sky130_osu_sc_18T_hs__tbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00745 | 0.01448 | 0.13420 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00731 | 0.01443 | 0.13413 |

# SKY130_OSU_SC_18T_HS__TNBUFIx

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__tnbufi_1 | 12.45420 |
| sky130_osu_sc_18T_hs__tnbufi_l | 12.45420 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | OE | Y |
| sky130_osu_sc_18T_hs__tnbufi_1 | 0.00592 | 0.00939 | 1.62384 |
| sky130_osu_sc_18T_hs__tnbufi_l | 0.00457 | 0.00702 | 1.11795 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_hs__tnbufi_1 | 0.00000 | 16.81660 | 20.18120 |
| sky130_osu_sc_18T_hs__tnbufi_l | 0.00000 | 10.64220 | 12.76580 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__tnbufi_1 | A->Y (FR) | 0.03533 | 0.72504 | 9.68903 |
| | OE->Y (RR) | 0.02800 | 0.37712 | 5.09540 |
| | OE->Y (FR) | 0.04728 | 0.71256 | 9.29768 |
| sky130_osu_sc_18T_hs__tnbufi_l | A->Y (FR) | 0.04170 | 0.80366 | 9.74076 |
| | OE->Y (RR) | 0.02895 | 0.37744 | 5.09569 |
| | OE->Y (FR) | 0.05227 | 0.78268 | 9.21018 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_hs__tnbufi_1 | A->Y (RF) | 0.02977 | 0.57739 | 7.68718 |
| | OE->Y (RF) | 0.02779 | 0.37714 | 5.09552 |
| | OE->Y (FF) | 0.04782 | 0.48229 | 5.60968 |
| sky130_osu_sc_18T_hs__tnbufi_l | A->Y (RF) | 0.03297 | 0.61609 | 7.49411 |
| | OE->Y (RF) | 0.02875 | 0.37746 | 5.09575 |
| | OE->Y (FF) | 0.05339 | 0.52224 | 5.30674 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__tnbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00817 | 0.01143 | 0.05042 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.02043 | 0.03299 | 0.22058 |
| sky130_osu_sc_18T_hs__tnbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00629 | 0.00808 | 0.03273 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.01515 | 0.02290 | 0.14295 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__tnbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00123 | 0.00063 | 0.02456 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.01822 | 0.03064 | 0.19946 |
| sky130_osu_sc_18T_hs__tnbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00094 | 0.00019 | 0.01650 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.01347 | 0.02113 | 0.12573 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__tnbufi_1 | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | -0.00369 | -0.00376 | -0.00370 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | -0.00279 | -0.00285 | -0.00280 |
| sky130_osu_sc_18T_hs__tnbufi_l | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | -0.00271 | -0.00275 | -0.00271 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | -0.00212 | -0.00215 | -0.00212 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__tnbufi_1 | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | 0.00369 | 0.00376 | 0.00370 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | 0.00325 | 0.00328 | 0.00321 |
| sky130_osu_sc_18T_hs__tnbufi_l | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | 0.00271 | 0.00275 | 0.00271 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | 0.00242 | 0.00243 | 0.00239 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__tnbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | -0.00609 | 0.00439 | 0.19333 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | -0.00635 | 0.00436 | 0.19322 |
| sky130_osu_sc_18T_hs__tnbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | -0.00434 | 0.00208 | 0.12246 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | -0.00451 | 0.00205 | 0.12238 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_hs__tnbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.01564 | 0.02866 | 0.21803 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.01516 | 0.02831 | 0.21767 |
| sky130_osu_sc_18T_hs__tnbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.01163 | 0.01990 | 0.14035 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.01133 | 0.01945 | 0.14011 |

# SKY130_OSU_SC_18T_HS__XNOR2

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__xnor2_l | 21.24540 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_18T_hs__xnor2_l | 0.01173 | 0.01079 | 1.66199 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_hs__xnor2_l | 0.00000 | 35.34770 | 59.95210 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_hs__xnor2_1 | A->Y (RR) | B | 0.08753 | 0.60310 | 6.58141 |
| | A->Y (FR) | !B | 0.04482 | 0.73439 | 9.74573 |
| | B->Y (RR) | A | 0.06879 | 0.58883 | 6.71789 |
| | B->Y (FR) | !A | 0.06369 | 0.73415 | 9.49255 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_hs__xnor2_1 | A->Y (FF) | B | 0.08832 | 0.56730 | 6.13241 |
| | A->Y (RF) | !B | 0.04258 | 0.56600 | 7.41911 |
| | B->Y (FF) | A | 0.07509 | 0.55558 | 6.14481 |
| | B->Y (RF) | !A | 0.05531 | 0.58107 | 7.41206 |

# Power Information

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__xnor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00936 | 0.01786 | 0.18183 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.01924 | 0.03267 | 0.24949 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00301 | 0.01333 | 0.20097 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.02185 | 0.03382 | 0.23724 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__xnor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.02578 | 0.03582 | 0.21782 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00676 | 0.01716 | 0.21728 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.02370 | 0.03519 | 0.22225 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00817 | 0.01843 | 0.21656 |

# SKY130_OSU_SC_18T_HS__XOR2

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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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_18T_hs__xor2_1 | 21.24540 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_18T_hs__xor2_1 | 0.01171 | 0.01084 | 1.65542 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_hs__xor2_1 | 0.00000 | 35.34800 | 59.61400 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_hs__xor2_1 | A->Y (RR) | !B | 0.08061 | 0.59105 | 6.67398 |
| | A->Y (FR) | B | 0.05858 | 0.73448 | 9.58702 |
| | B->Y (RR) | !A | 0.07084 | 0.58952 | 6.70649 |
| | B->Y (FR) | A | 0.06221 | 0.73645 | 9.54879 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_hs__xor2_1 | A->Y (FF) | !B | 0.07314 | 0.54046 | 5.79830 |
| | A->Y (RF) | B | 0.04359 | 0.60046 | 7.77701 |
| | B->Y (FF) | !A | 0.06965 | 0.54189 | 5.98576 |
| | B->Y (RF) | A | 0.05172 | 0.56330 | 7.17047 |

# Power Information

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__xor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.02384 | 0.03654 | 0.24916 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00398 | 0.01248 | 0.19781 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.02454 | 0.03726 | 0.24604 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00216 | 0.01232 | 0.20195 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_hs__xor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00600 | 0.01682 | 0.22561 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.02603 | 0.03750 | 0.20562 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00602 | 0.01640 | 0.21917 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.02369 | 0.03601 | 0.22471 |

# SKY130_OSU_SC_18T_HS_x

*sky130_osu_sc_18T_hs_tt_1P80_100C.ccs*
*Cell Library: Process , Voltage 1.80, Temp 100.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| **sky130_osu_sc_18T_hs__ant** | 6.59340 |
| **sky130_osu_sc_18T_hs__tiehi** | 6.59340 |
| **sky130_osu_sc_18T_hs__tielo** | 6.59340 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) |
|---|---|
| | A |
| **sky130_osu_sc_18T_hs__ant** | 1.10205 |
| **sky130_osu_sc_18T_hs__tiehi** | 0.00000 |
| **sky130_osu_sc_18T_hs__tielo** | 0.00000 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_18T_hs__ant** | 0.00000 | 430373.00000 | 860746.00000 |
| **sky130_osu_sc_18T_hs__tiehi** | 0.00000 | 0.00000 | 0.00000 |
| **sky130_osu_sc_18T_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_18T_hs__ant | 0.00000 | 0.00000 | 0.00000 |
| | -0.00151 | 0.13562 | 1.81082 |

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

| Cell Name | Power(pJ) | | |
|---|---|---|---|
| | first | mid | last |
| sky130_osu_sc_18T_hs__ant | 0.00000 | 0.00000 | 0.00000 |
| | 7.48836 | 7.10626 | 2.13825 |