# sky130_osu_sc_15T_hs_tt_1P50_25C.ccs Library

| Cell Groups |
| --- |
| SKY130_OSU_SC_15T_HS__ADDFx |
| SKY130_OSU_SC_15T_HS__ADDHx |
| SKY130_OSU_SC_15T_HS__AND2x |
| SKY130_OSU_SC_15T_HS__AOI21 |
| SKY130_OSU_SC_15T_HS__AOI22 |
| SKY130_OSU_SC_15T_HS__BUFx |
| SKY130_OSU_SC_15T_HS__DFFRx |
| SKY130_OSU_SC_15T_HS__DFFSRx |
| SKY130_OSU_SC_15T_HS__DFFSx |
| SKY130_OSU_SC_15T_HS__DFFx |
| SKY130_OSU_SC_15T_HS__INVx |
| SKY130_OSU_SC_15T_HS__MUX2 |
| SKY130_OSU_SC_15T_HS__NAND2x |
| SKY130_OSU_SC_15T_HS__NOR2x |
| SKY130_OSU_SC_15T_HS__OAI21 |
| SKY130_OSU_SC_15T_HS__OAI22 |
| SKY130_OSU_SC_15T_HS__OR2x |
| SKY130_OSU_SC_15T_HS__TBUFIx |
| SKY130_OSU_SC_15T_HS__TNBUFIx |
| SKY130_OSU_SC_15T_HS__XNOR2 |
| SKY130_OSU_SC_15T_HS__XOR2 |
| SKY130_OSU_SC_15T_HS_x |

# SKY130_OSU_SC_15T_HS__ADDFx

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__addf_1 | 39.07200 |
| sky130_osu_sc_15T_hs__addf_l | 39.07200 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) | | |
|---|---|---|---|---|---|---|
| | A | B | CI | CO | CON | S |
| sky130_osu_sc_15T_hs__addf_1 | 0.01431 | 0.01430 | 0.01110 | 1.49634 | 0.67145 | 1.42139 |
| sky130_osu_sc_15T_hs__addf_l | 0.01430 | 0.01430 | 0.01112 | 0.90340 | 0.66979 | 0.91308 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_15T_hs__addf_1** | 0.00000 | 0.17903 | 0.22676 |
| **sky130_osu_sc_15T_hs__addf_l** | 0.00000 | 0.11657 | 0.16430 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__addf_1 | A->CO (RR) | 0.17015 | 1.84795 | 25.73610 |
| | B->CO (RR) | 0.16452 | 1.79218 | 24.94100 |
| | CI->CO (RR) | 0.16168 | 1.87636 | 26.28560 |
| | CON->CO (FR) | 0.03032 | 0.80666 | 11.81120 |
| sky130_osu_sc_15T_hs__addf_l | A->CO (RR) | 0.17917 | 1.71151 | 19.87150 |
| | B->CO (RR) | 0.17330 | 1.67331 | 19.57330 |
| | CI->CO (RR) | 0.17067 | 1.74068 | 20.45910 |
| | CON->CO (FR) | 0.04019 | 0.92043 | 11.93480 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__addf_1 | A->CO (FF) | 0.24769 | 2.41436 | 33.19280 |
| | B->CO (FF) | 0.22206 | 2.31824 | 32.03920 |
| | CI->CO (FF) | 0.21610 | 2.36985 | 33.10340 |
| | CON->CO (RF) | 0.02413 | 0.60489 | 8.83485 |
| sky130_osu_sc_15T_hs__addf_l | A->CO (FF) | 0.24055 | 1.99508 | 22.83870 |
| | B->CO (FF) | 0.21550 | 1.91774 | 22.14770 |
| | CI->CO (FF) | 0.20904 | 1.95042 | 22.78690 |
| | CON->CO (RF) | 0.02456 | 0.57058 | 7.49442 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__addf_1 | A->CON (FR) | 0.18909 | 1.11415 | 11.59360 |
| | B->CON (FR) | 0.16449 | 1.05623 | 11.25170 |
| | CI->CON (FR) | 0.15772 | 1.07153 | 11.55940 |
| sky130_osu_sc_15T_hs__addf_l | A->CON (FR) | 0.17935 | 1.10366 | 11.56640 |
| | B->CON (FR) | 0.15544 | 1.04631 | 11.22650 |
| | CI->CON (FR) | 0.14797 | 1.06104 | 11.53360 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__addf_1 | A->CON (RF) | 0.10002 | 0.63924 | 6.81086 |
| | B->CON (RF) | 0.09697 | 0.64640 | 7.08982 |
| | CI->CON (RF) | 0.09162 | 0.66966 | 7.44111 |
| sky130_osu_sc_15T_hs__addf_l | A->CON (RF) | 0.09641 | 0.63512 | 6.79546 |
| | B->CON (RF) | 0.09357 | 0.64284 | 7.07645 |
| | CI->CON (RF) | 0.08800 | 0.66543 | 7.42703 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__addf_1 | A->S (-R) | 0.35955 | 2.25799 | 26.29240 |
| | B->S (-R) | 0.36699 | 2.25274 | 25.66770 |
| | CI->S (-R) | 0.32553 | 2.20787 | 26.20300 |
| | CON->S (RR) | 0.09628 | 0.72108 | 7.38813 |
| sky130_osu_sc_15T_hs__addf_l | A->S (-R) | 0.35004 | 2.07067 | 21.13490 |
| | B->S (-R) | 0.35784 | 2.07359 | 20.81540 |
| | CI->S (-R) | 0.31602 | 2.02094 | 21.06820 |
| | CON->S (RR) | 0.10145 | 0.80659 | 7.38681 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__addf_1 | A->S (-F) | 0.28307 | 1.64414 | 17.99950 |
| | B->S (-F) | 0.27788 | 1.57959 | 17.55540 |
| | CI->S (-F) | 0.27398 | 1.66902 | 18.54700 |
| | CON->S (FF) | 0.11534 | 0.73718 | 6.91200 |
| sky130_osu_sc_15T_hs__addf_l | A->S (-F) | 0.26561 | 1.41242 | 13.42640 |
| | B->S (-F) | 0.26131 | 1.36543 | 13.34850 |
| | CI->S (-F) | 0.25639 | 1.43815 | 14.01090 |
| | CON->S (FF) | 0.10857 | 0.69085 | 5.73418 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__addf_1 | A | 0.00203 | 0.00214 | 0.00485 |
| | B | 0.00307 | 0.00308 | 0.00524 |
| | CI | 0.00313 | 0.00330 | 0.00616 |
| sky130_osu_sc_15T_hs__addf_l | A | 0.00156 | 0.00157 | 0.00332 |
| | B | 0.00260 | 0.00251 | 0.00382 |
| | CI | 0.00265 | 0.00274 | 0.00433 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__addf_1 | A | 0.00819 | 0.00843 | 0.01375 |
| | B | 0.00868 | 0.00893 | 0.01338 |
| | CI | 0.00689 | 0.00710 | 0.01263 |
| sky130_osu_sc_15T_hs__addf_l | A | 0.00775 | 0.00789 | 0.01079 |
| | B | 0.00822 | 0.00841 | 0.01066 |
| | CI | 0.00717 | 0.00749 | 0.00997 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__addf_1 | A | 0.00879 | 0.00882 | 0.01034 |
| | B | 0.00866 | 0.00884 | 0.01038 |
| | CI | 0.00762 | 0.00781 | 0.00958 |
| sky130_osu_sc_15T_hs__addf_l | A | 0.00835 | 0.00836 | 0.00985 |
| | B | 0.00822 | 0.00837 | 0.00986 |
| | CI | 0.00717 | 0.00741 | 0.00907 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__addf_1 | A | 0.00240 | 0.00226 | 0.00322 |
| | B | 0.00303 | 0.00299 | 0.00401 |
| | CI | 0.00312 | 0.00324 | 0.00458 |
| sky130_osu_sc_15T_hs__addf_l | A | 0.00194 | 0.00175 | 0.00265 |
| | B | 0.00257 | 0.00247 | 0.00346 |
| | CI | 0.00265 | 0.00272 | 0.00400 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__addf_1 | A | 0.00819 | 0.00843 | 0.01345 |
| | B | 0.00867 | 0.00893 | 0.01306 |
| | CI | 0.00763 | 0.00801 | 0.01230 |
| sky130_osu_sc_15T_hs__addf_l | A | 0.00775 | 0.00789 | 0.01083 |
| | B | 0.00823 | 0.00841 | 0.01073 |
| | CI | 0.00718 | 0.00749 | 0.01001 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__addf_1 | A | 0.01793 | 0.01810 | 0.02015 |
| | B | 0.01622 | 0.01609 | 0.02154 |
| | CI | 0.01469 | 0.01469 | 0.01709 |
| sky130_osu_sc_15T_hs__addf_l | A | 0.01733 | 0.01728 | 0.01943 |
| | B | 0.01566 | 0.01541 | 0.02102 |
| | CI | 0.01409 | 0.01407 | 0.01656 |

# SKY130_OSU_SC_15T_HS__ADDHx

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__addh_1 | 23.19900 |
| sky130_osu_sc_15T_hs__addh_l | 23.19900 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) | | |
|---|---|---|---|---|---|
| | A | B | CO | CON | S |
| sky130_osu_sc_15T_hs__addh_1 | 0.00732 | 0.00805 | 1.45734 | 0.71346 | 1.48091 |
| sky130_osu_sc_15T_hs__addh_l | 0.00744 | 0.00829 | 0.93367 | 0.72126 | 0.93962 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_15T_hs__addh_1 | 0.00000 | 0.19332 | 0.22052 |
| sky130_osu_sc_15T_hs__addh_l | 0.00000 | 0.11767 | 0.16080 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__addh_1 | A->CO (RR) | 0.12245 | 0.74455 | 7.20954 |
| | B->CO (RR) | 0.12578 | 0.73887 | 7.27450 |
| sky130_osu_sc_15T_hs__addh_l | A->CO (RR) | 0.10784 | 0.79010 | 7.08245 |
| | B->CO (RR) | 0.11149 | 0.78850 | 7.15360 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__addh_1 | A->CO (FF) | 0.09587 | 0.63087 | 5.68800 |
| | B->CO (FF) | 0.10101 | 0.64244 | 5.72287 |
| sky130_osu_sc_15T_hs__addh_l | A->CO (FF) | 0.09362 | 0.61836 | 5.06067 |
| | B->CO (FF) | 0.10054 | 0.63411 | 5.11256 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_15T_hs__addh_1 | A->CON (RR) | B | 0.17032 | 0.61614 | 3.70462 |
| | A->CON (FR) | !B | 0.10945 | 0.99760 | 11.44010 |
| | B->CON (RR) | A | 0.17333 | 0.60974 | 3.76964 |
| | B->CON (FR) | !A | 0.13290 | 1.03787 | 11.54770 |
| sky130_osu_sc_15T_hs__addh_l | A->CON (RR) | B | 0.13542 | 0.55822 | 3.51220 |
| | A->CON (FR) | !B | 0.10035 | 0.99288 | 11.50890 |
| | B->CON (RR) | A | 0.13893 | 0.55596 | 3.57589 |
| | B->CON (FR) | !A | 0.12373 | 1.03254 | 11.61480 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_15T_hs__addh_1 | A->CON (FF) | B | 0.13722 | 0.66195 | 4.84447 |
| | A->CON (RF) | !B | 0.04767 | 0.54495 | 6.48231 |
| | B->CON (FF) | A | 0.13729 | 0.68500 | 5.06200 |
| | B->CON (RF) | !A | 0.05609 | 0.54160 | 6.25168 |
| sky130_osu_sc_15T_hs__addh_l | A->CON (FF) | B | 0.12879 | 0.64563 | 4.82549 |
| | A->CON (RF) | !B | 0.04517 | 0.54380 | 6.51818 |
| | B->CON (FF) | A | 0.13070 | 0.67361 | 5.06404 |
| | B->CON (RF) | !A | 0.05361 | 0.54049 | 6.28618 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_15T_hs__addh_1 | A->S (RR) | !B | 0.10285 | 1.54691 | 22.17490 |
| | A->S (FR) | B | 0.19344 | 1.64405 | 20.09220 |
| | B->S (RR) | !A | 0.11126 | 1.50820 | 21.37120 |
| | B->S (FR) | A | 0.19449 | 1.70292 | 20.91480 |
| | CON->S (FR) | - | 0.03276 | 0.81939 | 11.95270 |
| sky130_osu_sc_15T_hs__addh_l | A->S (RR) | !B | 0.10803 | 1.47104 | 18.15480 |
| | A->S (FR) | B | 0.19278 | 1.55877 | 16.14170 |
| | B->S (RR) | !A | 0.11657 | 1.44162 | 17.61630 |
| | B->S (FR) | A | 0.19566 | 1.61258 | 16.72100 |
| | CON->S (FR) | - | 0.04030 | 0.92082 | 12.08500 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_15T_hs__addh_1 | A->S (FF) | !B | 0.16034 | 2.18927 | 31.24020 |
| | A->S (RF) | B | 0.21334 | 1.44499 | 16.85850 |
| | B->S (FF) | !A | 0.18388 | 2.22877 | 31.40600 |
| | B->S (RF) | A | 0.21634 | 1.43705 | 16.92480 |
| | CON->S (RF) | - | 0.02368 | 0.60298 | 8.82621 |
| sky130_osu_sc_15T_hs__addh_l | A->S (FF) | !B | 0.15107 | 1.82239 | 22.32130 |
| | A->S (RF) | B | 0.17709 | 1.17098 | 11.21730 |
| | B->S (FF) | !A | 0.17454 | 1.86548 | 22.44600 |
| | B->S (RF) | A | 0.18056 | 1.16811 | 11.28990 |
| | CON->S (RF) | - | 0.02321 | 0.56726 | 7.56882 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__addh_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00411 | 0.00392 | 0.00524 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00376 | 0.00355 | 0.00465 |
| sky130_osu_sc_15T_hs__addh_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00361 | 0.00337 | 0.00522 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00326 | 0.00300 | 0.00459 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__addh_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00619 | 0.00601 | 0.00787 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00637 | 0.00644 | 0.00832 |
| sky130_osu_sc_15T_hs__addh_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00574 | 0.00555 | 0.00776 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00601 | 0.00604 | 0.00824 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__addh_1 | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00411 | 0.00391 | 0.00533 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00537 | 0.00532 | 0.00611 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00375 | 0.00355 | 0.00481 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00600 | 0.00595 | 0.00623 |
| sky130_osu_sc_15T_hs__addh_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00360 | 0.00336 | 0.00513 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00511 | 0.00505 | 0.00574 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00325 | 0.00300 | 0.00467 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00572 | 0.00563 | 0.00580 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__addh_1 | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00619 | 0.00603 | 0.00811 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00088 | 0.00086 | 0.00083 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00637 | 0.00643 | 0.00852 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00149 | 0.00141 | 0.00145 |
| sky130_osu_sc_15T_hs__addh_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00574 | 0.00555 | 0.00789 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00045 | 0.00043 | 0.00041 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00601 | 0.00605 | 0.00834 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00105 | 0.00096 | 0.00110 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__addh_1 | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00620 | 0.00603 | 0.00808 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00089 | 0.00092 | 0.00113 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00637 | 0.00645 | 0.00855 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00150 | 0.00144 | 0.00165 |
| sky130_osu_sc_15T_hs__addh_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00575 | 0.00556 | 0.00797 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00046 | 0.00045 | 0.00053 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00602 | 0.00606 | 0.00849 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00107 | 0.00099 | 0.00110 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__addh_1 | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00411 | 0.00392 | 0.00523 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00538 | 0.00545 | 0.00616 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00376 | 0.00356 | 0.00469 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00601 | 0.00602 | 0.00644 |
| sky130_osu_sc_15T_hs__addh_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00361 | 0.00336 | 0.00553 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00511 | 0.00512 | 0.00571 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00326 | 0.00300 | 0.00487 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00572 | 0.00566 | 0.00584 |

# SKY130_OSU_SC_15T_HS__AND2x

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__and2_1 | 10.37850 |
| sky130_osu_sc_15T_hs__and2_2 | 12.82050 |
| sky130_osu_sc_15T_hs__and2_4 | 17.70450 |
| sky130_osu_sc_15T_hs__and2_6 | 22.58850 |
| sky130_osu_sc_15T_hs__and2_8 | 27.47250 |
| sky130_osu_sc_15T_hs__and2_l | 10.37850 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_15T_hs__and2_1 | 0.00377 | 0.00388 | 1.48082 |
| sky130_osu_sc_15T_hs__and2_2 | 0.00376 | 0.00388 | 2.90968 |
| sky130_osu_sc_15T_hs__and2_4 | 0.00377 | 0.00389 | 5.52514 |
| sky130_osu_sc_15T_hs__and2_6 | 0.00380 | 0.00388 | 8.14524 |
| sky130_osu_sc_15T_hs__and2_8 | 0.00378 | 0.00389 | 10.71887 |
| sky130_osu_sc_15T_hs__and2_l | 0.00298 | 0.00310 | 0.89229 |

# Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_15T_hs__and2_1** | 0.00000 | 0.09176 | 0.14575 |
| **sky130_osu_sc_15T_hs__and2_2** | 0.00000 | 0.14563 | 0.15200 |
| **sky130_osu_sc_15T_hs__and2_4** | 0.00000 | 0.25339 | 0.28526 |
| **sky130_osu_sc_15T_hs__and2_6** | 0.00000 | 0.36114 | 0.42477 |
| **sky130_osu_sc_15T_hs__and2_8** | 0.00000 | 0.46890 | 0.56428 |
| **sky130_osu_sc_15T_hs__and2_l** | 0.00000 | 0.01560 | 0.02438 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__and2_1 | A->Y (RR) | 0.08852 | 0.66448 | 6.99955 |
| | B->Y (RR) | 0.09360 | 0.66816 | 7.01234 |
| sky130_osu_sc_15T_hs__and2_2 | A->Y (RR) | 0.09945 | 0.60772 | 7.13095 |
| | B->Y (RR) | 0.10420 | 0.60430 | 7.14494 |
| sky130_osu_sc_15T_hs__and2_4 | A->Y (RR) | 0.14005 | 0.62786 | 7.41133 |
| | B->Y (RR) | 0.14502 | 0.61685 | 7.41373 |
| sky130_osu_sc_15T_hs__and2_6 | A->Y (RR) | 0.17753 | 0.67057 | 7.69756 |
| | B->Y (RR) | 0.18243 | 0.65384 | 7.68932 |
| sky130_osu_sc_15T_hs__and2_8 | A->Y (RR) | 0.21399 | 0.71832 | 8.03203 |
| | B->Y (RR) | 0.21896 | 0.69844 | 8.00714 |
| sky130_osu_sc_15T_hs__and2_1 | A->Y (RR) | 0.09693 | 0.76690 | 6.91150 |
| | B->Y (RR) | 0.10215 | 0.76797 | 6.93484 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__and2_1 | A->Y (FF) | 0.07555 | 0.64163 | 6.55655 |
| | B->Y (FF) | 0.07929 | 0.65590 | 6.61266 |
| sky130_osu_sc_15T_hs__and2_2 | A->Y (FF) | 0.08619 | 0.60461 | 6.53244 |
| | B->Y (FF) | 0.09039 | 0.61576 | 6.58563 |
| sky130_osu_sc_15T_hs__and2_4 | A->Y (FF) | 0.12179 | 0.64245 | 7.03036 |
| | B->Y (FF) | 0.12554 | 0.64959 | 7.09735 |
| sky130_osu_sc_15T_hs__and2_6 | A->Y (FF) | 0.15885 | 0.68395 | 7.33190 |
| | B->Y (FF) | 0.16200 | 0.68887 | 7.38506 |
| sky130_osu_sc_15T_hs__and2_8 | A->Y (FF) | 0.19332 | 0.72197 | 7.55364 |
| | B->Y (FF) | 0.19625 | 0.72593 | 7.59036 |
| sky130_osu_sc_15T_hs__and2_l | A->Y (FF) | 0.08692 | 0.63321 | 5.33350 |
| | B->Y (FF) | 0.09409 | 0.65394 | 5.43135 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__and2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00288 | 0.00256 | 0.00914 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00294 | 0.00247 | 0.00642 |
| sky130_osu_sc_15T_hs__and2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00562 | 0.00557 | 0.01185 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00568 | 0.00553 | 0.00932 |
| sky130_osu_sc_15T_hs__and2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01167 | 0.01194 | 0.01760 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01175 | 0.01191 | 0.01516 |
| sky130_osu_sc_15T_hs__and2_6 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01780 | 0.01839 | 0.02423 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01791 | 0.01838 | 0.02251 |
| sky130_osu_sc_15T_hs__and2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02404 | 0.02456 | 0.02992 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02417 | 0.02465 | 0.02838 |
| sky130_osu_sc_15T_hs__and2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00218 | 0.00195 | 0.00573 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00225 | 0.00191 | 0.00420 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__and2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00724 | 0.00742 | 0.01412 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00807 | 0.00815 | 0.01443 |
| sky130_osu_sc_15T_hs__and2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00897 | 0.00953 | 0.01627 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00982 | 0.01024 | 0.01647 |
| sky130_osu_sc_15T_hs__and2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01351 | 0.01480 | 0.02115 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01439 | 0.01540 | 0.02141 |
| sky130_osu_sc_15T_hs__and2_6 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01827 | 0.02008 | 0.02657 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01896 | 0.02057 | 0.02660 |
| sky130_osu_sc_15T_hs__and2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02273 | 0.02514 | 0.03191 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02364 | 0.02554 | 0.03177 |
| sky130_osu_sc_15T_hs__and2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00574 | 0.00576 | 0.00972 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00643 | 0.00638 | 0.01008 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__and2_1 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00270 | -0.00270 | -0.00272 |
| sky130_osu_sc_15T_hs__and2_2 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00269 | -0.00270 | -0.00271 |
| sky130_osu_sc_15T_hs__and2_4 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00269 | -0.00271 | -0.00272 |
| sky130_osu_sc_15T_hs__and2_6 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00271 | -0.00272 | -0.00274 |
| sky130_osu_sc_15T_hs__and2_8 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00269 | -0.00270 | -0.00272 |
| sky130_osu_sc_15T_hs__and2_l | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00192 | -0.00193 | -0.00194 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__and2_1 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00272 | 0.00278 | 0.00273 |
| sky130_osu_sc_15T_hs__and2_2 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00272 | 0.00277 | 0.00272 |
| sky130_osu_sc_15T_hs__and2_4 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00272 | 0.00278 | 0.00273 |
| sky130_osu_sc_15T_hs__and2_6 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00274 | 0.00280 | 0.00275 |
| sky130_osu_sc_15T_hs__and2_8 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00273 | 0.00278 | 0.00273 |
| sky130_osu_sc_15T_hs__and2_l | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00194 | 0.00198 | 0.00195 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__and2_1 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00258 | -0.00260 | -0.00258 |
| sky130_osu_sc_15T_hs__and2_2 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00257 | -0.00259 | -0.00258 |
| sky130_osu_sc_15T_hs__and2_4 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00258 | -0.00260 | -0.00258 |
| sky130_osu_sc_15T_hs__and2_6 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00257 | -0.00259 | -0.00258 |
| sky130_osu_sc_15T_hs__and2_8 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00257 | -0.00259 | -0.00258 |
| sky130_osu_sc_15T_hs__and2_l | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00183 | -0.00184 | -0.00183 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__and2_1 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00264 | 0.00261 | 0.00259 |
| sky130_osu_sc_15T_hs__and2_2 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00264 | 0.00261 | 0.00259 |
| sky130_osu_sc_15T_hs__and2_4 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00264 | 0.00261 | 0.00260 |
| sky130_osu_sc_15T_hs__and2_6 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00264 | 0.00261 | 0.00260 |
| sky130_osu_sc_15T_hs__and2_8 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00264 | 0.00261 | 0.00260 |
| sky130_osu_sc_15T_hs__and2_l | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00187 | 0.00185 | 0.00184 |

# SKY130_OSU_SC_15T_HS__AOI21

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__aoi21_l | 10.37850 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) |
|---|---|---|---|---|
| | A0 | A1 | B0 | Y |
| sky130_osu_sc_15T_hs__aoi21_l | 0.00355 | 0.00370 | 0.00375 | 0.65901 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_15T_hs__aoi21_l | 0.00000 | 0.03665 | 0.06976 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__aoi21_l | A0->Y (FR) | 0.09853 | 1.03492 | 11.56990 |
| | A1->Y (FR) | 0.08491 | 0.98493 | 11.20410 |
| | B0->Y (FR) | 0.07190 | 0.99259 | 11.54140 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__aoi21_l | A0->Y (RF) | 0.05347 | 0.57838 | 6.57457 |
| | A1->Y (RF) | 0.04885 | 0.59527 | 6.97773 |
| | B0->Y (RF) | 0.02893 | 0.52293 | 6.35891 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.00613 | 0.00608 | 0.00623 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.00525 | 0.00517 | 0.00533 |
| | B0 | 0.00487 | 0.00469 | 0.00564 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.00145 | 0.00122 | 0.00145 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.00147 | 0.00125 | 0.00165 |
| | B0 | -0.00060 | -0.00063 | -0.00031 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | -0.00208 | -0.00234 | -0.00235 |
| | (!A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !Y) | -0.00238 | -0.00240 | -0.00239 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00237 | -0.00240 | -0.00238 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.00234 | 0.00235 | 0.00235 |
| | (!A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !Y) | 0.00238 | 0.00241 | 0.00239 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00244 | 0.00240 | 0.00239 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | -0.00206 | -0.00230 | -0.00231 |
| | (!A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !Y) | -0.00234 | -0.00236 | -0.00234 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | -0.00252 | -0.00254 | -0.00254 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | 0.00230 | 0.00232 | 0.00231 |
| | (!A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !Y) | 0.00234 | 0.00236 | 0.00235 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | 0.00253 | 0.00254 | 0.00255 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi21_l | (A0 * A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !Y) | -0.00121 | -0.00124 | -0.00122 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi21_l | (A0 * A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !Y) | 0.00135 | 0.00136 | 0.00125 |

# SKY130_OSU_SC_15T_HS__AOI22

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__aoi22_l** | 12.82050 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | | Max Cap(pf) |
|---|---|---|---|---|---|
| | **A0** | **A1** | **B0** | **B1** | **Y** |
| **sky130_osu_sc_15T_hs__aoi22_l** | 0.00355 | 0.00368 | 0.00383 | 0.00364 | 0.66837 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | **Min.** | **Avg** | **Max.** |
| **sky130_osu_sc_15T_hs__aoi22_l** | 0.00000 | 0.04253 | 0.13951 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__aoi22_l | A0->Y (FR) | 0.11949 | 1.05183 | 11.54700 |
| | A1->Y (FR) | 0.10836 | 1.03052 | 11.45190 |
| | B0->Y (FR) | 0.07227 | 0.97709 | 11.39340 |
| | B1->Y (FR) | 0.08351 | 0.99505 | 11.52930 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__aoi22_l | A0->Y (RF) | 0.07016 | 0.59955 | 6.65032 |
| | A1->Y (RF) | 0.06563 | 0.61684 | 7.05512 |
| | B0->Y (RF) | 0.03717 | 0.58367 | 7.01985 |
| | B1->Y (RF) | 0.04165 | 0.56587 | 6.61498 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi22_l | A0 | 0.00742 | 0.00735 | 0.00753 |
| | A1 | 0.00653 | 0.00639 | 0.00663 |
| | B0 | 0.00514 | 0.00499 | 0.00593 |
| | B1 | 0.00598 | 0.00556 | 0.00682 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi22_l | A0 | 0.00292 | 0.00269 | 0.00289 |
| | A1 | 0.00294 | 0.00272 | 0.00310 |
| | B0 | -0.00037 | -0.00042 | 0.00002 |
| | B1 | -0.00033 | -0.00042 | -0.00015 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi22_l | (A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * B1 * !Y) | -0.00212 | -0.00234 | -0.00234 |
| | (!A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * B1 * !Y) | -0.00238 | -0.00240 | -0.00239 |
| | (!A1 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !B1 * Y) | -0.00238 | -0.00239 | -0.00238 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00238 | -0.00239 | -0.00238 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi22_l | (A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * B1 * !Y) | 0.00234 | 0.00237 | 0.00234 |
| | (!A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * B1 * !Y) | 0.00238 | 0.00241 | 0.00239 |
| | (!A1 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !B1 * Y) | 0.00244 | 0.00240 | 0.00239 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00244 | 0.00240 | 0.00239 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi22_l | (A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * B1 * !Y) | -0.00209 | -0.00230 | -0.00230 |
| | (!A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * B1 * !Y) | -0.00234 | -0.00235 | -0.00234 |
| | (!A0 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !B1 * Y) | -0.00250 | -0.00253 | -0.00253 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | -0.00251 | -0.00253 | -0.00253 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi22_l | (A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * B1 * !Y) | 0.00229 | 0.00233 | 0.00230 |
| | (!A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * B1 * !Y) | 0.00234 | 0.00238 | 0.00235 |
| | (!A0 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !B1 * Y) | 0.00253 | 0.00259 | 0.00254 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | 0.00253 | 0.00259 | 0.00254 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi22_l | (A0 * A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B1 * !Y) | -0.00122 | -0.00125 | -0.00122 |
| | (A0 * A1 * !B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B1 * !Y) | -0.00122 | -0.00123 | -0.00122 |
| | (!A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B1 * Y) | -0.00261 | -0.00261 | -0.00263 |
| | (!A0 * A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B1 * Y) | -0.00261 | -0.00262 | -0.00263 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi22_l | (A0 * A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B1 * !Y) | 0.00141 | 0.00142 | 0.00127 |
| | (A0 * A1 * !B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B1 * !Y) | 0.00122 | 0.00123 | 0.00122 |
| | (!A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B1 * Y) | 0.00262 | 0.00264 | 0.00264 |
| | (!A0 * A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B1 * Y) | 0.00262 | 0.00264 | 0.00264 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi22_l | (A0 * A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B0 * !Y) | -0.00123 | -0.00125 | -0.00123 |
| | (A0 * A1 * !B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B0 * !Y) | -0.00122 | -0.00123 | -0.00123 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00243 | -0.00245 | -0.00243 |
| | (!A0 * A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B0 * Y) | -0.00243 | -0.00245 | -0.00243 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__aoi22_l | (A0 * A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B0 * !Y) | 0.00142 | 0.00143 | 0.00128 |
| | (A0 * A1 * !B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B0 * !Y) | 0.00122 | 0.00123 | 0.00123 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00249 | 0.00245 | 0.00244 |
| | (!A0 * A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B0 * Y) | 0.00249 | 0.00245 | 0.00244 |

# SKY130_OSU_SC_15T_HS__BUFx

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_15T_hs__buf_1 | 7.93650 |
| sky130_osu_sc_15T_hs__buf_2 | 10.37850 |
| sky130_osu_sc_15T_hs__buf_4 | 15.26250 |
| sky130_osu_sc_15T_hs__buf_6 | 20.14650 |
| sky130_osu_sc_15T_hs__buf_8 | 25.03050 |
| sky130_osu_sc_15T_hs__buf_l | 7.93650 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | Max Cap(pf) |
|---|---|---|
| | A | Y |
| sky130_osu_sc_15T_hs__buf_1 | 0.00389 | 1.45008 |
| sky130_osu_sc_15T_hs__buf_2 | 0.00389 | 2.86234 |
| sky130_osu_sc_15T_hs__buf_4 | 0.00389 | 5.54778 |
| sky130_osu_sc_15T_hs__buf_6 | 0.00090 | 1.80000 |
| sky130_osu_sc_15T_hs__buf_8 | 0.00389 | 10.71214 |
| sky130_osu_sc_15T_hs__buf_l | 0.00312 | 0.89507 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_15T_hs__buf_1** | 0.00000 | 0.07600 | 0.07600 |
| **sky130_osu_sc_15T_hs__buf_2** | 0.00000 | 0.11400 | 0.14575 |
| **sky130_osu_sc_15T_hs__buf_4** | 0.00000 | 0.19000 | 0.28526 |
| **sky130_osu_sc_15T_hs__buf_6** | 0.00000 | 0.00000 | 0.00000 |
| **sky130_osu_sc_15T_hs__buf_8** | 0.00000 | 0.34200 | 0.56428 |
| **sky130_osu_sc_15T_hs__buf_l** | 0.00000 | 0.01354 | 0.01354 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_15T_hs__buf_1** | **A->Y (RR)** | 0.06662 | 0.62714 | 6.83066 |
| **sky130_osu_sc_15T_hs__buf_2** | **A->Y (RR)** | 0.07363 | 0.55981 | 6.92744 |
| **sky130_osu_sc_15T_hs__buf_4** | **A->Y (RR)** | 0.09983 | 0.56029 | 7.25009 |
| **sky130_osu_sc_15T_hs__buf_8** | **A->Y (RR)** | 0.15026 | 0.61779 | 7.71008 |
| **sky130_osu_sc_15T_hs__buf_l** | **A->Y (RR)** | 0.07432 | 0.72721 | 6.79406 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_15T_hs__buf_1** | **A->Y (FF)** | 0.07189 | 0.62873 | 6.42029 |
| **sky130_osu_sc_15T_hs__buf_2** | **A->Y (FF)** | 0.08391 | 0.60678 | 6.63872 |
| **sky130_osu_sc_15T_hs__buf_4** | **A->Y (FF)** | 0.11890 | 0.63764 | 7.04302 |
| **sky130_osu_sc_15T_hs__buf_8** | **A->Y (FF)** | 0.19050 | 0.71788 | 7.53751 |
| **sky130_osu_sc_15T_hs__buf_l** | **A->Y (FF)** | 0.08383 | 0.62657 | 5.32109 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__buf_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00271 | 0.00233 | 0.00763 |
| sky130_osu_sc_15T_hs__buf_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00543 | 0.00522 | 0.01013 |
| sky130_osu_sc_15T_hs__buf_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01146 | 0.01167 | 0.01610 |
| sky130_osu_sc_15T_hs__buf_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02355 | 0.02447 | 0.03012 |
| sky130_osu_sc_15T_hs__buf_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00213 | 0.00182 | 0.00592 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__buf_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00705 | 0.00713 | 0.01369 |
| sky130_osu_sc_15T_hs__buf_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00880 | 0.00921 | 0.01557 |
| sky130_osu_sc_15T_hs__buf_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01334 | 0.01438 | 0.02057 |
| sky130_osu_sc_15T_hs__buf_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02261 | 0.02462 | 0.03099 |
| sky130_osu_sc_15T_hs__buf_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00560 | 0.00557 | 0.00947 |

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

| Cell Name | Power(pJ) | | |
|---|---|---|---|
| | first | mid | last |
| sky130_osu_sc_15T_hs__buf_6 | 0.00000 | 0.00000 | 0.00000 |
| | -0.00049 | -0.00049 | -0.00048 |

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

| Cell Name | Power(pJ) | | |
|---|---|---|---|
| | first | mid | last |
| sky130_osu_sc_15T_hs__buf_6 | 0.00000 | 0.00000 | 0.00000 |
| | 0.00049 | 0.00049 | 0.00048 |

# SKY130_OSU_SC_15T_HS__DFFRx

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__dffr_1** | 53.11350 |
| **sky130_osu_sc_15T_hs__dffr_l** | 53.11350 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) | |
|---|---|---|---|---|---|
| | **D** | **RN** | **CK** | **Q** | **QN** |
| **sky130_osu_sc_15T_hs__dffr_1** | 0.00365 | 0.00363 | 0.01089 | 1.35233 | 1.35502 |
| **sky130_osu_sc_15T_hs__dffr_l** | 0.00365 | 0.00363 | 0.01089 | 0.89773 | 0.89310 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | **Min.** | **Avg** | **Max.** |
| **sky130_osu_sc_15T_hs__dffr_1** | 0.00000 | 0.22202 | 0.35650 |
| **sky130_osu_sc_15T_hs__dffr_l** | 0.00000 | 0.15812 | 0.29260 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__dffr_1 | CK->Q (RR) | 0.38130 | 1.53117 | 15.15970 |
| | QN->Q (FR) | 0.03755 | 0.91846 | 13.15190 |
| sky130_osu_sc_15T_hs__dffr_l | CK->Q (RR) | 0.38238 | 1.73026 | 15.60260 |
| | QN->Q (FR) | 0.04285 | 0.99444 | 12.86560 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__dffr_1 | CK->Q (RF) | 0.35943 | 1.54033 | 15.79150 |
| | QN->Q (RF) | 0.02652 | 0.64600 | 9.24455 |
| | RN->Q (FF) | 0.26334 | 1.58208 | 17.41310 |
| sky130_osu_sc_15T_hs__dffr_l | CK->Q (RF) | 0.37127 | 1.76606 | 16.27590 |
| | QN->Q (RF) | 0.03038 | 0.70061 | 9.15796 |
| | RN->Q (FF) | 0.27578 | 1.80788 | 17.87280 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__dffr_1 | CK->QN (RR) | 0.32034 | 0.91689 | 7.08568 |
| | RN->QN (FR) | 0.22408 | 0.95866 | 8.69271 |
| sky130_osu_sc_15T_hs__dffr_l | CK->QN (RR) | 0.32279 | 1.00282 | 7.15197 |
| | RN->QN (FR) | 0.22685 | 1.04459 | 8.74953 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_15T_hs__dffr_1** | **CK->QN (RF)** | 0.32408 | 0.78708 | 4.79861 |
| **sky130_osu_sc_15T_hs__dffr_l** | **CK->QN (RF)** | 0.31536 | 0.82783 | 4.85919 |

# Constraint Information

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | hold | CK (R) | -0.07697 | -0.09261 | -0.31161 |
| | setup | CK (R) | 0.29891 | 0.32485 | 1.37614 |
| sky130_osu_sc_15T_hs__dffr_l | hold | CK (R) | -0.07689 | -0.09454 | -0.31225 |
| | setup | CK (R) | 0.29864 | 0.32466 | 1.38257 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | hold | CK (R) | -0.14562 | -0.41424 | -3.87699 |
| | setup | CK (R) | 0.17705 | 0.42917 | 3.98411 |
| sky130_osu_sc_15T_hs__dffr_l | hold | CK (R) | -0.14508 | -0.41712 | -3.87639 |
| | setup | CK (R) | 0.17669 | 0.42917 | 3.98214 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | hold | CK (R) | -0.07697 | -0.09261 | -0.31161 |
| | setup | CK (R) | 0.29891 | 0.32485 | 1.37614 |
| sky130_osu_sc_15T_hs__dffr_l | hold | CK (R) | -0.07689 | -0.09454 | -0.31225 |
| | setup | CK (R) | 0.29864 | 0.32466 | 1.38257 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | hold | CK (R) | -0.14562 | -0.41424 | -3.87699 |
| | setup | CK (R) | 0.17705 | 0.42917 | 3.98411 |
| sky130_osu_sc_15T_hs__dffr_l | hold | CK (R) | -0.14508 | -0.41712 | -3.87639 |
| | setup | CK (R) | 0.17669 | 0.42917 | 3.98214 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | recovery | CK (R) | 0.25831 | 0.28477 | 1.40231 |
| | removal | CK (R) | -0.06013 | -0.07272 | -0.15549 |
| sky130_osu_sc_15T_hs__dffr_l | recovery | CK (R) | 0.25671 | 0.28447 | 1.40165 |
| | removal | CK (R) | -0.05953 | -0.07272 | -0.15549 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | recovery | CK (R) | 0.25831 | 0.28477 | 1.40231 |
| | removal | CK (R) | -0.06013 | -0.07272 | -0.15549 |
| sky130_osu_sc_15T_hs__dffr_l | recovery | CK (R) | 0.25671 | 0.28447 | 1.40165 |
| | removal | CK (R) | -0.05953 | -0.07272 | -0.15549 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | min_pulse_width | RN () | 0.15862 | 0.46997 | 13.33370 |
| | min_pulse_width | RN () | 0.15862 | 0.46997 | 13.33370 |
| sky130_osu_sc_15T_hs__dffr_l | min_pulse_width | RN () | 0.15862 | 0.46997 | 13.33370 |
| | min_pulse_width | RN () | 0.15862 | 0.46997 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | min_pulse_width | CK () | 0.17984 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.19046 | 0.46997 | 13.33370 |
| sky130_osu_sc_15T_hs__dffr_l | min_pulse_width | CK () | 0.16569 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.18338 | 0.46997 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | min_pulse_width | CK () | 0.37444 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.14800 | 0.46997 | 13.33370 |
| sky130_osu_sc_15T_hs__dffr_l | min_pulse_width | CK () | 0.37444 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.14800 | 0.46997 | 13.33370 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00715 | 0.00569 | 0.00000 |
| sky130_osu_sc_15T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00626 | 0.00524 | 0.00394 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00794 | 0.00666 | 0.00000 |
| | RN | -0.00093 | -0.05207 | -0.76069 |
| | RN | 0.01803 | 0.01683 | 0.00599 |
| sky130_osu_sc_15T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00704 | 0.00620 | 0.00292 |
| | RN | -0.00093 | -0.04072 | -0.50497 |
| | RN | 0.01713 | 0.01637 | 0.01328 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00794 | 0.00666 | 0.00000 |
| | RN | -0.00093 | -0.05213 | -0.76220 |
| | RN | 0.01802 | 0.01683 | 0.00586 |
| sky130_osu_sc_15T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00704 | 0.00621 | 0.00298 |
| | RN | -0.00093 | -0.04059 | -0.50237 |
| | RN | 0.01712 | 0.01636 | 0.01342 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00711 | 0.00568 | 0.00000 |
| sky130_osu_sc_15T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00623 | 0.00522 | 0.00366 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00195 | -0.00231 | -0.00234 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00836 | 0.00788 | 0.01065 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.00377 | 0.00334 | 0.00623 |
| sky130_osu_sc_15T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00195 | -0.00231 | -0.00234 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00836 | 0.00788 | 0.01065 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.00377 | 0.00334 | 0.00622 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00232 | 0.00235 | 0.00234 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.01383 | 0.01360 | 0.01644 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.00633 | 0.00614 | 0.00903 |
| sky130_osu_sc_15T_hs__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00232 | 0.00235 | 0.00234 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.01383 | 0.01361 | 0.01644 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.00633 | 0.00614 | 0.00903 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00277 | 0.00236 | 0.00893 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.00760 | 0.00700 | 0.01335 |
| sky130_osu_sc_15T_hs__dffr_l | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00278 | 0.00236 | 0.00893 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.00759 | 0.00700 | 0.01335 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00651 | 0.00639 | 0.01376 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.01395 | 0.01362 | 0.02059 |
| sky130_osu_sc_15T_hs__dffr_1 | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00651 | 0.00639 | 0.01376 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.01394 | 0.01362 | 0.02059 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | -0.00044 | -0.00096 | 0.00539 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.00377 | 0.00283 | 0.00924 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | -0.00075 | -0.00124 | 0.00509 |
| sky130_osu_sc_15T_hs__dffr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | -0.00044 | -0.00096 | 0.00539 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.00377 | 0.00283 | 0.00924 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | -0.00075 | -0.00124 | 0.00509 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | 0.01042 | 0.01030 | 0.01760 |
| | (D * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * !Q * QN) | 0.02168 | 0.02099 | 0.02836 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.01670 | 0.01637 | 0.02335 |
| | (!D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * Q * !QN) | 0.02147 | 0.02111 | 0.03453 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.01156 | 0.01135 | 0.01849 |
| sky130_osu_sc_15T_hs__dffr_l | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | 0.01042 | 0.01030 | 0.01760 |
| | (D * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * !Q * QN) | 0.02168 | 0.02099 | 0.02836 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.01669 | 0.01637 | 0.02335 |
| | (!D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * Q * !QN) | 0.02147 | 0.02109 | 0.03453 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.01156 | 0.01135 | 0.01849 |

# SKY130_OSU_SC_15T_HS__DFFSRx

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__dffsr_1** | 57.99750 |
| **sky130_osu_sc_15T_hs__dffsr_l** | 57.99750 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | | Max Cap(pf) | |
|---|---|---|---|---|---|---|
| | **D** | **RN** | **SN** | **CK** | **Q** | **QN** |
| **sky130_osu_sc_15T_hs__dffsr_1** | 0.00360 | 0.00364 | 0.00805 | 0.01111 | 1.48994 | 1.49210 |
| **sky130_osu_sc_15T_hs__dffsr_l** | 0.00360 | 0.00364 | 0.00804 | 0.01111 | 0.88958 | 0.89279 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | **Min.** | **Avg** | **Max.** |
| **sky130_osu_sc_15T_hs__dffsr_1** | 0.00000 | 0.27257 | 0.36399 |
| **sky130_osu_sc_15T_hs__dffsr_l** | 0.00000 | 0.20867 | 0.30009 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__dffsr_1 | CK->Q (RR) | 0.36700 | 1.54579 | 16.13200 |
| | QN->Q (FR) | 0.03293 | 0.86144 | 12.62840 |
| | RN->Q (RR) | 0.29554 | 1.48563 | 16.14200 |
| | SN->Q (FR) | 0.27294 | 1.60566 | 18.16250 |
| sky130_osu_sc_15T_hs__dffsr_l | CK->Q (RR) | 0.37931 | 1.72863 | 15.50280 |
| | QN->Q (FR) | 0.04286 | 0.98937 | 12.77700 |
| | RN->Q (RR) | 0.30843 | 1.66915 | 15.50520 |
| | SN->Q (FR) | 0.28519 | 1.78789 | 17.50860 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__dffsr_1 | CK->Q (RF) | 0.39805 | 1.59310 | 16.57280 |
| | QN->Q (RF) | 0.02622 | 0.66673 | 9.77764 |
| | RN->Q (FF) | 0.27513 | 1.61159 | 18.21210 |
| sky130_osu_sc_15T_hs__dffsr_l | CK->Q (RF) | 0.41707 | 1.80945 | 16.18380 |
| | QN->Q (RF) | 0.03033 | 0.69792 | 9.10694 |
| | RN->Q (FF) | 0.29363 | 1.82809 | 17.81040 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__dffsr_1 | CK->QN (RR) | 0.35913 | 0.95030 | 7.21708 |
| | RN->QN (FR) | 0.23666 | 0.96923 | 8.85249 |
| sky130_osu_sc_15T_hs__dffsr_l | CK->QN (RR) | 0.36774 | 1.05327 | 7.20794 |
| | RN->QN (FR) | 0.24452 | 1.07125 | 8.83281 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__dffsr_1 | CK->QN (RF) | 0.31562 | 0.80053 | 5.30094 |
| | RN->QN (RF) | 0.24446 | 0.74133 | 5.30966 |
| | SN->QN (FF) | 0.22188 | 0.86157 | 7.32435 |
| sky130_osu_sc_15T_hs__dffsr_l | CK->QN (RF) | 0.31513 | 0.83405 | 4.90831 |
| | RN->QN (RF) | 0.24412 | 0.77560 | 4.91244 |
| | SN->QN (FF) | 0.22128 | 0.89413 | 6.91067 |

# Constraint Information

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | hold | CK (R) | -0.07727 | -0.10039 | -0.38233 |
| | setup | CK (R) | 0.27714 | 0.29979 | 1.40267 |
| sky130_osu_sc_15T_hs__dffsr_l | hold | CK (R) | -0.07848 | -0.10005 | -0.38531 |
| | setup | CK (R) | 0.27349 | 0.29728 | 1.39106 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | hold | CK (R) | -0.16049 | -0.43404 | -4.00662 |
| | setup | CK (R) | 0.20386 | 0.44837 | 4.09525 |
| sky130_osu_sc_15T_hs__dffsr_l | hold | CK (R) | -0.16413 | -0.43497 | -4.00866 |
| | setup | CK (R) | 0.19987 | 0.44837 | 4.09294 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | hold | CK (R) | -0.07727 | -0.10039 | -0.38233 |
| | setup | CK (R) | 0.27714 | 0.29979 | 1.40267 |
| sky130_osu_sc_15T_hs__dffsr_l | hold | CK (R) | -0.07848 | -0.10005 | -0.38531 |
| | setup | CK (R) | 0.27349 | 0.29728 | 1.39106 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | hold | CK (R) | -0.16049 | -0.43404 | -4.00662 |
| | setup | CK (R) | 0.20386 | 0.44837 | 4.09525 |
| sky130_osu_sc_15T_hs__dffsr_l | hold | CK (R) | -0.16413 | -0.43497 | -4.00866 |
| | setup | CK (R) | 0.19987 | 0.44837 | 4.09294 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | recovery | CK (R) | 0.21083 | 0.23434 | 1.29967 |
| | removal | CK (R) | -0.02991 | -0.03474 | -0.09574 |
| | hold | SN (R) | -0.21684 | -0.40667 | -2.09309 |
| | setup | SN (R) | 0.24274 | 0.45273 | 5.81522 |
| sky130_osu_sc_15T_hs__dffsr_l | recovery | CK (R) | 0.20923 | 0.23241 | 1.29054 |
| | removal | CK (R) | -0.02991 | -0.03474 | -0.09174 |
| | hold | SN (R) | -0.21496 | -0.40003 | -2.04279 |
| | setup | SN (R) | 0.24415 | 0.44632 | 5.69222 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | recovery | CK (R) | 0.21083 | 0.23434 | 1.29967 |
| | removal | CK (R) | -0.02991 | -0.03474 | -0.09574 |
| | hold | SN (R) | -0.21905 | -0.40667 | -2.09309 |
| | hold | SN (R) | -0.21684 | -0.40889 | -2.10667 |
| | setup | SN (R) | 0.24274 | 0.44873 | 5.57852 |
| | setup | SN (R) | 0.24107 | 0.45273 | 5.81522 |
| sky130_osu_sc_15T_hs__dffsr_l | recovery | CK (R) | 0.20923 | 0.23241 | 1.29054 |
| | removal | CK (R) | -0.02991 | -0.03474 | -0.09174 |
| | hold | SN (R) | -0.21830 | -0.40003 | -2.04279 |
| | hold | SN (R) | -0.21496 | -0.40265 | -2.05966 |
| | setup | SN (R) | 0.24415 | 0.44165 | 5.45705 |
| | setup | SN (R) | 0.22723 | 0.44632 | 5.69222 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | min_pulse_width | RN () | 0.18692 | 0.46997 | 13.33370 |
| | min_pulse_width | RN () | 0.19046 | 0.46997 | 13.33370 |
| sky130_osu_sc_15T_hs__dffsr_l | min_pulse_width | RN () | 0.18692 | 0.46997 | 13.33370 |
| | min_pulse_width | RN () | 0.18338 | 0.46997 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | recovery | CK (R) | 0.04760 | 0.08514 | 4.71928 |
| | removal | CK (R) | -0.01987 | -0.06270 | -0.38384 |
| sky130_osu_sc_15T_hs__dffsr_l | recovery | CK (R) | 0.04808 | 0.08408 | 4.55842 |
| | removal | CK (R) | -0.01811 | -0.06270 | -0.38677 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | recovery | CK (R) | 0.04760 | 0.08514 | 4.71928 |
| | removal | CK (R) | -0.01987 | -0.06270 | -0.38384 |
| sky130_osu_sc_15T_hs__dffsr_l | recovery | CK (R) | 0.04808 | 0.08408 | 4.55842 |
| | removal | CK (R) | -0.01811 | -0.06270 | -0.38677 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | min_pulse_width | SN () | 0.21876 | 0.46997 | 13.33370 |
| | min_pulse_width | SN () | 0.21975 | 0.47218 | 13.33370 |
| sky130_osu_sc_15T_hs__dffsr_l | min_pulse_width | SN () | 0.21522 | 0.46997 | 13.33370 |
| | min_pulse_width | SN () | 0.20815 | 0.46997 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | min_pulse_width | CK () | 0.16569 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.20461 | 0.46997 | 13.33370 |
| sky130_osu_sc_15T_hs__dffsr_l | min_pulse_width | CK () | 0.15862 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.20107 | 0.46997 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | min_pulse_width | CK () | 0.35321 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.17631 | 0.46997 | 13.33370 |
| sky130_osu_sc_15T_hs__dffsr_l | min_pulse_width | CK () | 0.34967 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.17631 | 0.46997 | 13.33370 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00884 | 0.00730 | -0.00258 |
| | RN | 0.01632 | 0.01493 | -0.00054 |
| | SN | -0.00093 | -0.05518 | -0.83809 |
| | SN | 0.01800 | 0.01659 | -0.00026 |
| sky130_osu_sc_15T_hs__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00805 | 0.00706 | 0.00568 |
| | RN | 0.01552 | 0.01469 | 0.01075 |
| | SN | -0.00093 | -0.04050 | -0.50039 |
| | SN | 0.01720 | 0.01636 | 0.01122 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00934 | 0.00856 | 0.00258 |
| | RN | -0.00093 | -0.05518 | -0.83809 |
| | RN | 0.01887 | 0.01803 | 0.01236 |
| sky130_osu_sc_15T_hs__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00851 | 0.00775 | 0.00464 |
| | RN | -0.00093 | -0.04050 | -0.50039 |
| | RN | 0.01802 | 0.01720 | 0.01432 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00933 | 0.00855 | 0.00254 |
| | RN | -0.00093 | -0.05523 | -0.83930 |
| | RN | 0.01886 | 0.01801 | 0.01236 |
| sky130_osu_sc_15T_hs__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00851 | 0.00776 | 0.00463 |
| | RN | -0.00093 | -0.04058 | -0.50219 |
| | RN | 0.01802 | 0.01720 | 0.01443 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00880 | 0.00727 | -0.00254 |
| | RN | 0.01628 | 0.01488 | -0.00041 |
| | SN | -0.00093 | -0.05523 | -0.83925 |
| | SN | 0.01796 | 0.01655 | 0.00026 |
| sky130_osu_sc_15T_hs__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00801 | 0.00703 | 0.00543 |
| | RN | 0.01547 | 0.01465 | 0.01061 |
| | SN | -0.00093 | -0.04058 | -0.50216 |
| | SN | 0.01715 | 0.01631 | 0.01114 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00227 | -0.00233 | -0.00232 |
| | (!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) | 0.01072 | 0.01027 | 0.01300 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.00431 | 0.00389 | 0.00668 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.00428 | 0.00387 | 0.00668 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00432 | 0.00391 | 0.00671 |
| sky130_osu_sc_15T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00227 | -0.00233 | -0.00232 |
| | (!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) | 0.01072 | 0.01027 | 0.01300 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.00431 | 0.00389 | 0.00668 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.00428 | 0.00387 | 0.00668 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00432 | 0.00391 | 0.00671 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00237 | 0.00234 | 0.00232 |
| | (!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) | 0.01613 | 0.01589 | 0.01846 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.00682 | 0.00668 | 0.00949 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.00688 | 0.00671 | 0.00950 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00678 | 0.00662 | 0.00945 |
| sky130_osu_sc_15T_hs__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00237 | 0.00234 | 0.00232 |
| | (!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) | 0.01612 | 0.01590 | 0.01845 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.00681 | 0.00667 | 0.00948 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.00687 | 0.00671 | 0.00949 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00677 | 0.00661 | 0.00945 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_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) | 0.00262 | 0.00222 | 0.00855 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.00927 | 0.00868 | 0.01495 |
| sky130_osu_sc_15T_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) | 0.00262 | 0.00222 | 0.00856 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.00927 | 0.00868 | 0.01496 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_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) | 0.00707 | 0.00702 | 0.01443 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.01481 | 0.01444 | 0.02140 |
| sky130_osu_sc_15T_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) | 0.00706 | 0.00701 | 0.01442 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.01480 | 0.01443 | 0.02139 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_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) | -0.00533 | -0.00536 | -0.00537 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | -0.00532 | -0.00574 | -0.00576 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | -0.00524 | -0.00546 | -0.00546 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.00360 | 0.00314 | 0.00662 |
| sky130_osu_sc_15T_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) | -0.00533 | -0.00537 | -0.00537 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | -0.00531 | -0.00572 | -0.00574 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | -0.00523 | -0.00546 | -0.00546 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.00361 | 0.00314 | 0.00663 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_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) | 0.00536 | 0.00549 | 0.00539 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00575 | 0.00579 | 0.00577 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | 0.00544 | 0.00550 | 0.00548 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.01122 | 0.01097 | 0.01344 |
| sky130_osu_sc_15T_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) | 0.00536 | 0.00549 | 0.00539 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00573 | 0.00578 | 0.00575 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | 0.00544 | 0.00550 | 0.00547 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.01121 | 0.01097 | 0.01343 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffsr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | -0.00046 | -0.00096 | 0.00538 |
| | (D * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * SN * !Q * QN) | 0.00445 | 0.00353 | 0.00995 |
| | (D * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !SN * !Q * QN) | 0.00438 | 0.00344 | 0.00990 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | -0.00061 | -0.00111 | 0.00522 |
| | (!D * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * !SN * Q * !QN) | 0.00327 | 0.00233 | 0.01499 |
| sky130_osu_sc_15T_hs__dffsr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | -0.00046 | -0.00096 | 0.00538 |
| | (D * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * SN * !Q * QN) | 0.00444 | 0.00352 | 0.00994 |
| | (D * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !SN * !Q * QN) | 0.00437 | 0.00344 | 0.00990 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | -0.00061 | -0.00111 | 0.00522 |
| | (!D * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * !SN * Q * !QN) | 0.00327 | 0.00233 | 0.01499 |

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

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

| | | | | |
|---|---|---|---|---|
| **sky130_osu_sc_15T_hs__dffsr_1** | **(D * RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * SN * !Q * QN)** | 0.02419 | 0.02355 | 0.03087 |
| | **(D * RN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * Q * !QN)** | 0.01046 | 0.01034 | 0.01763 |
| | **(D * !RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * SN * !Q * QN)** | 0.01703 | 0.01672 | 0.02376 |
| | **(D * !RN * !SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * !SN * !Q * QN)** | 0.01708 | 0.01678 | 0.02377 |
| | **(!D * RN * SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * Q * !QN)** | 0.02370 | 0.02322 | 0.03642 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.01145 | 0.01127 | 0.01838 |
| | **(!D * RN * !SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * !SN * Q * !QN)** | 0.01365 | 0.01342 | 0.02754 |
| **sky130_osu_sc_15T_hs__dffsr_l** | **(D * RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * SN * !Q * QN)** | 0.02419 | 0.02355 | 0.03087 |
| | **(D * RN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * Q * !QN)** | 0.01046 | 0.01034 | 0.01763 |
| | **(D * !RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * SN * !Q * QN)** | 0.01703 | 0.01672 | 0.02376 |
| | **(D * !RN * !SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * !SN * !Q * QN)** | 0.01708 | 0.01678 | 0.02377 |
| | **(!D * RN * SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * Q * !QN)** | 0.02369 | 0.02321 | 0.03641 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.01145 | 0.01127 | 0.01838 |
| | **(!D * RN * !SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * !SN * Q * !QN)** | 0.01364 | 0.01341 | 0.02753 |

# SKY130_OSU_SC_15T_HS__DFFSx

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__dffs_1 | 48.22950 |
| sky130_osu_sc_15T_hs__dffs_l | 48.22950 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) | |
|---|---|---|---|---|---|
| | D | SN | CK | Q | QN |
| sky130_osu_sc_15T_hs__dffs_1 | 0.00363 | 0.00635 | 0.01087 | 1.35182 | 1.36318 |
| sky130_osu_sc_15T_hs__dffs_l | 0.00363 | 0.00635 | 0.01086 | 0.89808 | 0.89719 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_15T_hs__dffs_1 | 0.00000 | 0.19459 | 0.28406 |
| sky130_osu_sc_15T_hs__dffs_l | 0.00000 | 0.13068 | 0.22016 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__dffs_1 | CK->Q (RR) | 0.28137 | 1.41325 | 15.00220 |
| | QN->Q (FR) | 0.03757 | 0.91621 | 13.08870 |
| | SN->Q (FR) | 0.22062 | 1.54290 | 17.02370 |
| sky130_osu_sc_15T_hs__dffs_l | CK->Q (RR) | 0.28935 | 1.62518 | 15.48320 |
| | QN->Q (FR) | 0.04285 | 0.99065 | 12.82790 |
| | SN->Q (FR) | 0.22753 | 1.74900 | 17.45910 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__dffs_1 | CK->Q (RF) | 0.40612 | 1.59254 | 15.80190 |
| | QN->Q (RF) | 0.02639 | 0.64337 | 9.21380 |
| sky130_osu_sc_15T_hs__dffs_l | CK->Q (RF) | 0.41575 | 1.81461 | 16.30220 |
| | QN->Q (RF) | 0.03027 | 0.69864 | 9.14110 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__dffs_1 | CK->QN (RR) | 0.36513 | 0.97122 | 7.15425 |
| sky130_osu_sc_15T_hs__dffs_l | CK->QN (RR) | 0.36544 | 1.05292 | 7.21507 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__dffs_1 | CK->QN (RF) | 0.23036 | 0.67432 | 4.70749 |
| | SN->QN (FF) | 0.16900 | 0.80458 | 6.71868 |
| sky130_osu_sc_15T_hs__dffs_l | CK->QN (RF) | 0.22839 | 0.72627 | 4.77155 |
| | SN->QN (FF) | 0.16582 | 0.85089 | 6.75212 |

# Constraint Information

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | hold | CK (R) | -0.05434 | -0.08004 | -0.27762 |
| | setup | CK (R) | 0.20238 | 0.23468 | 1.37333 |
| sky130_osu_sc_15T_hs__dffs_l | hold | CK (R) | -0.05510 | -0.07734 | -0.27816 |
| | setup | CK (R) | 0.19871 | 0.23879 | 1.37427 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | hold | CK (R) | -0.14930 | -0.41824 | -3.87390 |
| | setup | CK (R) | 0.20288 | 0.43384 | 4.00888 |
| sky130_osu_sc_15T_hs__dffs_l | hold | CK (R) | -0.14749 | -0.41902 | -3.87309 |
| | setup | CK (R) | 0.19892 | 0.43379 | 4.00891 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | hold | CK (R) | -0.05434 | -0.08004 | -0.27762 |
| | setup | CK (R) | 0.20238 | 0.23468 | 1.37333 |
| sky130_osu_sc_15T_hs__dffs_l | hold | CK (R) | -0.05510 | -0.07734 | -0.27816 |
| | setup | CK (R) | 0.19871 | 0.23879 | 1.37427 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | hold | CK (R) | -0.14930 | -0.41824 | -3.87390 |
| | setup | CK (R) | 0.20288 | 0.43384 | 4.00888 |
| sky130_osu_sc_15T_hs__dffs_l | hold | CK (R) | -0.14749 | -0.41902 | -3.87309 |
| | setup | CK (R) | 0.19892 | 0.43379 | 4.00891 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | recovery | CK (R) | 0.06693 | 0.10920 | 4.01185 |
| | removal | CK (R) | -0.02879 | -0.07871 | -0.55168 |
| sky130_osu_sc_15T_hs__dffs_l | recovery | CK (R) | 0.06408 | 0.10724 | 3.90823 |
| | removal | CK (R) | -0.02829 | -0.07961 | -0.55416 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | recovery | CK (R) | 0.06693 | 0.10920 | 4.01185 |
| | removal | CK (R) | -0.02879 | -0.07871 | -0.55168 |
| sky130_osu_sc_15T_hs__dffs_l | recovery | CK (R) | 0.06408 | 0.10724 | 3.90823 |
| | removal | CK (R) | -0.02829 | -0.07961 | -0.55416 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | min_pulse_width | SN () | 0.15351 | 0.47661 | 13.33370 |
| | min_pulse_width | SN () | 0.15710 | 0.47661 | 13.33370 |
| sky130_osu_sc_15T_hs__dffs_l | min_pulse_width | SN () | 0.15154 | 0.46997 | 13.33370 |
| | min_pulse_width | SN () | 0.14800 | 0.46997 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | min_pulse_width | CK () | 0.11970 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.20461 | 0.46997 | 13.33370 |
| sky130_osu_sc_15T_hs__dffs_l | min_pulse_width | CK () | 0.11616 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.19753 | 0.46997 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | min_pulse_width | CK () | 0.27537 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.17984 | 0.46997 | 13.33370 |
| sky130_osu_sc_15T_hs__dffs_l | min_pulse_width | CK () | 0.27537 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.17984 | 0.46997 | 13.33370 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00718 | 0.00573 | 0.00000 |
| | SN | -0.00093 | -0.05205 | -0.76040 |
| | SN | 0.01521 | 0.01382 | 0.00093 |
| sky130_osu_sc_15T_hs__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00629 | 0.00528 | 0.00393 |
| | SN | -0.00093 | -0.04073 | -0.50517 |
| | SN | 0.01431 | 0.01336 | 0.00923 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00788 | 0.00667 | 0.00000 |
| sky130_osu_sc_15T_hs__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00699 | 0.00620 | 0.00312 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00788 | 0.00667 | 0.00000 |
| sky130_osu_sc_15T_hs__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00699 | 0.00622 | 0.00314 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00714 | 0.00567 | 0.00000 |
| | SN | -0.00093 | -0.05232 | -0.76673 |
| | SN | 0.01518 | 0.01379 | 0.00065 |
| sky130_osu_sc_15T_hs__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00625 | 0.00524 | 0.00376 |
| | SN | -0.00093 | -0.04070 | -0.50464 |
| | SN | 0.01427 | 0.01334 | 0.00927 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00231 | -0.00237 | -0.00236 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00798 | 0.00748 | 0.01024 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.00369 | 0.00326 | 0.00612 |
| sky130_osu_sc_15T_hs__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00231 | -0.00237 | -0.00236 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00798 | 0.00748 | 0.01024 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.00369 | 0.00326 | 0.00612 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00240 | 0.00237 | 0.00236 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.01362 | 0.01335 | 0.01611 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.00645 | 0.00629 | 0.00921 |
| sky130_osu_sc_15T_hs__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00240 | 0.00237 | 0.00236 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.01362 | 0.01335 | 0.01611 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.00645 | 0.00628 | 0.00920 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | -0.00388 | -0.00388 | -0.00389 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.00299 | 0.00258 | 0.00512 |
| sky130_osu_sc_15T_hs__dffs_1 | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | -0.00387 | -0.00388 | -0.00389 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.00300 | 0.00258 | 0.00512 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00392 | 0.00394 | 0.00391 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.00782 | 0.00749 | 0.01062 |
| sky130_osu_sc_15T_hs__dffs_l | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00391 | 0.00394 | 0.00390 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.00782 | 0.00748 | 0.01061 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | -0.00048 | -0.00098 | 0.00537 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | -0.00071 | -0.00122 | 0.00513 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.00262 | 0.00174 | 0.01463 |
| sky130_osu_sc_15T_hs__dffs_l | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | -0.00047 | -0.00098 | 0.00537 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | -0.00071 | -0.00122 | 0.00513 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.00261 | 0.00174 | 0.01463 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dffs_1 | (D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * SN * !Q * QN) | 0.02140 | 0.02076 | 0.02825 |
| | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.01043 | 0.01031 | 0.01762 |
| | (!D * SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * Q * !QN) | 0.02115 | 0.02064 | 0.03405 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | 0.01150 | 0.01135 | 0.01845 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.01322 | 0.01299 | 0.02733 |
| sky130_osu_sc_15T_hs__dffs_l | (D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * SN * !Q * QN) | 0.02140 | 0.02074 | 0.02825 |
| | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.01043 | 0.01030 | 0.01762 |
| | (!D * SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * Q * !QN) | 0.02115 | 0.02068 | 0.03405 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | 0.01150 | 0.01133 | 0.01845 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.01322 | 0.01299 | 0.02732 |

# SKY130_OSU_SC_15T_HS__DFFx

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__dff_1 | 40.29300 |
| sky130_osu_sc_15T_hs__dff_l | 40.29300 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) | |
|---|---|---|---|---|
| | D | CK | Q | QN |
| sky130_osu_sc_15T_hs__dff_1 | 0.00379 | 0.01081 | 1.49494 | 1.49638 |
| sky130_osu_sc_15T_hs__dff_l | 0.00379 | 0.01080 | 0.82610 | 0.82510 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_15T_hs__dff_1 | 0.00000 | 0.24807 | 0.30228 |
| sky130_osu_sc_15T_hs__dff_l | 0.00000 | 0.18561 | 0.23982 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__dff_1 | CK->Q (RR) | 0.23143 | 1.38731 | 15.95360 |
| | QN->Q (FR) | 0.03271 | 0.86019 | 12.61500 |
| sky130_osu_sc_15T_hs__dff_l | CK->Q (RR) | 0.24066 | 1.41043 | 12.91750 |
| | QN->Q (FR) | 0.04930 | 1.05345 | 13.28970 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__dff_1 | CK->Q (RF) | 0.33061 | 1.51787 | 16.51460 |
| | QN->Q (RF) | 0.02613 | 0.66559 | 9.77602 |
| sky130_osu_sc_15T_hs__dff_l | CK->Q (RF) | 0.35329 | 1.63864 | 14.39190 |
| | QN->Q (RF) | 0.02621 | 0.60116 | 7.82216 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__dff_1 | CK->QN (RR) | 0.29313 | 0.87525 | 7.13268 |
| sky130_osu_sc_15T_hs__dff_l | CK->QN (RR) | 0.30953 | 1.00264 | 7.09330 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__dff_1 | CK->QN (RF) | 0.18608 | 0.64299 | 5.10465 |
| sky130_osu_sc_15T_hs__dff_l | CK->QN (RF) | 0.18223 | 0.58178 | 3.38736 |

# Constraint Information

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dff_1 | hold | CK (R) | -0.04923 | -0.07263 | -0.29622 |
| | setup | CK (R) | 0.15148 | 0.19318 | 1.43947 |
| sky130_osu_sc_15T_hs__dff_l | hold | CK (R) | -0.05033 | -0.07669 | -0.29732 |
| | setup | CK (R) | 0.14987 | 0.19126 | 1.43991 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dff_1 | hold | CK (R) | -0.13394 | -0.41770 | -3.84666 |
| | setup | CK (R) | 0.16386 | 0.43055 | 4.02653 |
| sky130_osu_sc_15T_hs__dff_l | hold | CK (R) | -0.13496 | -0.41794 | -3.85699 |
| | setup | CK (R) | 0.16079 | 0.43055 | 4.02653 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dff_1 | min_pulse_width | CK () | 0.10200 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.17631 | 0.46997 | 13.33370 |
| sky130_osu_sc_15T_hs__dff_l | min_pulse_width | CK () | 0.09847 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.17277 | 0.46997 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__dff_1 | min_pulse_width | CK () | 0.22584 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.13031 | 0.46997 | 13.33370 |
| sky130_osu_sc_15T_hs__dff_l | min_pulse_width | CK () | 0.22584 | 0.46997 | 13.33370 |
| | min_pulse_width | CK () | 0.13031 | 0.46997 | 13.33370 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00762 | 0.00596 | -0.00149 |
| sky130_osu_sc_15T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00700 | 0.00580 | 0.00331 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00806 | 0.00726 | 0.00149 |
| sky130_osu_sc_15T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00738 | 0.00635 | 0.00071 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00805 | 0.00727 | 0.00149 |
| sky130_osu_sc_15T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00739 | 0.00635 | 0.00060 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00759 | 0.00593 | -0.00149 |
| sky130_osu_sc_15T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00695 | 0.00576 | 0.00313 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00195 | -0.00230 | -0.00233 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.00766 | 0.00720 | 0.01004 |
| sky130_osu_sc_15T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00195 | -0.00230 | -0.00233 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.00767 | 0.00720 | 0.01005 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00231 | 0.00235 | 0.00233 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.01418 | 0.01386 | 0.01672 |
| sky130_osu_sc_15T_hs__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00231 | 0.00235 | 0.00233 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.01419 | 0.01387 | 0.01673 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dff_1 | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | -0.00046 | -0.00098 | 0.00539 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | -0.00070 | -0.00119 | 0.00516 |
| sky130_osu_sc_15T_hs__dff_l | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | -0.00046 | -0.00098 | 0.00539 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | -0.00070 | -0.00119 | 0.00516 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__dff_1 | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.01038 | 0.01025 | 0.01757 |
| | (D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !Q * QN) | 0.02109 | 0.02048 | 0.02809 |
| | (!D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * Q * !QN) | 0.02154 | 0.02099 | 0.03464 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.01145 | 0.01125 | 0.01839 |
| sky130_osu_sc_15T_hs__dff_l | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.01038 | 0.01026 | 0.01757 |
| | (D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !Q * QN) | 0.02109 | 0.02049 | 0.02810 |
| | (!D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * Q * !QN) | 0.02155 | 0.02100 | 0.03457 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.01145 | 0.01127 | 0.01839 |

# SKY130_OSU_SC_15T_HS__INVx

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_15T_hs__inv_1 | 5.49450 |
| sky130_osu_sc_15T_hs__inv_10 | 27.47250 |
| sky130_osu_sc_15T_hs__inv_2 | 7.93650 |
| sky130_osu_sc_15T_hs__inv_3 | 10.37850 |
| sky130_osu_sc_15T_hs__inv_4 | 12.82050 |
| sky130_osu_sc_15T_hs__inv_6 | 17.70450 |
| sky130_osu_sc_15T_hs__inv_8 | 22.58850 |
| sky130_osu_sc_15T_hs__inv_l | 5.49450 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | Max Cap(pf) |
|---|---|---|
| | A | Y |
| **sky130_osu_sc_15T_hs__inv_1** | 0.00367 | 1.42374 |
| **sky130_osu_sc_15T_hs__inv_10** | 0.03360 | 13.14421 |
| **sky130_osu_sc_15T_hs__inv_2** | 0.00692 | 2.82728 |
| **sky130_osu_sc_15T_hs__inv_3** | 0.01029 | 4.04620 |
| **sky130_osu_sc_15T_hs__inv_4** | 0.01358 | 5.44500 |
| **sky130_osu_sc_15T_hs__inv_6** | 0.02034 | 8.01838 |
| **sky130_osu_sc_15T_hs__inv_8** | 0.02695 | 10.71748 |
| **sky130_osu_sc_15T_hs__inv_l** | 0.00288 | 0.81201 |

# Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_15T_hs__inv_1** | 0.00000 | 0.03800 | 0.06976 |
| **sky130_osu_sc_15T_hs__inv_10** | 0.00000 | 0.38000 | 0.69754 |
| **sky130_osu_sc_15T_hs__inv_2** | 0.00000 | 0.07600 | 0.13951 |
| **sky130_osu_sc_15T_hs__inv_3** | 0.00000 | 0.11400 | 0.20926 |
| **sky130_osu_sc_15T_hs__inv_4** | 0.00000 | 0.15200 | 0.27902 |
| **sky130_osu_sc_15T_hs__inv_6** | 0.00000 | 0.22800 | 0.41852 |
| **sky130_osu_sc_15T_hs__inv_8** | 0.00000 | 0.30400 | 0.55803 |
| **sky130_osu_sc_15T_hs__inv_l** | 0.00000 | 0.00677 | 0.01084 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_15T_hs__inv_1** | **A->Y (FR)** | 0.03155 | 0.80515 | 11.66190 |
| **sky130_osu_sc_15T_hs__inv_10** | **A->Y (FR)** | 0.04263 | 0.55326 | 11.63440 |
| **sky130_osu_sc_15T_hs__inv_2** | **A->Y (FR)** | 0.02491 | 0.69283 | 11.60830 |
| **sky130_osu_sc_15T_hs__inv_3** | **A->Y (FR)** | 0.02740 | 0.64807 | 11.56660 |
| **sky130_osu_sc_15T_hs__inv_4** | **A->Y (FR)** | 0.02777 | 0.61583 | 11.55180 |
| **sky130_osu_sc_15T_hs__inv_6** | **A->Y (FR)** | 0.03054 | 0.58162 | 11.53230 |
| **sky130_osu_sc_15T_hs__inv_8** | **A->Y (FR)** | 0.03646 | 0.56466 | 11.62300 |
| **sky130_osu_sc_15T_hs__inv_l** | **A->Y (FR)** | 0.04329 | 0.92207 | 11.68760 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_15T_hs__inv_1** | **A->Y (RF)** | 0.02370 | 0.59259 | 8.59577 |
| **sky130_osu_sc_15T_hs__inv_10** | **A->Y (RF)** | 0.03243 | 0.38451 | 8.56128 |
| **sky130_osu_sc_15T_hs__inv_2** | **A->Y (RF)** | 0.01907 | 0.51115 | 8.59626 |
| **sky130_osu_sc_15T_hs__inv_3** | **A->Y (RF)** | 0.02060 | 0.47888 | 8.60820 |
| **sky130_osu_sc_15T_hs__inv_4** | **A->Y (RF)** | 0.02015 | 0.44949 | 8.60204 |
| **sky130_osu_sc_15T_hs__inv_6** | **A->Y (RF)** | 0.02385 | 0.41617 | 8.58576 |
| **sky130_osu_sc_15T_hs__inv_8** | **A->Y (RF)** | 0.02854 | 0.40021 | 8.63682 |
| **sky130_osu_sc_15T_hs__inv_l** | **A->Y (RF)** | 0.02406 | 0.55098 | 7.07560 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__inv_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00364 | 0.00366 | 0.00432 |
| sky130_osu_sc_15T_hs__inv_10 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03070 | 0.03287 | 0.03964 |
| sky130_osu_sc_15T_hs__inv_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00642 | 0.00663 | 0.00798 |
| sky130_osu_sc_15T_hs__inv_3 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00985 | 0.01015 | 0.01229 |
| sky130_osu_sc_15T_hs__inv_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01265 | 0.01330 | 0.01596 |
| sky130_osu_sc_15T_hs__inv_6 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01874 | 0.01962 | 0.02391 |
| sky130_osu_sc_15T_hs__inv_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02468 | 0.02601 | 0.03155 |
| sky130_osu_sc_15T_hs__inv_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00281 | 0.00262 | 0.00328 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| **sky130_osu_sc_15T_hs__inv_1** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00070 | -0.00071 | -0.00038 |
| **sky130_osu_sc_15T_hs__inv_10** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.01234 | -0.01166 | -0.00689 |
| **sky130_osu_sc_15T_hs__inv_2** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00232 | -0.00223 | -0.00149 |
| **sky130_osu_sc_15T_hs__inv_3** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00305 | -0.00296 | -0.00175 |
| **sky130_osu_sc_15T_hs__inv_4** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00475 | -0.00439 | -0.00287 |
| **sky130_osu_sc_15T_hs__inv_6** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00722 | -0.00689 | -0.00424 |
| **sky130_osu_sc_15T_hs__inv_8** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00980 | -0.00934 | -0.00560 |
| **sky130_osu_sc_15T_hs__inv_l** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00044 | -0.00046 | -0.00024 |

# SKY130_OSU_SC_15T_HS__MUX2

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__mux2_1** | 15.26250 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) |
|---|---|---|---|---|
| | **A0** | **A1** | **S0** | **Y** |
| **sky130_osu_sc_15T_hs__mux2_1** | 0.26474 | 0.26470 | 0.00751 | 0.26473 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | **Min.** | **Avg** | **Max.** |
| **sky130_osu_sc_15T_hs__mux2_1** | 0.00000 | 0.07610 | 0.07610 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_15T_hs__mux2_1 | A0->Y (RR) | - | 0.01604 | 0.30873 | 3.15192 |
| | A1->Y (RR) | - | 0.01811 | 0.31031 | 3.15062 |
| | S0->Y (RR) | (!A0 * A1) | 0.05270 | 0.31045 | 1.20153 |
| | S0->Y (FR) | (A0 * !A1) | 0.03967 | 0.44451 | 3.67500 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_15T_hs__mux2_1 | A0->Y (FF) | - | 0.01690 | 0.28777 | 2.84209 |
| | A1->Y (FF) | - | 0.01543 | 0.28541 | 2.82928 |
| | S0->Y (FF) | (!A0 * A1) | 0.07095 | 0.41695 | 2.54295 |
| | S0->Y (RF) | (A0 * !A1) | 0.02649 | 0.32560 | 2.45894 |

# Power Information

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__mux2_1 | A0 | - | 0.00000 | 0.00000 | 0.00000 |
| | A0 | - | -0.00383 | -0.00383 | -0.00383 |
| | A1 | - | 0.00000 | 0.00000 | 0.00000 |
| | A1 | - | -0.00267 | -0.00267 | -0.00268 |
| | S0 | (A0 * !A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (A0 * !A1) | 0.00448 | 0.00467 | 0.01249 |
| | S0 | (!A0 * A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (!A0 * A1) | -0.00254 | -0.00293 | 0.00419 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__mux2_1 | A0 | - | 0.00000 | 0.00000 | 0.00000 |
| | A0 | - | 0.00383 | 0.00383 | 0.00384 |
| | A1 | - | 0.00000 | 0.00000 | 0.00000 |
| | A1 | - | 0.00267 | 0.00267 | 0.00268 |
| | S0 | (A0 * !A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (A0 * !A1) | 0.00081 | 0.00047 | 0.00785 |
| | S0 | (!A0 * A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (!A0 * A1) | 0.00986 | 0.00997 | 0.01745 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__mux2_1 | (A1 * S0 * Y) + (!A1 * S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * S0 * Y) + (!A1 * S0 * !Y) | -0.00098 | -0.00098 | -0.00098 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__mux2_1 | (A1 * S0 * Y) + (!A1 * S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * S0 * Y) + (!A1 * S0 * !Y) | 0.00098 | 0.00098 | 0.00098 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__mux2_1 | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | -0.00116 | -0.00116 | -0.00117 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__mux2_1 | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | 0.00116 | 0.00116 | 0.00117 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__mux2_1 | (A0 * A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * Y) | -0.00088 | -0.00121 | 0.00603 |
| | (!A0 * !A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !Y) | -0.00086 | -0.00120 | 0.00607 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__mux2_1 | (A0 * A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * Y) | 0.00746 | 0.00738 | 0.01512 |
| | (!A0 * !A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !Y) | 0.00687 | 0.00685 | 0.01482 |

# SKY130_OSU_SC_15T_HS__NAND2x

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__nand2_1 | 7.93650 |
| sky130_osu_sc_15T_hs__nand2_l | 7.93650 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_15T_hs__nand2_1 | 0.00367 | 0.00366 | 1.36100 |
| sky130_osu_sc_15T_hs__nand2_l | 0.00288 | 0.00288 | 0.80754 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_15T_hs__nand2_1 | 0.00000 | 0.03788 | 0.13951 |
| sky130_osu_sc_15T_hs__nand2_l | 0.00000 | 0.00679 | 0.02168 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__nand2_1 | A->Y (FR) | 0.03270 | 0.79818 | 11.42480 |
| | B->Y (FR) | 0.03776 | 0.79248 | 11.26670 |
| sky130_osu_sc_15T_hs__nand2_l | A->Y (FR) | 0.04451 | 0.92718 | 11.68550 |
| | B->Y (FR) | 0.05308 | 0.93341 | 11.66400 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__nand2_1 | A->Y (RF) | 0.03502 | 0.74548 | 10.63980 |
| | B->Y (RF) | 0.03947 | 0.73022 | 10.28580 |
| sky130_osu_sc_15T_hs__nand2_l | A->Y (RF) | 0.03558 | 0.69979 | 8.79721 |
| | B->Y (RF) | 0.03982 | 0.67345 | 8.29869 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__nand2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00386 | 0.00388 | 0.00450 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00474 | 0.00471 | 0.00528 |
| sky130_osu_sc_15T_hs__nand2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00296 | 0.00289 | 0.00338 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00371 | 0.00365 | 0.00411 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__nand2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00044 | -0.00050 | -0.00019 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | -0.00041 | -0.00049 | -0.00030 |
| sky130_osu_sc_15T_hs__nand2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00029 | -0.00033 | -0.00014 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | -0.00027 | -0.00033 | -0.00019 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__nand2_1 | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | -0.00263 | -0.00263 | -0.00265 |
| sky130_osu_sc_15T_hs__nand2_l | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | -0.00184 | -0.00185 | -0.00186 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__nand2_1 | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | 0.00265 | 0.00271 | 0.00266 |
| sky130_osu_sc_15T_hs__nand2_l | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | 0.00186 | 0.00190 | 0.00186 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__nand2_1 | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | -0.00247 | -0.00248 | -0.00247 |
| sky130_osu_sc_15T_hs__nand2_l | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | -0.00171 | -0.00172 | -0.00171 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__nand2_1 | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00252 | 0.00249 | 0.00248 |
| sky130_osu_sc_15T_hs__nand2_l | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00175 | 0.00173 | 0.00172 |

# SKY130_OSU_SC_15T_HS__NOR2x

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__nor2_1 | 7.93650 |
| sky130_osu_sc_15T_hs__nor2_l | 7.93650 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_15T_hs__nor2_1 | 0.00364 | 0.00393 | 0.70942 |
| sky130_osu_sc_15T_hs__nor2_l | 0.00278 | 0.00310 | 0.44150 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_15T_hs__nor2_1 | 0.00000 | 0.02904 | 0.06976 |
| sky130_osu_sc_15T_hs__nor2_l | 0.00000 | 0.00561 | 0.01084 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__nor2_1 | A->Y (FR) | 0.07246 | 0.98305 | 11.52080 |
| | B->Y (FR) | 0.05622 | 0.94701 | 11.41020 |
| sky130_osu_sc_15T_hs__nor2_l | A->Y (FR) | 0.09136 | 1.12291 | 11.52550 |
| | B->Y (FR) | 0.07695 | 1.10182 | 11.55530 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__nor2_1 | A->Y (RF) | 0.03142 | 0.48951 | 5.92449 |
| | B->Y (RF) | 0.02503 | 0.47831 | 5.90635 |
| sky130_osu_sc_15T_hs__nor2_l | A->Y (RF) | 0.02924 | 0.46573 | 5.11677 |
| | B->Y (RF) | 0.02523 | 0.45730 | 5.10197 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__nor2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00503 | 0.00497 | 0.00520 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00391 | 0.00369 | 0.00482 |
| sky130_osu_sc_15T_hs__nor2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00370 | 0.00364 | 0.00380 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00301 | 0.00294 | 0.00358 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__nor2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00064 | 0.00045 | 0.00090 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | -0.00056 | -0.00056 | -0.00012 |
| sky130_osu_sc_15T_hs__nor2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00039 | 0.00027 | 0.00058 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | -0.00032 | -0.00033 | -0.00004 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__nor2_1 | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | -0.00197 | -0.00233 | -0.00234 |
| sky130_osu_sc_15T_hs__nor2_l | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | -0.00134 | -0.00155 | -0.00155 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__nor2_1 | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | 0.00233 | 0.00235 | 0.00234 |
| sky130_osu_sc_15T_hs__nor2_l | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | 0.00155 | 0.00156 | 0.00155 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__nor2_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | -0.00123 | -0.00125 | -0.00122 |
| sky130_osu_sc_15T_hs__nor2_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | -0.00080 | -0.00081 | -0.00080 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__nor2_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00129 | 0.00131 | 0.00125 |
| sky130_osu_sc_15T_hs__nor2_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00085 | 0.00085 | 0.00081 |

# SKY130_OSU_SC_15T_HS__OAI21

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__oai21_l | 10.37850 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) |
|---|---|---|---|---|
| | A0 | A1 | B0 | Y |
| sky130_osu_sc_15T_hs__oai21_l | 0.00369 | 0.00377 | 0.00311 | 0.70791 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_15T_hs__oai21_l | 0.00000 | 0.02074 | 0.08060 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__oai21_l | A0->Y (FR) | 0.07763 | 0.98652 | 11.59400 |
| | A1->Y (FR) | 0.09832 | 1.02558 | 11.71820 |
| | B0->Y (FR) | 0.05181 | 0.85527 | 10.46460 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__oai21_l | A0->Y (RF) | 0.04758 | 0.59569 | 6.97309 |
| | A1->Y (RF) | 0.05674 | 0.59346 | 6.84710 |
| | B0->Y (RF) | 0.03784 | 0.62158 | 7.59966 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.00526 | 0.00508 | 0.00607 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.00642 | 0.00633 | 0.00650 |
| | B0 | 0.00436 | 0.00428 | 0.00484 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.00021 | 0.00012 | 0.00036 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.00141 | 0.00121 | 0.00143 |
| | B0 | 0.00193 | 0.00185 | 0.00215 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | -0.00123 | -0.00125 | -0.00123 |
| | (A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * Y) | -0.00233 | -0.00236 | -0.00235 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00239 | -0.00241 | -0.00240 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.00130 | 0.00131 | 0.00125 |
| | (A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * Y) | 0.00234 | 0.00236 | 0.00235 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00242 | 0.00243 | 0.00241 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | -0.00192 | -0.00226 | -0.00229 |
| | (A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * Y) | -0.00229 | -0.00234 | -0.00233 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | -0.00236 | -0.00237 | -0.00237 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | 0.00227 | 0.00231 | 0.00229 |
| | (A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * Y) | 0.00232 | 0.00234 | 0.00233 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | 0.00238 | 0.00240 | 0.00237 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai21_l | (!A0 * !A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * Y) | -0.00186 | -0.00187 | -0.00191 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai21_l | (!A0 * !A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * Y) | 0.00190 | 0.00192 | 0.00191 |

# SKY130_OSU_SC_15T_HS__OAI22

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_15T_hs__oai22_l | 12.82050 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | | Max Cap(pf) |
|---|---|---|---|---|---|
| | A0 | A1 | B0 | B1 | Y |
| sky130_osu_sc_15T_hs__oai22_l | 0.00356 | 0.00378 | 0.00389 | 0.00379 | 0.70249 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_15T_hs__oai22_l | 0.00000 | 0.04315 | 0.13951 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__oai22_l | A0->Y (FR) | 0.10446 | 1.01420 | 11.49950 |
| | A1->Y (FR) | 0.08753 | 0.97638 | 11.38860 |
| | B0->Y (FR) | 0.06277 | 0.95646 | 11.37410 |
| | B1->Y (FR) | 0.08097 | 0.99004 | 11.48490 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__oai22_l | A0->Y (RF) | 0.07841 | 0.63505 | 7.01135 |
| | A1->Y (RF) | 0.06321 | 0.61418 | 6.96134 |
| | B0->Y (RF) | 0.05391 | 0.63771 | 7.58882 |
| | B1->Y (RF) | 0.06970 | 0.66211 | 7.67361 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai22_l | A0 | 0.00824 | 0.00816 | 0.00834 |
| | A1 | 0.00705 | 0.00681 | 0.00781 |
| | B0 | 0.00531 | 0.00526 | 0.00611 |
| | B1 | 0.00655 | 0.00646 | 0.00664 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai22_l | A0 | 0.00225 | 0.00205 | 0.00225 |
| | A1 | 0.00115 | 0.00105 | 0.00123 |
| | B0 | 0.00114 | 0.00107 | 0.00143 |
| | B1 | 0.00228 | 0.00208 | 0.00245 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | -0.00197 | -0.00233 | -0.00234 |
| | (A1 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * B1 * !Y) | -0.00197 | -0.00233 | -0.00234 |
| | (A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * !B1 * Y) | -0.00230 | -0.00234 | -0.00233 |
| | (!A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * !B1 * Y) | -0.00237 | -0.00238 | -0.00237 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.00232 | 0.00235 | 0.00234 |
| | (A1 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * B1 * !Y) | 0.00232 | 0.00235 | 0.00234 |
| | (A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * !B1 * Y) | 0.00233 | 0.00234 | 0.00233 |
| | (!A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * !B1 * Y) | 0.00239 | 0.00239 | 0.00238 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai22_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | -0.00121 | -0.00124 | -0.00122 |
| | (A0 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * B1 * !Y) | -0.00121 | -0.00124 | -0.00122 |
| | (A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * !B1 * Y) | -0.00227 | -0.00232 | -0.00231 |
| | (!A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * !B1 * Y) | -0.00235 | -0.00236 | -0.00236 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai22_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | 0.00128 | 0.00130 | 0.00124 |
| | (A0 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * B1 * !Y) | 0.00128 | 0.00130 | 0.00124 |
| | (A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * !B1 * Y) | 0.00230 | 0.00232 | 0.00231 |
| | (!A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * !B1 * Y) | 0.00236 | 0.00237 | 0.00236 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai22_l | (A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B1 * !Y) | -0.00120 | -0.00123 | -0.00121 |
| | (A0 * !A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B1 * !Y) | -0.00120 | -0.00120 | -0.00121 |
| | (!A0 * !A1 * B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B1 * Y) | -0.00253 | -0.00257 | -0.00256 |
| | (!A0 * !A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B1 * Y) | -0.00254 | -0.00257 | -0.00261 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai22_l | (A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B1 * !Y) | 0.00127 | 0.00127 | 0.00123 |
| | (A0 * !A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B1 * !Y) | 0.00127 | 0.00128 | 0.00123 |
| | (!A0 * !A1 * B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B1 * Y) | 0.00256 | 0.00257 | 0.00256 |
| | (!A0 * !A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B1 * Y) | 0.00260 | 0.00262 | 0.00262 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | -0.00194 | -0.00228 | -0.00230 |
| | (A0 * !A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B0 * !Y) | -0.00194 | -0.00228 | -0.00230 |
| | (!A0 * !A1 * B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B0 * Y) | -0.00259 | -0.00264 | -0.00262 |
| | (!A0 * !A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B0 * Y) | -0.00260 | -0.00261 | -0.00266 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.00228 | 0.00231 | 0.00230 |
| | (A0 * !A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B0 * !Y) | 0.00228 | 0.00230 | 0.00230 |
| | (!A0 * !A1 * B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B0 * Y) | 0.00262 | 0.00264 | 0.00262 |
| | (!A0 * !A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B0 * Y) | 0.00267 | 0.00268 | 0.00267 |

# SKY130_OSU_SC_15T_HS__OR2x

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__or2_1 | 10.37850 |
| sky130_osu_sc_15T_hs__or2_2 | 12.82050 |
| sky130_osu_sc_15T_hs__or2_4 | 17.70450 |
| sky130_osu_sc_15T_hs__or2_8 | 27.47250 |
| sky130_osu_sc_15T_hs__or2_l | 10.37850 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_15T_hs__or2_1 | 0.00400 | 0.00376 | 1.43865 |
| sky130_osu_sc_15T_hs__or2_2 | 0.00400 | 0.00376 | 2.85105 |
| sky130_osu_sc_15T_hs__or2_4 | 0.00400 | 0.00377 | 5.50473 |
| sky130_osu_sc_15T_hs__or2_8 | 0.00400 | 0.00377 | 10.62706 |
| sky130_osu_sc_15T_hs__or2_l | 0.00319 | 0.00293 | 0.82204 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_15T_hs__or2_1** | 0.00000 | 0.05116 | 0.08225 |
| **sky130_osu_sc_15T_hs__or2_2** | 0.00000 | 0.07328 | 0.15200 |
| **sky130_osu_sc_15T_hs__or2_4** | 0.00000 | 0.11753 | 0.29151 |
| **sky130_osu_sc_15T_hs__or2_8** | 0.00000 | 0.20602 | 0.57053 |
| **sky130_osu_sc_15T_hs__or2_l** | 0.00000 | 0.01035 | 0.01624 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__or2_1 | A->Y (RR) | 0.07761 | 0.66157 | 6.84047 |
| | B->Y (RR) | 0.06824 | 0.63016 | 6.76491 |
| sky130_osu_sc_15T_hs__or2_2 | A->Y (RR) | 0.08521 | 0.59051 | 6.97665 |
| | B->Y (RR) | 0.07542 | 0.56465 | 6.90163 |
| sky130_osu_sc_15T_hs__or2_4 | A->Y (RR) | 0.11173 | 0.58556 | 7.30000 |
| | B->Y (RR) | 0.10171 | 0.56405 | 7.23413 |
| sky130_osu_sc_15T_hs__or2_8 | A->Y (RR) | 0.16204 | 0.63818 | 7.80210 |
| | B->Y (RR) | 0.15187 | 0.62180 | 7.73761 |
| sky130_osu_sc_15T_hs__or2_l | A->Y (RR) | 0.08514 | 0.77450 | 6.83125 |
| | B->Y (RR) | 0.07783 | 0.74820 | 6.72653 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__or2_1 | A->Y (FF) | 0.13677 | 0.73640 | 6.83225 |
| | B->Y (FF) | 0.11402 | 0.69066 | 6.58319 |
| sky130_osu_sc_15T_hs__or2_2 | A->Y (FF) | 0.16506 | 0.72515 | 7.10978 |
| | B->Y (FF) | 0.14252 | 0.68928 | 6.83599 |
| sky130_osu_sc_15T_hs__or2_4 | A->Y (FF) | 0.23501 | 0.78293 | 7.56456 |
| | B->Y (FF) | 0.21249 | 0.75414 | 7.28809 |
| sky130_osu_sc_15T_hs__or2_8 | A->Y (FF) | 0.37596 | 0.93401 | 8.13177 |
| | B->Y (FF) | 0.35342 | 0.89941 | 7.87316 |
| sky130_osu_sc_15T_hs__or2_l | A->Y (FF) | 0.16573 | 0.72808 | 5.46864 |
| | B->Y (FF) | 0.14012 | 0.69327 | 5.25894 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__or2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00406 | 0.00353 | 0.00701 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00292 | 0.00266 | 0.00949 |
| sky130_osu_sc_15T_hs__or2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00682 | 0.00650 | 0.00987 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00563 | 0.00564 | 0.01052 |
| sky130_osu_sc_15T_hs__or2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01286 | 0.01297 | 0.01666 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01164 | 0.01220 | 0.01719 |
| sky130_osu_sc_15T_hs__or2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02506 | 0.02582 | 0.03059 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02370 | 0.02524 | 0.03118 |
| sky130_osu_sc_15T_hs__or2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00301 | 0.00263 | 0.00473 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00229 | 0.00207 | 0.00482 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__or2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00842 | 0.00829 | 0.01091 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00702 | 0.00724 | 0.01402 |
| sky130_osu_sc_15T_hs__or2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01017 | 0.01049 | 0.01291 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00878 | 0.00932 | 0.01571 |
| sky130_osu_sc_15T_hs__or2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01478 | 0.01569 | 0.01803 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01340 | 0.01440 | 0.02042 |
| sky130_osu_sc_15T_hs__or2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02491 | 0.02585 | 0.02856 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02350 | 0.02456 | 0.03031 |
| sky130_osu_sc_15T_hs__or2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00652 | 0.00628 | 0.00798 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00554 | 0.00556 | 0.00930 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__or2_1 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00199 | -0.00235 | -0.00236 |
| sky130_osu_sc_15T_hs__or2_2 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00199 | -0.00235 | -0.00236 |
| sky130_osu_sc_15T_hs__or2_4 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00199 | -0.00235 | -0.00236 |
| sky130_osu_sc_15T_hs__or2_8 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00199 | -0.00235 | -0.00236 |
| sky130_osu_sc_15T_hs__or2_l | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00136 | -0.00156 | -0.00157 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__or2_1 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00234 | 0.00237 | 0.00236 |
| sky130_osu_sc_15T_hs__or2_2 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00234 | 0.00237 | 0.00236 |
| sky130_osu_sc_15T_hs__or2_4 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00235 | 0.00237 | 0.00236 |
| sky130_osu_sc_15T_hs__or2_8 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00235 | 0.00237 | 0.00236 |
| sky130_osu_sc_15T_hs__or2_l | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00157 | 0.00158 | 0.00157 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__or2_1 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00122 | -0.00125 | -0.00123 |
| sky130_osu_sc_15T_hs__or2_2 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00122 | -0.00125 | -0.00123 |
| sky130_osu_sc_15T_hs__or2_4 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00122 | -0.00125 | -0.00123 |
| sky130_osu_sc_15T_hs__or2_8 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00122 | -0.00125 | -0.00123 |
| sky130_osu_sc_15T_hs__or2_l | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00081 | -0.00082 | -0.00082 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__or2_1 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00131 | 0.00132 | 0.00125 |
| sky130_osu_sc_15T_hs__or2_2 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00131 | 0.00132 | 0.00125 |
| sky130_osu_sc_15T_hs__or2_4 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00131 | 0.00132 | 0.00125 |
| sky130_osu_sc_15T_hs__or2_8 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00131 | 0.00132 | 0.00125 |
| sky130_osu_sc_15T_hs__or2_l | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00086 | 0.00087 | 0.00083 |

# SKY130_OSU_SC_15T_HS__TBUFIx

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__tbufi_1 | 10.37850 |
| sky130_osu_sc_15T_hs__tbufi_l | 10.37850 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | OE | Y |
| sky130_osu_sc_15T_hs__tbufi_1 | 0.00391 | 0.00493 | 0.71527 |
| sky130_osu_sc_15T_hs__tbufi_l | 0.00310 | 0.00404 | 0.44166 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_15T_hs__tbufi_1 | 0.00000 | 0.04080 | 0.13951 |
| sky130_osu_sc_15T_hs__tbufi_l | 0.00000 | 0.00798 | 0.02168 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__tbufi_1 | A->Y (FR) | 0.05347 | 0.94368 | 11.41460 |
| | OE->Y (FR) | 0.05134 | 0.30715 | 4.44543 |
| | OE->Y (RR) | 0.09583 | 0.79486 | 6.93366 |
| sky130_osu_sc_15T_hs__tbufi_l | A->Y (FR) | 0.07405 | 1.09714 | 11.56100 |
| | OE->Y (FR) | 0.06162 | 0.30888 | 4.44522 |
| | OE->Y (RR) | 0.10916 | 0.93478 | 6.93086 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__tbufi_1 | A->Y (RF) | 0.03398 | 0.59208 | 7.28339 |
| | OE->Y (FF) | 0.05237 | 0.30716 | 4.44542 |
| | OE->Y (RF) | 0.03218 | 0.56902 | 6.87246 |
| sky130_osu_sc_15T_hs__tbufi_l | A->Y (RF) | 0.03517 | 0.56900 | 6.29535 |
| | OE->Y (FF) | 0.06237 | 0.31095 | 4.44524 |
| | OE->Y (RF) | 0.03356 | 0.53690 | 5.78765 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__tbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00370 | 0.00349 | 0.00453 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00365 | 0.00332 | 0.01002 |
| sky130_osu_sc_15T_hs__tbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00284 | 0.00275 | 0.00335 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00264 | 0.00234 | 0.00615 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__tbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00056 | -0.00057 | -0.00016 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00256 | 0.00222 | 0.00969 |
| sky130_osu_sc_15T_hs__tbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00032 | -0.00033 | -0.00007 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00172 | 0.00142 | 0.00568 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__tbufi_1 | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | -0.00196 | -0.00198 | -0.00197 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | -0.00179 | -0.00180 | -0.00179 |
| sky130_osu_sc_15T_hs__tbufi_l | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | -0.00141 | -0.00143 | -0.00141 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | -0.00129 | -0.00131 | -0.00129 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__tbufi_1 | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | 0.00196 | 0.00198 | 0.00197 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | 0.00183 | 0.00186 | 0.00181 |
| sky130_osu_sc_15T_hs__tbufi_l | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | 0.00141 | 0.00143 | 0.00141 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | 0.00132 | 0.00133 | 0.00130 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__tbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00151 | 0.00117 | 0.00876 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00135 | 0.00103 | 0.00857 |
| sky130_osu_sc_15T_hs__tbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00099 | 0.00071 | 0.00499 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00087 | 0.00058 | 0.00486 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__tbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00442 | 0.00425 | 0.01210 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00446 | 0.00432 | 0.01218 |
| sky130_osu_sc_15T_hs__tbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00349 | 0.00329 | 0.00778 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00354 | 0.00334 | 0.00785 |

# SKY130_OSU_SC_15T_HS__TNBUFIx

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_15T_hs__tnbufi_1 | 10.37850 |
| sky130_osu_sc_15T_hs__tnbufi_l | 10.37850 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | OE | Y |
| sky130_osu_sc_15T_hs__tnbufi_1 | 0.00390 | 0.00607 | 0.71525 |
| sky130_osu_sc_15T_hs__tnbufi_l | 0.00309 | 0.00449 | 0.44751 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_15T_hs__tnbufi_1 | 0.00000 | 0.06197 | 0.07600 |
| sky130_osu_sc_15T_hs__tnbufi_l | 0.00000 | 0.01070 | 0.01354 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__tnbufi_1 | A->Y (FR) | 0.05418 | 0.94368 | 11.41440 |
| | OE->Y (RR) | 0.02873 | 0.30692 | 4.44591 |
| | OE->Y (FR) | 0.06784 | 0.97638 | 11.52240 |
| sky130_osu_sc_15T_hs__tnbufi_l | A->Y (FR) | 0.07469 | 1.10294 | 11.65570 |
| | OE->Y (RR) | 0.02823 | 0.30690 | 4.44588 |
| | OE->Y (FR) | 0.08549 | 1.12480 | 11.62930 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_15T_hs__tnbufi_1 | A->Y (RF) | 0.03338 | 0.59180 | 7.28303 |
| | OE->Y (RF) | 0.02838 | 0.30690 | 4.44584 |
| | OE->Y (FF) | 0.06092 | 0.57197 | 5.08531 |
| sky130_osu_sc_15T_hs__tnbufi_l | A->Y (RF) | 0.03442 | 0.57103 | 6.34162 |
| | OE->Y (RF) | 0.02795 | 0.30689 | 4.44588 |
| | OE->Y (FF) | 0.07220 | 0.58051 | 4.37172 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__tnbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00382 | 0.00361 | 0.00465 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00907 | 0.00920 | 0.01767 |
| sky130_osu_sc_15T_hs__tnbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00296 | 0.00287 | 0.00346 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00682 | 0.00685 | 0.01162 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__tnbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00072 | -0.00071 | -0.00030 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00812 | 0.00831 | 0.01584 |
| sky130_osu_sc_15T_hs__tnbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00047 | -0.00047 | -0.00022 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00603 | 0.00607 | 0.01048 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__tnbufi_1 | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | -0.00167 | -0.00169 | -0.00168 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | -0.00151 | -0.00152 | -0.00152 |
| sky130_osu_sc_15T_hs__tnbufi_l | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | -0.00113 | -0.00115 | -0.00113 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | -0.00102 | -0.00104 | -0.00102 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__tnbufi_1 | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | 0.00167 | 0.00169 | 0.00168 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | 0.00155 | 0.00157 | 0.00154 |
| sky130_osu_sc_15T_hs__tnbufi_l | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | 0.00113 | 0.00115 | 0.00113 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | 0.00105 | 0.00105 | 0.00103 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__tnbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | -0.00265 | -0.00325 | 0.00472 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | -0.00264 | -0.00320 | 0.00474 |
| sky130_osu_sc_15T_hs__tnbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | -0.00170 | -0.00217 | 0.00229 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | -0.00168 | -0.00204 | 0.00230 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_15T_hs__tnbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00692 | 0.00716 | 0.01550 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00680 | 0.00703 | 0.01542 |
| sky130_osu_sc_15T_hs__tnbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00517 | 0.00521 | 0.00997 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00509 | 0.00514 | 0.00991 |

# SKY130_OSU_SC_15T_HS__XNOR2

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__xnor2_l | 17.70450 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_15T_hs__xnor2_l | 0.00775 | 0.00684 | 0.73641 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_15T_hs__xnor2_l | 0.00000 | 0.13265 | 0.21551 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_15T_hs__xnor2_l | A->Y (RR) | B | 0.11965 | 0.84047 | 7.18515 |
| | A->Y (FR) | !B | 0.06867 | 0.96974 | 11.57870 |
| | B->Y (RR) | A | 0.09493 | 0.81335 | 7.14859 |
| | B->Y (FR) | !A | 0.09006 | 1.00373 | 11.68940 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_15T_hs__xnor2_l | A->Y (FF) | B | 0.10587 | 0.66700 | 5.46183 |
| | A->Y (RF) | !B | 0.04612 | 0.58574 | 6.99600 |
| | B->Y (FF) | A | 0.09305 | 0.65327 | 5.45191 |
| | B->Y (RF) | !A | 0.05650 | 0.59970 | 7.00822 |

# Power Information

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__xnor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00346 | 0.00304 | 0.00947 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00891 | 0.00888 | 0.01763 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00125 | 0.00104 | 0.00835 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00961 | 0.00953 | 0.01769 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__xnor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.01143 | 0.01117 | 0.01863 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00257 | 0.00213 | 0.00961 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.01018 | 0.01037 | 0.01818 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00353 | 0.00300 | 0.01047 |

# SKY130_OSU_SC_15T_HS__XOR2

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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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_15T_hs__xor2_1 | 17.70450 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_15T_hs__xor2_1 | 0.00778 | 0.00689 | 0.71339 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_15T_hs__xor2_1 | 0.00000 | 0.13265 | 0.20411 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_15T_hs__xor2_l | A->Y (RR) | !B | 0.11505 | 0.82300 | 7.03707 |
| | A->Y (FR) | B | 0.08698 | 0.99643 | 11.58650 |
| | B->Y (RR) | !A | 0.09957 | 0.81547 | 7.04233 |
| | B->Y (FR) | A | 0.09238 | 1.00262 | 11.58120 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_15T_hs__xor2_l | A->Y (FF) | !B | 0.09659 | 0.65340 | 5.31580 |
| | A->Y (RF) | B | 0.04759 | 0.61378 | 7.29373 |
| | B->Y (FF) | !A | 0.09108 | 0.64817 | 5.34566 |
| | B->Y (RF) | A | 0.05549 | 0.59522 | 6.88750 |

# Power Information

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__xor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.01053 | 0.01045 | 0.01863 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00173 | 0.00091 | 0.00793 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.01064 | 0.01060 | 0.01874 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00113 | 0.00085 | 0.00816 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_15T_hs__xor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00242 | 0.00180 | 0.00940 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.01159 | 0.01166 | 0.01871 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00244 | 0.00188 | 0.00930 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.01036 | 0.01059 | 0.01838 |

# SKY130_OSU_SC_15T_HS_x

*sky130_osu_sc_15T_hs_tt_1P50_25C.ccs*
*Cell Library: Process , Voltage 1.50,*
*Temp 25.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| **sky130_osu_sc_15T_hs__ant** | 5.49450 |
| **sky130_osu_sc_15T_hs__tiehi** | 5.49450 |
| **sky130_osu_sc_15T_hs__tielo** | 5.49450 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) |
|---|---|
| | A |
| **sky130_osu_sc_15T_hs__ant** | 0.36519 |
| **sky130_osu_sc_15T_hs__tiehi** | 0.00000 |
| **sky130_osu_sc_15T_hs__tielo** | 0.00000 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_15T_hs__ant** | 0.00000 | 136406.00000 | 272812.00000 |
| **sky130_osu_sc_15T_hs__tiehi** | 0.00000 | 0.00000 | 0.00000 |
| **sky130_osu_sc_15T_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_15T_hs__ant | 0.00000 | 0.00000 | 0.00000 |
| | -0.00177 | 0.02833 | 0.41946 |

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

| Cell Name | Power(pJ) | | |
|---|---|---|---|
| | first | mid | last |
| sky130_osu_sc_15T_hs__ant | 0.00000 | 0.00000 | 0.00000 |
| | 2.37468 | 2.25306 | 0.52530 |