# sky130_osu_sc_18T_ls_ss_1P60_150C.ccs Library

| Cell Groups |
| --- |
| SKY130_OSU_SC_18T_LS__ADDFx |
| SKY130_OSU_SC_18T_LS__ADDHx |
| SKY130_OSU_SC_18T_LS__AND2x |
| SKY130_OSU_SC_18T_LS__AOI21 |
| SKY130_OSU_SC_18T_LS__AOI22 |
| SKY130_OSU_SC_18T_LS__BUFx |
| SKY130_OSU_SC_18T_LS__DFFRx |
| SKY130_OSU_SC_18T_LS__DFFSRx |
| SKY130_OSU_SC_18T_LS__DFFSx |
| SKY130_OSU_SC_18T_LS__DFFx |
| SKY130_OSU_SC_18T_LS__INVx |
| SKY130_OSU_SC_18T_LS__MUX2 |
| SKY130_OSU_SC_18T_LS__NAND2x |
| SKY130_OSU_SC_18T_LS__NOR2x |
| SKY130_OSU_SC_18T_LS__OAI21 |
| SKY130_OSU_SC_18T_LS__OAI22 |
| SKY130_OSU_SC_18T_LS__OR2x |
| SKY130_OSU_SC_18T_LS__TBUFIx |
| SKY130_OSU_SC_18T_LS__TNBUFIx |
| SKY130_OSU_SC_18T_LS__XNOR2 |
| SKY130_OSU_SC_18T_LS__XOR2 |
| SKY130_OSU_SC_18T_LS_x |

# SKY130_OSU_SC_18T_LS__ADDFx

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__addf_1 | 46.88640 |
| sky130_osu_sc_18T_ls__addf_l | 46.88640 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) | | |
|---|---|---|---|---|---|---|
| | A | B | CI | CO | CON | S |
| sky130_osu_sc_18T_ls__addf_1 | 0.02330 | 0.02325 | 0.01781 | 1.68363 | 0.78715 | 1.65076 |
| sky130_osu_sc_18T_ls__addf_l | 0.02329 | 0.02324 | 0.01781 | 1.14795 | 0.78879 | 1.14386 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_18T_ls__addf_1** | 0.00000 | 0.79573 | 1.03057 |
| **sky130_osu_sc_18T_ls__addf_l** | 0.00000 | 0.67991 | 0.91475 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__addf_1 | A->CO (RR) | 0.29102 | 2.51384 | 29.23740 |
| | B->CO (RR) | 0.28770 | 2.45016 | 28.37480 |
| | CI->CO (RR) | 0.27889 | 2.55082 | 29.84650 |
| | CON->CO (FR) | 0.04913 | 0.97195 | 11.83390 |
| sky130_osu_sc_18T_ls__addf_1 | A->CO (RR) | 0.29185 | 2.33107 | 23.58220 |
| | B->CO (RR) | 0.28888 | 2.28536 | 23.16490 |
| | CI->CO (RR) | 0.27962 | 2.36799 | 24.21350 |
| | CON->CO (FR) | 0.05631 | 1.06023 | 11.81030 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__addf_1 | A->CO (FF) | 0.37721 | 2.99536 | 34.37350 |
| | B->CO (FF) | 0.34368 | 2.89823 | 33.73150 |
| | CI->CO (FF) | 0.33288 | 2.96510 | 34.69480 |
| | CON->CO (RF) | 0.04185 | 0.82707 | 10.05670 |
| sky130_osu_sc_18T_ls__addf_1 | A->CO (FF) | 0.36955 | 2.69672 | 26.83860 |
| | B->CO (FF) | 0.33641 | 2.61218 | 26.47850 |
| | CI->CO (FF) | 0.32536 | 2.66662 | 27.17740 |
| | CON->CO (RF) | 0.04611 | 0.87602 | 9.79162 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__addf_1 | A->CON (FR) | 0.26821 | 1.31206 | 11.13520 |
| | B->CON (FR) | 0.23744 | 1.26112 | 11.18980 |
| | CI->CON (FR) | 0.22388 | 1.28252 | 11.49980 |
| sky130_osu_sc_18T_ls__addf_1 | A->CON (FR) | 0.25366 | 1.29821 | 11.13540 |
| | B->CON (FR) | 0.22353 | 1.24805 | 11.18990 |
| | CI->CON (FR) | 0.20928 | 1.26896 | 11.50000 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__addf_1 | A->CON (RF) | 0.18128 | 0.95094 | 8.34152 |
| | B->CON (RF) | 0.18133 | 0.96424 | 8.63361 |
| | CI->CON (RF) | 0.16899 | 0.98922 | 9.00350 |
| sky130_osu_sc_18T_ls__addf_1 | A->CON (RF) | 0.17412 | 0.94445 | 8.34473 |
| | B->CON (RF) | 0.17458 | 0.95833 | 8.63636 |
| | CI->CON (RF) | 0.16177 | 0.98276 | 9.00603 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__addf_1 | A->S (-R) | 0.54978 | 2.84334 | 27.21060 |
| | B->S (-R) | 0.58557 | 2.88934 | 26.90400 |
| | CI->S (-R) | 0.50216 | 2.80589 | 27.52200 |
| | CON->S (RR) | 0.15610 | 0.95904 | 8.19822 |
| sky130_osu_sc_18T_ls__addf_1 | A->S (-R) | 0.52338 | 2.60944 | 22.40940 |
| | B->S (-R) | 0.50889 | 2.58681 | 22.34480 |
| | CI->S (-R) | 0.47561 | 2.57305 | 22.74100 |
| | CON->S (RR) | 0.15572 | 1.02173 | 8.09467 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__addf_1 | A->S (-F) | 0.47820 | 2.35843 | 21.44990 |
| | B->S (-F) | 0.47314 | 2.26135 | 20.88170 |
| | CI->S (-F) | 0.46453 | 2.38802 | 22.04940 |
| | CON->S (FF) | 0.18742 | 0.97624 | 7.46228 |
| sky130_osu_sc_18T_ls__addf_l | A->S (-F) | 0.45387 | 2.15427 | 17.63960 |
| | B->S (-F) | 0.44789 | 2.07728 | 17.42490 |
| | CI->S (-F) | 0.43985 | 2.18321 | 18.25390 |
| | CON->S (FF) | 0.17620 | 1.01766 | 7.23798 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__addf_1 | A | 0.00359 | 0.00386 | 0.00865 |
| | B | 0.00567 | 0.00586 | 0.00992 |
| | CI | 0.00599 | 0.00640 | 0.01131 |
| sky130_osu_sc_18T_ls__addf_l | A | 0.00259 | 0.00270 | 0.00568 |
| | B | 0.00467 | 0.00468 | 0.00720 |
| | CI | 0.00499 | 0.00521 | 0.00833 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__addf_1 | A | 0.01574 | 0.01624 | 0.02336 |
| | B | 0.01668 | 0.01726 | 0.02330 |
| | CI | 0.01464 | 0.01544 | 0.02167 |
| sky130_osu_sc_18T_ls__addf_l | A | 0.01596 | 0.01606 | 0.01977 |
| | B | 0.01567 | 0.01611 | 0.01979 |
| | CI | 0.01362 | 0.01429 | 0.01819 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__addf_1 | A | 0.01691 | 0.01702 | 0.01951 |
| | B | 0.01664 | 0.01701 | 0.01947 |
| | CI | 0.01461 | 0.01520 | 0.01792 |
| sky130_osu_sc_18T_ls__addf_l | A | 0.01593 | 0.01595 | 0.01834 |
| | B | 0.01564 | 0.01598 | 0.01829 |
| | CI | 0.01360 | 0.01415 | 0.01674 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__addf_1 | A | 0.00415 | 0.00398 | 0.00576 |
| | B | 0.00561 | 0.00564 | 0.00748 |
| | CI | 0.00597 | 0.00625 | 0.00842 |
| sky130_osu_sc_18T_ls__addf_l | A | 0.00316 | 0.00290 | 0.00461 |
| | B | 0.00462 | 0.00456 | 0.00631 |
| | CI | 0.00497 | 0.00515 | 0.00725 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__addf_1 | A | 0.01574 | 0.01623 | 0.02313 |
| | B | 0.01667 | 0.01725 | 0.02308 |
| | CI | 0.01463 | 0.01542 | 0.02145 |
| sky130_osu_sc_18T_ls__addf_l | A | 0.01596 | 0.01606 | 0.01969 |
| | B | 0.01567 | 0.01611 | 0.01972 |
| | CI | 0.01361 | 0.01428 | 0.01815 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__addf_1 | A | 0.03553 | 0.03596 | 0.04015 |
| | B | 0.03171 | 0.03143 | 0.03894 |
| | CI | 0.02875 | 0.02893 | 0.03358 |
| sky130_osu_sc_18T_ls__addf_l | A | 0.03424 | 0.03442 | 0.03859 |
| | B | 0.03044 | 0.03008 | 0.03764 |
| | CI | 0.02750 | 0.02754 | 0.03232 |

# SKY130_OSU_SC_18T_LS__ADDHx

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__addh_1 | 27.83880 |
| sky130_osu_sc_18T_ls__addh_l | 27.83880 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) | | |
|---|---|---|---|---|---|
| | A | B | CO | CON | S |
| sky130_osu_sc_18T_ls__addh_1 | 0.01150 | 0.01242 | 1.65893 | 0.83755 | 1.68635 |
| sky130_osu_sc_18T_ls__addh_l | 0.01150 | 0.01242 | 0.94359 | 0.82483 | 0.96123 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_ls__addh_1 | 0.00000 | 1.00075 | 1.19253 |
| sky130_osu_sc_18T_ls__addh_l | 0.00000 | 0.82955 | 1.03483 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__addh_1 | A->CO (RR) | 0.19787 | 1.01500 | 8.21360 |
| | B->CO (RR) | 0.20473 | 0.99462 | 8.22464 |
| sky130_osu_sc_18T_ls__addh_l | A->CO (RR) | 0.20051 | 1.12473 | 8.14373 |
| | B->CO (RR) | 0.20742 | 1.10914 | 8.14993 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__addh_1 | A->CO (FF) | 0.16128 | 0.92502 | 7.37750 |
| | B->CO (FF) | 0.17097 | 0.94565 | 7.44558 |
| sky130_osu_sc_18T_ls__addh_l | A->CO (FF) | 0.16134 | 0.98043 | 6.97950 |
| | B->CO (FF) | 0.17061 | 1.00098 | 7.05010 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_ls__addh_1 | A->CON (RR) | B | 0.26795 | 0.87970 | 4.75963 |
| | A->CON (FR) | !B | 0.15289 | 1.19692 | 11.50660 |
| | B->CON (RR) | A | 0.27469 | 0.85874 | 4.76513 |
| | B->CON (FR) | !A | 0.18901 | 1.22325 | 11.22090 |
| sky130_osu_sc_18T_ls__addh_l | A->CON (RR) | B | 0.23736 | 0.83260 | 4.57991 |
| | A->CON (FR) | !B | 0.13449 | 1.17244 | 11.37920 |
| | B->CON (RR) | A | 0.24416 | 0.81636 | 4.59799 |
| | B->CON (FR) | !A | 0.17062 | 1.19588 | 11.09010 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_ls__addh_1 | A->CON (FF) | B | 0.25349 | 1.06537 | 6.84686 |
| | A->CON (RF) | !B | 0.10770 | 0.92426 | 9.08891 |
| | B->CON (FF) | A | 0.24666 | 1.09813 | 7.17062 |
| | B->CON (RF) | !A | 0.13325 | 0.93305 | 8.86754 |
| sky130_osu_sc_18T_ls__addh_l | A->CON (FF) | B | 0.22858 | 1.01158 | 6.54506 |
| | A->CON (RF) | !B | 0.09851 | 0.90949 | 9.00528 |
| | B->CON (FF) | A | 0.22179 | 1.04571 | 6.86881 |
| | B->CON (RF) | !A | 0.12415 | 0.91582 | 8.78693 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_ls__addh_1 | A->S (RR) | !B | 0.20489 | 2.42500 | 29.31090 |
| | A->S (FR) | B | 0.35229 | 2.54187 | 26.85360 |
| | B->S (RR) | !A | 0.23147 | 2.38752 | 28.42340 |
| | B->S (FR) | A | 0.34501 | 2.62000 | 27.83710 |
| | CON->S (FR) | - | 0.05333 | 0.99249 | 12.06660 |
| sky130_osu_sc_18T_ls__addh_l | A->S (RR) | !B | 0.20549 | 2.19052 | 21.91790 |
| | A->S (FR) | B | 0.33773 | 2.27857 | 19.33930 |
| | B->S (RR) | !A | 0.23268 | 2.16957 | 21.38480 |
| | B->S (FR) | A | 0.33019 | 2.33990 | 19.97680 |
| | CON->S (FR) | - | 0.06428 | 1.13777 | 12.11560 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_ls__addh_1 | A->S (FF) | !B | 0.24427 | 2.74569 | 33.16790 |
| | A->S (RF) | B | 0.34200 | 1.95649 | 19.29150 |
| | B->S (FF) | !A | 0.28047 | 2.77563 | 32.92610 |
| | B->S (RF) | A | 0.34871 | 1.93583 | 19.28580 |
| | CON->S (RF) | - | 0.03989 | 0.81151 | 9.87246 |
| sky130_osu_sc_18T_ls__addh_l | A->S (FF) | !B | 0.23495 | 2.36739 | 23.58450 |
| | A->S (RF) | B | 0.31776 | 1.74141 | 13.72400 |
| | B->S (FF) | !A | 0.27139 | 2.39623 | 23.31130 |
| | B->S (RF) | A | 0.32453 | 1.72486 | 13.73850 |
| | CON->S (RF) | - | 0.04724 | 0.89507 | 9.64915 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__addh_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00715 | 0.00692 | 0.00904 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00633 | 0.00606 | 0.00775 |
| sky130_osu_sc_18T_ls__addh_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00578 | 0.00544 | 0.00811 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00496 | 0.00456 | 0.00678 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__addh_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01141 | 0.01107 | 0.01388 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01174 | 0.01196 | 0.01494 |
| sky130_osu_sc_18T_ls__addh_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01002 | 0.00965 | 0.01243 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01037 | 0.01043 | 0.01335 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__addh_1 | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00715 | 0.00693 | 0.00958 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00981 | 0.00986 | 0.01097 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00632 | 0.00606 | 0.00812 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.01117 | 0.01119 | 0.01196 |
| sky130_osu_sc_18T_ls__addh_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00578 | 0.00542 | 0.00803 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00893 | 0.00896 | 0.00969 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00496 | 0.00456 | 0.00689 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.01029 | 0.01019 | 0.01066 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__addh_1 | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.01140 | 0.01114 | 0.01379 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00173 | 0.00173 | 0.00246 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.01174 | 0.01192 | 0.01495 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00267 | 0.00255 | 0.00322 |
| sky130_osu_sc_18T_ls__addh_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.01002 | 0.00965 | 0.01241 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00053 | 0.00048 | 0.00097 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.01037 | 0.01042 | 0.01324 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00147 | 0.00127 | 0.00180 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__addh_1 | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.01142 | 0.01110 | 0.01407 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00176 | 0.00185 | 0.00278 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.01176 | 0.01199 | 0.01520 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00270 | 0.00263 | 0.00350 |
| sky130_osu_sc_18T_ls__addh_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.01003 | 0.00966 | 0.01244 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00054 | 0.00050 | 0.00107 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.01038 | 0.01045 | 0.01329 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00149 | 0.00131 | 0.00181 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__addh_1 | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00716 | 0.00692 | 0.00924 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00982 | 0.01004 | 0.01141 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00633 | 0.00606 | 0.00791 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.01119 | 0.01134 | 0.01250 |
| sky130_osu_sc_18T_ls__addh_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00578 | 0.00543 | 0.00799 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00893 | 0.00900 | 0.00972 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00496 | 0.00457 | 0.00666 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.01030 | 0.01028 | 0.01070 |

# SKY130_OSU_SC_18T_LS__AND2x

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__and2_1 | 12.45420 |
| sky130_osu_sc_18T_ls__and2_2 | 15.38460 |
| sky130_osu_sc_18T_ls__and2_4 | 21.24540 |
| sky130_osu_sc_18T_ls__and2_6 | 27.10620 |
| sky130_osu_sc_18T_ls__and2_8 | 32.96700 |
| sky130_osu_sc_18T_ls__and2_l | 12.45420 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_18T_ls__and2_1 | 0.00618 | 0.00628 | 1.67707 |
| sky130_osu_sc_18T_ls__and2_2 | 0.00618 | 0.00629 | 3.28286 |
| sky130_osu_sc_18T_ls__and2_4 | 0.00618 | 0.00628 | 6.34070 |
| sky130_osu_sc_18T_ls__and2_6 | 0.00621 | 0.00628 | 9.43946 |
| sky130_osu_sc_18T_ls__and2_8 | 0.00619 | 0.00630 | 12.14302 |
| sky130_osu_sc_18T_ls__and2_l | 0.00464 | 0.00475 | 1.15017 |

# Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_18T_ls__and2_1** | 0.00000 | 0.38532 | 0.48024 |
| **sky130_osu_sc_18T_ls__and2_2** | 0.00000 | 0.22776 | 0.27097 |
| **sky130_osu_sc_18T_ls__and2_4** | 0.00000 | 0.31837 | 0.35739 |
| **sky130_osu_sc_18T_ls__and2_6** | 0.00000 | 0.40897 | 0.49934 |
| **sky130_osu_sc_18T_ls__and2_8** | 0.00000 | 0.49958 | 0.64129 |
| **sky130_osu_sc_18T_ls__and2_l** | 0.00000 | 0.28757 | 0.35700 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__and2_1 | A->Y (RR) | 0.15099 | 0.91233 | 7.89583 |
| | B->Y (RR) | 0.15976 | 0.90578 | 7.90844 |
| sky130_osu_sc_18T_ls__and2_2 | A->Y (RR) | 0.17545 | 0.86671 | 8.10744 |
| | B->Y (RR) | 0.18436 | 0.85086 | 8.09462 |
| sky130_osu_sc_18T_ls__and2_4 | A->Y (RR) | 0.24194 | 0.91925 | 8.59212 |
| | B->Y (RR) | 0.25071 | 0.89119 | 8.53655 |
| sky130_osu_sc_18T_ls__and2_6 | A->Y (RR) | 0.30616 | 0.99418 | 9.04246 |
| | B->Y (RR) | 0.31474 | 0.96026 | 8.95252 |
| sky130_osu_sc_18T_ls__and2_8 | A->Y (RR) | 0.36933 | 1.06781 | 9.27296 |
| | B->Y (RR) | 0.37820 | 1.03108 | 9.17790 |
| sky130_osu_sc_18T_ls__and2_l | A->Y (RR) | 0.16983 | 1.02087 | 7.98344 |
| | B->Y (RR) | 0.17939 | 1.01248 | 7.98605 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_18T_ls__and2_1** | **A->Y (FF)** | 0.12354 | 0.82544 | 6.85081 |
| | **B->Y (FF)** | 0.13093 | 0.84695 | 6.97229 |
| **sky130_osu_sc_18T_ls__and2_2** | **A->Y (FF)** | 0.14358 | 0.80006 | 7.09035 |
| | **B->Y (FF)** | 0.15196 | 0.81822 | 7.18808 |
| **sky130_osu_sc_18T_ls__and2_4** | **A->Y (FF)** | 0.20082 | 0.85094 | 7.54514 |
| | **B->Y (FF)** | 0.20940 | 0.86440 | 7.63977 |
| **sky130_osu_sc_18T_ls__and2_6** | **A->Y (FF)** | 0.26153 | 0.91774 | 7.98197 |
| | **B->Y (FF)** | 0.27016 | 0.92908 | 8.04852 |
| **sky130_osu_sc_18T_ls__and2_8** | **A->Y (FF)** | 0.31843 | 0.97680 | 8.13200 |
| | **B->Y (FF)** | 0.32726 | 0.98700 | 8.19574 |
| **sky130_osu_sc_18T_ls__and2_l** | **A->Y (FF)** | 0.13429 | 0.90028 | 6.85657 |
| | **B->Y (FF)** | 0.14340 | 0.92387 | 6.96297 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__and2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00567 | 0.00526 | 0.01437 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00577 | 0.00503 | 0.01171 |
| sky130_osu_sc_18T_ls__and2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01126 | 0.01133 | 0.01983 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01135 | 0.01113 | 0.01742 |
| sky130_osu_sc_18T_ls__and2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02338 | 0.02402 | 0.03190 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02350 | 0.02403 | 0.02988 |
| sky130_osu_sc_18T_ls__and2_6 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03599 | 0.03687 | 0.04539 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.03590 | 0.03695 | 0.04337 |
| sky130_osu_sc_18T_ls__and2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.04845 | 0.04968 | 0.05824 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.04870 | 0.04906 | 0.05697 |
| sky130_osu_sc_18T_ls__and2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00412 | 0.00380 | 0.01017 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00421 | 0.00364 | 0.00840 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__and2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01361 | 0.01395 | 0.02295 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01531 | 0.01574 | 0.02399 |
| sky130_osu_sc_18T_ls__and2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01708 | 0.01837 | 0.02710 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01882 | 0.01990 | 0.02807 |
| sky130_osu_sc_18T_ls__and2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02592 | 0.02847 | 0.03717 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02758 | 0.02977 | 0.03808 |
| sky130_osu_sc_18T_ls__and2_6 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03468 | 0.03848 | 0.04797 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.03644 | 0.03966 | 0.04842 |
| sky130_osu_sc_18T_ls__and2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.04442 | 0.04825 | 0.05860 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.04560 | 0.04913 | 0.05861 |
| sky130_osu_sc_18T_ls__and2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01028 | 0.01043 | 0.01673 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01153 | 0.01170 | 0.01761 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__and2_1 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00528 | -0.00528 | -0.00532 |
| sky130_osu_sc_18T_ls__and2_2 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00528 | -0.00529 | -0.00532 |
| sky130_osu_sc_18T_ls__and2_4 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00528 | -0.00529 | -0.00532 |
| sky130_osu_sc_18T_ls__and2_6 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00530 | -0.00531 | -0.00534 |
| sky130_osu_sc_18T_ls__and2_8 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00528 | -0.00528 | -0.00532 |
| sky130_osu_sc_18T_ls__and2_l | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | -0.00378 | -0.00378 | -0.00381 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__and2_1 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00532 | 0.00543 | 0.00535 |
| sky130_osu_sc_18T_ls__and2_2 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00532 | 0.00542 | 0.00535 |
| sky130_osu_sc_18T_ls__and2_4 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00532 | 0.00538 | 0.00535 |
| sky130_osu_sc_18T_ls__and2_6 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00534 | 0.00544 | 0.00537 |
| sky130_osu_sc_18T_ls__and2_8 | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00532 | 0.00542 | 0.00535 |
| sky130_osu_sc_18T_ls__and2_l | (!B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * !Y) | 0.00380 | 0.00388 | 0.00382 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__and2_1 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00505 | -0.00507 | -0.00506 |
| sky130_osu_sc_18T_ls__and2_2 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00505 | -0.00507 | -0.00507 |
| sky130_osu_sc_18T_ls__and2_4 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00505 | -0.00508 | -0.00507 |
| sky130_osu_sc_18T_ls__and2_6 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00505 | -0.00507 | -0.00507 |
| sky130_osu_sc_18T_ls__and2_8 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00505 | -0.00507 | -0.00507 |
| sky130_osu_sc_18T_ls__and2_l | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | -0.00361 | -0.00363 | -0.00362 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__and2_1 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00514 | 0.00517 | 0.00509 |
| sky130_osu_sc_18T_ls__and2_2 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00513 | 0.00517 | 0.00509 |
| sky130_osu_sc_18T_ls__and2_4 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00514 | 0.00516 | 0.00509 |
| sky130_osu_sc_18T_ls__and2_6 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00514 | 0.00516 | 0.00509 |
| sky130_osu_sc_18T_ls__and2_8 | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00514 | 0.00516 | 0.00509 |
| sky130_osu_sc_18T_ls__and2_l | (!A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * !Y) | 0.00367 | 0.00369 | 0.00364 |

# SKY130_OSU_SC_18T_LS__AOI21

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__aoi21_l | 12.45420 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) |
|---|---|---|---|---|
| | A0 | A1 | B0 | Y |
| sky130_osu_sc_18T_ls__aoi21_l | 0.00587 | 0.00607 | 0.00590 | 0.79196 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_ls__aoi21_l | 0.00000 | 0.27881 | 0.60737 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__aoi21_l | A0->Y (FR) | 0.14409 | 1.19056 | 11.07910 |
| | A1->Y (FR) | 0.12520 | 1.14193 | 10.80720 |
| | B0->Y (FR) | 0.10423 | 1.15982 | 11.44060 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__aoi21_l | A0->Y (RF) | 0.10356 | 0.84802 | 8.02582 |
| | A1->Y (RF) | 0.09555 | 0.87919 | 8.58546 |
| | B0->Y (RF) | 0.05557 | 0.78986 | 8.14851 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.01241 | 0.01226 | 0.01288 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.01062 | 0.01049 | 0.01108 |
| | B0 | 0.00949 | 0.00912 | 0.01032 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.00261 | 0.00212 | 0.00280 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.00263 | 0.00226 | 0.00315 |
| | B0 | -0.00130 | -0.00133 | -0.00057 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | -0.00453 | -0.00474 | -0.00472 |
| | (!A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !Y) | -0.00482 | -0.00485 | -0.00484 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00482 | -0.00485 | -0.00483 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.00470 | 0.00474 | 0.00472 |
| | (!A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !Y) | 0.00484 | 0.00490 | 0.00485 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00490 | 0.00490 | 0.00485 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | -0.00451 | -0.00470 | -0.00468 |
| | (!A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !Y) | -0.00479 | -0.00480 | -0.00479 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | -0.00506 | -0.00510 | -0.00512 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | 0.00465 | 0.00470 | 0.00468 |
| | (!A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !Y) | 0.00479 | 0.00482 | 0.00481 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | 0.00512 | 0.00522 | 0.00514 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi21_l | (A0 * A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !Y) | -0.00214 | -0.00218 | -0.00215 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi21_l | (A0 * A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !Y) | 0.00238 | 0.00239 | 0.00222 |

# SKY130_OSU_SC_18T_LS__AOI22

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__aoi22_1 | 15.38460 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | | Max Cap(pf) |
|---|---|---|---|---|---|
| | A0 | A1 | B0 | B1 | Y |
| sky130_osu_sc_18T_ls__aoi22_1 | 0.00588 | 0.00607 | 0.00627 | 0.00605 | 0.77880 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_ls__aoi22_1 | 0.00000 | 0.24768 | 0.65820 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__aoi22_l | A0->Y (FR) | 0.18129 | 1.24068 | 11.12780 |
| | A1->Y (FR) | 0.16287 | 1.20518 | 10.98550 |
| | B0->Y (FR) | 0.11062 | 1.16113 | 11.33370 |
| | B1->Y (FR) | 0.12956 | 1.19662 | 11.52270 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__aoi22_l | A0->Y (RF) | 0.13990 | 0.88197 | 7.98829 |
| | A1->Y (RF) | 0.13196 | 0.91259 | 8.55024 |
| | B0->Y (RF) | 0.06853 | 0.84299 | 8.48327 |
| | B1->Y (RF) | 0.07683 | 0.80940 | 7.91953 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi22_l | A0 | 0.01537 | 0.01525 | 0.01576 |
| | A1 | 0.01358 | 0.01344 | 0.01392 |
| | B0 | 0.01018 | 0.01004 | 0.01127 |
| | B1 | 0.01192 | 0.01153 | 0.01306 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi22_l | A0 | 0.00548 | 0.00498 | 0.00562 |
| | A1 | 0.00550 | 0.00511 | 0.00597 |
| | B0 | -0.00079 | -0.00083 | 0.00015 |
| | B1 | -0.00067 | -0.00091 | -0.00016 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi22_l | (A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * B1 * !Y) | -0.00454 | -0.00472 | -0.00472 |
| | (!A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * B1 * !Y) | -0.00482 | -0.00485 | -0.00484 |
| | (!A1 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !B1 * Y) | -0.00482 | -0.00485 | -0.00483 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00482 | -0.00485 | -0.00483 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi22_l | (A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * B1 * !Y) | 0.00469 | 0.00472 | 0.00472 |
| | (!A1 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * B1 * !Y) | 0.00484 | 0.00490 | 0.00485 |
| | (!A1 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * B0 * !B1 * Y) | 0.00490 | 0.00490 | 0.00485 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00490 | 0.00490 | 0.00485 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi22_l | (A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * B1 * !Y) | -0.00452 | -0.00469 | -0.00468 |
| | (!A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * B1 * !Y) | -0.00479 | -0.00481 | -0.00479 |
| | (!A0 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !B1 * Y) | -0.00505 | -0.00510 | -0.00512 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | -0.00506 | -0.00510 | -0.00512 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi22_l | (A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * B1 * !Y) | 0.00466 | 0.00469 | 0.00468 |
| | (!A0 * B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * B1 * !Y) | 0.00479 | 0.00486 | 0.00481 |
| | (!A0 * B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * B0 * !B1 * Y) | 0.00512 | 0.00522 | 0.00514 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | 0.00511 | 0.00522 | 0.00514 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi22_l | (A0 * A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B1 * !Y) | -0.00215 | -0.00220 | -0.00216 |
| | (A0 * A1 * !B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B1 * !Y) | -0.00212 | -0.00215 | -0.00214 |
| | (!A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B1 * Y) | -0.00517 | -0.00518 | -0.00523 |
| | (!A0 * A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B1 * Y) | -0.00517 | -0.00518 | -0.00523 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi22_l | (A0 * A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B1 * !Y) | 0.00248 | 0.00250 | 0.00225 |
| | (A0 * A1 * !B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B1 * !Y) | 0.00215 | 0.00216 | 0.00215 |
| | (!A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B1 * Y) | 0.00523 | 0.00525 | 0.00525 |
| | (!A0 * A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B1 * Y) | 0.00523 | 0.00525 | 0.00525 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi22_l | (A0 * A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B0 * !Y) | -0.00217 | -0.00221 | -0.00217 |
| | (A0 * A1 * !B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B0 * !Y) | -0.00213 | -0.00216 | -0.00215 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00488 | -0.00489 | -0.00490 |
| | (!A0 * A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B0 * Y) | -0.00488 | -0.00489 | -0.00490 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__aoi22_l | (A0 * A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * B0 * !Y) | 0.00249 | 0.00251 | 0.00226 |
| | (A0 * A1 * !B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * !B0 * !Y) | 0.00216 | 0.00218 | 0.00216 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00496 | 0.00495 | 0.00491 |
| | (!A0 * A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * A1 * !B0 * Y) | 0.00496 | 0.00495 | 0.00491 |

# SKY130_OSU_SC_18T_LS__BUFx

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__buf_1 | 9.52380 |
| sky130_osu_sc_18T_ls__buf_2 | 12.45420 |
| sky130_osu_sc_18T_ls__buf_4 | 18.31500 |
| sky130_osu_sc_18T_ls__buf_6 | 24.17580 |
| sky130_osu_sc_18T_ls__buf_8 | 30.03660 |
| sky130_osu_sc_18T_ls__buf_l | 9.52380 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | Max Cap(pf) |
|---|---|---|
| | A | Y |
| sky130_osu_sc_18T_ls__buf_1 | 0.00628 | 1.66455 |
| sky130_osu_sc_18T_ls__buf_2 | 0.00629 | 3.30935 |
| sky130_osu_sc_18T_ls__buf_4 | 0.00628 | 6.41189 |
| sky130_osu_sc_18T_ls__buf_6 | 0.00099 | 1.80000 |
| sky130_osu_sc_18T_ls__buf_8 | 0.00629 | 12.48123 |
| sky130_osu_sc_18T_ls__buf_l | 0.00479 | 1.14152 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_18T_ls__buf_1** | 0.00000 | 0.42717 | 0.42717 |
| **sky130_osu_sc_18T_ls__buf_2** | 0.00000 | 0.32131 | 0.42471 |
| **sky130_osu_sc_18T_ls__buf_4** | 0.00000 | 0.42903 | 0.56666 |
| **sky130_osu_sc_18T_ls__buf_6** | 0.00000 | 0.00000 | 0.00000 |
| **sky130_osu_sc_18T_ls__buf_8** | 0.00000 | 0.64448 | 0.85055 |
| **sky130_osu_sc_18T_ls__buf_l** | 0.00000 | 0.31135 | 0.31135 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_18T_ls__buf_1** | **A->Y (RR)** | 0.10644 | 0.84231 | 7.68427 |
| **sky130_osu_sc_18T_ls__buf_2** | **A->Y (RR)** | 0.11870 | 0.78141 | 7.94504 |
| **sky130_osu_sc_18T_ls__buf_4** | **A->Y (RR)** | 0.15942 | 0.79837 | 8.37349 |
| **sky130_osu_sc_18T_ls__buf_8** | **A->Y (RR)** | 0.23700 | 0.89180 | 9.02890 |
| **sky130_osu_sc_18T_ls__buf_l** | **A->Y (RR)** | 0.11984 | 0.94328 | 7.72016 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_18T_ls__buf_1** | **A->Y (FF)** | 0.11750 | 0.80941 | 6.77551 |
| **sky130_osu_sc_18T_ls__buf_2** | **A->Y (FF)** | 0.13863 | 0.79218 | 7.13035 |
| **sky130_osu_sc_18T_ls__buf_4** | **A->Y (FF)** | 0.19622 | 0.84445 | 7.60037 |
| **sky130_osu_sc_18T_ls__buf_8** | **A->Y (FF)** | 0.31403 | 0.97381 | 8.26217 |
| **sky130_osu_sc_18T_ls__buf_l** | **A->Y (FF)** | 0.12967 | 0.88640 | 6.76665 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__buf_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00526 | 0.00478 | 0.01346 |
| sky130_osu_sc_18T_ls__buf_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01088 | 0.01081 | 0.01918 |
| sky130_osu_sc_18T_ls__buf_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02295 | 0.02367 | 0.03146 |
| sky130_osu_sc_18T_ls__buf_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.04725 | 0.04905 | 0.05800 |
| sky130_osu_sc_18T_ls__buf_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00393 | 0.00352 | 0.00981 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__buf_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01315 | 0.01341 | 0.02235 |
| sky130_osu_sc_18T_ls__buf_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01660 | 0.01777 | 0.02642 |
| sky130_osu_sc_18T_ls__buf_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02543 | 0.02771 | 0.03648 |
| sky130_osu_sc_18T_ls__buf_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.04364 | 0.04727 | 0.05686 |
| sky130_osu_sc_18T_ls__buf_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01002 | 0.01012 | 0.01649 |

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

| Cell Name | Power(pJ) | | |
|---|---|---|---|
| | first | mid | last |
| sky130_osu_sc_18T_ls__buf_6 | 0.00000 | 0.00000 | 0.00000 |
| | -0.00061 | -0.00062 | -0.00061 |

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

| Cell Name | Power(pJ) | | |
|---|---|---|---|
| | first | mid | last |
| sky130_osu_sc_18T_ls__buf_6 | 0.00000 | 0.00000 | 0.00000 |
| | 0.00061 | 0.00062 | 0.00061 |

# SKY130_OSU_SC_18T_LS__DFFRx

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__dffr_1 | 63.73620 |
| sky130_osu_sc_18T_ls__dffr_l | 63.73620 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) | |
|---|---|---|---|---|---|
| | D | RN | CK | Q | QN |
| sky130_osu_sc_18T_ls__dffr_1 | 0.00603 | 0.00602 | 0.01728 | 1.65052 | 1.64339 |
| sky130_osu_sc_18T_ls__dffr_l | 0.00603 | 0.00602 | 0.01728 | 1.15144 | 1.14965 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_ls__dffr_1 | 0.00000 | 1.61696 | 1.90715 |
| sky130_osu_sc_18T_ls__dffr_l | 0.00000 | 1.50114 | 1.79133 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__dffr_1 | CK->Q (RR) | 0.56900 | 2.11237 | 18.28000 |
| | QN->Q (FR) | 0.05488 | 1.04624 | 12.69950 |
| sky130_osu_sc_18T_ls__dffr_l | CK->Q (RR) | 0.55919 | 2.26679 | 18.04750 |
| | QN->Q (FR) | 0.05992 | 1.11140 | 12.43290 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__dffr_1 | CK->Q (RF) | 0.55507 | 2.14806 | 19.09330 |
| | QN->Q (RF) | 0.04682 | 0.91600 | 11.07930 |
| | RN->Q (FF) | 0.40660 | 2.08458 | 19.76190 |
| sky130_osu_sc_18T_ls__dffr_l | CK->Q (RF) | 0.56257 | 2.34145 | 18.96230 |
| | QN->Q (RF) | 0.04959 | 0.94793 | 10.60780 |
| | RN->Q (FF) | 0.41508 | 2.27857 | 19.62650 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__dffr_1 | CK->QN (RR) | 0.48627 | 1.26670 | 8.23424 |
| | RN->QN (FR) | 0.33759 | 1.20299 | 8.90134 |
| sky130_osu_sc_18T_ls__dffr_l | CK->QN (RR) | 0.48504 | 1.34278 | 8.25539 |
| | RN->QN (FR) | 0.33718 | 1.27951 | 8.91572 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_18T_ls__dffr_1** | **CK->QN (RF)** | 0.48606 | 1.16828 | 6.69719 |
| **sky130_osu_sc_18T_ls__dffr_l** | **CK->QN (RF)** | 0.46730 | 1.18825 | 6.51560 |

# Constraint Information

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | hold | CK (R) | -0.14415 | -0.15456 | -0.32300 |
| | setup | CK (R) | 0.44898 | 0.45570 | 1.29976 |
| sky130_osu_sc_18T_ls__dffr_l | hold | CK (R) | -0.14288 | -0.15402 | -0.32254 |
| | setup | CK (R) | 0.44794 | 0.45653 | 1.30916 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | hold | CK (R) | -0.22007 | -0.54528 | -3.34248 |
| | setup | CK (R) | 0.26865 | 0.56159 | 3.38271 |
| sky130_osu_sc_18T_ls__dffr_l | hold | CK (R) | -0.22030 | -0.54593 | -3.34172 |
| | setup | CK (R) | 0.26841 | 0.56159 | 3.38271 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | hold | CK (R) | -0.14415 | -0.15456 | -0.32300 |
| | setup | CK (R) | 0.44898 | 0.45570 | 1.29976 |
| sky130_osu_sc_18T_ls__dffr_l | hold | CK (R) | -0.14288 | -0.15402 | -0.32254 |
| | setup | CK (R) | 0.44794 | 0.45653 | 1.30916 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | hold | CK (R) | -0.22007 | -0.54528 | -3.34248 |
| | setup | CK (R) | 0.26865 | 0.56159 | 3.38271 |
| sky130_osu_sc_18T_ls__dffr_l | hold | CK (R) | -0.22030 | -0.54593 | -3.34172 |
| | setup | CK (R) | 0.26841 | 0.56159 | 3.38271 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | recovery | CK (R) | 0.35179 | 0.37535 | 1.31247 |
| | removal | CK (R) | -0.07072 | -0.07807 | -0.12458 |
| sky130_osu_sc_18T_ls__dffr_l | recovery | CK (R) | 0.35178 | 0.37788 | 1.32043 |
| | removal | CK (R) | -0.07072 | -0.07807 | -0.12458 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | recovery | CK (R) | 0.35179 | 0.37535 | 1.31247 |
| | removal | CK (R) | -0.07072 | -0.07807 | -0.12458 |
| sky130_osu_sc_18T_ls__dffr_l | recovery | CK (R) | 0.35178 | 0.37788 | 1.32043 |
| | removal | CK (R) | -0.07072 | -0.07807 | -0.12458 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | min_pulse_width | RN () | 0.23987 | 0.61523 | 13.33370 |
| | min_pulse_width | RN () | 0.23987 | 0.61523 | 13.33370 |
| sky130_osu_sc_18T_ls__dffr_l | min_pulse_width | RN () | 0.23529 | 0.61523 | 13.33370 |
| | min_pulse_width | RN () | 0.23300 | 0.61523 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | min_pulse_width | CK () | 0.26733 | 0.61523 | 13.33370 |
| | min_pulse_width | CK () | 0.29251 | 0.61523 | 13.33370 |
| sky130_osu_sc_18T_ls__dffr_l | min_pulse_width | CK () | 0.24902 | 0.61523 | 13.33370 |
| | min_pulse_width | CK () | 0.28564 | 0.61523 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | min_pulse_width | CK () | 0.56358 | 0.63450 | 13.33370 |
| | min_pulse_width | CK () | 0.22614 | 0.61523 | 13.33370 |
| sky130_osu_sc_18T_ls__dffr_l | min_pulse_width | CK () | 0.56358 | 0.63450 | 13.33370 |
| | min_pulse_width | CK () | 0.22614 | 0.61523 | 13.33370 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01299 | 0.01086 | -0.00202 |
| sky130_osu_sc_18T_ls__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01141 | 0.00981 | 0.00747 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01531 | 0.01393 | 0.00521 |
| | RN | -0.00174 | -0.08137 | -1.05633 |
| | RN | 0.03466 | 0.03350 | 0.02463 |
| sky130_osu_sc_18T_ls__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01371 | 0.01271 | 0.01078 |
| | RN | -0.00174 | -0.06556 | -0.73692 |
| | RN | 0.03305 | 0.03225 | 0.03018 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01530 | 0.01392 | 0.00513 |
| | RN | -0.00174 | -0.08116 | -1.05160 |
| | RN | 0.03465 | 0.03349 | 0.02463 |
| sky130_osu_sc_18T_ls__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01370 | 0.01269 | 0.01064 |
| | RN | -0.00174 | -0.06550 | -0.73570 |
| | RN | 0.03303 | 0.03224 | 0.03007 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01294 | 0.01084 | -0.00189 |
| sky130_osu_sc_18T_ls__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01137 | 0.00977 | 0.00755 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00424 | -0.00470 | -0.00471 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.01553 | 0.01462 | 0.02018 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.00727 | 0.00641 | 0.01211 |
| sky130_osu_sc_18T_ls__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00425 | -0.00470 | -0.00471 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.01553 | 0.01462 | 0.02018 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.00727 | 0.00641 | 0.01211 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00468 | 0.00474 | 0.00471 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.02769 | 0.02731 | 0.03284 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.01288 | 0.01260 | 0.01823 |
| sky130_osu_sc_18T_ls__dffr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00468 | 0.00474 | 0.00471 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * Q * !QN) + (!CK * RN * !Q * QN) | 0.02769 | 0.02731 | 0.03284 |
| | (!CK * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !Q * QN) | 0.01288 | 0.01259 | 0.01823 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00487 | 0.00422 | 0.01320 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.01349 | 0.01251 | 0.02155 |
| sky130_osu_sc_18T_ls__dffr_l | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00487 | 0.00422 | 0.01320 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.01349 | 0.01251 | 0.02155 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.01168 | 0.01152 | 0.02106 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.02584 | 0.02529 | 0.03442 |
| sky130_osu_sc_18T_ls__dffr_l | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !Q * QN) + (!CK * !D * !Q * QN) | 0.01168 | 0.01152 | 0.02106 |
| | (!CK * D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !Q * QN) | 0.02583 | 0.02529 | 0.03442 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | -0.00092 | -0.00179 | 0.00699 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.00745 | 0.00607 | 0.01469 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | -0.00142 | -0.00216 | 0.00647 |
| sky130_osu_sc_18T_ls__dffr_l | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | -0.00092 | -0.00179 | 0.00699 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.00744 | 0.00607 | 0.01469 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | -0.00142 | -0.00216 | 0.00647 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | 0.01833 | 0.01817 | 0.02765 |
| | (D * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * !Q * QN) | 0.04086 | 0.03976 | 0.04834 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.03166 | 0.03122 | 0.03982 |
| | (!D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * Q * !QN) | 0.04050 | 0.03989 | 0.05734 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.02161 | 0.02166 | 0.03041 |
| sky130_osu_sc_18T_ls__dffr_l | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | 0.01833 | 0.01816 | 0.02765 |
| | (D * RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * !Q * QN) | 0.04085 | 0.03976 | 0.04833 |
| | (D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !Q * QN) | 0.03166 | 0.03122 | 0.03982 |
| | (!D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * Q * !QN) | 0.04050 | 0.03989 | 0.05734 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.02161 | 0.02165 | 0.03041 |

# SKY130_OSU_SC_18T_LS__DFFSRx

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| **sky130_osu_sc_18T_ls__dffsr_1** | 69.59700 |
| **sky130_osu_sc_18T_ls__dffsr_l** | 69.59700 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | | Max Cap(pf) | |
|---|---|---|---|---|---|---|
| | **D** | **RN** | **SN** | **CK** | **Q** | **QN** |
| **sky130_osu_sc_18T_ls__dffsr_1** | 0.00599 | 0.00603 | 0.01276 | 0.01752 | 1.68725 | 1.69072 |
| **sky130_osu_sc_18T_ls__dffsr_l** | 0.00599 | 0.00603 | 0.01275 | 0.01752 | 1.15622 | 1.15424 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | **Min.** | **Avg** | **Max.** |
| **sky130_osu_sc_18T_ls__dffsr_1** | 0.00000 | 1.85458 | 2.67642 |
| **sky130_osu_sc_18T_ls__dffsr_l** | 0.00000 | 1.73876 | 2.56060 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__dffsr_1 | CK->Q (RR) | 0.57683 | 2.10297 | 18.14560 |
| | QN->Q (FR) | 0.05273 | 1.02648 | 12.53710 |
| | RN->Q (RR) | 0.45593 | 2.00305 | 18.12710 |
| | SN->Q (FR) | 0.42052 | 2.03743 | 19.12160 |
| sky130_osu_sc_18T_ls__dffsr_l | CK->Q (RR) | 0.58210 | 2.30363 | 18.18840 |
| | QN->Q (FR) | 0.05985 | 1.11093 | 12.43960 |
| | RN->Q (RR) | 0.46194 | 2.20476 | 18.16420 |
| | SN->Q (FR) | 0.42615 | 2.23648 | 19.13210 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__dffsr_1 | CK->Q (RF) | 0.64319 | 2.22615 | 19.06080 |
| | QN->Q (RF) | 0.04347 | 0.87399 | 10.64050 |
| | RN->Q (FF) | 0.42140 | 2.08952 | 19.72840 |
| sky130_osu_sc_18T_ls__dffsr_l | CK->Q (RF) | 0.65646 | 2.45005 | 19.13770 |
| | QN->Q (RF) | 0.04950 | 0.94869 | 10.62230 |
| | RN->Q (FF) | 0.43580 | 2.31409 | 19.79960 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__dffsr_1 | CK->QN (RR) | 0.57481 | 1.36512 | 8.38569 |
| | RN->QN (FR) | 0.35445 | 1.22945 | 9.05374 |
| sky130_osu_sc_18T_ls__dffsr_l | CK->QN (RR) | 0.57705 | 1.44745 | 8.39045 |
| | RN->QN (FR) | 0.35762 | 1.31302 | 9.05269 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__dffsr_1 | CK->QN (RF) | 0.49879 | 1.17859 | 6.68702 |
| | RN->QN (RF) | 0.37814 | 1.07941 | 6.66703 |
| | SN->QN (FF) | 0.34307 | 1.11336 | 7.65664 |
| sky130_osu_sc_18T_ls__dffsr_l | CK->QN (RF) | 0.49232 | 1.22398 | 6.61605 |
| | RN->QN (RF) | 0.37218 | 1.12583 | 6.59267 |
| | SN->QN (FF) | 0.33673 | 1.15745 | 7.55364 |

# Constraint Information

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | hold | CK (R) | -0.15308 | -0.16670 | -0.40152 |
| | setup | CK (R) | 0.43459 | 0.44047 | 1.34734 |
| sky130_osu_sc_18T_ls__dffsr_l | hold | CK (R) | -0.15338 | -0.16533 | -0.39880 |
| | setup | CK (R) | 0.43217 | 0.43972 | 1.35067 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | hold | CK (R) | -0.25617 | -0.57305 | -3.48796 |
| | setup | CK (R) | 0.32232 | 0.58947 | 3.52123 |
| sky130_osu_sc_18T_ls__dffsr_l | hold | CK (R) | -0.25348 | -0.57360 | -3.48501 |
| | setup | CK (R) | 0.32251 | 0.58910 | 3.51981 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | hold | CK (R) | -0.15308 | -0.16670 | -0.40152 |
| | setup | CK (R) | 0.43459 | 0.44047 | 1.34734 |
| sky130_osu_sc_18T_ls__dffsr_l | hold | CK (R) | -0.15338 | -0.16533 | -0.39880 |
| | setup | CK (R) | 0.43217 | 0.43972 | 1.35067 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | hold | CK (R) | -0.25617 | -0.57305 | -3.48796 |
| | setup | CK (R) | 0.32232 | 0.58947 | 3.52123 |
| sky130_osu_sc_18T_ls__dffsr_l | hold | CK (R) | -0.25348 | -0.57360 | -3.48501 |
| | setup | CK (R) | 0.32251 | 0.58910 | 3.51981 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | recovery | CK (R) | 0.30716 | 0.32354 | 1.24694 |
| | removal | CK (R) | -0.03834 | -0.04176 | -0.08002 |
| | hold | SN (R) | -0.32803 | -0.57940 | -2.46627 |
| | setup | SN (R) | 0.36384 | 0.63780 | 4.64442 |
| sky130_osu_sc_18T_ls__dffsr_l | recovery | CK (R) | 0.30286 | 0.32286 | 1.25003 |
| | removal | CK (R) | -0.03733 | -0.04176 | -0.08002 |
| | hold | SN (R) | -0.31922 | -0.56757 | -2.39297 |
| | setup | SN (R) | 0.36497 | 0.62469 | 4.54690 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | recovery | CK (R) | 0.30716 | 0.32354 | 1.24694 |
| | removal | CK (R) | -0.03834 | -0.04176 | -0.08002 |
| | hold | SN (R) | -0.32848 | -0.57940 | -2.46627 |
| | hold | SN (R) | -0.32803 | -0.58198 | -2.48606 |
| | setup | SN (R) | 0.36384 | 0.63326 | 4.50479 |
| | setup | SN (R) | 0.36294 | 0.63780 | 4.64442 |
| sky130_osu_sc_18T_ls__dffsr_l | recovery | CK (R) | 0.30286 | 0.32286 | 1.25003 |
| | removal | CK (R) | -0.03733 | -0.04176 | -0.08002 |
| | hold | SN (R) | -0.32011 | -0.56757 | -2.39297 |
| | hold | SN (R) | -0.31922 | -0.56916 | -2.41541 |
| | setup | SN (R) | 0.36497 | 0.61994 | 4.34347 |
| | setup | SN (R) | 0.34050 | 0.62469 | 4.54690 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | min_pulse_width | RN () | 0.27420 | 0.61523 | 13.33370 |
| | min_pulse_width | RN () | 0.27878 | 0.61523 | 13.33370 |
| sky130_osu_sc_18T_ls__dffsr_l | min_pulse_width | RN () | 0.27420 | 0.61523 | 13.33370 |
| | min_pulse_width | RN () | 0.26962 | 0.61523 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | recovery | CK (R) | 0.09051 | 0.13294 | 3.27935 |
| | removal | CK (R) | -0.03727 | -0.09824 | -0.53278 |
| sky130_osu_sc_18T_ls__dffsr_l | recovery | CK (R) | 0.08700 | 0.13245 | 3.14919 |
| | removal | CK (R) | -0.03727 | -0.09824 | -0.53278 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | recovery | CK (R) | 0.09051 | 0.13294 | 3.27935 |
| | removal | CK (R) | -0.03727 | -0.09824 | -0.53278 |
| sky130_osu_sc_18T_ls__dffsr_l | recovery | CK (R) | 0.08700 | 0.13245 | 3.14919 |
| | removal | CK (R) | -0.03727 | -0.09824 | -0.53278 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | min_pulse_width | SN () | 0.32913 | 0.61523 | 13.33370 |
| | min_pulse_width | SN () | 0.32913 | 0.61523 | 13.33370 |
| sky130_osu_sc_18T_ls__dffsr_l | min_pulse_width | SN () | 0.32913 | 0.61523 | 13.33370 |
| | min_pulse_width | SN () | 0.30853 | 0.61523 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | min_pulse_width | CK () | 0.26733 | 0.61523 | 13.33370 |
| | min_pulse_width | CK () | 0.31769 | 0.61523 | 13.33370 |
| sky130_osu_sc_18T_ls__dffsr_l | min_pulse_width | CK () | 0.25818 | 0.61523 | 13.33370 |
| | min_pulse_width | CK () | 0.31082 | 0.61523 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | min_pulse_width | CK () | 0.55305 | 0.61738 | 13.33370 |
| | min_pulse_width | CK () | 0.29022 | 0.61523 | 13.33370 |
| sky130_osu_sc_18T_ls__dffsr_l | min_pulse_width | CK () | 0.55076 | 0.61738 | 13.33370 |
| | min_pulse_width | CK () | 0.28793 | 0.61523 | 13.33370 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01647 | 0.01500 | 0.00956 |
| | RN | 0.03019 | 0.02904 | 0.01931 |
| | SN | -0.00174 | -0.08245 | -1.07984 |
| | SN | 0.03388 | 0.03263 | 0.02316 |
| sky130_osu_sc_18T_ls__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01500 | 0.01344 | 0.01109 |
| | RN | 0.02871 | 0.02748 | 0.02097 |
| | SN | -0.00174 | -0.06572 | -0.73998 |
| | SN | 0.03240 | 0.03105 | 0.02471 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01775 | 0.01673 | 0.01034 |
| | RN | -0.00174 | -0.08245 | -1.07983 |
| | RN | 0.03542 | 0.03432 | 0.02842 |
| sky130_osu_sc_18T_ls__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01629 | 0.01543 | 0.01363 |
| | RN | -0.00174 | -0.06572 | -0.73997 |
| | RN | 0.03391 | 0.03299 | 0.03125 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01774 | 0.01671 | 0.01013 |
| | RN | -0.00174 | -0.08255 | -1.08196 |
| | RN | 0.03541 | 0.03431 | 0.02777 |
| sky130_osu_sc_18T_ls__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01627 | 0.01541 | 0.01347 |
| | RN | -0.00174 | -0.06566 | -0.73864 |
| | RN | 0.03390 | 0.03298 | 0.03112 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01641 | 0.01495 | 0.00936 |
| | RN | 0.03013 | 0.02899 | 0.01912 |
| | SN | -0.00174 | -0.08255 | -1.08196 |
| | SN | 0.03382 | 0.03257 | 0.02293 |
| sky130_osu_sc_18T_ls__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01495 | 0.01339 | 0.01101 |
| | RN | 0.02866 | 0.02742 | 0.02077 |
| | SN | -0.00174 | -0.06566 | -0.73864 |
| | SN | 0.03235 | 0.03100 | 0.02461 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00459 | -0.00470 | -0.00470 |
| | (!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) | 0.02035 | 0.01949 | 0.02500 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.00839 | 0.00757 | 0.01314 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.00832 | 0.00750 | 0.01310 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00842 | 0.00760 | 0.01319 |
| sky130_osu_sc_18T_ls__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00459 | -0.00470 | -0.00470 |
| | (!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) | 0.02035 | 0.01949 | 0.02500 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.00839 | 0.00757 | 0.01314 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.00832 | 0.00749 | 0.01310 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00841 | 0.00760 | 0.01319 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00474 | 0.00474 | 0.00470 |
| | (!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) | 0.03151 | 0.03110 | 0.03620 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.01355 | 0.01331 | 0.01882 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.01360 | 0.01335 | 0.01884 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.01350 | 0.01327 | 0.01877 |
| sky130_osu_sc_18T_ls__dffsr_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00474 | 0.00474 | 0.00470 |
| | (!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) | 0.03150 | 0.03109 | 0.03619 |
| | (!CK * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * RN * !SN * Q * !QN) | 0.01354 | 0.01330 | 0.01881 |
| | (!CK * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * SN * !Q * QN) | 0.01359 | 0.01334 | 0.01883 |
| | (!CK * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !RN * !SN * !Q * QN) | 0.01350 | 0.01326 | 0.01876 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__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) | 0.00407 | 0.00338 | 0.01216 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.01625 | 0.01521 | 0.02393 |
| sky130_osu_sc_18T_ls__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) | 0.00407 | 0.00337 | 0.01217 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.01626 | 0.01522 | 0.02394 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__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) | 0.01258 | 0.01250 | 0.02214 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.02739 | 0.02677 | 0.03590 |
| sky130_osu_sc_18T_ls__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) | 0.01257 | 0.01247 | 0.02213 |
| | (!CK * D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * SN * !Q * QN) | 0.02738 | 0.02675 | 0.03589 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__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) | -0.01044 | -0.01051 | -0.01057 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | -0.01058 | -0.01086 | -0.01081 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | -0.01034 | -0.01052 | -0.01046 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.00724 | 0.00653 | 0.01269 |
| sky130_osu_sc_18T_ls__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) | -0.01043 | -0.01051 | -0.01057 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | -0.01056 | -0.01084 | -0.01079 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | -0.01033 | -0.01051 | -0.01046 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.00725 | 0.00652 | 0.01269 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__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) | 0.01058 | 0.01079 | 0.01063 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.01079 | 0.01089 | 0.01083 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | 0.01045 | 0.01053 | 0.01050 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.02101 | 0.02055 | 0.02552 |
| sky130_osu_sc_18T_ls__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) | 0.01058 | 0.01079 | 0.01063 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * !RN * !Q * QN) + (!CK * !D * !RN * !Q * QN) | 0.01078 | 0.01088 | 0.01081 |
| | (!CK * D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * D * !RN * !Q * QN) | 0.01044 | 0.01052 | 0.01050 |
| | (!CK * !D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * RN * Q * !QN) | 0.02100 | 0.02054 | 0.02551 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffsr_1 | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | -0.00092 | -0.00179 | 0.00699 |
| | (D * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * SN * !Q * QN) | 0.00833 | 0.00707 | 0.01568 |
| | (D * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !SN * !Q * QN) | 0.00825 | 0.00699 | 0.01562 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | -0.00122 | -0.00189 | 0.00668 |
| | (!D * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * !SN * Q * !QN) | 0.00612 | 0.00442 | 0.02160 |
| sky130_osu_sc_18T_ls__dffsr_l | (D * RN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * RN * Q * !QN) | -0.00092 | -0.00179 | 0.00699 |
| | (D * !RN * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * SN * !Q * QN) | 0.00832 | 0.00706 | 0.01567 |
| | (D * !RN * !SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !RN * !SN * !Q * QN) | 0.00824 | 0.00698 | 0.01562 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN) | -0.00122 | -0.00189 | 0.00668 |
| | (!D * RN * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * RN * !SN * Q * !QN) | 0.00612 | 0.00442 | 0.02160 |

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

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

| | | | | |
|---|---|---|---|---|
| **sky130_osu_sc_18T_ls__dffsr_1** | **(D * RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * SN * !Q * QN)** | 0.04576 | 0.04472 | 0.05327 |
| | **(D * RN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * Q * !QN)** | 0.01837 | 0.01828 | 0.02769 |
| | **(D * !RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * SN * !Q * QN)** | 0.03245 | 0.03200 | 0.04066 |
| | **(D * !RN * !SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * !SN * !Q * QN)** | 0.03257 | 0.03212 | 0.04068 |
| | **(!D * RN * SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * Q * !QN)** | 0.04426 | 0.04348 | 0.06054 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.02146 | 0.02150 | 0.03026 |
| | **(!D * RN * !SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * !SN * Q * !QN)** | 0.02469 | 0.02437 | 0.04248 |
| **sky130_osu_sc_18T_ls__dffsr_l** | **(D * RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * SN * !Q * QN)** | 0.04576 | 0.04472 | 0.05327 |
| | **(D * RN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * RN * Q * !QN)** | 0.01837 | 0.01828 | 0.02769 |
| | **(D * !RN * SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * SN * !Q * QN)** | 0.03245 | 0.03200 | 0.04066 |
| | **(D * !RN * !SN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(D * !RN * !SN * !Q * QN)** | 0.03256 | 0.03212 | 0.04068 |
| | **(!D * RN * SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * Q * !QN)** | 0.04426 | 0.04347 | 0.06055 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * SN * !Q * QN) + (!D * !RN * !Q * QN)** | 0.02146 | 0.02150 | 0.03026 |
| | **(!D * RN * !SN * Q * !QN)** | 0.00000 | 0.00000 | 0.00000 |
| | **(!D * RN * !SN * Q * !QN)** | 0.02468 | 0.02437 | 0.04247 |

# SKY130_OSU_SC_18T_LS__DFFSx

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__dffs_1 | 57.87540 |
| sky130_osu_sc_18T_ls__dffs_l | 57.87540 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) | |
|---|---|---|---|---|---|
| | D | SN | CK | Q | QN |
| sky130_osu_sc_18T_ls__dffs_1 | 0.00602 | 0.00988 | 0.01729 | 1.64036 | 1.65905 |
| sky130_osu_sc_18T_ls__dffs_l | 0.00602 | 0.00988 | 0.01729 | 1.14771 | 1.15695 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_ls__dffs_1 | 0.00000 | 1.18287 | 1.31633 |
| sky130_osu_sc_18T_ls__dffs_l | 0.00000 | 1.06704 | 1.20051 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__dffs_1 | CK->Q (RR) | 0.42571 | 1.93707 | 17.97370 |
| | QN->Q (FR) | 0.05468 | 1.03832 | 12.58860 |
| | SN->Q (FR) | 0.31539 | 1.97782 | 19.06740 |
| sky130_osu_sc_18T_ls__dffs_l | CK->Q (RR) | 0.42720 | 2.11026 | 17.82280 |
| | QN->Q (FR) | 0.05974 | 1.10886 | 12.36060 |
| | SN->Q (FR) | 0.31539 | 2.14268 | 18.85160 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__dffs_1 | CK->Q (RF) | 0.63858 | 2.24079 | 19.02750 |
| | QN->Q (RF) | 0.04650 | 0.91064 | 11.00140 |
| sky130_osu_sc_18T_ls__dffs_l | CK->Q (RF) | 0.64064 | 2.42626 | 18.95610 |
| | QN->Q (RF) | 0.04934 | 0.94136 | 10.56140 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__dffs_1 | CK->QN (RR) | 0.56583 | 1.36681 | 8.37136 |
| sky130_osu_sc_18T_ls__dffs_l | CK->QN (RR) | 0.55944 | 1.43339 | 8.36994 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__dffs_1 | CK->QN (RF) | 0.35088 | 1.00545 | 6.58427 |
| | SN->QN (FF) | 0.24015 | 1.04637 | 7.66932 |
| sky130_osu_sc_18T_ls__dffs_l | CK->QN (RF) | 0.34284 | 1.04045 | 6.39909 |
| | SN->QN (FF) | 0.23054 | 1.07351 | 7.42856 |

# Constraint Information

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | hold | CK (R) | -0.11152 | -0.13188 | -0.28939 |
| | setup | CK (R) | 0.30605 | 0.32361 | 1.24394 |
| sky130_osu_sc_18T_ls__dffs_l | hold | CK (R) | -0.11339 | -0.13120 | -0.28724 |
| | setup | CK (R) | 0.30508 | 0.32428 | 1.25009 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | hold | CK (R) | -0.22618 | -0.54480 | -3.35257 |
| | setup | CK (R) | 0.30858 | 0.56394 | 3.39571 |
| sky130_osu_sc_18T_ls__dffs_l | hold | CK (R) | -0.22893 | -0.54419 | -3.35113 |
| | setup | CK (R) | 0.31040 | 0.56382 | 3.39349 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | hold | CK (R) | -0.11152 | -0.13188 | -0.28939 |
| | setup | CK (R) | 0.30605 | 0.32361 | 1.24394 |
| sky130_osu_sc_18T_ls__dffs_l | hold | CK (R) | -0.11339 | -0.13120 | -0.28724 |
| | setup | CK (R) | 0.30508 | 0.32428 | 1.25009 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | hold | CK (R) | -0.22618 | -0.54480 | -3.35257 |
| | setup | CK (R) | 0.30858 | 0.56394 | 3.39571 |
| sky130_osu_sc_18T_ls__dffs_l | hold | CK (R) | -0.22893 | -0.54419 | -3.35113 |
| | setup | CK (R) | 0.31040 | 0.56382 | 3.39349 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | recovery | CK (R) | 0.09926 | 0.13800 | 2.13541 |
| | removal | CK (R) | -0.03865 | -0.09371 | -0.51532 |
| sky130_osu_sc_18T_ls__dffs_l | recovery | CK (R) | 0.09896 | 0.13800 | 1.98860 |
| | removal | CK (R) | -0.03865 | -0.09371 | -0.51532 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | recovery | CK (R) | 0.09926 | 0.13800 | 2.13541 |
| | removal | CK (R) | -0.03865 | -0.09371 | -0.51532 |
| sky130_osu_sc_18T_ls__dffs_l | recovery | CK (R) | 0.09896 | 0.13800 | 1.98860 |
| | removal | CK (R) | -0.03865 | -0.09371 | -0.51532 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | min_pulse_width | SN () | 0.20554 | 0.61523 | 13.33370 |
| | min_pulse_width | SN () | 0.21011 | 0.61523 | 13.33370 |
| sky130_osu_sc_18T_ls__dffs_l | min_pulse_width | SN () | 0.20554 | 0.61523 | 13.33370 |
| | min_pulse_width | SN () | 0.19867 | 0.61523 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | min_pulse_width | CK () | 0.19180 | 0.61523 | 13.33370 |
| | min_pulse_width | CK () | 0.31540 | 0.61523 | 13.33370 |
| sky130_osu_sc_18T_ls__dffs_l | min_pulse_width | CK () | 0.18265 | 0.61523 | 13.33370 |
| | min_pulse_width | CK () | 0.30624 | 0.61523 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | min_pulse_width | CK () | 0.42068 | 0.61523 | 13.33370 |
| | min_pulse_width | CK () | 0.27878 | 0.61523 | 13.33370 |
| sky130_osu_sc_18T_ls__dffs_l | min_pulse_width | CK () | 0.42068 | 0.61523 | 13.33370 |
| | min_pulse_width | CK () | 0.27878 | 0.61523 | 13.33370 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01302 | 0.01088 | -0.00130 |
| | SN | -0.00174 | -0.08107 | -1.04983 |
| | SN | 0.02818 | 0.02612 | 0.01087 |
| sky130_osu_sc_18T_ls__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01144 | 0.00982 | 0.00801 |
| | SN | -0.00174 | -0.06543 | -0.73454 |
| | SN | 0.02659 | 0.02507 | 0.02005 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01518 | 0.01397 | 0.00596 |
| sky130_osu_sc_18T_ls__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01360 | 0.01269 | 0.01115 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01517 | 0.01395 | 0.00591 |
| sky130_osu_sc_18T_ls__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01359 | 0.01268 | 0.01111 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01298 | 0.01083 | -0.00170 |
| | SN | -0.00174 | -0.08162 | -1.06166 |
| | SN | 0.02813 | 0.02607 | 0.01064 |
| sky130_osu_sc_18T_ls__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01140 | 0.00978 | 0.00777 |
| | SN | -0.00174 | -0.06575 | -0.74037 |
| | SN | 0.02654 | 0.02500 | 0.01984 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00464 | -0.00476 | -0.00473 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.01479 | 0.01384 | 0.01940 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.00711 | 0.00627 | 0.01195 |
| sky130_osu_sc_18T_ls__dffs_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00465 | -0.00476 | -0.00473 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.01479 | 0.01384 | 0.01939 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.00711 | 0.00627 | 0.01195 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00477 | 0.00477 | 0.00473 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.02679 | 0.02630 | 0.03179 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.01305 | 0.01279 | 0.01846 |
| sky130_osu_sc_18T_ls__dffs_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00477 | 0.00477 | 0.00473 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * SN * Q * !QN) + (!CK * SN * !Q * QN) | 0.02679 | 0.02630 | 0.03179 |
| | (!CK * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !SN * Q * !QN) | 0.01305 | 0.01279 | 0.01846 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | -0.00754 | -0.00760 | -0.00760 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.00596 | 0.00534 | 0.01071 |
| sky130_osu_sc_18T_ls__dffs_1 | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | -0.00754 | -0.00760 | -0.00760 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.00596 | 0.00534 | 0.01071 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00767 | 0.00766 | 0.00764 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.01412 | 0.01370 | 0.01933 |
| sky130_osu_sc_18T_ls__dffs_l | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (CK * Q * !QN) + (!CK * D * Q * !QN) | 0.00766 | 0.00766 | 0.00764 |
| | (!CK * !D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * !D * Q * !QN) | 0.01412 | 0.01370 | 0.01932 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | -0.00094 | -0.00181 | 0.00697 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | -0.00133 | -0.00208 | 0.00657 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.00480 | 0.00310 | 0.02054 |
| sky130_osu_sc_18T_ls__dffs_l | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | -0.00094 | -0.00181 | 0.00697 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | -0.00134 | -0.00208 | 0.00656 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.00480 | 0.00310 | 0.02054 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dffs_1 | (D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * SN * !Q * QN) | 0.04006 | 0.03894 | 0.04771 |
| | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.01833 | 0.01818 | 0.02766 |
| | (!D * SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * Q * !QN) | 0.03949 | 0.03872 | 0.05605 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | 0.02150 | 0.02147 | 0.03031 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.02410 | 0.02382 | 0.04216 |
| sky130_osu_sc_18T_ls__dffs_l | (D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * SN * !Q * QN) | 0.04006 | 0.03893 | 0.04771 |
| | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.01833 | 0.01816 | 0.02766 |
| | (!D * SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * Q * !QN) | 0.03949 | 0.03873 | 0.05605 |
| | (!D * SN * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * SN * !Q * QN) | 0.02150 | 0.02147 | 0.03031 |
| | (!D * !SN * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !SN * Q * !QN) | 0.02410 | 0.02382 | 0.04216 |

# SKY130_OSU_SC_18T_LS__DFFx

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__dff_1 | 48.35160 |
| sky130_osu_sc_18T_ls__dff_l | 48.35160 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) | |
|---|---|---|---|---|
| | D | CK | Q | QN |
| sky130_osu_sc_18T_ls__dff_1 | 0.00617 | 0.01727 | 1.70779 | 1.70664 |
| sky130_osu_sc_18T_ls__dff_l | 0.00617 | 0.01727 | 1.13590 | 1.14382 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_ls__dff_1 | 0.00000 | 1.43351 | 1.74445 |
| sky130_osu_sc_18T_ls__dff_l | 0.00000 | 1.31768 | 1.62863 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__dff_1 | CK->Q (RR) | 0.38216 | 1.88484 | 18.08710 |
| | QN->Q (FR) | 0.05241 | 1.02748 | 12.58610 |
| sky130_osu_sc_18T_ls__dff_l | CK->Q (RR) | 0.39489 | 2.07793 | 17.70620 |
| | QN->Q (FR) | 0.06058 | 1.11791 | 12.41810 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__dff_1 | CK->Q (RF) | 0.52197 | 2.09665 | 19.09590 |
| | QN->Q (RF) | 0.04329 | 0.87489 | 10.68780 |
| sky130_osu_sc_18T_ls__dff_l | CK->Q (RF) | 0.53951 | 2.31044 | 18.77050 |
| | QN->Q (RF) | 0.04943 | 0.93967 | 10.50220 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__dff_1 | CK->QN (RR) | 0.45690 | 1.23237 | 8.29015 |
| sky130_osu_sc_18T_ls__dff_l | CK->QN (RR) | 0.46272 | 1.32051 | 8.24230 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__dff_1 | CK->QN (RF) | 0.31170 | 0.95746 | 6.49526 |
| sky130_osu_sc_18T_ls__dff_l | CK->QN (RF) | 0.31154 | 1.00922 | 6.33450 |

# Constraint Information

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dff_1 | hold | CK (R) | -0.10643 | -0.12991 | -0.31695 |
| | setup | CK (R) | 0.26152 | 0.28027 | 1.24305 |
| sky130_osu_sc_18T_ls__dff_l | hold | CK (R) | -0.10973 | -0.12907 | -0.31543 |
| | setup | CK (R) | 0.26020 | 0.27935 | 1.25110 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dff_1 | hold | CK (R) | -0.21291 | -0.54988 | -3.40104 |
| | setup | CK (R) | 0.24818 | 0.56678 | 3.44522 |
| sky130_osu_sc_18T_ls__dff_l | hold | CK (R) | -0.21235 | -0.54910 | -3.40018 |
| | setup | CK (R) | 0.24818 | 0.56678 | 3.44503 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__dff_1 | min_pulse_width | CK () | 0.17578 | 0.61523 | 13.33370 |
| | min_pulse_width | CK () | 0.28107 | 0.61523 | 13.33370 |
| sky130_osu_sc_18T_ls__dff_l | min_pulse_width | CK () | 0.17120 | 0.61523 | 13.33370 |
| | min_pulse_width | CK () | 0.27420 | 0.61523 | 13.33370 |

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

| Cell Name | Timing Check | Ref Pin(trans) | Reference Slew Rate(ns) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| **sky130_osu_sc_18T_ls__dff_1** | **min_pulse_width** | **CK ()** | 0.37491 | 0.61523 | 13.33370 |
| | **min_pulse_width** | **CK ()** | 0.20096 | 0.61523 | 13.33370 |
| **sky130_osu_sc_18T_ls__dff_l** | **min_pulse_width** | **CK ()** | 0.37491 | 0.61523 | 13.33370 |
| | **min_pulse_width** | **CK ()** | 0.20096 | 0.61523 | 13.33370 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01384 | 0.01221 | 0.00692 |
| sky130_osu_sc_18T_ls__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01236 | 0.01069 | 0.00895 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01555 | 0.01448 | 0.00844 |
| sky130_osu_sc_18T_ls__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01408 | 0.01310 | 0.01087 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01554 | 0.01447 | 0.00826 |
| sky130_osu_sc_18T_ls__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01407 | 0.01310 | 0.01070 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01379 | 0.01217 | 0.00724 |
| sky130_osu_sc_18T_ls__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.01231 | 0.01064 | 0.00869 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00424 | -0.00469 | -0.00470 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.01425 | 0.01334 | 0.01921 |
| sky130_osu_sc_18T_ls__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | -0.00424 | -0.00469 | -0.00470 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.01426 | 0.01335 | 0.01921 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dff_1 | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00467 | 0.00476 | 0.00470 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.02765 | 0.02716 | 0.03309 |
| sky130_osu_sc_18T_ls__dff_l | CK | 0.00000 | 0.00000 | 0.00000 |
| | CK | 0.00467 | 0.00476 | 0.00470 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!CK * Q * !QN) + (!CK * !Q * QN) | 0.02766 | 0.02717 | 0.03309 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dff_1 | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | -0.00094 | -0.00183 | 0.00697 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | -0.00132 | -0.00198 | 0.00660 |
| sky130_osu_sc_18T_ls__dff_l | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | -0.00095 | -0.00183 | 0.00697 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | -0.00132 | -0.00198 | 0.00659 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__dff_1 | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.01827 | 0.01820 | 0.02761 |
| | (D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !Q * QN) | 0.03956 | 0.03850 | 0.04732 |
| | (!D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * Q * !QN) | 0.04011 | 0.03937 | 0.05703 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.02143 | 0.02148 | 0.03024 |
| sky130_osu_sc_18T_ls__dff_l | (D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * Q * !QN) | 0.01827 | 0.01820 | 0.02761 |
| | (D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (D * !Q * QN) | 0.03956 | 0.03850 | 0.04732 |
| | (!D * Q * !QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * Q * !QN) | 0.04011 | 0.03938 | 0.05703 |
| | (!D * !Q * QN) | 0.00000 | 0.00000 | 0.00000 |
| | (!D * !Q * QN) | 0.02142 | 0.02148 | 0.03024 |

# SKY130_OSU_SC_18T_LS__INVx

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| **sky130_osu_sc_18T_ls__inv_1** | 6.59340 |
| **sky130_osu_sc_18T_ls__inv_10** | 32.96700 |
| **sky130_osu_sc_18T_ls__inv_2** | 9.52380 |
| **sky130_osu_sc_18T_ls__inv_3** | 12.45420 |
| **sky130_osu_sc_18T_ls__inv_4** | 15.38460 |
| **sky130_osu_sc_18T_ls__inv_6** | 21.24540 |
| **sky130_osu_sc_18T_ls__inv_8** | 27.10620 |
| **sky130_osu_sc_18T_ls__inv_l** | 6.59340 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | Max Cap(pf) |
|---|---|---|
| | A | Y |
| sky130_osu_sc_18T_ls__inv_1 | 0.00606 | 1.65419 |
| sky130_osu_sc_18T_ls__inv_10 | 0.05760 | 14.88647 |
| sky130_osu_sc_18T_ls__inv_2 | 0.01171 | 3.26640 |
| sky130_osu_sc_18T_ls__inv_3 | 0.01747 | 4.74347 |
| sky130_osu_sc_18T_ls__inv_4 | 0.02315 | 6.28775 |
| sky130_osu_sc_18T_ls__inv_6 | 0.03472 | 9.38102 |
| sky130_osu_sc_18T_ls__inv_8 | 0.04617 | 12.43228 |
| sky130_osu_sc_18T_ls__inv_l | 0.00454 | 1.12248 |

# Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_ls__inv_1 | 0.00000 | 0.21358 | 0.28276 |
| sky130_osu_sc_18T_ls__inv_10 | 0.00000 | 0.53861 | 0.70974 |
| sky130_osu_sc_18T_ls__inv_2 | 0.00000 | 0.10772 | 0.14195 |
| sky130_osu_sc_18T_ls__inv_3 | 0.00000 | 0.32131 | 0.35626 |
| sky130_osu_sc_18T_ls__inv_4 | 0.00000 | 0.21544 | 0.28389 |
| sky130_osu_sc_18T_ls__inv_6 | 0.00000 | 0.32317 | 0.42584 |
| sky130_osu_sc_18T_ls__inv_8 | 0.00000 | 0.43089 | 0.56779 |
| sky130_osu_sc_18T_ls__inv_l | 0.00000 | 0.15568 | 0.20465 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_18T_ls__inv_1** | **A->Y (FR)** | 0.05050 | 0.96896 | 11.76710 |
| **sky130_osu_sc_18T_ls__inv_10** | **A->Y (FR)** | 0.06889 | 0.67226 | 11.60200 |
| **sky130_osu_sc_18T_ls__inv_2** | **A->Y (FR)** | 0.04111 | 0.83578 | 11.71780 |
| **sky130_osu_sc_18T_ls__inv_3** | **A->Y (FR)** | 0.04481 | 0.78428 | 11.74000 |
| **sky130_osu_sc_18T_ls__inv_4** | **A->Y (FR)** | 0.04580 | 0.74676 | 11.64470 |
| **sky130_osu_sc_18T_ls__inv_6** | **A->Y (FR)** | 0.05103 | 0.70687 | 11.70960 |
| **sky130_osu_sc_18T_ls__inv_8** | **A->Y (FR)** | 0.05935 | 0.68768 | 11.74970 |
| **sky130_osu_sc_18T_ls__inv_l** | **A->Y (FR)** | 0.05765 | 1.05535 | 11.70780 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| **sky130_osu_sc_18T_ls__inv_1** | **A->Y (RF)** | 0.03991 | 0.80366 | 9.73622 |
| **sky130_osu_sc_18T_ls__inv_10** | **A->Y (RF)** | 0.05920 | 0.54892 | 9.47962 |
| **sky130_osu_sc_18T_ls__inv_2** | **A->Y (RF)** | 0.03316 | 0.70169 | 9.69319 |
| **sky130_osu_sc_18T_ls__inv_3** | **A->Y (RF)** | 0.03575 | 0.66057 | 9.71872 |
| **sky130_osu_sc_18T_ls__inv_4** | **A->Y (RF)** | 0.03581 | 0.62343 | 9.64815 |
| **sky130_osu_sc_18T_ls__inv_6** | **A->Y (RF)** | 0.04398 | 0.58939 | 9.68379 |
| **sky130_osu_sc_18T_ls__inv_8** | **A->Y (RF)** | 0.05154 | 0.56864 | 9.68900 |
| **sky130_osu_sc_18T_ls__inv_l** | **A->Y (RF)** | 0.04537 | 0.86450 | 9.66109 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__inv_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00705 | 0.00713 | 0.00807 |
| sky130_osu_sc_18T_ls__inv_10 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.06148 | 0.06440 | 0.07545 |
| sky130_osu_sc_18T_ls__inv_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01275 | 0.01323 | 0.01513 |
| sky130_osu_sc_18T_ls__inv_3 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01948 | 0.01939 | 0.02329 |
| sky130_osu_sc_18T_ls__inv_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02516 | 0.02598 | 0.03018 |
| sky130_osu_sc_18T_ls__inv_6 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.03731 | 0.03835 | 0.04515 |
| sky130_osu_sc_18T_ls__inv_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.04941 | 0.05211 | 0.06011 |
| sky130_osu_sc_18T_ls__inv_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00529 | 0.00531 | 0.00598 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| **sky130_osu_sc_18T_ls__inv_1** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00152 | -0.00143 | -0.00073 |
| **sky130_osu_sc_18T_ls__inv_10** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.02534 | -0.02312 | -0.01280 |
| **sky130_osu_sc_18T_ls__inv_2** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00476 | -0.00442 | -0.00280 |
| **sky130_osu_sc_18T_ls__inv_3** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00640 | -0.00603 | -0.00331 |
| **sky130_osu_sc_18T_ls__inv_4** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00979 | -0.00884 | -0.00534 |
| **sky130_osu_sc_18T_ls__inv_6** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.01502 | -0.01343 | -0.00796 |
| **sky130_osu_sc_18T_ls__inv_8** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.02036 | -0.01884 | -0.01042 |
| **sky130_osu_sc_18T_ls__inv_l** | **A** | 0.00000 | 0.00000 | 0.00000 |
| | **A** | -0.00101 | -0.00099 | -0.00050 |

# SKY130_OSU_SC_18T_LS__MUX2

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

| INPUT | | | OUTPUT |
|---|---|---|---|
| **A0** | **A1** | **S0** | **Y** |
| **0** | **0** | **x** | **0** |
| **0** | **1** | **0** | **0** |
| **x** | **1** | **1** | **1** |
| **1** | **x** | **0** | **1** |
| **1** | **0** | **1** | **0** |

## Footprint

| Cell Name | Area |
|---|---|
| **sky130_osu_sc_18T_ls__mux2_1** | 18.31500 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) |
|---|---|---|---|---|
| | **A0** | **A1** | **S0** | **Y** |
| **sky130_osu_sc_18T_ls__mux2_1** | 0.35557 | 0.35564 | 0.01230 | 0.35952 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | **Min.** | **Avg** | **Max.** |
| **sky130_osu_sc_18T_ls__mux2_1** | 0.00000 | 0.68351 | 0.87667 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_ls__mux2_1 | A0->Y (RR) | - | 0.03073 | 0.43877 | 3.89336 |
| | A1->Y (RR) | - | 0.03326 | 0.44248 | 3.89797 |
| | S0->Y (RR) | (!A0 * A1) | 0.08828 | 0.48512 | 2.14295 |
| | S0->Y (FR) | (A0 * !A1) | 0.06908 | 0.58184 | 4.08970 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_ls__mux2_1 | A0->Y (FF) | - | 0.02703 | 0.41750 | 3.65743 |
| | A1->Y (FF) | - | 0.02531 | 0.41509 | 3.65478 |
| | S0->Y (FF) | (!A0 * A1) | 0.11647 | 0.55146 | 2.65038 |
| | S0->Y (RF) | (A0 * !A1) | 0.04602 | 0.49946 | 3.58045 |

# Power Information

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__mux2_1 | A0 | - | 0.00000 | 0.00000 | 0.00000 |
| | A0 | - | -0.00717 | -0.00717 | -0.00718 |
| | A1 | - | 0.00000 | 0.00000 | 0.00000 |
| | A1 | - | -0.00518 | -0.00518 | -0.00519 |
| | S0 | (A0 * !A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (A0 * !A1) | 0.00777 | 0.00788 | 0.01814 |
| | S0 | (!A0 * A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (!A0 * A1) | -0.00503 | -0.00560 | 0.00394 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__mux2_1 | A0 | - | 0.00000 | 0.00000 | 0.00000 |
| | A0 | - | 0.00718 | 0.00718 | 0.00719 |
| | A1 | - | 0.00000 | 0.00000 | 0.00000 |
| | A1 | - | 0.00520 | 0.00520 | 0.00521 |
| | S0 | (A0 * !A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (A0 * !A1) | 0.00158 | 0.00109 | 0.01089 |
| | S0 | (!A0 * A1) | 0.00000 | 0.00000 | 0.00000 |
| | S0 | (!A0 * A1) | 0.01867 | 0.01867 | 0.02837 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__mux2_1 | (A1 * S0 * Y) + (!A1 * S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * S0 * Y) + (!A1 * S0 * !Y) | -0.00186 | -0.00186 | -0.00186 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__mux2_1 | (A1 * S0 * Y) + (!A1 * S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * S0 * Y) + (!A1 * S0 * !Y) | 0.00187 | 0.00186 | 0.00186 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__mux2_1 | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | -0.00222 | -0.00221 | -0.00221 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__mux2_1 | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !S0 * Y) + (!A0 * !S0 * !Y) | 0.00222 | 0.00222 | 0.00222 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__mux2_1 | (A0 * A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * Y) | -0.00176 | -0.00228 | 0.00741 |
| | (!A0 * !A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !Y) | -0.00171 | -0.00224 | 0.00745 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__mux2_1 | (A0 * A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * A1 * Y) | 0.01405 | 0.01393 | 0.02382 |
| | (!A0 * !A1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !Y) | 0.01240 | 0.01240 | 0.02267 |

# SKY130_OSU_SC_18T_LS__NAND2x

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__nand2_1 | 9.52380 |
| sky130_osu_sc_18T_ls__nand2_l | 9.52380 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_18T_ls__nand2_1 | 0.00608 | 0.00605 | 1.29528 |
| sky130_osu_sc_18T_ls__nand2_l | 0.00455 | 0.00453 | 0.84623 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_ls__nand2_1 | 0.00000 | 0.13714 | 0.19747 |
| sky130_osu_sc_18T_ls__nand2_l | 0.00000 | 0.10740 | 0.15235 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__nand2_1 | A->Y (FR) | 0.05260 | 0.90280 | 10.31440 |
| | B->Y (FR) | 0.06147 | 0.90230 | 10.25190 |
| sky130_osu_sc_18T_ls__nand2_l | A->Y (FR) | 0.05953 | 0.96384 | 10.04200 |
| | B->Y (FR) | 0.06972 | 0.97080 | 10.02390 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__nand2_1 | A->Y (RF) | 0.06413 | 0.99661 | 11.36100 |
| | B->Y (RF) | 0.07228 | 0.96495 | 10.83870 |
| sky130_osu_sc_18T_ls__nand2_l | A->Y (RF) | 0.07474 | 1.09137 | 11.12960 |
| | B->Y (RF) | 0.08291 | 1.06045 | 10.58520 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__nand2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00752 | 0.00755 | 0.00871 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00934 | 0.00882 | 0.01044 |
| sky130_osu_sc_18T_ls__nand2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00560 | 0.00559 | 0.00643 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00691 | 0.00686 | 0.00768 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__nand2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00096 | -0.00098 | -0.00022 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | -0.00088 | -0.00108 | -0.00049 |
| sky130_osu_sc_18T_ls__nand2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00068 | -0.00075 | -0.00019 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | -0.00063 | -0.00078 | -0.00037 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__nand2_1 | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | -0.00520 | -0.00524 | -0.00525 |
| sky130_osu_sc_18T_ls__nand2_l | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | -0.00369 | -0.00371 | -0.00372 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__nand2_1 | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | 0.00524 | 0.00535 | 0.00527 |
| sky130_osu_sc_18T_ls__nand2_l | (!B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!B * Y) | 0.00372 | 0.00377 | 0.00374 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__nand2_1 | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | -0.00493 | -0.00494 | -0.00493 |
| sky130_osu_sc_18T_ls__nand2_l | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | -0.00348 | -0.00350 | -0.00349 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__nand2_1 | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00499 | 0.00500 | 0.00495 |
| sky130_osu_sc_18T_ls__nand2_l | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00353 | 0.00354 | 0.00350 |

# SKY130_OSU_SC_18T_LS__NOR2x

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__nor2_1 | 9.52380 |
| sky130_osu_sc_18T_ls__nor2_l | 9.52380 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_18T_ls__nor2_1 | 0.00605 | 0.00638 | 0.85054 |
| sky130_osu_sc_18T_ls__nor2_l | 0.00446 | 0.00481 | 0.56973 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_ls__nor2_1 | 0.00000 | 0.25581 | 0.31862 |
| sky130_osu_sc_18T_ls__nor2_l | 0.00000 | 0.18689 | 0.24082 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__nor2_1 | A->Y (FR) | 0.11197 | 1.15116 | 11.24670 |
| | B->Y (FR) | 0.08428 | 1.13516 | 11.54470 |
| sky130_osu_sc_18T_ls__nor2_l | A->Y (FR) | 0.12498 | 1.25850 | 11.05620 |
| | B->Y (FR) | 0.10050 | 1.24288 | 11.37130 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__nor2_1 | A->Y (RF) | 0.05518 | 0.68695 | 7.07630 |
| | B->Y (RF) | 0.04252 | 0.67001 | 7.04820 |
| sky130_osu_sc_18T_ls__nor2_l | A->Y (RF) | 0.06001 | 0.72688 | 6.98315 |
| | B->Y (RF) | 0.04805 | 0.70908 | 6.95819 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__nor2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01032 | 0.01023 | 0.01085 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00761 | 0.00760 | 0.00897 |
| sky130_osu_sc_18T_ls__nor2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00739 | 0.00729 | 0.00778 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00565 | 0.00540 | 0.00655 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__nor2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00110 | 0.00082 | 0.00179 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | -0.00119 | -0.00112 | -0.00016 |
| sky130_osu_sc_18T_ls__nor2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00071 | 0.00054 | 0.00126 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | -0.00074 | -0.00069 | -0.00004 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__nor2_1 | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | -0.00426 | -0.00474 | -0.00471 |
| sky130_osu_sc_18T_ls__nor2_l | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | -0.00298 | -0.00327 | -0.00326 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__nor2_1 | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | 0.00469 | 0.00474 | 0.00471 |
| sky130_osu_sc_18T_ls__nor2_l | (B * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * !Y) | 0.00325 | 0.00328 | 0.00326 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__nor2_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | -0.00214 | -0.00218 | -0.00215 |
| sky130_osu_sc_18T_ls__nor2_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | -0.00150 | -0.00152 | -0.00151 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__nor2_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00227 | 0.00230 | 0.00220 |
| sky130_osu_sc_18T_ls__nor2_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00159 | 0.00161 | 0.00154 |

# SKY130_OSU_SC_18T_LS__OAI21

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__oai21_l | 12.45420 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | Max Cap(pf) |
|---|---|---|---|---|
| | A0 | A1 | B0 | Y |
| sky130_osu_sc_18T_ls__oai21_l | 0.00613 | 0.00616 | 0.00502 | 0.82682 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_ls__oai21_l | 0.00000 | 0.30258 | 0.52327 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__oai21_l | A0->Y (FR) | 0.11411 | 1.15905 | 11.41340 |
| | A1->Y (FR) | 0.14693 | 1.18027 | 11.12400 |
| | B0->Y (FR) | 0.07324 | 0.96280 | 9.87289 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__oai21_l | A0->Y (RF) | 0.08800 | 0.86901 | 8.49802 |
| | A1->Y (RF) | 0.11104 | 0.87849 | 8.35243 |
| | B0->Y (RF) | 0.06830 | 0.89699 | 9.14634 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.01030 | 0.01016 | 0.01138 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.01302 | 0.01286 | 0.01345 |
| | B0 | 0.00887 | 0.00881 | 0.00994 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai21_l | A0 | 0.00000 | 0.00000 | 0.00000 |
| | A0 | 0.00031 | 0.00007 | 0.00074 |
| | A1 | 0.00000 | 0.00000 | 0.00000 |
| | A1 | 0.00255 | 0.00210 | 0.00278 |
| | B0 | 0.00352 | 0.00342 | 0.00413 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | -0.00214 | -0.00219 | -0.00215 |
| | (A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * Y) | -0.00465 | -0.00471 | -0.00470 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | -0.00485 | -0.00486 | -0.00485 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai21_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.00228 | 0.00230 | 0.00221 |
| | (A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * Y) | 0.00468 | 0.00471 | 0.00470 |
| | (!A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * Y) | 0.00487 | 0.00491 | 0.00487 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | -0.00422 | -0.00463 | -0.00465 |
| | (A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * Y) | -0.00461 | -0.00468 | -0.00469 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | -0.00480 | -0.00484 | -0.00481 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai21_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | 0.00463 | 0.00463 | 0.00465 |
| | (A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * Y) | 0.00467 | 0.00468 | 0.00469 |
| | (!A0 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * Y) | 0.00483 | 0.00488 | 0.00483 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai21_l | (!A0 * !A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * Y) | -0.00371 | -0.00373 | -0.00382 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai21_l | (!A0 * !A1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * Y) | 0.00382 | 0.00390 | 0.00384 |

# SKY130_OSU_SC_18T_LS__OAI22

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__oai22_l | 15.38460 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | | | Max Cap(pf) |
|---|---|---|---|---|---|
| | A0 | A1 | B0 | B1 | Y |
| sky130_osu_sc_18T_ls__oai22_l | 0.00594 | 0.00623 | 0.00638 | 0.00623 | 0.82344 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_ls__oai22_l | 0.00000 | 0.17531 | 0.43102 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__oai22_l | A0->Y (FR) | 0.16110 | 1.18927 | 11.08120 |
| | A1->Y (FR) | 0.13324 | 1.17321 | 11.37570 |
| | B0->Y (FR) | 0.09563 | 1.13548 | 11.34840 |
| | B1->Y (FR) | 0.12449 | 1.15235 | 11.05490 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__oai22_l | A0->Y (RF) | 0.15805 | 0.96040 | 8.65733 |
| | A1->Y (RF) | 0.12378 | 0.91453 | 8.54294 |
| | B0->Y (RF) | 0.10606 | 0.93731 | 9.17526 |
| | B1->Y (RF) | 0.14218 | 0.99288 | 9.37381 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai22_l | A0 | 0.01710 | 0.01694 | 0.01752 |
| | A1 | 0.01437 | 0.01422 | 0.01539 |
| | B0 | 0.01086 | 0.01083 | 0.01202 |
| | B1 | 0.01369 | 0.01356 | 0.01417 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai22_l | A0 | 0.00431 | 0.00388 | 0.00446 |
| | A1 | 0.00223 | 0.00192 | 0.00250 |
| | B0 | 0.00220 | 0.00204 | 0.00285 |
| | B1 | 0.00432 | 0.00399 | 0.00480 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | -0.00426 | -0.00473 | -0.00471 |
| | (A1 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * B1 * !Y) | -0.00426 | -0.00474 | -0.00471 |
| | (A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * !B1 * Y) | -0.00462 | -0.00468 | -0.00470 |
| | (!A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * !B1 * Y) | -0.00482 | -0.00484 | -0.00482 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.00468 | 0.00473 | 0.00471 |
| | (A1 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * B1 * !Y) | 0.00468 | 0.00474 | 0.00471 |
| | (A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * !B0 * !B1 * Y) | 0.00467 | 0.00468 | 0.00470 |
| | (!A1 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A1 * !B0 * !B1 * Y) | 0.00484 | 0.00488 | 0.00484 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai22_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | -0.00213 | -0.00217 | -0.00214 |
| | (A0 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * B1 * !Y) | -0.00213 | -0.00217 | -0.00214 |
| | (A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * !B1 * Y) | -0.00461 | -0.00467 | -0.00466 |
| | (!A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * !B1 * Y) | -0.00480 | -0.00483 | -0.00481 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai22_l | (A0 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * B0 * !Y) | 0.00226 | 0.00228 | 0.00219 |
| | (A0 * !B0 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * B1 * !Y) | 0.00226 | 0.00228 | 0.00219 |
| | (A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !B0 * !B1 * Y) | 0.00464 | 0.00467 | 0.00466 |
| | (!A0 * !B0 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !B0 * !B1 * Y) | 0.00483 | 0.00487 | 0.00483 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai22_l | (A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B1 * !Y) | -0.00212 | -0.00216 | -0.00213 |
| | (A0 * !A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B1 * !Y) | -0.00212 | -0.00212 | -0.00213 |
| | (!A0 * !A1 * B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B1 * Y) | -0.00502 | -0.00512 | -0.00508 |
| | (!A0 * !A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B1 * Y) | -0.00505 | -0.00510 | -0.00521 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai22_l | (A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B1 * !Y) | 0.00225 | 0.00227 | 0.00218 |
| | (A0 * !A1 * B1 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B1 * !Y) | 0.00225 | 0.00226 | 0.00218 |
| | (!A0 * !A1 * B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B1 * Y) | 0.00508 | 0.00512 | 0.00508 |
| | (!A0 * !A1 * !B1 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B1 * Y) | 0.00521 | 0.00523 | 0.00524 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | -0.00421 | -0.00468 | -0.00466 |
| | (A0 * !A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B0 * !Y) | -0.00421 | -0.00467 | -0.00466 |
| | (!A0 * !A1 * B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B0 * Y) | -0.00507 | -0.00516 | -0.00517 |
| | (!A0 * !A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B0 * Y) | -0.00513 | -0.00514 | -0.00526 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__oai22_l | (A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A1 * B0 * !Y) | 0.00463 | 0.00468 | 0.00466 |
| | (A0 * !A1 * B0 * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A0 * !A1 * B0 * !Y) | 0.00463 | 0.00467 | 0.00466 |
| | (!A0 * !A1 * B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * B0 * Y) | 0.00517 | 0.00516 | 0.00517 |
| | (!A0 * !A1 * !B0 * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A0 * !A1 * !B0 * Y) | 0.00527 | 0.00537 | 0.00530 |

# SKY130_OSU_SC_18T_LS__OR2x

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__or2_1 | 12.45420 |
| sky130_osu_sc_18T_ls__or2_2 | 15.38460 |
| sky130_osu_sc_18T_ls__or2_4 | 21.24540 |
| sky130_osu_sc_18T_ls__or2_8 | 32.96700 |
| sky130_osu_sc_18T_ls__or2_l | 12.45420 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_18T_ls__or2_1 | 0.00638 | 0.00620 | 1.66537 |
| sky130_osu_sc_18T_ls__or2_2 | 0.00638 | 0.00620 | 3.27821 |
| sky130_osu_sc_18T_ls__or2_4 | 0.00638 | 0.00620 | 6.41116 |
| sky130_osu_sc_18T_ls__or2_8 | 0.00637 | 0.00622 | 12.15184 |
| sky130_osu_sc_18T_ls__or2_l | 0.00486 | 0.00463 | 1.13653 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_18T_ls__or2_1** | 0.00000 | 0.43765 | 0.47396 |
| **sky130_osu_sc_18T_ls__or2_2** | 0.00000 | 0.38349 | 0.47150 |
| **sky130_osu_sc_18T_ls__or2_4** | 0.00000 | 0.50832 | 0.61344 |
| **sky130_osu_sc_18T_ls__or2_8** | 0.00000 | 0.75799 | 0.89734 |
| **sky130_osu_sc_18T_ls__or2_l** | 0.00000 | 0.32086 | 0.35831 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__or2_1 | A->Y (RR) | 0.12683 | 0.90479 | 7.88674 |
| | B->Y (RR) | 0.10976 | 0.84773 | 7.67083 |
| sky130_osu_sc_18T_ls__or2_2 | A->Y (RR) | 0.13966 | 0.83089 | 8.07055 |
| | B->Y (RR) | 0.12211 | 0.78646 | 7.88011 |
| sky130_osu_sc_18T_ls__or2_4 | A->Y (RR) | 0.18104 | 0.84230 | 8.54941 |
| | B->Y (RR) | 0.16290 | 0.80599 | 8.39500 |
| sky130_osu_sc_18T_ls__or2_8 | A->Y (RR) | 0.25878 | 0.92164 | 9.05164 |
| | B->Y (RR) | 0.23998 | 0.89434 | 8.92345 |
| sky130_osu_sc_18T_ls__or2_l | A->Y (RR) | 0.14064 | 1.00692 | 7.94173 |
| | B->Y (RR) | 0.12360 | 0.95498 | 7.74441 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__or2_1 | A->Y (FF) | 0.21696 | 0.94509 | 7.19222 |
| | B->Y (FF) | 0.18185 | 0.90576 | 7.05458 |
| sky130_osu_sc_18T_ls__or2_2 | A->Y (FF) | 0.26313 | 0.93944 | 7.46399 |
| | B->Y (FF) | 0.22820 | 0.91517 | 7.36321 |
| sky130_osu_sc_18T_ls__or2_4 | A->Y (FF) | 0.37447 | 1.03618 | 8.02715 |
| | B->Y (FF) | 0.33947 | 1.01796 | 7.98812 |
| sky130_osu_sc_18T_ls__or2_8 | A->Y (FF) | 0.59889 | 1.27757 | 8.60962 |
| | B->Y (FF) | 0.56402 | 1.25730 | 8.67688 |
| sky130_osu_sc_18T_ls__or2_l | A->Y (FF) | 0.23717 | 1.02173 | 7.15476 |
| | B->Y (FF) | 0.20254 | 0.98789 | 7.03414 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__or2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00789 | 0.00721 | 0.01426 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00569 | 0.00518 | 0.01366 |
| sky130_osu_sc_18T_ls__or2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01345 | 0.01329 | 0.02024 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01128 | 0.01124 | 0.01959 |
| sky130_osu_sc_18T_ls__or2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02551 | 0.02626 | 0.03326 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02329 | 0.02431 | 0.03197 |
| sky130_osu_sc_18T_ls__or2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.05004 | 0.05146 | 0.05961 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.04747 | 0.04993 | 0.05893 |
| sky130_osu_sc_18T_ls__or2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00571 | 0.00514 | 0.01017 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.00428 | 0.00388 | 0.00996 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__or2_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01628 | 0.01633 | 0.02173 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01327 | 0.01388 | 0.02275 |
| sky130_osu_sc_18T_ls__or2_2 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01982 | 0.02067 | 0.02581 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01676 | 0.01803 | 0.02653 |
| sky130_osu_sc_18T_ls__or2_4 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.02874 | 0.03068 | 0.03590 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.02575 | 0.02775 | 0.03627 |
| sky130_osu_sc_18T_ls__or2_8 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.04884 | 0.04968 | 0.05638 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.04561 | 0.04680 | 0.05647 |
| sky130_osu_sc_18T_ls__or2_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.01209 | 0.01200 | 0.01589 |
| | B | 0.00000 | 0.00000 | 0.00000 |
| | B | 0.01001 | 0.01040 | 0.01666 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__or2_1 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00433 | -0.00477 | -0.00474 |
| sky130_osu_sc_18T_ls__or2_2 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00433 | -0.00477 | -0.00474 |
| sky130_osu_sc_18T_ls__or2_4 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00433 | -0.00477 | -0.00474 |
| sky130_osu_sc_18T_ls__or2_8 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00433 | -0.00477 | -0.00474 |
| sky130_osu_sc_18T_ls__or2_l | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | -0.00301 | -0.00328 | -0.00327 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__or2_1 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00471 | 0.00479 | 0.00474 |
| sky130_osu_sc_18T_ls__or2_2 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00471 | 0.00479 | 0.00474 |
| sky130_osu_sc_18T_ls__or2_4 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00471 | 0.00479 | 0.00474 |
| sky130_osu_sc_18T_ls__or2_8 | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00471 | 0.00480 | 0.00474 |
| sky130_osu_sc_18T_ls__or2_l | (B * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (B * Y) | 0.00325 | 0.00328 | 0.00327 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__or2_1 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00214 | -0.00217 | -0.00215 |
| sky130_osu_sc_18T_ls__or2_2 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00214 | -0.00217 | -0.00215 |
| sky130_osu_sc_18T_ls__or2_4 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00214 | -0.00217 | -0.00215 |
| sky130_osu_sc_18T_ls__or2_8 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00214 | -0.00217 | -0.00215 |
| sky130_osu_sc_18T_ls__or2_l | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | -0.00153 | -0.00155 | -0.00153 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__or2_1 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00229 | 0.00231 | 0.00221 |
| sky130_osu_sc_18T_ls__or2_2 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00229 | 0.00232 | 0.00221 |
| sky130_osu_sc_18T_ls__or2_4 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00229 | 0.00232 | 0.00221 |
| sky130_osu_sc_18T_ls__or2_8 | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00229 | 0.00232 | 0.00222 |
| sky130_osu_sc_18T_ls__or2_l | (A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * Y) | 0.00164 | 0.00164 | 0.00157 |

# SKY130_OSU_SC_18T_LS__TBUFIx

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__tbufi_1 | 12.45420 |
| sky130_osu_sc_18T_ls__tbufi_l | 12.45420 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | OE | Y |
| sky130_osu_sc_18T_ls__tbufi_1 | 0.00638 | 0.00793 | 0.83643 |
| sky130_osu_sc_18T_ls__tbufi_l | 0.00482 | 0.00603 | 0.58153 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_ls__tbufi_1 | 0.00000 | 0.37185 | 0.56553 |
| sky130_osu_sc_18T_ls__tbufi_l | 0.00000 | 0.27591 | 0.40930 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__tbufi_1 | A->Y (FR) | 0.08079 | 1.12151 | 11.41790 |
| | OE->Y (FR) | 0.08290 | 0.40252 | 4.68905 |
| | OE->Y (RR) | 0.15102 | 1.03349 | 7.70092 |
| sky130_osu_sc_18T_ls__tbufi_l | A->Y (FR) | 0.09677 | 1.25096 | 11.52650 |
| | OE->Y (FR) | 0.08813 | 0.40217 | 4.68876 |
| | OE->Y (RR) | 0.16713 | 1.17414 | 7.88778 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__tbufi_1 | A->Y (RF) | 0.06225 | 0.85560 | 8.79716 |
| | OE->Y (FF) | 0.08445 | 0.40255 | 4.68908 |
| | OE->Y (RF) | 0.05631 | 0.80990 | 8.22650 |
| sky130_osu_sc_18T_ls__tbufi_l | A->Y (RF) | 0.07358 | 0.94333 | 8.92937 |
| | OE->Y (FF) | 0.08964 | 0.40217 | 4.68879 |
| | OE->Y (RF) | 0.06758 | 0.90328 | 8.34335 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__tbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00720 | 0.00695 | 0.00842 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00754 | 0.00708 | 0.01648 |
| sky130_osu_sc_18T_ls__tbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00536 | 0.00508 | 0.00619 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00533 | 0.00497 | 0.01172 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__tbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00121 | -0.00115 | -0.00025 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00502 | 0.00454 | 0.01443 |
| sky130_osu_sc_18T_ls__tbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00075 | -0.00071 | -0.00012 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.00348 | 0.00309 | 0.01012 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__tbufi_1 | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | -0.00353 | -0.00359 | -0.00354 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | -0.00303 | -0.00309 | -0.00305 |
| sky130_osu_sc_18T_ls__tbufi_l | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | -0.00260 | -0.00265 | -0.00261 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | -0.00227 | -0.00231 | -0.00228 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__tbufi_1 | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | 0.00353 | 0.00359 | 0.00354 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | 0.00314 | 0.00318 | 0.00312 |
| sky130_osu_sc_18T_ls__tbufi_l | (!OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * Y) | 0.00260 | 0.00265 | 0.00261 |
| | (!OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!OE * !Y) | 0.00234 | 0.00236 | 0.00232 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__tbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00295 | 0.00253 | 0.01241 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00261 | 0.00218 | 0.01203 |
| sky130_osu_sc_18T_ls__tbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00202 | 0.00168 | 0.00871 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00178 | 0.00144 | 0.00845 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__tbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00809 | 0.00786 | 0.01782 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00833 | 0.00805 | 0.01804 |
| sky130_osu_sc_18T_ls__tbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00619 | 0.00593 | 0.01302 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00638 | 0.00613 | 0.01319 |

# SKY130_OSU_SC_18T_LS__TNBUFIx

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__tnbufi_1 | 12.45420 |
| sky130_osu_sc_18T_ls__tnbufi_l | 12.45420 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | OE | Y |
| sky130_osu_sc_18T_ls__tnbufi_1 | 0.00638 | 0.01024 | 0.84495 |
| sky130_osu_sc_18T_ls__tnbufi_l | 0.00482 | 0.00746 | 0.57984 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_ls__tnbufi_1 | 0.00000 | 0.41797 | 0.48016 |
| sky130_osu_sc_18T_ls__tnbufi_l | 0.00000 | 0.30856 | 0.35695 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__tnbufi_1 | A->Y (FR) | 0.08166 | 1.12603 | 11.49050 |
| | OE->Y (RR) | 0.04806 | 0.40274 | 4.69035 |
| | OE->Y (FR) | 0.10407 | 1.14113 | 11.19010 |
| sky130_osu_sc_18T_ls__tnbufi_l | A->Y (FR) | 0.09785 | 1.24969 | 11.50490 |
| | OE->Y (RR) | 0.05132 | 0.40298 | 4.69053 |
| | OE->Y (FR) | 0.11642 | 1.26145 | 11.18470 |

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

| Cell Name | Timing Arc(Dir) | Delay(ns) | | |
|---|---|---|---|---|
| | | First | Mid | Last |
| sky130_osu_sc_18T_ls__tnbufi_1 | A->Y (RF) | 0.06139 | 0.85827 | 8.84485 |
| | OE->Y (RF) | 0.04755 | 0.40277 | 4.69038 |
| | OE->Y (FF) | 0.10193 | 0.78464 | 5.88650 |
| sky130_osu_sc_18T_ls__tnbufi_l | A->Y (RF) | 0.07253 | 0.94184 | 8.91390 |
| | OE->Y (RF) | 0.05074 | 0.40298 | 4.69057 |
| | OE->Y (FF) | 0.11748 | 0.88580 | 5.97627 |

# Power Information

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__tnbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00735 | 0.00709 | 0.00859 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.01801 | 0.01826 | 0.02909 |
| sky130_osu_sc_18T_ls__tnbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | 0.00551 | 0.00523 | 0.00634 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.01311 | 0.01318 | 0.02088 |

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

| Cell Name | Input | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__tnbufi_1 | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00139 | -0.00134 | -0.00043 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.01572 | 0.01599 | 0.02614 |
| sky130_osu_sc_18T_ls__tnbufi_l | A | 0.00000 | 0.00000 | 0.00000 |
| | A | -0.00095 | -0.00090 | -0.00031 |
| | OE | 0.00000 | 0.00000 | 0.00000 |
| | OE | 0.01143 | 0.01156 | 0.01873 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__tnbufi_1 | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | -0.00307 | -0.00313 | -0.00308 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | -0.00262 | -0.00268 | -0.00264 |
| sky130_osu_sc_18T_ls__tnbufi_l | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | -0.00217 | -0.00221 | -0.00218 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | -0.00187 | -0.00191 | -0.00188 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__tnbufi_1 | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | 0.00307 | 0.00313 | 0.00308 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | 0.00271 | 0.00275 | 0.00270 |
| sky130_osu_sc_18T_ls__tnbufi_l | (OE * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * Y) | 0.00217 | 0.00221 | 0.00218 |
| | (OE * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (OE * !Y) | 0.00193 | 0.00195 | 0.00192 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__tnbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | -0.00574 | -0.00658 | 0.00368 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | -0.00553 | -0.00648 | 0.00374 |
| sky130_osu_sc_18T_ls__tnbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | -0.00393 | -0.00449 | 0.00276 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | -0.00378 | -0.00444 | 0.00282 |

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

| Cell Name | When | Power(pJ) | | |
|---|---|---|---|---|
| | | first | mid | last |
| sky130_osu_sc_18T_ls__tnbufi_1 | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.01339 | 0.01399 | 0.02448 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.01316 | 0.01360 | 0.02427 |
| sky130_osu_sc_18T_ls__tnbufi_l | (A * !Y) | 0.00000 | 0.00000 | 0.00000 |
| | (A * !Y) | 0.00979 | 0.01008 | 0.01753 |
| | (!A * Y) | 0.00000 | 0.00000 | 0.00000 |
| | (!A * Y) | 0.00963 | 0.00980 | 0.01738 |

# SKY130_OSU_SC_18T_LS__XNOR2

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__xnor2_l | 21.24540 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_18T_ls__xnor2_l | 0.01263 | 0.01163 | 0.85704 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_ls__xnor2_l | 0.00000 | 0.61523 | 0.75256 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_ls__xnor2_l | A->Y (RR) | B | 0.19096 | 1.10229 | 7.99588 |
| | A->Y (FR) | !B | 0.10894 | 1.16488 | 11.58820 |
| | B->Y (RR) | A | 0.15172 | 1.06182 | 7.95110 |
| | B->Y (FR) | !A | 0.14299 | 1.18266 | 11.30100 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_ls__xnor2_l | A->Y (FF) | B | 0.19104 | 0.95696 | 6.48395 |
| | A->Y (RF) | !B | 0.08892 | 0.85723 | 8.50653 |
| | B->Y (FF) | A | 0.16061 | 0.92598 | 6.45956 |
| | B->Y (RF) | !A | 0.11331 | 0.88853 | 8.53507 |

# Power Information

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__xnor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00743 | 0.00675 | 0.01592 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.01752 | 0.01732 | 0.02863 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00220 | 0.00187 | 0.01169 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.01967 | 0.01952 | 0.03032 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__xnor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.02165 | 0.02099 | 0.03068 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00487 | 0.00409 | 0.01438 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.01970 | 0.01997 | 0.03018 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00596 | 0.00502 | 0.01529 |

# SKY130_OSU_SC_18T_LS__XOR2

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| sky130_osu_sc_18T_ls__xor2_l | 21.24540 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) | | Max Cap(pf) |
|---|---|---|---|
| | A | B | Y |
| sky130_osu_sc_18T_ls__xor2_l | 0.01260 | 0.01168 | 0.83377 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| sky130_osu_sc_18T_ls__xor2_l | 0.00000 | 0.61523 | 0.73742 |

# Delay Information

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_ls__xor2_l | A->Y (RR) | !B | 0.18014 | 1.07147 | 7.79062 |
| | A->Y (FR) | B | 0.13097 | 1.15817 | 11.13850 |
| | B->Y (RR) | !A | 0.15523 | 1.05373 | 7.78804 |
| | B->Y (FR) | A | 0.14251 | 1.17199 | 11.13800 |

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

| Cell Name | Timing Arc(Dir) | When | Delay(ns) | | |
|---|---|---|---|---|---|
| | | | First | Mid | Last |
| sky130_osu_sc_18T_ls__xor2_l | A->Y (FF) | !B | 0.16130 | 0.90563 | 6.17842 |
| | A->Y (RF) | B | 0.09408 | 0.89745 | 8.81998 |
| | B->Y (FF) | !A | 0.15312 | 0.90015 | 6.18736 |
| | B->Y (RF) | A | 0.10628 | 0.86397 | 8.26637 |

# Power Information

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__xor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.02049 | 0.02038 | 0.03131 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.00349 | 0.00228 | 0.01173 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.02126 | 0.02123 | 0.03215 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.00187 | 0.00143 | 0.01128 |

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

| Cell Name | Input | When | Power(pJ) | | |
|---|---|---|---|---|---|
| | | | first | mid | last |
| sky130_osu_sc_18T_ls__xor2_l | A | B | 0.00000 | 0.00000 | 0.00000 |
| | A | B | 0.00412 | 0.00307 | 0.01375 |
| | A | !B | 0.00000 | 0.00000 | 0.00000 |
| | A | !B | 0.02195 | 0.02208 | 0.03171 |
| | B | A | 0.00000 | 0.00000 | 0.00000 |
| | B | A | 0.00413 | 0.00314 | 0.01350 |
| | B | !A | 0.00000 | 0.00000 | 0.00000 |
| | B | !A | 0.02006 | 0.02042 | 0.03064 |

# SKY130_OSU_SC_18T_LS_x

*sky130_osu_sc_18T_ls_ss_1P60_150C.ccs*
*Cell Library: Process , Voltage 1.60,*
*Temp 150.00*

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## Truth Table

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

## Footprint

| Cell Name | Area |
|---|---|
| **sky130_osu_sc_18T_ls__ant** | 6.59340 |
| **sky130_osu_sc_18T_ls__tiehi** | 6.59340 |
| **sky130_osu_sc_18T_ls__tielo** | 6.59340 |

## Pin Capacitance Information

| Cell Name | Pin Cap(pf) |
|---|---|
| | A |
| **sky130_osu_sc_18T_ls__ant** | 0.42242 |
| **sky130_osu_sc_18T_ls__tiehi** | 0.00000 |
| **sky130_osu_sc_18T_ls__tielo** | 0.00000 |

## Leakage Information

| Cell Name | Leakage(nW) | | |
|---|---|---|---|
| | Min. | Avg | Max. |
| **sky130_osu_sc_18T_ls__ant** | 0.00000 | 163747.00000 | 327494.00000 |
| **sky130_osu_sc_18T_ls__tiehi** | 0.00000 | 0.00000 | 0.00000 |
| **sky130_osu_sc_18T_ls__tielo** | 0.00000 | 0.00000 | 0.00000 |

# Passive Power Information

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

| Cell Name | Power(pJ) | | |
|---|---|---|---|
| | first | mid | last |
| sky130_osu_sc_18T_ls__ant | 0.00000 | 0.00000 | 0.00000 |
| | -0.00312 | 0.04524 | 0.54641 |

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

| Cell Name | Power(pJ) | | |
|---|---|---|---|
| | first | mid | last |
| sky130_osu_sc_18T_ls__ant | 0.00000 | 0.00000 | 0.00000 |
| | 2.85016 | 2.67179 | 0.67634 |