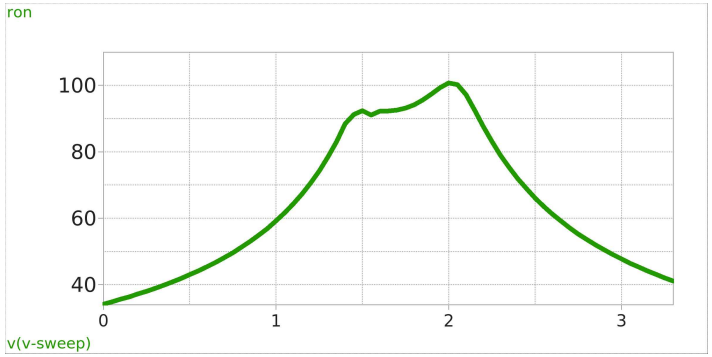
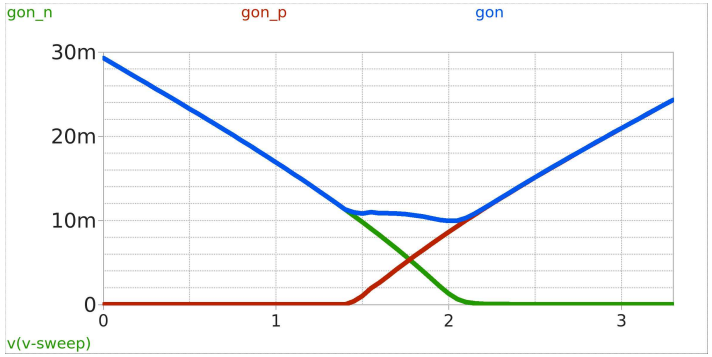


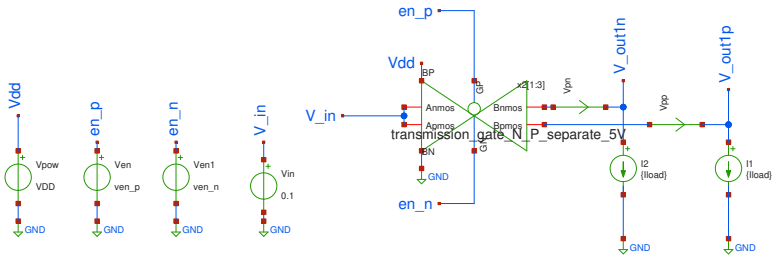


Using 5.0V devices
-> nMOS L=0.6u
-> pMOS L=0.5u
but putting 3 Tgates in parallel
--> 3x 24/0.6 for n and 3x 72/0.5 for the p
running at 5V ==> Ron approx 40-45 Ohm
running at 3.3V ==> Ron approx 100 Ohm

MODELS

```
.include $::180MCU_MODELS/design.ngspice
.lib $::180MCU_MODELS/sm141064.ngspice typical

.include /foss/pdks/gf180mcuD/libs.ref/gf180mcu_fd_sc_mcu7t5v0/spice/gf180mcu_fd_sc_mcu7t5v0.spice
```



SWEEP_SIM
SIM=ngspice

```
.param temp=27
.param mn_w={24.0u}
* .param mn_nf=6
.param mp_w={72.0u}
* .param mp_nf=6
.param VDD=3.3
.param ven_p=0
.param ven_n=VDD

.param temp=27
*.param Iload=500u
.param Iload=10u
.control
save all

set num_threads 1
*dc I0 -5m 5m 1.1u
dc Vin 0 3.3 0.05

let Ron_N=(V(V_in)-V(V_out1n))/I(Vpn)
let Ron_P=(V(V_in)-V(V_out1p))/I(Vpp)
let Gon_N=1/Ron_N
let Gon_P=1/Ron_P
let Gon = Gon_N + Gon_P
let Ron = 1/Gon
* meas dc Ronmax max Ron
* print Ronmax
* plot Ron title 'RON resistance'  ylabel 'Ron'
* plot Gon_N Gon_P Gon title 'GON conductance'  ylabel 'Gon'
* wrdata /foss/designs/SSCS-Chipathon-2025_AC3E-Chile-team/xschem/tgate/out_Ron.txt Ron
write tb_tgate_separate_5v.raw
.endc
```

used to run ngspice sweep in parallel

parameterizing the nf threw an error
making w much larger threw an error
--> put T-gate symbols in parallel
--> using the bus notation x2[1:3]

set num_threads to 1 for small circuits