

NGSPICE

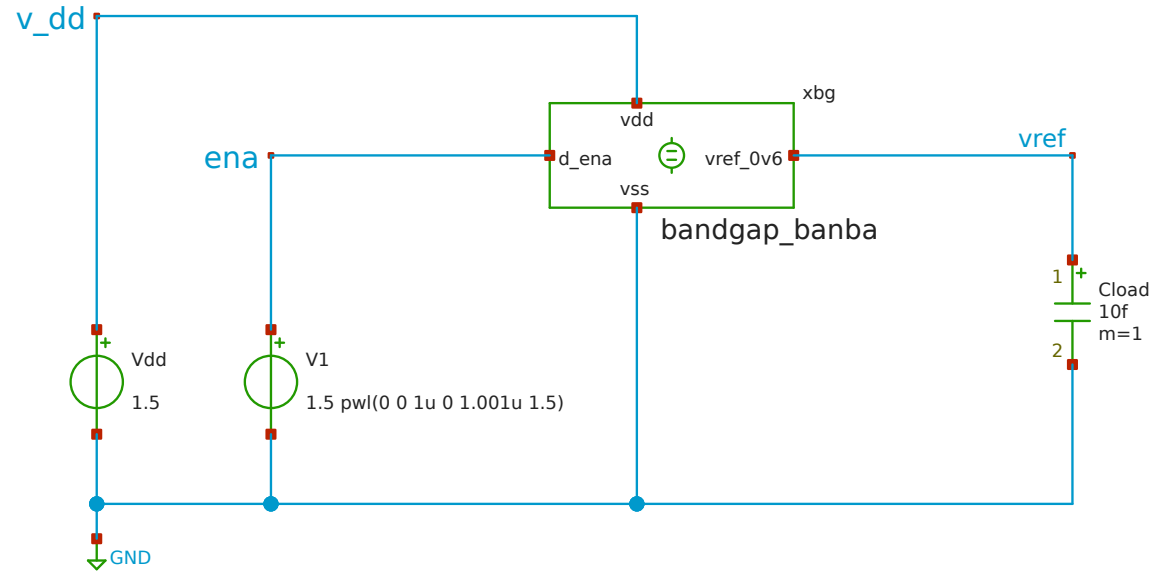
```
.include bandgap_banba_tb.save
.control
option klu
option method=gear
option noacct
option noint
save v(vref)
save all

compose temp_vec start=-30 stop=125 step=5
let vref_vec=vector(length(temp_vec))
let idx=0

foreach tmp $&temp_vec
  option temp=$tmp
  tran 0.01u 50u
  meas tran vr FIND v(vref) AT=50u
  let vref_vec[idx]=vr
  let idx=idx+1
end

plot vref_vec vs temp_vec
wrrdata bandgap_banba.txt vref_vec vs temp_vec

.endc
```



MODEL

```
.lib cornerMOSlv.lib mos_tt
.lib cornerHBT.lib hbt_ttyp
.lib cornerRES.lib res_ttyp
```

→ simulate

→ annotate OP