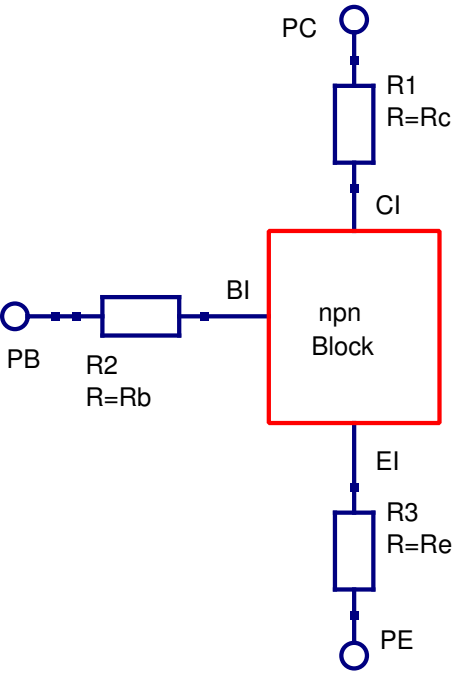
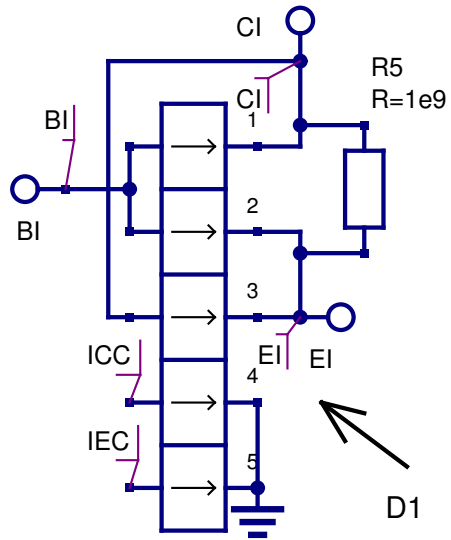


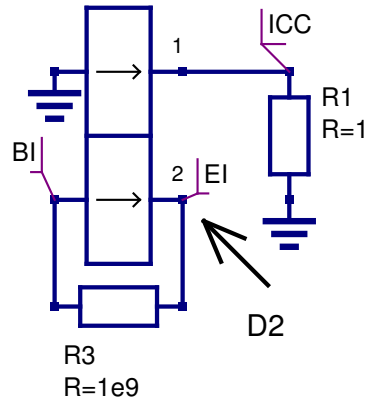
npnBlock1
Nf=Nf
Nr=Nr
Is=Is
Bf=Bf
Br=Br
Tbulk=Tbulk
Vcrit=Vcrit
Tf=Tf
Tr=Tr
Mc=Mc
Cjc=Cjc
Me=Me
Cje=Cje
Vjc=Vjc
Vje=Vje

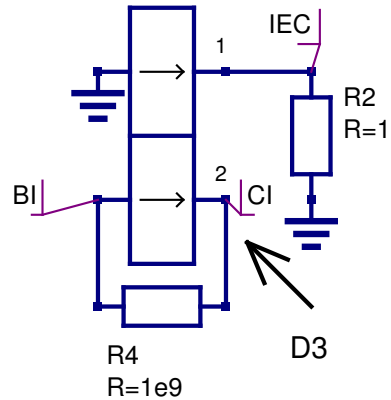
D1
I1=V5/Br
Q1=Tr*V4+PCjc*(V1-Vmaxc)*(1+(V1-Vmaxc)*(0.5+(V1-Vmaxc)/6))
I2=V4/Bf
Q2=Tf*V5+PCje*(V2-Vmaxe)*(1+(V2-Vmaxe)*(0.5+(V2-Vmaxe)/6))
I3=(V4-V5)
I4=0
I5=0

D2
I1=Is*(exp(Deltaf*V2)-1)*stp(-Deltaf*V2+Xcritf)+Is*Excritf*(1+(Deltaf*V2-Xcritf)*(1+(Deltaf*V2-Xcritf)/2))*stp(Deltaf*V2-Xcritf)
I2=0

D3
I1=Is*(exp(Deltar*V2)-1)*stp(-Deltar*V2+Xcritr)+Is*Excritr*(1+(Deltar*V2-Xcritr)*(1+(Deltar*V2-Xcritr)/2))*stp(Deltar*V2-Xcritr)
I2=0







Equation

Eqn1
TKelvin=Tbulk+271.15
Deltaf=q/(Nf*kB*TKelvin)
Deltar=q/(Nr*kB*TKelvin)
Xcritf=Vcrit*Deltaf
Xcritr=Vcrit*Deltar
Excritf=exp(Xcritf)
Excritr=exp(Xcritr)
PCjc=Cjc*(2^Mc)
PCje=Cje*(2^Me)
Vmaxc=Vjc/2
Vmaxe=Vje/2

Equation

Eqn2
kB=1.38e-23
q=1.6e-19