

dc simulation

DC1

Parameter sweep

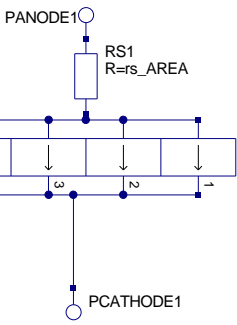
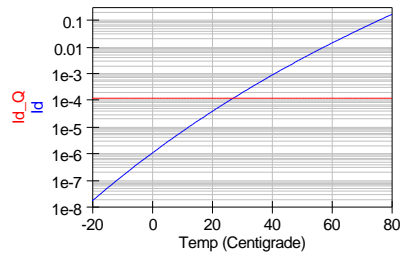
SW2  
 Sim=DC1  
 Type=lin  
 Param=Temp\_sw  
 Start=-20  
 Stop=80  
 Points=100

Equation

Eqn1  
 Id=Pr1.I  
 Id\_Q=Pr2.I  
 lnId=ln(Pr1.I)  
 lnId\_Q=ln(Pr2.I)

SUB1  
 n=1.0  
 rs=0.01  
 Is=1e-14  
 BV=100.0  
 IBV=1e-3  
 Vj=1.0  
 Cj0=1e-12  
 m=0.5  
 Area=1  
 FC=0.5  
 tt=1e-12  
 XTI=3.0  
 Tnom=26.85  
 Temp=Temp\_sw  
 Eg=1.16

D1  
 Is=1e-14 A  
 N=1  
 Cj0=1e-12  
 Vj=1.0  
 Rs=0.01  
 Bv=100.00  
 lbv=1e-3  
 Temp=26.85  
 Xti=3.0  
 Eg=1.11  
 Tnom=26.85  
 Area=1



D2  
 $I1=(V1 > 5.0 * n * Vt) ? Area * Is * T2 * (\limexp(V1 / (n * Vt)) - 1.0) + V1 * GMIN : 0$   
 $Q1=(V1 < FC * Vj) ? tt * I1 + Area * (Cj0 * T2 * Vj\_T2 * (1 - m)) * (1 - (1 - V1 / Vj\_T2)^(1 - m)) : 0$   
 $I2=(-BV < V1) ? (V1 < 5.0 * n * Vt) ? -Area * Is * T2 + V1 * GMIN : 0 : 0$   
 $Q2=(V1 >= FC * Vj) ? tt * I1 + Area * Cj0 * T2 * (F1 + 1 / F2) * (F3 * (V1 - FC * Vj\_T2) + (m * (2 * Vj\_T2)) * (V1 * V1 - FC * Vj\_T2 * Vj\_T2))) : 0$   
 $I3=(V1 == -BV) ? -IBV : 0$   
 $Q3=0$   
 $I4=(V1 < -BV) ? -Area * Is * T2 * (\limexp(-(BV + V1) / Vt) - 1.0) + BV / Vt : 0$   
 $Q4=0$

Equation

Eqn3  
 $F1=(Vj / (1 - m)) * (1 - (1 - FC)^(1 - m))$   
 $F2=(1 - FC)^(1 + m)$   
 $F3=1 - FC * (1 + m)$   
 $Vt=vt(300)$

Equation

Eqn2  
 $Cj0\_T2=Cj0 * (1 + m * (400e - 6 * (T2 - T1) - (Vj\_T2 - Vj) / Vj))$   
 $rs\_AREA=rs / AREA$   
 $GMIN=1e - 12$   
 $A=7.02e - 4$   
 $B=1108$   
 $T1=Tnom + 273.15$   
 $Vj\_T2=(T2 / T1)^4 * Vj - (2 * kB * T2 / q) * \ln((T2 / T1)^4 * 1.5) - (T2 / T1) * Eg\_T1 - Eg\_T2$   
 $Is\_T2=Is * (T2 / T1)^4 * XTI / n * \limexp(- (q * Eg) / (kB * T2)) * (1 - T2 / T1)$   
 $Eg\_T1=Eg - A * T1 * T1 / (B + T1)$   
 $Eg\_T2=Eg - A * T2 * T2 / (B + T2)$   
 $T2=Temp + 273.15$