

Semiconductor Device Physics of Pinned Surface Double Junction Solar Cell

 Case (1) DP=100 ; DN=100 ; DPP=100 ;

$VBP = kT \cdot \ln(NV/DP) = 0.324852$; $VBPP = kT \cdot \log(NV/DPP) = 0.324852$;

$Vout = 0.500000$;

$DPN = DP \cdot DN / (DP + DN)$; $WD = \sqrt{2 \cdot Esi \cdot VB / DPN} = 2.718646$;

$WDN = DP \cdot WD / (DP + DN) = 1.359323$; $WDP = DN \cdot WD / (DP + DN) = 1.359323$;

$DPPN = DPP \cdot DN / (DPP + DN)$; $WDD = \sqrt{2 \cdot Esi \cdot VB / DPPN} = 2.718646$;

$WDDN = DPP \cdot WDD / (DPP + DN) = 1.359323$; $WDDP = DN \cdot WDD / (DPP + DN) = 1.359323$;

$X1 = \sqrt{Esi \cdot kT / DPP} = 0.409673$;

$XJ1 = X1 + WDDP = 1.768996$;

$XM = XJ1 + WDDN = 3.128319$;

$XJ2 = XM + WDN = 4.487643$;

$X2 = XJ2 + WDP = 5.846966$;

Ion Dose > $QN = XJ2 \cdot (DN + DP) = 897.528538$; $QP = XJ1 \cdot (DPP + DN) = 353.799251$;

 Case (2) DP=500 ; DN=500 ; DPP=500 ;

$VBP = kT \cdot \ln(NV/DP) = 0.283167$; $VBPP = kT \cdot \log(NV/DPP) = 0.283167$;

$Vout = 0.500000$;

$DPN = DP \cdot DN / (DP + DN) = 0.650826$; $WD = \sqrt{2 \cdot Esi \cdot VB / DPN} = 1.301653$;

$WDN = DP \cdot WD / (DP + DN) = 0.650826$; $WDP = DN \cdot WD / (DP + DN) = 0.650826$;

$DPPN = DPP \cdot DN / (DPP + DN) = 0.650826$; $WDD = \sqrt{2 \cdot Esi \cdot VB / DPPN} = 1.301653$;

$WDDN = DPP \cdot WDD / (DPP + DN) = 0.650826$; $WDDP = DN \cdot WDD / (DPP + DN) = 0.650826$;

$X1 = \sqrt{Esi \cdot kT / DPP} = 0.183211$;

$XJ1 = X1 + WDDP = 0.834038$;

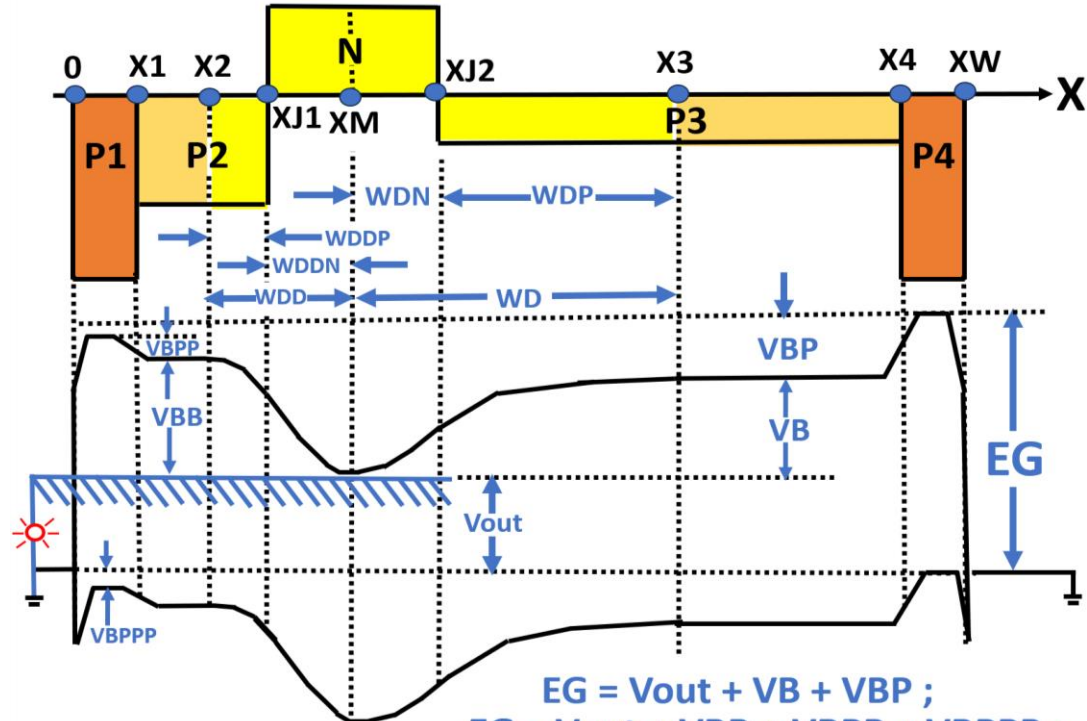
$XM = XJ1 + WDDN = 1.484864$;

$XJ2 = XM + WDN = 2.135690$;

$X2 = XJ2 + WDP = 2.786517$;

Ion Dose > $QN = XJ2 \cdot (DN + DP) = 2135.690450$; $QP = XJ1 \cdot (DPP + DN) = 834.037719$;

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$EG = Vout + VB + VBP$;
 $EG = Vout + VBB + VBPP + VBPPP$;

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