

file: g:\mathcad\mos3Dcurves.mcd RWN 09/14-16/09

$$KP := 5 \cdot 10^{-4} \quad \underline{\underline{W}} := 10 \cdot 10^{-6} \quad \underline{\underline{L}} := 10 \cdot 10^{-6} \quad VT := 0.8 \quad \lambda := 0.006$$

$$eps := 0.001$$

break ID into parts, saturation and Ohmic, to fit the screen, vg=vgs, vd=vds, VT=VTO

$$Isat(vg, vd) := \left(\frac{KP}{2}\right) \cdot \left(\frac{W}{L}\right) \cdot [(vg - VT)^2 \cdot (1 + \lambda \cdot vd)] \cdot \Phi[vd - eps - (vg - VT)]$$

$$Iohm(vg, vd) := \left(\frac{KP}{2}\right) \cdot \left(\frac{W}{L}\right) \cdot [2 \cdot (vg - VT) \cdot vd - vd^2] \cdot (1 + \lambda \cdot vd) \cdot \Phi[(vg - VT) + eps - vd]$$

$$ID(vg, vd) := 0 \cdot \Phi(VT - vg) + (Isat(vg, vd) + Iohm(vg, vd)) \cdot \Phi(vg - VT)$$

represent vg and vd by integers for 3D plot

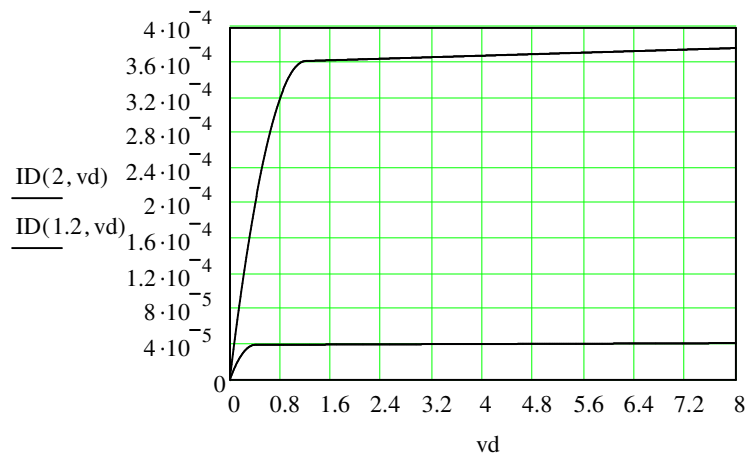
$$int := 10 \quad \Delta := 0.01$$

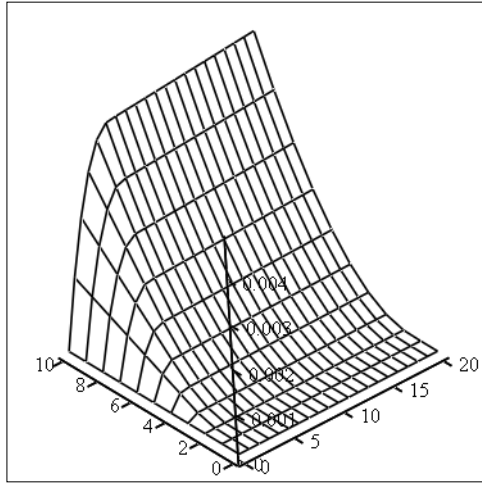
$$i := 0..int \quad j := 0..2int$$

$$vgmax := 5 \quad vdmax := 8 \quad vg(i) := i \cdot \frac{vgmax}{int} \quad vd(j) := j \cdot \frac{vdmax}{int}$$

$$M_{i,j} := ID(vg(i), vd(j)) \quad M_{3,4} = 1.249 \times 10^{-4}$$

$$\underline{\underline{vd}} := 0, \Delta..vdmax$$





M

