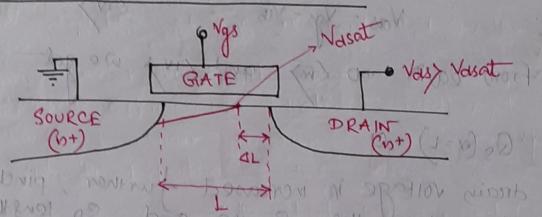
\* Channel Length Modulation \*





On a long channel device, drain current Stays Constant when the drain voltage exceeded Vasat. On Contrast, the drain current of a Short channel HOIFET increase Slightly beyond the pinch-off on the relocity Saturation point. This arises because of two factors,—

i) the short channel effect is channel Length Modulation

N.B: As the drain voltage increases beyond the Saturation voltage vasat the saturation point where the surface channel Collapses begins to move slightly toward the source

Channel length modulation effect Come into existance after pinch off take place and Current Saturation occurs.

At the Source-end et becomes, -

Qs(x=L) = - Cox (Vgs-V+15- Vos) ---- Lim

- We know that, when Saturation take place -
Vas = Vgs - Vas Liv>
So, from ears no (m) and Livy wo get
Qs (x=L) (=0)
As the drain voltage in increased further, pinch-off points shift towards the Source end, so length of the Channel decreases.
Now, the effective length (L') in given by
NOW the effective longine (2)
Then to shannel Enhancement type HOSFET operating in
Softwation region then  Cox. (Vgs-V4h)2  Losset = len (W ). Cox. (Vgs-V4h)2/2  Northwater len (W ). Cox. (Vgs-V4h)2/2  Northwater len (W ). Cox. (Vgs-V4h)2/2  Northwater len (W ). Cox. (Vgs-V4h)2/2
works the line (W L-OL) · Cox. (Vgs-V+h) 1/2
= un. (W/L). Cox. (vgs-V+m)2/2 Idsate
(1-4L) 00 sprints 200 (1-4L)
There, (1-(1) = (1- A) vas) 0
As the sometherd is hocemen.
Idsat = $u_n \cdot G_{x} \cdot \frac{w}{2L} \left( v_{gs} - v_{th} \right)^2 \cdot \left( 1 + \lambda v_{ds} \right)$
AND CUVE ON A DO O CONTRACTOR ON TA

here g = Empirical model parameter. (Van - Vox VAN) (With Channel From)

Vgs 4

Vgs 4 Vg12 (Noglecting channel Vas (volt) N.B :- The electrons in the channel, that Come from the Source travel through the shortened channel & are injected into the depletion region from where they are streeted to the depletion region from where they are streeted to the drain by the high electric field. oitoticail out li all selled the property was suffered to and the model composite to the following out (a extine once cheaned that for a given supply voltage the Software of contraction Sutrainoic Capacitance of a short longured modifier also loader, which merces it consents to knitch. stowers for a given process, the channel lenth can't be antiformly neduced over if placed by lithography.