EE 421/ECE 621

Digital IC Design

Sept. 27, 2017

Lecture 9

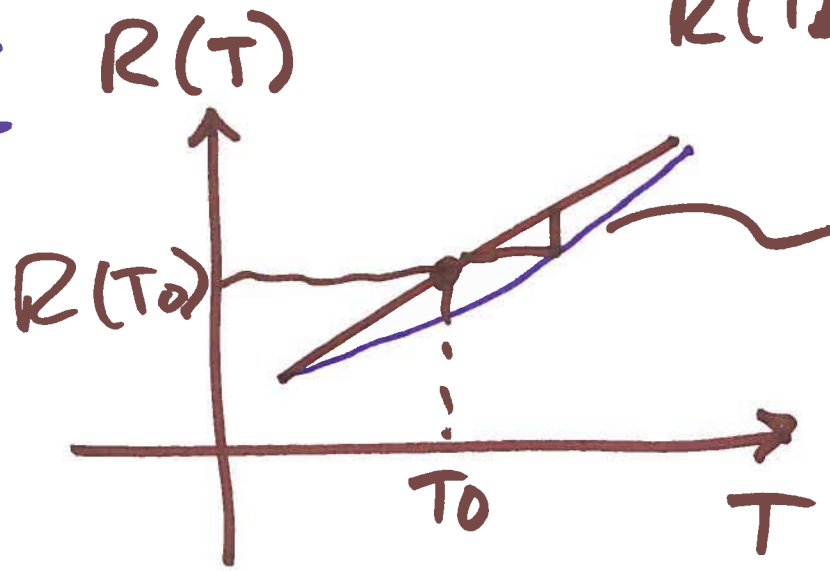
10^{-6}

2,400 ppm/°C

$= 0.0024$

$= \frac{1}{R}\frac{dR}{dT}$

$R(T) = R(T_0)\cdot\left(TCR_1(T-T_0) + TCR_2(T-T_0)^2 + 1\right)$



$\frac{dR(T)}{dT}$

$TCR = \frac{1}{R(T)}\cdot\frac{dR(T)}{dT}$

$TCR = \frac{1}{R}\frac{dR}{dT}$

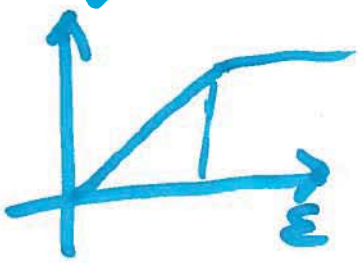
$\Omega \cdot cm$ (resistivity)

$$R = \frac{\rho}{t} \cdot \frac{L}{W}$$

Sheet resistance

$$\left(\frac{Columbs/s}{V \cdot Cm}\right)^{-1} = \left(\frac{A}{V \cdot Cm}\right)^{-1} = \Omega \cdot cm$$

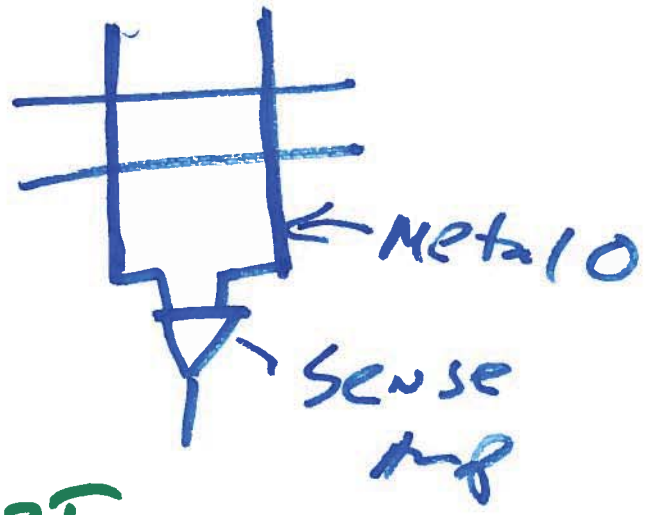
$$\rho = \frac{1}{q(\mu_n \cdot N + \mu_p \cdot P)}$$

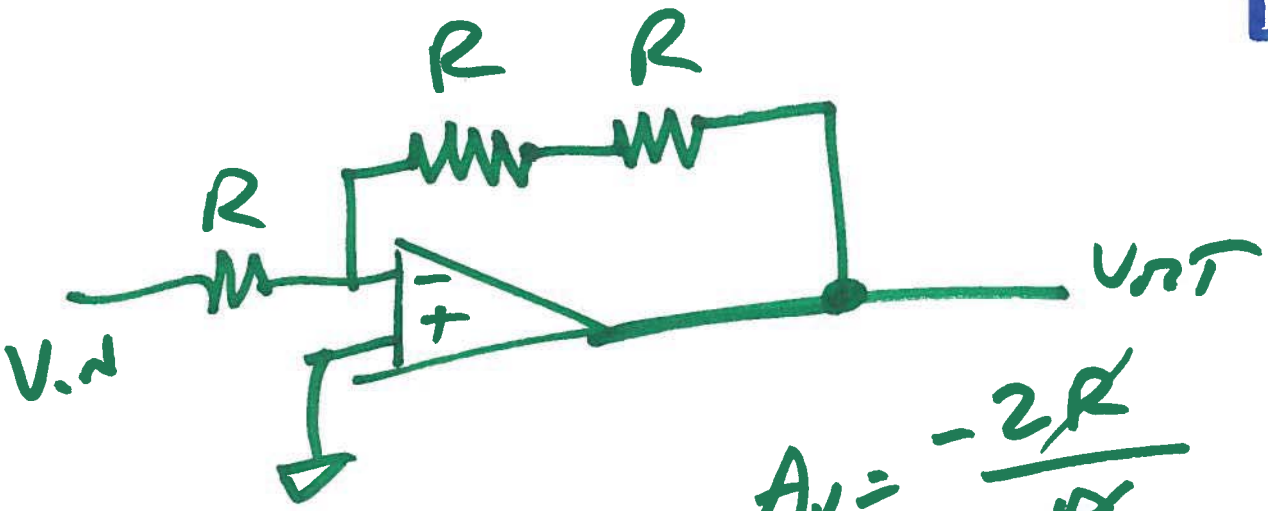


$$\frac{Cm^2}{S \cdot V} \cdot \frac{Carriers}{Cm^3} \cdot \frac{Columb}{Carrier} \quad \mu = \frac{\text{Average velocity } cm/s}{\text{Applied } \varepsilon \text{ field } V/cm}$$

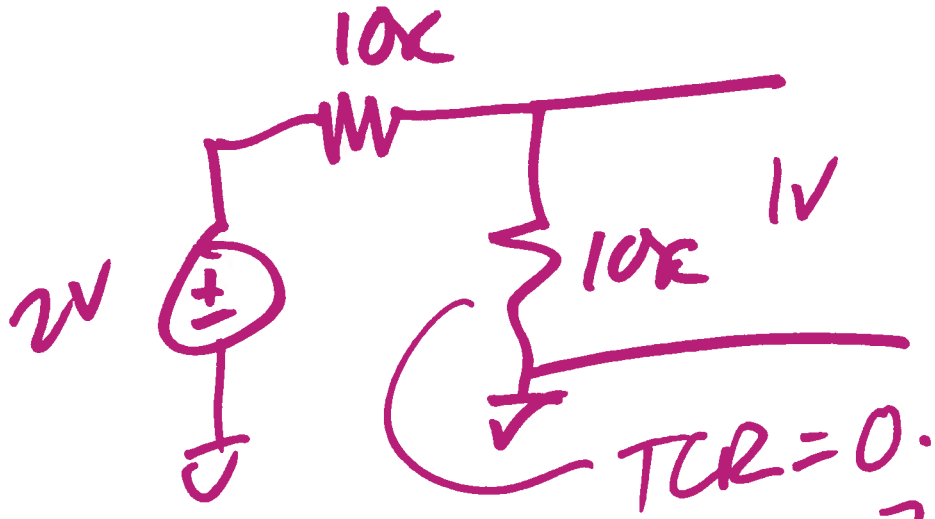
Mobility

$$\mu \Rightarrow \frac{Cm^2}{V \cdot S}$$

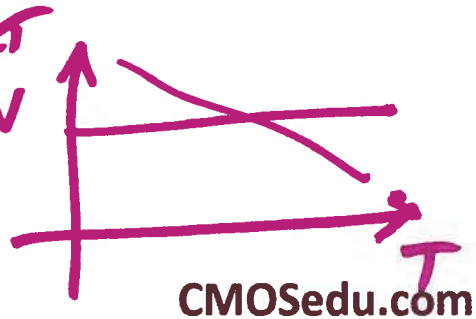


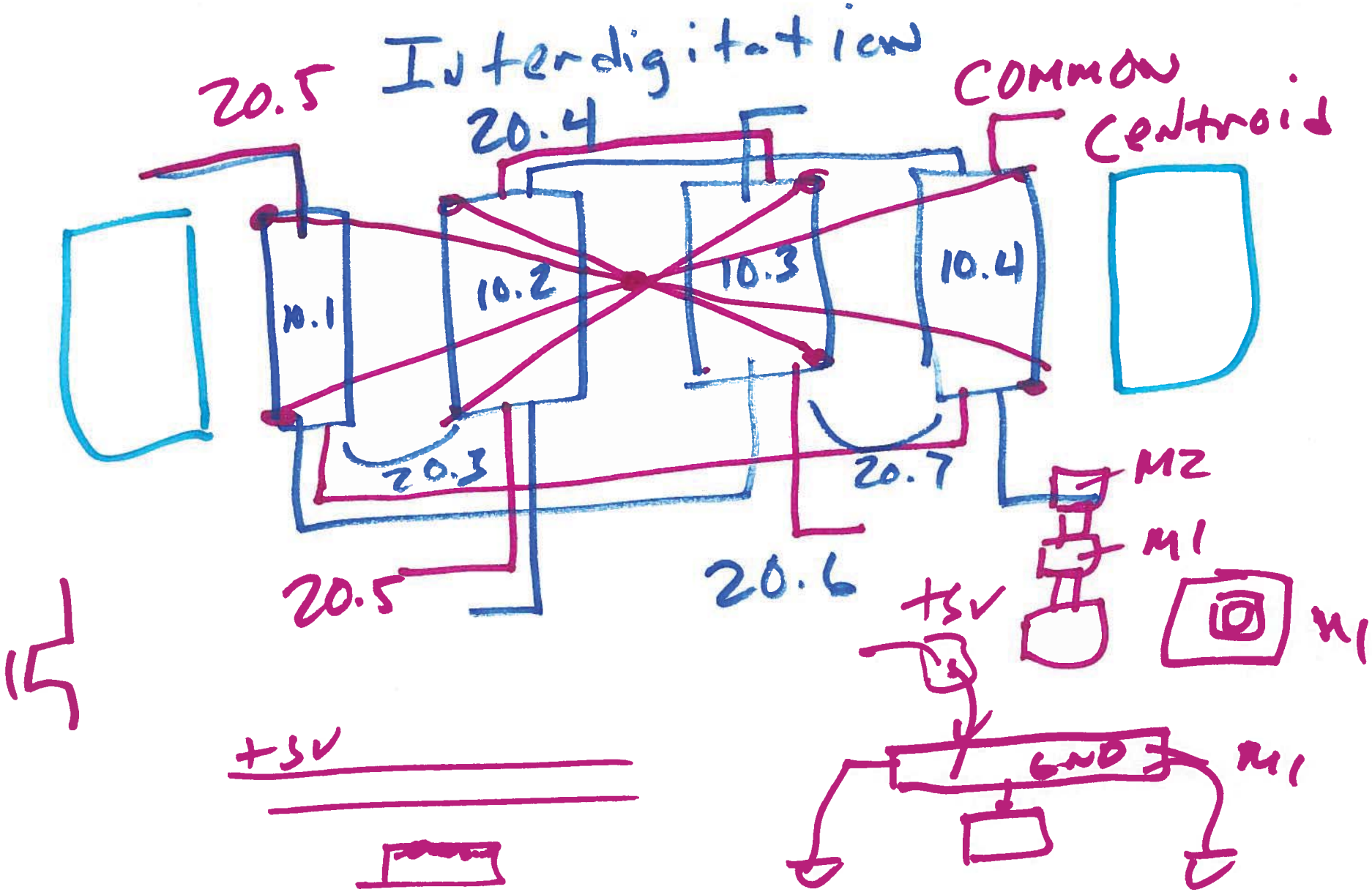


$$A_V = \frac{-2R}{R}$$

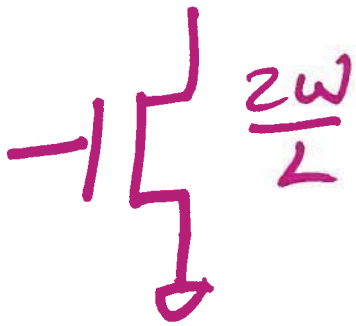


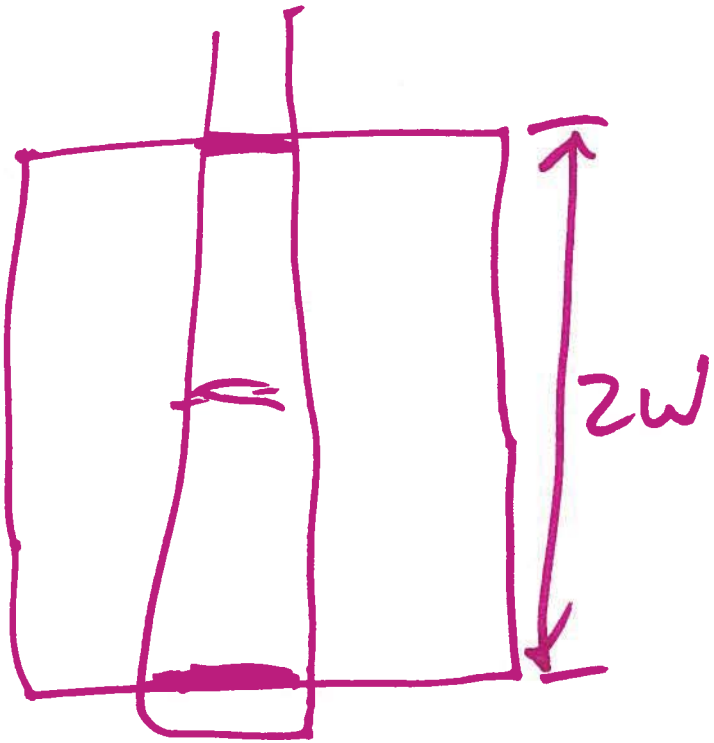
$$= \frac{-2R(T_0)(TCR(T-T_0)+1)}{R(T_0)(TCR(T-T_0)+1)}$$

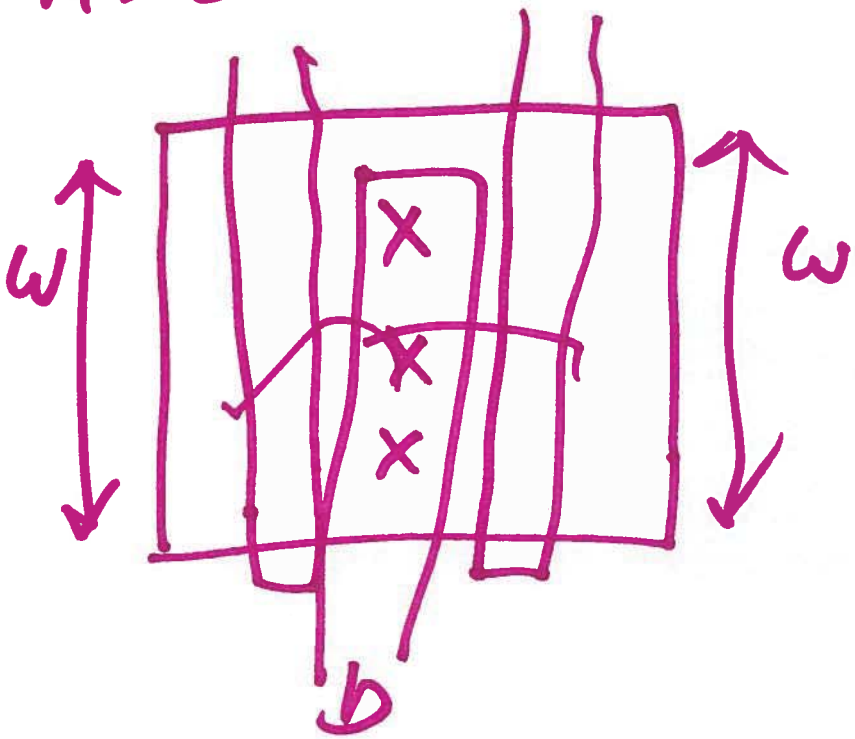


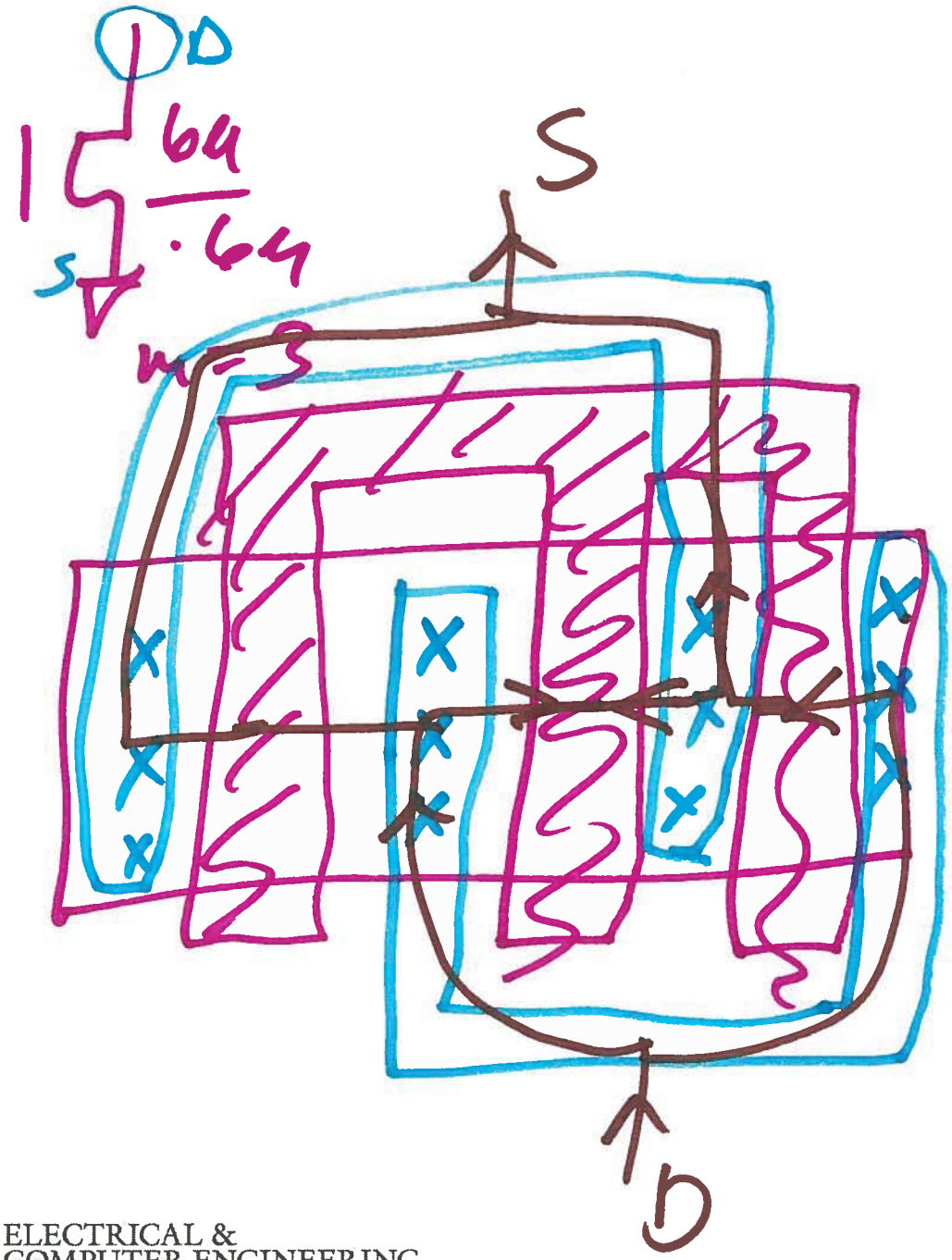

20.5
Interdigitation
20.4
COMMON
Centroid
10.1
10.2
10.3
10.4
20.3
20.7
M2
M1
20.5
20.6
+5V
M1
+5V
GND
M1


D
W/L
W/L


2W
L
M=2


2W


W
W
b


D
64
1
.64
S
W=3
S
D