SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Department of Electronics and Communication Engineering

Differentiation

COURSE :**VLSID (C322)** Class: **III B.Tech ECE A&B**
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sheet Resistance Rs of MOS Layers for different technologies (5µm ,2µm ,1.2µm)

Layer	*R_s ohm per square*		
	5 µm	*Orbit*	*Orbit 1.2 µm*
Metal	0.03	0.04	0.04
Diffusion (or active)**	10→50	20→45	20→45
Silicide	2→4	—	—
Polysilicon	15→100	15→30	15→30
n-transistor channel	$10^{4\dagger}$	$2 \times 10^{4\dagger}$	$2 \times 10^{4\dagger}$
p-transistor channel	$2.5 \times 10^{4\dagger}$	$4.5 \times 10^{4\dagger}$	$4.5 \times 10^{4\dagger}$

area capacitance values for MOS circuits

Capacitance	*Value in $pF \times 10^{-4}/\mu m^2$ (Relative values in brackets)*					
	5 µm		*2 µm*		*1.2 µm*	
Gate to channel	4	(1.0)	8	(1.0)	16	(1.0)
Diffusion (active)	1	(0.25)	1.75	(0.22)	3.75	(0.23)
Polysilicon* to substrate	0.4	(0.1)	0.6	(0.075)	0.6	(0.038)
Metal 1 to substrate	0.3	(0.075)	0.33	(0.04)	0.33	(0.02)
Metal 2 to substrate	0.2	(0.05)	0.17	(0.02)	0.17	(0.01)
Metal 2 to metal 1	0.4	(0.1)	0.5	(0.06)	0.5	(0.03)
Metal 2 to polysilicon	0.3	(0.075)	0.3	(0.038)	0.3	(0.018)

- **For 5µm MOS circuits**
  Area/standard square = 5µm X 5µm = 25 μm^2(minimum transistor size)
  Capacitance value = 4 X 10^{-4} pF/ μm^2(form table 3.2)
  Thus, standard value □C_g= 25 μm^2 X 4 X 10-4 pF/ μm^2 = 0.01 pF

- **For 2µm MOS circuits**
  Area/standard square = 2µm X 2µm = 4 μm^2
  Capacitance value = 8 X 10^{-4} pF/ μm^2
  Thus, standard value □C_g = 4 μm^2 X 8 X 10^{-4} pF/ μm^2 = 0.01 pF

- **For 1.2µm MOS circuits**
  Area/standard square = 1.2µm X 1.2µm = 1.44 μm^2
  Capacitance value = 16 X 10-4 pF/ μm^2
  Thus, standard value □C_g = 1.44 μm^2 X 16 X 10^{-4} pF/ μm^2 = 0.0023 Pf

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