#1 Layer thickness and spacing for C5N process

Layer spacing: inter-layer capacitance

$$C = \frac{\varepsilon_r \cdot \varepsilon_0 \cdot A}{d}$$

A - area
d - plate separation
(no fringe fields included)

— table uses $aF/\mu m^2$, → convert units to aF and μm.

$\varepsilon_r (SiO_2) = 3.9$

$\varepsilon_0 = 8.854 \times 10^{-14} \frac{F}{cm} \cdot \frac{10^2 cm}{m} \cdot \frac{10^{-6} m}{\mu m} \rightarrow X \cdot 10^{-18} \frac{F}{\mu m} \rightarrow \frac{aF}{\mu m}$

$\varepsilon_{total} = 34.5 \frac{aF}{\mu m}$

solve

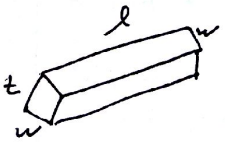
$$d = \frac{\varepsilon_{total} \cdot A}{C} = \frac{34.5 \frac{aF}{\mu m}}{X \, aF/\mu m^2} = \boxed{\frac{34.5}{X} \mu m}$$

X → inter-layer C in $aF/\mu m^2$

resistivity → thickness

"square"

$$R = \rho \frac{l}{A} = \rho \frac{l}{w \cdot t}$$



$$t = \frac{\rho \, (\Omega \cdot cm)}{R \, (\Omega/\square)}$$

$\rho_{Al} = 2.82 \times 10^{-8} \Omega \cdot m \cdot \frac{10^9 nm}{m}$

$\rho_{Al} = 2.82 \times 10^{1} \Omega \cdot nm$

$\rho_{Al} = 28.2 \Omega \cdot nm$