

48. We denote the maximum dimension (side length) of each transistor as ℓ_{\max} , the size of the chip as A , and the number of transistors on the chip as N . Then $A = N\ell_{\max}^2$. Therefore,

$$\ell_{\max} = \sqrt{\frac{A}{N}} = \sqrt{\frac{(1.0 \text{ in.} \times 0.875 \text{ in.})(2.54 \times 10^{-2} \text{ m/in.})^2}{3.5 \times 10^6}} = 1.3 \times 10^{-5} \text{ m} = 13 \mu\text{m} .$$