DESIGN RULES

Design rules include width rules and spacing rules. Mead and Conway developed a set of simplified scalable X -based design rules, which are valid for a range of fabrication technologies. In these rules, the minimum feature size of a technology is characterized as 2 X. All width and spacing rules are specified in terms of the parameter X. Suppose we have design rules that call for a minimum width of 2 X, and a minimum spacing of 3 X . If we select a 2 um technology (i.e., X = 1 um), the above rules are translated to a minimum width of 2 um and a minimum spacing of 3 um. On the other hand, if a 1 um technology (i.e., X = 0.5 um) is selected, then the same width and spacing rules are now specified as 1 um and 1.5 um, respectively.

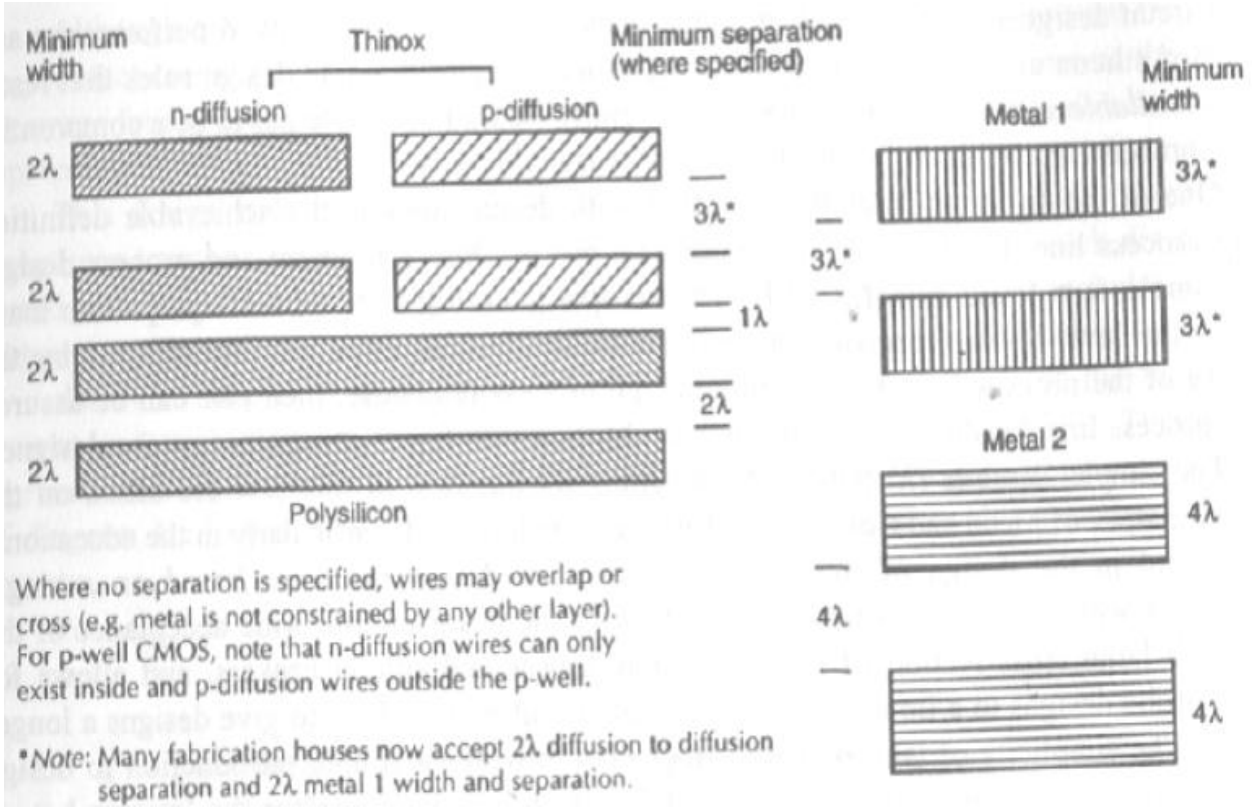

Figure 10: Design rules for the diffusion layers and metal layers.

Figure 10 shows the design rule n diffusion, p diffusion, poly, metal1 and metal 2. The n and p diffusion lines is having a minimum width of 2λ and a minimum spacing of 3λ.Similarly we are showing for other layers.

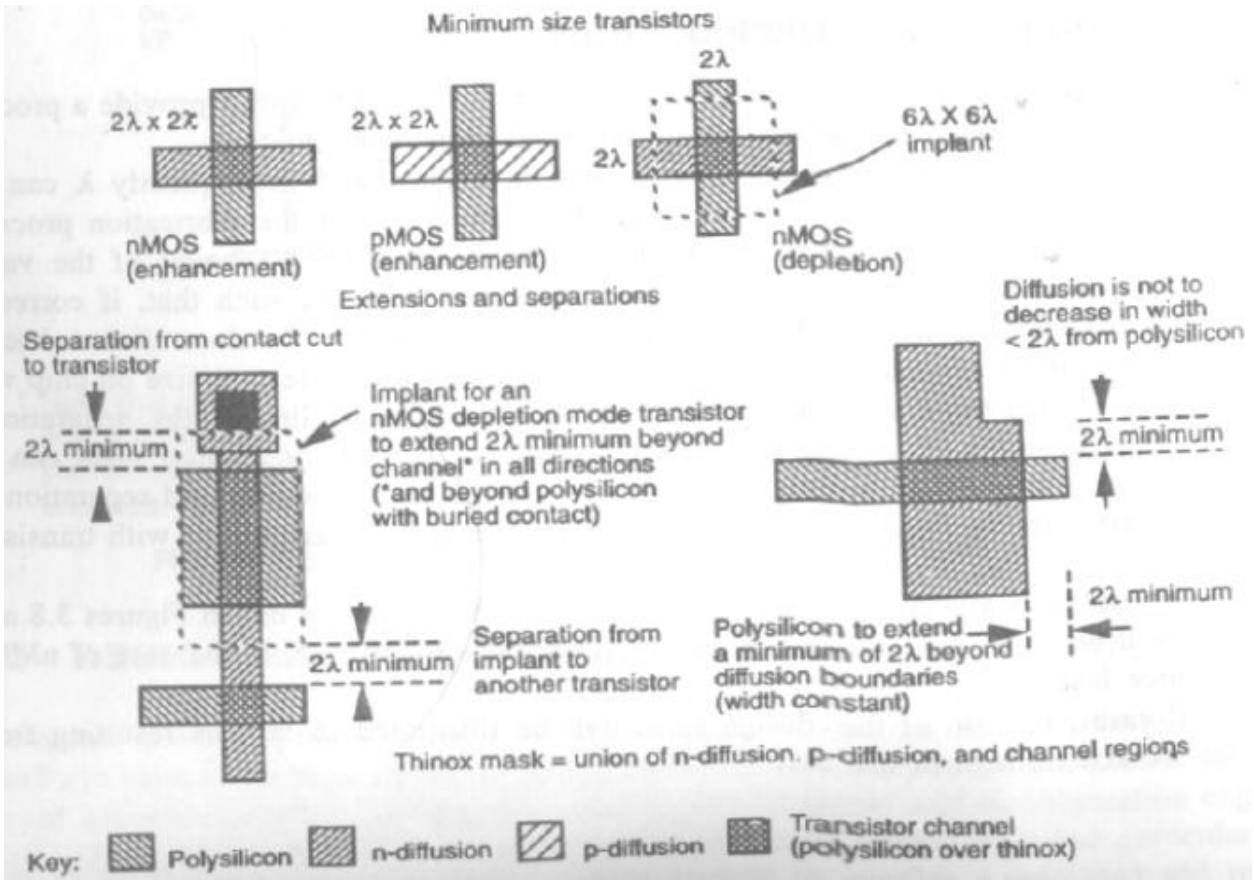

Figure 11: Design rules for transistors and gate over hang distance.

Figure shows the design rule for the transistor, and it also shows that the poly should extend for a minimum of 7k beyond the diffusion boundaries. (gate over hang distance)

What is Via?

It is used to connect higher level metals from metal connection. The cross section and layout view given figure 13 explain via in a better way.

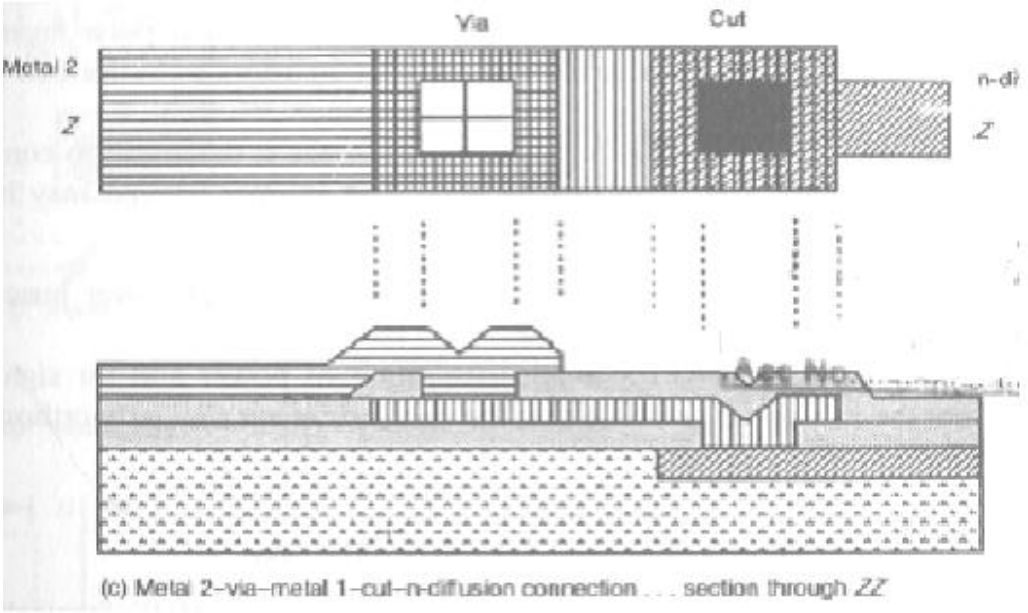

Figure 12: cross section showing the contact cut and via

Figure shows the design rules for contact cuts and Vias. The design rule for contact is minimum2λx2λ and same is applicable for a Via.

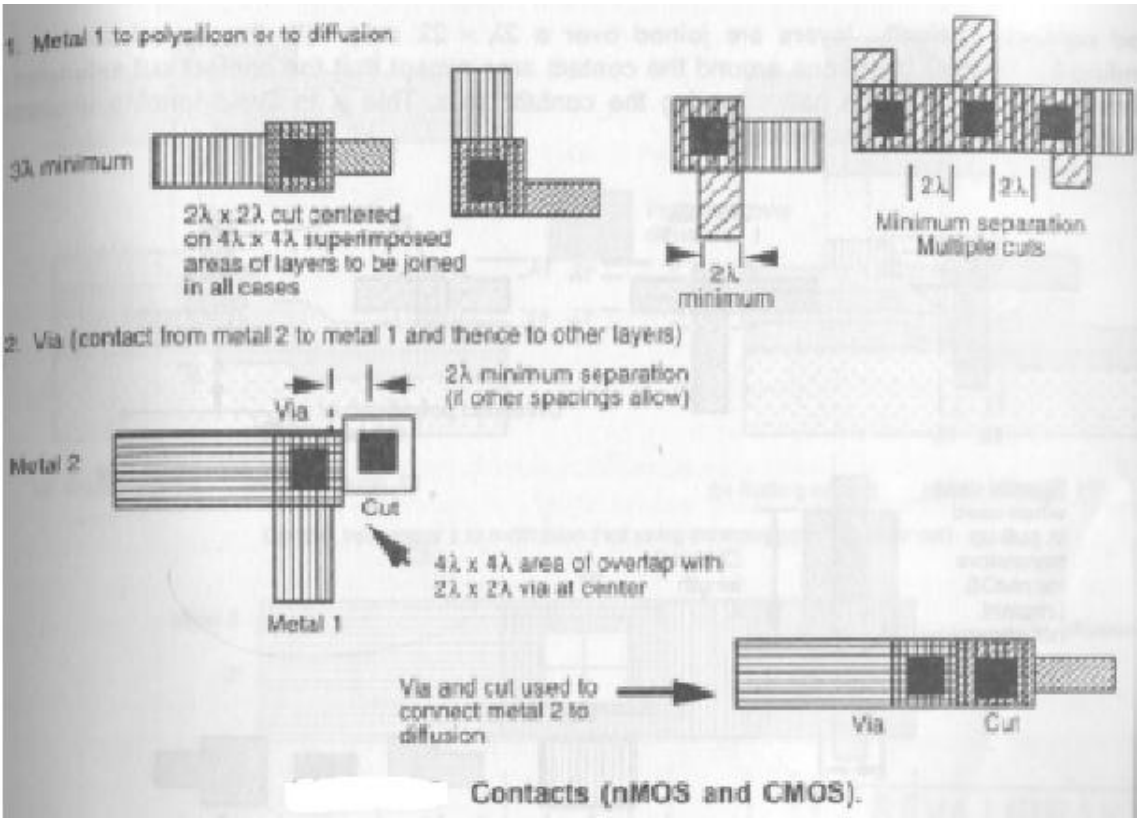

Figure 13: Design rules for contact cuts and vias

Buried contact: The contact cut is made down each layer to be joined and it is shown in figure 14.

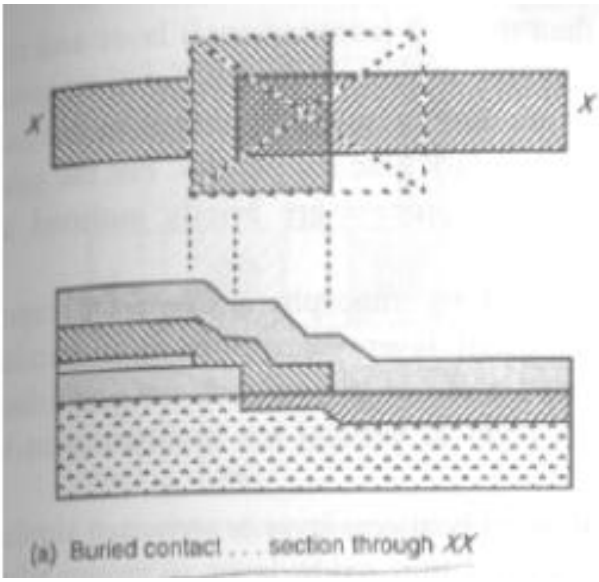

Figure 14: Buried contact.

Butting contact: The layers are butted together in such a way the two contact cuts become contiguous. We can better under the butting contact from figure 15.

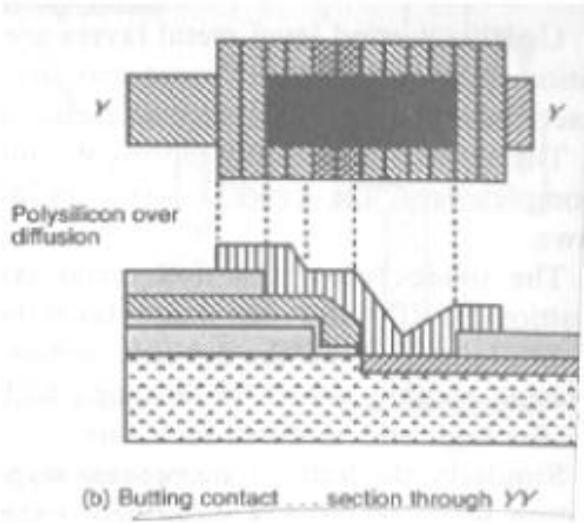

Figure 15: Butting contact.

Source : http://elearningatria.files.wordpress.com/2013/10/ece-v-fundamentals-of-cmos-vlsi-10ec56-notes.pdf