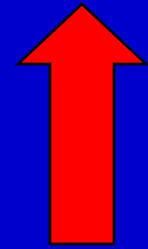
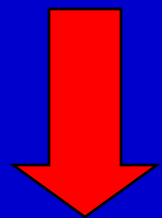


<http://www.youtube.com/watch?v=6iDzt2IPmS8>

BJT and HBT



design and



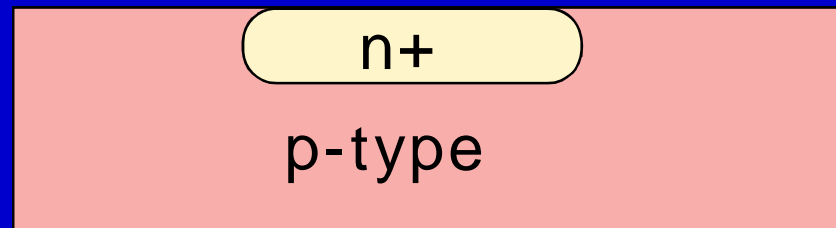
fabrication

http://www.youtube.com/watch?v=_j-YEdsVV74

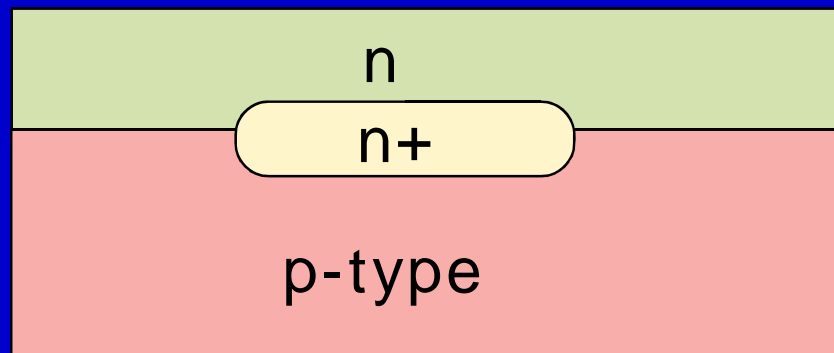
General Comments

- Double diffused epitaxial process
- Starting material - lightly doped Si (3 - 10 ohm-cm)
- Followed by diffusion of the buried n+ layer
- Followed by epitaxial layer of n-type Si (3-15 micron)
- Isolation by p+ moats diffused from the top surface

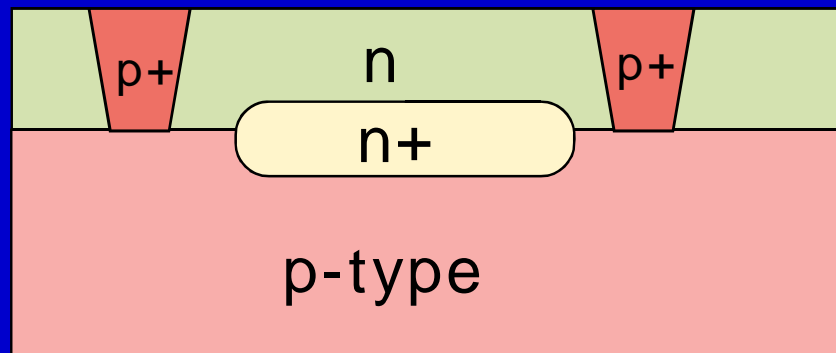
Step 1. Buried Layer diffused



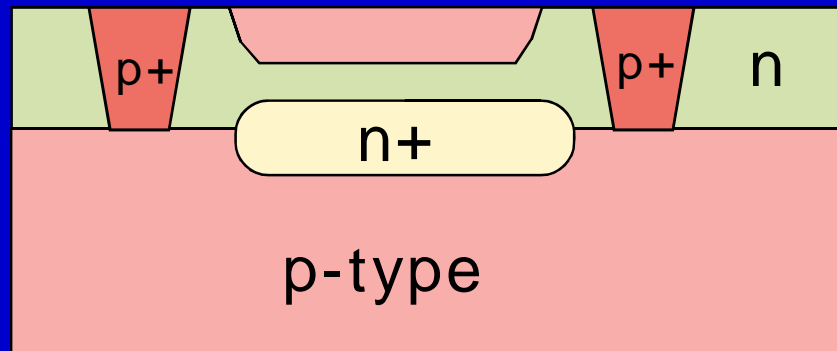
Step 2. Si epi grown



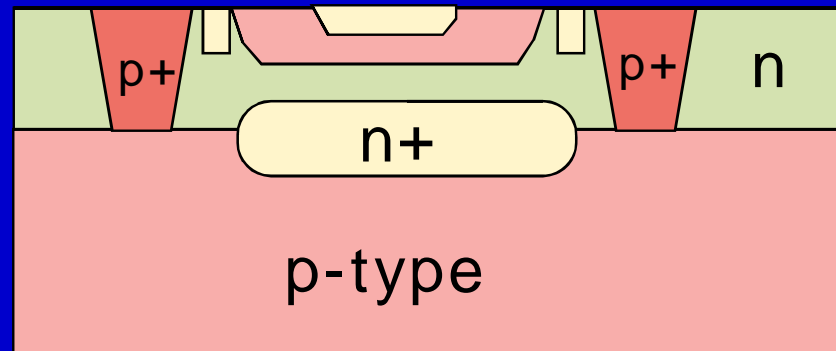
Step 3 p+ isolation diffused



Step 4. Base diffusion



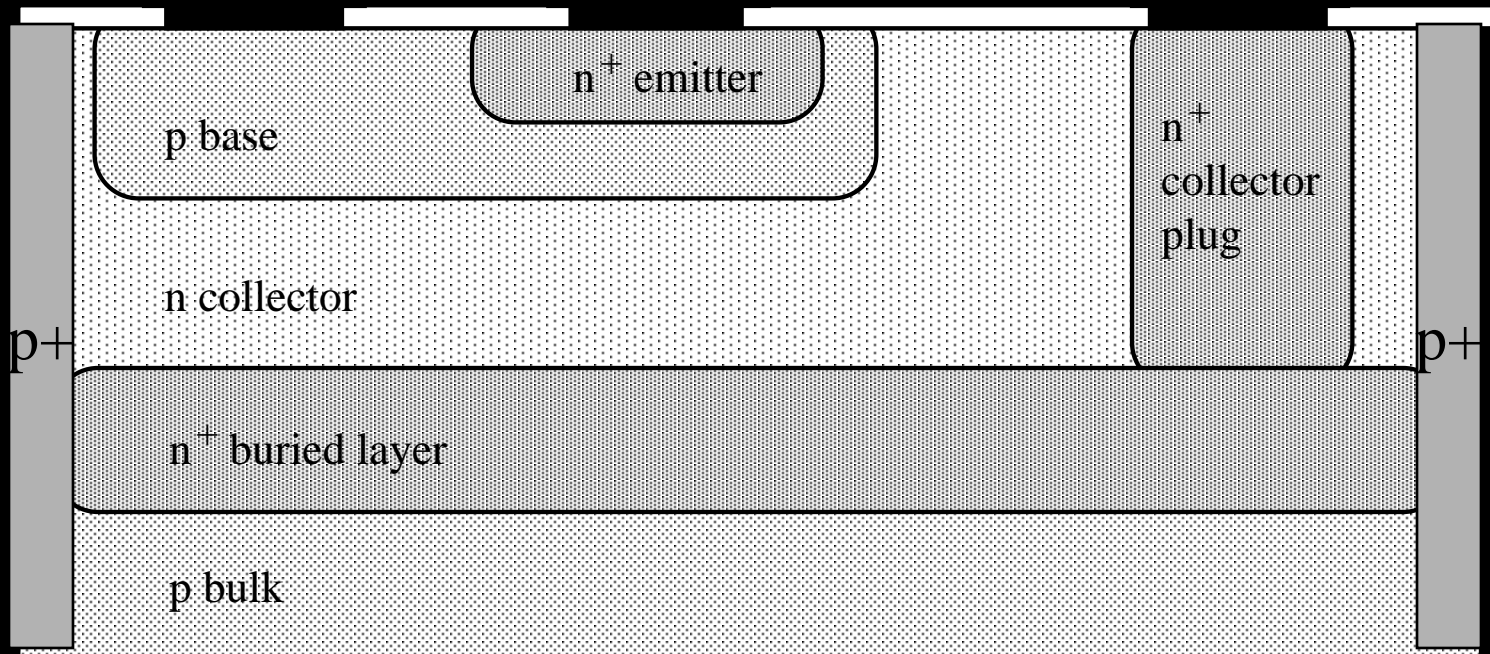
Step 5 Emitter and collector contact diffusions



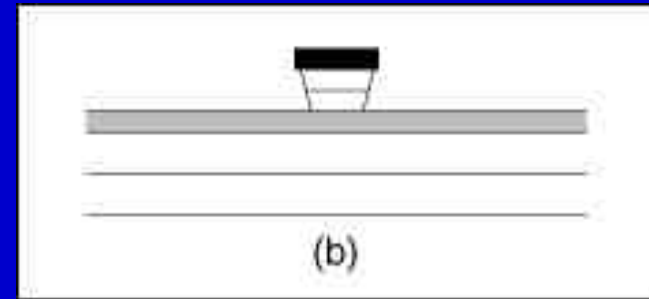
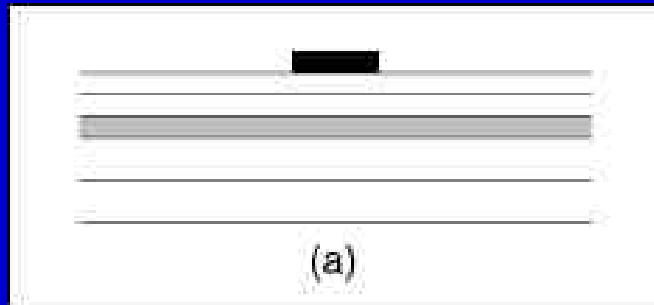
Steps 6 and 7

- Contact pattern
- Metallization and interconnect patterns

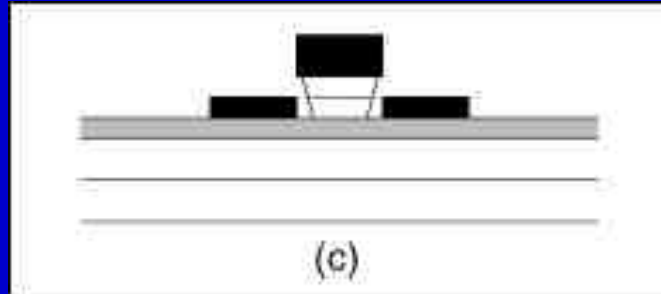
Schematic BJT Layout for IC



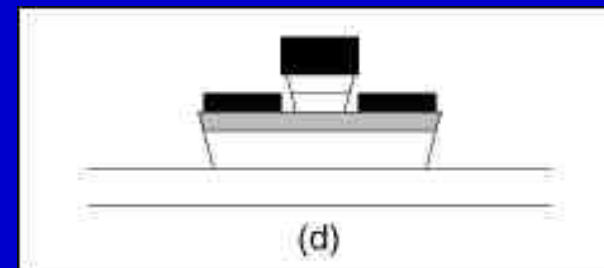
HBT Fabrication



emitter contact is deposited



The emitter cap and emitter layers are then selectively etched to expose the base layer and undercut the emitter contacts

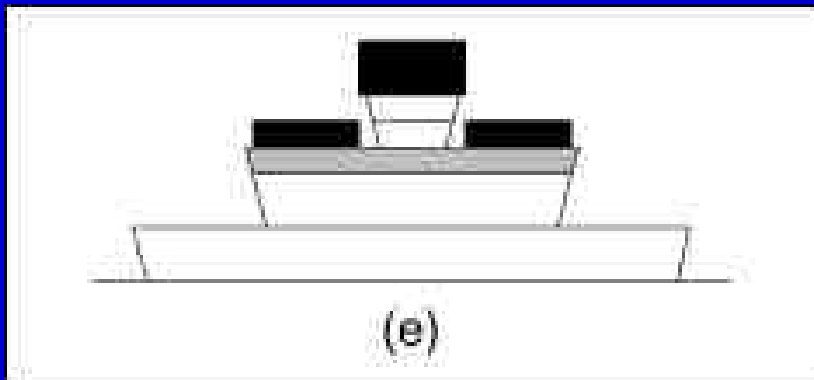


The base metal is deposited and is self-aligned to the emitter mesa

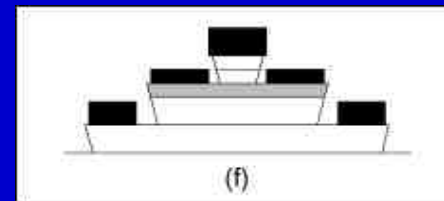
The base/collector mesa is etched and the subcollector exposed

From <http://www.ews.uiuc.edu/~gstill/hbt-fab.html>

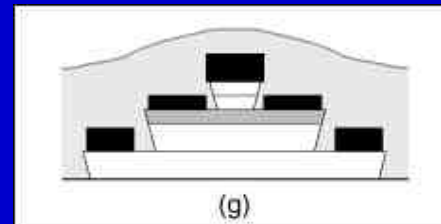
HBT fabrication continued



The isolation mesa is etched



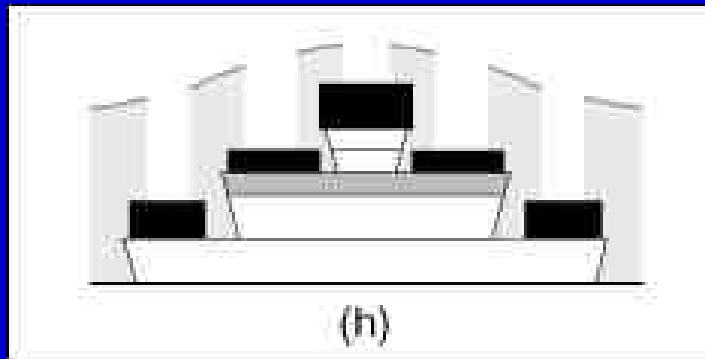
The collector contacts are deposited



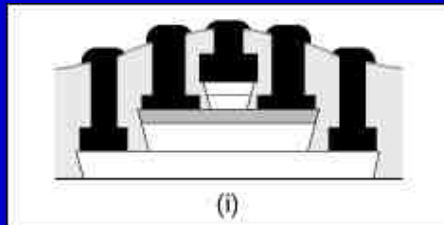
Polyimide is spun on and cured to planarize and prevent interconnect metal from shorting to the sides of the device

From <http://www.ews.uiuc.edu/~gstill/hbt-fab.html>

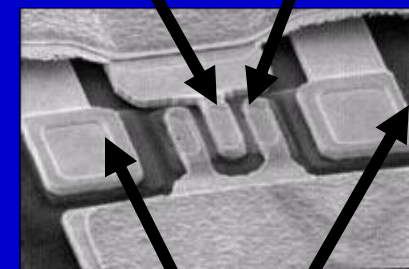
HBT Fabrication – Final Steps



Contact vias are etched through the polyimide



Base **Emitter**

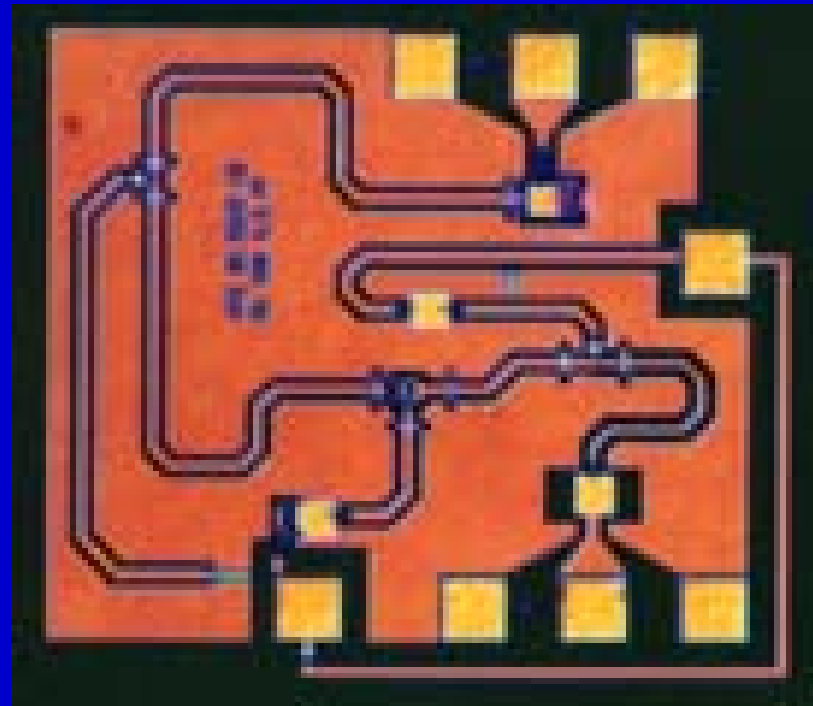


Collector

The interconnect metallization is deposited

From <http://www.ews.uiuc.edu/~gstill/hbt-fab.html>

38 GHz Voltage Controlled Oscillator



From <http://www.ews.uiuc.edu/~gstill/hbtckt.html>