

TECHNOLOGIE PRODUKCJI TRANZYSTORÓW

Elektronika Ciała Stałego

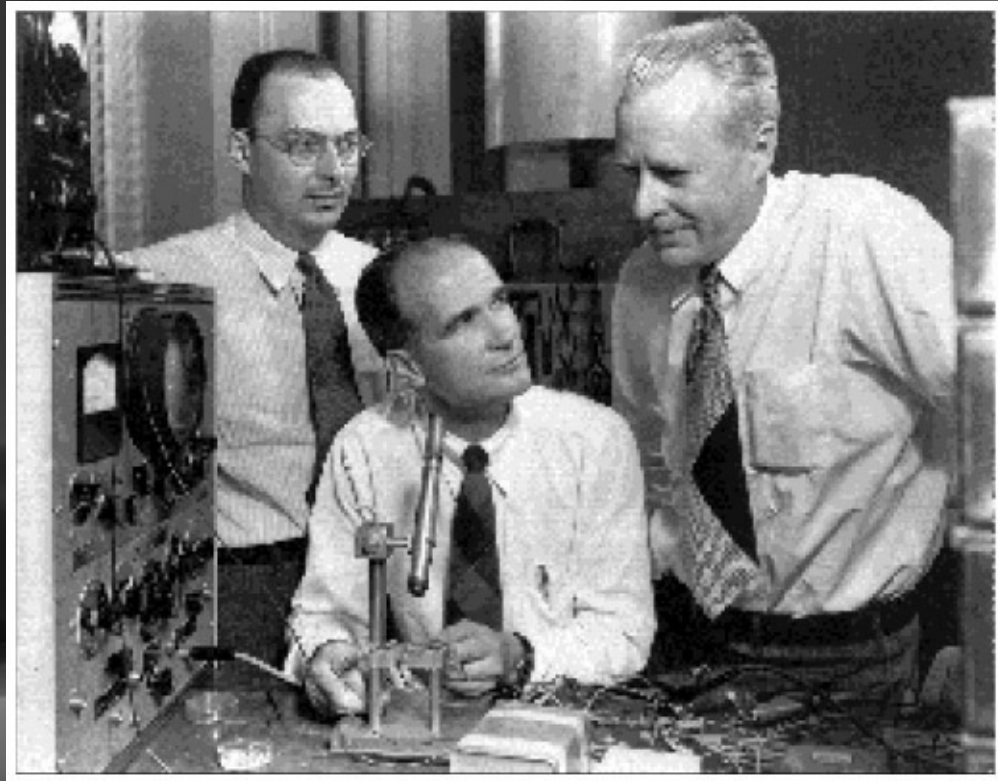
Paweł Płończak

Trochę historii

-- Bell Laboratories, Murray Hill, New Jersey - 1947

John Bardeen

Walter Brattain



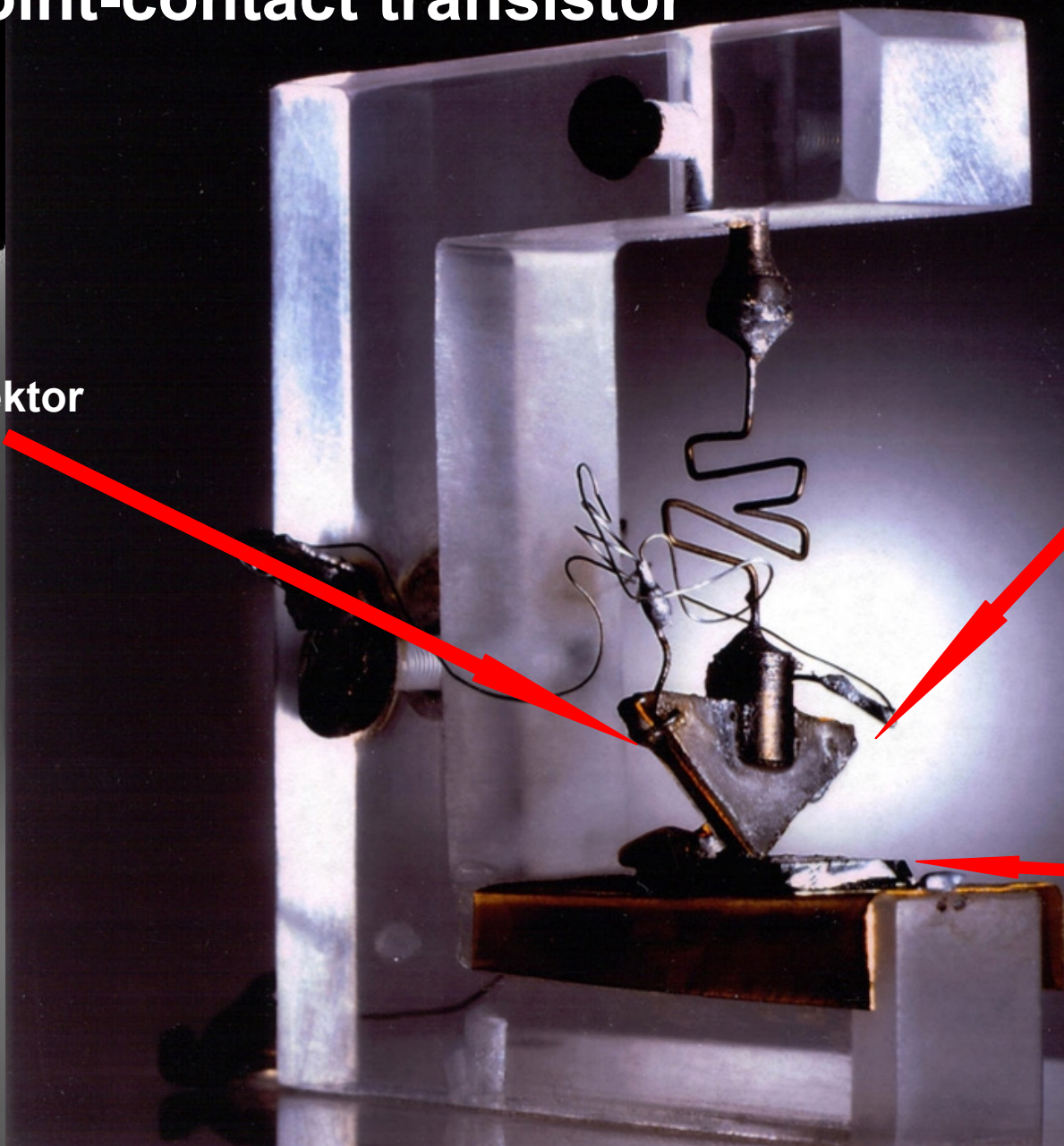
William Shockley

Point-contact transistor

kolektor

emiter

baza

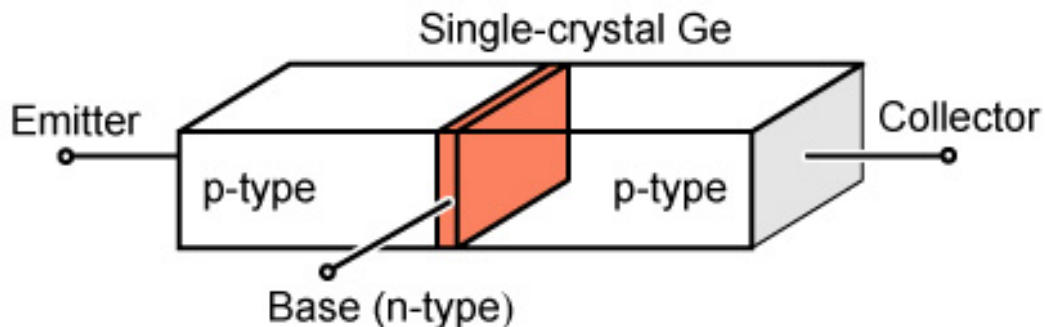
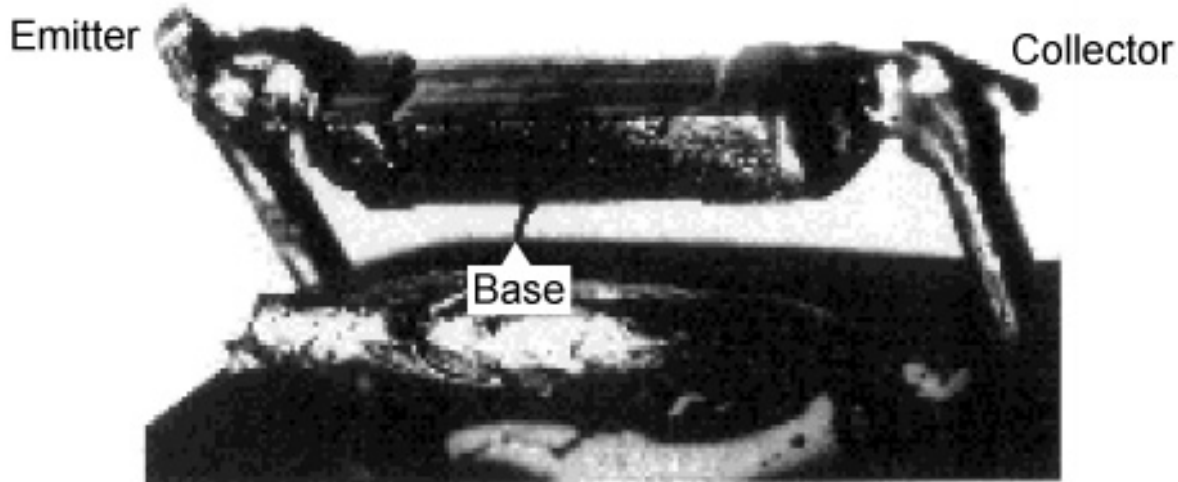


Juntion Transistor

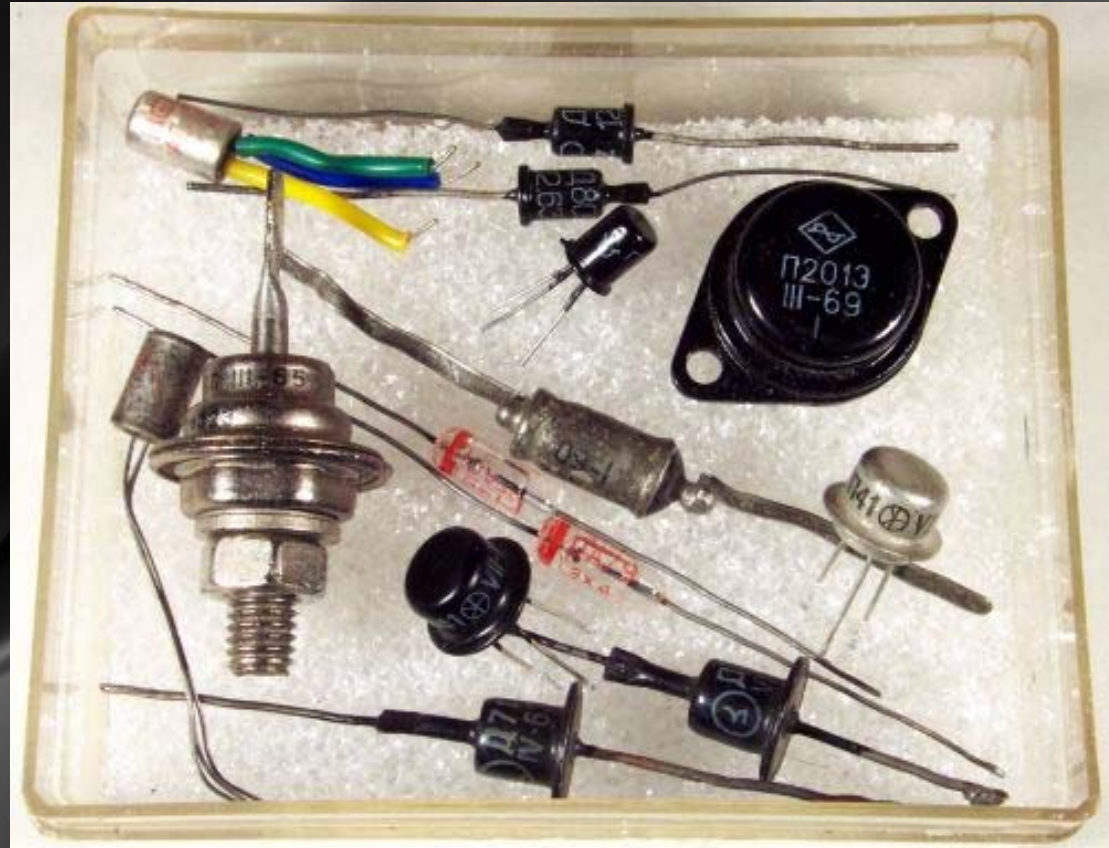
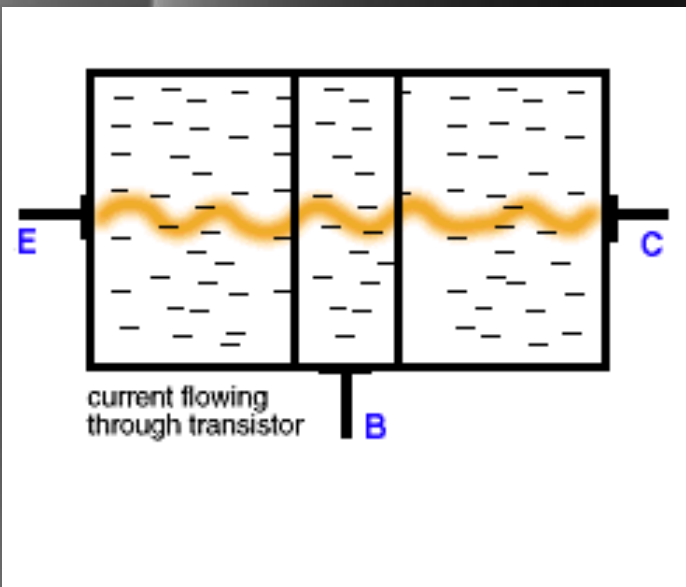
Początek 1949 Shockley wymyśla tranzystor oparty o strukturę sandwicha.

The First Junction Transistor

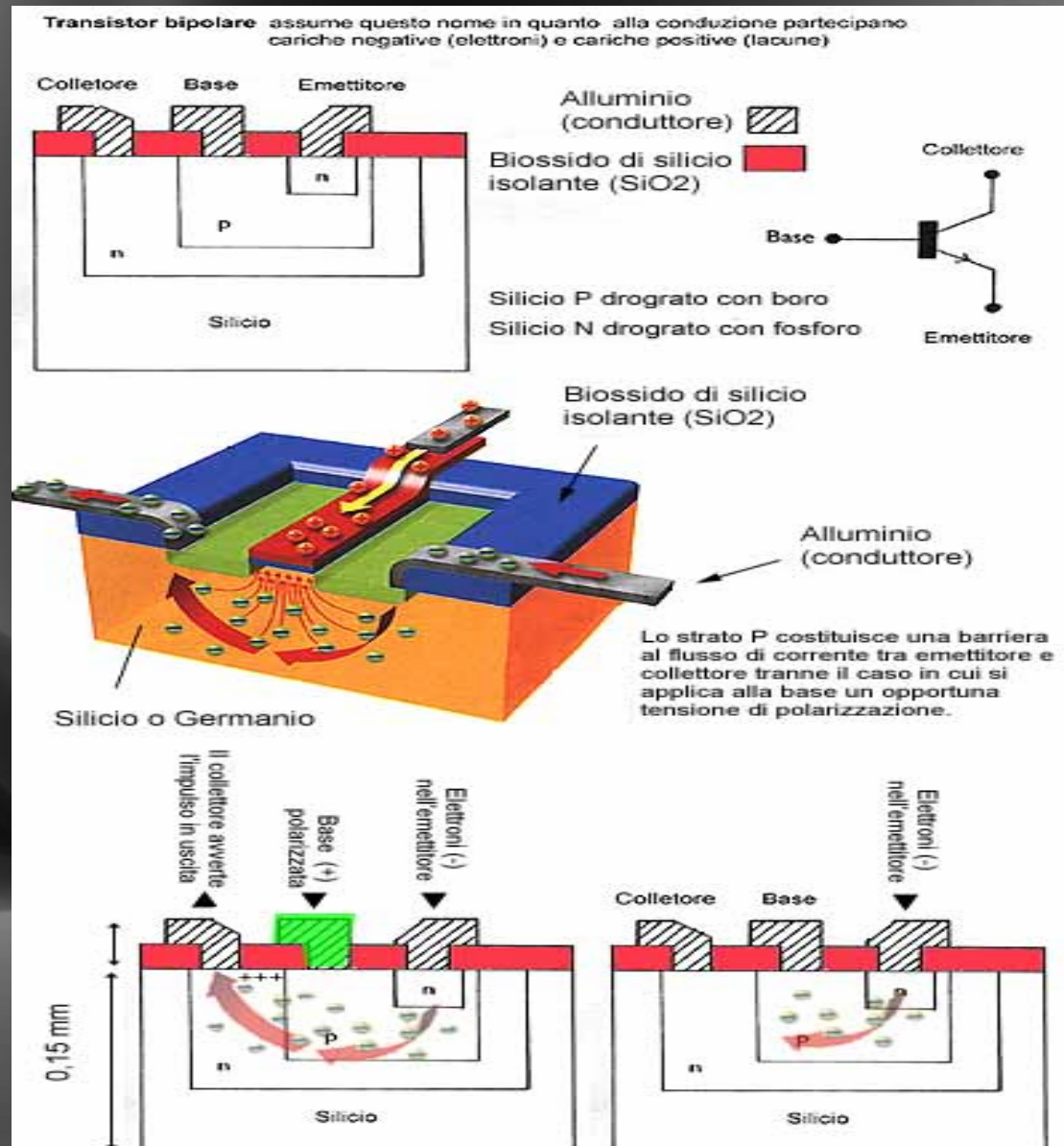
First transistor with diffused pn junctions by William Shockley
Bell Laboratories, Murray Hill, New Jersey (1949)



BJT - bipolar junction transistors



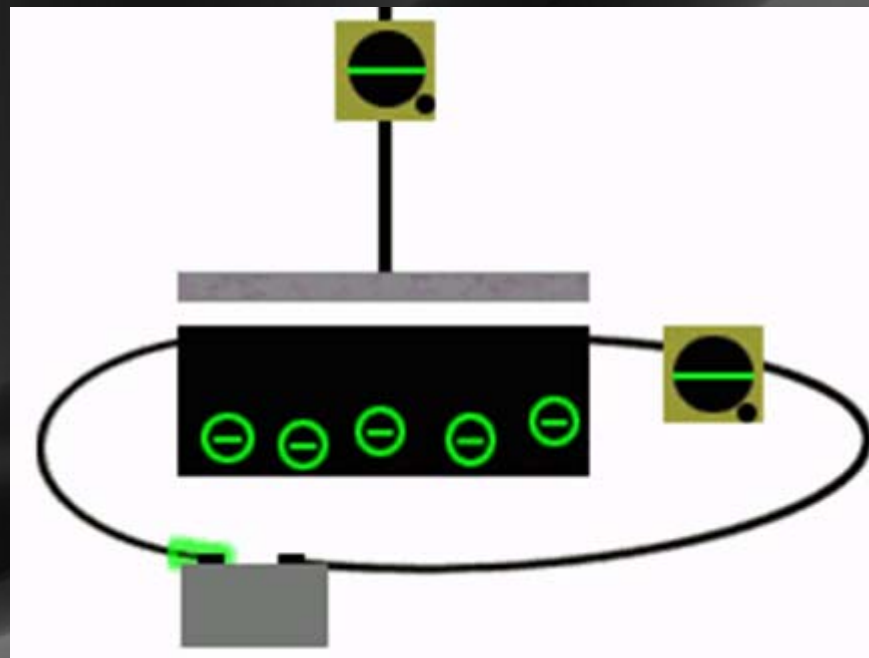
BJT - bipolar junction transistors



FET – Field Effect Transistor

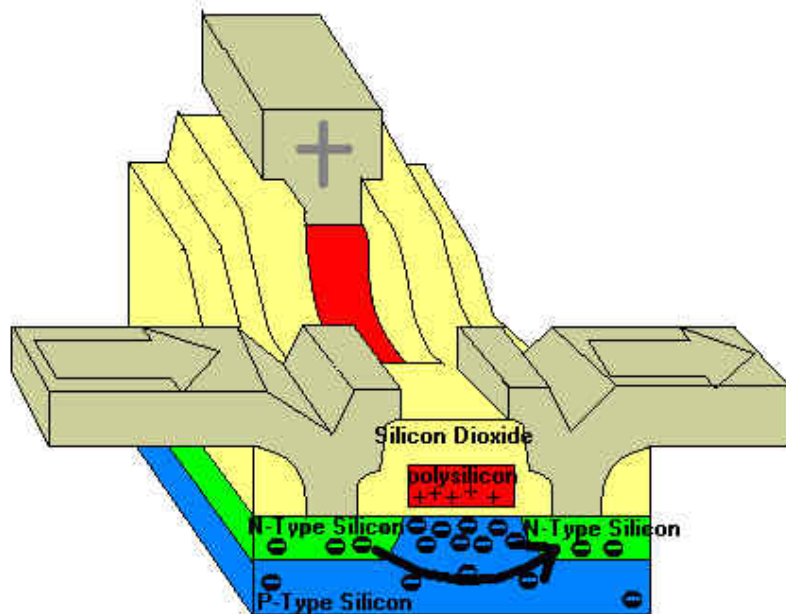
Tranzystor polowy

Wynaleziony w Bell Labs w 1960r.

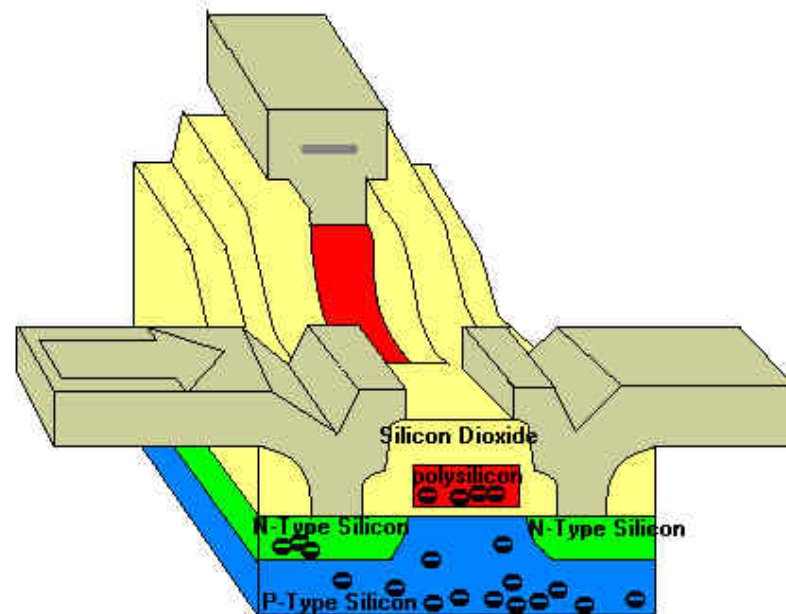


FET – Field Effect Transistor

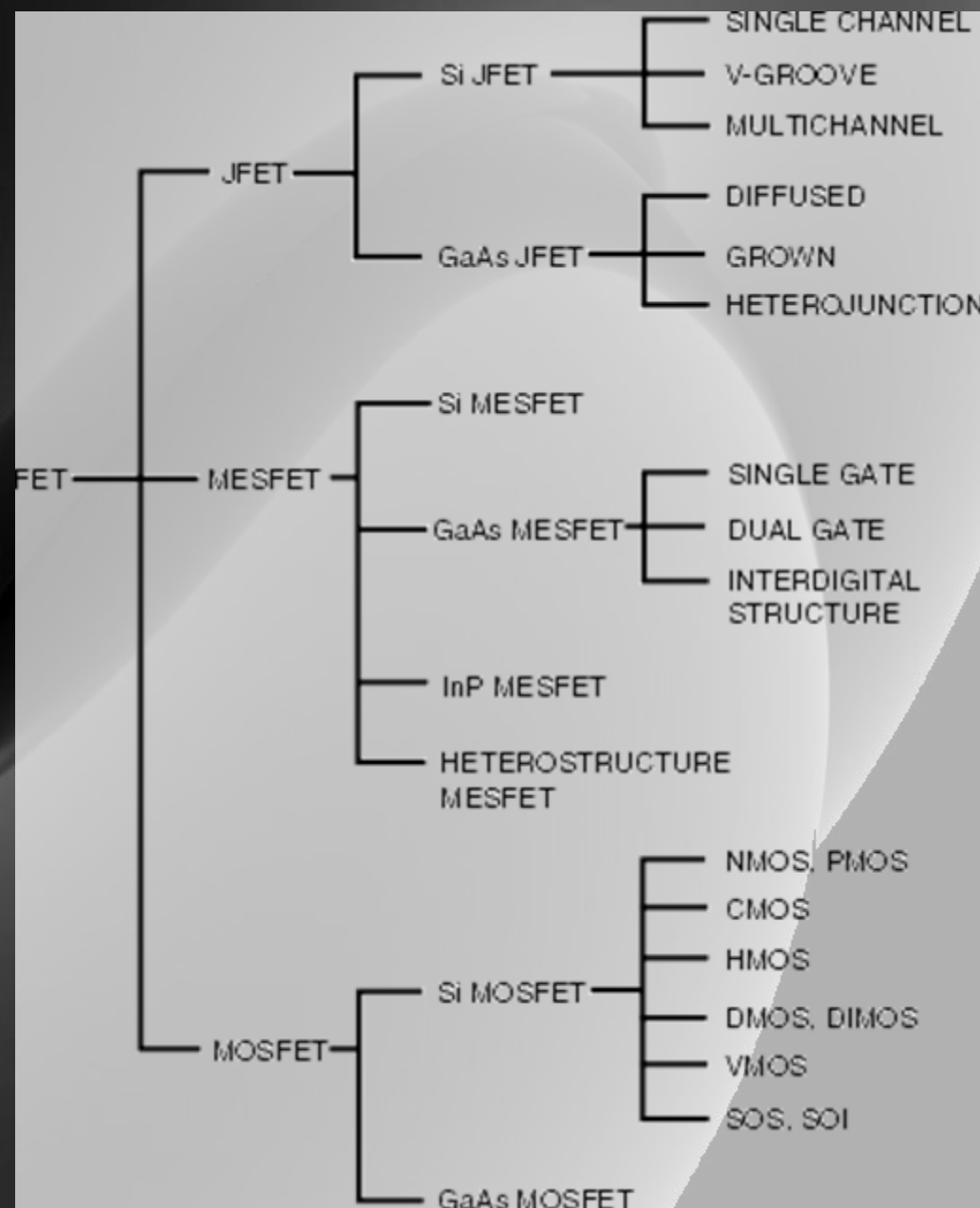
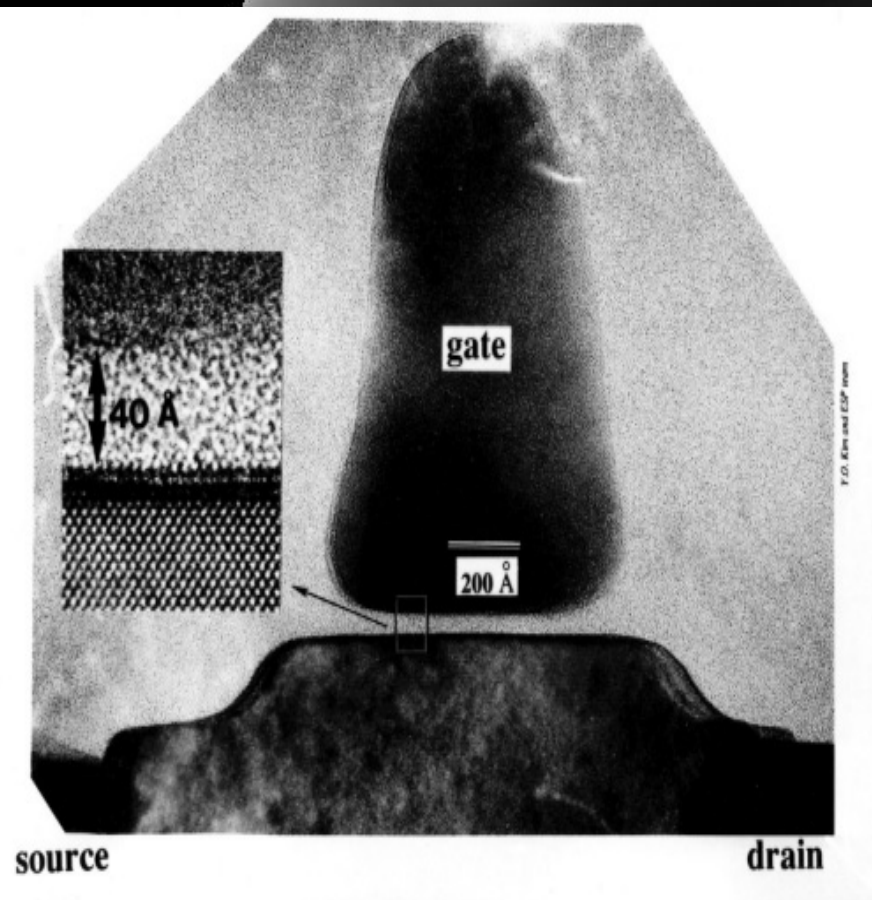
Tranzystor polowy



Włączony



Wyłączony



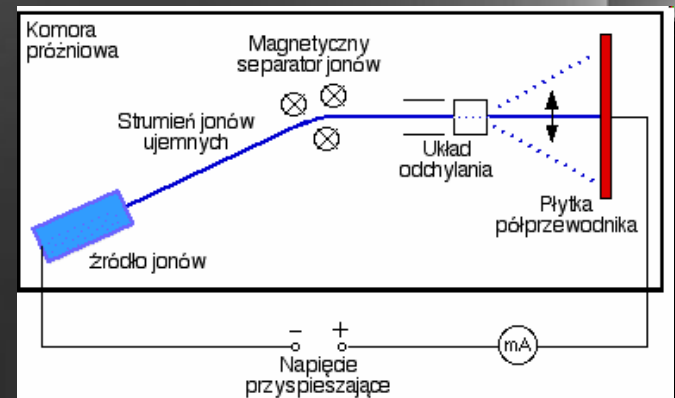
Produkcja Tranzystorów

Główne zjawiska występujące przy produkcji :

Epitaksja – wzrost pojedynczych kryształów na powierzchni półprzewodnika

Depozycja – osadzanie oparów domieszki na powierzchni półprzewodnika, w wysokiej temperaturze

Implantacja jonów – przyspieszane jony pierwiastków domieszki zderzają się z półprzewodnikiem i wnikają do jego wnętrza



Technologia Planarna

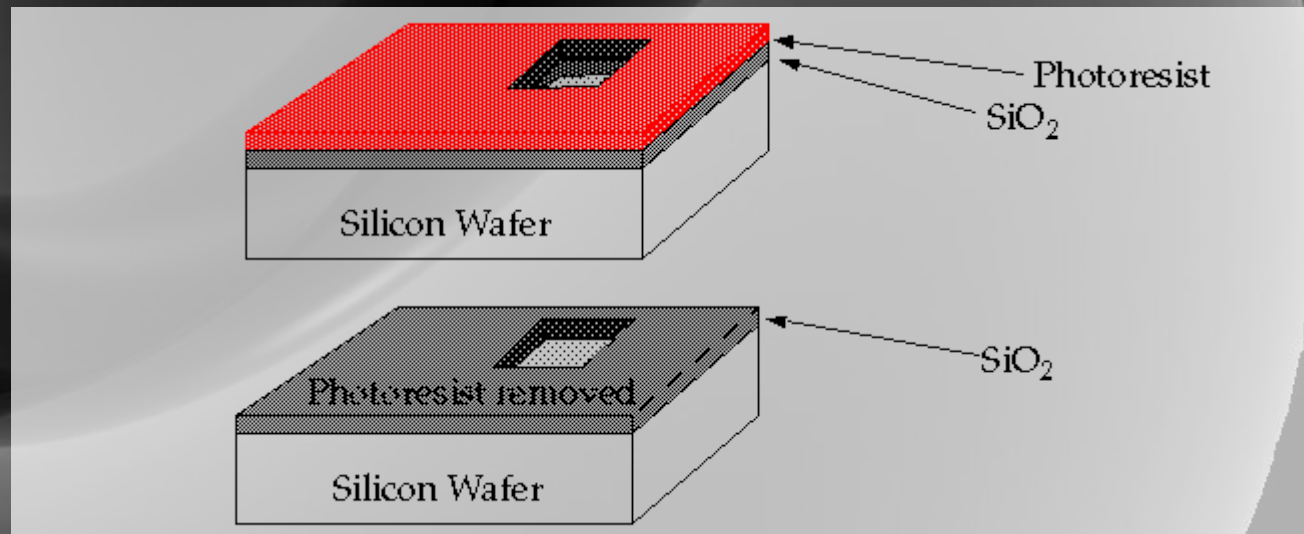
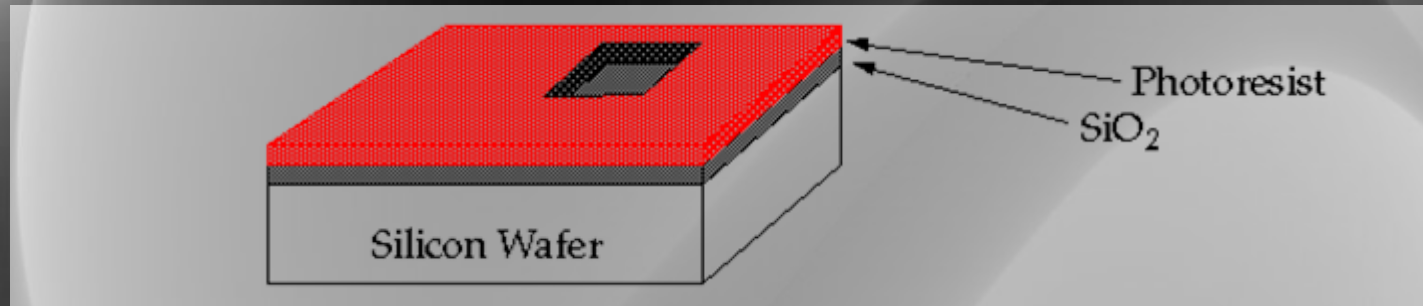


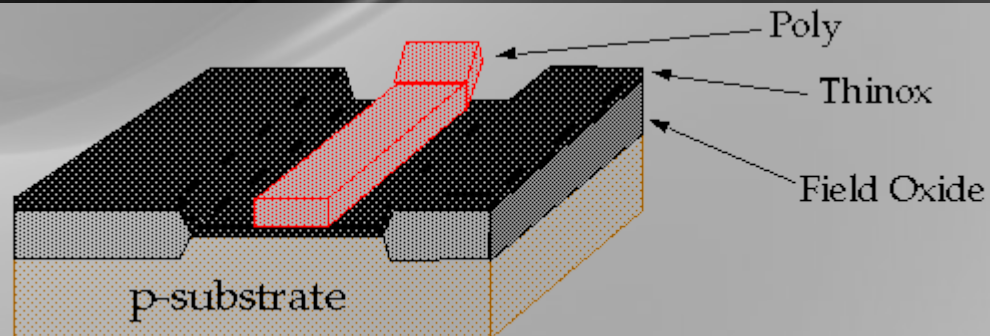
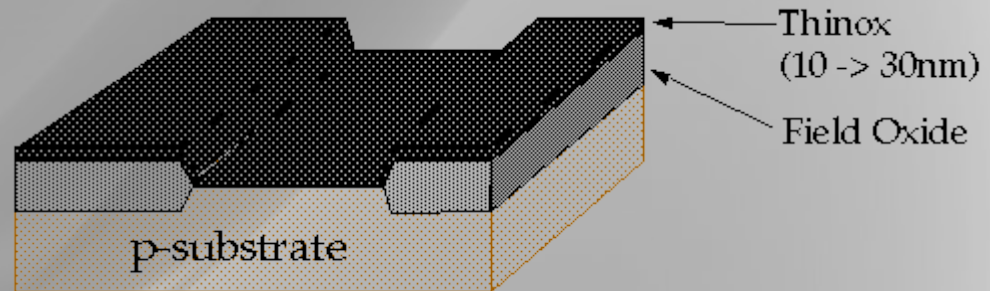
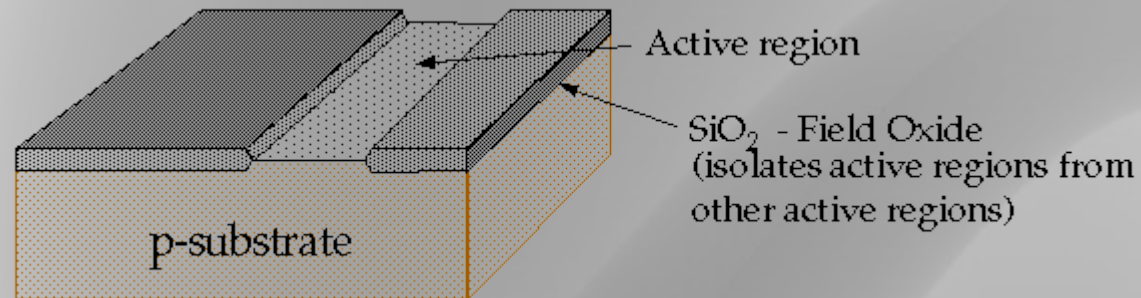
UV light

Mask

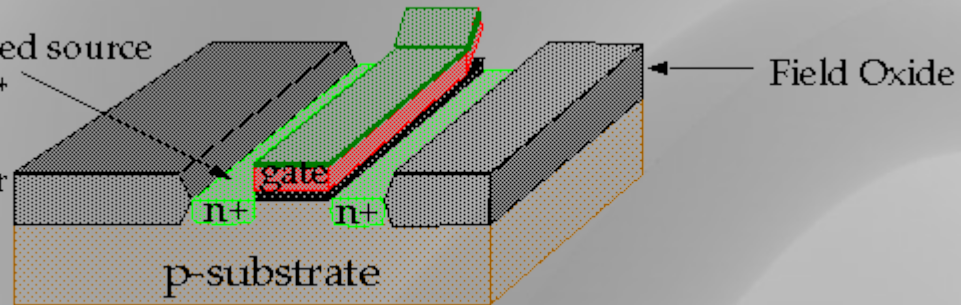
- Photoresist
SiO₂

Technologia Planarna

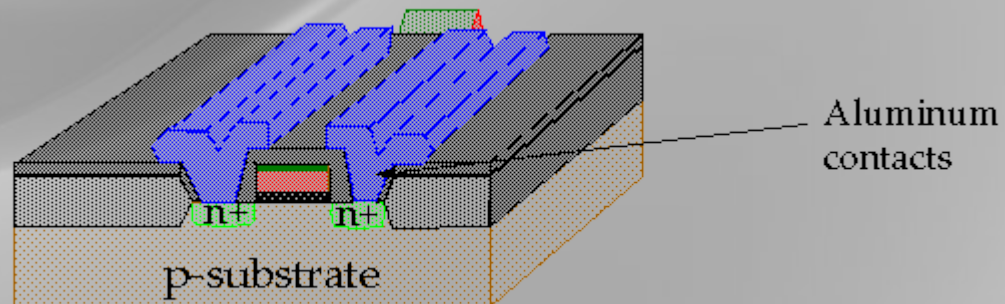
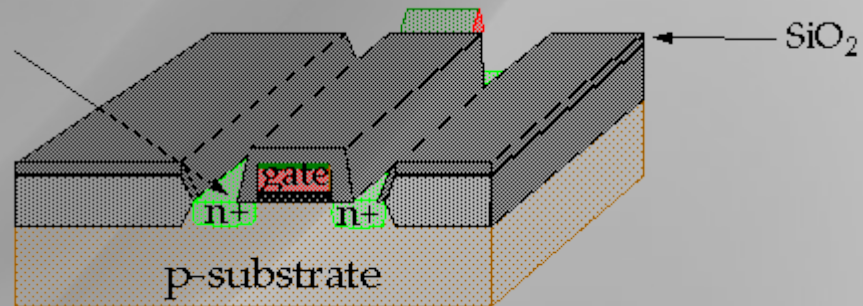


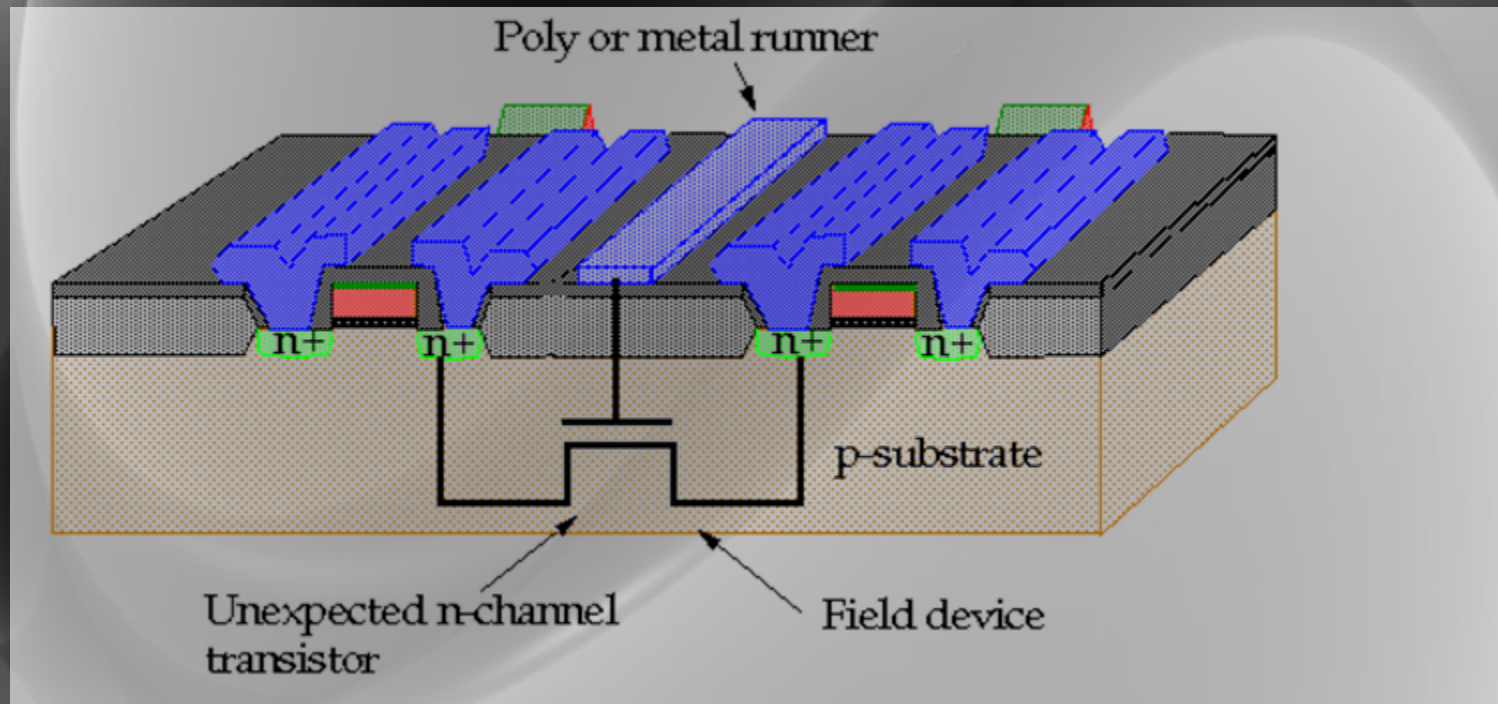


*** Self-aligned source and drain ***
do NOT extend under the gate.

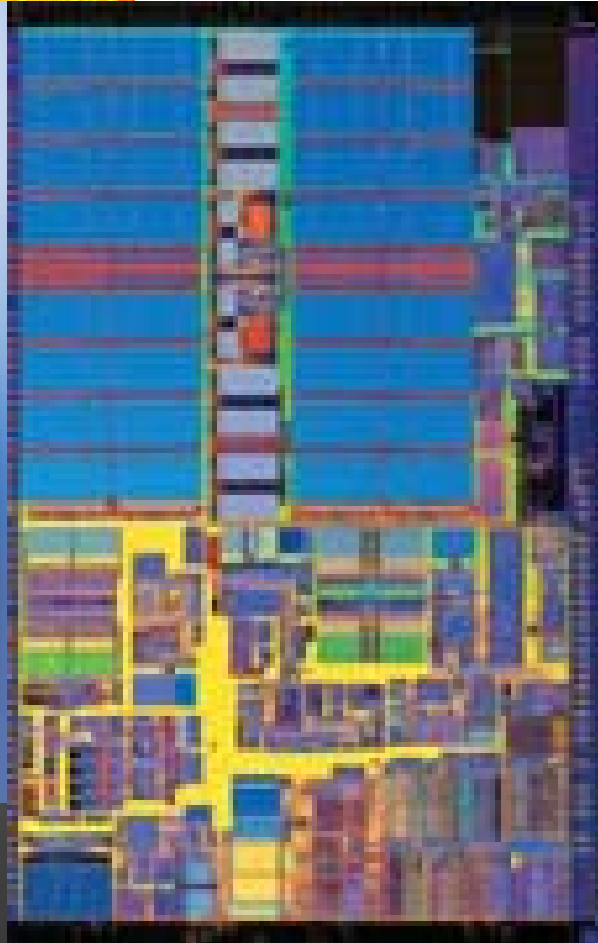
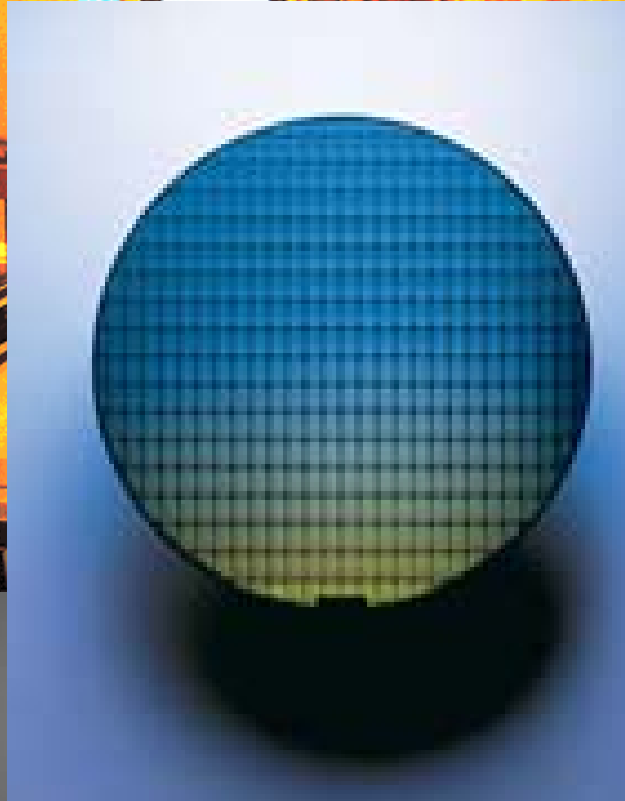


Contact cuts

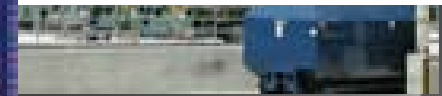
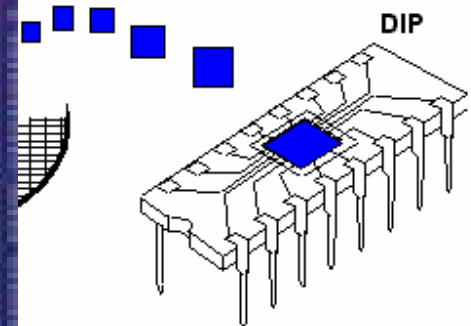




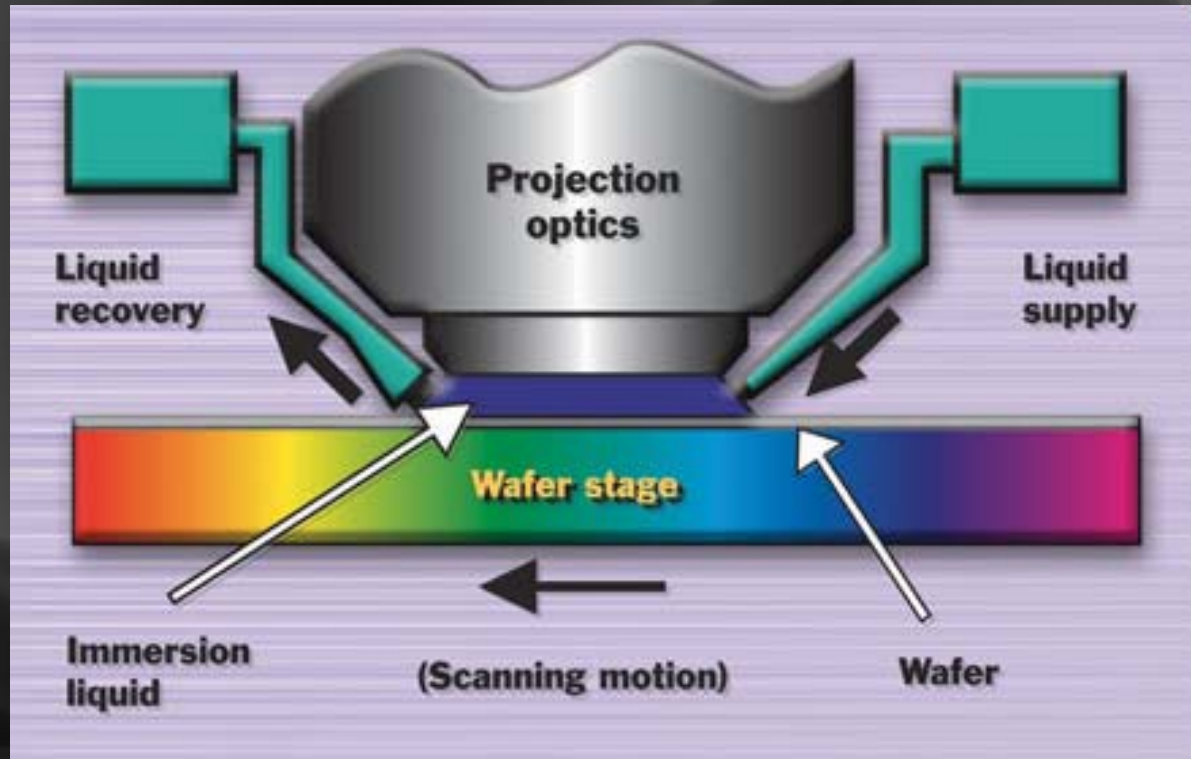
Co dalej z tranzystorem



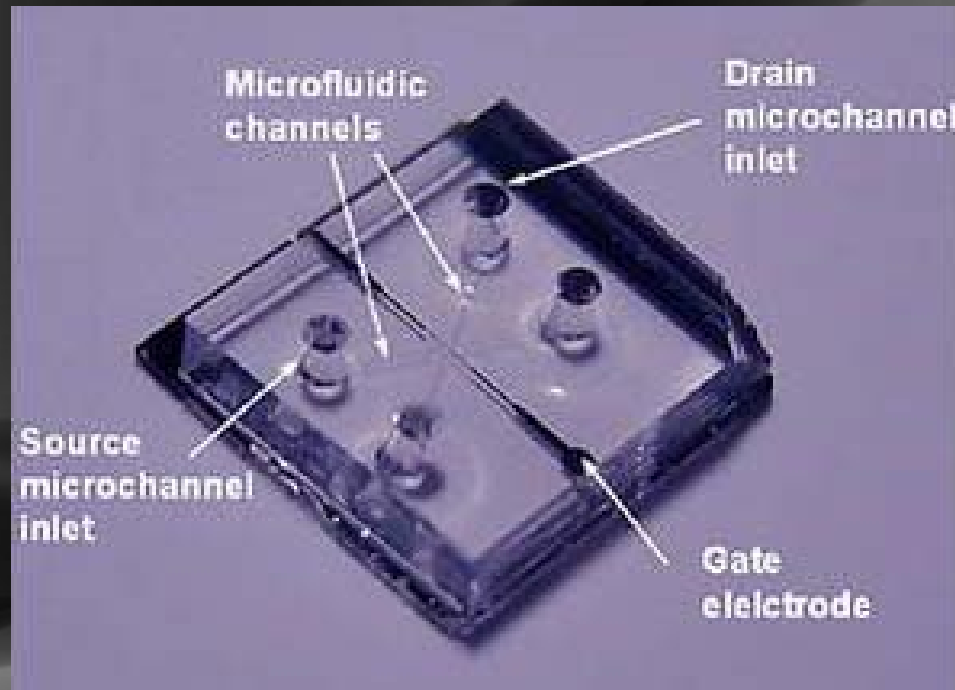
From Computer Desktop Encyclopedia
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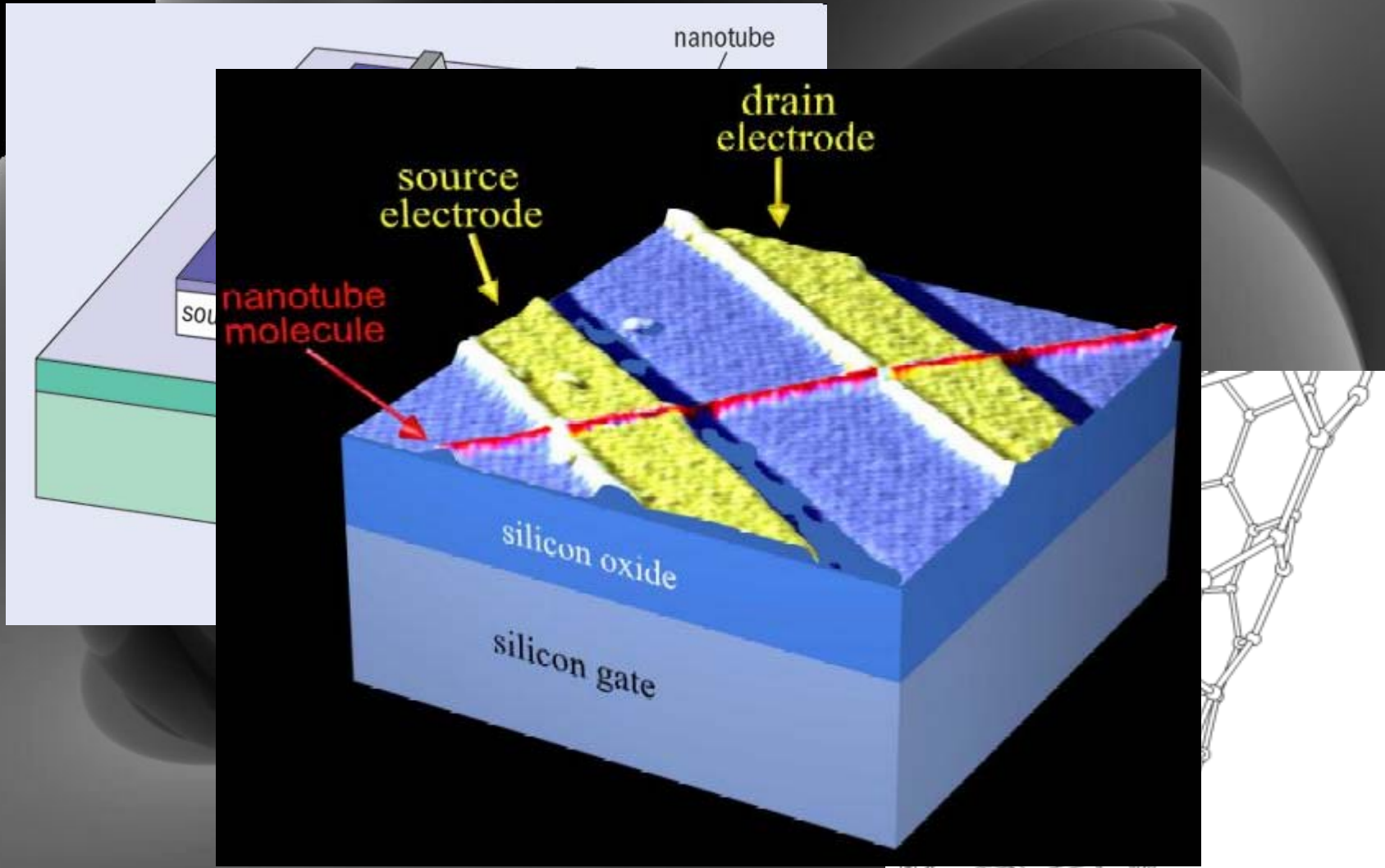
Immersion Litography



Nanofluidical Transistor



Tranzystor oparty na nanorurkach



Dziękuję za uwagę

