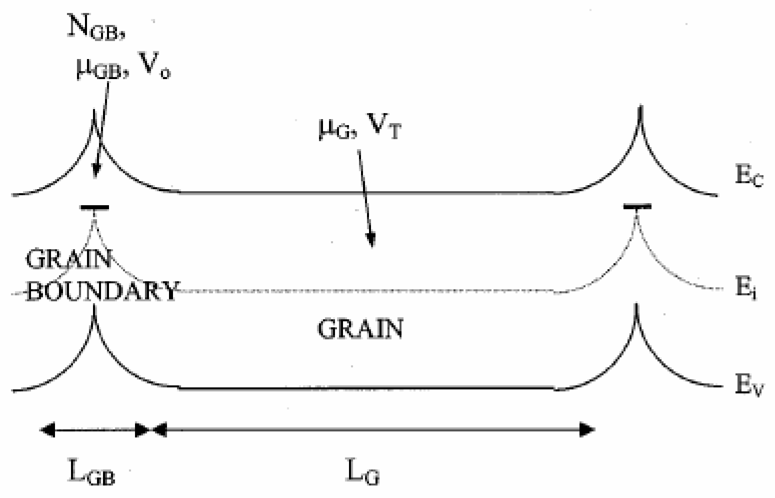

Fig. 2-1. Energy band diagram in the lateral direction along the channel of a n-channel polysilicon TFTs.

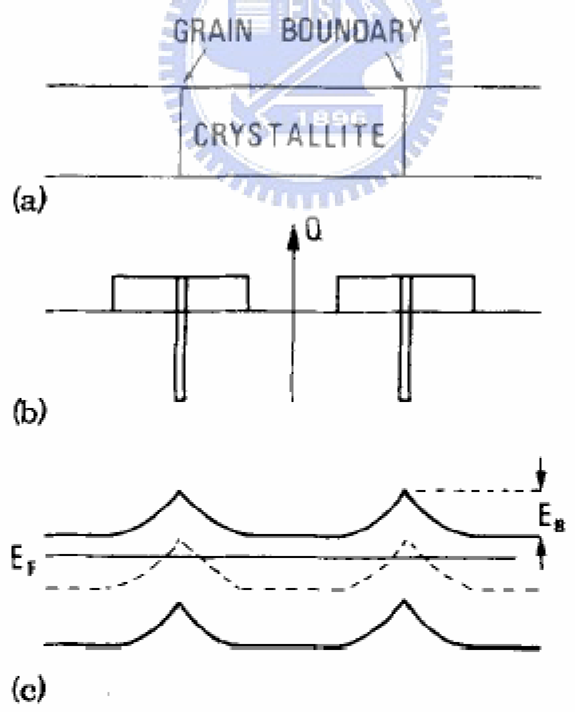

Fig. 2-2. Sketch of the band diagram of the polycrystalline silicon films.

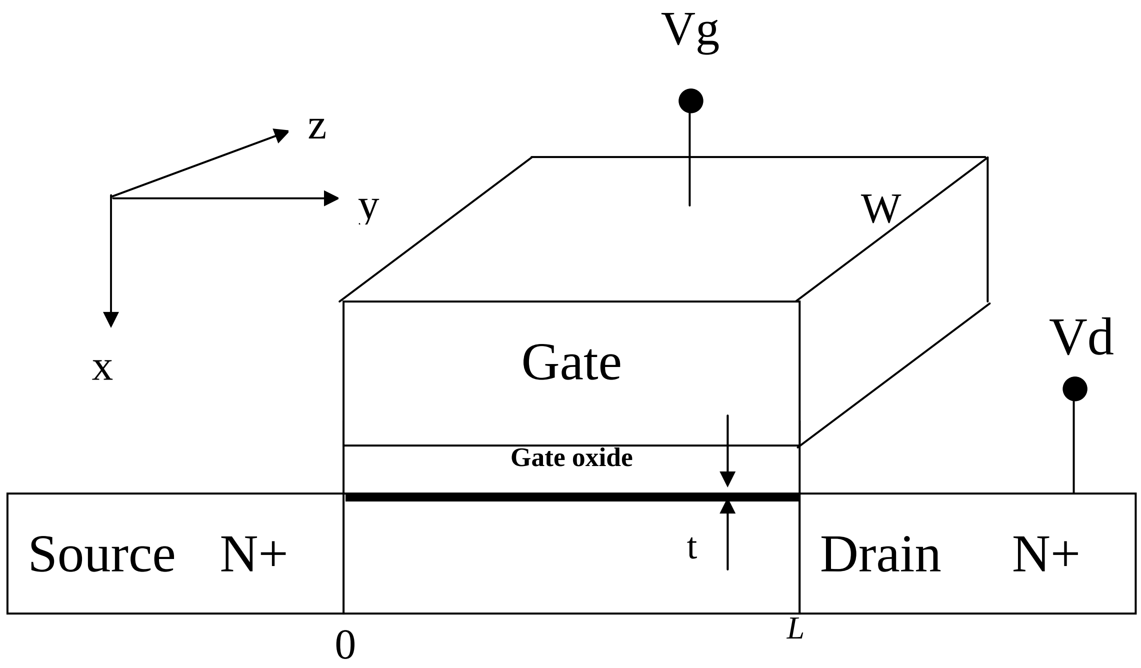

Fig. 2-3. A schematic MOSFET cross section, showing the axes of coordinates and the bias voltages at the four terminals for the drain-current model.

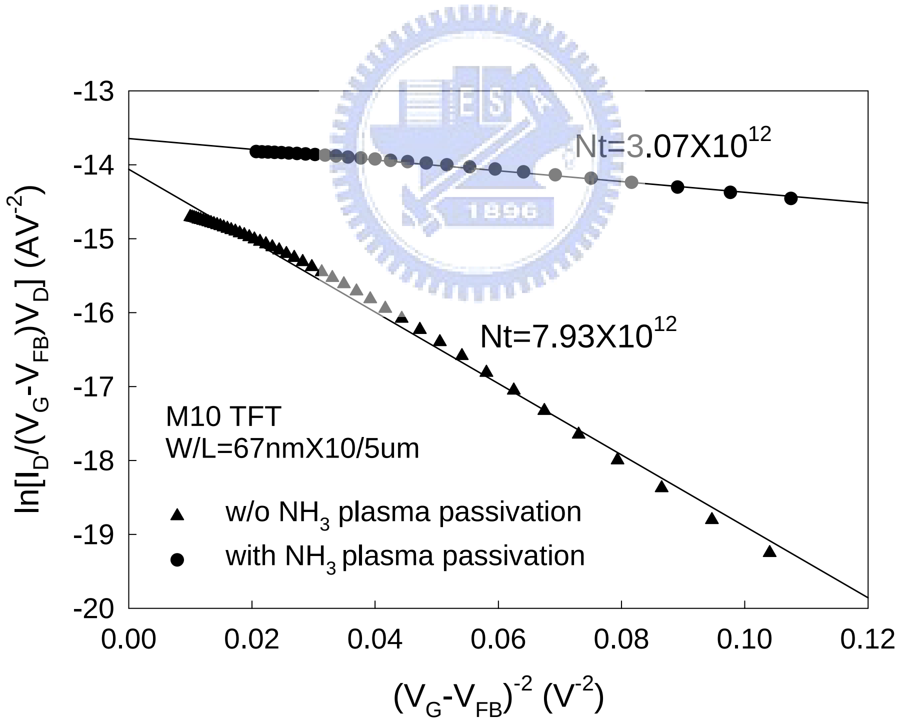

Fig. 2-4. Extraction of N_t plot of the M10 PDMILC TFTs, with and without NH_3 plasma passivation.

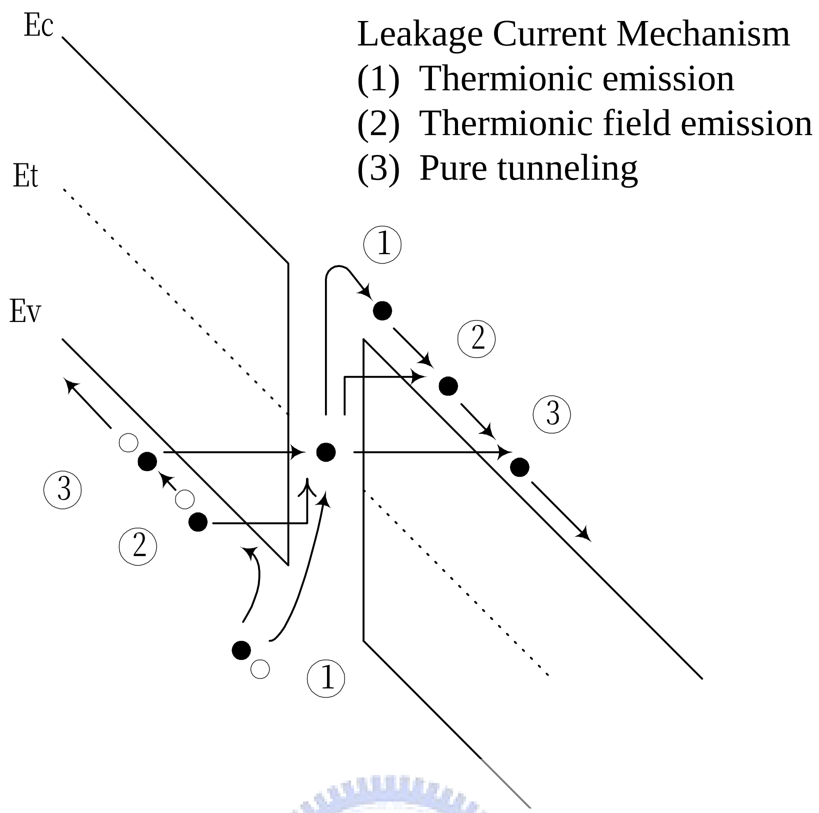

Fig. 2-5. Three possible mechanisms of leakage current in poly-Si TFTs, including thermionic emission, thermionic field emission and pure tunneling.

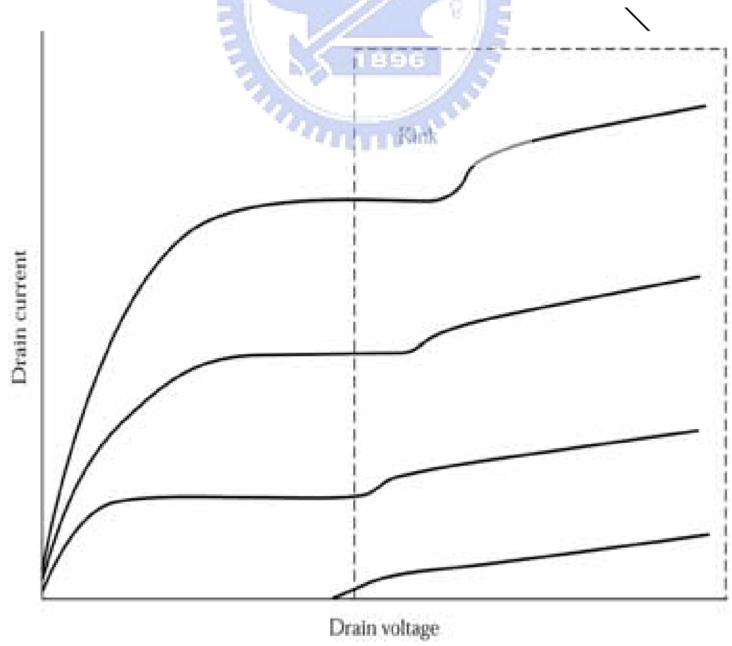

Fig. 2-6 The kink effect in the output characteristics of an *n*-channel SOI MOSFET.

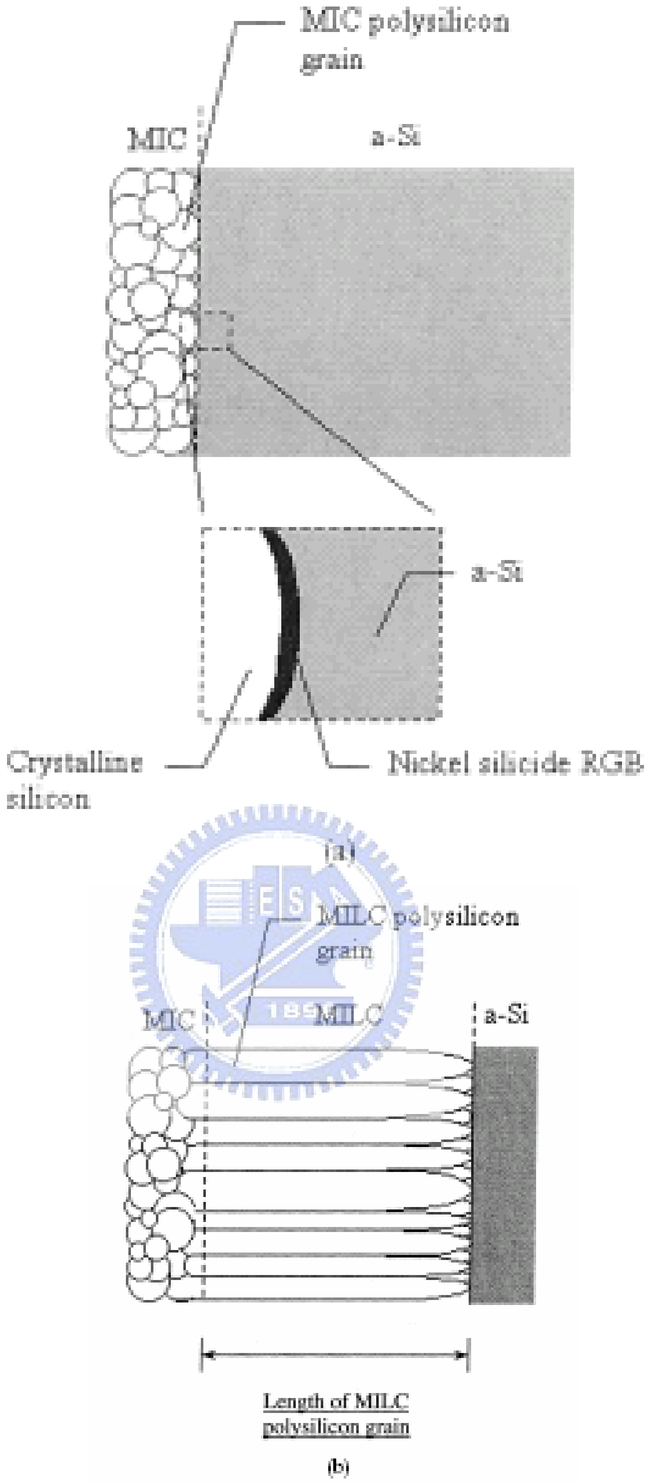

Fig. 2-7 MILC polysilicon formation during annealing process. (a) At the beginning of the annealing process, many nickel atoms are trapped and nickel silicide is formed at the grain boundaries of the MILC polysilicon region. Those nickel silicide grain boundaries at the MIC to a-Si interfaces, which are reactive regions, are responsible for MILC formation. (b) During the annealing process, the nickel silicide RGB absorbs silicon atoms from the a-Si region and rejects them to the MIC polycrystalline silicon region. As a result, the polysilicon grain grows up in lateral direction.

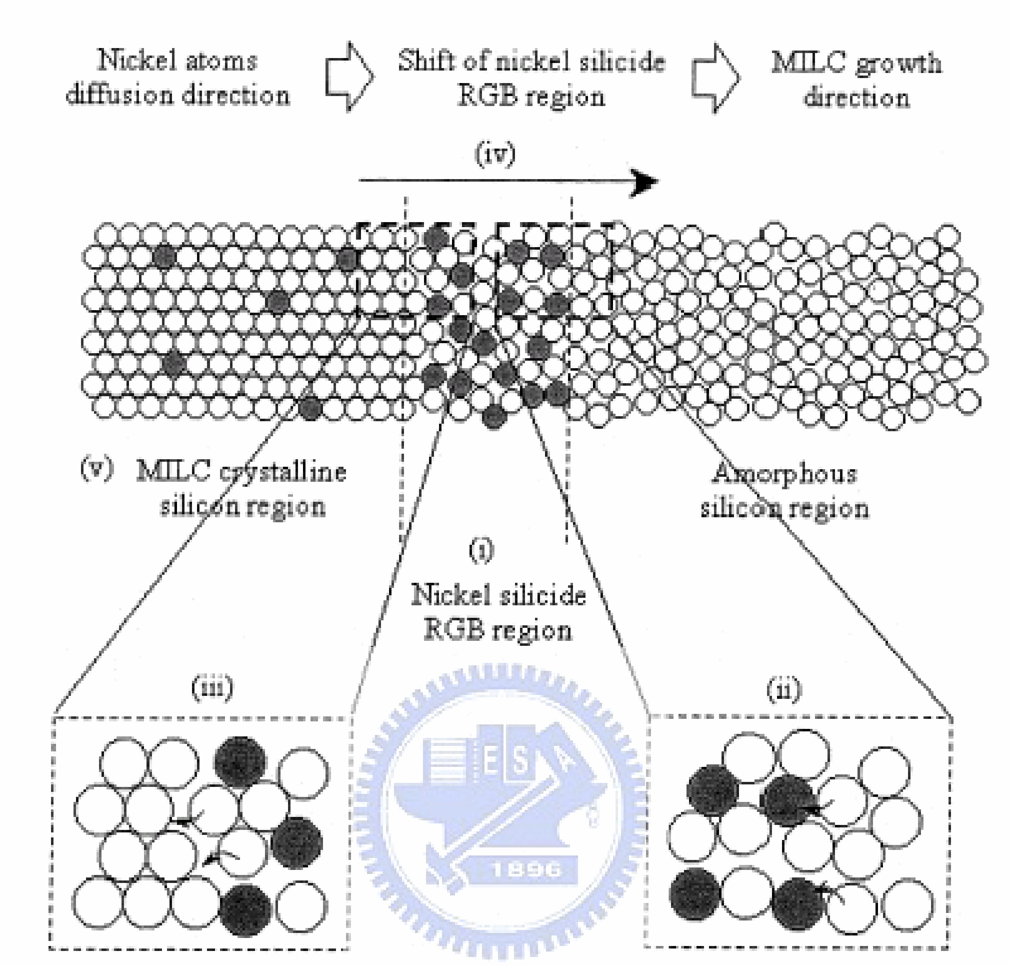

Fig. 2-8 MILC polysilicon formation mechanism. (i) Most of nickel atoms are trapped at the nickel silicide RGB, which is a layer between the amorphous silicon (a-Si) and MILC crystalline silicon regions. (ii) The nickel atoms in the nickel silicide RGB diffuse to the a-Si region and bonds with silicon atoms. The activation energy of the a-Si crystallization is lowered by the nickel impurities. (iii) The silicon atoms are dissociated from the nickel silicide RGB and then bond to the MILC crystalline silicon region. (iv) Nickel atoms diffuse to the a-Si region and crystallize the a-Si atoms continuously. This leads the shift of nickel silicide RGB and the growth of MILC polysilicon. (v) Only few nickel atoms are left and trapped inside the MILC silicon grain.

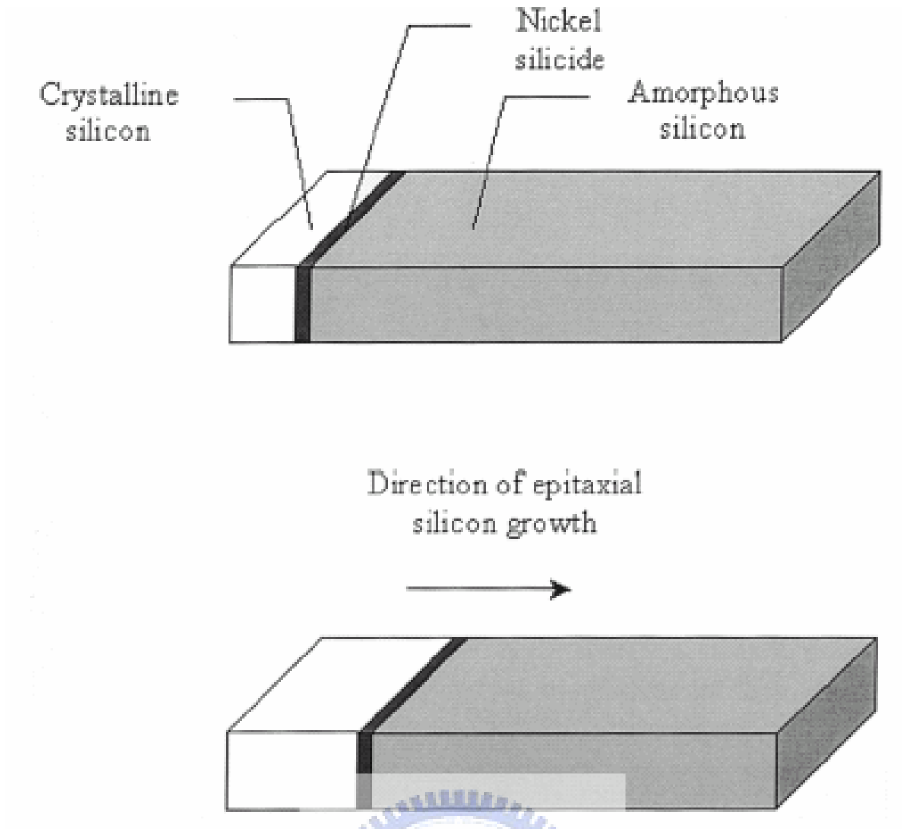

Fig. 2-9 Epitaxial silicon growth using nickel silicide, in which, the nickel silicide consumes the a-Si atoms at the leading edge and rejects the Si atoms to the crystalline silicon region.