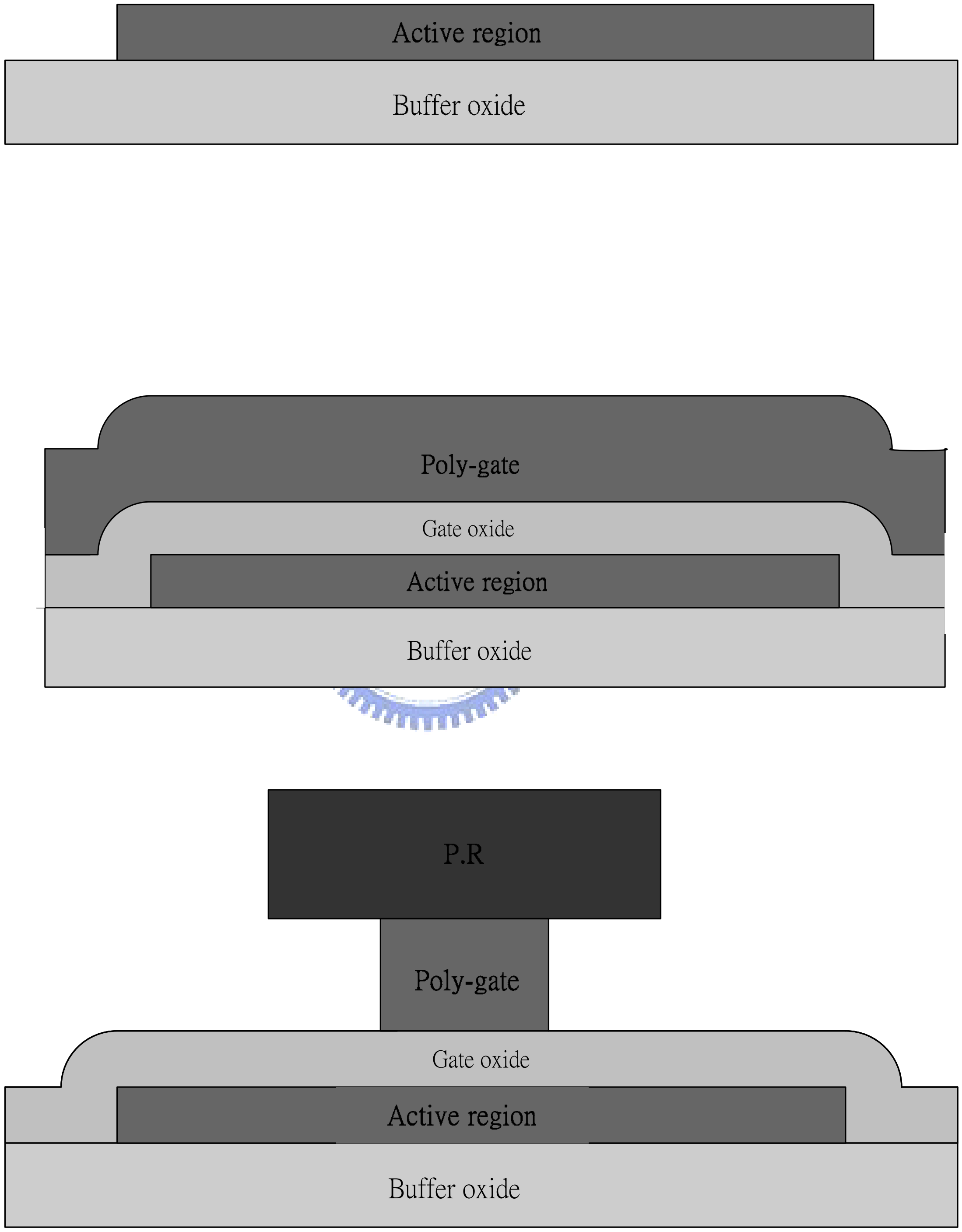
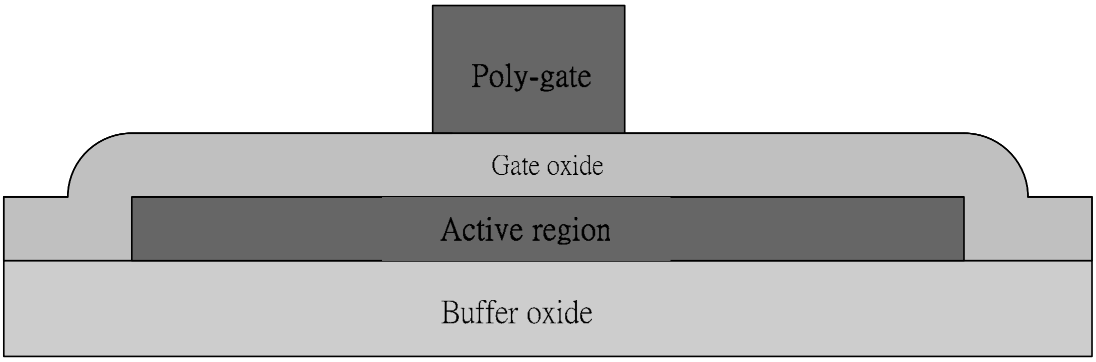
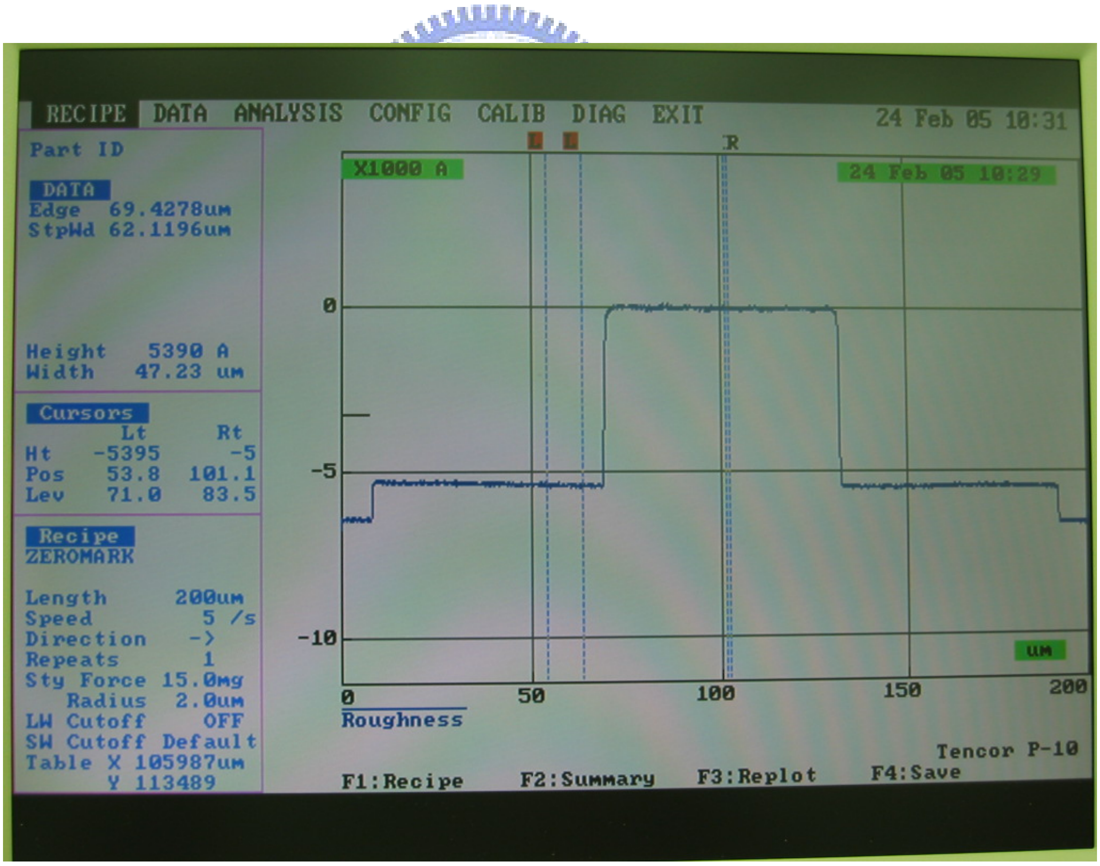


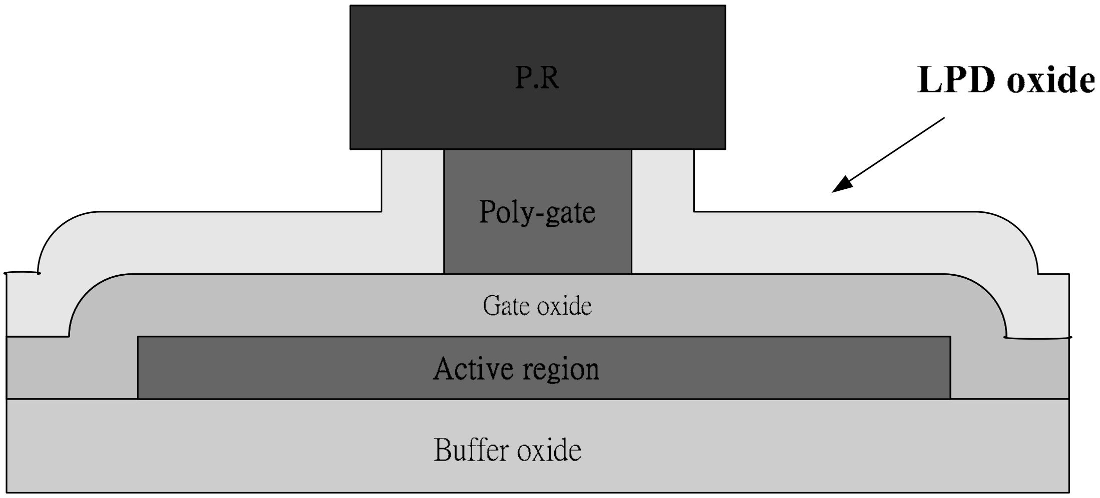
Figure 3.1 Key process flows of T-gate TFTs.





```
Part ID

DATA
Edge   69.4278um
StpWd  62.1196um

Height    5390 A
Width    47.23 um

Cursors
         Lt      Rt
Ht    -5395      -5
Pos    53.8   101.1
Lev    71.0    83.5

Recipe
ZEROMARK

Length       200um
Speed          5 /s
Direction     ->
Repeats        1
Sty Force 15.0mg
   Radius  2.0um
LW Cutoff    OFF
SW Cutoff Default
Table X 105987um
      Y 113489
```

Figure 3.1 Key process flows of T-gate TFTs.


P.R
LPD oxide
Poly-gate
Gate oxide
Active region
Buffer oxide

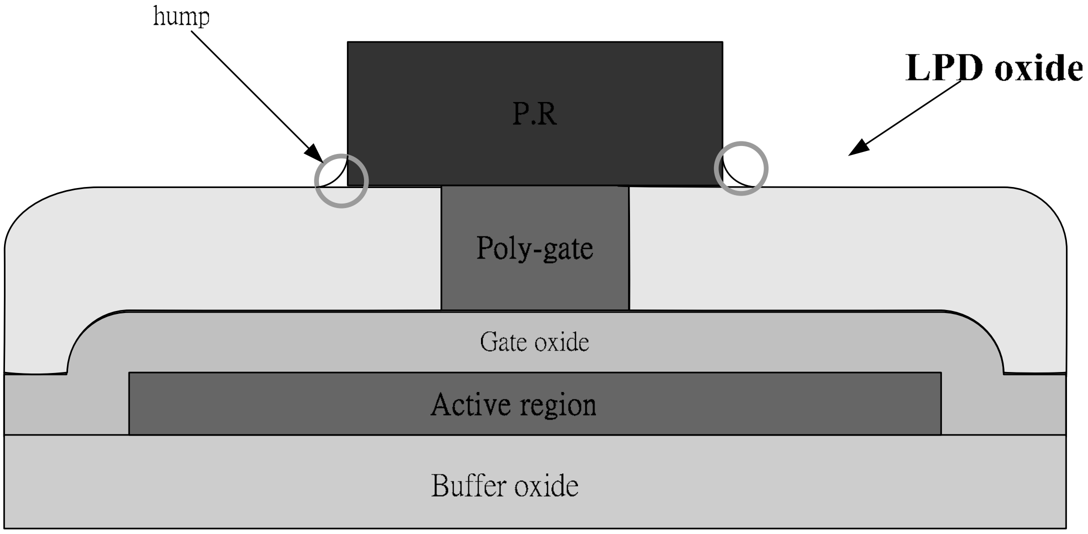
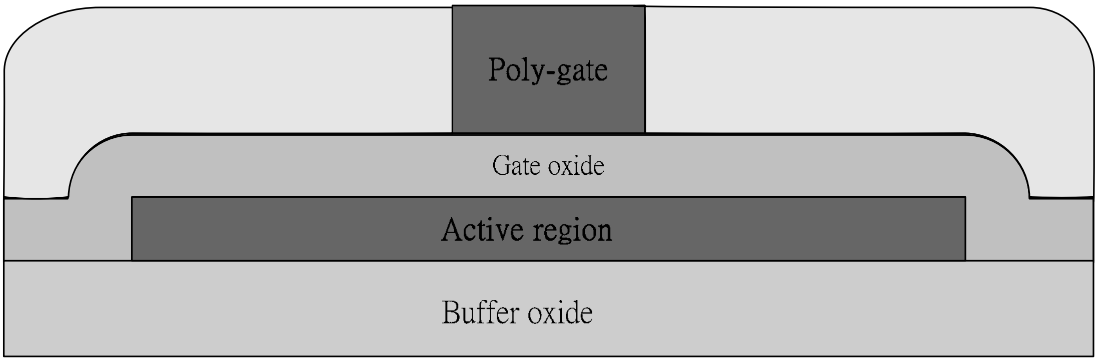
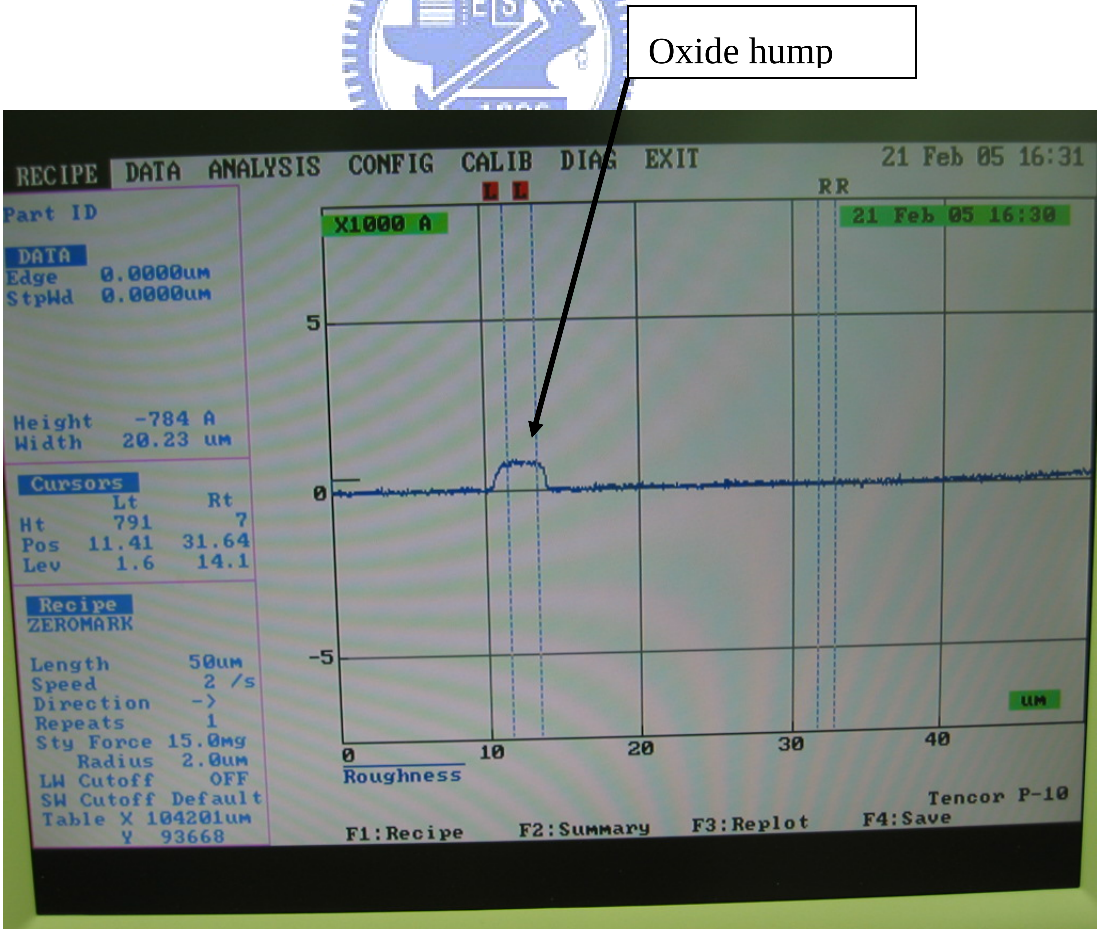

hump
P.R
LPD oxide
Poly-gate
Gate oxide
Active region
Buffer oxide

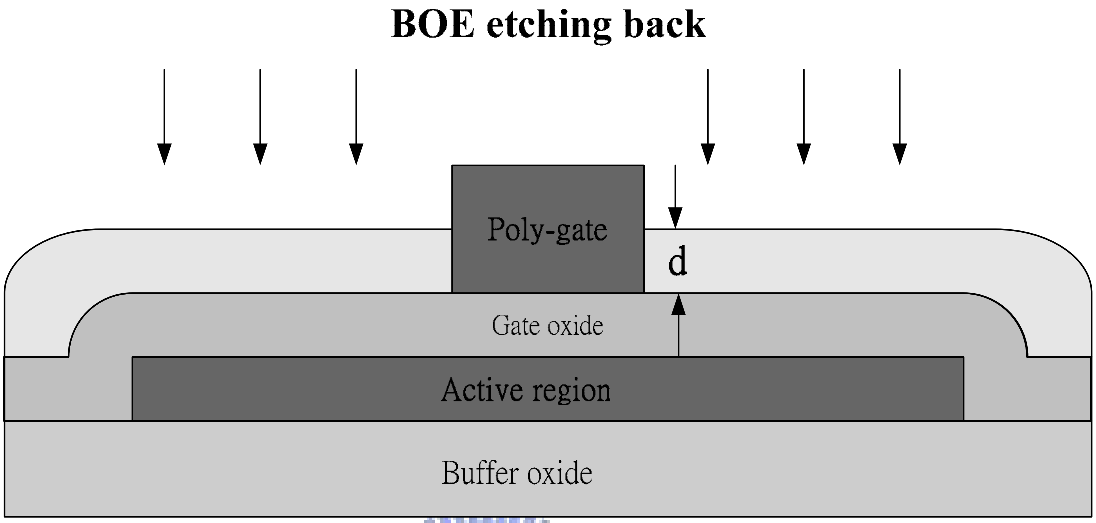
Figure 3.1 Key process flows of T-gate TFTs.

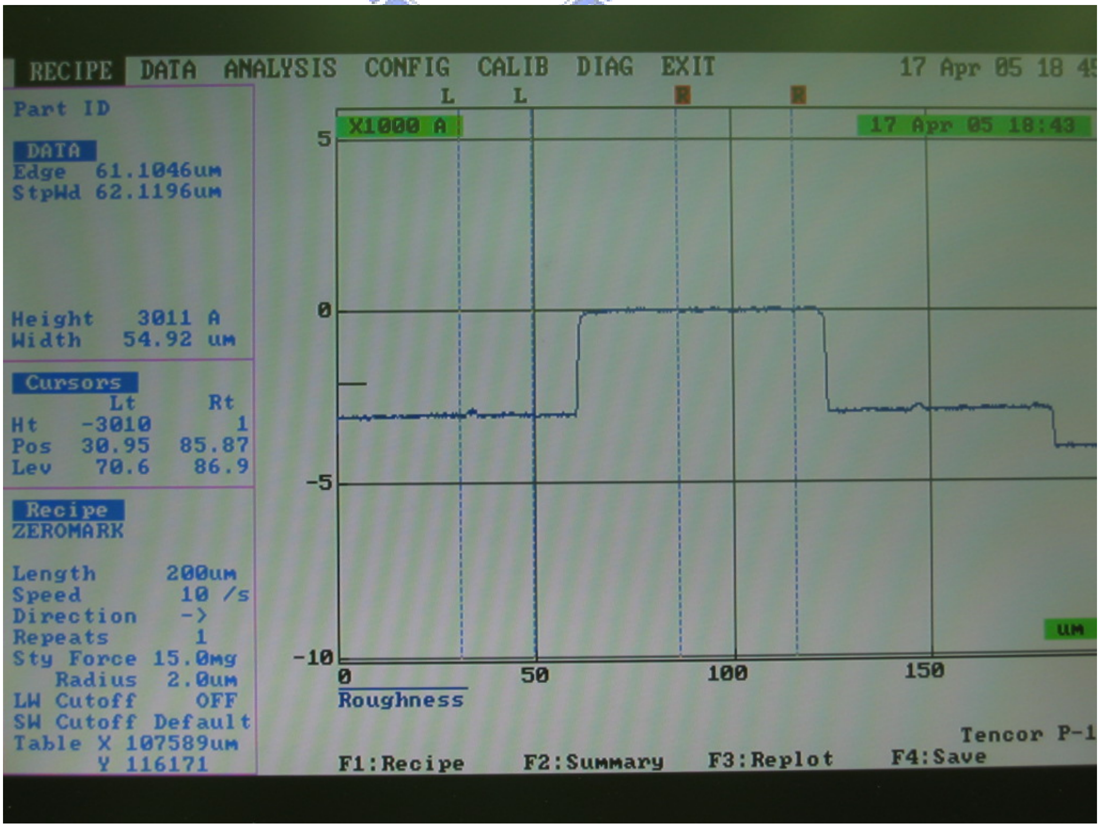




```
Part ID
 DATA
Edge    0.0000um
StpWd   0.0000um

 Height    -784 A
 Width    20.23 um

 Cursors
          Lt        Rt
 Ht      791         7
 Pos   11.41     31.64
 Lev     1.6      14.1

 Recipe
 ZEROMARK

 Length          50um
 Speed            2 /s
 Direction       ->
 Repeats          1
 Sty Force  15.0mg
     Radius   2.0um
 LW Cutoff      OFF
 SW Cutoff  Default
 Table X 104201um
       Y   93668
```

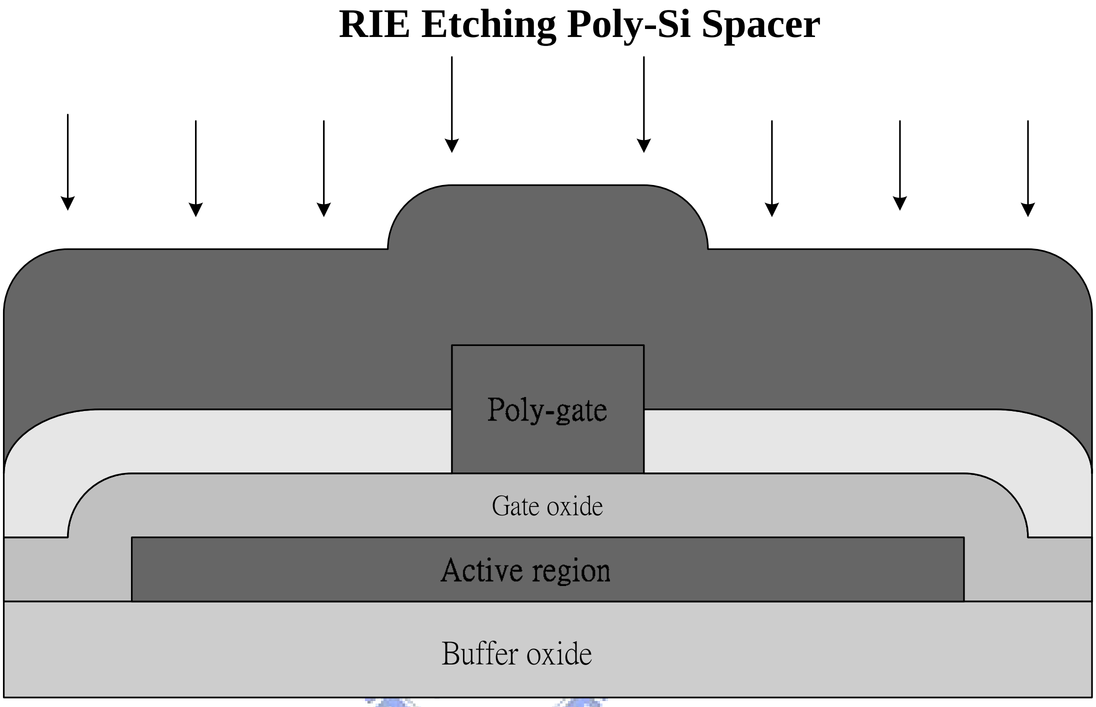
Figure 3.1 Key process flows of T-gate TFTs and surface scan graph.





```
Part ID

DATA
Edge   61.1046um
StpWd  62.1196um

Height    3011 A
Width    54.92 um

Cursors
         Lt       Rt
Ht    -3010        1
Pos   30.95    85.87
Lev    70.6     86.9

Recipe
ZEROMARK

Length        200um
Speed          10 /s
Direction      ->
Repeats         1
Sty Force  15.0mg
   Radius   2.0um
LW Cutoff     OFF
SW Cutoff  Default
Table X 107589um
      Y 116171
```

Figure 3.1 Key process flows of T-gate TFTs surface scan graph.



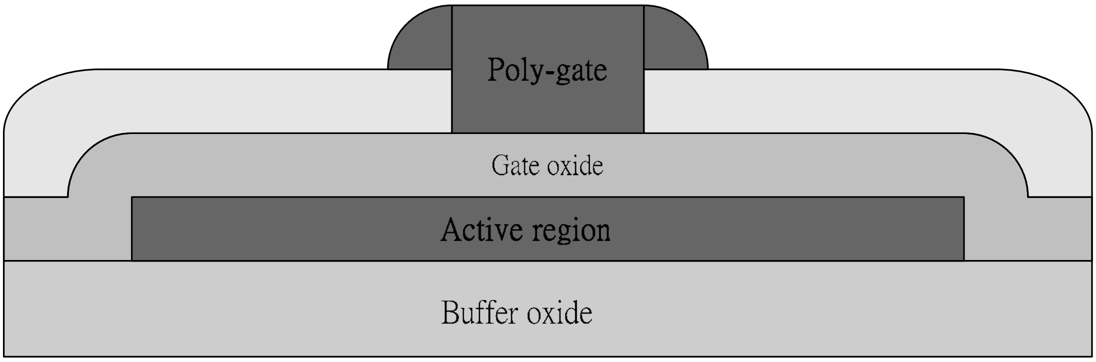
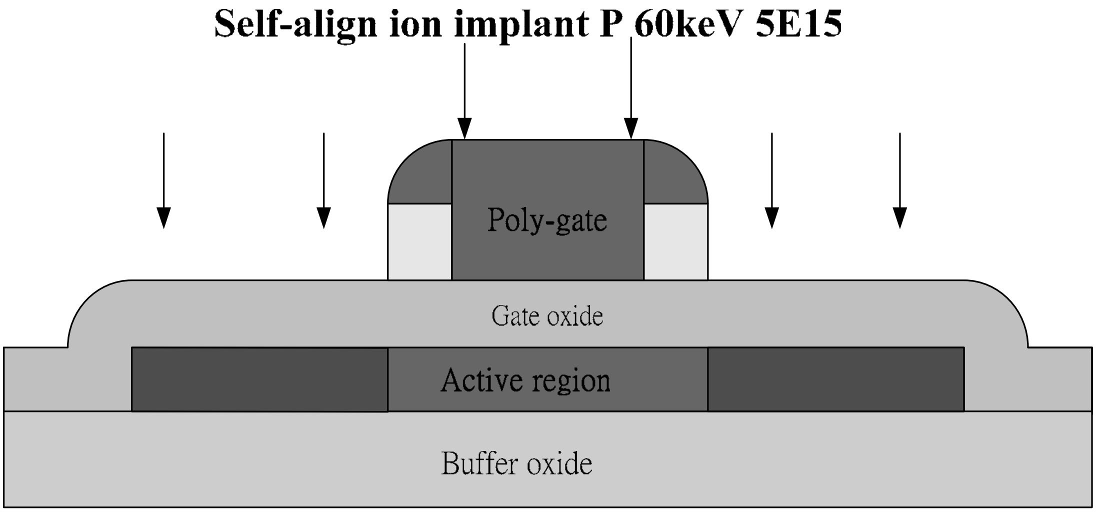


Figure 3.1 Key process flows of T-gate TFTs.



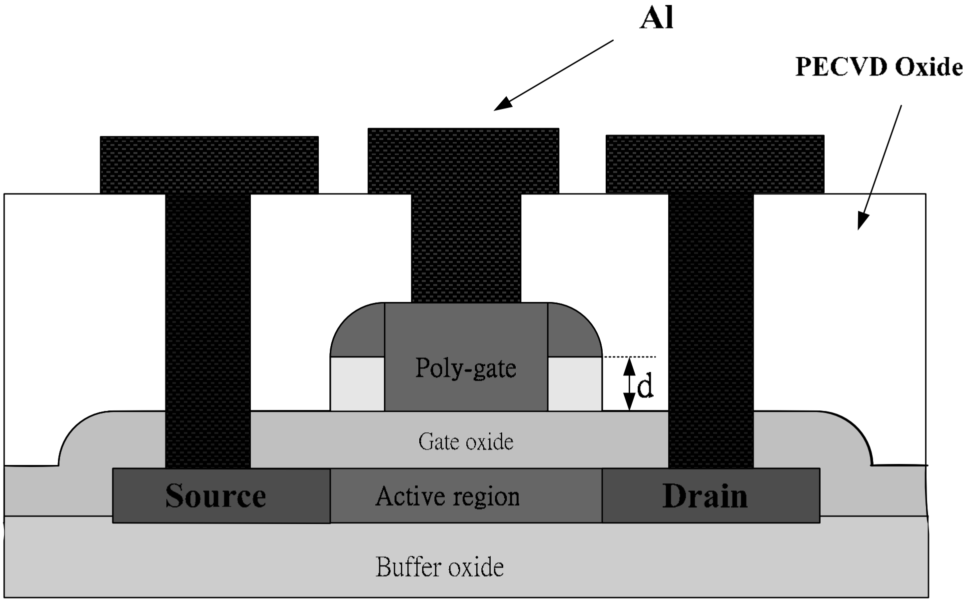


Figure 3.1 Key process flows of T-gate TFTs.

	Vth	mobility	I_{on}	I_{off}	I_{on}/I_{off}
Conventional TFT	**39**	**12.08**	**1.01E-04**	**1.23E-10**	**8.26E+05**
T-gate TFT;d=100nm	**41.1**	**10.54**	**7.10E-05**	**1.06E-10**	**6.67E+05**
T-gate TFT;d=150nm	**42.3**	**9.47**	**6.74E-05**	**9.54E-11**	**7.07E+05**
T-gate TFT;d=200nm	**43.5**	**9.1**	**6.36E-05**	**9.21E-11**	**6.91E+05**

Table 3.1 The electrical characteristics of CTFTs and TGTFTs before plasma treatment.

	Vth	mobility	I_{on}	I_{off}	I_{on}/I_{off}
Conventional TFT	**22.7**	**19.55**	**1.97E-04**	**6.64E-11**	**2.9E+06**
T-gate TFT;d=100nm	**29.4.**	**16.07**	**1.39E-04**	**5.5E-11**	**2.5E+06**
T-gate TFT;d=150nm	**30**	**15.9**	**1.27E-04**	**4.08E-11**	**3.1E+06**
T-gate TFT;d=200nm	**30.6**	**15.22**	**1.18E-04**	**6.18E-11**	**1.9E+06**

Table 3.2 The electrical characteristics of CTFTs and TGTFTs after plasma treatment.

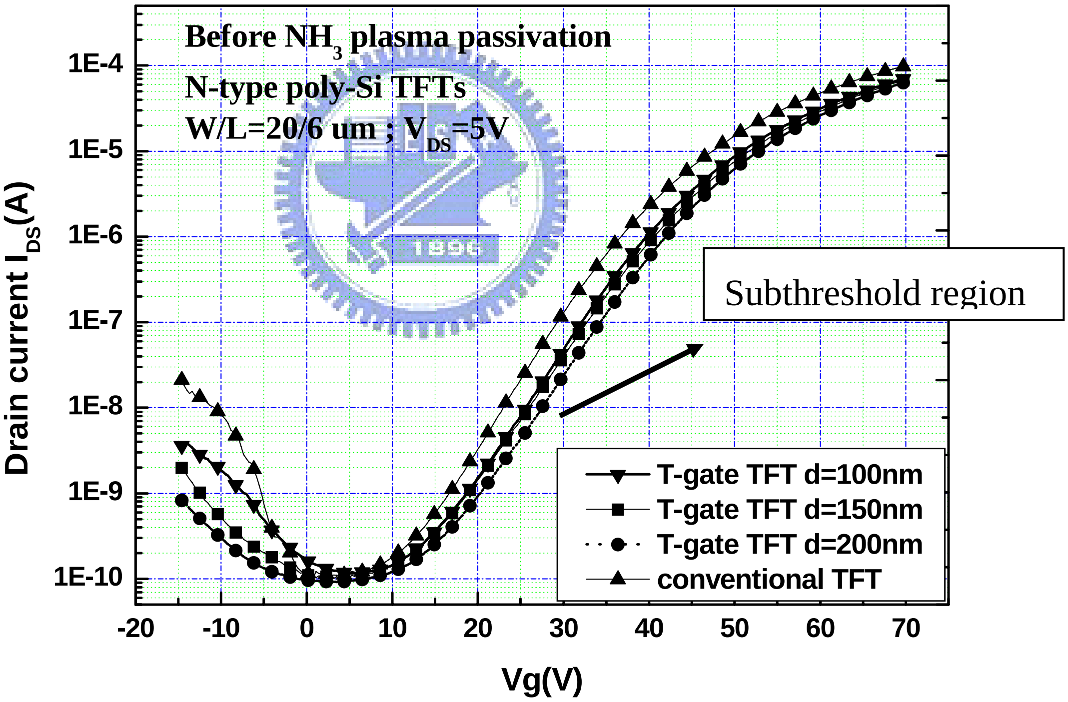


Figure 3.2 (a) Transfer characteristics for comparison of CTFT and TGTFT with difference offset oxide thickness before plasma treatment.

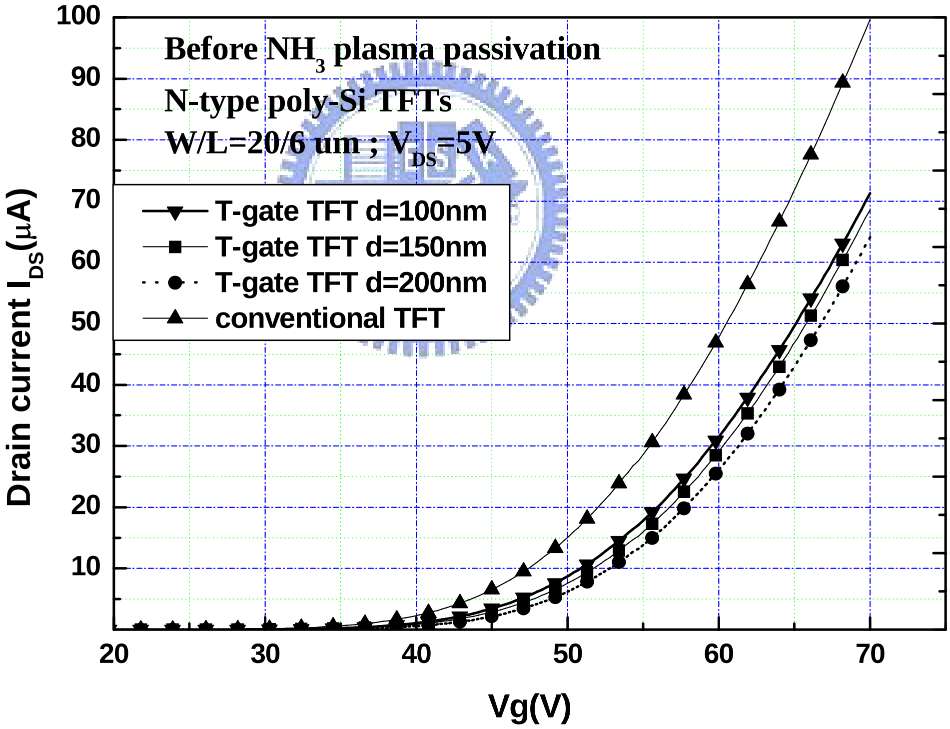


Figure 3.2 (b) Transfer characteristics (linear scale) for comparison of CTFT and TGTFT with difference offset oxide thickness before plasma treatment.

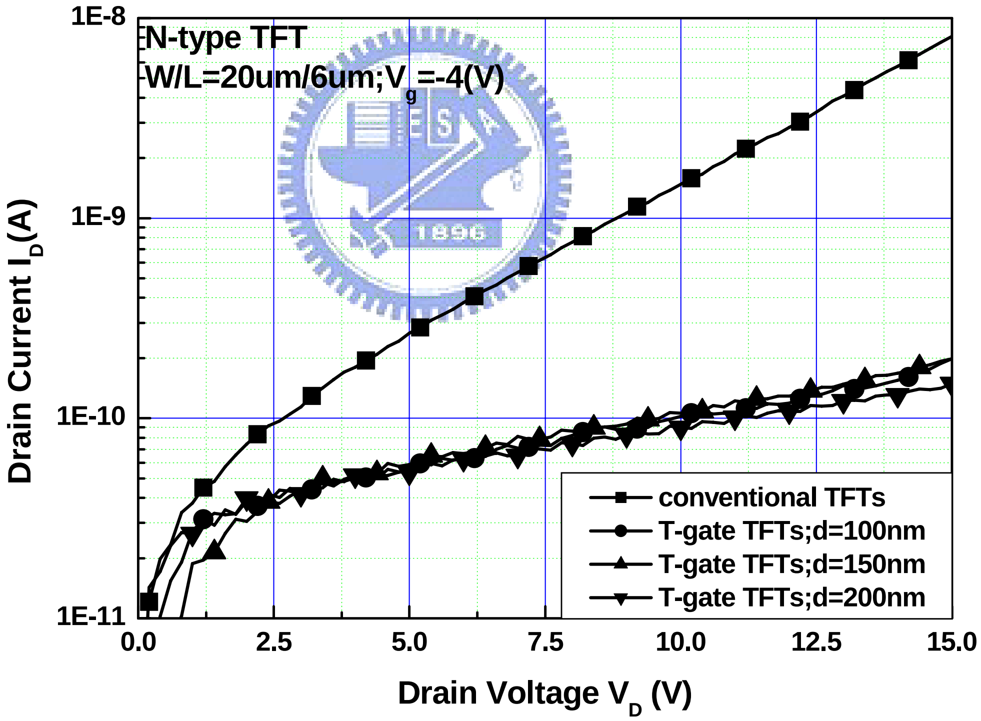


Figure 3.3 Leakage current, measured at Vg = - 4 V, for CTFT and TGTFT with W/L = 20/6 and different offset oxide thickness.

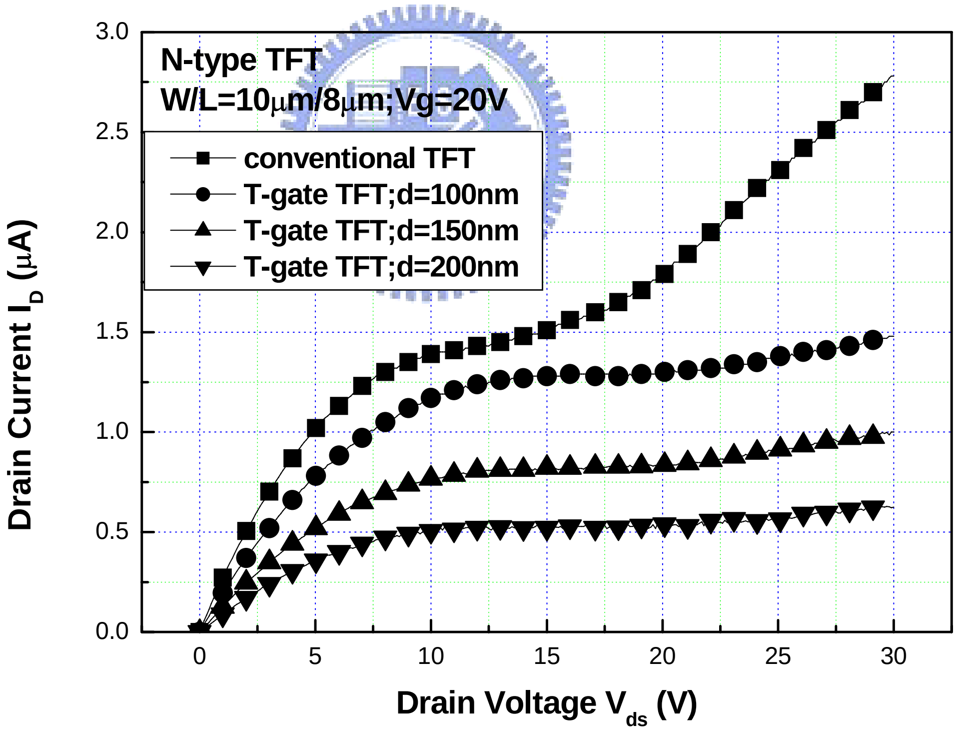


Figure 3.4 The Id – V_D characteristics curve for CTFT and TGTFT with W/L = 10/8 measured at Vg = 20 V.

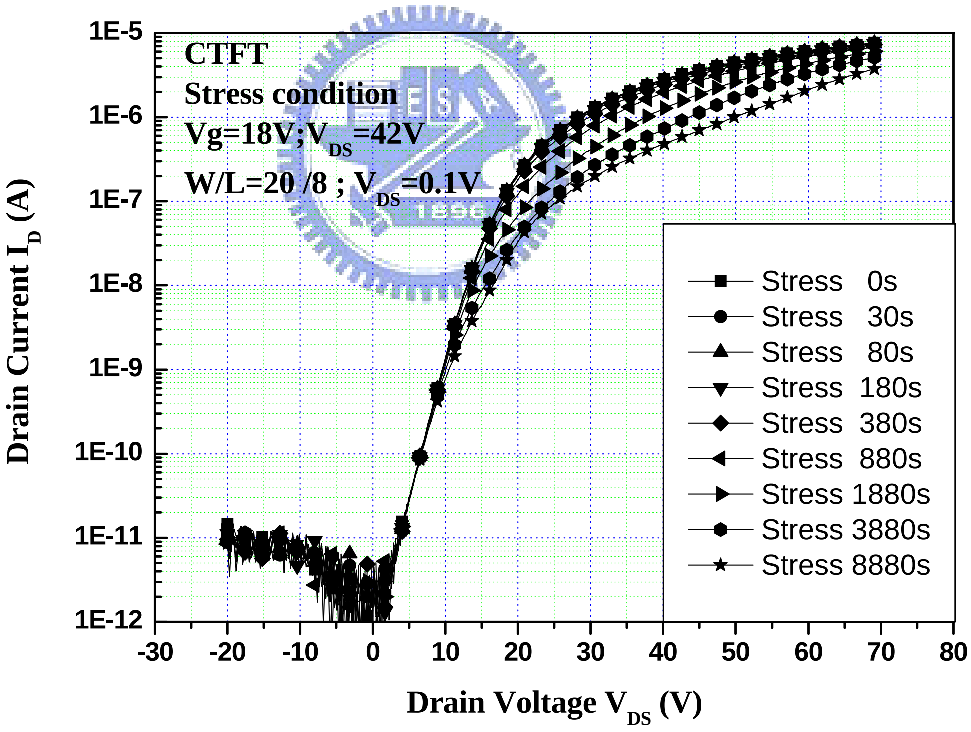


Figure 3.5 (a) The Id – V_D characteristics curve for CTFT before and after the application of hot- carrier stress (W/L = 10/8 measured at Vg = 20 V).

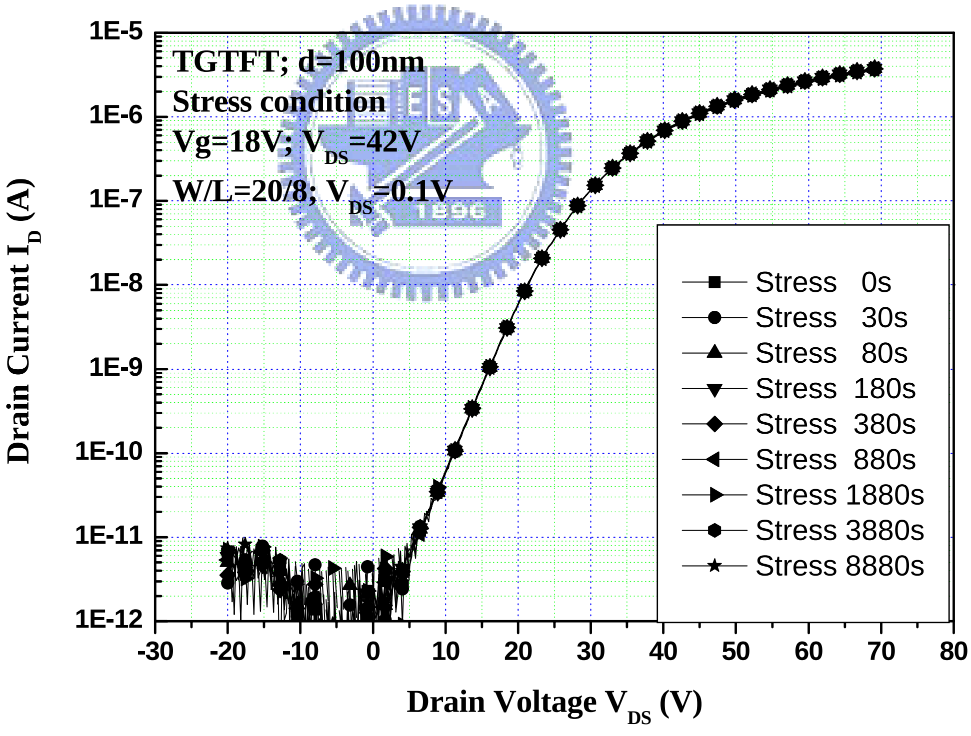


Figure 3.5 (a) The Id – V_D characteristics curve for TGTFT before and after the application of hot- carrier stress (W/L = 10/8 measured at V_{DS} = 0.1V).

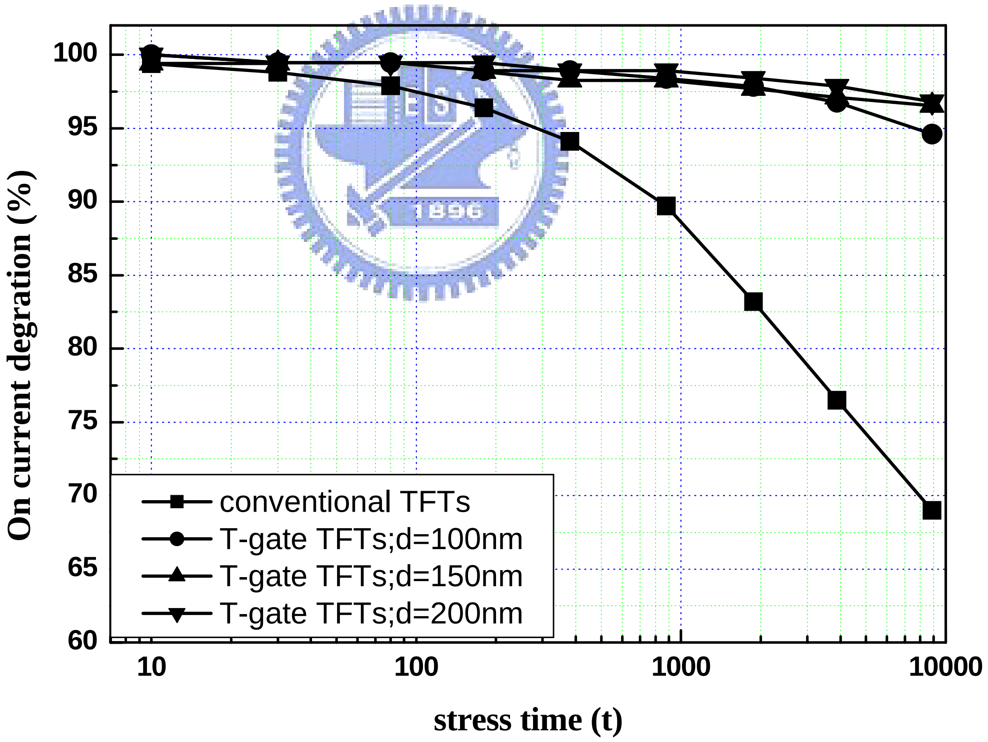


Figure 3.6 (a) Comparison of degradation rate of ON-state current after hot carrier stress (stress condition: V_g= 18 V, V_{DS}= 42 V) with W/L = 10/8.

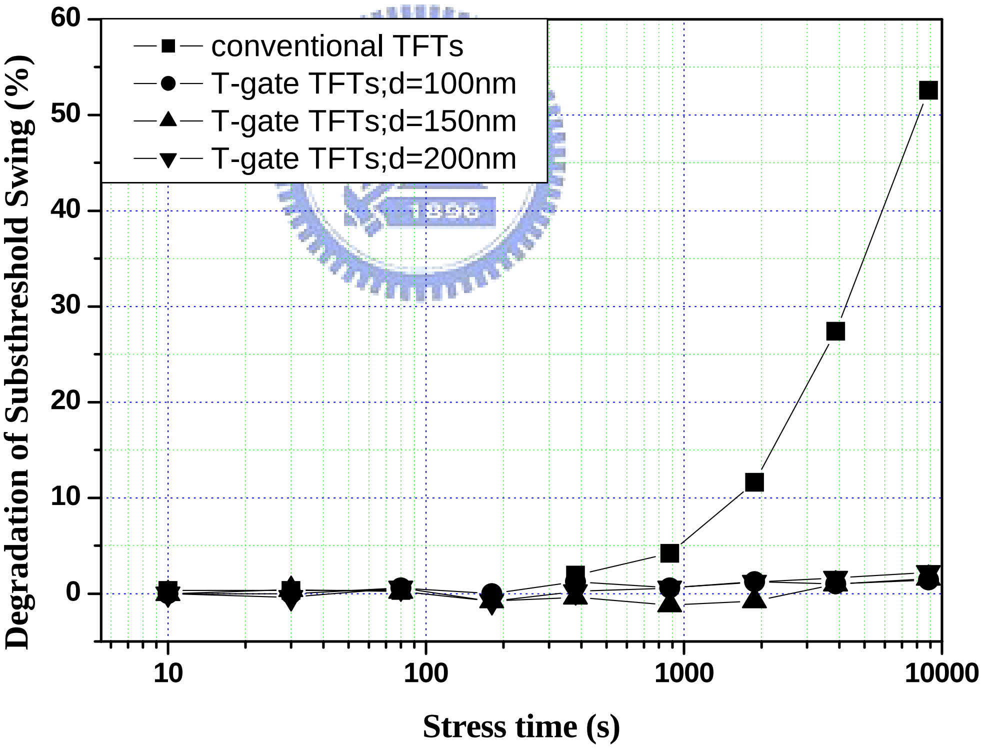


Figure 3.6 (b) Comparison of degradation rate of subtrhreshold swing after hot carrier stress (stress condition: V_g= 18 V, V_{DS}= 42 V) with W/L = 10/8.

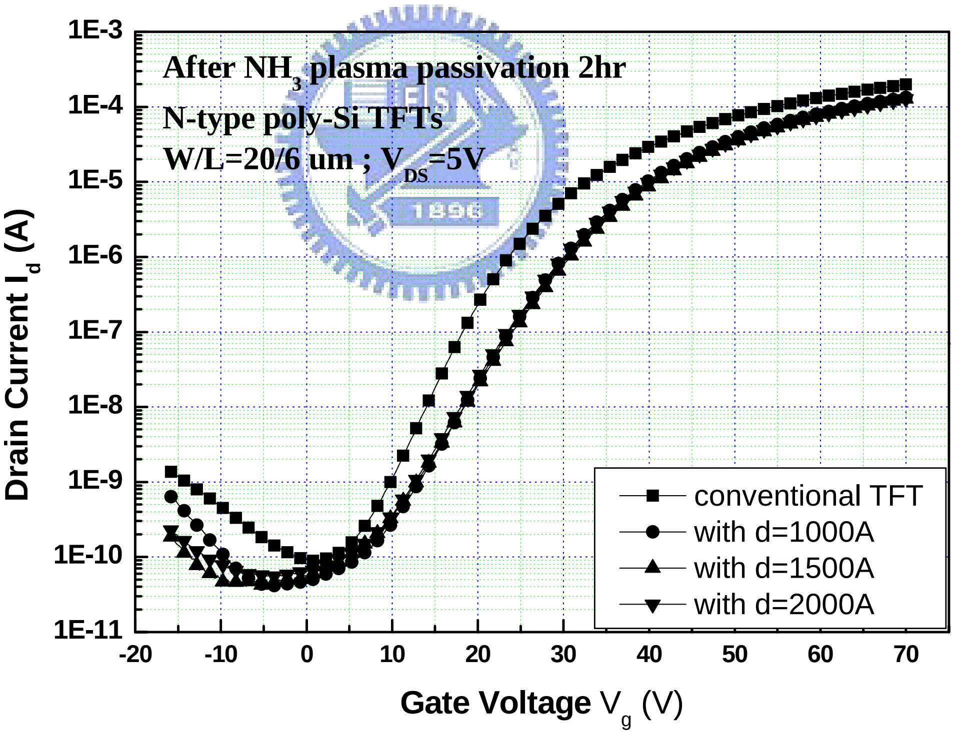


Figure 3.7 Transfer characteristics for comparison of CTFT and TGTFT with difference offset oxide thickness after plasma treatment 2hr.

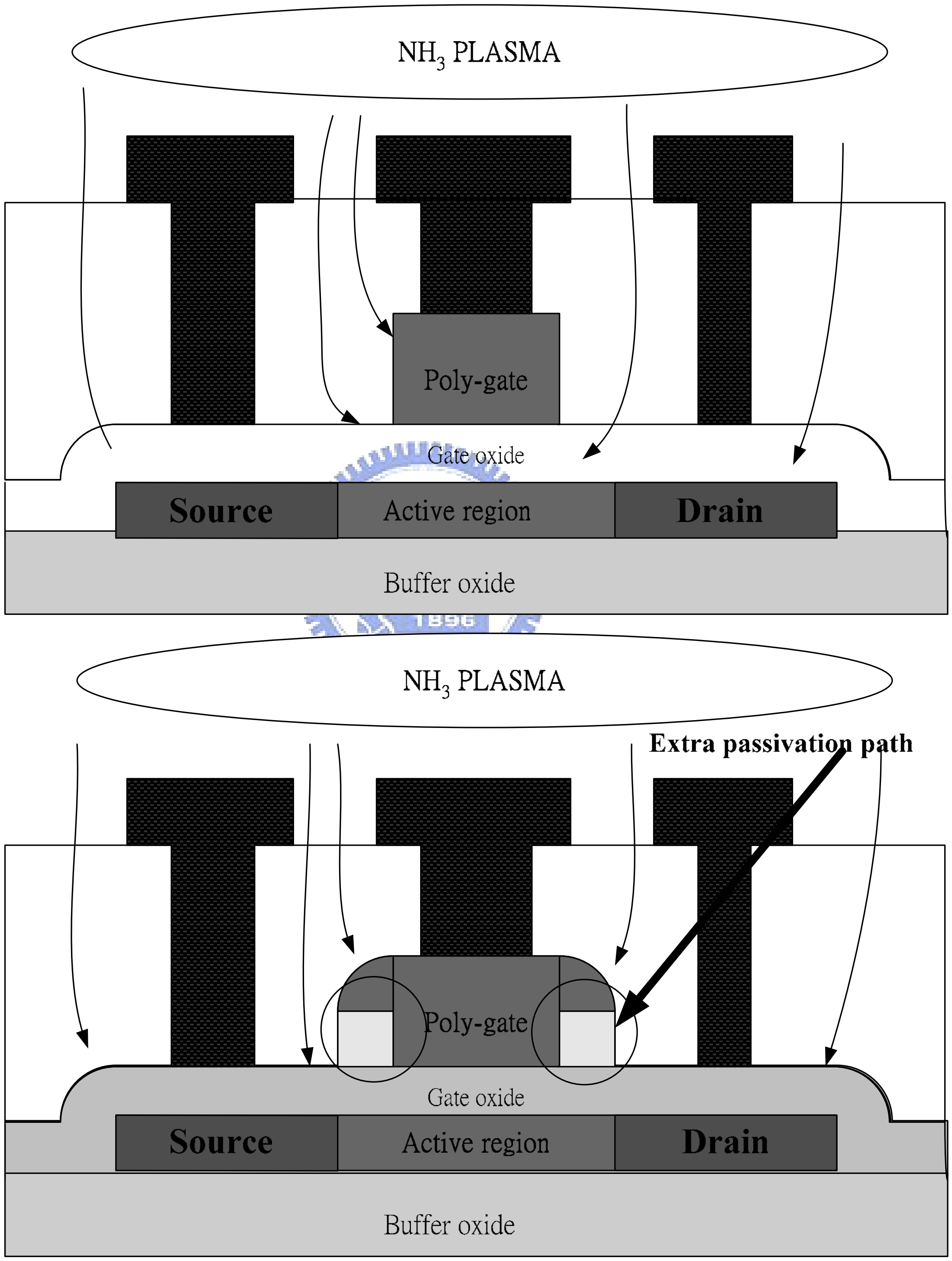


Figure 3.8 The pathway for hydrogen migration from a gaseous source to the active channel region of (a) conventional TFTs and (b) TGTFTs.

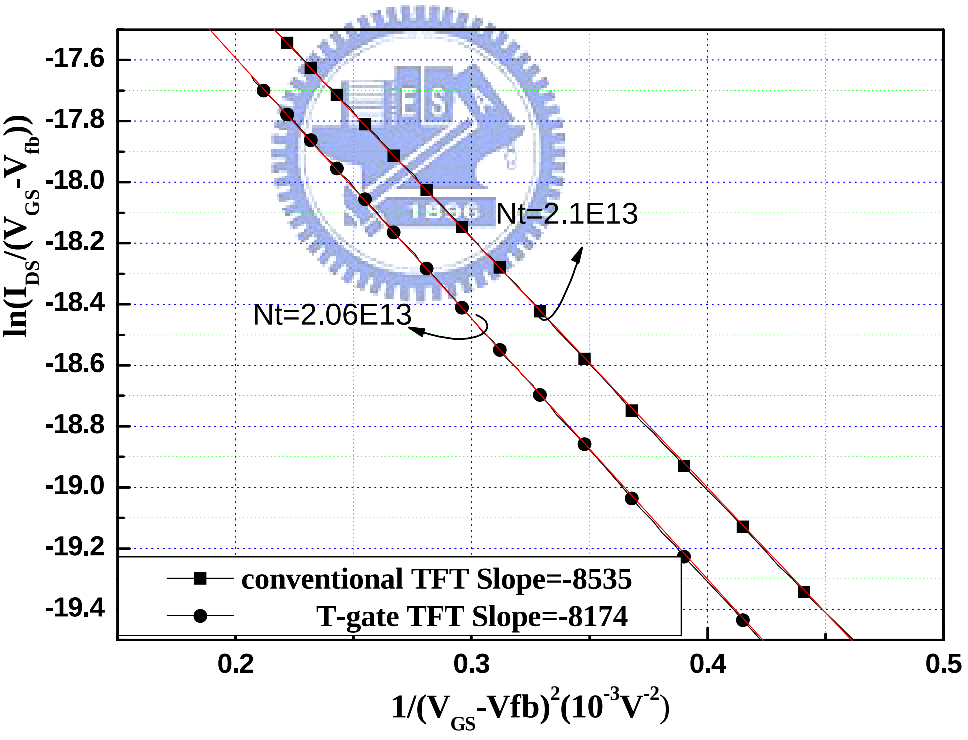


Figure 3.9 (a) Extraction of trap-state density (Nt) by the modified Levinson theorem for CTFT and TGTFT before plasma treatment.

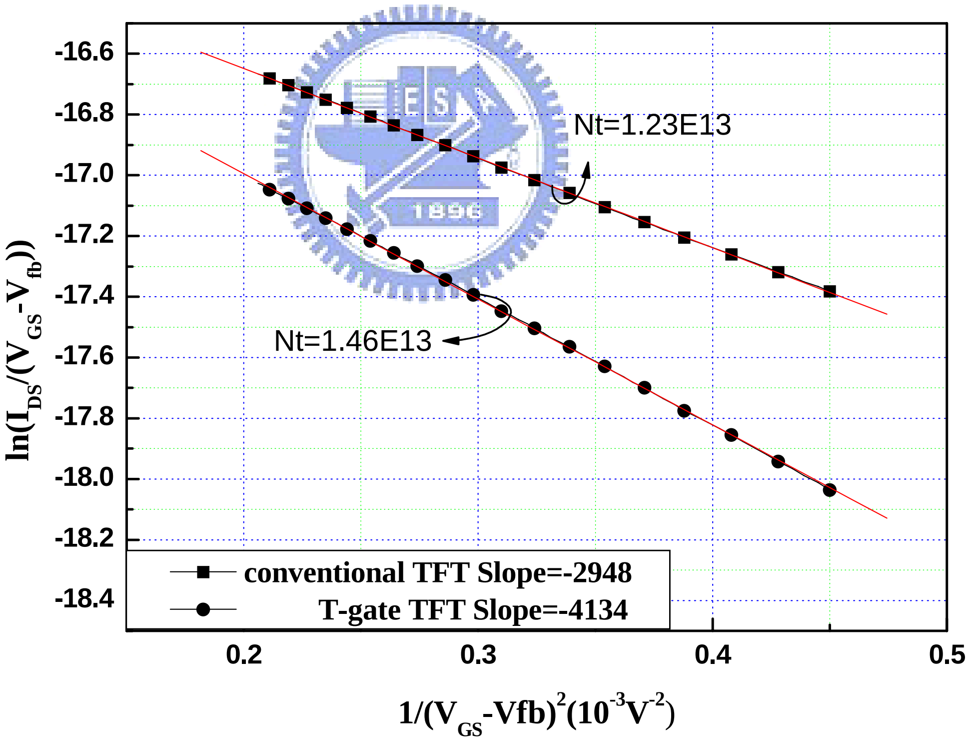


Figure 3.9 (b) Extraction of trap-state density (Nt) by the modified Levinson theorem for CTFT and TGTFT after plasma treatment 2hr.

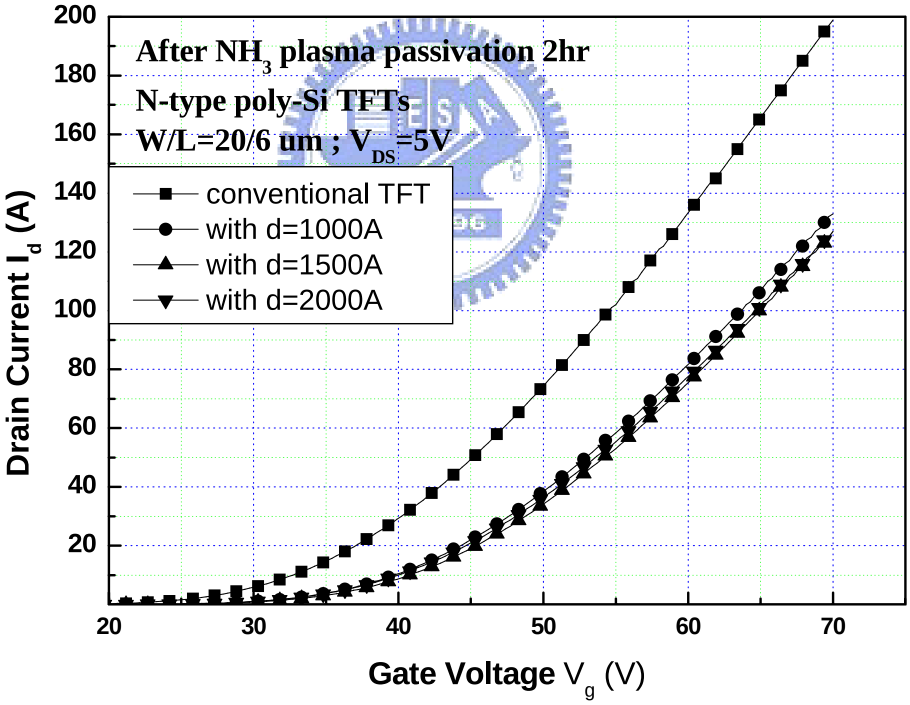


Figure 3.10 Transfer characteristics (with linear scale) for comparison of CTFT and TGTFT with difference offset oxide thickness after plasma treatment 2hr