Table 4.1 Summary of the DC performances

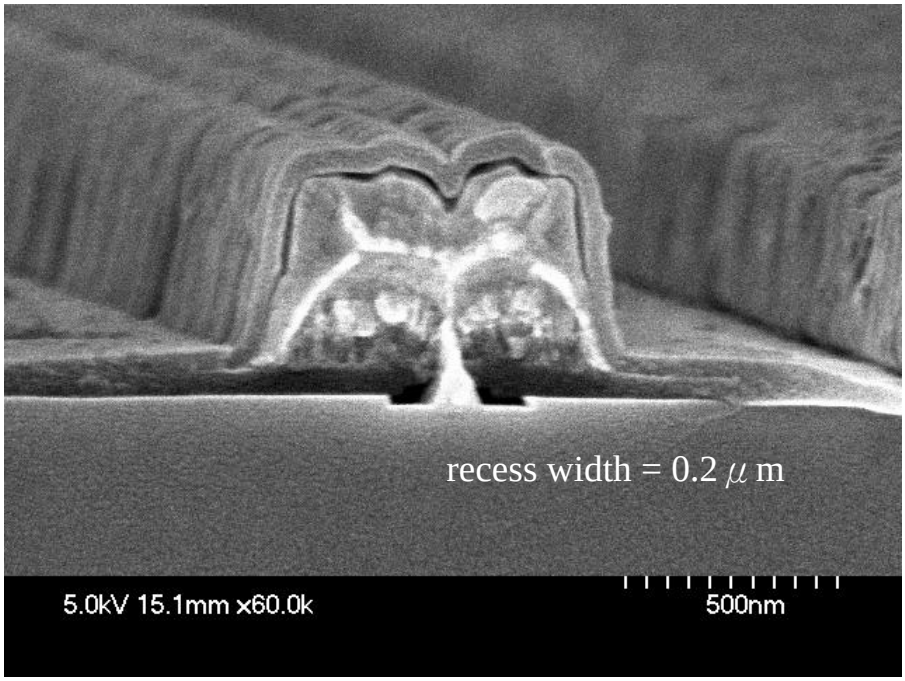
MHEMTs device	Recess width (μ m)	Ids@1.5V (mA/mm)	Vth (V)	Gm (mS/mm)	Vbr (Vbr)
Sample A	0.2	620	-1.1	930	9
Sample B	0.8	256	-0.6	980	6.6

Table 4.2 Summary of the RF and noise performances

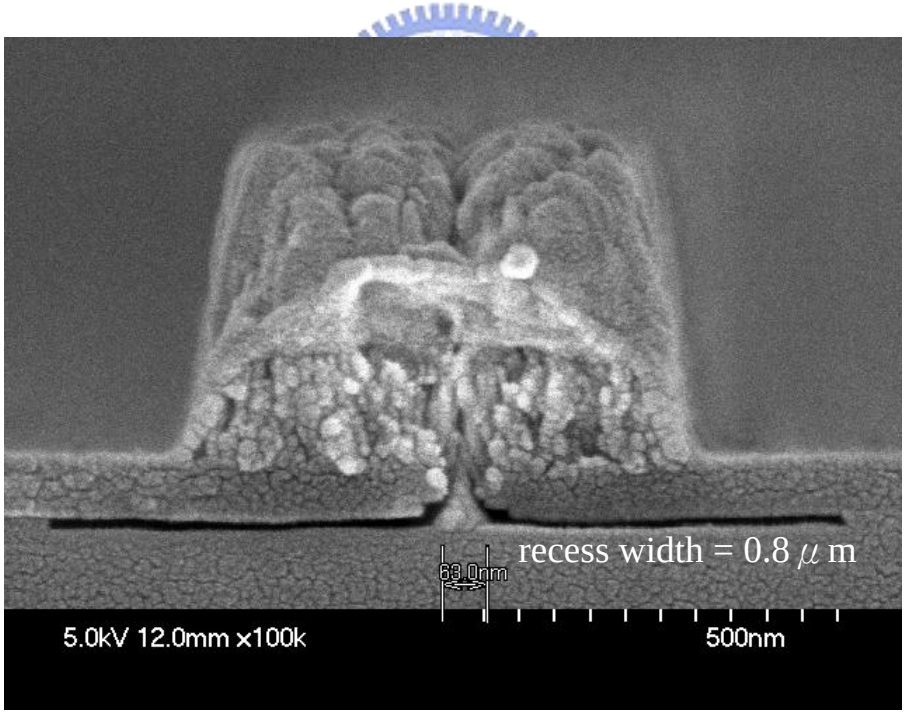
MHEMTs device	RF Performance				Noise Performance at 16GHz	
	H_{21}@40GHz (dB)	MAG/MSG@40GHz (dB)	f_T (GHz)	f_{max} (GHz)	NF_{min} (dB)	Ga (dB)
Sample A	9.8	13	130	200	0.69	9.767
Sample B	10	10	150	180	1.42	13.33

Table 4.3 Summary of the power performances

MHEMTs device	Power Performance at 2.4GHz			Power Performance at 6GHz		
	Pout (dBm)	Gain (dB)	PAE (%)	Pout (dBm)	Gain (dB)	PAE (%)
Sample A	17.67	27.83	57.7	14.86	27.04	57.1
Sample B	12.63	24.56	45	13.05	23.71	49.3

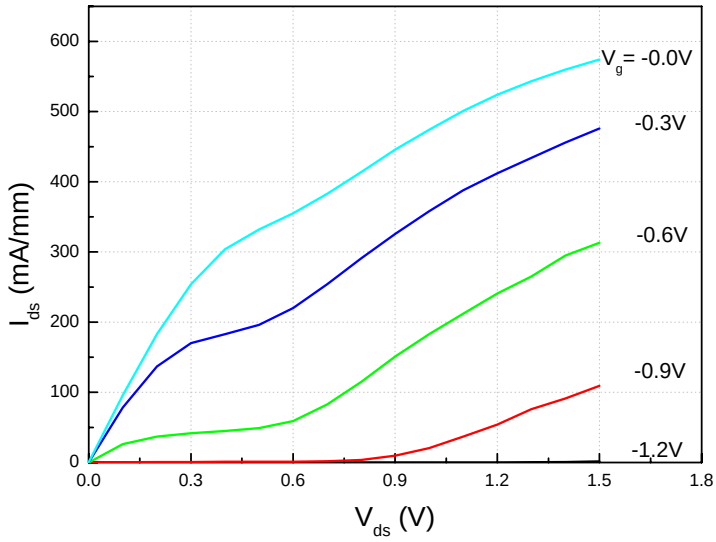


Sample A

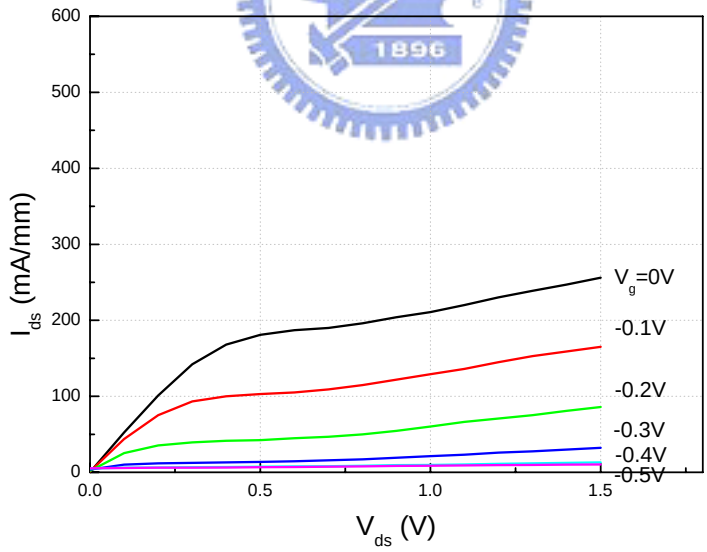


Sample B

Fig. 4.1 SEM photos of sample A and sample B

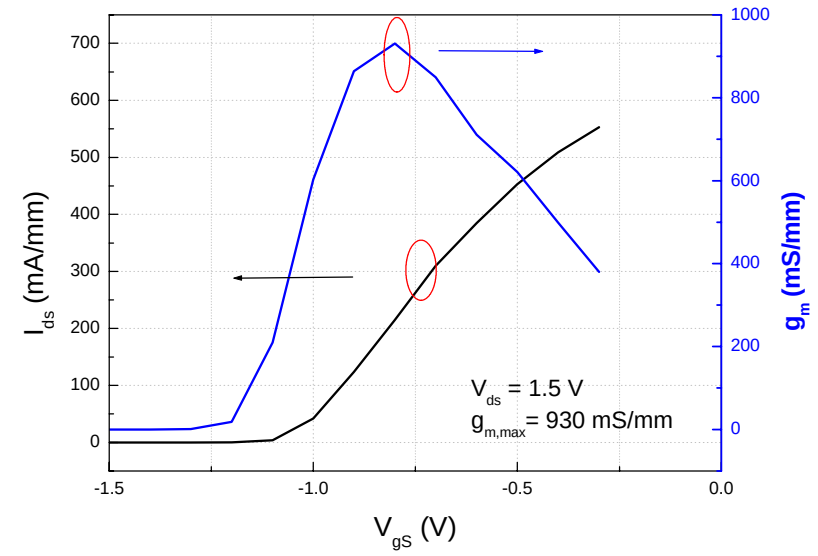


Sample A

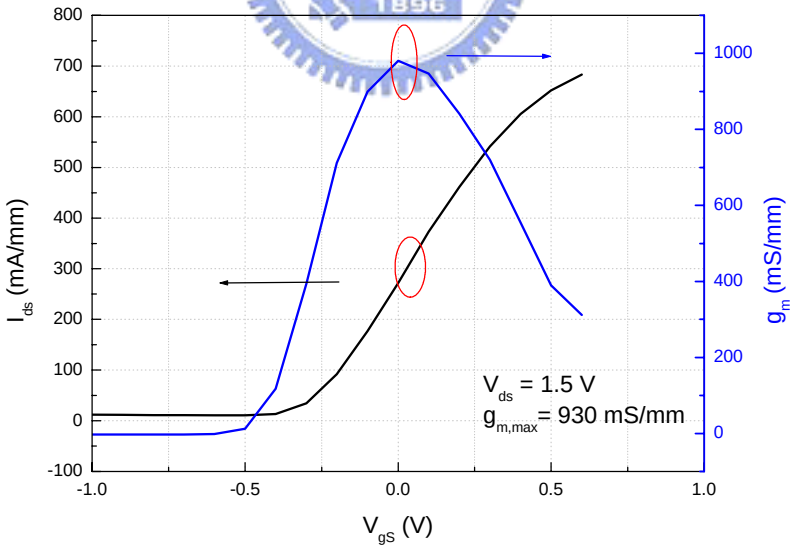


Sample B

Fig. 4.2 I-V characteristics of sample A and sample B MHEMTs

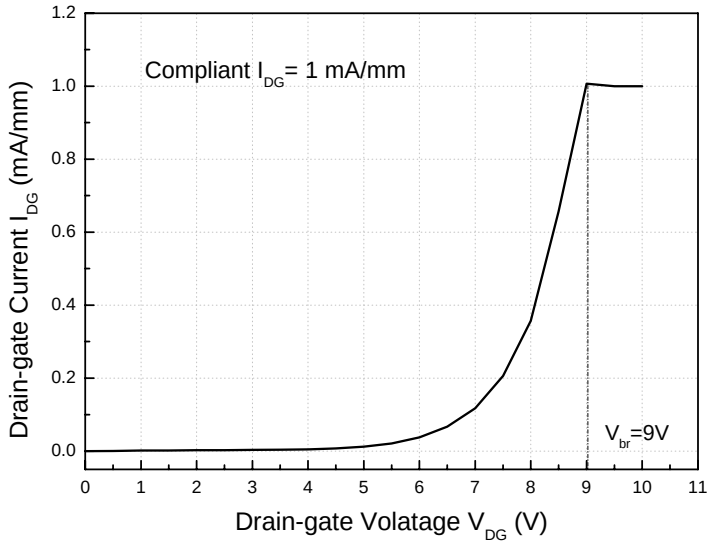


Sample A

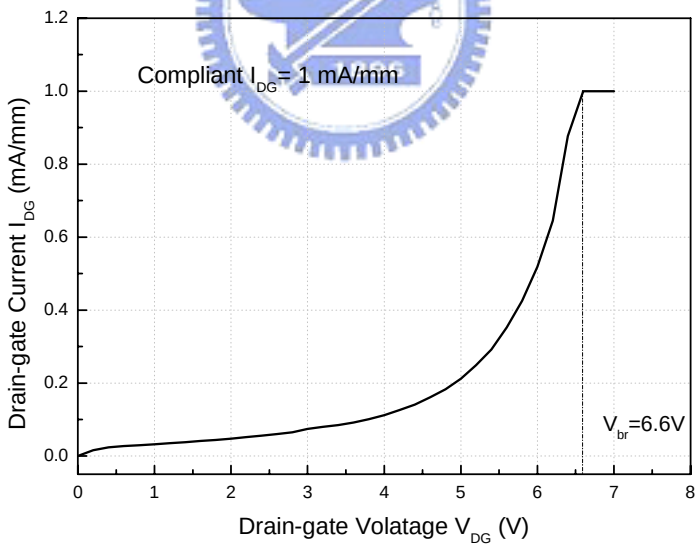


Sample B

Fig. 4.3 Transconductance vs. applied voltage for sample A and sample B

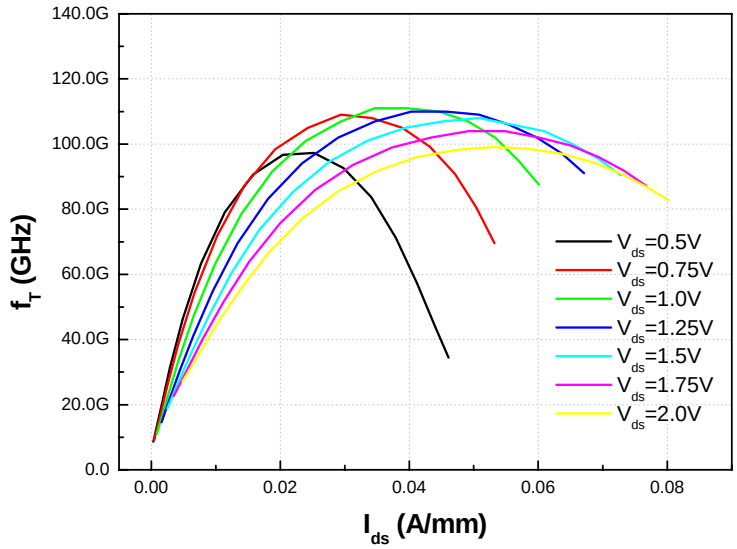


Sample A

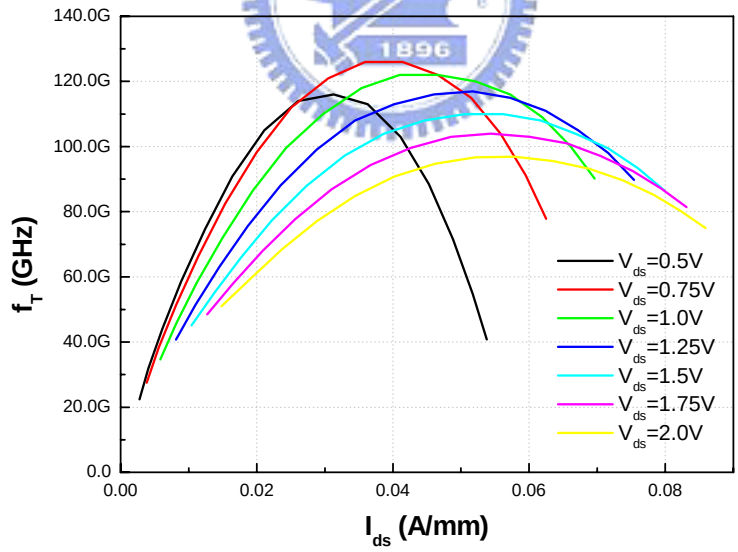


Sample B

Fig. 4.4 Breakdown voltage of sample A and sample B

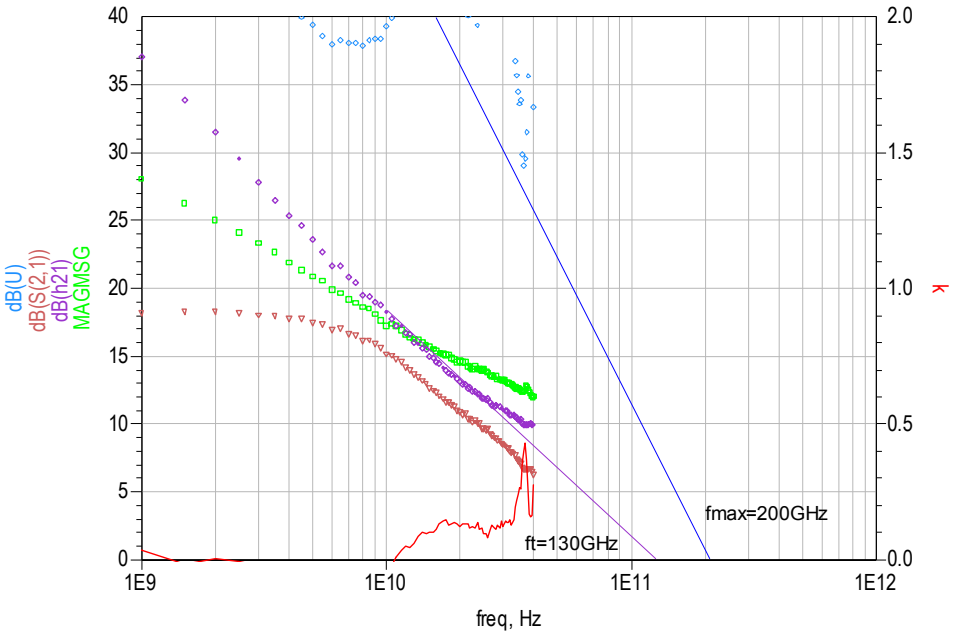


Sample A

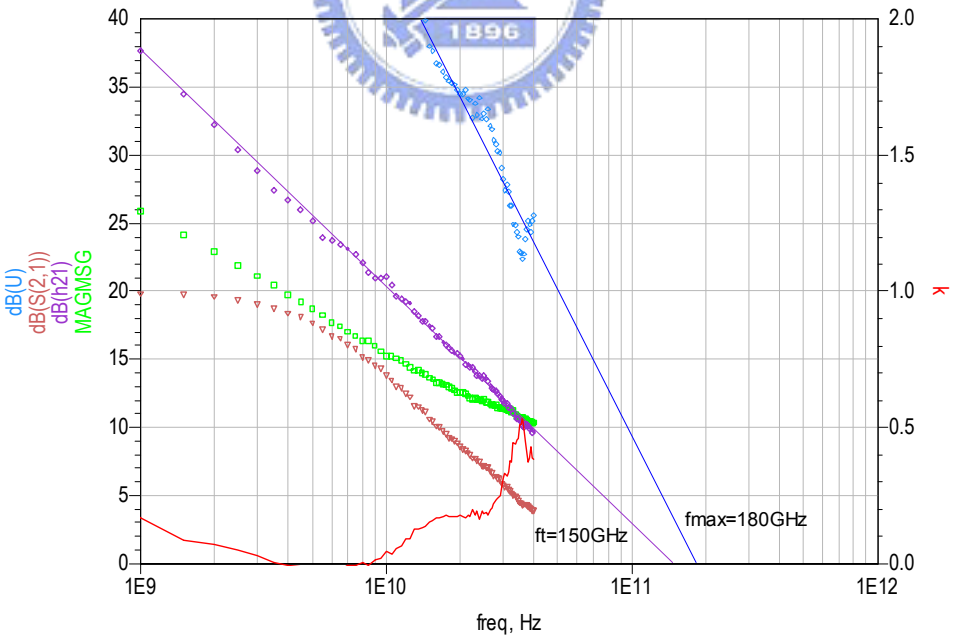


Sample B

Fig. 4.5 Cutoff frequency (f_T) vs. I_{ds} and V_{ds} of sample A and sample B



Sample A



Sample B

Fig. 4.6 Current gain, maximum available/stable power gain, and unilateral power gain of sample A and sample B