MULTI PROBE

The debate over going SEM-less.

There are three main techniques in use for nanoprobing. The most widely used of these is Focused Ion Beam wiring of probing pads. Below is a table listing advantages and disadvantages of each technique. The table is organized according to issue and whether the inherent technology acts to impede or promote the technique

Issue:	SEM/FIB Prober	FIB Wiring Pads	Atomic Force Probing
Force Feedback	NO/User Scrub View	NO/ Not Applicable	Core Technology
Probe Touch Down	Very Time Consuming/Prone to Tip/Sample Damage	Standard Wafer Probing	Automatic with Force Feedback
Imaging	SEM View of probes and sample (this is the only advantage of this technique)	Optical Microscope Looking at FIB Pads	Atomic Force Image of Contacts/Lines
Technology Node	Capable at 65nm	Capable at 90nm, limited at 65nm	Proven at 45nm, scaleable to 22nm and beyond
Tip Change time	Long (0.5 to 1 hr)	Short (5min)	Short (5min)
Sample Exchange	Long (0.5 to 2 hr)	Short (5-10min)	Very Short (2min)
Time to Probe 1st Transistor	>=1hr	>1day (including sample prep)	
Time to Probe 2nd Transistor	~10min	~10min	~1 min
Affects Transistor (threshold)	Slight to Significant	Extreme	None
Repeatability	Good	Poor	Very Good
Multiple Uses	None/Few (EBIC, PVC)	No	Many[i]
Compatible with Low K Dielectrics?	No (melt/damage)	No (melt)	Yes
Marking Required for Navigation	Yes	Inherent	No (Precision stage/CAD Nav)
Contact Times	30min	Infinite	30min
Pico Current Imaging / Ramping	Not Possible	NA	Yes
Leakage Currents/ Noise Currents	pA	Depends upon Sample Prep	fA
Can see the probes?	Yes (SEM image)	Yes (optical)	Optical View, Not necessary for probing
Wafer Probing Capable	No	No	Yes
Requires additional Equipment (excluding test equipment)	$400k- $1.2M FESEM/DB system	$200k Probe Station	None
Time to Functional System	4-8 months (Zyvex upgrade) to ~5-6 months (Hitachi System)	Time to train operator	1 day!

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