

Company Profile



CSE is to be a leading global company



CSE

Summary of CSE



Company Name : CSE Co. Ltd

C.E.O : Dae Pyo, LEE

Establishment : AUG 1st, 1999

Type of Business : Manufacturing/Semiconductor Equipment

Major Products : Wafer Prober, Probe Card, Accessories & Parts

Capital : US \$ 450K

**Address : 121-9, Maejari-gil, Gwangju-si, Gyeonggi-do
464-893, Korea.**

Employees : 24

Contact : TEL.031)765-3060 FAX.031)765-3063

Website : www.proberworld.com



Company History

- 1999. 8** Established as a CSE Corporation
- 2003. 5** Moved company to Opo-eup, Kwangju-Shi, Gyunggi-do, Korea
- 2004. 9** Established a company's R&D Center at Sunnam-Shi in Korea
- 2004. 10** Made a contract for the supply of goods & service of KEC in Korea.
- 2004. 11** Made a contract for the supply of goods & service of MagnaChip Co in Korea.
- 2004. 12** Made a contract for dealership of Signatone. (USA)
- 2006. 01** Obtain certification for ISO9001 and 14001.
- 2006. 05** Obtain certification the VENTURE an enterprise by Gyunggi-Do, Korea
- 2006. 10** Obtain certification the INNO-BIZ

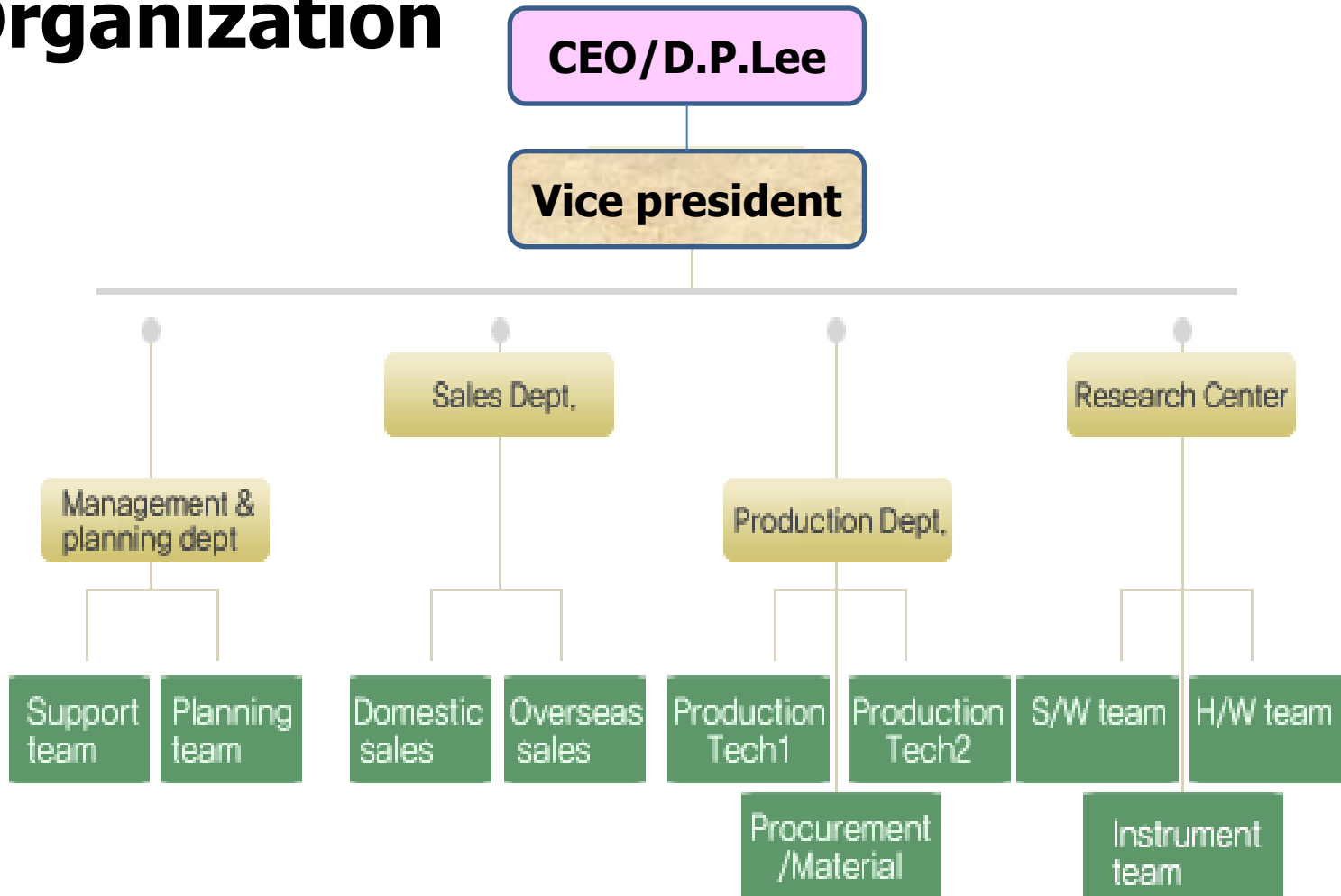


Company History

- 2008. 09** Registered bright prospect company by Gyeonggi-Do.
- 2008. 11** Obtain a patent on an Invention (No.10-0522975. 10-0647538. 10-0607094)
- 2008. 12** Registration an export bright prospect company by SMBC in Korea.
- 2009. 02** Registration an Specialist company of Electronics components and Material.
- 2010. 03** Acquisitions and mergers the Zpard probe card company and start probe card business for cantilever and Vertical probe card fields.
- 2010. 11** 1 Million USD export tower Award
- 2011. 05** Change company name to CSE
- 2011. 06** 3 Million USD export tower Award
- 2012. 03** Agent contract of probe card and prober with Singapore G4 source Co,.
- 2012. 11** Registration a Venture company by Korea technology credit guarantee fund.



Organization





Wafer Prober

- **Manual Prober Station**
- **Semi-auto Prober**
- **Full Auto Prober station**

Probe Card

- **Memory Device**
Mobile Dram & Nand Flash.
- **D.D.I (LDI) Device**
- **System LSI Device**

Accessory

- **Linear Motor**
- **Inker Ass'y / Positioner**
- **PC PRU Vision System**

TESTER

- **Image Sensor**
- **LDI**
- **LOGIC Device**
- **Discrete Device**

IP Status

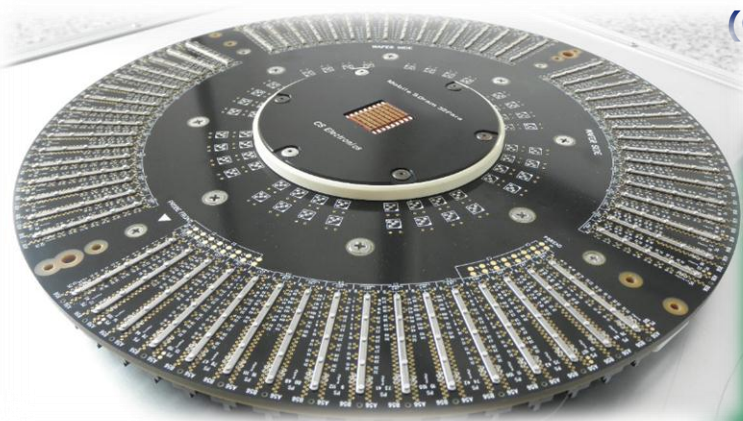


Classification	Nomenclature	Registration No.
Patent	Wafer Probing socket	0343883
Patent	Chip size Probe card	0389879
Patent	Manufacturing method of Ceramic bar & Manufactured Ceramic bar by those method	10-0609834
Patent	Probe card for inspection of semiconductor wafer	10-0689180
Patent	Manufacturing method for MEMS probe needle by plating Technology	10-0842395
Patent	Multichip probe frame	0314140
Patent	Prober system for De-tapped semiconductor chip test	10-0647538
Patent	Wafer prober system hot chuck with prevent thermal deformation structure.	10-0607094
Patent	Semiconductor analyzing prober system with Auto align function	10-0522975
Pat. Pending	Auto semiconductor wafer inspection instrument	10-2006-0017788
Pat. Pending	Manual semiconductor wafer inspection instrument	10-2006-0017789
A patent on a new device	Auto semiconductor wafer inspection instrument	20-0415369
A patent on a new device	Manual semiconductor wafer inspection instrument	20-0415370

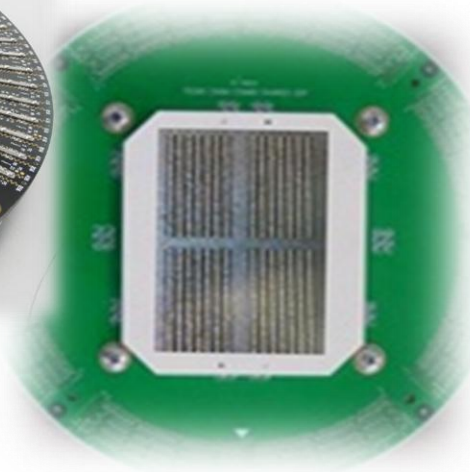
Probe Card Products



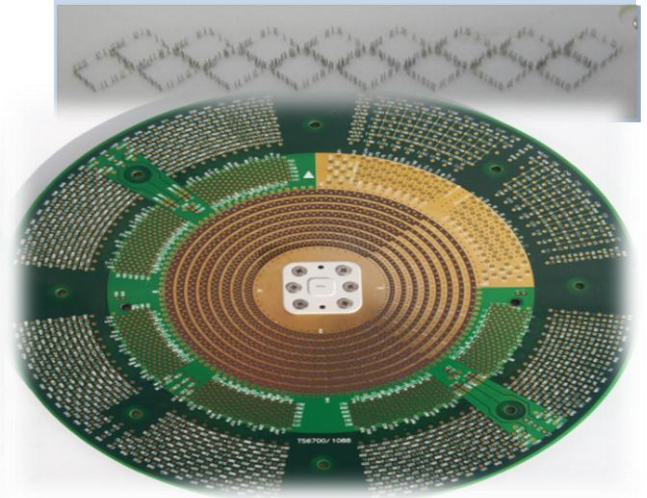
**Vertical Probe Card
(Mobile D-RAM)**



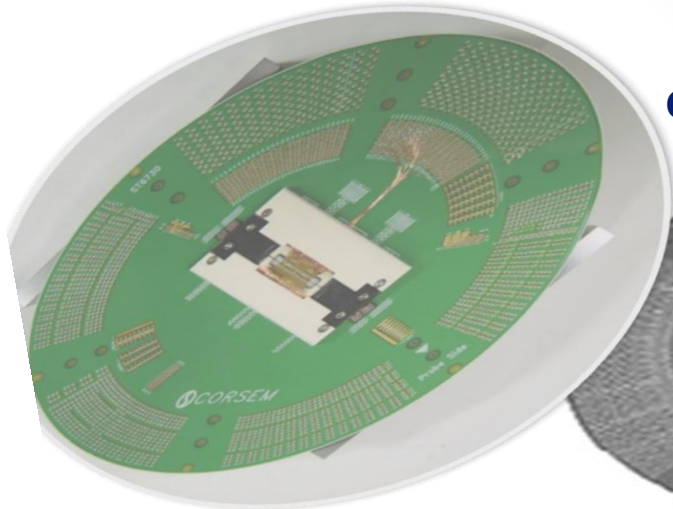
**Flip Chip 60um Pitch
Vertical probe card
(Option: Up to 40um pitch)**



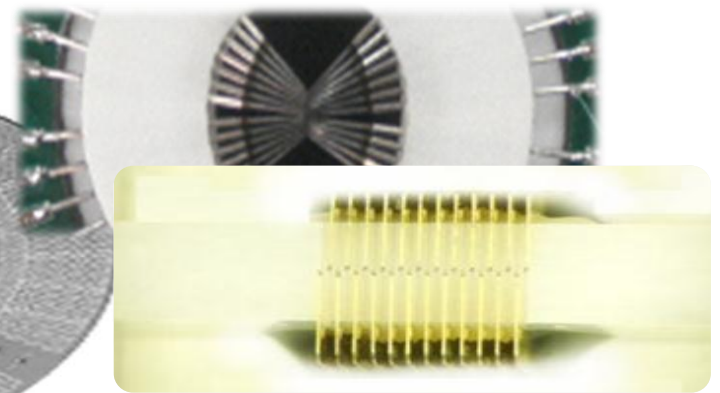
**Vertical Probe Card for
System LSI, Soc Devices**



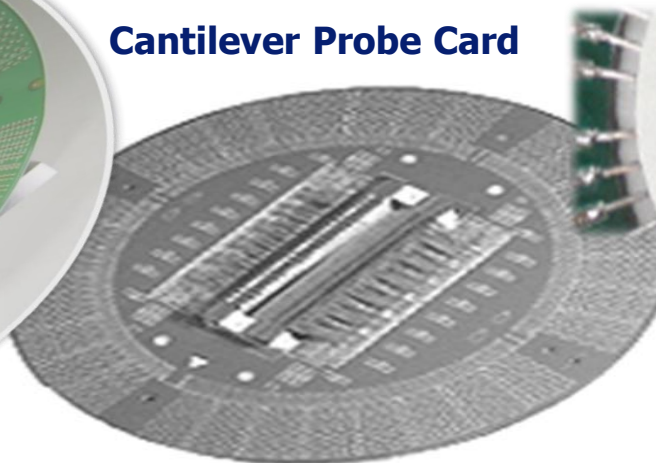
L.D.I. Vertical Probe Card



Low Leakage Probe Card



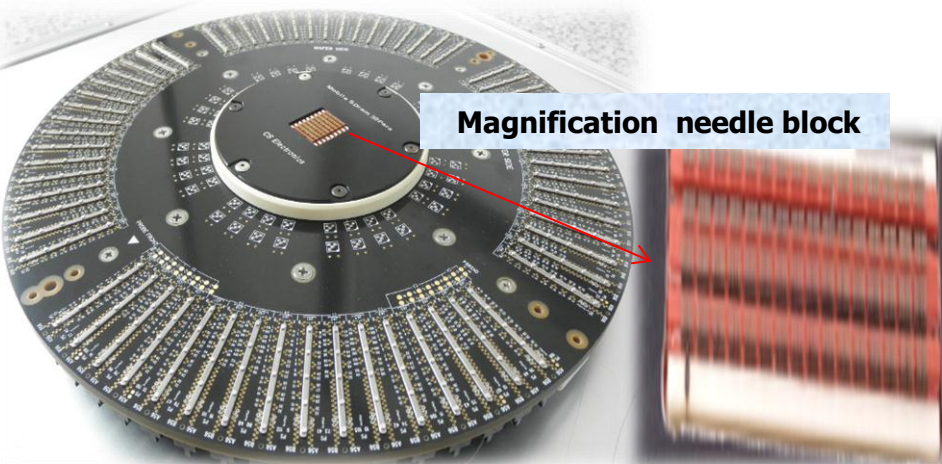
Cantilever Probe Card



Vertical Probe Card.



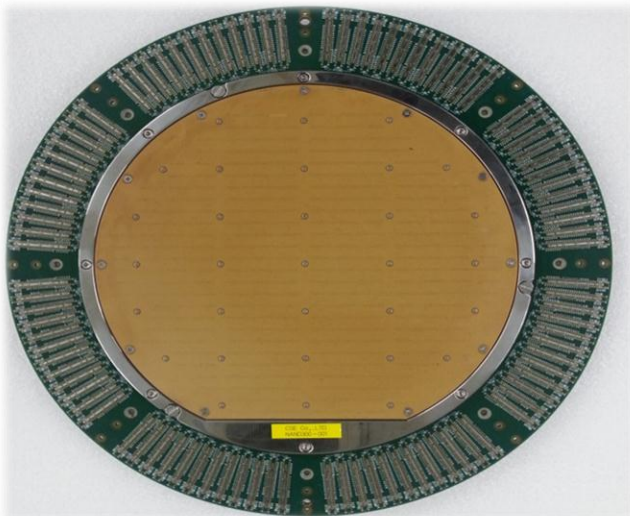
For Mobile D RAM Probe card



MEMS Probe card Specification

Needle Material	: Ni Alloy
Tip shape	: Round
Available Minimum pad Pitch	: >60um
DUT Parallel	: System LSI . SoC, over 2 Para Nand Flash 300mm One touch down
Test Speed rate	: >70Mhz
Voltage (max adjacent tip)	: 150VDC
Max Current (recommended)	: 1A
Vickers Hardness (Kg/mm ²)	: 500 ~ 550
Gram Force (g/mil)	: 2.5g (Standard). Adjustable by customer needs.
Alignment accuracy	: ±4um
Planarity	: < 19um (12inch)
Tip Length	: 250 ± 20 um
Leakage Current (nA) / GND.PWR	: 10 / 50 nA
Operating Temp, range	: -40℃ ~ 150 ℃
Maximum over drive	: 100um

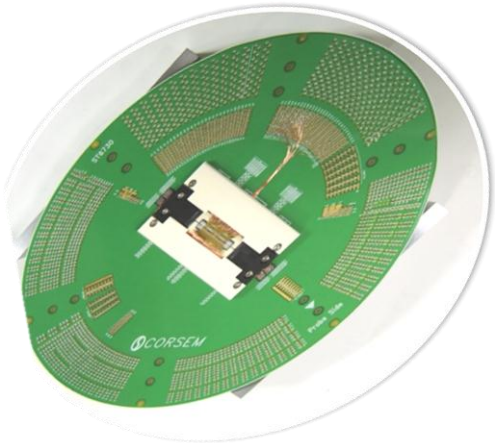
For Nand Flash 300mm One touch



Vertical & Cantilever Probe card



D.D.I (L.D.I.) Specification



- ◆ Needle Materials : BeCu or Ni-Alloy
- ◆ Min, Pad pitch In- line : 20um
- ◆ Min, Pad pitch Quad- tier : 35um
- ◆ Min, Pad Size (um) : 20x71um
- ◆ Operating temperature range (°C) : 40°C ~ 150°C
- ◆ Max test frequency (MHz) : Over 200Mhz
- ◆ Leakage level (nA) : <10nA
- ◆ Contact resistance (Ohm) : <4Ω

Low leakage Probe card Specification

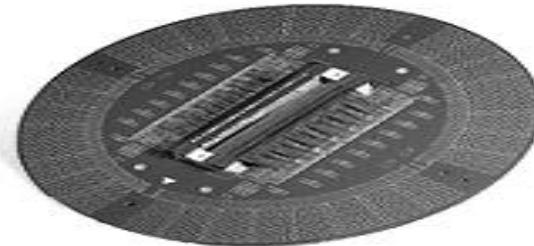
- Needle Materials : W. Coaxial or Ni Alloy
- Tip shape : Round
- Alignment accuracy : ± 4um
- Planarity : < 8um
- Leakage Current 10V F : <500 fA. <300fA (Coaxial needles)
- Contact resistance : <3Ω
- Tip Length : 250 ± 20 um
- Operating Temp, range : -40°C ~ 150 °C
- Life time : Over 1M times T/D
- Voltage (max adjacent tip) : 150VDC
- Max Current : 500mA
- Min, pad Pitch (Both side Fan-out) : 30um/ Single side : 60um
- Min, pad Pitch (Both side Fan-out) : 60um (Coaxial needles)
- Min, pad Pitch (Both side Fan-out) : 120um (Coaxial needles)

Probe card Spider for Low leakage probe card



Cantilever Specification

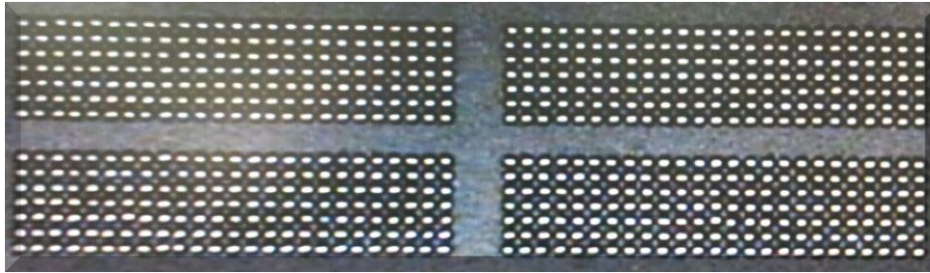
- ◆ Needle Materials : W, Re-W, BeCu, P7, Pt
- ◆ Confront Various type of device for Non Memory Devices
- ◆ High Pin Count, Available fine pitch
 - High Pin Count : Over 1~ 15,000Pins./60um Pitch
- ◆ Tip Diameter : 8 ~ 30um (Variable for customer spec,)
- ◆ Planarity : less than 15um (depends on Device size)
- ◆ Contact resistance : < 4 Ohm



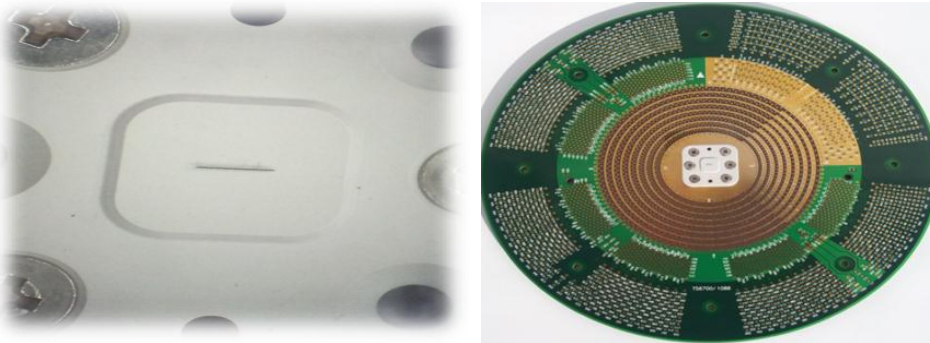
Silicon and Ceramic Guide for fine pitch



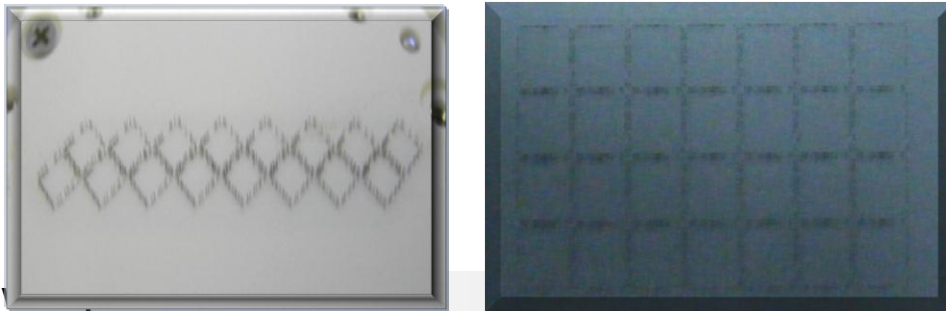
Flip chip Probe card



LSI Probe card



Ceramic & Silicon Probe Guide



Vertical-40 Specifications

- Needle Material : Ni Alloy
- Beam Diameter : 20um x 20um
- Tip Diameter (Flat) : 20um x 20um
- Min. Pad to Pad Pitch : $\geq 40\mu\text{m}$
- Alignment (X, Y) : $\pm 4\mu\text{m}$
- Planarity : $< 12\mu\text{m}$
- Needle Force : Force @ 70um 2.9 g
(Depend on user spec)
- Scrub Mark : $\leq 20\mu\text{m}$

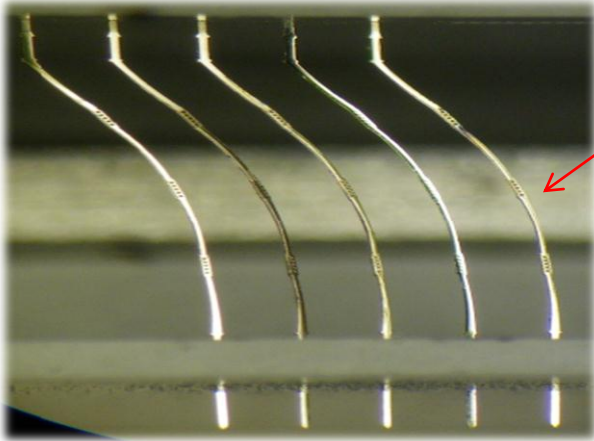
- Recommended OD : 70um (Max 90um)
- Contact Resistance : $\leq 4\Omega$ (Wired)
- Max Current : 450mA
- Leakage Current : $\leq 10\text{nA} / 5\text{V}$
- Test Frequency(Probes) : $\leq 10\text{nA} / 5\text{V}$
- Test Temperature : $-40^\circ\text{C} \sim 150^\circ\text{C}$
- Parallelism : System LSI. SoC : Over 2Para
Memory : x32. X64. x128

- Applications : LSI-Logic(SOC Flip chip). CIS,
Memories Area Array, Inline, Peripheral
Bump pad(Au, Solder), Al pad

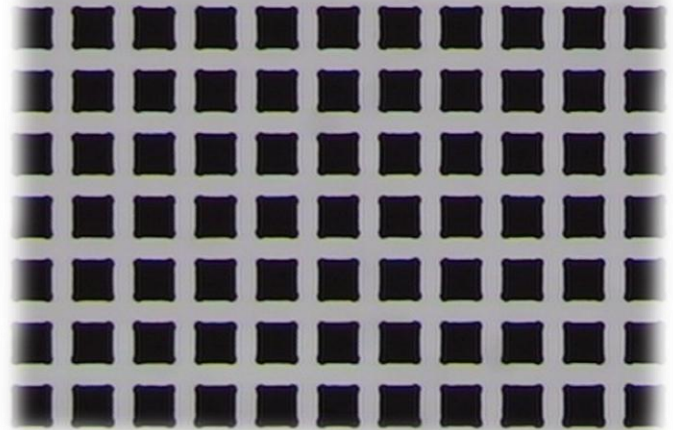
Probe Assembly Picture



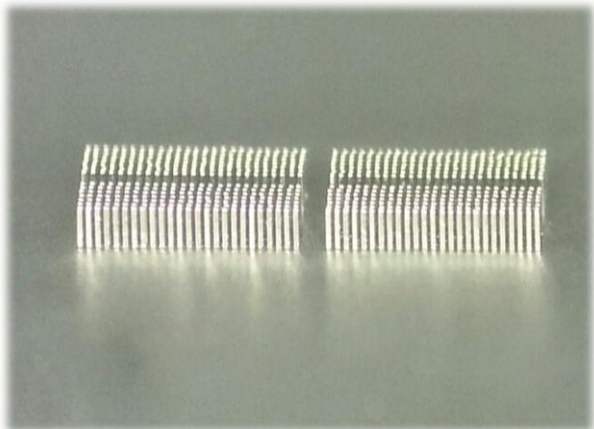
1. Probe Image



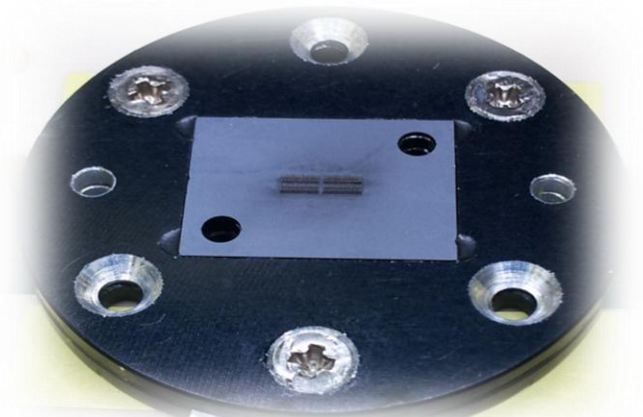
2. Silicon Housing



3. Probe & Housing Insert Image



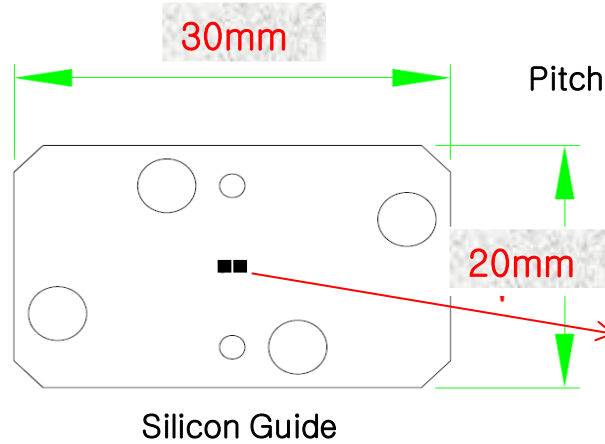
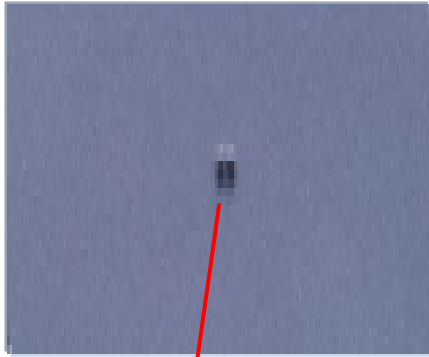
4. Probe Head Assembly



40um Pitch 1,058 Bump pad Probe Head

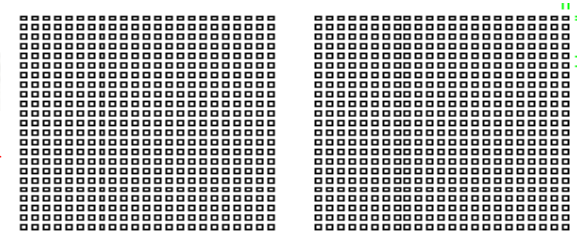


Probe Head Detail

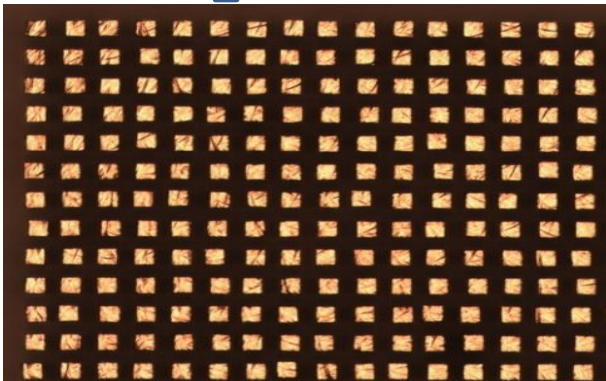


Pitch 20x20 um / 40 um Hole Center to center

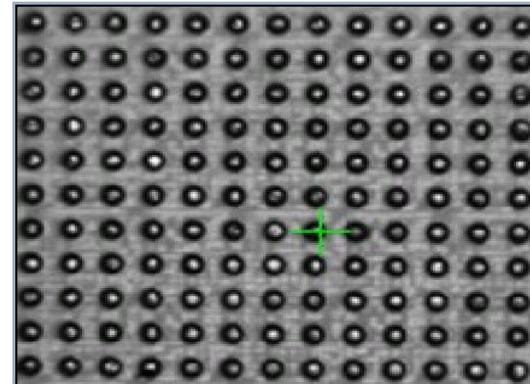
40um Pitch 1,058 Bump Pad



Silicon Guide



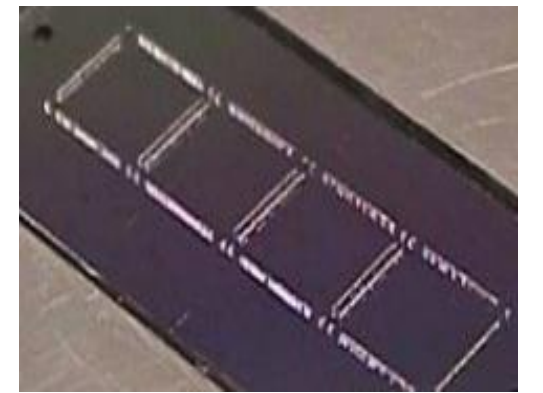
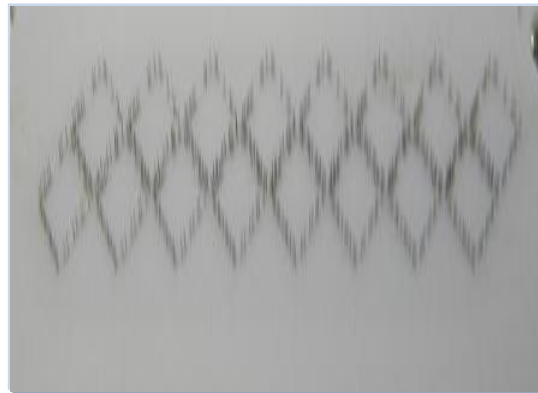
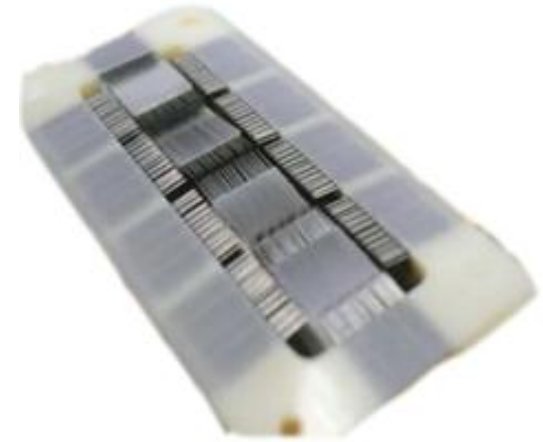
Magnification Probe Head



Bump Pad Before Contact



❖ Compare picture the Vertical probe cards with Cantilever
Expansible DUT's Array as the below pictures



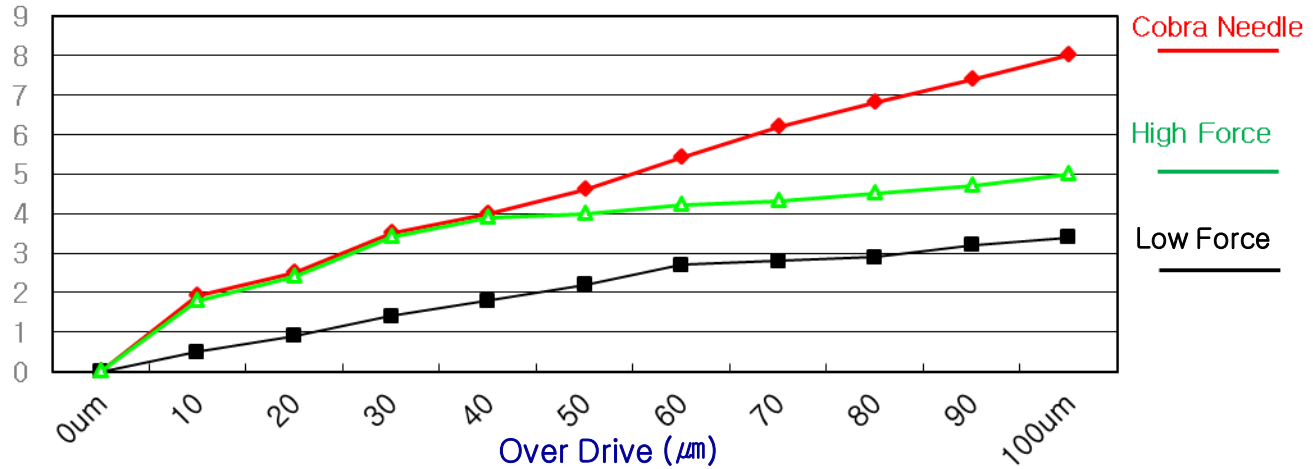
Non linearity Probe Needle force



Over Drive	0um	10um	20um	30um	40um	50um	60um	70um	80um	90um	100um
Low Force	0	0.5	0.9	1.4	2.2	2.6	2.7	2.8	2.9	3.2	3.4
High Force	0	1.8	2.4	3.4	3.9	4	4.2	4.3	4.5	4.7	5.0

Probe Contact Force vs Over Drive

Contact force/gram



Probe needle test results



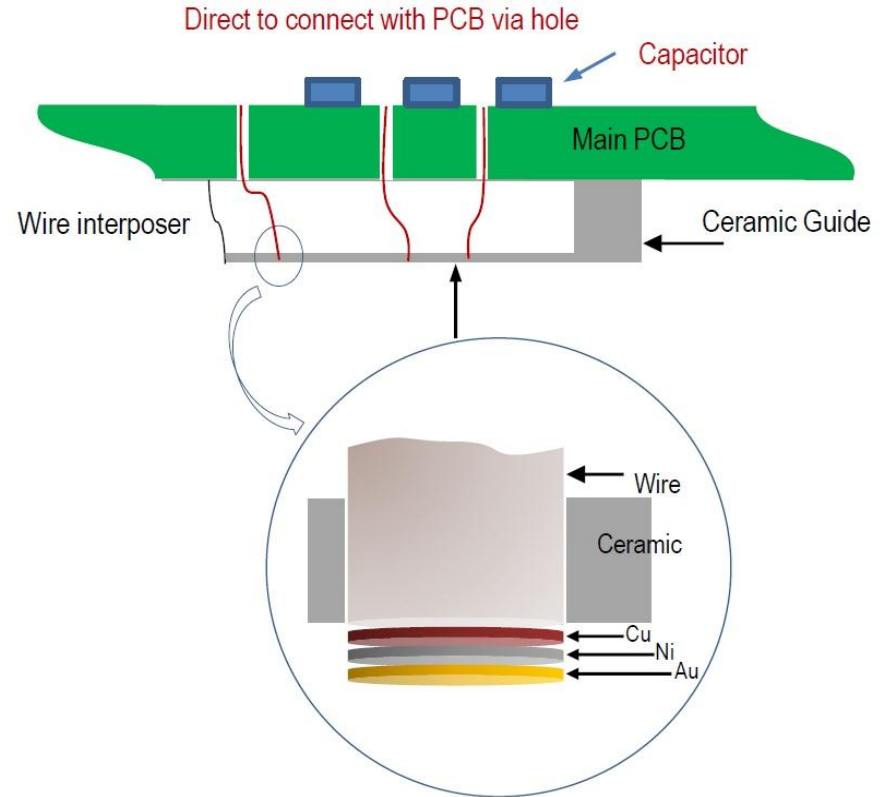
Life time Test

MEMS needles	40um x 40um Needle /OD60um 1,000,000 touch down Life Time Test results						
		TD's 200K	TD's 400K	TD's 600K	TD's 800K	TD's 1,000K	Total
Tip Length	initial	360um	357um	354um	351um	348um	360um
	Measured value	357um	354um	351um	348um	345um	345um
	difference	-3um	-3um	-3um	-3um	-3um	-15um (max 20um)
Diameter	initial	40 x 40um	40 x 40um	40 x 40um	40 x 40um	40 x 40um	40 x 40um
	Measured value	40 x 40um	40 x 40um	40 x 40um	40 x 40um	40 x 40um	40 x 40um

Interpose Structure

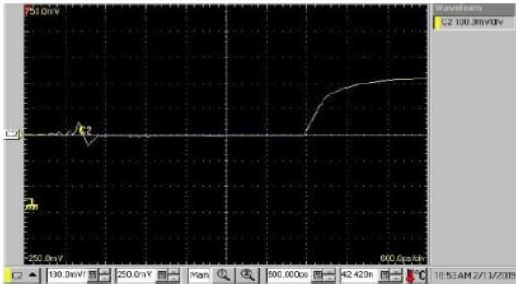


1. Short Transmission Signal(vs. MLC, MLO)
2. High Speed > LSI : 1GHz, DRAM : 250MHz...
3. Fine Pitch > 70um pitch(depend on pad size)
4. Stable Contact > Hard & Soft gold plating
5. Good Planarity > Under 10um(regardless of size)
6. Easy Repair > Just need 1day
7. Short Delivery > Within 4weeks based on 8K

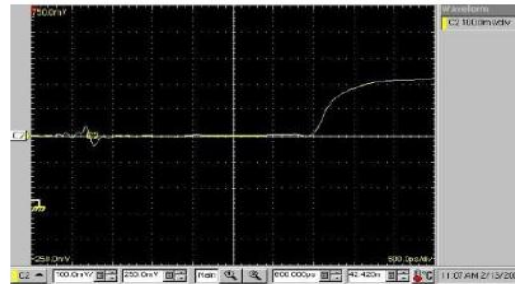


SIMULATION RESULT

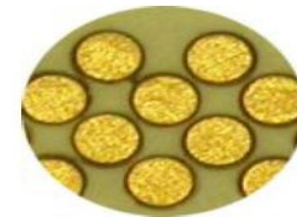
► Delay time



PCB



PCB + MVP + PH



Real PAD Image

INTERPOSE Specifications



Item	Details	Specification
Gold Pad thickness	Hard Electric plating	3~5 um
Contact Resistance	0.1 m-ohm	Under 0.1 m-ohm
Current	100 um wire	1.2 A
Pattern Resistance	5mm	Under 0.5 ohm
Speed	10 mm pattern length	Normal 1 Ghz (option 2~5Ghz)
Touch down strength	Cobra tip condition	Over 500 k (after simple cleaning)
Repairable	Damaged Pad by hard thing	Available in 1 days
Min Pitch	80 um pitch	Depend on pad size

Future Direction of Required Technologies



System on chip (SoC) Flip Chip Technology

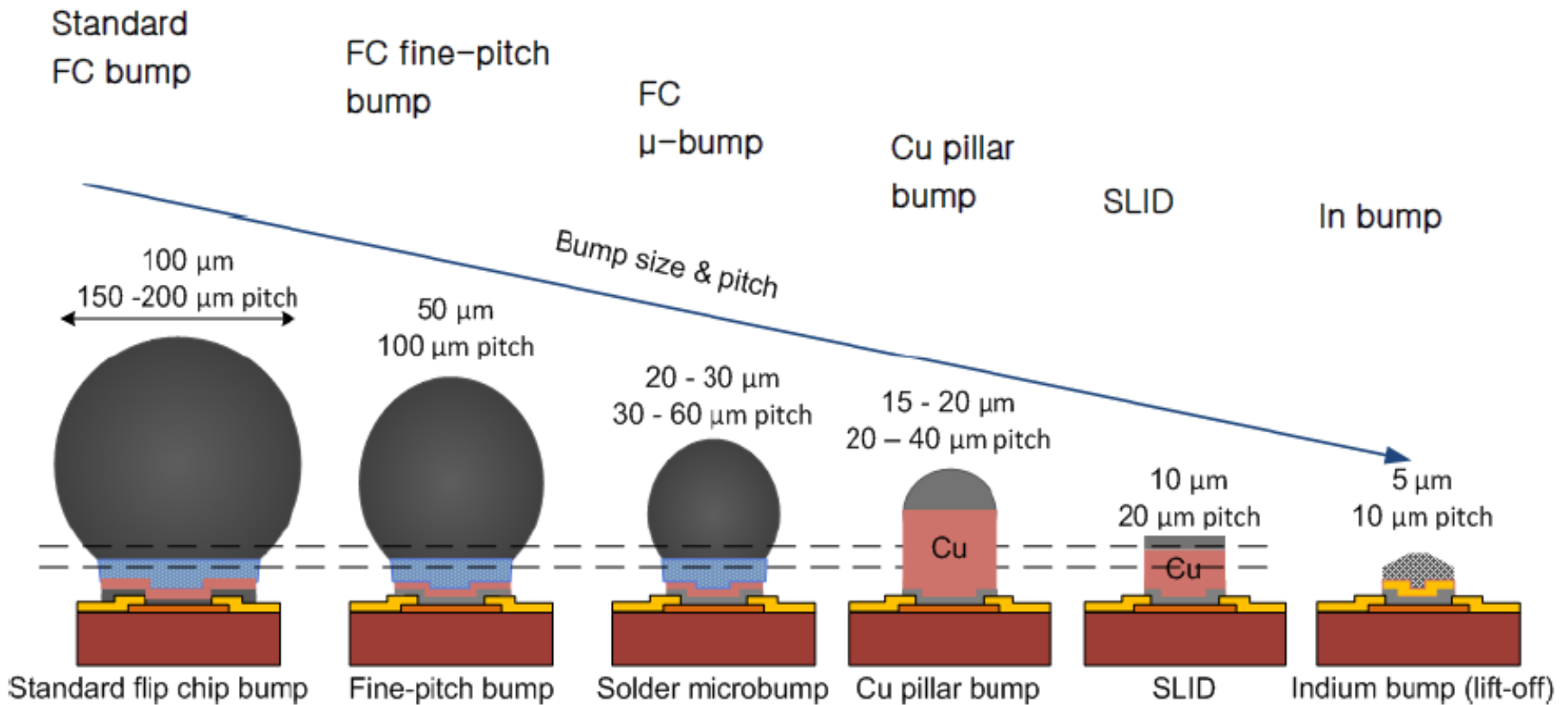
	Today (Standard) Flipchip	Today (Fine Pitch) Flipchip	Today (Fine Pitch) Flipchip	Today (TSV)	Tomorrow (TSV)
Bump Material	EU, Solder	Solder (Sn Ag)	Solder (Sn Ag) Au CuSn	Solder (Sn Ag) Cu-Au	Cu-Au
Bump type	FlipChip Bump	FC Fine Pitch Bump	FC Fine Pitch Bump U-Bump	U-Bump Cu Pillar Bump	Cu Pillar Bump
Bump Size	100um	50um	50um	20~30um	15~20um
Bump Pitch	<130um	100um	80um	50~60um	40um
Probe Size	3mil(75um)	2mil (50um)	1.5mil (38um)	1mil (25um)	0.75mil(19um)
Cobra (Apollo)	3mil은 Pitch120um 이상 제품	2mil은 90~110um 80um Pitch 대응안됨	1.5mil은 78um ?		
Bow (MBS) 적용 Size		1.5mil (38~40um) 1.75mil (45um)	1.5mil (38~40um)	> 1mil (25um)	> 0.75mil (20um)
Application		Fine Pitch SoC	Fine Pitch SoC Si 인터포저 Bump	SoC 2.5D, TSV	2.5D, 3D, TSV
Contact force	C : 2.8g/mil	C : 1.5g/mil BL : 1.2g/mil BH : 2.8g/mil	BL : 1.2g/mil BH : 2.8g/mil	B:0.8~1.5g@50OD	B:0.7~1g@50OD
Si node	32nm (A5)	28nm (A6)	28nm, 22nm	22nm, 20nm	20nm, 14nm
Pin count	14000/4Dut	20,000/4Dut			

자료출처 : Silicon news

Technologies Required of Fine Pitch Probe card



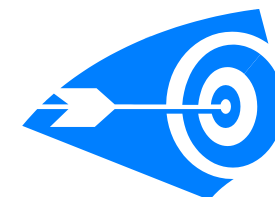
■ Wafer Bumping – Bump Sizes and Pitches



자료출처 : Silicon news



Prober station fields



Probe Station for Analysis



Prober Station CMP-200S

- Powerful and easy to use
- For 8inch (3 Inch to 8 Inch Available)
- High accuracy & safety
- Compact and flexible desktop type
- Reasonable price
- User friendly X-Y driver
- Easy wafer handling



Sanding Station CS-200D

- Powerful and easy to use
- High performances and durability
- Portability and lightness
- Reasonable Price
- Minimizing of working space
- Controlling of speed and sanding quality
- Measurement of plate planarity by pressure Gauge

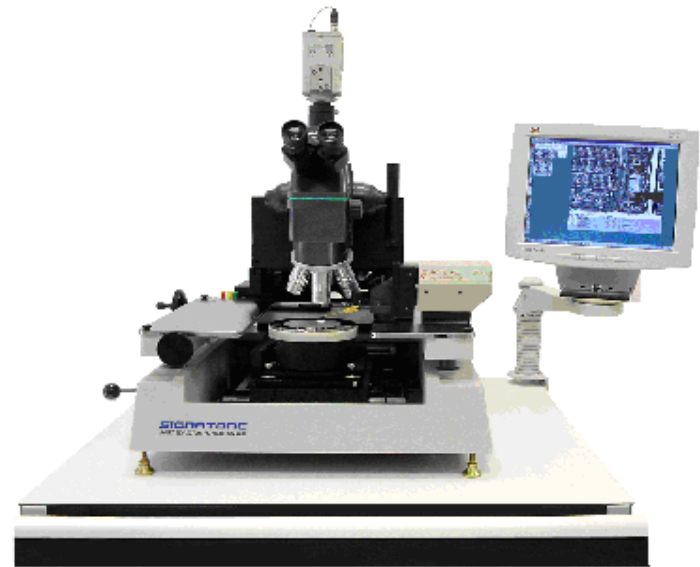


Probe Station for Analysis



Signatone S-460

The S-460 is a 6" semi-automatic analytical probe stations represents mature technology at its best . Base on linear motor technology, which virtually eliminates accuracy and repeatability issues, the S-460 will deliver years of worry-free performance



Signatone S-1160

The S-1160 is a rugged, economically priced prober that can be fitted with either high powered optics for probing small geometries or lower powered optics for probing bonding pads and larger geometries.



Wafer Probe Station



42" LED Probe Station

- Powerful and easy to use
- High accuracy & safety
- Reasonable price
- User friendly X-Y drive
- Easy LCD Panel handling
- Air Bearing Stage use



EG2001X Probe Station

- For 6inch (3 Inch to 6 Inch Available)
- Gold/Nickel Chuck
- Automatic Alignment
- Stage Resolution 1um to 2.5um
- Option
 - . Hot Chuck
 - . Probe Card Holder
 - . Positioner
 - . Interface GP-IB/RS232/TTL





EG2080S,EG3001X

- For 8inch (3 Inch to 8 Inch Available)
- Gold/Nickel Chuck
- Automatic Alignment
- Stage Resolution 1um to 2.5um
- Option
 - . Hot Chuck
 - . Probe Card Holder
 - . Positioner
 - . Interface GP-IB/RS232/TTL



EG4090u

- For 8inch (5 Inch to 8 Inch Available)
- Gold/Nickel Chuck
- Automatic Alignment
- Stage Resolution 1um to 2.5um
- Option
 - . Hot Chuck
 - . Probe Card Holder
 - . Positioner
 - . Interface GP-IB/RS232/TTL





TEL-19S

- For 6inch (3 Inch to 6 Inch Available)
- Gold/Nickel Chuck
- Automatic Alignment
- Stage Resolution 1um to 2.5um
- Option
 - . Hot Chuck
 - . Probe Card Holder
 - . Positioner
 - . Interface GP-IB/RS232/TTL



TEL-P8 Series

- For 8inch (5 Inch to 8 Inch Available)
- Gold/Nickel Chuck
- Automatic Alignment
- Stage Resolution 1um to 2.5um
- Option
 - . Hot Chuck
 - . Probe Card Holder
 - . Positioner
 - . Interface GP-IB/RS232/TTL





TEL P-12XLm

SACC
Linear Scale
Shield System
OCR
VIP3A/VIP4
Mapping Arm
TSI Loader



TEL Precio

SACC
Linear Scale
Shield System
VIP4
Mapping Arm
TSI Loader





TSK APM-90A

- For 8 inch (5 Inch to 8 Inch Available)
- Gold/Nickel Chuck
- Automatic Alignment
- Stage Resolution 1um to 2.5um
- Option
 - . Hot Chuck
 - . Probe Card Holder
 - . Positioner
 - . Interface GP-IB/RS232/TTL



TSK UF-200

- For 8 inch (5 Inch to 8 Inch Available)
- Gold/Nickel Chuck
- Automatic Alignment
- Stage Resolution 1um to 2.5um
- Option
 - . Hot Chuck
 - . Probe Card Holder
 - . Positioner
 - . Interface GP-IB/RS232/TTL



UF-3000 Series

Full Contact Probing
Multi-Die Probing
Needle Cleaning
Mini-Environment
PMI : Probe Mark Inspection
Loader : Double Loader / Various Automated Loaders including OHT
HST : Head Stage Tilt Unit (Probe Card Tilt Unit)
Chuck : Normal Temp / High Temp / Low Temp / Ultra Low Temp
(Low Noise Option On All Chucks Available)
APC : Automatic Probe Card Changer
Cassette ID Reader
Wafer ID Reader (Front Surface / Back Surface)
Printer
GP-IB Interface



Thank You.