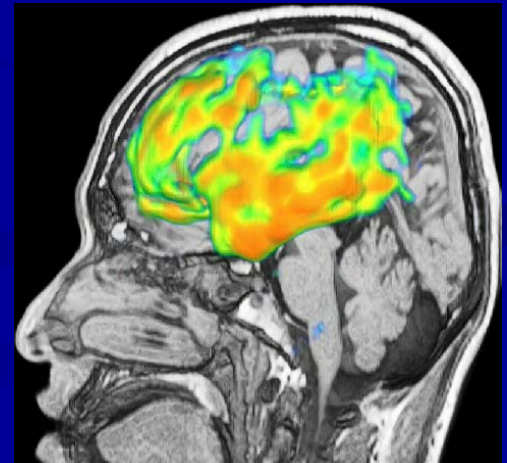
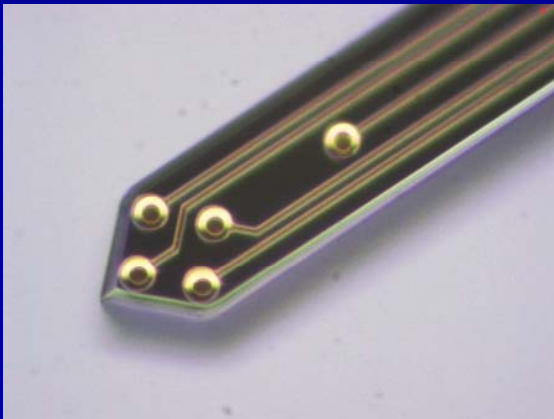


3D-IC & MEMS technology into Brain

Advanced & Intelligent Brain Microprobe Mfg Service

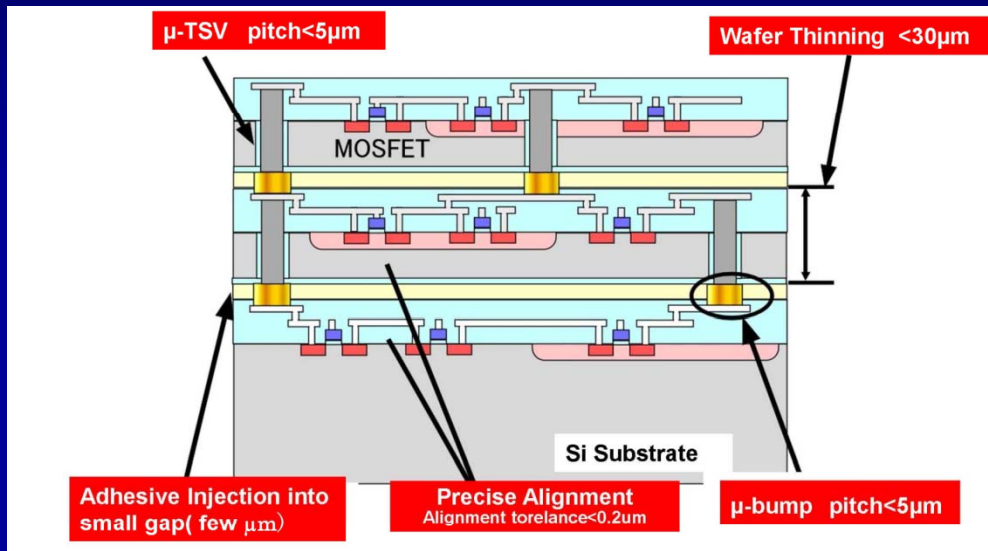
Tohoku-MicroTec Co., Ltd. (T-Micro)



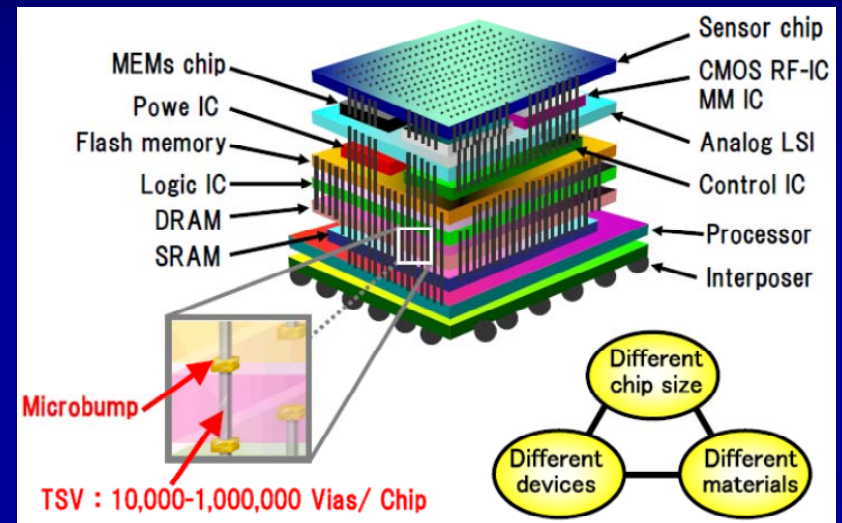
T-Micro Core Technology

5 key factors for Advanced 3DIC & MEMS process technology

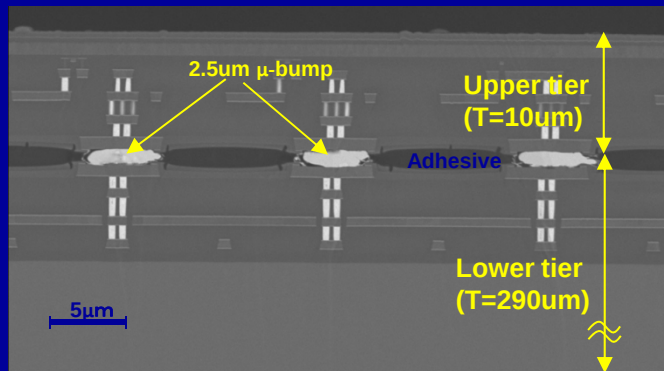
Our 5 Key technology factors for 3DIC & MEMS



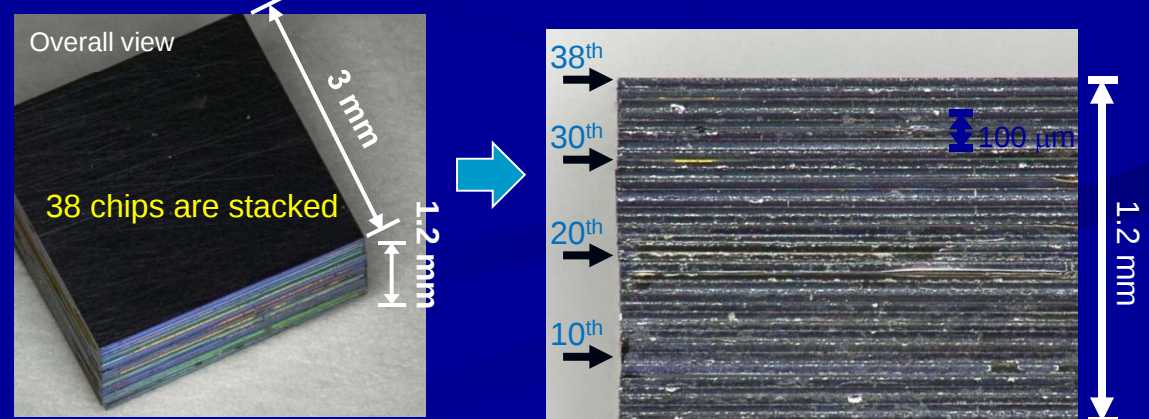
High Density & Sophisticated IC Cube



SEM picture of the key factors



Example : 38 Si layers stacked



Product Facility

- Start-to-finish product line in our clean room
- Custom small-lot production by 2" / 4" wafer
- Bonding equipment owned



図2.34 新規に導入した高真空蒸着装置



Custom Si Microprobe Mfg Service

Multi-channel Si probe for recording/stimulation

Substrate material : Silicon

Probe length : 4 – 50 mm or Longer

Probe width : 100 μm <

Probe thickness : 40 μm <

Probe shaft back side : Round shape

Probe Tip shape : Sharp-pointed

Shank number : 1 – 16 or More

Shank space : 100 μm <

Site material : Ir, Pt, Au

Site number : 1 – 256 ch or More

Site diameter : 10 μm <

Site space : 7 μm <

Site layout : Custom design

Package : PCB or Implantable

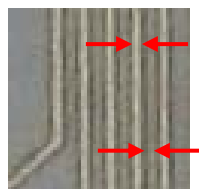
Socket stage : Major system compatible or Custom

Purpose : Recording and Stimulation

Thickness: 40 μm or thicker



Back side
Round shape

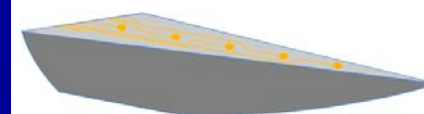


Width
3.5 μm

Space
3.5 μm



Ir, Pt, Au site



Tip : Sharp-pointed

Mfg service examples



33 mm / 4 shank / 32 ch / Acute



10mm / 1 shank / 16 ch / Acute



5 mm / 1 shank / 8 ch / Custom Acute



Laminar site layout
Tiered tapering



Edgeways site layout
Straight tapering

Custom Si Microprobe Mfg Service

Bilateral Multi-channel Si probe for recording/stimulation

Substrate material : Silicon

Probe length : 4 – 50 mm or Longer

Probe width : 100 μm <

Probe thickness : 50 μm <

Probe shaft shape : Straight or Tiered tapering

Shank number : 1 – 16 or More

Shank space : 100 μm <

Site material : Ir, Pt, Au

Site number : 1 – 256 ch or More

Site diameter : 10 μm <

Site space : 7 μm <

Site layout : Custom design (Front/Back)

Interconnect : Au

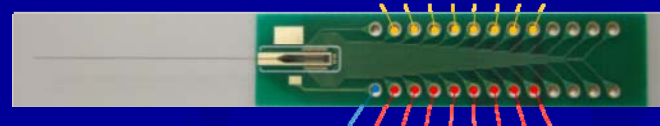
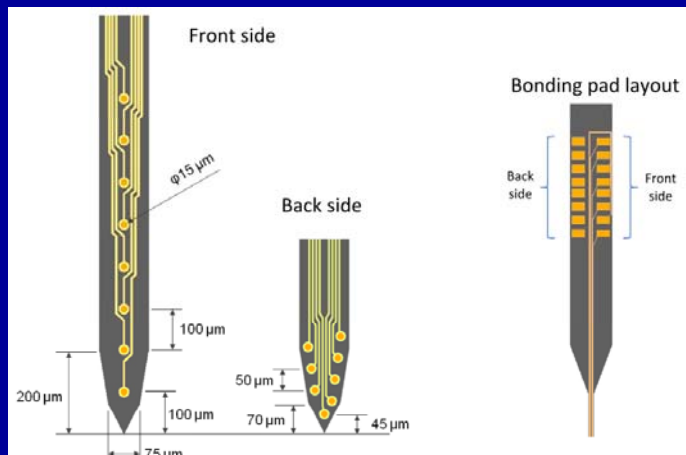
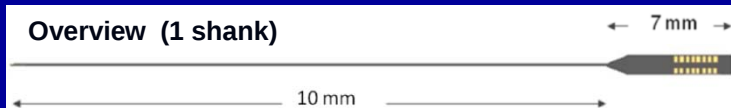
Package : PCB or Implantable

Socket stage : Major system compatible or Custom

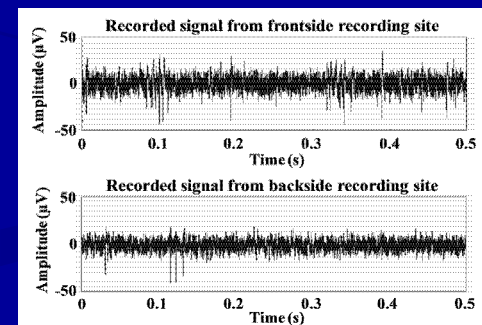
Purpose : Recording and Stimulation

Custom Mfg service example

Overview (1 shank)



Signal recording (Rat)



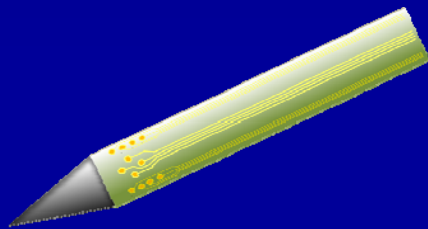
Recorded signals

Tungsten-based Microprobe for Deep Brain

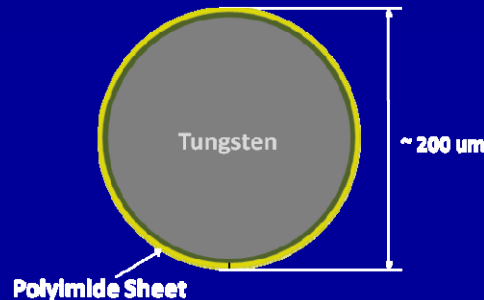
Neuronode600 (Standard product and Custom Mfg service)

Neuronode600 is the omnidirectional micro brain probe, consisting of Tungsten needle rolled in a thin electrode site sheet, for deep brain recording/stimulation.

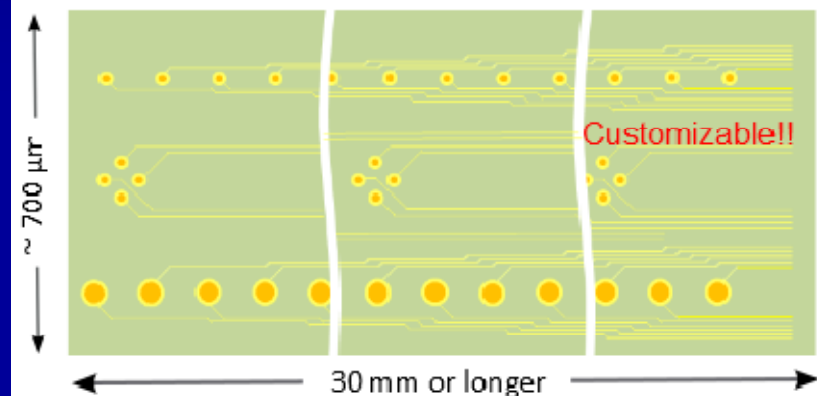
Overview



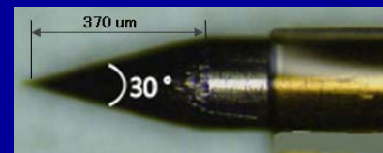
Cross-sectional view



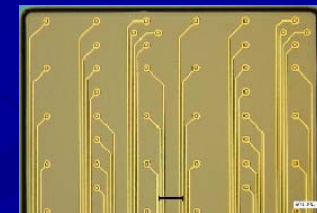
Electrode site sheet layout



Probe core material : Tungsten (W)
Electrode site sheet : Polyimide
Polyimide sheet size : 30 mm or longer x ~700 μm
Electrode site material : Ir (Pt or Au optional)
Site number : Up to 256 ch
Site layout : Flexible all over P.I. sheet
Site diameter / shape : Flexible (more than 10 μm)
Probe length / width : 33 mm or longer / 200 μm
Package : Acute or Chronic



Tip of probe



Example picture of site layout

Number, shape, diameter and layout of electrode sites, and Probe length are customizable to meet specific experiment requirements.

Custom Si Microprobe development service

Micro optical waveguide-integrated Si brain probe for Optogenetics

Length: 5, 10, 20, 33 mm or longer

Thickness: 50 μm <

Width: 160 μm <

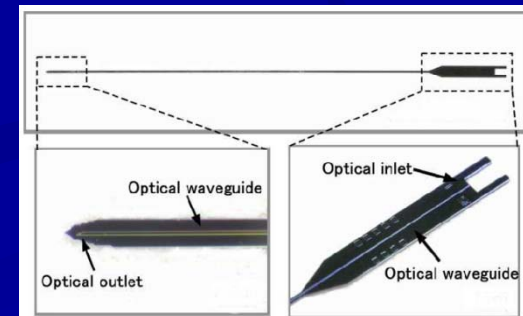
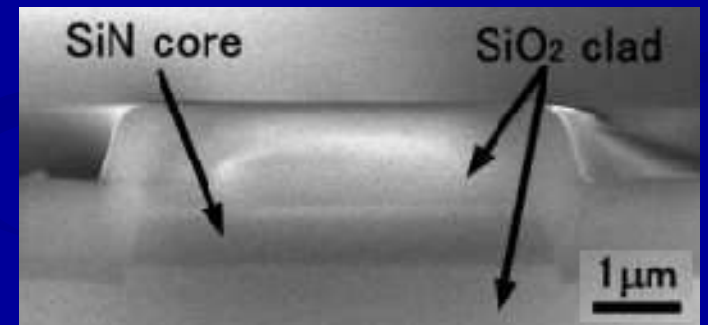
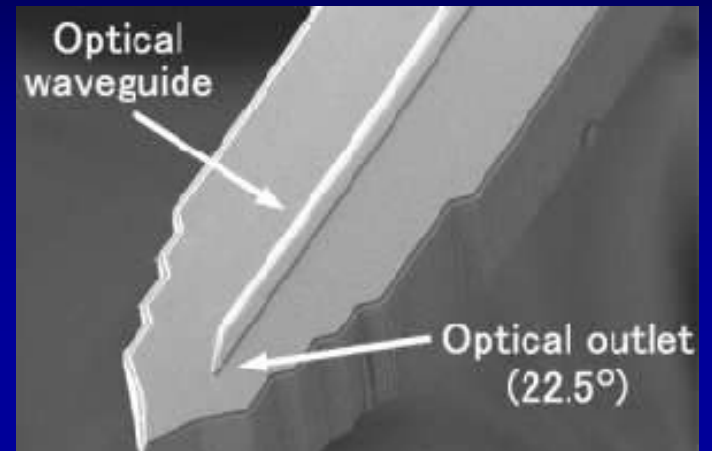
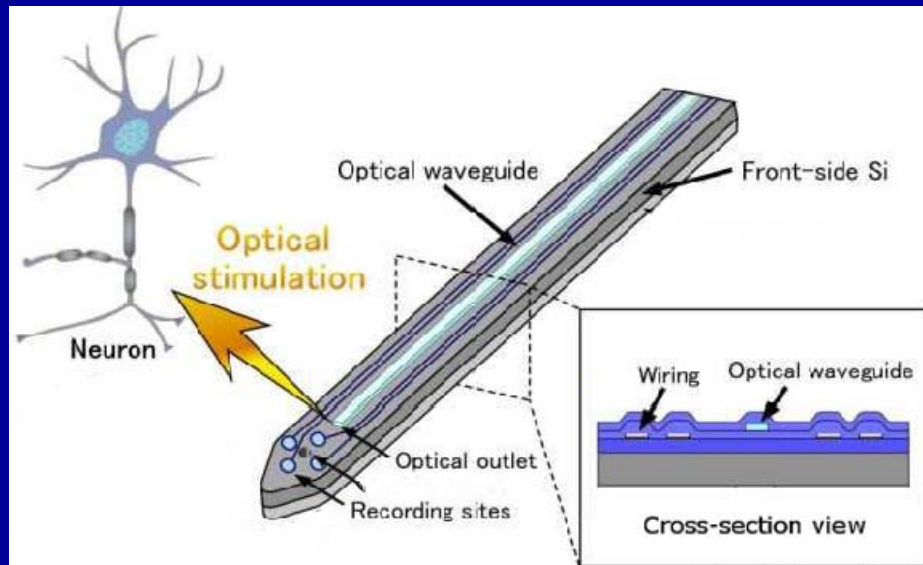
Site layout: Custom design

Site material: Ir, Pt or Au

Optical waveguide: 2.5 x 15 μm (core & clad)

Optical waveguide outlet angle: 90 or 22.5 degree

Package: Custom (due to optical waveguide)

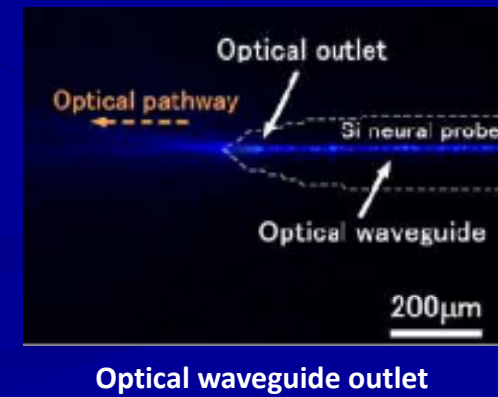
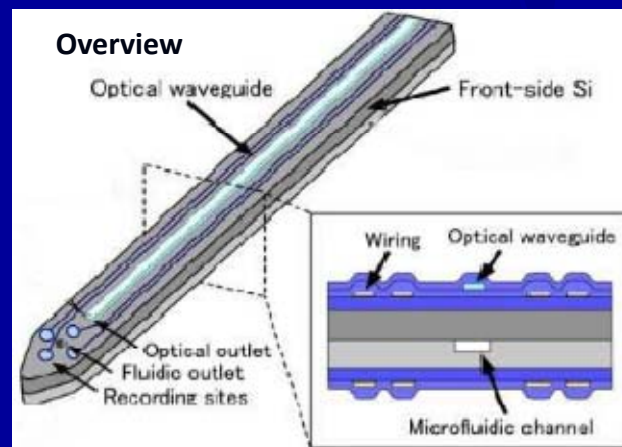
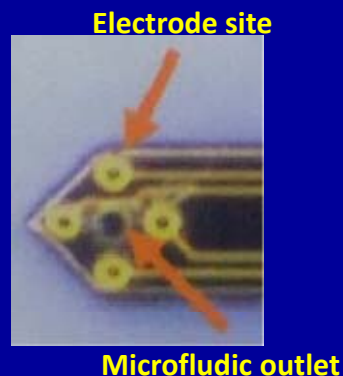


Custom Si Microprobe development service

Optical Waveguide & Microfluidic Channel Si Brain Probe

T-Micro, on a project-basis, develops both Optical Waveguide-integrated and Microfluidic channel-integrated Si microprobe for your research project.

- Advanced 3DIC and MEMS process technology.
- Micro-fabricated Microfluidic channel in middle of Si probe shaft.
- Microfluidic outlet at Si probe tip .
- Micro-fabricated Optical waveguide on Si probe shaft.
- Thickness, 50 μm , for minimization of tissue damage.
- Flexible and customizable number and location of electrode sites



Contact :

Marketing & Sales

Mike Hasegawa

hasegawa@t-microtec.com

Phone : 408 - 464 - 7972 in US

US Office: 135 Rio Robles E, #160

San Jose, CA 95134 USA

Thank you !!