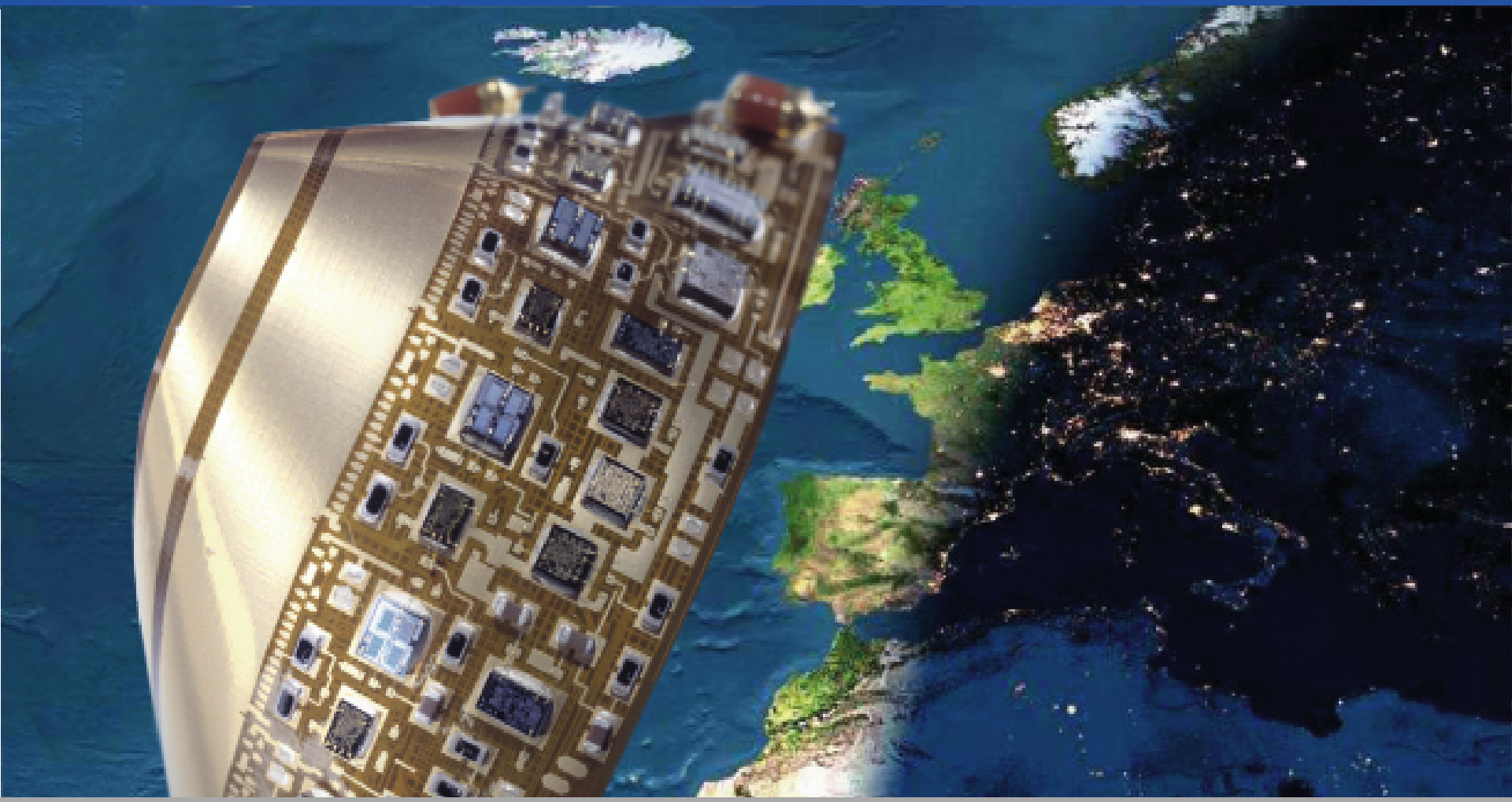
HIGHTEC
Custom made MicroCircuits

JOIN INNOVATION AND FLEXIBILITY.

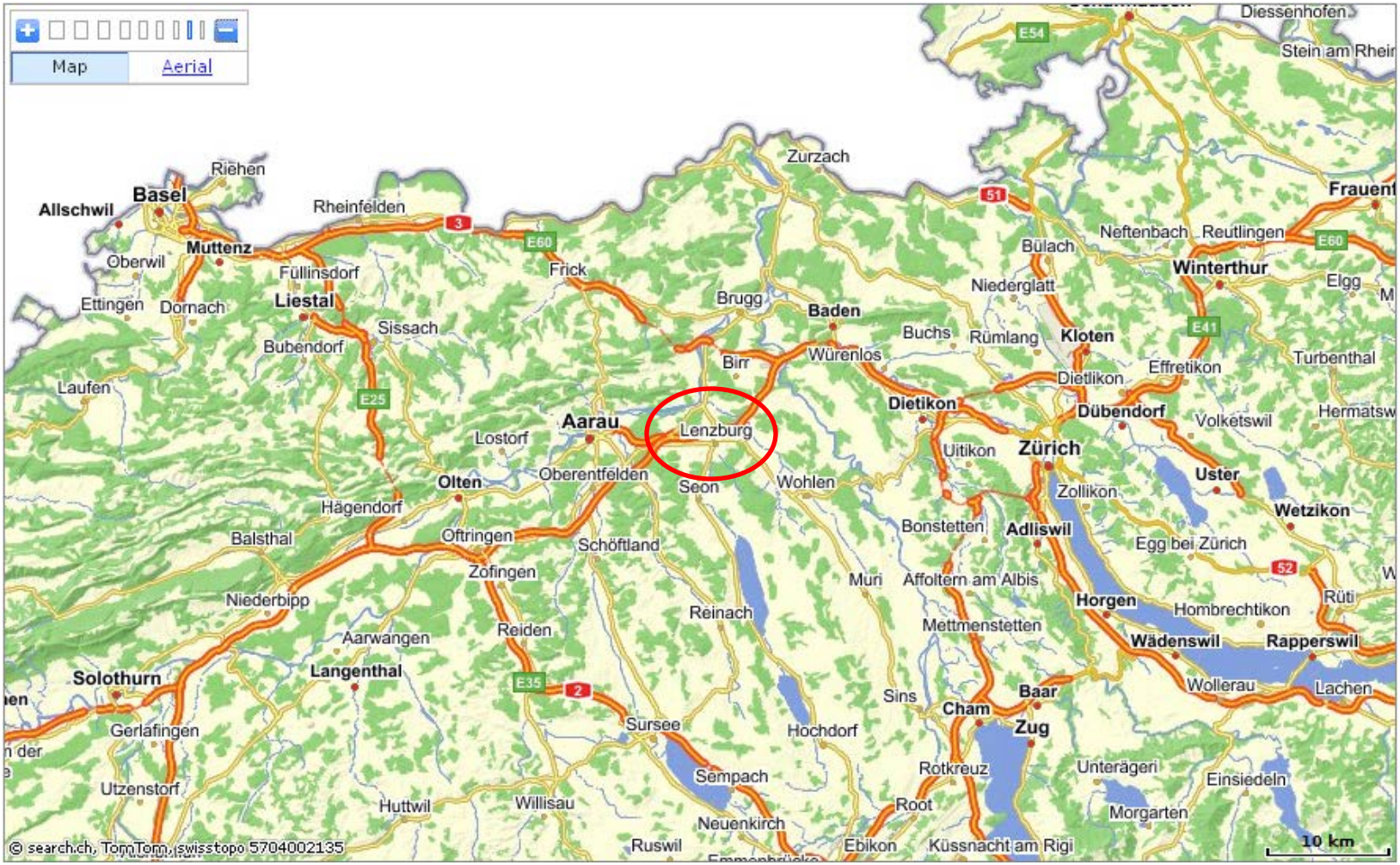
Low mass hybrid technology



History

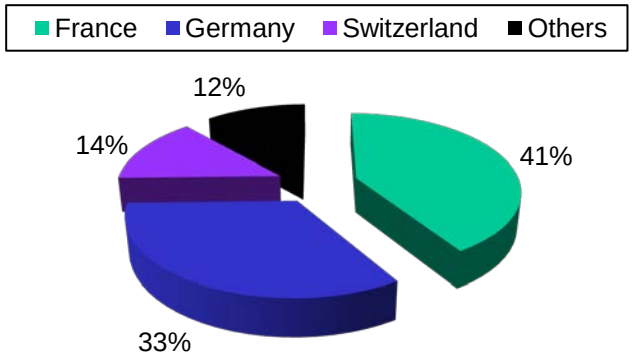
2011	HiCoFlex® serial production on 24" glass panels
2010	First prototypes on 24" glass panels
2008	Strategic decision for a 24" production line
1998	Thin film production (HiCoFlex®) on 6" glass panels
1992	Foundation of Hightec MC AG
1991	Merging of Thin Film Division Lenzburg and Oerlikon Contraves Thin Film Division Zurich
1989	Sell-off Thin Film Division Lenzburg to Oerlikon Contraves
1979	Thin film production on 4" ceramic panels by BBC (today ABB) Thin Film Division Lenzburg

Location



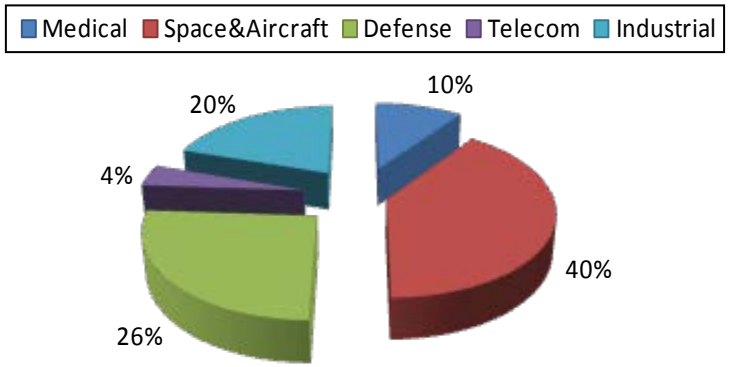
http://www.hightec.ch/

Facts



Sales by region

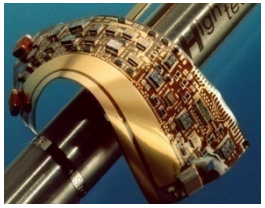
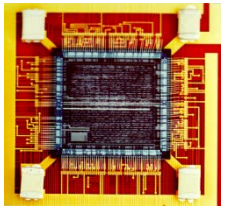
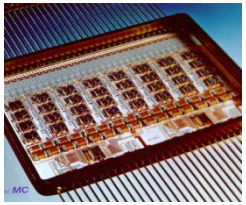
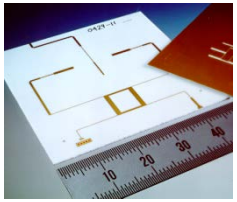
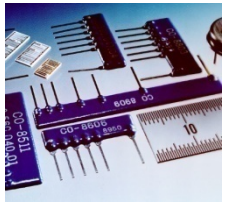
Sales: CHF 7.4 Mio



Sales by application

Employees: 30

Typical Products

HiCoFlex®	MCM-D	Hybrids	Sensors	Structured Substrates	Resistor Networks
					
• Highest density multilayer flex • High density flex cables • Integrated electronic inter-connections • CSP • 3D packaging	• Multilayer up to 5 layers • SMD • Integrated high- precision thin film resistors	• Integrated high-precision thin film resistors • Mounting of controller dices • MIL STD 883	• Thin film sensors • Optoelectronic devices • Customised sensor housing • Integrated passive components available	• Microwave circuits • Submounts for optoelectronic devices • Pitch adapters • Interposers	• DIL, SIL, SMD • Tolerance: 0.05% • Lowest temperature drift • harsh environment proved

Our Identity

- All products are custom-made
- Full range of services from a single source
  - Developing, Micromachining and Assembling
  - Feasability Studies, Design, Prototyping, Manufacturing, Testing
- HiCoFlex®: High Connectivity Flex
  - Multilayer flex foils
  - Down to 20 µm layer flex foils thickness available
  - Up to 24“ production panel size

HIGHTEC
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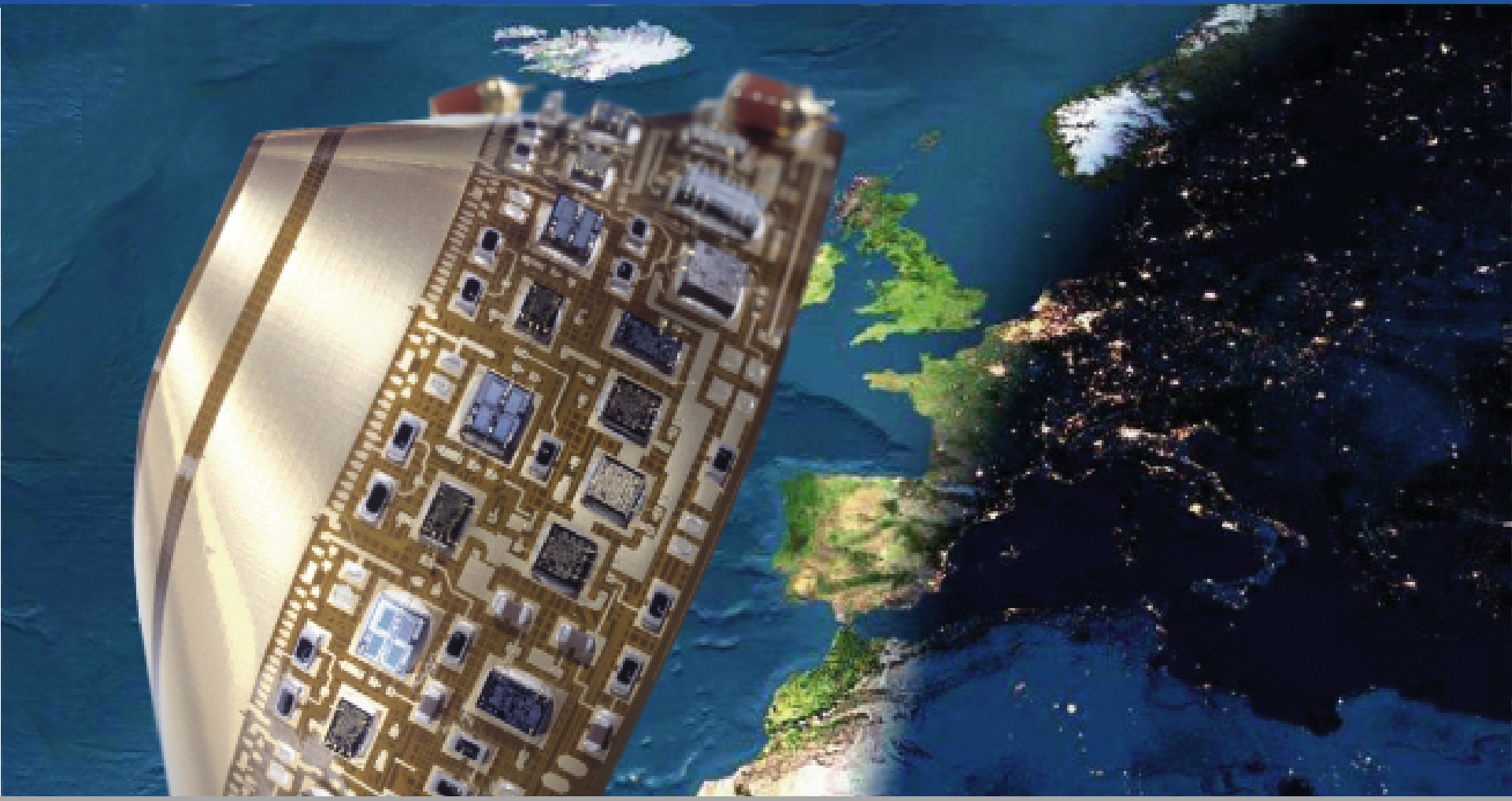
HiCoFlex®



ISO 9001 certified

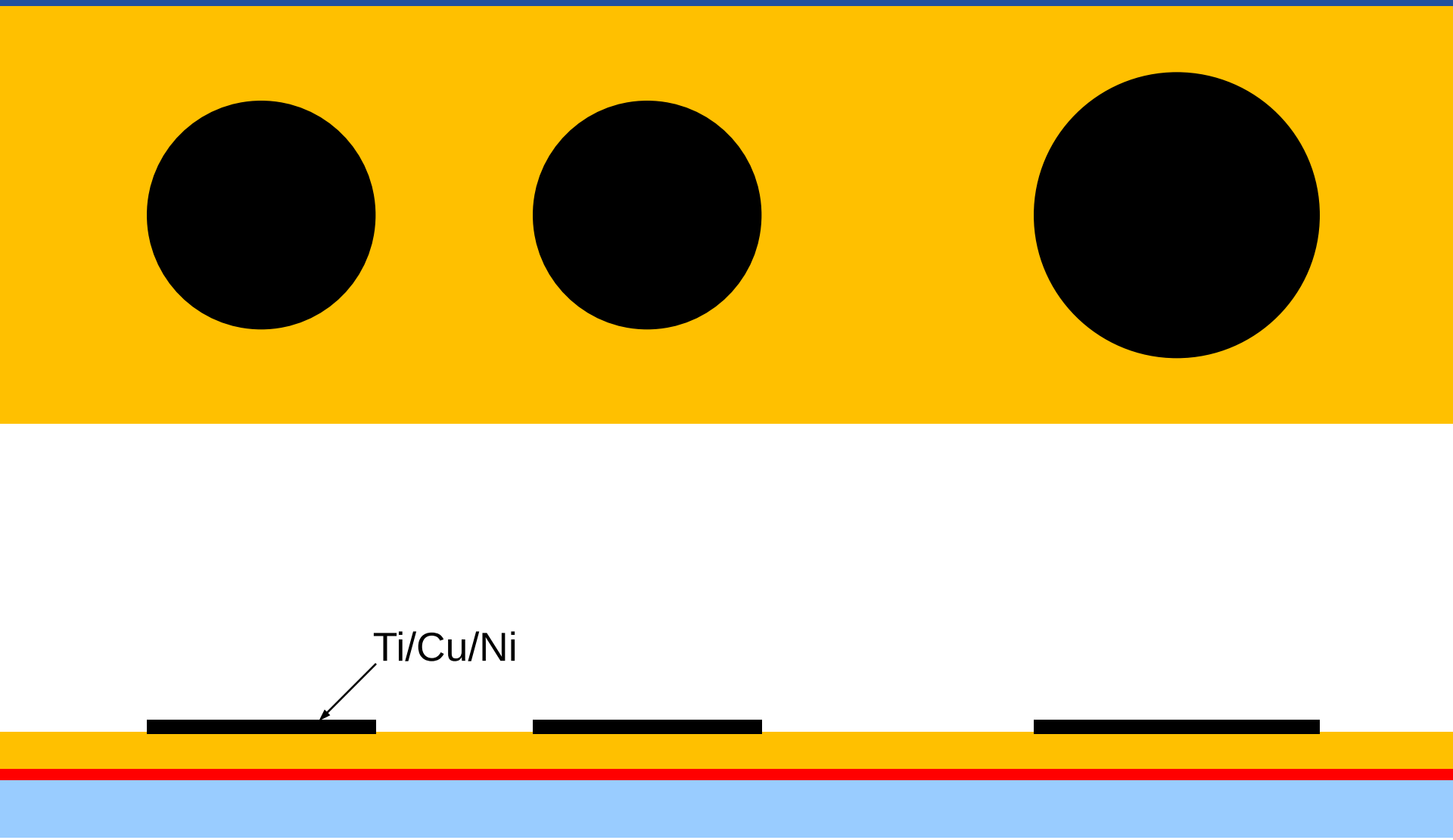
The HiCoFlex® Process: Carrier

Ceramics, glass or metal

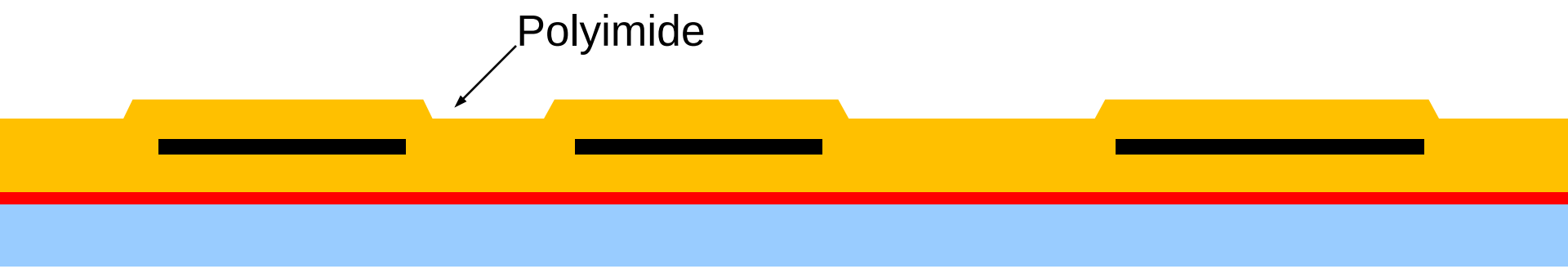
The HiCoFlex® Process: Separation Layer

The HiCoFlex® Process: 1st Polyimide Layer

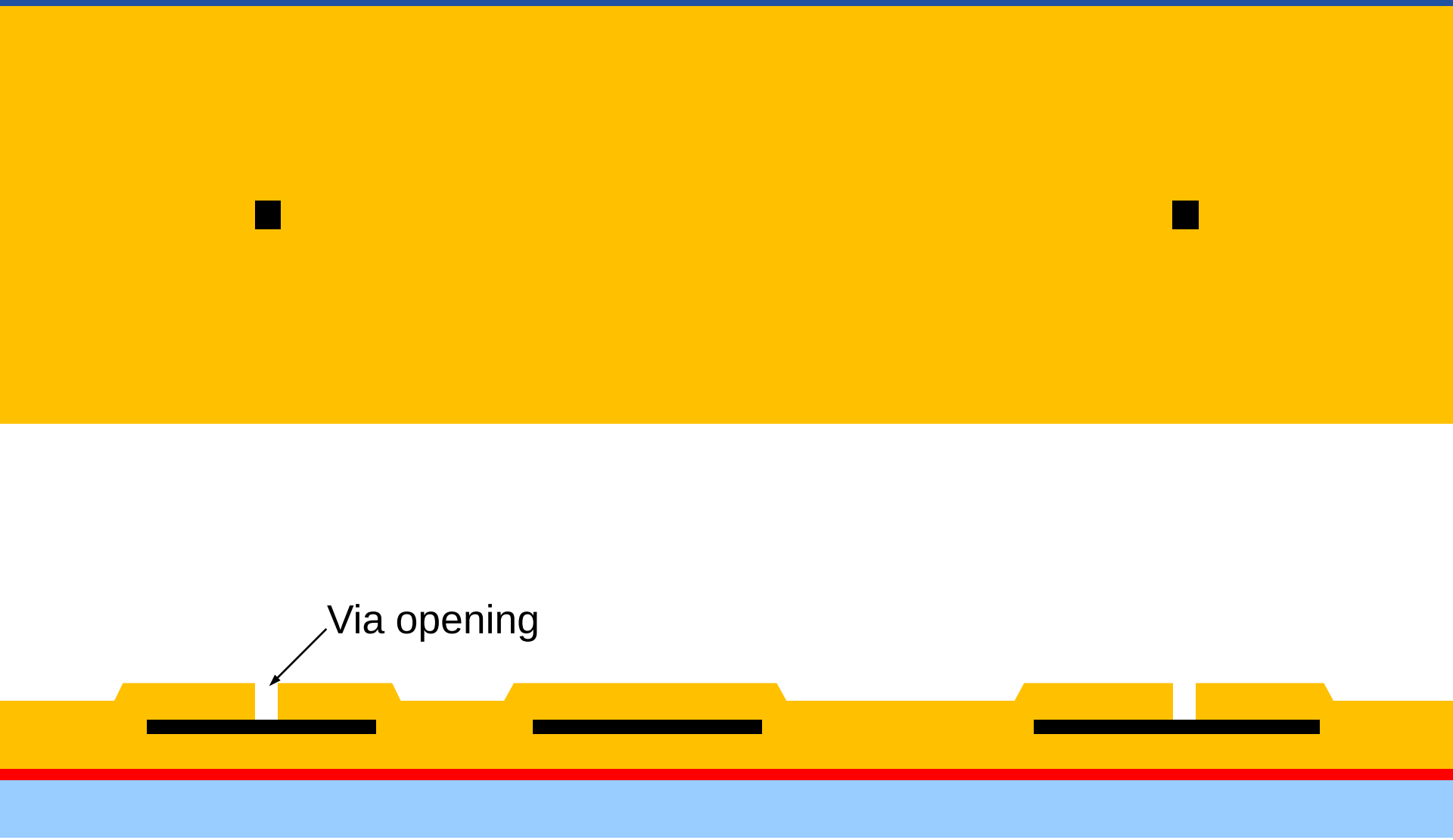
The HiCoFlex® Process: 1st Metal after Structuring



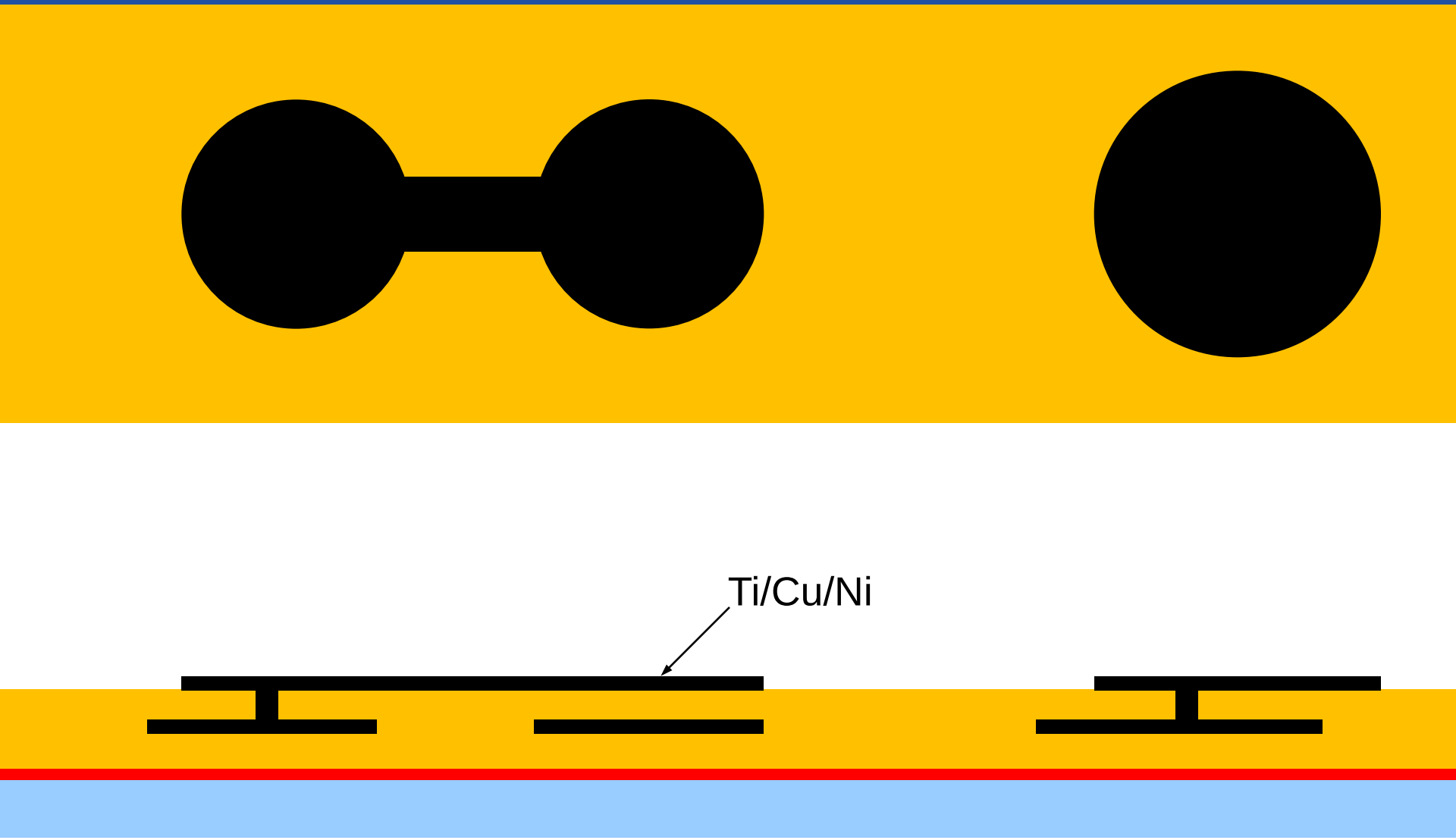
The HiCoFlex® Process: 2nd Polyimide Layer



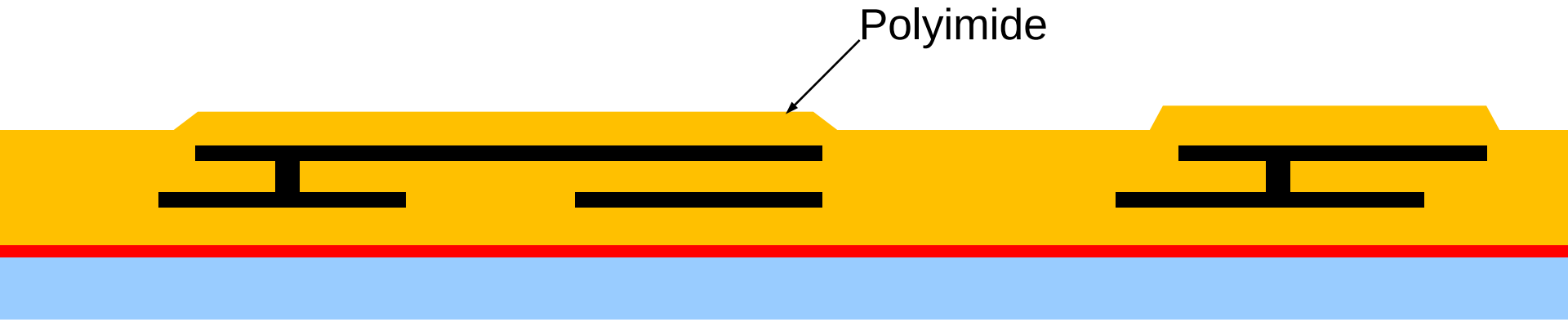
The HiCoFlex® Process: Vias



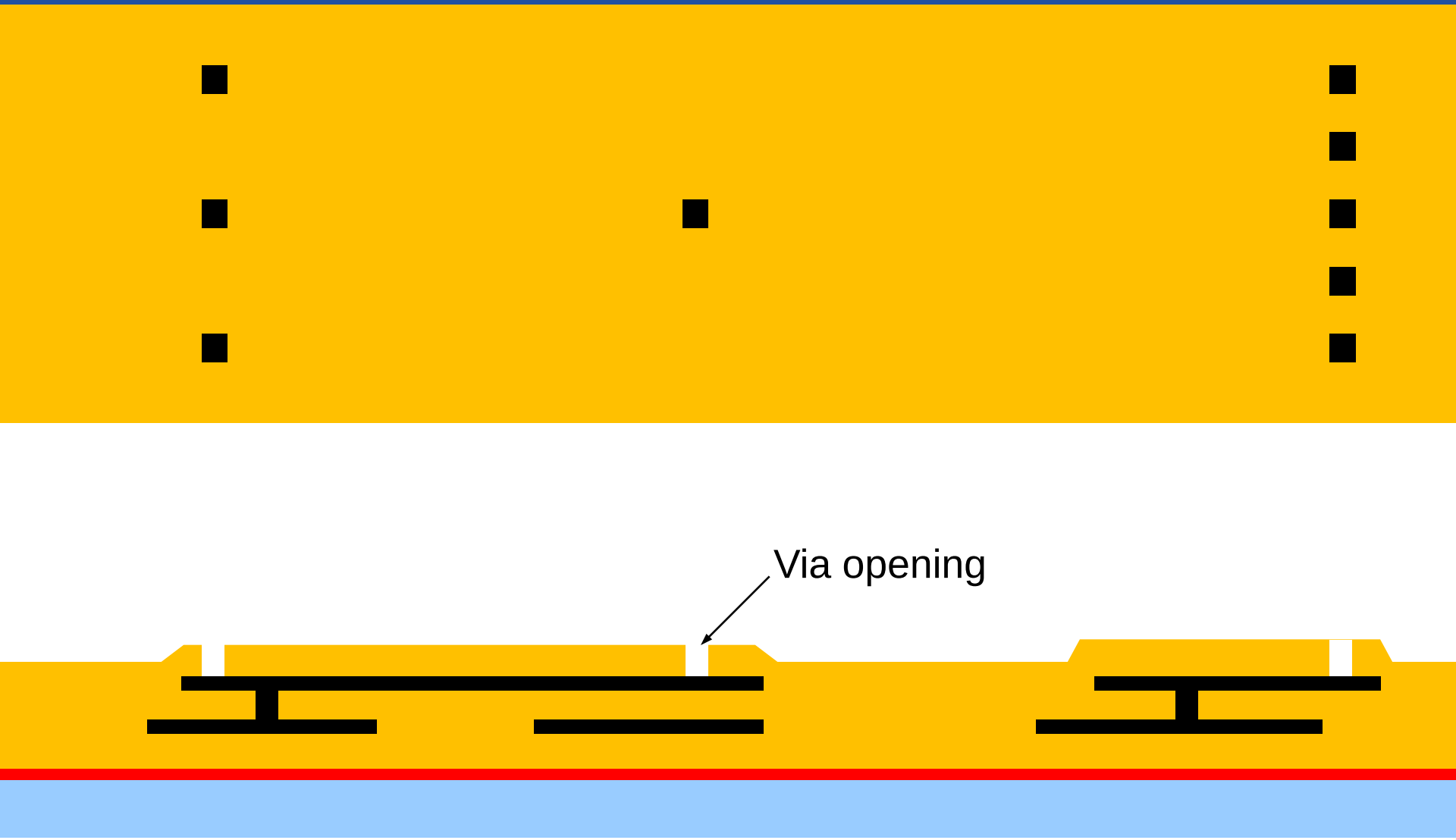
The HiCoFlex® Process: 2nd Metal after Structuring



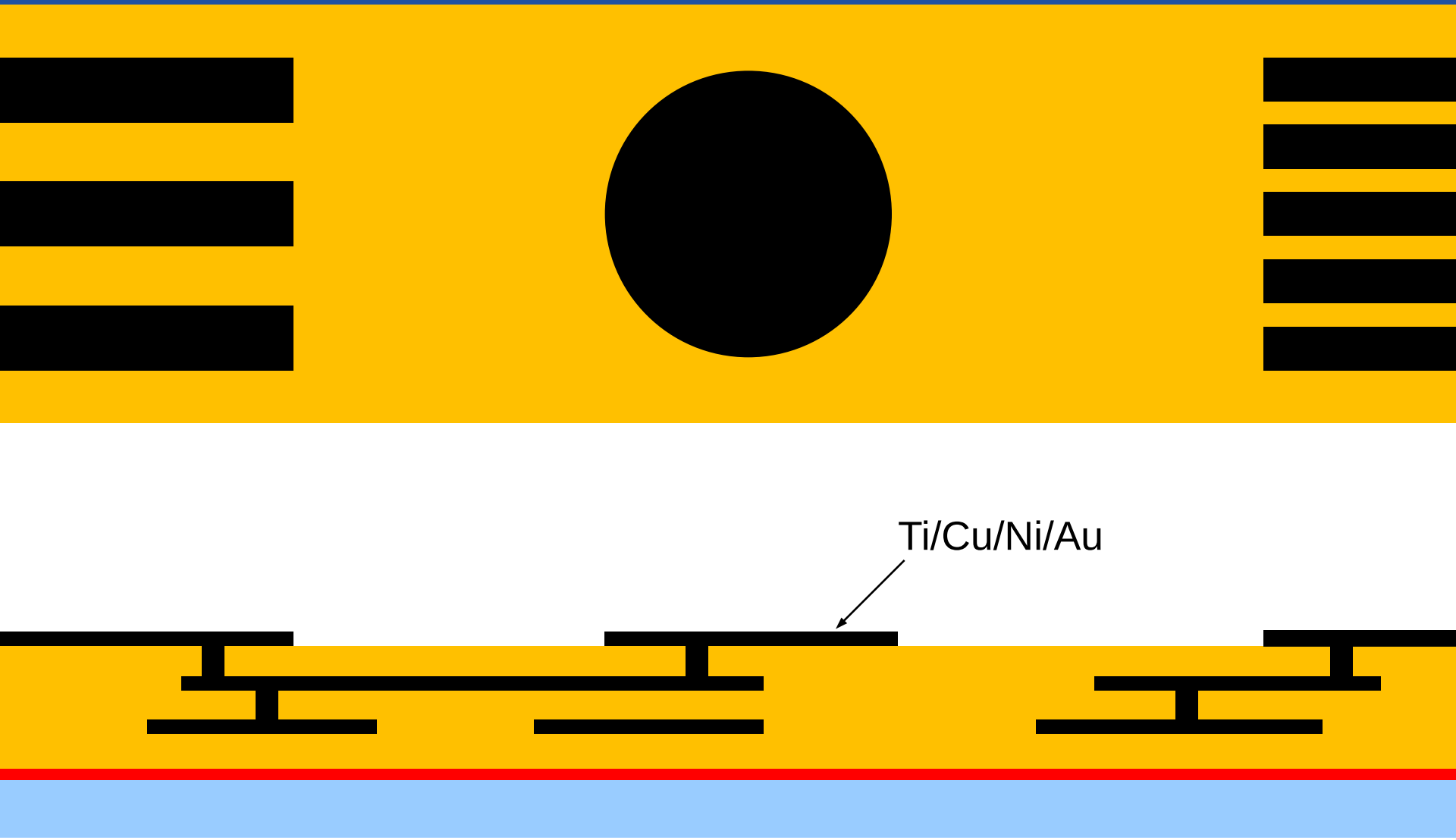
The HiCoFlex® Process: 3rd Polyimide Layer



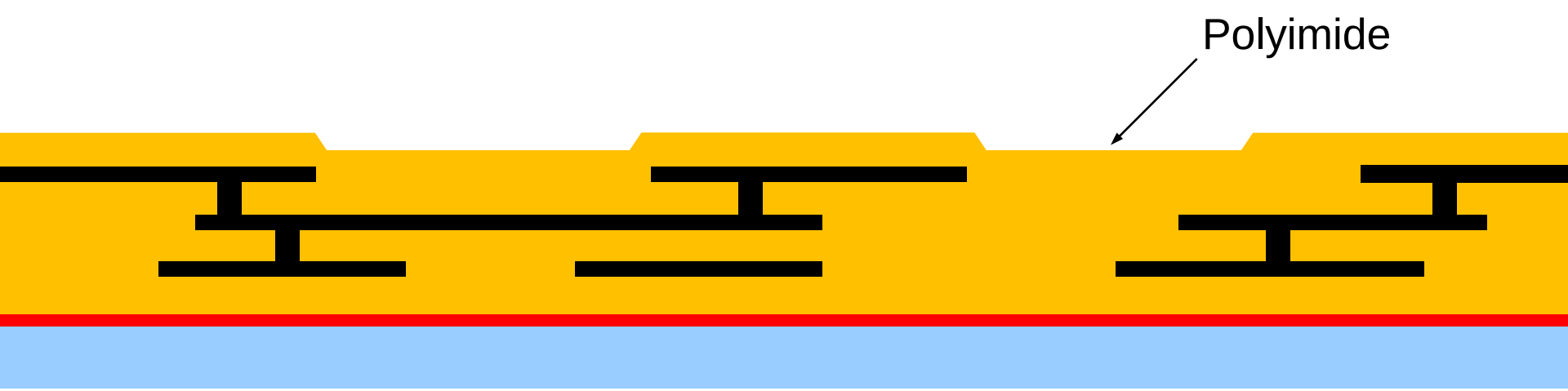
The HiCoFlex® Process: Vias



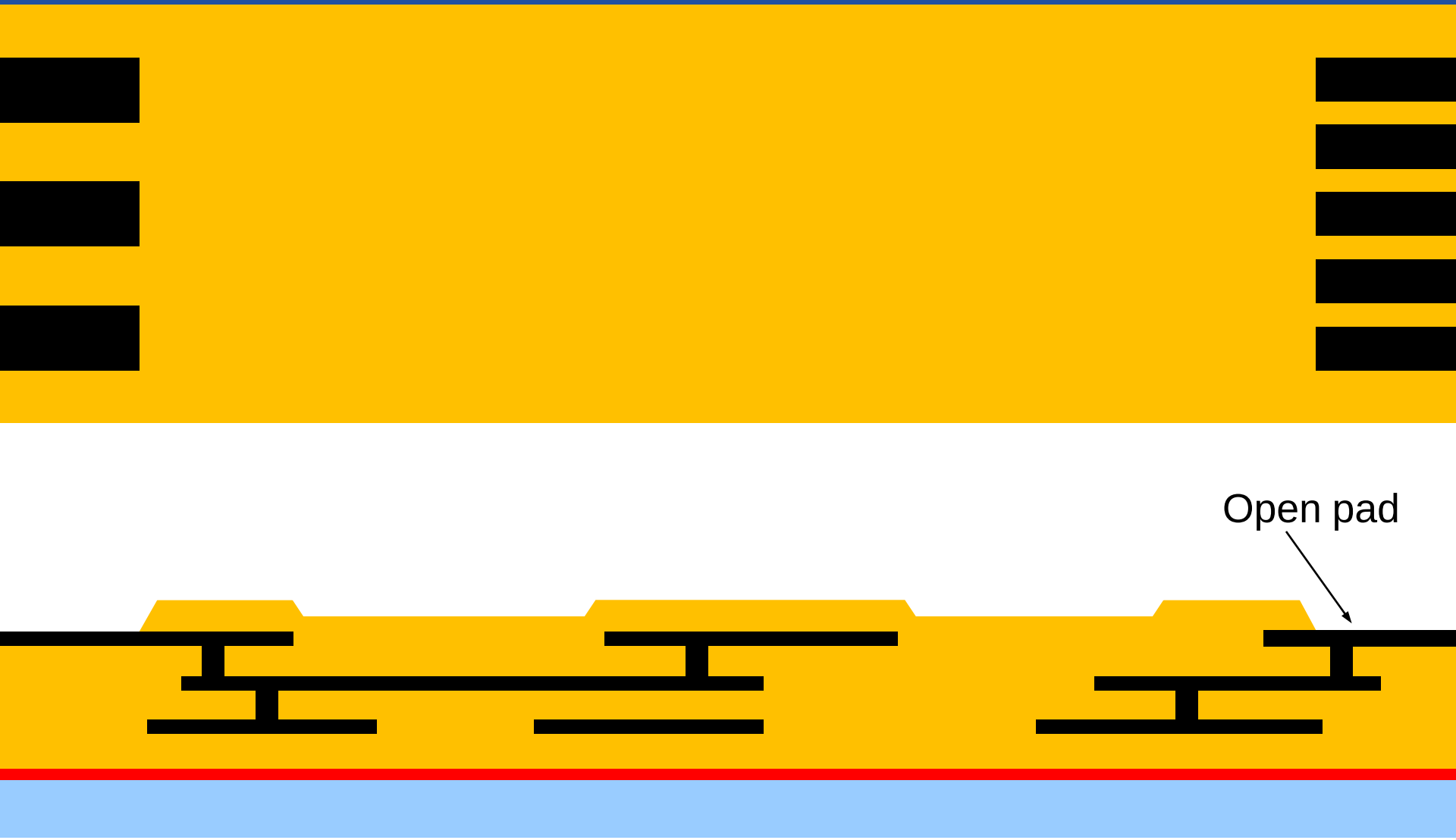
The HiCoFlex® Process: 3rd Metal after Structuring



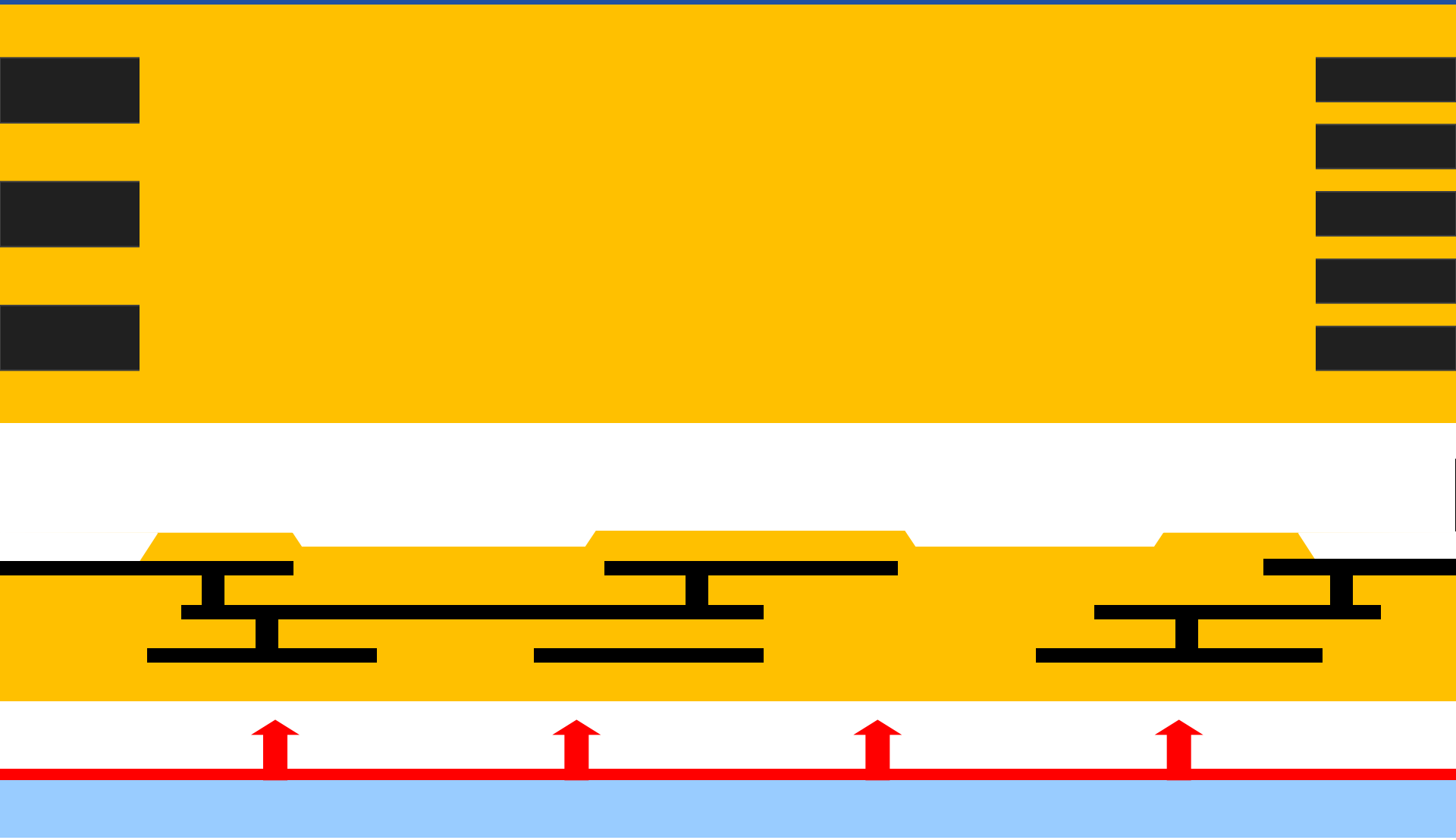
The HiCoFlex® Process: 4th Polyimide Layer



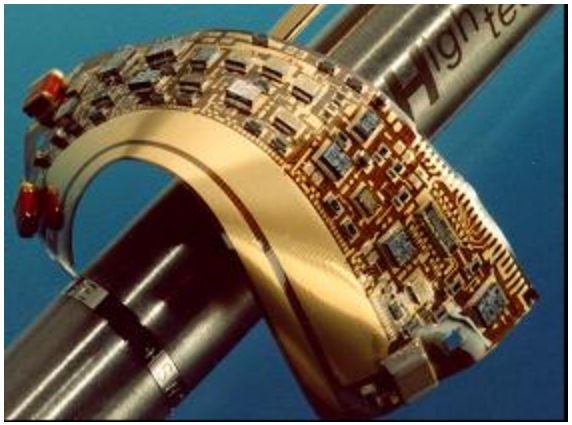
The HiCoFlex® Process: Opening Pads



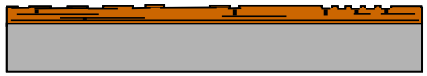
The HiCoFlex® Process: Force-free Separation



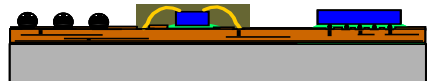
HiCoFlex® Technology



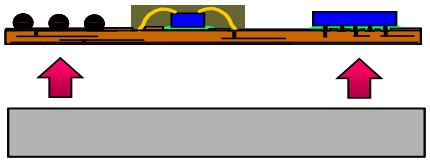
Fabrication of multilayer structure on rigid carrier substrate



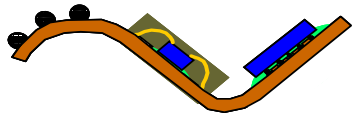
Assembling, Bonding Protection, Test

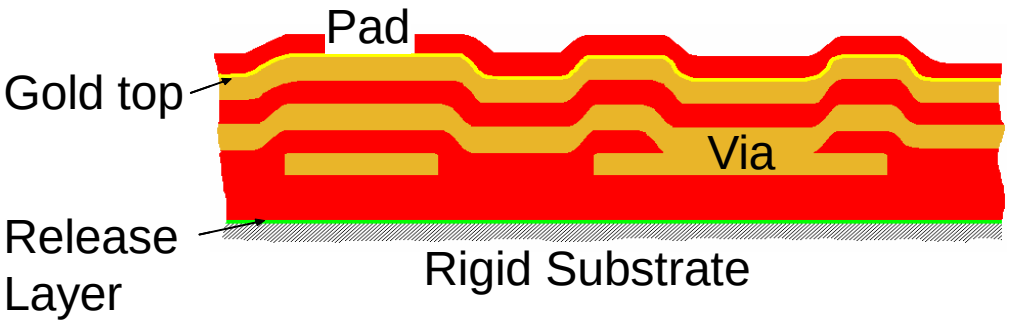


Separation of multilayer from rigid substrate

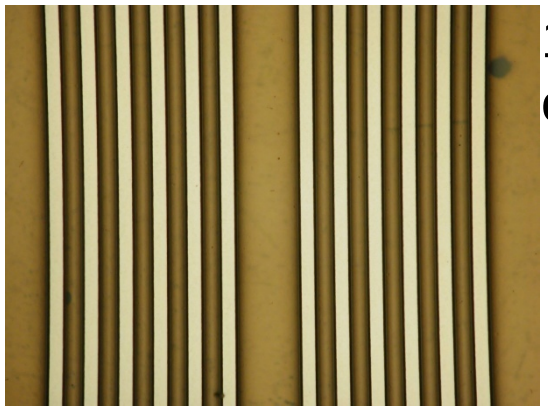


HiCoFlex®



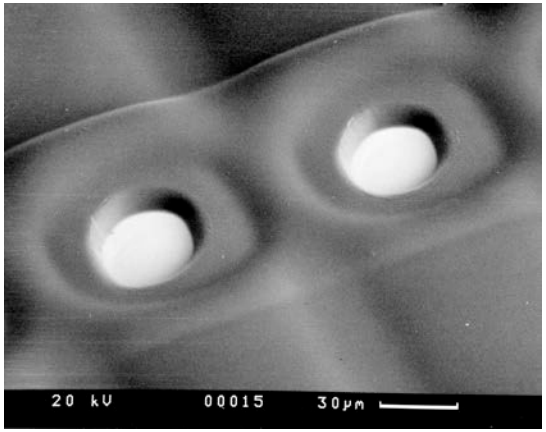


HiCoFlex® Technology

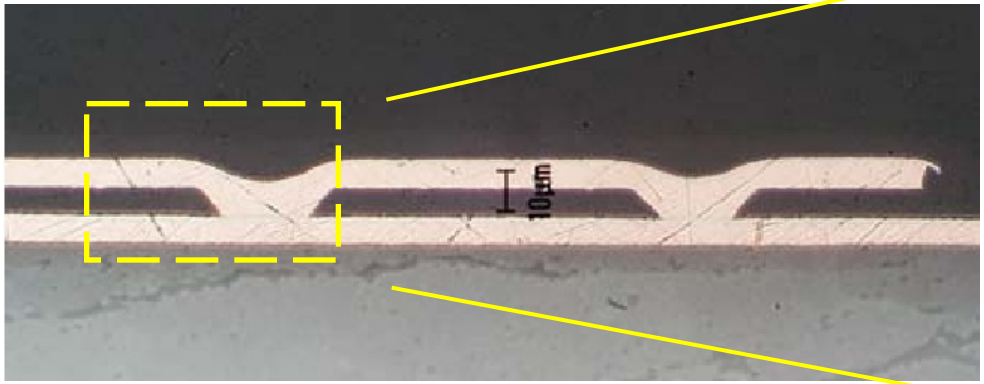


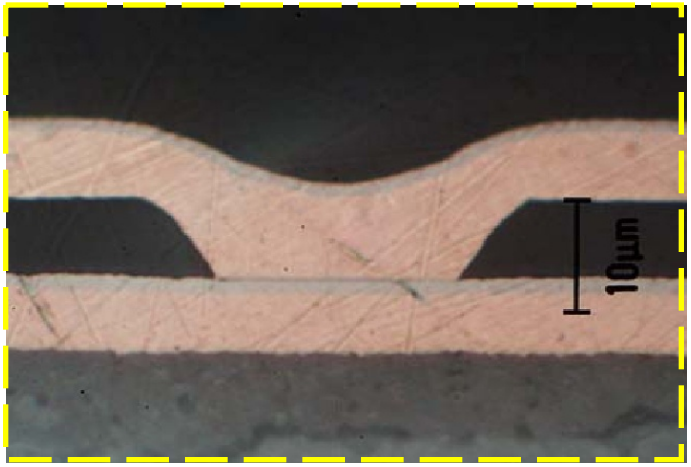
15 µm line/space conductors

Laser cut vias
∅ 30 µm

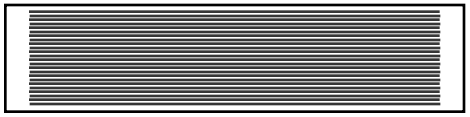


Electroplated vias



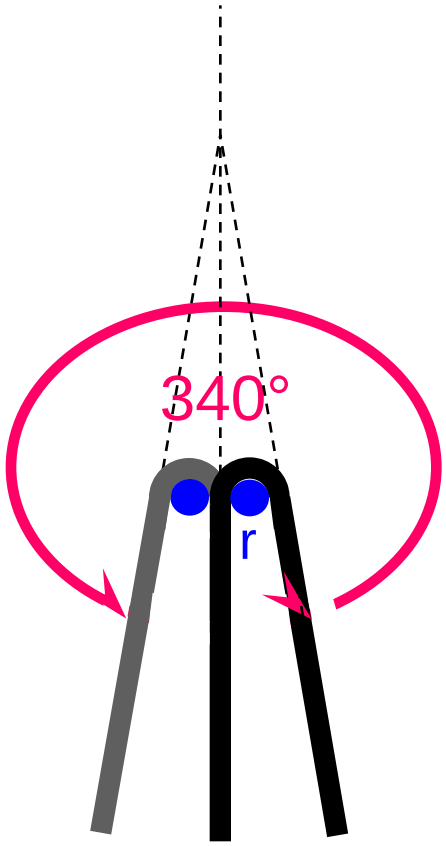


HiCoFlex® Technology



10 mm

77 wires,
150 µm pitch,
25 µm total thickness



r = 1 mm

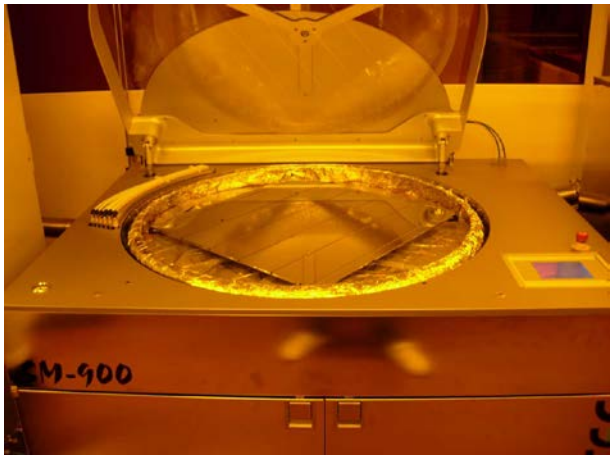
- no mechanical damage
- no change in electrical properties

number of cycles > 10^7

The HiCoFlex® line of Hightec MC AG

- Glass substrates 24” x 24”
- Higher volume at lower cost
- Larger flex formats
- Equipment:
  - LDI for 15 µm line and space
  - Sputter Tool (vertical)
  - Electroplating Cu, Ni, Au
  - UV Laser
  - AOI
  - Spray Clean, Develop, Etch and Strip
  - 3D Measurement Microscope, etc.
- Investment 8 Mio. CHF

24" Production Line



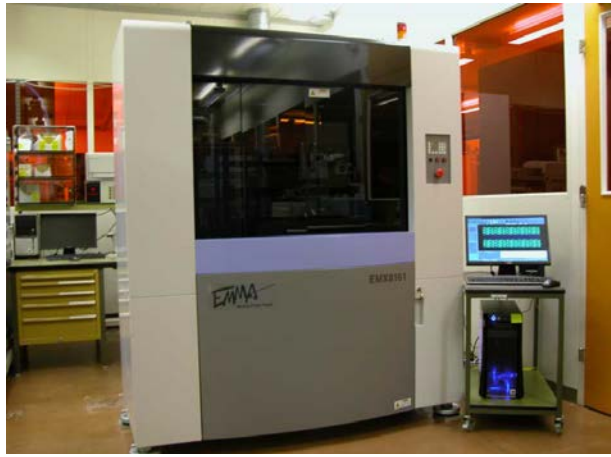
Spin Coating

Hotplates

LDI & Electro Plating

Resist Develop

3D Thickness Measurement



Prober

HIGHTEC
Custom made MicroCircuits

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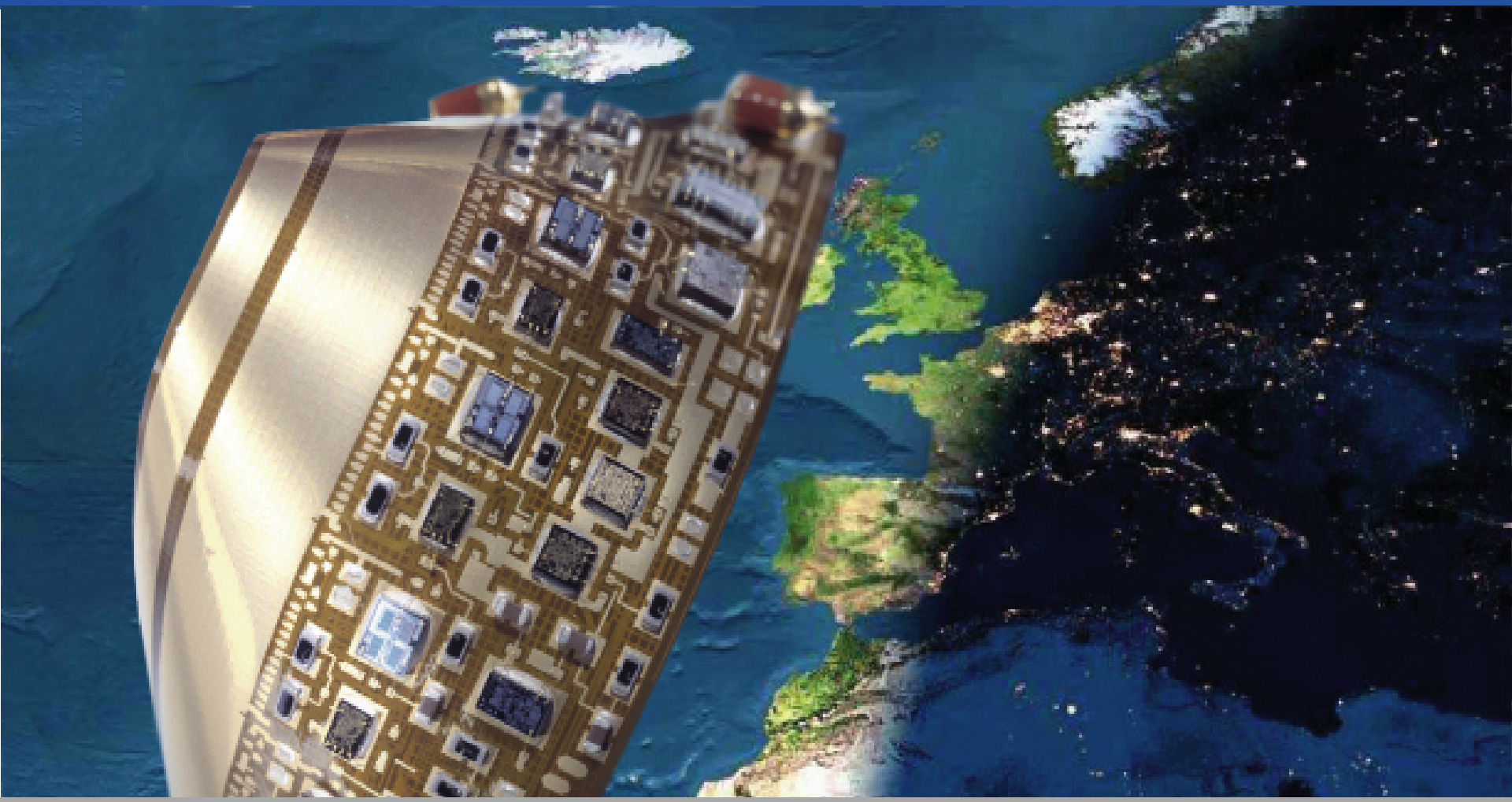
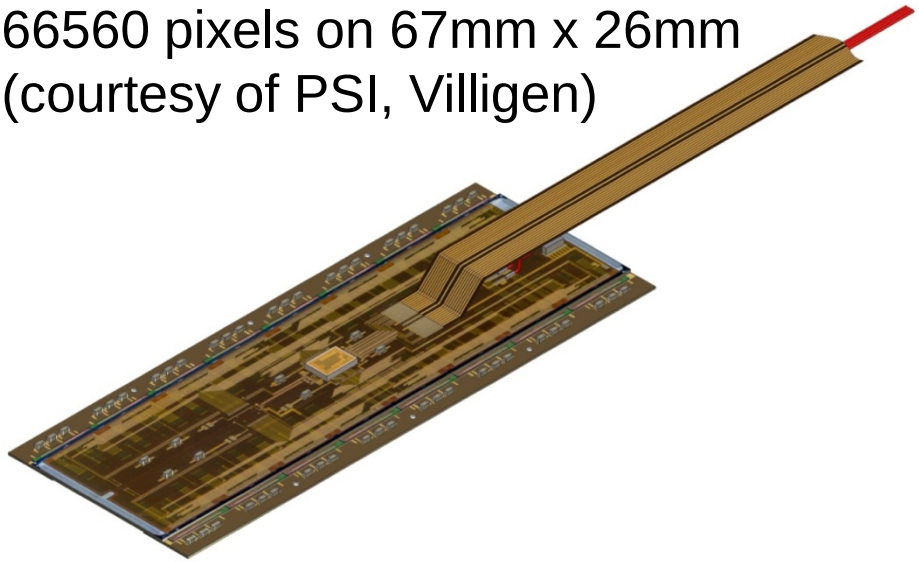
HiCoFlex® Applications

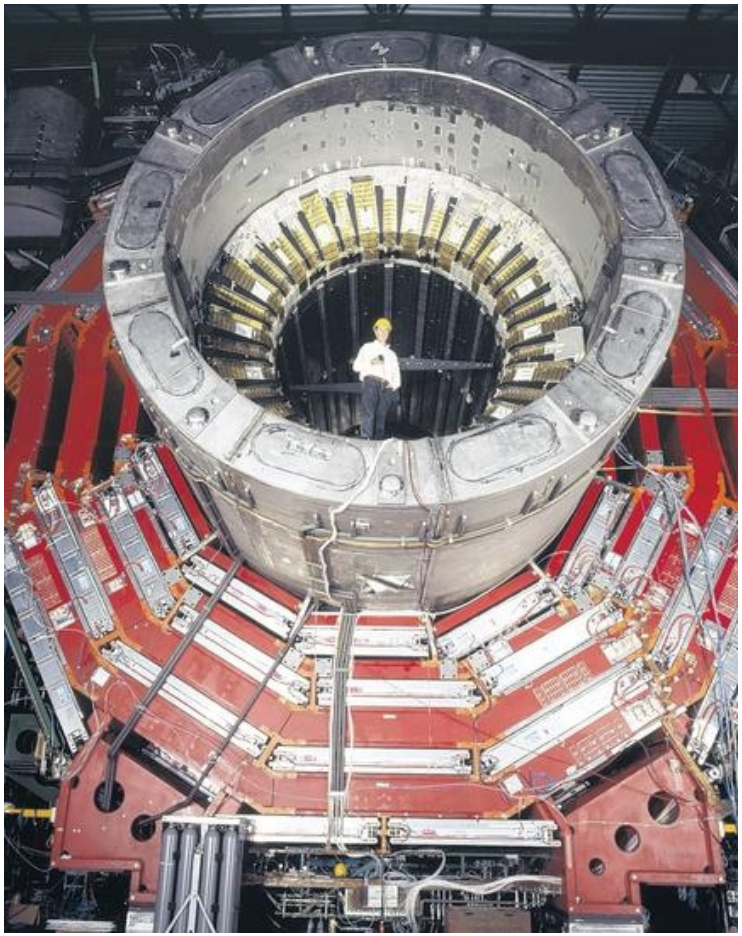


HDI / VHDI

3-layer HDI flex
CMS experiment in the Large Hadron Collider (LHC) at CERN

Assembled barrel modul for
66560 pixels on 67mm x 26mm
(courtesy of PSI, Villigen)

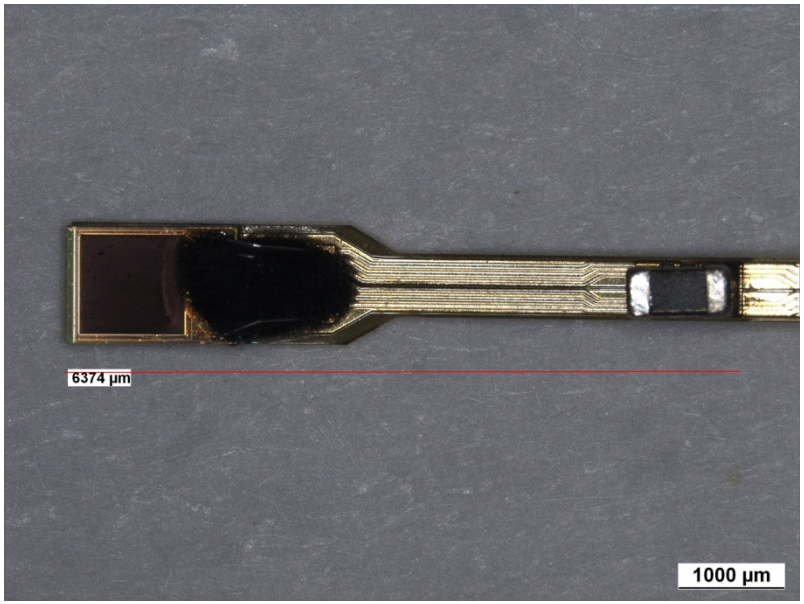


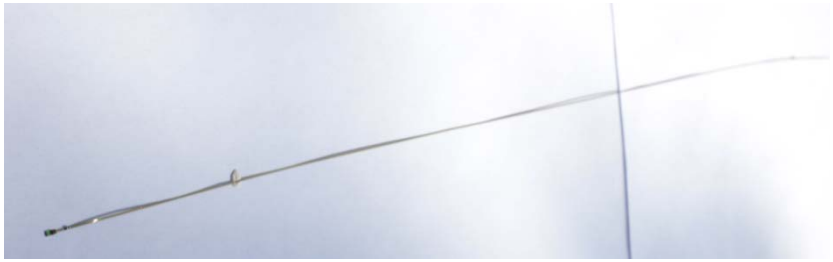


HiCoFlex Long Micro Cables

Medical application for catheder and endoscope connection
For example:

- Length typ. ≥ 0.5m
- Width ≤ 1 – 2 mm
- Number of layers: from 2 to 3





550mm

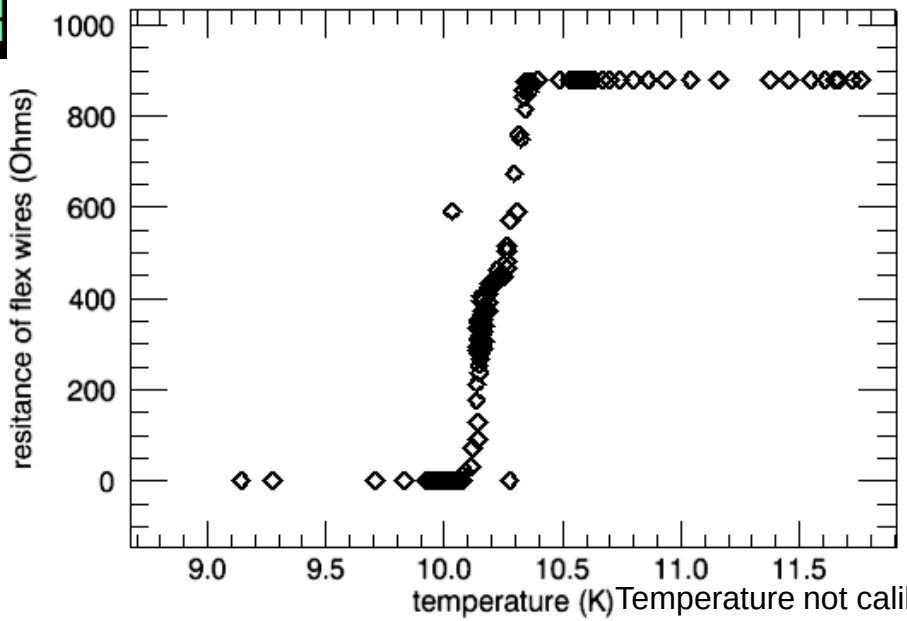
Cables for Space Applications

Cryo harness

250 nm Nb

T_c ~ 8-9K

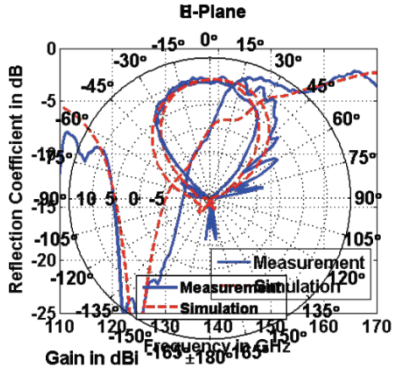
Measurement done by SRON

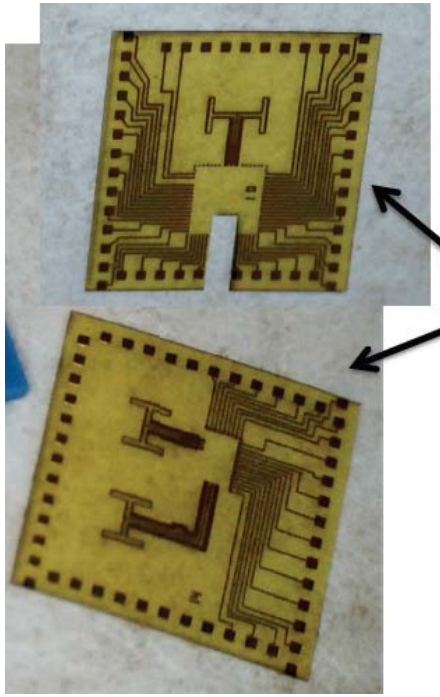


Temperature not calibrated

High-Frequency Application – 122GHz

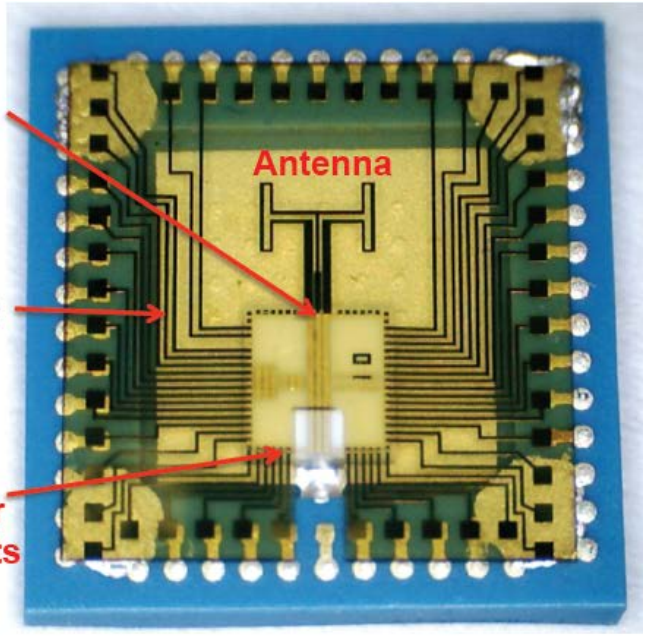
www.success-project.eu





Antennas on HiCoFlex
(14 µm Polyimide)

→ Double Dipole Antenna
→ Uses package base as reflector

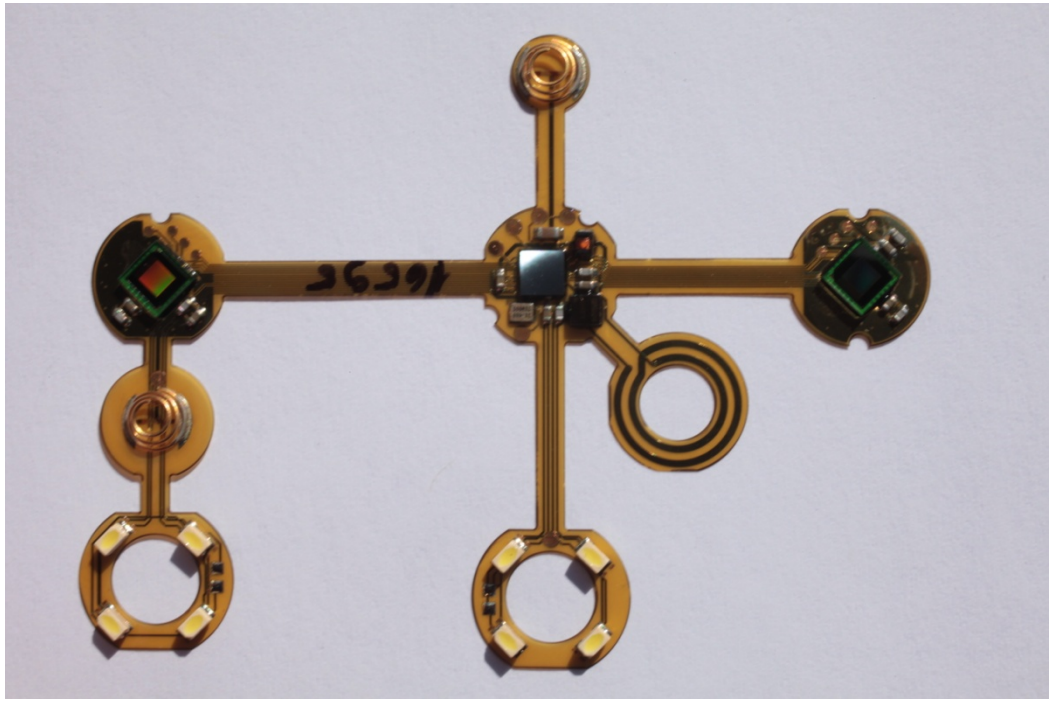


- Performance including the flip chip interconnect:
- 17 GHz Bandwidth
- 11 dBi Gain
- No sidelobes
- Not affected by interconnect lines

Medical Devices

Multiple folded flex board for Pill Cam

Manufacturing of flex board, assembly of components, testing of function on a rigid substrate



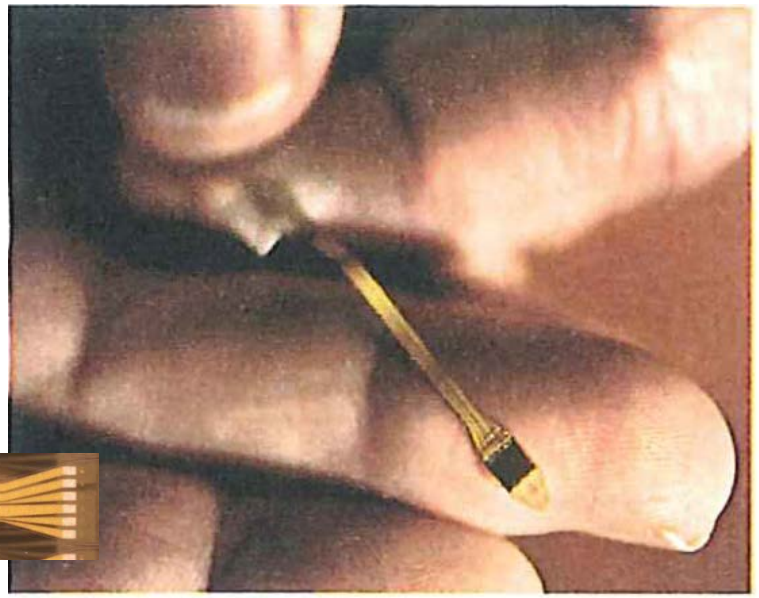
Medical Devices – Retina Implant

Article in Focus 6/2012


FORSCHUNG & TECHNIK

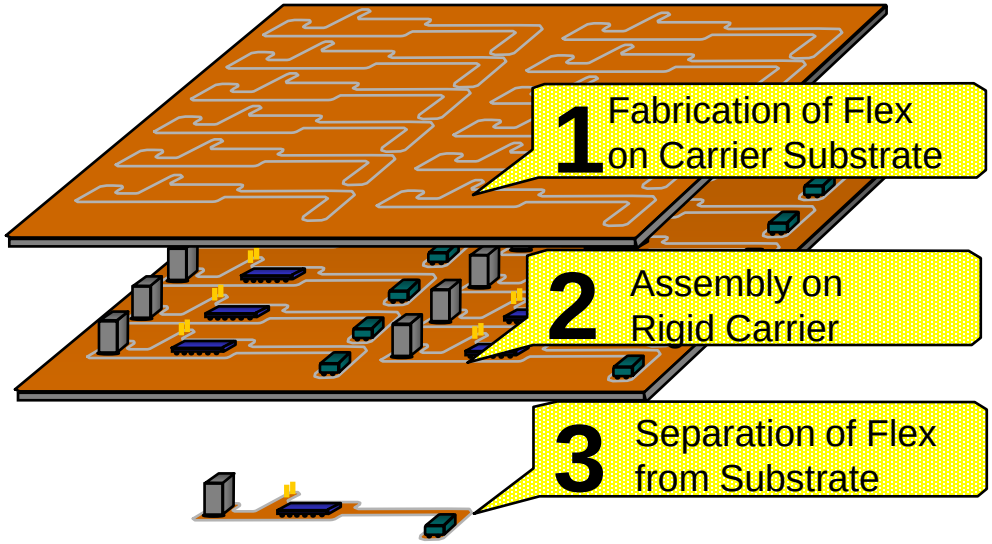
Wenn Blinde **wieder sehen**

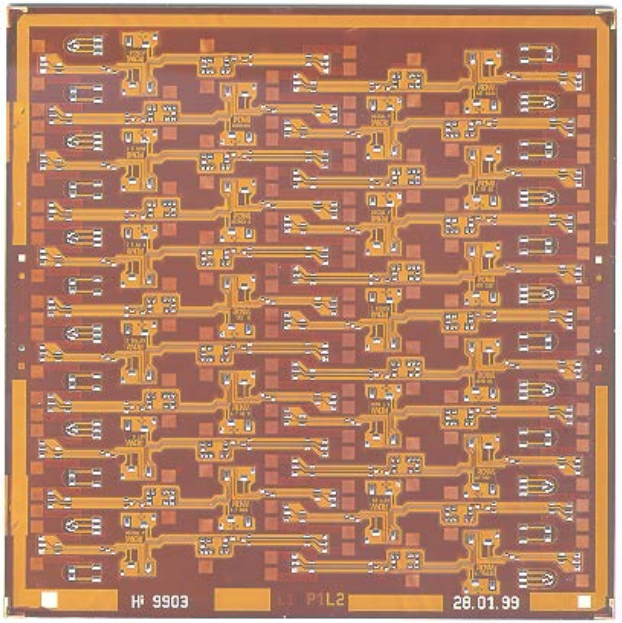
Ein Arzt gibt einem 36-Jährigen sein AUGENLICHT zurück. Wie fühlt sich das Wunder an, aus der Dunkelheit befreit zu sein?



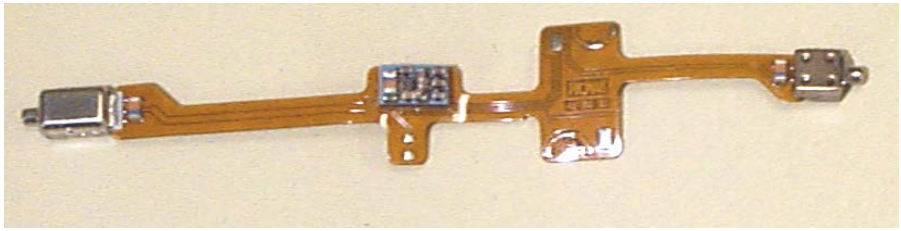
High-Tech-Auge Dieser Chip wird in die kranke Netzhaut implantiert. Bald soll er Tausenden Blinden helfen

HiCoFlex® Assembly on 6” Panels



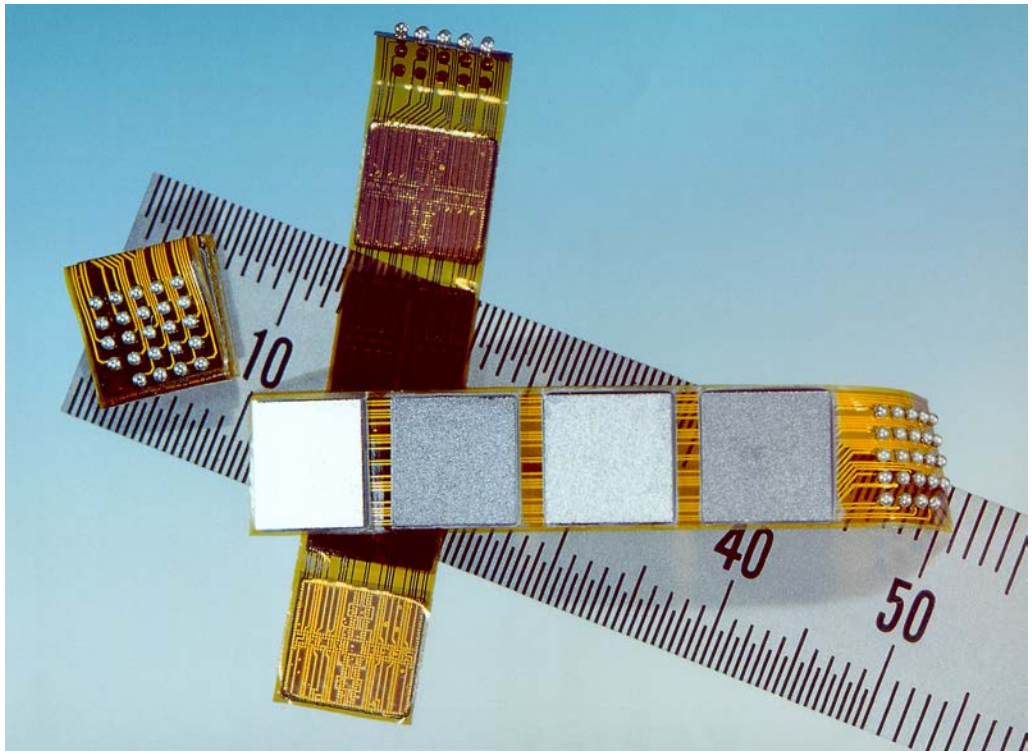


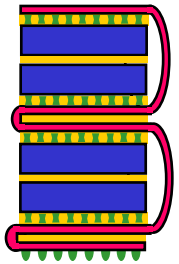
6“ Substrate before Assembly



Final part assembled and separated

HiCoFlex® 3D-Packaging





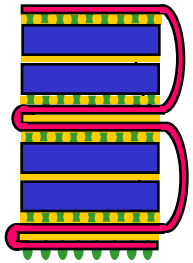
ISO 9001 certified

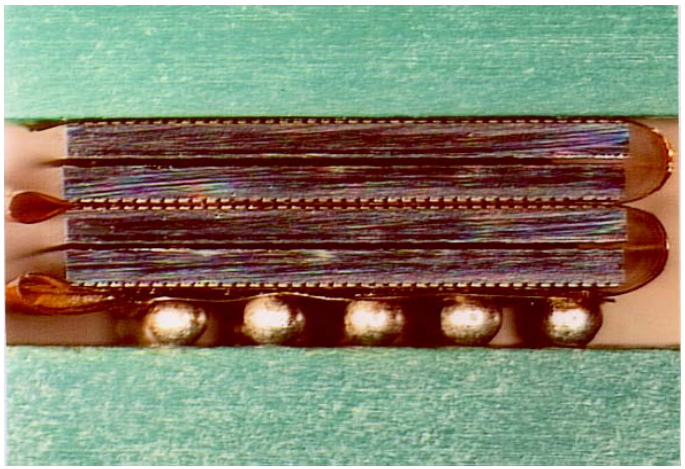
HiCoFlex® MCSP!

4 ICs, 7 x 7 mm, Flip-Chip on *HiCoFlex*®

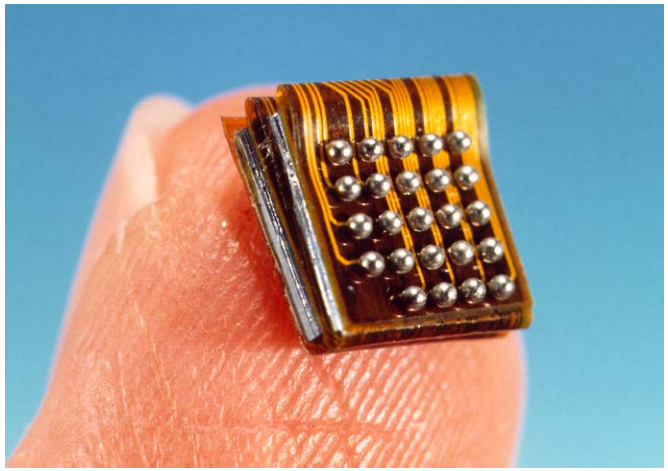
BGA Pitch 1.27 mm

Flip-Chip PbSn-Solder Interconnections Pitch 180 µm



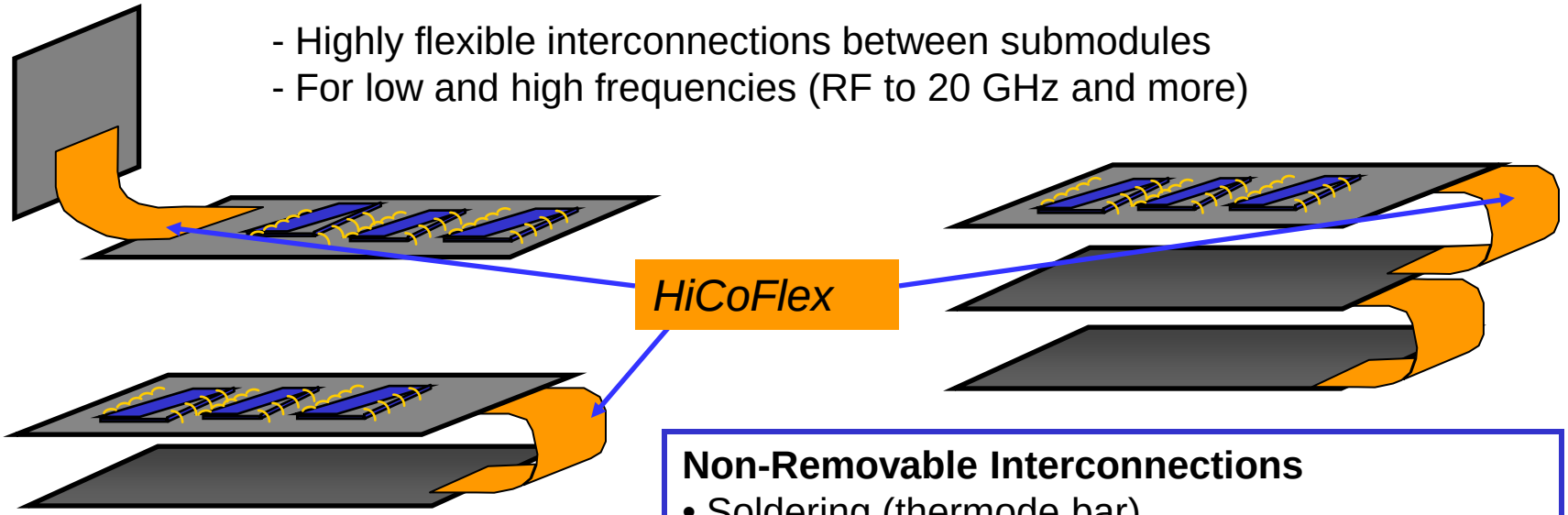


Side View



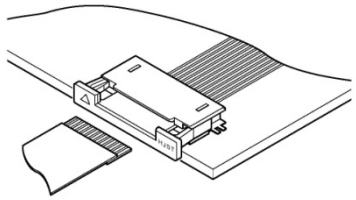
HiCoFlex® Cables and Interconnections

- Highly flexible interconnections between submodules
- For low and high frequencies (RF to 20 GHz and more)



Removable Interconnections

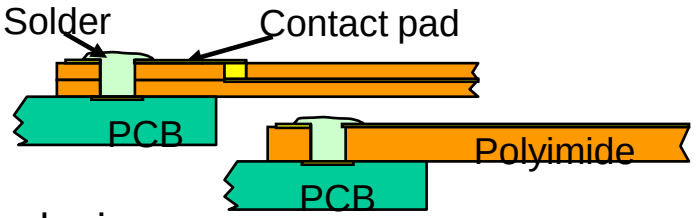
• Mini ZIF



• Cu pressure contacts

Non-Removable Interconnections

• Soldering (thermode bar)



• Conductive glueing

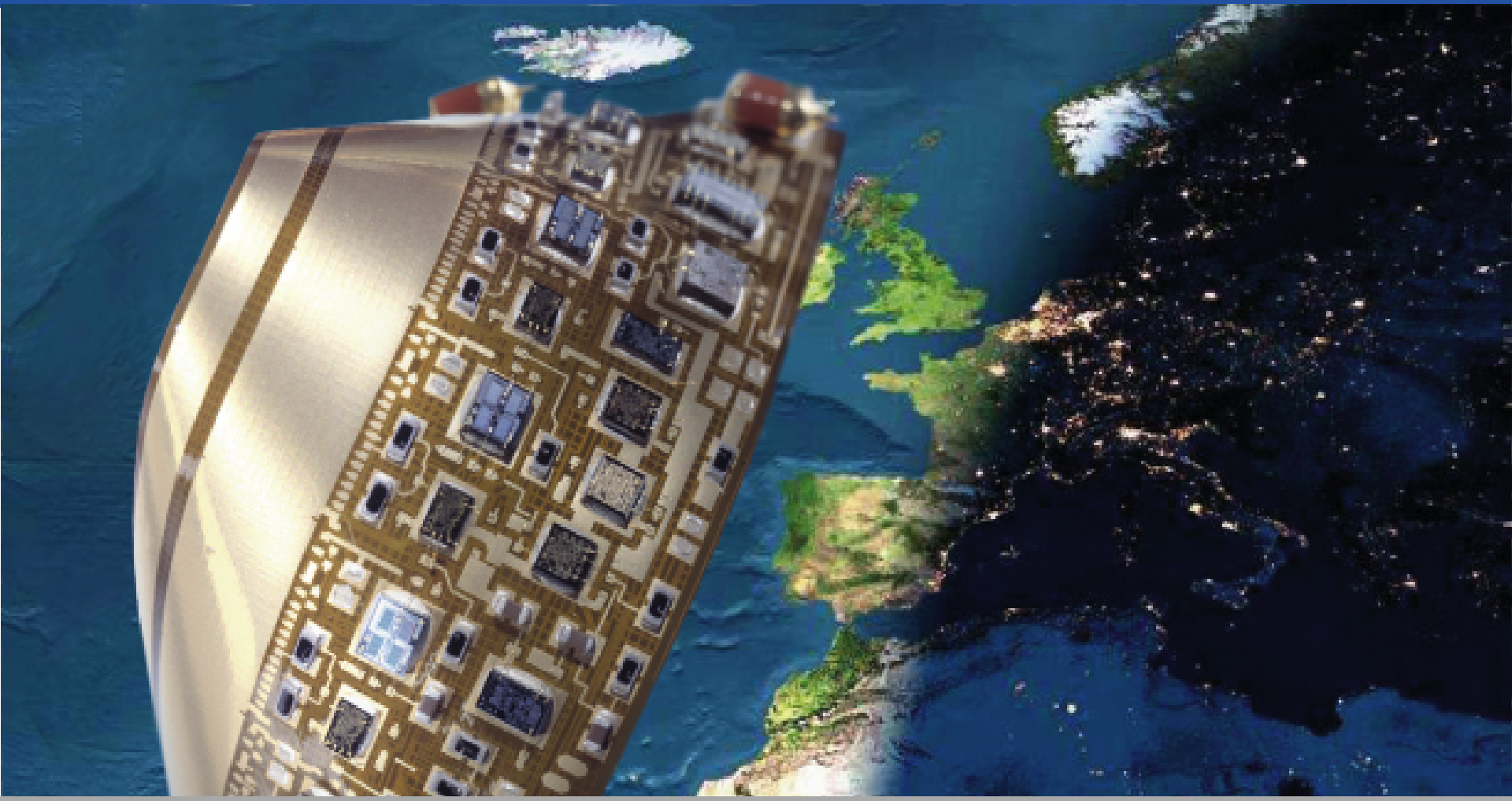
• Anisotropic conducting film (ACF) ~ Pitch 50 µm

• Glueing + Wire bonding

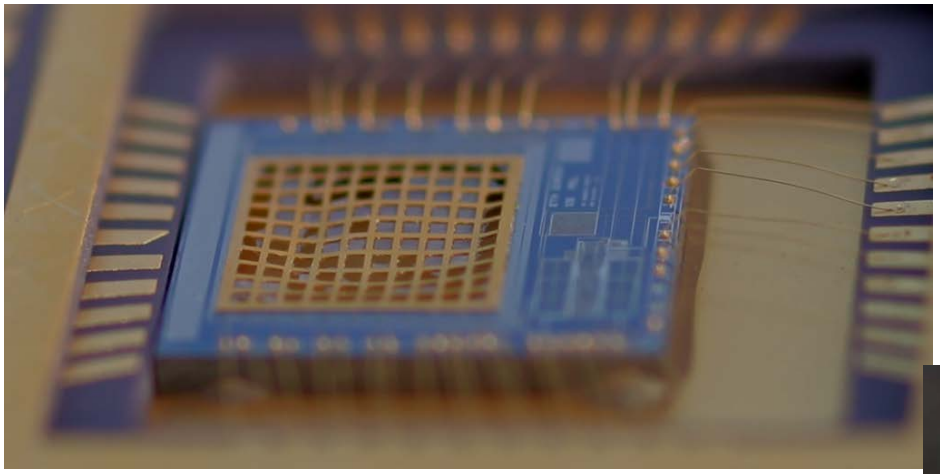
HIGHTEC
Custom made MicroCircuits

JOIN INNOVATION AND FLEXIBILITY.

Customised Assembling

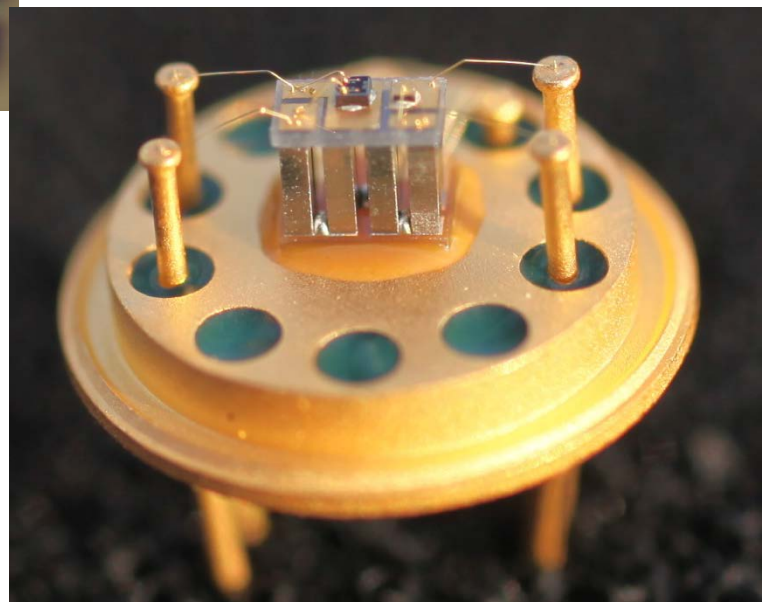


Sensor Assembling



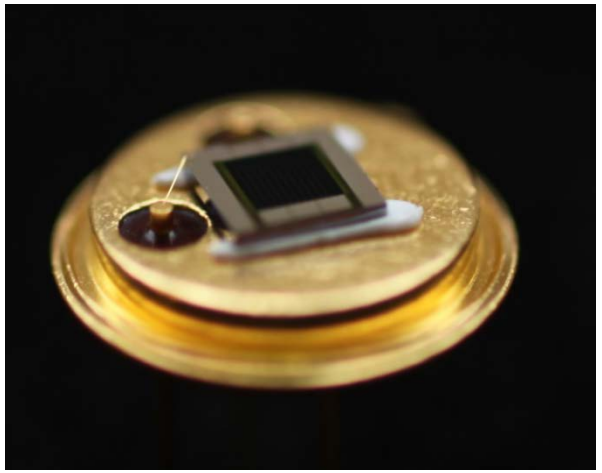
Special handling tools for mounting dices with fragil grids or membrans.

Controlled temperature board.



Sensor Assembling

Lithiumtantalat
25 µm thick



3 µm Membrane

Electronic Assembling

20 GHz Amplifier

Minimum
pitch 50 µm

HIGHTEC
Custom made MicroCircuits

Thank you

Special Techniques

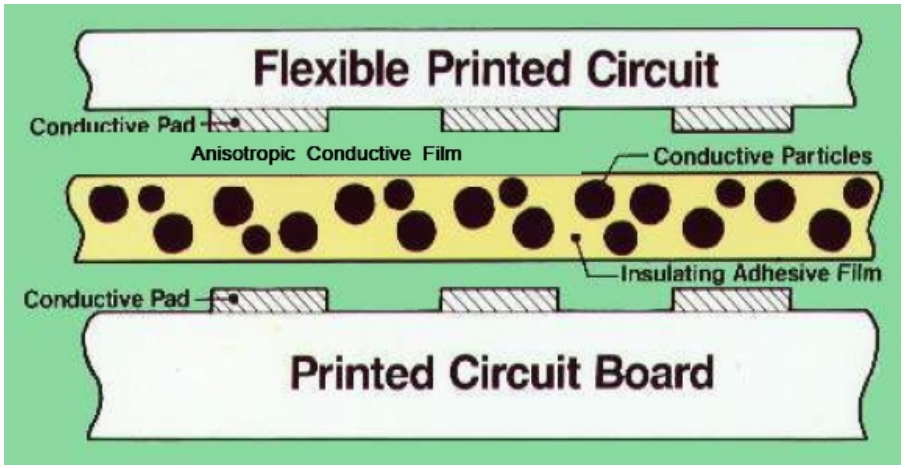
Services:		Feasibility Studies, Design, Prototyping, Manufacturing, Screening, Testing
Substrate material:		Al_2O_3, AlN, glass, metals (Mo, steel), polyimide, LCP
Deposition and Structuring:	4" 6" 24"	Sputtering: Cu, Ni, Au, NiCr, Ti, Cr, Pd, Pt, Sn, Nb, Al Spinning & Laser Direct Imaging (LDI) Electroplating: Cu, Ni, Au, Pt Stripping & Etching
Laser Processing:		Cutting and Drilling of Polyimide with UV Laser
Assembly:		Ball-Wedge & Wedge-Wedge bonding, Flip-Chip mounting, Hermetical sealing and Customized packaging

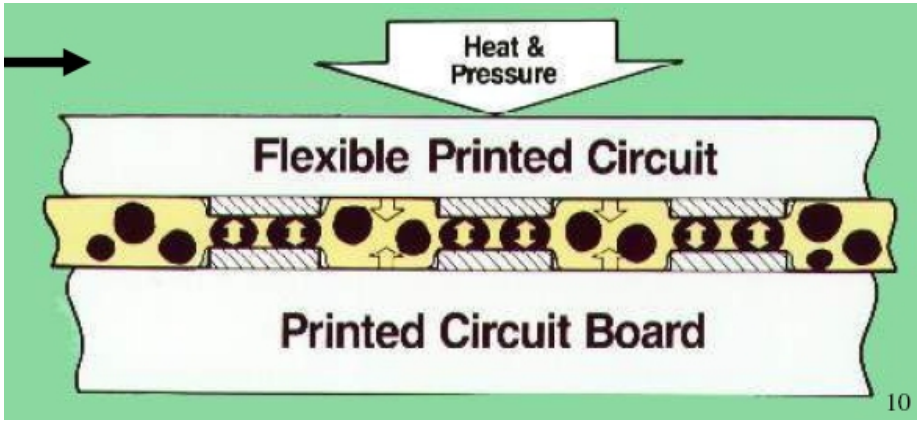
Interconnection by ACF

New tasks Connection of HiCoFlex to PCB's and Hybrids (non-removable)

Methode Heatsealing, by use of Anisotropic Conductive Film (ACF)

Tests Testsamples → Check the possible pitch (range 50 … 250 µm),





ACF left before and right after heatsealing

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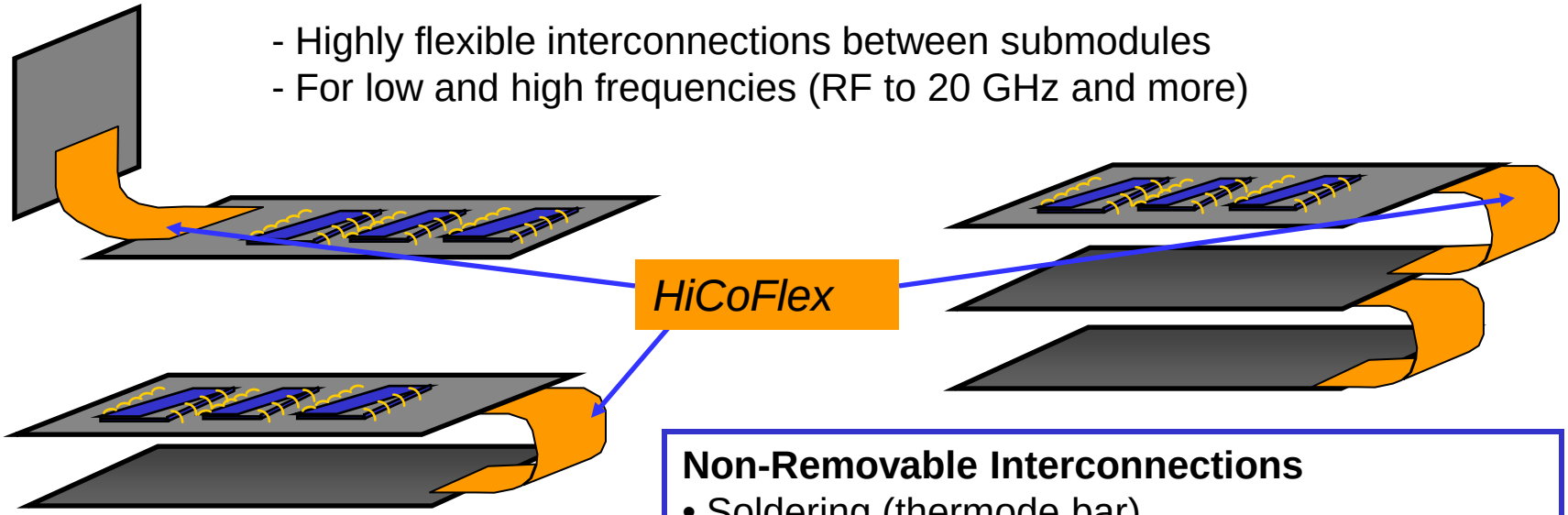

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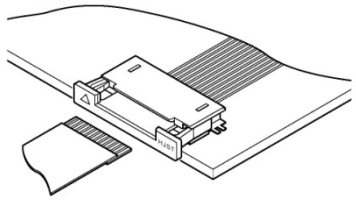

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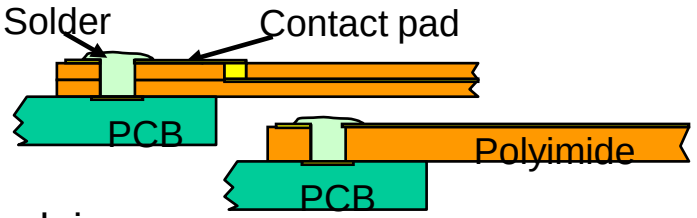
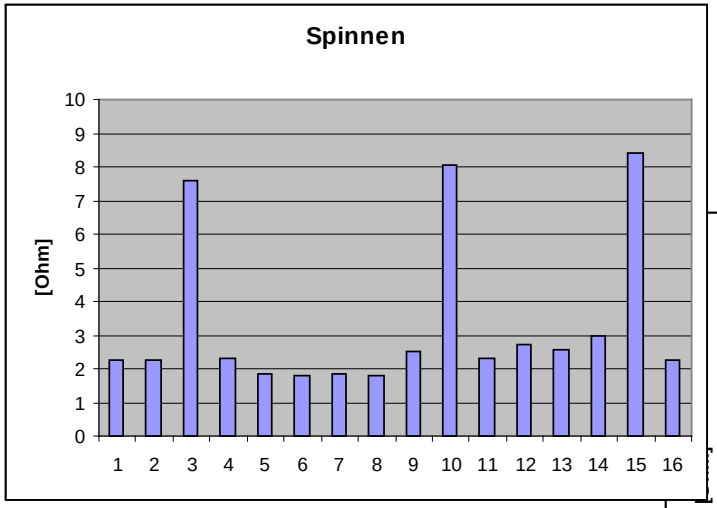


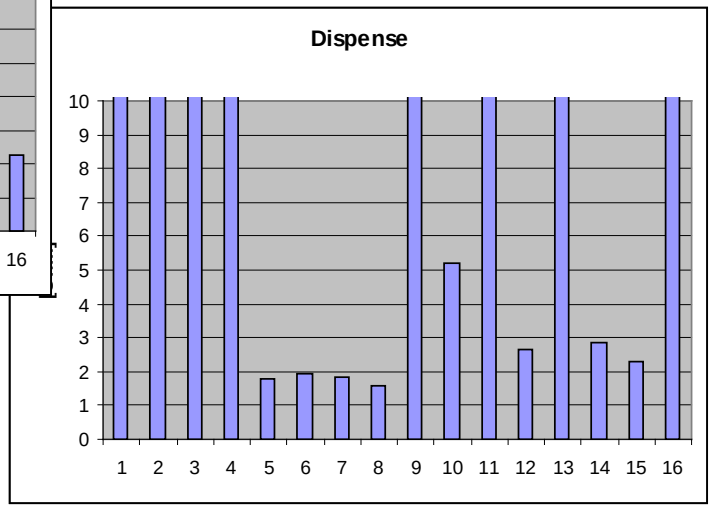
• Conductive gluing
• Anisotropic conducting film (ACF)
• Gluing + Wire bonding

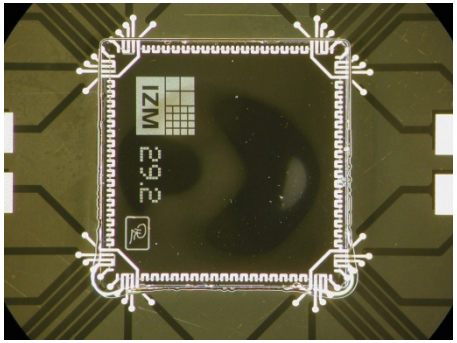
ISO 9001 certified

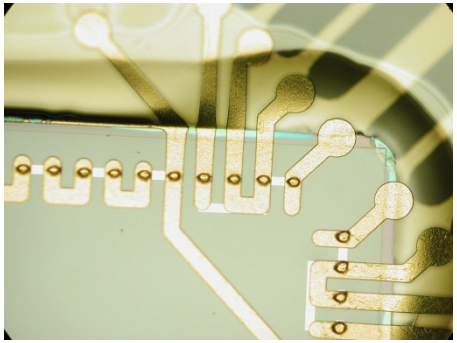
Chip Embedding: Summary of recent work

- Chips embedded with BCB (dispensed or spinned) as glue for the chips.
- Top metallisation (alignment !)
- Measure resistance of daisy chain along one edge of chip (= 36 connections each):
- Typical ≈2 Ω, some misaligned









ISO 9001 certified

The HiCoFlex® Process