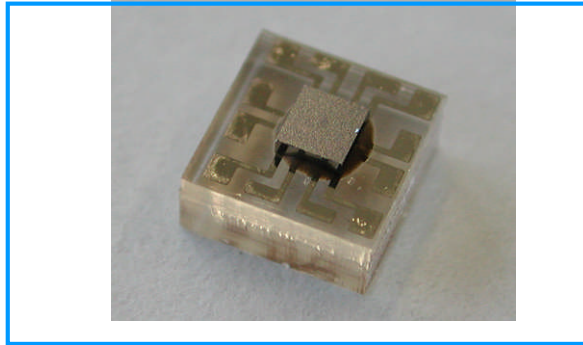


## Integration of Silicon MEMS devices and sensors into microfluidic packages



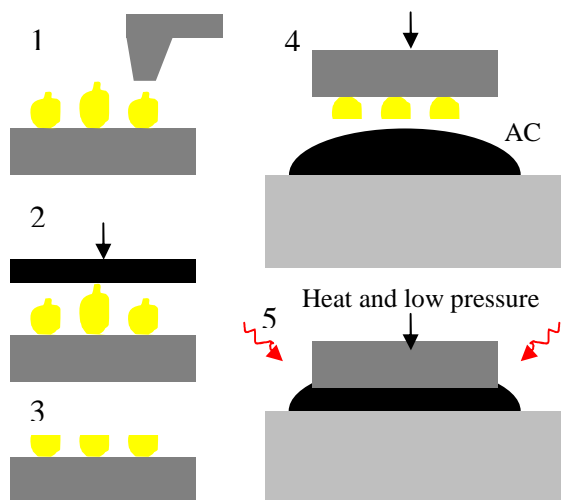
- Simultaneous electrical and fluidic connections
- Ultra-compact package
- Very low dead volume

### Silicon in microfluidic packages

Si-based CMOS or MEMS devices (e.g. sensors, actuators, etc) can now be fully integrated into microfluid modules or microfluid systems using the following methods.

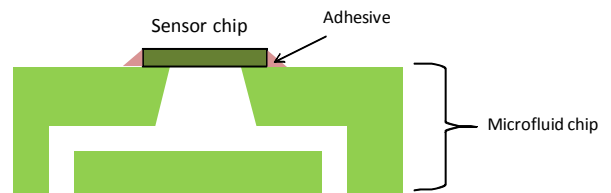
First of all, a polymer substrate with embedded metal track pattern on one side and in/out fluid feed-through holes is prepared. The fluid feed-throughs are connected, using a PTFE ferrule type fitting, to the rest of the microfluid module or system.

### Process Overview



For more information contact:

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Kirkleatham Business Park, Redcar,  
TS10 5SQ, UK.



Substrate materials available are:

- PMMA
- PEEK

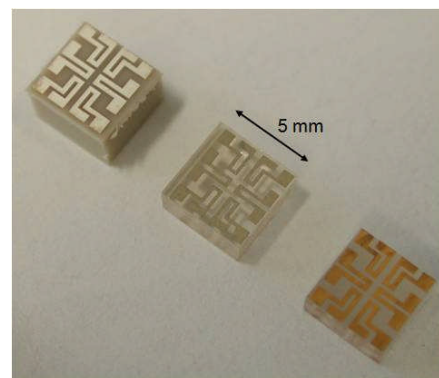
Electrode materials available for the substrate are:

- Nickel
- Gold

Gold stud bumps are placed either on to the substrate or the Si die. Typical bump height is 35 microns. Then, a ring of anisotropic conducting adhesive (ACA) is dispensed on top of the substrate. Finally the Si die is placed on top and the ACA is cured. The ACA ring makes the electrical connection between the die and the substrate and also seals the microfluid cavity under the die

### Applications

- Pressure sensing
- Microfluid pH measurement
- Microfluid conductivity measurement
- Microfluid biosensors
- Quartz resonant bio-sensors



From left to right: 3 mm thick PEEK substrate with Cu/Ag metal tracks, 2 mm thick PMMA substrate with Cu/Ni metal tracks, and 2 mm thick PMMA substrate with Cu/Au metal tracks.

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