Docket #: S17-509

Double-sided anisotropic Si etch technique to define through-microchannels in thick Si substrates

Stanford researchers have developed a method for etching microchannels through silicon substrates. Specifically, this method can produce wafers where the two sides have different features as well as through channels. Traditional methods of etching channels through a wafer only etch from one side, which allows the etching gas to pass through. This can cause previously etched features to be further etched beyond desired specifications or can mix with mounting assemblies to produce unwanted side products. This technology utilizes a series of masking and metallic layers to selectively etch and protect features on both side of the wafer while through channels are produced by etching from both sides. By etching through channels from both sides, the researchers prevent-over etching of a given side and control the size of these microchannels. Ultimately these substrates are useful for cooling devices by providing microchannel arrays for cooling fluid and guiding the flow of said coolants.

Stage of Research

- Proof of concept

Applications

- **Double-sided Si wafer production**
- Chip-scale heat exchangers
- Power electronics cooling for example in electric vehicles

Advantages

- **Avoid over-exposing surface features to etching gas**
- Different sides of wafers can have different etch patterns
- Selective control over microchannel size

Patents

- Published Application: 20190287810
- Issued: 10,395,940 (USA)

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