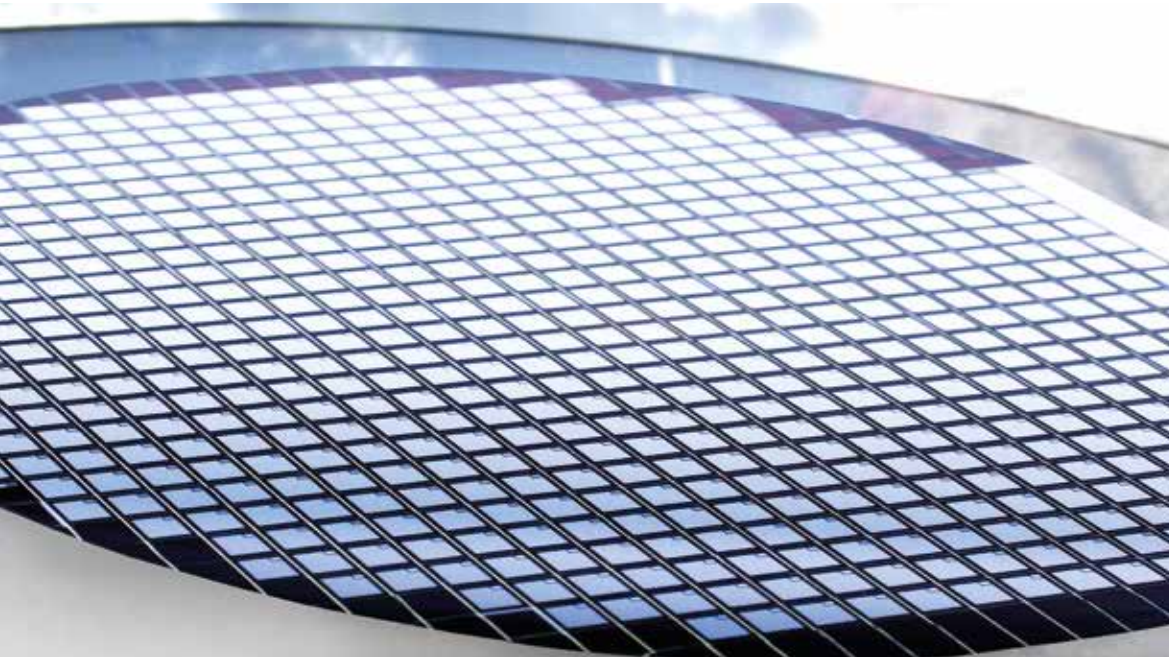


TLS-Dicing™

Enabling dicing technology

for excellent cleaving results and higher throughput





Thermal Laser Separation (TLS-Dicing™)

Enabling technology for fast, clean, and cost effective wafer dicing

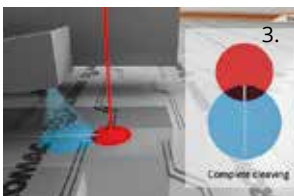


TLS-Dicing™ (thermal laser separation) is a unique technology for semiconductor industry's back-end to separate wafers into single chips. TLS-Dicing™ uses thermally induced mechanical stress to separate brittle semiconductor materials, like Si and SiC wafers.



Compared to traditional separation technologies, TLS-Dicing™ impresses with a clean process, micro-crack-free edges, and higher resulting bending strength.

Process steps of TLS-Dicing™



1. Initial scribe as defined starting point
2. Local laser heating combined with subsequent cooling
3. Induced stress opens and guides a cleave through the wafer

Advantages of TLS-Dicing™



I
SiC Wafer: free of chipping, backside-metal separated



II
Resized Si solarcell



III
Diced compound material



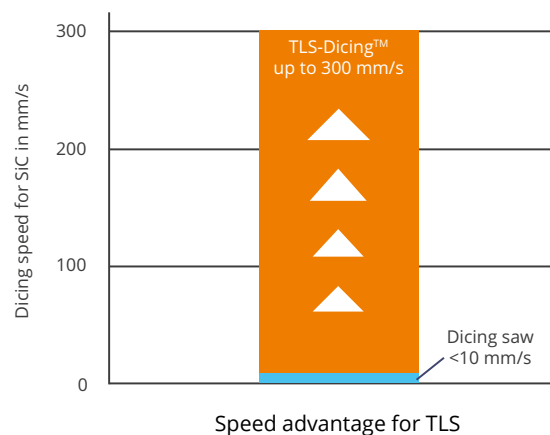
IV
Ring of Si, shows the excellent bending strength and the possibility of resizing.

Benefits for your product

- Perfect side walls free of chipping and micro cracks with superior bending strength
- Particle-free machining / no heat affected zone
- Forceless and contactless machining
- Independent on lattice plane
- Separation of back side metal without peeling in same step
- Dicing of material stacks is possible
- No changes of electrical properties, e.g. pn-junction-cutting
- Resizing is possible

Cost advantages and efficiency

- Higher throughput due to higher process speed
- Increased yield due to reduced street width
- Minimal cost of ownership by no tool wear, and no special consumables
- Reduced number of process steps by elimination of protective coating and/or adjacent cleaning
- No damaging of the dicing tape
- Enabling new products (e.g. pn-junction-cutting)





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Picture I-II: courtesy of Fraunhofer IISB



Rev. 2015-1

Changes in accordance to technical progress are reserved.