

UV Curable Dicing Tape

PULSED UV ADVANTAGE

An important advantage of pulsed UV systems in Semiconductor applications is the ability to deliver high peak UV energy in short pulses and low substrate temperatures, providing rapid penetration of thick materials.

REMOVING DICING TAPE

Integrated circuits are fabricated on 150 mm, 200 mm, and now 300 mm single crystal silicon wafers. Hundreds of devices are fabricated at the same time using photolithography and other processes. Upon completion, the single die/chips must be separated from each other using a diamond saw or laser scribing, while the entire wafer is held together using a "dicing" tape. The "sticky" tape is initially applied to the wafer using a pressure roller. The pressure-sensitive tape is typically formulated with 4 components:

- 1 - **Acrylic polymer**—main adhesive ingredient, determines sticky/tacky property
- 2 - **Oligomers**—reacts upon UV radiation to become "harder" and "shrink"
- 3 - **Cross linker**—binds acrylic polymer
- 4 - **Photoinitiator**—activated by UV radiation to start photo polymerization

After dicing is completed the dicing tape, described above, is exposed to pulsed UV radiation. The oligomers that cause the adhesion properties are cross-linked and shrinkage occurs. This action aids in the release of the die from the tape, ideally leaving no residue. To optimize the process, the light source producing the UV radiation must generate:

- High intensity to penetrate tape to wafer/tape interface—for processing speed
- The proper spectral output—so photoinitiator works correctly
- Low heat—so adhesion is reduced and release is clean

Unlike other possible light sources, Xenon's pulsed UV light system meets all these requirements. Attributes include, peak pulse penetration, low heat transfer, broad spectral output, instant on/off and environmentally friendly components vs. potentially hazardous mercury lamps. Once cured, the tape loses its "stickiness" and the die can be picked up, one at a time, for the packaging step. If any residue remains, chip failure can result due to poor heat transfer. Packaging failure can result due to cracking.

Xenon's Pulsed UV systems have demonstrated optimum performance with a wide variety of UV curable dicing tapes. They are quickly becoming the system of choice in the industry.