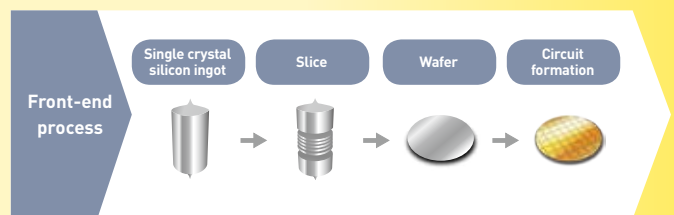


# LINTEC's Semiconductor-Related Business

LINTEC's semiconductor-related business began in 1986 with the development of a fixing tape for use in the wafer cutting process in the manufacture of semiconductors—a UV curable dicing tape. Such tapes adhere strongly to thin wafers, holding them firm when they are being diced into chips. Adhesion is then reduced through UV irradiation after dicing for easy removal when the chips are picked up. This tape radically changed the semiconductor industry. Since then, we have developed many semiconductor-related tapes. We have also developed semiconductor-related equipment that fully leverages the special features of our tapes. In such ways, we have established our own unique position within the industry.

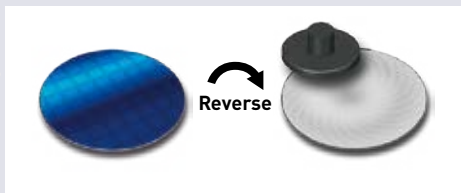
The manufacture of semiconductors involves the formation of a number of electronic circuits on the surface of a wafer sliced from columnar silicon ingot. The wafer is then ground on the backside to make it thinner and cut into individual chips, which are then mounted and stacked on a substrate. All of our semiconductor-related adhesive tapes and equipment are used in back-end processes after circuit formation.



Back-end process

Lamination of surface protective tape

Back grinding (wafer thinning)



1

## Back grinding

This is the process of using a grinding wheel to grind the backside of the wafer to make it thinner. Tape is affixed to protect the circuit-carrying front from grinding water and dust.



Tapes that protect the surface of wafer circuits and tape laminator

Lamination of dicing tape

Removal of surface protective tape

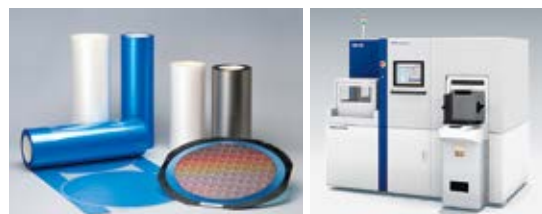
Dicing (wafer cutting)



2

## Dicing

Dicing is the process of cutting the wafers into individual chips. Tape is placed on the backsides of wafers to fix them to a ring frame, thereby preventing chips from scattering during cutting.



Dicing tapes and wafer mouter that secure wafers to ring frames

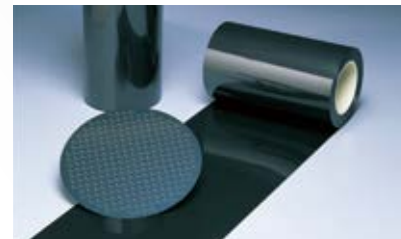
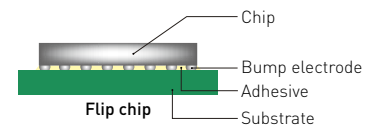
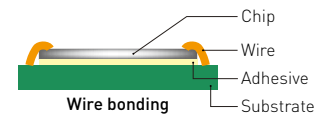
## Focus

### Flip chip mounting and backside coating tape for chips

In recent years, as smartphones and other electronic devices have become thinner and advanced in performance, semiconductor packages with flip chips, which are connected to the substrate by bumps (protruding electrodes on the circuit) and with the circuit facing downward, have come into widespread use instead of wire bonding (in which the chip is mounted and wires are used to connect the chip to the substrate).

Flip chip mounting has the advantage of enhancing electrical properties and reducing the mounting area. However, because the backside of the chip is exposed, reinforcing the chip became an issue as chips became thinner. In response, we came up with the idea of using tapes to protect and reinforce the backside surfaces of flip chips. The result was that LINTEC was the first mover in developing backside coating tapes for flip chips. Tailored to meeting customer needs, our lineup spans tapes that enable detection of imperfections in chips through infrared rays and tapes with outstanding heat dissipation qualities. Our global share in backside coating tape for flip chips is almost 100%.

#### Various methods for mounting chips



Backside coating tapes for flip chips

#### UV irradiation of tape

#### Picking up

#### Mounting



3

### Picking up and Mounting

This process involves picking up the cut chips, and mounting and stacking on the substrate with adhesive. After cutting, the tape's adhesion is reduced through UV irradiation so that chips can be picked up easily. We also offer a proprietary process that transfers the adhesive of the fixing tape, which is used at the time of wafer cutting, to the back of the chip when it is picked up so that it can be mounted on the substrate directly.



Equipment for UV irradiation of the dicing tape to reduce its adhesion



A multifunction tape that has the functions of a dicing tape as well as a function that transfers adhesive for use in die bonding

#### Molding



4

### Molding

This process involves connecting the mounted and stacked chips on a substrate with wires and sealing with liquid resin.