

WHAT IS CLAIMED IS:

1. A wafer processing method for dividing a wafer along a plurality of division lines to obtain a plurality of individual device chips, the division lines being formed on ~~a~~the front side of the wafer to thereby define a plurality of separate regions where ~~the~~a plurality of individual device chips~~devices~~ are individually formed, the wafer processing method comprising:

a ~~ring frame~~ preparing step of preparing a ring frame having an inside opening for accommodating the wafer;

a ~~polyester sheet~~ providing step of positioning the wafer in the inside opening of the ring frame and providing a polyester sheet on a back side of the wafer and on a back side of the ring frame, the polyester sheet having no adhesive layer and being in direct contact with the back side of the wafer and the backside of the ring frame;

a uniting step of heating the polyester sheet as applying a pressure to the polyester sheet after performing the polyester sheet providing step, thereby uniting the wafer and the ring frame through the polyester sheet by thermocompression bonding to form a frame unit in a condition where the front side of the

wafer and ~~at~~the front side of the ring frame are exposed upward;

a dividing step of applying a laser beam to the wafer along each division line, the laser beam having an absorption wavelength to the wafer, after performing the uniting step, thereby forming a division groove in the wafer along each division line to divide the wafer into the individual device chips; and

a pickup step of cooling the polyester sheet in each region of the polyester sheet corresponding to each device chip, pushing up each device chip from the polyester sheet side to pick up each device chip from the polyester sheet after performing the dividing step.

2. The wafer processing method according to claim 1, wherein the uniting step includes a step of applying infrared light to the polyester sheet, thereby performing the thermocompression bonding.

3. The wafer processing method according to claim 1, wherein the polyester sheet is larger in size than the ring frame, and the uniting step includes an additional step of cutting the polyester sheet after heating the polyester sheet, thereby removing a part of the polyester sheet outside an outer circumference of the ring frame.

4. The wafer processing method according to claim

1, wherein the pickup step includes a step of expanding the polyester sheet to thereby increase a spacing between any adjacent ones of the device chips.

5. The wafer processing method according to claim 1, wherein the polyester sheet is formed of a material selected from the group consisting of polyethylene terephthalate and polyethylene naphthalate.

6. The wafer processing method according to claim 5, wherein the polyester sheet is formed of polyethylene terephthalate, and the polyester sheet is heated in the range of 250°C to 270°C in the uniting step.

7. The wafer processing method according to claim 5, wherein the polyester sheet is formed of polyethylene naphthalate, and the polyester sheet is heated in the range of 160°C to 180°C in the uniting step.

8. The wafer processing method according to claim 1, wherein the wafer is formed of a material selected from the group consisting of silicon, gallium nitride, gallium arsenide, and glass.

9. The wafer processing method according to claim 1, wherein the division groove formed by the laser beam extends through an entire depth of the wafer.