

WHAT IS CLAIMED IS:

1. A device chip manufacturing method for processing a wafer to manufacture a plurality of device chips from the wafer, the wafer having a front side and a plurality of devices formed on the front side so as to be separated by a plurality of crossing division lines, a passivation film being formed on the front side of the wafer so as to cover the plurality of devices, the device chip manufacturing method comprising:

a passivation film removing step of removing the passivation film along each division line;

a wafer supporting step of attaching a die attach film to the back side of said wafer and next attaching a dicing tape mounted on an annular frame to said die attach film to thereby support said wafer through said die attach film and said dicing tape;

a wafer dividing step of performing plasma etching using a fluorine-based gas to the front side of said wafer in the condition where said passivation film is used as a mask after performing said passivation film removing step and said wafer supporting step, thereby dividing said wafer into said individual device chips along said division lines

and exposing said die attach film along said division lines; and

a die attach film removing step of performing plasma etching using an oxygen-based gas to the front side of said wafer in the condition where said passivation film is used as a mask after performing said wafer dividing step, thereby removing at least part of said die attach film along each division line.

2. The device chip manufacturing method according to claim 1, wherein said passivation film removing step includes the step of applying a laser beam having an absorption wavelength to said wafer along each division line to thereby form a groove on the front side of said wafer along each division line, so that said passivation film is removed along each division line.

3. The device chip manufacturing method according to claim 1, wherein said passivation film removing step includes the step of using a cutting blade to cut said passivation film along each division line, thereby forming a groove on the front side of said wafer along each division line, so that said passivation film is removed along each division line.

4. The device chip manufacturing method according to claim 1, wherein said dicing tape is expandable;

said device chip manufacturing method further comprising a die attach film breaking step of expanding said dicing tape after performing said die attach film removing step, thereby breaking said die attach film along said division lines.

5. The device chip manufacturing method according to claim 1, further comprising a step of forming a groove on the front side of the wafer along each division line, and a protective film forming step that includes forming a protective film on an inside surface of each groove.

6. The device chip manufacturing method according to claim 5, wherein forming said protective film on an inside surface of each groove includes depositing a fluorine-based material on said inside surface of each groove.

7. The device chip manufacturing method according to claim 5, further comprising a cleaning step that

includes removing said protective film on a bottom surface of each groove.