WHAT IS CLAIMED IS:

1. A method of processing a wafer to divide the wafer into individual device chips, the wafer being demarcated into a plurality of devices by a plurality of crossing projected dicing lines and having a low-k film formed on a face side, the method comprising:

a protective member laying step of placing a protective member on the face side of the wafer;

a reverse side grinding step of grinding a reverse side of the wafer to thin the wafer after performing the protective member laying step;

a frame supporting step of peeling off the protective member from the face side of the wafer, applying an adhesive tape to the face side of the wafer, and applying an outer peripheral portion of the adhesive tape to an annular frame which has an opening for accommodating the wafer therein, so that the wafer is supported on the annular frame through the adhesive tape after performing the reverse side grinding step;

a cut groove forming step of positioning a cutting blade in alignment with the projected dicing lines one at a time on the reverse side of the wafer, and cutting the wafer with the cutting blade to form cut grooves in the wafer which terminate at a predetermined depth in a thickness direction of the wafer, short of the face side thereof after performing the frame supporting step;

a step of forming individual device chips by cutting completely through the wafer and the low-k film by applying a laser beam to the wafer from the reverse side thereof along the

cut grooves, thereby completely cutting through the low-k film from the predetermined depth to the face side of the wafer; and

a pick-up step of picking up the individual device chips from the adhesive tape supported on the annular frame after performing the cutting step.

2. The method of processing a wafer as defined in claim 1, further comprising increasing the distance between adjacent individual device chips by exerting a radially outward tensile force on the adhesive layer.