

DESCRIPTION

TAPE FOR WAFER PROCESSING

TECHNICAL FIELD

[0001] The present invention relates to a tape for wafer processing. More particularly, the invention relates to a tape for wafer processing used at the time of cutting and separating (dicing) a semiconductor wafer or the like and thereby dividing the semiconductor wafer or the like into individual chip-like pieces.

BACKGROUND ART

[0002] In a case in which an object to be processed, such as a semiconductor wafer or the like, is divided into individual chip-like pieces, the object to be processed is fixed using a tape for wafer processing and is divided by means of a rotary blade or laser light. In recent years, a technique of providing fragile sites called modified layer using laser light in the interior of a semiconductor wafer, fixing the semiconductor wafer provided with the modified layer by means of a tape for wafer processing, subsequently pulling and expanding the tape for wafer processing, and thereby dividing the semiconductor wafer into individual pieces from the modified layer as starting points, is also used.

[0003] Conventionally, examples of the performance required from a tape for wafer processing such as described above include a characteristic that the tape has satisfactory fixability at the time of processing, and a characteristic that the object to be processed is not contaminated when the tape for wafer processing is detached after processing. However, in recent years, for the purpose of quality verification after processing, visually inspecting the state of chips and the like through the surface to which the tape for wafer processing is stuck, has been carried out. Furthermore, when a modified layer is formed by means of laser light in the interior of a semiconductor wafer as described above, in a case in which irradiation with laser light through a surface of the semiconductor wafer, the surface having no tape for wafer processing stuck thereto, that is, a circuit surface, is difficult due to the circuit pattern, irradiation of the semiconductor wafer with laser light over the tape for wafer processing through the surface on the side where the tape for wafer processing is stuck, is carried out. In such a case, the tape for wafer processing is required to exhibit the performance of sufficiently transmitting visible light or near-infrared light.

[0004] Regarding the technique of sufficiently transmitting visible light or near-infrared light, it has been disclosed that the surface roughness Ra of the rear surface of

the tape for wafer processing is adjusted to be 0.3 μm or less (for example, Patent Document 1). However, tapes for wafer processing generally have a long film shape and are stored in a state of being wound into a roll form. As such, when a tape for wafer processing is stored in the state of a rolled body, if the surface roughness Ra of the rear surface of the tape for wafer processing is made too small, faces of the tape for wafer processing that have been wound and stacked are likely to stick together, and on the occasion of using the tape for wafer processing, trapping, which is called blocking, is likely to occur when the tape for wafer processing is continuously dispensed from the rolled body. Thus, it is disclosed in Patent Document 1 that in order to suppress this blocking, it is preferable that the surface roughness Ra of the rear surface of the tape for wafer processing is adjusted to be 0.1 μm or higher.

[0005] Here, regarding the tape for wafer processing, there is a tape for wafer processing that has been subjected to precut processing, in consideration of workability such as attachment to the wafer or installation on the ring frame at the time of dicing. Examples of dicing tapes that have been processed by precutting are presented in Fig. 2 and Fig. 3. Fig. 2, Fig. 3(a), and Fig. 3(b) are a perspective view, a plan view, and a cross-sectional view of a dicing tape 50, respectively. The tape for wafer processing 50 is composed of a release film

51 and a pressure-sensitive adhesive film 52. The pressure-sensitive adhesive film 52 has a label part 52a having a circular shape corresponding to the shape of a ring frame for dicing; and a peripheral part 52b surrounding the outer side of the label part 52a. Around the label part 52a, there is a portion in which the pressure-sensitive adhesive film 52 does not exist, and only the release film 51 exists.

[0006] When the wafer is diced, the label part 52a of the pressure-sensitive adhesive film 52 is detached from the release film 51, and as illustrated in Fig. 4, the rear surface of the semiconductor wafer W is attached, and a ring frame for dicing R is fixed by pressure-sensitive adhesiveness to the outer periphery of the pressure-sensitive adhesive film 52. The semiconductor wafer W is diced in this state, subsequently the pressure-sensitive adhesive film 52 is subjected to a curing treatment such as ultraviolet irradiation, and semiconductor chips are picked up. At this time, since the pressure-sensitive adhesive force of the pressure-sensitive adhesive film 52 has been decreased by the curing treatment, the semiconductor chips are easily detached.

CITATION LIST

PATENT DOCUMENT

[0007] Patent Document 1: JP 2012-15236 A

SUMMARY OF THE INVENTION

PROBLEM TO BE SOLVED BY THE INVENTION

[0008] However, in a case in which the tape for wafer processing 50 is subjected to precut processing as described above, since there exist an area where the release film 51 only is provided and an area where the label part 52a is also provided, when the tape for wafer processing is wound into a roll form, winding pressure is applied to the label part 52a, blocking is likely to occur even at the surface roughness Ra in the range disclosed in Patent Document 1. Thus, when the tape for wafer processing is used, the label part 52a that is intended to be dispensed continuously from a rolled body may stick to the rear surface of the tape for wafer processing 50 on the side of the rolled body and be taken away.

[0009] Thus, an object of the invention is to provide a tape for wafer processing, in which when the tape for wafer processing that has been precut-processed is stored in a state of being wound into a roll form, the label part 52a causing blocking with the rear surface of the tape for wafer processing is suppressed, and the label part 52a can be continuously dispensed satisfactorily when the tape for wafer processing is continuously dispensed from a state of being wound in a roll form.

MEANS FOR SOLVING PROBLEM

[0010] In order to solve the problems described above, the tape for wafer processing according to the invention includes a long release film; a pressure-sensitive adhesive film having a label part provided on a first face of the release film and having a predetermined shape corresponding to the shape of a ring frame for dicing, and a peripheral part surrounding the outer side of the label part; and support members provided at both ends in the transverse direction of the release film, the support members being provided on a second face on the opposite side of the first face having the pressure-sensitive adhesive film provided thereon, in which the pressure-sensitive adhesive film has an arithmetic surface roughness Ra of 0.3 μm or less on the side that is not in contact with the release film, and the support members each have a thickness of 30 to 150 μm .

[0011] In regard to the tape for wafer processing, it is preferable that the support members are provided so as to have a region overlapping with the label part, with the release film being disposed therebetween, and the maximum width of the region overlapping with the label part, the maximum width being in the transverse direction of the release film, is 25 mm or less.

[0012] In regard to the tape for wafer processing, it is preferable that the support members have a laminated structure having two or more layers.

[0013] In regard to the tape for wafer processing, it is preferable that the support members are formed from a tacky

adhesive tape obtained by applying a tacky adhesive on a resin film base material selected from the group consisting of polyethylene terephthalate, polypropylene, and high-density polyethylene.

EFFECT OF THE INVENTION

[0014] According to the invention, when the tape for wafer processing that has been precut-processed is stored in a state of being wound into a roll form, the label part causing blocking with the rear surface of the tape for wafer processing is suppressed, and when the tape for wafer processing is continuously dispensed from a state of being wound into a roll form, the label part can be satisfactorily dispensed continuously.

BRIEF DESCRIPTION OF DRAWINGS

[0015] Fig. 1(a) is a plan view of a tape for wafer processing according to embodiments of the invention, and Fig. 1(b) is a cross-sectional view of the same tape;

Fig. 2 is a perspective view of a conventional tape for wafer processing;

Fig. 3(a) is a plan view of a conventional tape for wafer processing, and Fig. 3(b) is a cross-sectional view of the same tape; and

Fig. 4 is a cross-sectional view illustrating the state

in which a tape for wafer processing and a ring frame for dicing are bonded together.

MODE(S) FOR CARRYING OUT THE INVENTION

[0016] In the following description, embodiments of the invention will be described in detail with reference to the drawings. Fig. 1(a) is a plan view of a tape for wafer processing according to embodiments of the invention, and Fig. 1(b) is a cross-sectional view of Fig. 1(a).

[0017] As illustrated in Fig. 1(a) and Fig. 1(b), the tape for wafer processing 10 has a long release film 11, a pressure-sensitive adhesive film 12, and support members 13.

[0018] The pressure-sensitive adhesive film 12 has a label part 12a provided on a first face 11a of the release film 11, and a peripheral part 12b surrounding the outer side of this label part 12a. The peripheral part 12b includes a form that completely surrounds the outer side of the label part 12a, and a form that does not completely surround as illustrated in the diagram. The label part 12a has a shape corresponding to a ring frame for dicing.

[0019] The support members 13 are provided on a second face 11b of the release film 11, the face being on the opposite side of the first face 11a where the pressure-sensitive adhesive film 12 is provided, and are provided at two ends in the transverse direction of the release film 11. The support members 13 are

provided in a region corresponding to the region of the first face 11a and extending to the region of the label part 12a that is in contact with the release film 11. That is, the support members 13 are each provided so as to have a region overlapping with the label part 12a, with the release film 11 being interposed therebetween.

[0020] The support members 13 can be provided intermittently or continuously along the longitudinal direction of the release film 11; however, from the viewpoint of suppressing the occurrence of transfer marks more effectively, it is preferable that the support members 13 are provided continuously along the longitudinal direction of the release film 11.

[0021] Hereinafter, the various constituent elements of the tape for wafer processing 10 of the present embodiment will be described in detail.

[0022] (Release film)

Regarding the release film 11 used for the tape for wafer processing 10 of the invention, a well-known release film such as a polyethylene terephthalate (PET)-based film, a polyethylene-based film, and any other release-treated film, can be used.

The thickness of the release film is not particularly limited and may be set as appropriate; however, the thickness is preferably 25 to 50 μm .

[0023] (Pressure-sensitive adhesive film)

The pressure-sensitive adhesive film 12 of the invention includes, as explained above, a label part 12a corresponding to the shape of a ring frame for dicing, and a peripheral part 12b surrounding the outer side of the label part 12a. Such a pressure-sensitive adhesive film can be formed by removing the peripheral region of the label part 12a from a film-like pressure-sensitive adhesive by precut processing. The shape corresponding to the shape of a ring frame for dicing is an analogous shape that is approximately the same as the shape of the inner side of the ring frame and is larger than the size of the inner side of the ring frame. Furthermore, the shape not necessarily needs to be a circular shape; however, a shape close to a circular shape is preferred, and a circular shape is more preferred.

[0024] The pressure-sensitive adhesive film 12 is not particularly limited, and any pressure-sensitive adhesive film having sufficient pressure-sensitive adhesive force so that when a wafer is diced, the wafer is not detached, and exhibiting low pressure-sensitive adhesive force so that when chips are picked up after dicing, the pressure-sensitive adhesive film can be easily detached, may be used. For example, a base film provided with a pressure-sensitive adhesive layer can be suitably used.

[0025] Regarding the base film of the pressure-sensitive

adhesive film 12, any conventionally known base film in which the arithmetic surface roughness Ra of a surface on the opposite side of the pressure-sensitive adhesive layer (that is, the surface on the side where the pressure-sensitive adhesive film 12 is not in contact with the release film 11) is 0.3 μm or less, can be used without any particularly limitations. Furthermore, in the case of using a radiation-curable material as the pressure-sensitive adhesive layer that will be described below, it is preferable to use a radiation-transmissive material.

[0026] Examples of the material include homopolymers or copolymers of α -olefins, such as polyethylene, polypropylene, an ethylene-propylene copolymer, polybutene-1, poly-4-methylpentene-1, an ethylene-vinyl acetate copolymer, an ethylene-ethyl acrylate copolymer, an ethylene-methyl acrylate copolymer, an ethylene-acrylic acid copolymer, and an ionomer, or mixtures thereof; thermoplastic elastomers such as polyurethane, a styrene-ethylene-butene or pentene-based copolymer, and a polyamide-polyol copolymer; and mixtures thereof. Furthermore, the base film may be a mixture of two or more kinds of materials selected from this group, or a film in which these materials form a single layer or multiple layers.

The thickness of the base film is not particularly limited, and may be set as appropriate. However, a thickness of 50 to 200 μm is preferred.

[0027] The arithmetic surface roughness Ra of the base film

for realizing sufficient transmissibility is 0.3 μm or less, and more preferably 0.25 μm or less. If the arithmetic surface roughness Ra is larger than 0.3 μm , incident light is scattered, and sufficient transmissibility cannot be obtained.

[0028] Regarding the specific value of sufficient transmittance in the case of visually inspecting the state of chip or the like through the surface on which the tape for wafer processing 10 is stuck, for the purpose of quality verification after processing, or in the case of processing a semiconductor wafer by irradiating the wafer with laser light over the tape for wafer processing 10 through the surface of the semiconductor wafer on the side where the tape for wafer processing 10 is stuck, it is preferable that the parallel light transmittance in the wavelength range of 400 to 1,100 nm is 80% or higher.

[0029] The resin used for the pressure-sensitive adhesive layer of the pressure-sensitive adhesive film 12 is not particularly limited, and a chlorinated polypropylene resin, an acrylic resin, a polyester resin, a polyurethane resin, an epoxy resin or the like, which are known to be used for pressure-sensitive adhesives, can be used. It is preferable that the resin of the pressure-sensitive adhesive layer 13 is appropriately mixed with an acrylic pressure-sensitive adhesive, a radiation-polymerizable compound, a photopolymerization initiator, a curing agent, and the like to prepare a pressure-sensitive adhesive. The thickness of the

pressure-sensitive adhesive layer 13 is not particularly limited and may be set as appropriate; however, the thickness is preferably 5 to 30 μm .

[0030] A radiation-polymerizable compound can be incorporated into the pressure-sensitive adhesive layer, and the pressure-sensitive adhesive layer can be made easily detachable from the adhesive layer by radiation curing. Regarding the radiation-polymerizable compound, for example, a low-molecular weight compound having at least two or more photopolymerizable carbon-carbon double bonds in the molecule, the compound being capable of forming a three-dimensional network as a result of light irradiation, is used.

[0031] Specifically, trimethylolpropane triacrylate, pentaerythritol triacrylate, pentaerythritol tetraacrylate, dipentaerythritol monohydroxypentaacrylate, dipentaerythritol hexaacrylate, 1,4-butylene glycol diacrylate, 1,6-hexanediol diacrylate, polyethylene glycol diacrylate, an oligoester acrylate or the like can be applied.

[0032] In addition to the acrylate-based compounds such as described above, a urethane acrylate-based oligomer can also be used. A urethane acrylate-based oligomer is obtained by reacting a polyester type or polyether type polyol compound with a polyvalent isocyanate compound (for example, 2,4-tolylene diisocyanate, 2,6-tolylene diisocyanate, 1,3-xylylene diisocyanate, 1,4-xylylene diisocyanate, diphenylmethane

4,4-diisocyanate, or the like) to obtain a terminal isocyanate urethane prepolymer, and reacting the terminal isocyanate urethane prepolymer with an acrylate or methacrylate having a hydroxyl group (for example, 2-hydroxyethyl acrylate, 2-hydroxyethyl methacrylate, 2-hydroxypropyl acrylate, 2-hydroxypropyl methacrylate, polyethylene glycol acrylate, polyethylene glycol methacrylate, or the like). The pressure-sensitive adhesive layer may also be a mixture of two or more kinds selected from the resins described above.

[0033] In the case of using a photopolymerization initiator, for example, isopropyl benzoin ether, isobutyl benzoin ether, benzophenone, Michler's ketone, chlorothioxanthone, dodecylthioxanthone, dimethylthioxanthone, diethylthioxanthone, benzyl dimethyl ketal, α -hydroxycyclohexyl phenyl ketone, or 2-hydroxymethylphenylpropane can be used. The amount of incorporation of this photopolymerization initiator is preferably 0.01 to 5 parts by mass with respect to 100 parts by mass of the acrylic copolymer.

[0034] (Support members)

The support members 13 are provided at two ends in the transverse direction of the release film 11, the support members being provided on the second face 11b opposite to the first face 11a where the pressure-sensitive adhesive film 12 is provided, so as to have a region overlapping with the label part 12a, with

the release film 11 being disposed therebetween. The thickness of the support members 13 is 30 to 150 μm , and more preferably 40 to 140 μm .

[0035] When the support members 13 are provided, in a state in which the tape for wafer processing 10 is wound into a rolled form, space is provided between the label part 12a of the pressure-sensitive adhesive film 12 and the rear surface of the tape for wafer processing 10 that is positioned on the inner side of the rolled body of the label part 12a, and the two can be prevented from closely adhering to each other. Therefore, the label part 52a blocking with the rear surface of the tape for wafer processing 10 (rear surface of release film 11) can be suppressed, and when the tape for wafer processing is continuously dispensed from a state of being wound into a roll form, the tape can be satisfactorily dispensed continuously without having the label part 52a taken away to the side of the rolled body.

[0036] If the support member 13 is thinner than 20 μm , there is a risk that the label part 12a may closely adhere to the rear surface of the tape for wafer processing 10 that is positioned on the inner side of the rolled body of the label part 12a, due to the conveyance of the tape for wafer processing 10 as the rolled body, or due to the vibration caused by installation of the tape for wafer processing to the apparatus used at the time of sticking the tape for wafer processing to a wafer ring. Thus,

sufficient effects may not be obtained. Furthermore, if the support member 13 is thicker than 150 μm , the winding diameter obtainable at the time of producing a rolled body becomes larger, the weight also increases, and handling becomes difficult.

[0037] Regarding the support members 13, it is preferable that the maximum width x (see Fig. 1(a)) of the region overlapping with the label part 12a, the width being in the transverse direction of the release film, is 25 mm or less. If the maximum width x of the region in which the support members 13 overlap the label part 12a is larger than 25 mm, the contact area between the label part 12a and the support members 13 positioned on the inner side of the rolled body of the label part 12a in the state as a rolled body becomes too large, blocking between the label part 12a and the support members 13 occurs, and there is a risk that the label part 52a that is to be dispensed continuously from the rolled body may stick to the support member 14 on the side of the rolled body and be taken away. Furthermore, the surface of the support members 13 on the side that is brought into contact with the rolled body may be rough. When the surface of the support members 13 is rough, the contact area between the support members and the rolled body side can be decreased.

[0038] It is acceptable that the support members 13 do not have a region overlapping with the label part 12a, and the support members 13 may be installed between the outer periphery

of the label part 12a and the edges in the transverse direction of the release film.

[0039] Regarding the support member 13, for example, a tacky adhesive tape obtained by applying a tacky adhesive on a resin film base material can be suitably used. The tape for wafer processing 10 of the present embodiment can be formed by attaching such a tacky adhesive tape at predetermined positions of two end portions of the second face 11b of the release film 11. Regarding the tacky adhesive tape, only one layer may be attached, or a thin tape may be laminated thereon.

[0040] The resin film base material of the tacky adhesive tape is not particularly limited as long as the base material can endure the winding pressure; however, from the viewpoints of heat resistance, smoothness, and easy availability, it is preferable that the resin film base material is selected from polyethylene terephthalate (PET), polypropylene, and high-density polyethylene.

There are no particular limitations on the composition and physical properties of the tacky adhesive of the tacky adhesive tape, and any tacky adhesive that does not detach from the release film 11 during the winding process and storage process concerning the tape for wafer processing 10, may be used.

[0041] Furthermore, regarding the support members 13, colored support members may also be used. By using such colored

support members, the type of the tape can be clearly identified when the tape for wafer processing 10 is wound into a roll form. For example, the type or thickness of the tape can be easily identified by varying the color of the colored support members depending on the type or thickness of the tape for wafer processing 10, and thus the occurrence of human errors can be suppressed and prevented.

[0042] <Examples>

Hereinafter, the invention will be described in more detail by way of Examples; however, the invention is not intended to be limited to these Examples.

[0043] Tapes for wafer processing according to Examples and Comparative Examples were produced by the following method, and the performance was evaluated.

[0044] (Production of base film)

[Base film 1A]

A polyethylene resin, "NUC-8122", manufactured by NUC Corp. was heated to melt and was extrusion molded, and thus base film 1A having a thickness of 100 μm was produced. At the time of molding, the surface on which a pressure-sensitive adhesive was not applied was subjected to a surface-roughening treatment, and adjustment of the surface roughness was carried out so as to obtain the surface roughness values indicated in Table 1. Thus, a plurality of kinds of base films was produced.

[0045] [Base film 1B]

Base film 1B was produced in the same manner as in the case of the base film 1A, except that an EMMA resin, "ACRYFT WD201", manufactured by Sumitomo Chemical Co., Ltd. was used.

[0046] [Base film 1C]

Base film 1C was produced in the same manner as in the case of base film 1A, except that an ethylene-vinyl acetate copolymer resin, "EVATATE", manufactured by Sumitomo Chemical Co., Ltd. was used.

[0047] (Preparation of pressure-sensitive adhesive composition)

[Pressure-sensitive adhesive composition 2A]

100 parts by weight of an acrylic copolymer (weight average molecular weight 200,000) formed from 2-ethylhexyl acrylate, methyl acrylate, and 2-hydroxyethyl acrylate was mixed with 2 parts by weight of a polyisocyanate, "CORONATE L", manufactured by Tosoh Corp. as a curing agent, and thus pressure-sensitive adhesive composition 2A was obtained.

[0048] [Pressure-sensitive adhesive composition 2B]

100 parts by weight of an acrylic copolymer (weight average molecular weight 200,000) formed from 2-ethylhexyl acrylate, methyl acrylate, and 2-hydroxyethyl acrylate was mixed with 2 parts by weight of a polyisocyanate, "CORONATE L", manufactured by Tosoh Corp. as a curing agent, 150 parts by weight of "AD-PMT" manufactured by Shin Nakamura Chemical Co., Ltd. as an acrylate-based oligomer, and 2 parts by weight of

"IRGACURE 184" manufactured by Ciba-Geigy Japan, Ltd. as a photopolymerization initiator, and thus ultraviolet-curable pressure-sensitive adhesive composition 2A was obtained.

[0049] (Production of support members)

[Support member 3A]

100 parts by weight of an acrylic resin (mass average molecular weight 600,000, glass transition temperature -20°C) was mixed with 10 parts by mass of polyisocyanate "CORONATE L" manufactured by Tosoh Corp. as a curing agent and thus a pressure-sensitive adhesive composition was obtained.

The pressure-sensitive adhesive composition was applied on a polyethylene terephthalate film as a resin film base material such that the dried film thickness would be $10\text{ }\mu\text{m}$, and the pressure-sensitive adhesive composition was dried for 3 minutes at 110°C . Thus, support member 3A having an overall thickness of $35\text{ }\mu\text{m}$ was produced so as to obtain a width of 30 mm.

[0050] [Support member 3B]

Support member 3B was produced in the same manner as in the case of support member 3A, except that a polyethylene terephthalate film having a thickness different from that of support member 3A was used, and the overall thickness was adjusted to $48\text{ }\mu\text{m}$.

[0051] [Support member 3C]

Support member 3C was produced in the same manner as in

the case of support member 3A, except that a polypropylene film was used as the resin film base material, and the overall thickness was adjusted to be 65 μm .

[0052] [Support member 3D]

Support member 3D was produced in the same manner as in the case of support member 3C, except that the pressure-sensitive adhesive composition was applied so as to obtain a dried film thickness of 5 μm , and the overall thickness was adjusted to be 25 μm .

[0053] [Support member 3E]

Support member 3E was produced in the same manner as in the case of support member 3A, except that a high-density polyethylene film was used as the resin film base material, and the overall thickness was adjusted to be 150 μm .

[0054] [Support member 3F]

Support member 3F was produced in the same manner as in the case of support member 3C, except that a polypropylene film having one blast-treated surface was used as the resin film base material, the pressure-sensitive adhesive composition was applied on the surface on the opposite side of the blast-treated surface, and the overall thickness was adjusted to be 65 μm .

[0055] (Production of tape for wafer processing)

[Example 1]

Pressure-sensitive adhesive composition 2A was applied on a release film formed from a release-treated polyethylene

terephthalate film such that the dried film thickness would be 25 μm , and the pressure-sensitive adhesive composition was dried for 3 minutes at 110°C. Subsequently, the release film and base film 1A were bonded together, and thus a pressure-sensitive adhesive film was produced. The pressure-sensitive adhesive film was subjected to circular precut processing to obtain a circular shape having a diameter of 290 mm, by regulating the cutting depth into the release film to be 10 μm or less. Next, support members 3A were stuck to a second face of the release film 2A, the second face being on the opposite side of the first face where the pressure-sensitive adhesive film was provided, at two ends in the transverse direction of the release film 2A, such that the maximum width of the region in which the label part of the pressure-sensitive adhesive film overlapped the support members 3A, the maximum width being in the transverse direction of the release film, would be 25 mm. Thus, a tape for wafer processing according to Example 1 having the structure illustrated in Fig. 1 was produced.

[0056] [Examples 2 to 6 and Comparative Examples 1 to 3]

Tapes for wafer processing according to Examples 2 to 6 and Comparative Examples 1 to 3 were produced in the same manner as in Example 1, except that the base film, the pressure-sensitive adhesive composition, and the support members indicated in Table 1 were used, and the support members

were provided such that the maximum width of the region of the support members overlapping the label part would have the values indicated in Table 1.

[0057] (Arithmetic surface roughness Ra)

For each of the pressure-sensitive adhesive films used for the pressure-sensitive adhesive tapes for wafer processing according to Examples and Comparative Examples, the arithmetic average roughness Ra of the surface of the pressure-sensitive adhesive film on the side that was not in contact with the release film, that is, the surface of the base film on the side where the pressure-sensitive adhesive layer was not provided, was measured using a surface roughness analyzer (SURFTEST SJ-301) manufactured by Mitutoyo Corp. under the conditions of N = 10, and the average value was determined. The results are presented in Table 1.

[0058] (Evaluation of dispensability from rolled body)

Each of the pressure-sensitive adhesive tapes for wafer processing according to the Examples and Comparative Examples was wound into a roll form such that the number of sheets of a circular-shaped pressure-sensitive adhesive film (label part) would be 50, and thus a rolled body was produced. The pressure-sensitive adhesive tape for wafer processing was continuously dispensed from the rolled body by means of a bonding apparatus that sticks the pressure-sensitive adhesive tape to ring frames, and the number of sheets of the label part

that could not be dispensed smoothly and continuously and were taken away to the side of the rolled body was counted. The results are presented in Table 1.

[0059] (Transmittance)

For the pressure-sensitive adhesive films used for the pressure-sensitive adhesive tape for wafer processing according to the Examples and Comparative Examples, the parallel light transmittance was measured. The measurement was performed in the wavelength range of 400 to 1,100 nm using UV-3101 spectrophotometer manufactured by Shimadzu Corp., and the lowest transmittance was determined. The results are presented in Table 1.

[0060] [Table 1]

		Example 1	Example 2	Example 3	Example 4	Example 5	Example 6	Comparative Example 1	Comparative Example 2	Comparative Example 3
Pressure-sensitive adhesive film	Type of base film	1A	1A	1B	1B	1C	1A	1A	1A	1A
	Surface roughness Ra (μm)	0.22	0.23	0.28	0.27	0.28	0.28	0.35	0.28	0.28
	Type of pressure-sensitive adhesive composition	2A	2B	2A	2A	2A	2A	2A	2A	2A
Support member	Type	3A	3B	3C	3E	3F	3A	3A	3D	None
	Thickness (μm)	35	48	65	150	65	35	35	25	
Maximum width of region overlapping with label part (mm)		25	25	25	23	23	30	25	25	-
Transmittance (%)		82	83	81	81	80	82	37	81	81
Evaluation of dispensability from rolled body (sheets)		0	0	0	0	0	2	0	8	10

[0061] As shown in Table 1, the tapes for wafer processing of Examples 1 to 6 were such that the arithmetic surface roughness Ra of the pressure-sensitive adhesive film on the side that was not in contact with the release film was 0.3 μm or less, and the thickness of the support members was 30 to 150 μm . Therefore, the tapes for wafer processing exhibited high transmissibility, and also, dispensing from the rolled body could be carried out satisfactorily. Examples 1 to 5 in which the maximum width of the region of the support members overlapping the label part, the maximum width being in the transverse direction of the release film, was 25 mm or less, exhibited particularly superior results in the evaluation of continuous dispensability from the rolled body.

[0062] In contrast, in the tape for wafer processing of Comparative Example 1, as shown in Table 1, since the arithmetic surface roughness Ra of the pressure-sensitive adhesive film on the side that was not in contact with the release film was larger than 0.3 μm , the tape did not show sufficient transmissibility. In the tape for wafer processing of Comparative Example 2, since the thickness of the support members was thinner than 30 μm , blocking occurred between the label part and the rear surface of the release film, and there were 8 sheets of the label part that stuck and were taken away to the rear surface of the release film on the side of the rolled body and could not be dispensed continuously from the rolled body. Furthermore, in Comparative Example 3 that was not provided with support members, there were 10 sheets of the label part that could not be continuously dispensed from the rolled

body.

EXPLANATIONS OF LETTERS OR NUMERALS

[0063] 10: TAPE FOR WAFER PROCESSING
 11: RELEASE FILM
 12: PRESSURE-SENSITIVE ADHESIVE FILM
 12a: LABEL PART
 12b: PERIPHERAL PART
 13: SUPPORT MEMBER

CLAIMS

1. A tape for wafer processing, comprising:

a long release film;

a pressure-sensitive adhesive film having a label part provided on a first face of the release film and having a predetermined shape corresponding to the shape of a ring frame for dicing, and a peripheral part surrounding the outer side of the label part; and

support members provided at two ends in the transverse direction of the release film, the support members being provided on a second face on the opposite side of the first face having the pressure-sensitive adhesive film provided thereon,

wherein the pressure-sensitive adhesive film has an arithmetic surface roughness Ra of 0.3 μm or less on the side not in contact with the release film, and the support members each have a thickness of 30 to 150 μm .

2. The tape for wafer processing according to claim 1, wherein the support members are each provided so as to have a region overlapping with the label part, with the release film being disposed therebetween, and the maximum width of the region overlapping with the label part, the maximum width extending in the transverse direction of the release film, is 25 mm or less.

3. The tape for wafer processing according to claim 1 or 2, wherein the support members are provided continuously along the longitudinal direction of the release film.

4. The tape for wafer processing according to any one of claims 1 to 3, wherein the support members each have a laminated structure including two or more layers.

5. The tape for wafer processing according to any one of claims 1 to 4, wherein the support members are formed from a tacky adhesive tape obtained by applying a tacky adhesive on a resin film base material selected from the group consisting of polyethylene terephthalate, polypropylene, and high-density polyethylene.