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LENS MODULE

Abstract

A light module including a substrate, a light emitter disposed on the substrate and including a plurality of light emitting devices, a lens disposed on the substrate and the light emitter, and a supporter configured to be connected to a region of the lens, in which the lens includes a curved region and a flat region, and the supporter includes a protruding region extended from the substrate in a direction substantially perpendicular to the substrate and a clip region connected to a region of an end of the lens.

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Background/Summary

CROSS REFERENCE TO RELATED APPLICATIONS [0001] This application is a continuation of U.S. patent application Ser. No. 17/771,767, filed on Apr. 25, 2022, which is a national stage entry of International Application No. PCT/CN 2020/123754, filed on Oct. 26, 2020, which claims priority to and the benefit of Chinese Patent Application No. 201911023036.0, filed on Oct. 25, 2019, each of which is hereby incorporated by reference for all purposes as if fully set forth herein.

BACKGROUND

Field

[0002] Embodiments of the invention relate generally to a lens module including a glue, and more particularly, to a lens module for preventing a glue or a lens from being detached from a substrate.

Discussion of the Background

[0003] Light emitting diode (LED) has many advantages over conventional light sources. The light emitting diode has light directionality, is capable of controlling various colors, and is advantageous in controlling an amount of light depending on changes in voltage and current, compared to the conventional light sources.

[0004] The light emitting diode is a semiconductor light emitting device that emits light by a potential difference when electrons and holes recombine in a P-N semiconductor junction structure by an applied current. A light emitting apparatus using the light emitting diode has advantages such as eco-friendliness, low voltage, long lifespan, low price, and others.

[0005] Typically, an optical lens is attached to an upper end of a light emitting diode package through a glue or an adhesive sheet. Accordingly, when the glue is used, an arrangement location of the optical lens may be shifted due to a flow of the glue when the glue is cured. In addition, the glue and the adhesive sheet include an organic-based glue material such as acrylic, epoxy, or the like. The adhesive material may have reduced glue characteristics at high temperatures. Accordingly, there may be a drawback that the optical lens is detached from the light emitting diode package.

[0006] The above information disclosed in this Background section is only for understanding of the background of the inventive concepts, and, therefore, it may contain information that does not constitute prior art.

SUMMARY

[0007] Exemplary embodiments provide a lens module for preventing a glue or a lens from being detached from a substrate.

[0008] Additional features of the inventive concepts will be set forth in the description which follows, and in part will be apparent from the description, or may be learned by practice of the inventive concepts.

[0009] A lens module according to an exemplary embodiment of the present disclosure includes a substrate having a plurality of light emitting regions, a light emitting devices provided in each of the plurality of light emitting regions to emit light, and a lens unit provided on the substrate to cover the light emitting devices, a glue contacting the substrate and the lens unit to secure the substrate and the lens unit, and a support member provided in the glue and mounted on the substrate. The support member may include a hump for increasing a contact area between the support member and the glue, and a clip connected to the lens unit.

[0010] In an exemplary embodiment of the present disclosure, the support member may comprise a metal sheet, and may further include a clip holder for supporting the clip, and a pad mounted on the substrate.

[0011] In an exemplary embodiment of the present disclosure, a hole may be provided in the hump.
[0012] In an exemplary embodiment of the present disclosure, the hump may be configured to have a length corresponding to a predetermined first ratio with respect to a length of the support member in contact with the substrate, or the hump may be configured to have a length corresponding to a predetermined second ratio with respect to a thickness of the glue.
[0013] In an exemplary embodiment of the present disclosure, the clip holder may have elasticity such that a shape thereof is deformed when an external force in a Z-axis direction perpendicular to the substrate is applied, the shape of the clip holder may be deformed such that the clip and an end of the lens unit are fastened, and thereafter, when the clip and the lens unit are fastened, the deformed shape of the clip holder may be restored.
[0014] In an exemplary embodiment of the present disclosure, the shape of the clip holder may be configured to correspond to a shape of the end of the lens unit, or a length of the clip holder may be configured to have a length corresponding to a predetermined third ratio with respect to a thickness of the end of the lens unit.
[0015] In an exemplary embodiment of the present disclosure, the clip may have elasticity such that a shape thereof is deformed when an external force in the Z-axis direction perpendicular to the substrate is applied, the shape of the clip may be deformed such that the support member secures the lens unit, and thereafter, when the lens unit is secured, the deformed shape of the clip holder may be restored.
[0016] In an exemplary embodiment of the present disclosure, the shape of the clip may be configured to correspond to the shape of the end of the lens unit, or a distance between the clip and the substrate may be configured in a predetermined fourth ratio with respect to the thickness of the end of the lens unit.
[0017] In an exemplary embodiment of the present disclosure, the lens module may include a plurality of support members of different types from one another determined in consideration of shapes of the substrate, the lens unit, and the glue.
[0018] In an exemplary embodiment of the present disclosure, the plurality of support members may include at least two support members among a first support member including a first hump having a first length and including a hole, a second support member including a second hump having the first length and not including the hole, a third support member including a third hump having a second length shorter than the first length and including the hole, and a fourth support member including a fourth hump having the second length and not including the hole.
[0019] An exemplary embodiment of the present disclosure may prevent a glue included in a lens module from being detached from a substrate.
[0020] Another exemplary embodiment of the present disclosure may prevent a lens unit included in a lens module from being detached from a substrate.
[0021] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0022] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention, and together with the description serve to explain the inventive concepts.
[0023] FIG. **1** is a perspective view illustrating a lens module according to an exemplary embodiment of the present disclosure.
[0024] FIG. **2** is an exploded perspective view of the lens module of FIG. **1**.

[0025] FIG. **3** is a cross-sectional view illustrating a process in which a glue is included in the lens module according to an exemplary embodiment of the present disclosure.
[0026] FIGS. **4**A through **4**C are cross-sectional views illustrating an exemplary embodiment in which a support member is included in the lens module of the present disclosure.
[0027] FIGS. **5**A through **5**C are cross-sectional views illustrating another exemplary embodiment in which a support member is included in the lens module of the present disclosure.
[0028] FIG. **6** is a perspective view illustrating a support member according to a first exemplary embodiment of the present disclosure.
[0029] FIG. **7** is a perspective view illustrating the support member and the substrate together according to the first exemplary embodiment of the present disclosure.
[0030] FIG. **8** is a front view illustrating a state in which the support member according to the first exemplary embodiment of the present disclosure is mounted on the substrate.
[0031] FIG. **9** is a side view illustrating the state in which the support member according to the first exemplary embodiment of the present disclosure is mounted on the substrate.
[0032] FIGS. **10**A through **10**C are side views illustrating a process in which the support member is connected to the lens unit according to the first exemplary embodiment of the present disclosure.
[0033] FIG. **11** is a perspective view illustrating a support member according to a second exemplary embodiment of the present disclosure.
[0034] FIG. **12** is a perspective view illustrating a support member according to a third exemplary embodiment of the present disclosure.
[0035] FIG. **13**A is a perspective view illustrating the support member and the substrate together according to the third exemplary embodiment of the present disclosure.
[0036] FIG. **13**B is a front view illustrating the support member according to the third exemplary embodiment of the present disclosure.
[0037] FIG. **13**C is a side view illustrating the support member according to the third exemplary embodiment of the present disclosure.
[0038] FIG. **14** is a front view illustrating a state in which the support member is mounted on the substrate according to the third exemplary embodiment of the present disclosure.
[0039] FIG. **15** is a side view illustrating the state in which the support member is mounted on the substrate according to the third exemplary embodiment of the present disclosure.
[0040] FIGS. **16**A through **16**C are side views illustrating a process in which the support member is connected to the lens unit according to the third exemplary embodiment of the present disclosure.
[0041] FIG. **17** is a perspective view illustrating a support member according to a fourth exemplary embodiment of the present disclosure.
[0042] FIGS. **18**A through **18**D are diagrams illustrating a process of designing a lens module according to an exemplary embodiment of the present disclosure.
[0043] FIGS. **19**A through **19**C are cross-sectional views illustrating an exemplary embodiment in which a support member is implemented on the substrate of the present disclosure.

DETAILED DESCRIPTION

[0044] In the following description, for the purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of various embodiments or implementations of the invention. As used herein “embodiments” and “implementations” are interchangeable words that are non-limiting examples of devices or methods employing one or more of the inventive concepts disclosed herein. It is apparent, however, that various embodiments may be practiced without these specific details or with one or more equivalent arrangements. In other instances, well-known structures and devices are shown in block diagram form in order to avoid unnecessarily obscuring various embodiments. Further, various embodiments may be different, but do not have to be exclusive. For example, specific shapes, configurations, and characteristics of an embodiment may be used or implemented in another embodiment without departing from the inventive concepts.

[0045] Unless otherwise specified, the illustrated embodiments are to be understood as providing features of varying detail of some ways in which the inventive concepts may be implemented in practice. Therefore, unless otherwise specified, the features, components, modules, layers, films, panels, regions, and/or aspects, etc. (hereinafter individually or collectively referred to as "elements"), of the various embodiments may be otherwise combined, separated, interchanged, and/or rearranged without departing from the inventive concepts.
[0046] The use of cross-hatching and/or shading in the accompanying drawings is generally provided to clarify boundaries between adjacent elements. As such, neither the presence nor the absence of cross-hatching or shading conveys or indicates any preference or requirement for particular materials, material properties, dimensions, proportions, commonalities between illustrated elements, and/or any other characteristic, attribute, property, etc., of the elements, unless specified. Further, in the accompanying drawings, the size and relative sizes of elements may be exaggerated for clarity and/or descriptive purposes. When an embodiment may be implemented differently, a specific process order may be performed differently from the described order. For example, two consecutively described processes may be performed substantially at the same time or performed in an order opposite to the described order. Also, like reference numerals denote like elements.
[0047] When an element, such as a layer, is referred to as being "on," "connected to," or "coupled to" another element or layer, it may be directly on, connected to, or coupled to the other element or layer or intervening elements or layers may be present. When, however, an element or layer is referred to as being "directly on," "directly connected to," or "directly coupled to" another element or layer, there are no intervening elements or layers present. To this end, the term "connected" may refer to physical, electrical, and/or fluid connection, with or without intervening elements. Further, the D1-axis, the D2-axis, and the D3-axis are not limited to three axes of a rectangular coordinate system, such as the x, y, and z-axes, and may be interpreted in a broader sense. For example, the D1-axis, the D2-axis, and the D3-axis may be perpendicular to one another, or may represent different directions that are not perpendicular to one another. For the purposes of this disclosure, "at least one of X, Y, and Z" and "at least one selected from the group consisting of X, Y, and Z" may be construed as X only, Y only, Z only, or any combination of two or more of X, Y, and Z, such as, for instance, XYZ, XYY, Y Z, and ZZ. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items.
[0048] Although the terms "first," "second," etc. may be used herein to describe various types of elements, these elements should not be limited by these terms. These terms are used to distinguish one element from another element. Thus, a first element discussed below could be termed a second element without departing from the teachings of the disclosure.
[0049] Spatially relative terms, such as "beneath," "below," "under," "lower," "above," "upper," "over," "higher," "side" (e.g., as in "sidewall"), and the like, may be used herein for descriptive purposes, and, thereby, to describe one elements relationship to another element(s) as illustrated in the drawings. Spatially relative terms are intended to encompass different orientations of an apparatus in use, operation, and/or manufacture in addition to the orientation depicted in the drawings. For example, if the apparatus in the drawings is turned over, elements described as "below" or "beneath" other elements or features would then be oriented "above" the other elements or features. Thus, the exemplary term "below" can encompass both an orientation of above and below. Furthermore, the apparatus may be otherwise oriented (e.g., rotated 90 degrees or at other orientations), and, as such, the spatially relative descriptors used herein interpreted accordingly.
[0050] The terminology used herein is for the purpose of describing particular embodiments and is not intended to be limiting. As used herein, the singular forms, "a," "an," and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. Moreover, the terms "comprises," "comprising," "includes," and/or "including," when used in this specification, specify the presence of stated features, integers, steps, operations, elements, components, and/or groups

thereof, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof. It is also noted that, as used herein, the terms “substantially,” “about,” and other similar terms, are used as terms of approximation and not as terms of degree, and, as such, are utilized to account for inherent deviations in measured, calculated, and/or provided values that would be recognized by one of ordinary skill in the art.

[0051] Various embodiments are described herein with reference to sectional and/or exploded illustrations that are schematic illustrations of idealized embodiments and/or intermediate structures. As such, variations from the shapes of the illustrations as a result, for example, of manufacturing techniques and/or tolerances, are to be expected. Thus, embodiments disclosed herein should not necessarily be construed as limited to the particular illustrated shapes of regions, but are to include deviations in shapes that result from, for instance, manufacturing. In this manner, regions illustrated in the drawings may be schematic in nature and the shapes of these regions may not reflect actual shapes of regions of a device and, as such, are not necessarily intended to be limiting.

[0052] As customary in the field, some embodiments are described and illustrated in the accompanying drawings in terms of functional blocks, units, and/or modules. Those skilled in the art will appreciate that these blocks, units, and/or modules are physically implemented by electronic (or optical) circuits, such as logic circuits, discrete components, microprocessors, hard-wired circuits, memory elements, wiring connections, and the like, which may be formed using semiconductor-based fabrication techniques or other manufacturing technologies. In the case of the blocks, units, and/or modules being implemented by microprocessors or other similar hardware, they may be programmed and controlled using software (e.g., microcode) to perform various functions discussed herein and may optionally be driven by firmware and/or software. It is also contemplated that each block, unit, and/or module may be implemented by dedicated hardware, or as a combination of dedicated hardware to perform some functions and a processor (e.g., one or more programmed microprocessors and associated circuitry) to perform other functions. Also, each block, unit, and/or module of some embodiments may be physically separated into two or more interacting and discrete blocks, units, and/or modules without departing from the scope of the inventive concepts. Further, the blocks, units, and/or modules of some embodiments may be physically combined into more complex blocks, units, and/or modules without departing from the scope of the inventive concepts.

[0053] Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this disclosure is a part. Terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and should not be interpreted in an idealized or overly formal sense, unless expressly so defined herein.

[0054] FIG. **1** is a perspective view illustrating a lens module according to an exemplary embodiment of the present disclosure, and FIG. **2** is an exploded perspective view of the lens module of FIG. **1**.

[0055] Referring to FIG. **1** and FIG. **2**, a lens module **100** according to an exemplary embodiment of the present disclosure includes a substrate **10**, a light emitting device **20**, a lens unit **30**, a glue **40**, and a fastening member **50**.

[0056] The substrate **10** is provided for mounting one or more light emitting devices **20** thereon. A light emitting region which the light emitting device **20** is mounted on and light is emitted through is provided on the substrate **10**, and one or more light emitting devices **20** may be provided for each light emitting region.

[0057] In the exemplary embodiment of the present disclosure, a plurality of light emitting regions may be provided on an upper surface of the substrate **10**, and thus, a size of the lens module **100** and an amount of light may be determined. For example, the light emitting regions may be

arranged in a 2×2 matrix shape. However, this is only an example, and the light emitting region may be arranged in various shapes such as 3×4, 2×6, or others.

[0058] The substrate **10** may be provided in various shapes. For example, the substrate **10** may have a quadrangular shape in plan view, which is provided in a shape of a plate having a predetermined height. However, the shape of the substrate **10** is not limited thereto, and may be provided in an elliptical or circular shape.

[0059] The substrate **10** is provided with interconnections and a terminal for providing power to the light emitting device **20**. In an exemplary embodiment of the present disclosure, the substrate **10** may be a printed circuit board. However, a type of the substrate **10** is not limited thereto, and may be formed of various materials and various shapes.

[0060] For example, at least a portion of the substrate **10** may consist of a material having high thermal conductivity. The substrate **10** may include, for example, a metal such as copper, iron, nickel, chromium, aluminum, silver, gold, titanium, or an alloy thereof. Alternatively, the substrate **10** may include a non-conductive material such as a ceramic, a polymer resin, glass, or a composite material thereof (e.g., a composite resin or a mixture of a composite resin and a conductive material).

[0061] In an exemplary embodiment of the present disclosure, the light emitting device **20** may emit light upwards from the substrate **10**. For example, the light emitting device **20** may emit light radially from the surface of the substrate **10**. In this case, the light emitting device **20** may emit light uniformly and isotropically with respect to all angles. However, a light exiting direction of the light emitting device **20** according to the exemplary embodiment of the present disclosure is not limited thereto. For example, the light exiting direction of the light emitting device **20** may be limited within a certain angle, and in this case, light may be anisotropically emitted along a predetermined direction. Accordingly, when light with directionality in a specific direction is required, light emission in the specific direction may be easily implemented by using the light emitting device **20** that anisotropically emits light.

[0062] In an exemplary embodiment of the present disclosure, the light emitting device **20** may be implemented with light emitting diode chips. Although not shown, the light emitting device **20** may include a light emitting structure and an electrode portion.

[0063] The light emitting structure may include a first conductivity type semiconductor layer, an active layer, and a second conductivity type semiconductor layer sequentially provided.

[0064] The first conductivity type semiconductor layer is a semiconductor layer doped with a first conductivity type dopant. The first conductivity type dopant may be an n-type dopant. The first conductivity type dopant may be Si, Ge, Se, Te or C. In an exemplary embodiment of the present disclosure, the first conductivity type semiconductor layer may include a nitride-based semiconductor material. For example, the first conductivity type semiconductor layer may consist of a semiconductor material having a compositional formula of In.sub.xAl.sub.yGa.sub.1-x-yN ($0 \leq x \leq 1$, $0 \leq y \leq 1$, $0 \leq x\ y \leq 1$). The active layer is provided on the first conductivity type semiconductor layer and corresponds to the light emitting layer.

[0065] The active layer is a layer in which electrons (or holes) injected through the first conductivity type semiconductor layer and holes (or electrons) injected through the second conductivity type semiconductor layer meet each other, and light is emitted due to a difference in band gaps of energy bands depending on a material forming the active layer. The active layer may emit light of at least one peak wavelength of ultraviolet, blue, green, and red. The active layer may be implemented with a compound semiconductor. The active layer may be implemented, for example, by at least one of group III-V or group II-VI compound semiconductors, and may be formed of a material having a compositional formula of InxAlyGa1-x-yN ($0 \leq x \leq 1$, $0 \leq y \leq 1$, $0 \leq x+y \leq 1$).

[0066] The second conductivity type semiconductor layer is provided on the active layer. The second conductivity type semiconductor layer is a semiconductor layer having a second

conductivity type dopant having a polarity opposite to that of the first conductivity type dopant. The second conductivity type dopant may be a p-type dopant, and the second conductivity type dopant may include, for example, Mg, Zn, Ca, Sr, Ba, or the like. In an exemplary embodiment of the present disclosure, the second conductivity type semiconductor layer may include a nitride-based semiconductor material. The second conductivity type semiconductor layer may consist of a semiconductor material having a composition formula of In.sub.xAl.sub.yGa.sub.1-x-yN ($0 \leq x \leq 1$, $0 \leq y \leq 1$, $0 \leq x\ y \leq 1$).

[0067] In an exemplary embodiment of the present disclosure, a cathode connected to the first conductivity type semiconductor layer and an anode connected to the second conductivity type semiconductor layer are provided on the first conductivity type semiconductor layer and the second conductivity type semiconductor layer, respectively, and the cathode and the anode may receive power by being connected to the interconnections or the terminal of the substrate **10**.

[0068] Referring to FIG. **1** and FIG. **2**, the lens module **100** includes the lens unit **30** that covers the light emitting device **20**. The lens unit **30** may protect the light emitting device **20**, and may also be used as an optical element that simply transmits light emitted from the light emitting device **20** or guides it in a predetermined direction.

[0069] The lens unit **30** may be provided in various shapes in plan view. For example, the lens unit **30** may be provided in a rectangular shape. However, the shape of the lens unit **30** is not limited thereto, and may be provided in another polygonal or oval shape.

[0070] The lens unit **30** may correspond to the shape of the light emitting region on the substrate **10** on which the light emitting device **20** is disposed, and may include a lens unit **30***a* at least partially formed of a curved surface and a flat portion **30***b* provided around the lens **30***a* and having an upper surface parallel to the surface of the substrate **10**.

[0071] In FIG. **1** and FIG. **2**, although each of the lens units **30** is illustrated as including four lens **30***a*, the inventive concepts are not limited thereto, but the lens unit **30** may include various numbers of lens **30***a* depending on design specifications.

[0072] The lens **30***a* may have an elliptical shape protruding upwards. The flat portion **30***b* may be provided around the lens **30***a* in a plate shape substantially parallel to the surface of the substrate **10**. However, the shape of the lens **30***a* is not limited thereto, and other shapes may be provided depending on a light exiting efficiency and a light exiting direction.

[0073] In addition, the upper surface of the flat portion **30***b* may be provided substantially parallel to the upper surface of the substrate **10**. However, this is only an example, and to facilitate fastening with other elements, the flat portion **30***b* may be provided as having a partially parallel and partially inclined surface. In an exemplary embodiment of the present disclosure, the lens **30***a* and the flat portion **30***b* may be integrally formed without being separated.

[0074] The lens **30***a* may be provided with various materials satisfying the above-described functions, but the materials are not limited thereto. For example, the lens **30***a* may consist of quartz or a polymer organic material. Herein, in a case of a polymer organic material, since a wavelength of light to be absorbed/transmitted is different depending on types of a monomer, a molding method, and a condition, the polymer organic material may be selected in consideration of a wavelength of light emitted from the light emitting device **20**. For example, an organic polymer such as poly (methylmethacrylate) (PM MA), polyvinylalcohol (PVA), polypropylene (PP), low-density polyethylene (PE), and the like may hardly absorb UV light, but an organic polymer such as polyester may absorb UV light.

[0075] Referring to FIG. **1** and FIG. **2**, the lens module **100** includes the glue **40** for securing the lens unit **30** to the substrate **10**. The glue **40** may be implemented as a sealing glue or a plastic type.

[0076] For example, the glue **40** may include at least one of an acrylic glue, a silicone glue, a urethane glue, a polyvinyl butyral glue (PMB), an ethylene-vinyl acetate glue (EVA), polyvinyl ether, saturated amorphous polyester, and melamine resin.

[0077] Referring to FIG. **1** and FIG. **2**, the lens module **100** includes the fastening member **50**

connecting the substrate **10** and the glue **40**. In an exemplary embodiment of the present disclosure, the substrate **10** and the glue **40** may be firmly connected by fastening a screw in the fastening member **50**.

[0078] FIG. **3** is a cross-sectional view illustrating a process in which the glue is included in the lens module according to an exemplary embodiment of the present disclosure.

[0079] Referring to FIGS. **1** through **3**, the lens module **100** includes a lens **31** having an elliptical spherical shape protruding upwards, the lens unit **30** including the lens **31**, and the substrate **10**.

[0080] The glue **40** may be disposed in contact with each of the substrate **10** and the lens unit **30** so as to secure the lens unit **30** on the substrate **10**.

[0081] The present disclosure relates to a technique for securing a lens to a substrate (e.g., PCB) using a glue when a lens module is produced, in which adhesion between the glue and the substrate is determined by a contact area between the glue and the substrate or a roughness of a contact surface.

[0082] For example, when the contact area between the glue and the substrate is small, the glue may be detached from the substrate, and a method is suggested in the present disclosure that a support member is included in the glue so as to increase the adhesion between the glue and the substrate.

[0083] Herein, the support member may comprise a metal sheet, and the metal sheet may increase the contact area between the glue and the substrate. A surface of the metal sheet may have a roughness equal to or greater than a certain value so as to increase the adhesion.

[0084] In addition, when the thickness of the glue is small, the lens may be detached from the substrate because the adhesion between the glue and the substrate is not sufficient. Even in this case, a metal sheet may be included in the glue so as to increase the adhesion between the glue and the substrate.

[0085] According to an exemplary embodiment, some portions of the metal sheet may have elasticity, and one end of the metal sheet may contact the lens. According to an exemplary embodiment, the lens is secured by applying a force in the Z-axis direction to the end of the lens in contact with some portions of the metal sheet, and thus, it is possible to prevent the lens from being detached from the substrate.

[0086] FIGS. **4**A through **4**C are cross-sectional views illustrating an exemplary embodiment in which a support member is included in the lens module of the present disclosure.

[0087] Referring to FIGS. **1** through **4**A, the lens module includes the substrate **10**, the light emitting device **20** disposed on the substrate **10**, the lens unit **30** covering the light emitting device **20**, and the glue **40** that is adhered to the substrate **10** and the lens unit **30** and firmly connects the substrate **10** and the lens unit **30**.

[0088] According to an exemplary embodiment, after the glue **40** is solidified, the substrate **10** and the lens unit **30** may be secured by the adhesion of the glue **40**, and the lens module may be waterproofed.

[0089] As shown in FIG. **4**B, when the contact area between the substrate **10** and the glue **40** is reduced, the adhesion between the substrate **10** and the glue **40** may be decreased. In particular, there is a high possibility that the adhesion between the substrate **10** and the glue **40** at an edge of the substrate **10** is reduced.

[0090] When the adhesion between the glue **40** and the substrate **10** is reduced and the glue **40** is detached (or peeled off) from the substrate **10**, the waterproof performance of the lens module may also be affected.

[0091] In this case, to prevent the glue **40** from being detached from (or peeled off) from the substrate **10**, a method is suggested in the present disclosure that a support member **60** is included in the glue **40** as shown in FIG. **4**C. The support member **60** may be a metal sheet, and the metal sheet may be implemented so as to increase the contact area between the glue **40** and the substrate **10** or so as to increase a roughness. Through this, the support member **60** may prevent the glue **40**

from being detached from the substrate **10**.
[0092] In this case, the support member **60** may be mounted on the substrate **10** in a surface mount technology (SMT) process. The support member **60** may be implemented in various shapes so as to prevent the glue **40** from being loosened or peeled off from the substrate **10**.
[0093] The shape of the support member **60** shown in FIG. **4**C is only one form for solving a technical problem of the present application, and the inventive concepts are not limited to the shape of the support member **60** shown in FIG. **4**C, but the support member **60** may be implemented in various forms.
[0094] In addition, the support member **60** is not limited to only a metal sheet, but may be implemented with other materials capable of firmly connecting the glue **40** and the substrate **10**.
[0095] FIGS. **5**A through **5**C are cross-sectional views illustrating another exemplary embodiment in which a support member is included in the lens module of the present disclosure.
[0096] Referring to FIGS. **1** through **5**A, the lens module includes the substrate **10**, the light emitting device **20** disposed on the substrate **10**, the lens unit **30** covering the light emitting device **20**, and the glue **40** that is adhered to the substrate **10** and the lens unit **30** and firmly connects the substrate **10** and the lens unit **30**. Herein, the lens unit **30** may be secured by a pressure of the glue **40**.
[0097] In FIG. **5**B, when an external force is applied in a direction to weaken the connection between the lens unit **30** and the substrate **10**, a portion of a contact surface of the lens unit **30** may be detached from the substrate **10**, thereby creating a gap between the lens unit **30** and the substrate **10**. In this case, since the contact area between the lens unit **30** and the glue **40** is reduced, the adhesion between the lens unit **30** and the glue **40** may be decreased.
[0098] In the present disclosure, as shown in FIG. **5**B, to prevent the lens unit **30** from being detached from the substrate **10**, a method is suggested in the present disclosure that the support member **60** is included in the glue **40** as shown in FIG. **5**C.
[0099] In this case, the support member **60** may be mounted on the substrate **10** in a surface mount technology (SMT) process. The support member **60** may be implemented in various shapes so as to prevent the lens unit **30** from being loosened or peeled off from the substrate **10**.
[0100] The shape of the support member **60** shown in FIG. **5**C is only one form for solving a technical problem of the present application, and the inventive concepts are not limited to the shape of the support member **60** shown in FIG. **5**C, but the support member **60** may be implemented in various forms.
[0101] The support member **60** may be implemented as a metal sheet, and the support member **60** may be implemented so as to secure the lens unit **30** by applying pressure to one end of the lens unit **30** in the Z-axis direction while in contact with one end of the lens unit **30**. Accordingly, it is possible to prevent the lens unit **30** from being detached from the substrate **10**.
[0102] In addition, the support member **60** is not limited to only a metal sheet, but may be implemented with other materials capable of firmly connecting the lens unit **30** and the substrate **10**.
[0103] FIG. **6** is a perspective view illustrating a support member according to a first exemplary embodiment of the present disclosure, and FIG. **7** is a perspective view illustrating the support member and the substrate together according to the first exemplary embodiment of the present disclosure.
[0104] Referring to FIG. **6**, a support member **60***a* according to the first exemplary embodiment of the present disclosure may be implemented as a metal sheet. The support member **60***a* may include a hump **61***a*, a clip holder **62***a*, a clip **63***a*, and a pad **64***a*.
[0105] According to an exemplary embodiment, the hump **61***a* may be set so as to maximize a contact area between the support member **60***a* included in the lens module and the glue **40**. According to an exemplary embodiment, the hump **61***a* may be implemented such that the contact area between the support member **60***a* and the glue **40** is equal to or greater than a predetermined

area. The hump **61***a* may be formed to extend from both sides (or one side) of the pad **64***a*, which will be described in more detail later, and may be formed to have a shape partially protruding in the Z-axis direction, which is a direction perpendicular to the substrate. Since the hump **61***a* is formed by extending the pad **64***a*, it also corresponds to an extended portion.

[0106] In addition, to increase the contact area between the support member **60***a* and the glue, the hump **61***a* may be implemented so as to include a hole. In this case, since the glue is inserted into the hole in the hump **61***a*, the contact area between the support member **60***a* and the glue may be increased.

[0107] The clip holder **62***a* may be configured to support the clip **63***a*, and the clip **63***a* may be used so as to connect the lens unit included in the lens module and the support member **60***a*.

[0108] Referring to FIG. **6** and FIG. **7**, the pad **64***a* of the support member **60***a* is disposed on a pad region **11** on the substrate **10**, and thus, the support member **60***a* may be mounted on the substrate **10**.

[0109] FIG. **8** is a front view illustrating a state in which the support member according to the first exemplary embodiment of the present disclosure is mounted on the substrate, and FIG. **9** is a side view illustrating the state in which the support member according to the first exemplary embodiment of the present disclosure is mounted on the substrate.

[0110] Referring to FIGS. **6** through **8**, the support member **60***a* may be included in the glue **40** and may be mounted on the substrate **10**. The support member **60***a* may be implemented in various shapes such that the glue **40** and the substrate **10** are firmly connected to each other.

[0111] The pad **64***a* of the support member **60***a* may be secured on the pad region **11** on the substrate **10** by a surface mount technology (SMT) process.

[0112] According to an exemplary embodiment, a length “A” of the hump **61***a* of the support member **60***a* may be longer than a length “B” of a body of the support member **60***a* in contact with the substrate **10**.

[0113] When the length A of the hump **61***a* is implemented to be longer than the length B of the body of the support member **60***a*, there is an effect that the adhesion between the support member **60***a* and the glue may be increased by increasing the contact area between the support member **60***a* and the glue.

[0114] In addition, when the length A of the hump **61***a* is implemented to be longer than the length B of the body of the support member **60***a*, there is an effect that the adhesion between the support member **60***a* and the glue may be increased by increasing a roughness of the contact surface between the support member **60***a* and the glue.

[0115] According to an exemplary embodiment, the length A of the hump **61***a* may be implemented to be longer than a thickness C of the glue **40**.

[0116] When the length A of the hump **61***a* is implemented to be longer than the thickness C of the glue **40**, there is an effect that a supporting force of the support member **60***a* for the glue **40** may be increased.

[0117] Referring to FIGS. **6** through **9**, the support member **60***a* may be coupled to the end of the lens unit **30** through the clip **63***a* implemented in the support member **60***a*. A process in which the support member **60***a* is fastened to the end of the lens unit **30** is specifically illustrated in FIGS. **10**A through **10**C.

[0118] FIGS. **10**A through **10**C are side views illustrating a process in which the support member is connected to the lens unit according to the first exemplary embodiment of the present disclosure.

[0119] Referring to FIGS. **6** through **10**A, the clip holder **62***a* supporting the clip **63***a* in the support member **60***a* may have elasticity, and may be formed so as to receive a force in the Z-axis direction. According to an exemplary embodiment, a shape and a size of the clip holder **62***a* of the support member **60***a* may be adjusted depending on a shape and a size of the end of the lens unit **30**.

[0120] When the clip holder **62***a* supporting the clip **63***a* has elasticity, the clip **63***a* and the end of the lens unit **30** may be more easily fastened, and a force required for fastening may be reduced.

[0121] In addition, when the shape and the size of the clip holder **62***a* of the support member **60***a* are adjusted depending on the shape and the size of the end of the lens unit **30**, there is an effect that the force required for fastening the clip **63***a* and the end of the lens unit **30** may be reduced and a power consumption during the process may be reduced.
[0122] According to an exemplary embodiment, a shape of a fastening hole of the clip holder **62***a* may be formed so as to correspond to the end of the lens unit **30** to which it is fastened. According to an exemplary embodiment, a size of the fastening hole of the clip holder **62***a* may be formed so as to correspond to a thickness of the end of the lens unit **30** to which it is fastened.
[0123] When the size of the fastening hole of the clip holder **62***a* is formed to have the size corresponding to the thickness of the end of the lens unit **30** to which it is fastened, there is an effect that the end of the clip **63***a* and the lens unit **30** may be more easily fastened.
[0124] Referring to FIGS. **6** through **10**B, when an external force in the Z-axis direction is applied such that the clip **63***a* of the support member **60***a* is fastened to the end of the lens unit **30**, the shape of the clip holder **62***a* having elasticity may be deformed.
[0125] Referring to FIGS. **6** through **10**C, when the clip **63***a* of the support member **60***a* is fastened to the end of the lens unit **30**, the clip holder **62***a* may be restored to its original shape.
[0126] FIG. **11** is a perspective view illustrating a support member according to a second exemplary embodiment of the present disclosure.
[0127] Referring to FIG. **11**, a support member **60***b* according to the second exemplary embodiment of the present disclosure may be implemented as a metal sheet. The support member **60***b* may include a hump **61***b*, a clip holder **62***b*, a clip **63***b*, and a pad **64***b*.
[0128] The hump **61***b* according to the second exemplary embodiment of the present disclosure may be implemented with a predetermined length so as to increase a contact area between the support member **60***b* included in the lens module and the glue **40**.
[0129] However, unlike the support member **60***a* according to the first exemplary embodiment of the present disclosure shown in FIG. **6**, the hump **61***b* in the support member **60***b* according to the second exemplary embodiment of the present disclosure shown in FIG. **11** is implemented not to include a hole. In this case, since the hump **61***b* does not include a hole, there is an effect that a process of manufacturing the support member **60***b* may be further simplified.
[0130] Since the support member **60***b* according to the second exemplary embodiment of the present disclosure does not have the hole in the hump **61***b*, there is an effect that the support member **60***b* may be manufactured more easily. In addition, although the hole is not provided in the hump **61***b*, when the hump **61***b* is implemented such that a roughness of a surface in contact with the glue is equal to or greater than a predetermined threshold, there is an effect that a frictional force between the hump **61***b* and the glue may be increased and the support member **60***b* may more firmly support the glue.
[0131] FIG. **12** is a perspective view illustrating a support member according to a third exemplary embodiment of the present disclosure. FIG. **13**A is a perspective view illustrating the support member and the substrate together according to the third exemplary embodiment of the present disclosure, FIG. **13**B is a front view illustrating the support member according to the third exemplary embodiment of the present disclosure, and FIG. **13**C is a side view illustrating the support member according to the third exemplary embodiment of the present disclosure.
[0132] Referring to FIG. **12** and FIG. **13**A, a support member **60***c* according to the third exemplary embodiment of the present disclosure may be implemented as a metal sheet. The support member **60***c* may include a hump **61***c*, a clip holder **62***c*, a clip **63***c*, and a pad **64***c*.
[0133] Since a length of the hump **61***c* is configured not to be lengthy, it is possible to install the support member **60***c* according to the third exemplary embodiment of the present disclosure in a small area within the lens module.
[0134] The support member **60***a* according to the first exemplary embodiment of the present disclosure and the support member **60***b* according to the second exemplary embodiment of the

present disclosure are configured to have the lengthy hump so as to increase the contact area between the support member and the glue, while the support member **60***c* according to the third exemplary embodiment of the present disclosure is configured to a narrow hump **61***c* such that the support member is implemented in the glue even when a width of the glue or the substrate is narrow.

[0135] When the support member **60***c* includes the narrow hump **61***c*, there is an effect that the support member **60***c* may be easily installed even on an edge portion of the substrate to which the glue is attached. In addition, when the lens module includes a large lens unit, there is an effect that the support member **60***c* having the narrow hump **61***c* may be mounted in the lens module to increase a light emission function of the lens module.

[0136] In addition, by mounting a plurality of support members **60***c* having narrow humps **61***c* in the lens module, there is an effect that a greater support force may be secured compared to other types of support members.

[0137] According to an exemplary embodiment, a length of the hump **61***c* may be set to a length corresponding to a predetermined ratio to the width of the substrate. According to another exemplary embodiment, the length of the hump **61***c* may be set to a length corresponding to a predetermined ratio to the thickness of the glue.

[0138] However, to increase the contact area between the support member **60***c* and the glue, the hump **61***c* may be implemented so as to include a hole. In this case, since the glue is inserted into the hole in the hump **61***c*, the contact area between the support member **60***c* and the glue may be increased.

[0139] Referring to FIGS. **12** through **13**B, the pad **64***c* of the support member **60***c* may be configured to be disposed on the pad region **11** on the substrate **10**. The pad **64***c* of the support member **60***c* may be mounted on the pad region **11** on the substrate **10**, and the support member **60***c* may be connected to the substrate **10**.

[0140] Referring to FIGS. **12** through **13**C, the clip **63***c* of the support member **60***c* may be configured to secure the lens unit included in the lens module. The clip **63***c* of the support member **60***c* may be fastened to the end of the lens unit, and the support member **60***c* may be connected to the lens unit.

[0141] FIG. **14** is a front view illustrating a state in which the support member is mounted on the substrate according to the third exemplary embodiment of the present disclosure, and FIG. **15** is a side view illustrating the state in which the support member is mounted on the substrate according to the third exemplary embodiment of the present disclosure.

[0142] Referring to FIGS. **12** through **14**, the support member **60***c* is included in the glue **40** and may be mounted on the substrate **10**. The support member **60***c* may be implemented in various forms such that the glue **40** and the substrate **10** are firmly connected to each other.

[0143] The pad **64***c* of the support member **60***c* may be secured on the pad region **11** on the substrate **10** by a surface mount technology (SMT) process.

[0144] According to an exemplary embodiment, a length A′ of the hump **61***c* of the support member **60***c* may be implemented as short as a predetermined ratio compared to a length B′ of a body of the support member **60***c* in contact with the substrate **10**.

[0145] Although the length A′ of the hump **61***c* is shorter than the length B′ of the body of the support member **60***c*, by implementing the hump **61***c* in a curved shape, the contact area between the support member **60***c* and the glue is increased, and thus, there is an effect that the adhesion between the support member **60***c* and the glue **40** may be improved.

[0146] In addition, although the length A′ of the hump **61***c* is implemented to be shorter than the length B′ of the body of the support member **60***c*, by implementing the hump **61***c* in the curved shape, a roughness of the contact surface between the support member **60***c* and the glue **40** is increased, and thus, there is an effect that the adhesion between the support member **60***c* and the glue **40** may be improved.

[0147] According to an exemplary embodiment, the length A′ of the hump **61***c* may be implemented as short as a predetermined ratio compared to a thickness C′ of the glue **40**.
[0148] Although the length A′ of the hump **61***c* is implemented to be shorter than the thickness C′ of the glue **40**, there is an effect that a supporting force of the support member **60***c* for the glue **40** may be increased by implementing the hump **61***c* in the curved shape.
[0149] Referring to FIGS. **12** through **15**, the support member **60***c* may firmly secure the lens unit **30** using the clip **63***c* implemented in the support member **60***c*. A process in which the support member **60***c* firmly secures the lens unit **30** is specifically illustrated in FIGS. **16**A through **16**C.
[0150] FIGS. **16**A through **16**C are side views illustrating a process in which the support member is connected to the lens unit according to the third exemplary embodiment of the present disclosure.
[0151] Referring to FIGS. **12** through **16**A, the clip **63***c* of the support member **60***c* may have elasticity, and may be formed so as to apply a force in the Z-axis direction. A shape and a size of the clip **63***c* of the support member **60***c* may be adjusted depending on the shape and the size of the end of the lens unit **30**.
[0152] For example, the shape of the clip **63***c* may be formed to correspond to the end of the lens unit **30** to be secured. For example, a height of the clip **63***c* (i.e., a distance from the substrate **10** to the clip **63***c*) may be set at a predetermined ratio compared to the thickness of the end of the lens unit **30** to be secured.
[0153] Referring to FIGS. **12** through **16**B, when an external force in the Z-axis direction is applied such that the clip **63***c* of the support member **60***c* is fastened to the end of the lens unit **30**, the shape of the clip **63***c* having the elasticity may be deformed.
[0154] Referring to FIGS. **12** through **16**C, when the clip **63***c* of the support member **60***c* is fastened to the end of the lens unit **30**, the clip **63***c* may be restored to its original shape.
[0155] As described above, when the external force in the Z-axis direction is applied, since the clips **63***a*, **63***b*, and **63***c* and/or the clip holders **62***a*, **62***b*, and **62***c* are deformed by elastic deformation, and the end of the lens unit **30** is secured to the substrate, a combination of the clips and the clip holders may be called as a securing portion. In other words, the end of the pad extends in the Z-axis direction (i.e., a direction perpendicular to the substrate) to form the securing portion, and the end of the lens unit **30** is secured to the substrate by this securing portion, and thus, it is possible to prevent a gap from being generated between the lens unit and the substrate due to a partial contact surface of the lens unit being detached from the substrate.
[0156] More specifically, a hole is formed in the securing portion, and when the external force in the Z-axis direction is applied, the securing portion is elastically deformed and the end of the lens unit is inserted into this hole and secured to the substrate, through which it is possible to prevent the gap from being generated between the lens unit and the substrate due to the partial contact surface of the lens unit being detached from the substrate.
[0157] In addition, a pressing portion extending outwardly (or extending curvedly is formed at an end of the securing portion, and when the external force in the Z-axis direction is applied, the pressing portion is elastically deformed and the end of the lens unit is inserted into a lower side of the pressing portion and secured to the substrate, through which it is possible to prevent the gap from being generated between the lens unit and the substrate due to the partial contact surface of the lens unit being detached from the substrate.
[0158] FIG. **17** is a perspective view illustrating a support member according to a fourth exemplary embodiment of the present disclosure.
[0159] Referring to FIG. **17**, the support member according to the fourth exemplary embodiment of the present disclosure may be implemented as a metal sheet. The support member according to the fourth exemplary embodiment of the present disclosure may include a hump, a clip holder, a clip, and a pad similarly to the support member according to the third exemplary embodiment of the present disclosure.
[0160] However, unlike the support member according to the third exemplary embodiment of the

present disclosure shown in FIG. **12**, the hump in the support member according to the fourth exemplary embodiment of the present disclosure shown in FIG. **17** is implemented not to include a hole. In this case, since the hump does not include the hole, there is an effect that a process of manufacturing the support member may be further simplified.

[0161] Since the support member according to the fourth exemplary embodiment of the present disclosure does not have the hole in the hump, there is an effect that the support member may be manufactured more easily. In addition, although the hole is not provided in the hump, when the hump is implemented such that a roughness of a surface in contact with the glue is equal to or greater than a predetermined threshold, there is an effect that a frictional force between the hump and the glue may be increased, and the support member may more firmly support the glue.

[0162] In the present disclosure, although the support members according to the first through fourth exemplary embodiments are shown and mainly described, the inventive concepts are not limited thereto, but the support members mounted in the lens module may be implemented in a form other than those of the first through fourth exemplary embodiments so as to prevent the glue or the lens from being detached from the substrate.

[0163] For example, the support member may have a more curved hump so as to increase the contact area with the glue. For example, the support member may include a plurality of holes in the hump, and may include at least one hole in the pad.

[0164] FIGS. **18**A through **18**D are diagrams illustrating a process of designing a lens module according to an exemplary embodiment of the present disclosure.

[0165] Referring to FIGS. **1** through **18**A, a plurality of light emitting devices **20** and a plurality of support members **60** may be mounted on the substrate **10** during an SMT process. Herein, each of the plurality of support members **60** may be any one of the support members according to the first through fourth exemplary embodiments of the present disclosure.

[0166] Although FIG. **18**A shows an example in which **12** support members **60** are mounted on the substrate, the inventive concepts are not limited thereto, but various numbers of support members **60** may be installed on the substrate **10** during the SMT process.

[0167] Referring to FIGS. **1** through **18**B, the lens unit **30** may be disposed on the substrate **10** on which the plurality of light emitting devices **20** and the plurality of support members **60** are mounted. In this case, at least one end of the lens unit **30** may be secured by a clip or a clip holder included in each of the plurality of support members **60**. That is, the lens unit **30** may be firmly connected to the substrate **10** by the plurality of support members **60** mounted on the substrate **10**.

[0168] Referring to FIGS. **1** through **18**C, the glue **40** may be filled in the lens module in which the substrate **10** and the lens unit **30** are connected using a special mold set in advance. Herein, the glue **40** may comprise sealing glue or plastic.

[0169] Referring to FIGS. **1** through **18**D, when the glue **40** filled in the lens module is hardened (or solidified), the lens module including the support member according to exemplary embodiments of the present disclosure may be completed.

[0170] FIGS. **19**A through **19**C are cross-sectional views illustrating an exemplary embodiment in which a support member is implemented on the substrate of the present disclosure.

[0171] Referring to FIGS. **1** through **19**A, a glue **40-1** disposed on the substrate **10** may be implemented as a plastic type. In this case, the substrate **10** and the glue **40-1** may be firmly connected to each other by a frictional force between the substrate **10** and the glue **40-1**.

[0172] However, in FIG. **19**B, when a surface of the substrate **10** is smooth and an adhesion between the substrate **10** and the glue **40-1** is reduced, the glue **40-1** is detached from the substrate **10**, and thus, a gap may be generated between a portion of the glue **40-1** and the substrate **10**.

[0173] To solve a drawback that the plastic-type glue **40-1** is detached from the substrate **10**, a method is suggested in the present disclosure that a support member **70** is included in the substrate **10** as shown in FIG. **19**C. The support member **70** may be implemented in a form of a countersunk hole, and when the plastic glue **40-1** is filled in the countersink hole, it is possible to prevent the

glue **40**-**1** from being detached from the substrate **10**.
[0174] A shape of the support member **70** shown in FIG. **19**C is only one form for solving a technical problem of the present disclosure, and the inventive concepts are not limited to the shape of the support member **70** shown in FIG. **19**C, but the support member **70** may be implemented in various forms.
[0175] Although certain embodiments and implementations have been described herein, other embodiments and modifications will be apparent from this description. Accordingly, the inventive concepts are not limited to such embodiments, but rather to the broader scope of the appended claims and various obvious modifications and equivalent arrangements as would be apparent to a person of ordinary skill in the art.
[0176] Accordingly, the technical scope of the present invention should not be limited to the content described in the detailed description of the specification, but should be defined by the claims.
DESCRIPTION OF REFERENCE NUMERALS
[0177] **100**: lens module, **10**: substrate, **20**: light emitting device [0178] **30**: lens unit, **40** and **40**-**1**: glue [0179] **50**: fastening member, **60**, **60***a*, **60***b*, **60***c*, and **70**: support member [0180] **61***a*, **61***b*, and **61***c:* hump, **62***a*, **62***b*, and **62***c:* clip holder [0181] **63***a*, **63***b*, and **63***c:* clip, **64***a*, **64***b*, and **64***c:* pad

Claims

1. A light module, comprising: a substrate; a light emitter disposed on the substrate and comprising a plurality of light emitting devices; a lens disposed on the substrate and the light emitter; and a supporter configured to be connected to a region of the lens, wherein the lens includes a curved region and a flat region, and wherein the supporter includes a protruding region extended from the substrate in a direction substantially perpendicular to the substrate and a clip region connected to a region of an end of the lens.
2. The light module of claim 1, wherein the protruding region has a length corresponding to a predetermined first ratio to a length of the supporter in contact with the substrate.
3. The light module of claim 1, wherein the supporter is formed on an edge of the substrate.
4. The light module of claim 1, wherein the lens is configured to guide light emitted from the light emitter, and wherein the flat region is disposed around an edge of the lens.
5. The light module of claim 1, wherein a shape of the clip corresponds to the shape of the end of the lens.
6. The light module of claim 1, wherein a distance between the clip region and the substrate has a predetermined ratio with respect to a thickness of the end of the lens.
7. The light module of claim 1, further comprising an adhesive layer disposed on the supporter and configured to contact the region of the lens.
8. The light module of claim 1, wherein the supporter is formed in plural of different types in consideration of shapes of the substrate and the lens.
9. A light module, comprising: a substrate; a light emitter disposed on the substrate and comprising a plurality of light emitting devices; a lens disposed on the substrate and the light emitter; a supporter configured to be connected to a region of the lens; and an adhesive layer disposed on the supporter and configured to contact the region of the lens, wherein the supporter is formed on the substrate and extended from the substrate in a direction substantially perpendicular to the substrate, and wherein the supporter includes a region connected to an end of the lens.
10. The light module of claim 9, wherein the supporter has a length corresponding to a predetermined first ratio to a length of the supporter in contact with the substrate.
11. The light module of claim 9, wherein the supporter is formed on an edge of the substrate.
12. The light module of claim 9, wherein a shape of the region of the supporter corresponds to the shape of the end of the lens.

13. The light module of claim 9, wherein a distance between the region of the supporter and the substrate has a predetermined ratio with respect to a thickness of the end of the lens.
14. The light module of claim 1, wherein the lens includes a curved surface and a flat region.
15. The light module of claim 14, wherein the flat region is disposed around an edge of the lens.
16. A light module, comprising: a substrate; a light emitter disposed on the substrate and comprising a plurality of light emitting devices; a lens disposed on the substrate and the light emitter; and a supporter configured to be connected to a region of the lens, wherein the supporter is formed on an edge region of the substrate and extended from the substrate in a direction substantially perpendicular to the substrate, and wherein the supporter includes a region connected to an end of the lens.
17. The light module of claim 16, wherein the supporter has a length corresponding to a predetermined first ratio to a length of the supporter in contact with the substrate.
18. The light module of claim 16, wherein the lens is configured to guide light emitted from the light emitter.
19. The light module of claim 16, wherein a shape of the region of the supporter corresponds to the shape of the end of the lens.
20. The light module of claim 16, wherein a distance between the region of the supporter and the substrate has a predetermined ratio with respect to a thickness of the end of the lens.