Typically the light sensor is placed directly under the light-transparent opening in the cover of the electronic device. The incoming light therefore directly impinges on the light sensor. For constructional reasons it may occur that the sensor is not arranged in line with the light-transparent opening, but rather arranged laterally displaced from the light-transparent opening under the cover. For this reason the light which enters through the light-transparent opening has to be guided to the light sensitive surface area of the light sensor. It is well known to guide visible light by means of optical light guide elements such as light pipes made of glass or plastic. However, mobile electronic devices have to be light and small-sized. Therefore, the numerous components within the housing of such an electronic device are normally densely packed and space for additional components is often extremely limited. This means that in such a case there is not a lot of available space for an optical light guide element. However, light guide elements in the state-of-the-art are known for being bulky and for needing a lot of space.

DESCRIPTION OF THE INVENTION

Embodiments~~It is therefore an object~~ of the invention seek to create an optical light guide element of the type initially mentioned, which overcomes the disadvantages mentioned above.

~~This object is achieved by an optical light guide element according to claim 1 and an electronic device according to claim 27. The dependent claims comprise further developments of the invention or alternative solutions for the invention.~~

The optical light guide element according to an aspect of the invention has a first end section with a light entrance area designed for facing a light source, particularly a light-transparent opening through which (ambient) light passes. The size and shape of the light entrance area is preferably optimized in order to guarantee an optimum per-

formance with respect to light collection efficiency and angular response. Further, the optical light guide element has a second end section with a light exit area designed for facing a light target area, particularly a light sensor, i.e. an opto-electronic sensor. The light entrance area is defined by a surface area on the optical light guide element, referred to as first surface area, which faces the light source or the light-transparent opening. The first end section comprises~~forms~~ an inclined surface area, referred to as first inclined surface, which forms an acute angle with said first surface area (i.e. the surface area of the light entrance area). I.e. the light entrance area lies to some degree opposite to this inclined surface.

The inclined resp. slanted surface area is preferably inclined in a direction parallel to the main direction of the light propagation within the light guide element. I. e. the acute angle is formed by the surface lines of the two surface areas in a cross-sectional view along the main direction of the light propagation. The inclined surface of the first end section practicably corresponds to an inclined front face of the optical light guide element. The main direction of the light propagation within the light guide element is defined by a starting point in the first end section and an end point in the second end section.

Additionally or alternatively to the above described inclined surface area being inclined in a direction parallel to the main direction of the light propagation, the optical light guide can contain an inclined surface area which is inclined in a direction transverse to the main direction of the light propagation. In this case the acute angle is formed by the surface lines of the two surface areas in a cross-sectional view transverse to the main direction of the light propagation.

The acute angle between the inclined surface area and the surface area of the light entrance area is preferably at minimum 10°, advantageously at minimum 20°, and most preferably at minimum 30° (angular degree). Further, the acute angle between the inclined surface area and the surface area of the light entrance area is preferably

The light entrance area is preferably defined by a plane surface which faces the light-transparent opening. The plane is preferably orientated perpendicular to the axis of the light-transparent opening. The plane is preferably smooth and uniform. However, the light entrance area and the light exit area can comprise an optical active structure, particularly microstructure, e.g. a lens or a diffuser. Of course, this optical active structure can also be a separate element arranged between the light source or the light-transparent opening and the entrance area and/or between the light target area or the sensor and the light exit area. The optical structures can be replicated in said areas or surfaces during manufacturing of the light guide element. The above mentioned optical active structures can also be provided on the inclined surfaces. The optical active structures can also comprise a coating on the surfaces of the light guide element, such as anti-reflection coatings, color filters, etc. Such coatings can e.g. be applied on the light entrance surface, the light exit surface and/or on the inclined surface in the first and/or second end section.

The term "opening" in the expression "light-transparent opening" means an aperture through which light can pass. The opening can, but does not have to be a physical opening. Usually the light-transparent opening is covered by light-transmissive element or window, e.g. made of glass or plastic. Hence, the light transparent opening can also be named as a light transparent area.

The inclined surface area of the first end section preferably also forms a plane. The inclined surface area can be smooth and uniform. The inclined surface area can also have a surface finish with a specific roughness.

According to a further development of the aspect of invention, the light exit area of the optical light guide element is defined by a surface area of the optical light guide element, referred to as second surface area, which faces the light target area, particularly the light sensor. The second end section preferably forms also an inclined

surface area, referred to as second inclined surface, which encloses an acute angle with the second surface area (i.e. the surface area of the light exit area). I.e. the light exit area lies to some degree opposite to the inclined surface area.

The inclined surface area is preferably inclined in a direction parallel to the main direction of the light propagation within the light guide element. I. e. the acute angle is formed by the two surface lines in a cross-sectional view along the main direction of the light propagation. The inclined surface of the second end section practicably corresponds to an inclined front face of the optical light guide element.

Additionally or alternatively to the above described inclined surface area being inclined in a direction parallel to the main direction of the light propagation, the optical light guide can contain an inclined surface area which is inclined in a direction transverse to the main direction of the light propagation. In this case the acute angle is formed between the surface lines of the two surface areas in a cross-sectional view transverse to the main direction of the light propagation.

The location and dimension of the light exit area, the location and dimension of the inclined surface of the second end section and the acute angle between the inclined surface and the light exit are preferably such that at least some of the light, preferably most of the light propagating within the optical light guide from the first end section towards the second end section is reflected on the inclined surface within the optical light guide element towards the light exit area.

The acute angle between said inclined surface area and the light exit area is preferably at minimum 10°, advantageously at minimum 20° and most preferably at minimum 30°. The acute angle between said inclined surface area and the surface area of the light exit area is preferably at maximum 80°, advantageously at maximum 70°, most preferably at maximum 60°. The acute angle is e.g. between 40° and 50° and particularly 45°.