Patent Claims

1. An opto-electronic module (1), comprising

a substrate member (P,P');

an optics member (O);

at least one active optical component (E) mounted on said substrate member (P,P');

at least one passive optical component (20, L) comprised in said optics member (O);

wherein the optics member (O) is directly or indirectly fixed to said substrate member (P,P'), and wherein said optics member (O) comprises at least one portion, referred to as blocking portion (b), which is at least substantially non-transparent for at least a specific wavelength range, and at least one other portion, referred to as transparent portion (t), which is at least substantially transparent for at least said specific wavelength range, the blocking portion (b) comprising an opening (11), the transparent portion (t) comprising a transparent element (6) provided in the opening (11) and being laterally enclosed by the blocking portion (b), the transparent element (6) having two opposing flat surfaces substantially perpendicular to a vertical direction, the transparent element (6) being formed from a cured transparent material (T), which at least partially fills the opening (11), and wherein the at least one passive optical component (20, L) is arranged on at least one of the surfaces of the transparent element (6).

2. The module according to claim 1, wherein said at least one active optical component (E) is exactly one light-emitting component, in particular wherein said opto-electronic module (1) is a flash module.

3. The module according to claim 1 or claim 2, wherein at least one of:

outer bounds of a vertical silhouette of the opto-electronic module (1) and outer bounds of a vertical silhouette of said optics member (O) and of said substrate member (P) each describe a substantially rectangular shape;

lateral dimensions of said substrate member (P,P') and of said optics member (O) are substantially identical;

said substrate member (P,P') and said optics member (O) are of generally block- or plate-like shape, possibly comprising at least one hole.

4. The module according to one of claims 1 to 3, comprising at least one electrical connection between said at least one active optical component (E) and said substrate member (P,P'), in particular wherein

said substrate member (P,P') is a printed circuit board or a printed circuit board assembly; and/or

said substrate member (P,P') provides at least one electrical connection from said active optical component (E) across said substrate member (P,P').

5. The module according to one of claims 1 to 4, comprising means for ensuring a well-defined distance between said at least one active optical component (E) and said at least one passive optical component (20, L), wherein said means are comprised in said optics member (O) or comprised in said substrate member (P,P') or are distinct from these, wherein said means are, at least in part, made substantially of a material which is at least substantially non-transparent for at least a specific wavelength range.

6. The module according to one of claims 1 to 5, wherein said at least one active optical component (E) is at least one bare die.

7. An appliance (2) comprising a multitude of opto-electronic modules (1) according to one of claims 1 to 6, wherein the appliance comprises a first wafer referred to as substrate wafer (PW) and a second wafer referred to as optics wafer (OW), wherein the multitude of substrate members (P,P') is comprised in said substrate wafer (PW), and the multitude of optics members (O) is comprised in said optics wafer (OW).

8. An electronic device (10) comprising a printed circuit board (9) and an opto-electronic module (1) according to one of claims 1 to 6 mounted on said printed circuit board (9), in particular wherein the electronic device is a hand-held communication device or a photographic device.

9. A method for manufacturing a device (1, 2, 10), the device comprising at least one opto-electronic module (1), the at least one opto-electronic module being according to claim 1, said method comprising the step of c) creating a wafer stack (2) comprising a first wafer (PW), referred to as substrate wafer (PW), and a second wafer (OW), referred to as optics wafer (OW); wherein a multitude of active optical components (E) is mounted on said substrate wafer (PW), and said optics wafer (OW) comprises a multitude of passive optical components (20, L), and wherein each of said at least one opto-electronic modules (1) comprises at least one of said active optical components (E) and at least one of said passive optical components (20, L), wherein said optics wafer (OW) comprises at least one portion, referred to as blocking portion (b), which is at least substantially non-transparent for at least a specific wavelength range, and at least one other portion, referred to as transparent portion (t), which is at least substantially transparent for at least said specific wavelength range, in particular wherein said active optical components (E) are provided as bare dies; wherein the method comprises:

manufacturing said optics wafer (OW), the step of manufacturing the optics wafer (OW) comprising:

providing a wafer precursor (8) substantially made of a non-transparent material having openings (11) in places where the transparent portions (t) are to be located;

at least partially filing the openings (11) with a transparent material (T);

curing the transparent material (T) to form a multitude of transparent elements (6), each transparent element (6) having two opposing flat surfaces substantially perpendicular to a vertical direction; and

producing said multitude of passive optical components (20, L) by producing on each of said multitude of transparent elements (6) at least one optical structure.

10. The method according to claim 9, wherein said active optical components (E) are light emitting components, and wherein each of said at least one opto-electronic modules (1) comprises exactly one of said light emitting components, in particular wherein each of said at least one opto-electronic modules (1) is a flash module.

11. The method according to claim 9 or claim 10, wherein the wafer stack (2) comprises means (S, S', SW) for ensuring a well-defined distance between said active optical components (E) and said passive optical components (20, L), the method comprising,

in case said means (S, S', SW) are comprised in said optics wafer (OW): the steps of

f) providing said optics wafer (OW), said optics wafer comprising, as said means, vertical protrusions for ensuring said well-defined distance between said active optical components (E) and said passive optical components (20, L); and

h) attaching said active optical components (E) to said wafer stack (2); wherein step h) is not carried out before step f) is carried out; and

in case said means (S, S', SW) are not comprised in said optics wafer: the steps of

g1) providing said optics wafer; and

g2) providing, as said means, at least one spacer wafer (SW) for ensuring a well-defined distance between said active optical components (E) and said passive optical components (20, L);

h') attaching said active optical components (E) to said wafer stack;

wherein step h') is not carried out before steps g1) and g2) are carried out.

12. The method according to one of claims 9 to 11, comprising the step of

j) establishing an electrical connection between each of said active optical components (E) and said substrate wafer (PW).

13. The method according to one of claims 9 to 12, wherein said substrate wafer (PW) is a printed circuit board or a printed circuit board assembly.

14. The method according to one of claims 9 to 13, wherein the wafer stack (2) comprises means (S, S', SW) for ensuring a well-defined distance between said active optical components (E) and said passive optical components (20, L), wherein said means (S, S', SW) are comprised in said optics wafer (OW) or comprised in said

substrate wafer (PW) or are distinct from these, wherein said means (S, S', SW) are, at least in part, made substantially of a material which is at least substantially non-transparent for at least a specific wavelength range.

15. The method according to one of claims 9 to 14, comprising the step of

d) separating said wafer stack (2) into a multitude of said opto-electronic modules (1), each comprising at least one of said passive optical components (20, L) and, vertically and optically aligned thereto, at least one of said active optical components (E).