CLAIMS

1. Electronic device for radiofrequency or power applications, comprising a semiconductor layer (2') supporting electronic components on a support substrate (1), characterised in that the support substrate (1) comprises a base layer (12) having a thermal conductivity of at least 30 W/m K and a superficial layer (13, 14) having a thickness of at least 5 µm, said superficial layer having an electrical resistivity of at least 3000 Ohm.cm and a thermal conductivity of at least 30 W/m K.

2. Electronic device according to claim 1, characterised in that the support substrate (1) is a bilayer substrate comprising a superficial layer (13) of AlN, alumina or amorphous diamond-like carbon having a thickness greater than 5 µm on a silicon base substrate (12).

3. Electronic device according to claim 1, characterised in that the support substrate (1) is a silicon substrate comprising a porous surface region (14) having a thickness greater than 5 µm.

4. Electronic device according to claim 1, characterised in that the support substrate (1) is an aluminium substrate encased with an AlN or alumina coating having a thickness greater than 5 µm.

5. Electronic device according to claim 1, characterised in that the support substrate (1) is a silicon substrate comprising a surface region doped with gold, with a concentration greater than 10^{15} at/cm^3 and having a thickness greater than 5 µm.

6. Device according to one of claims 1 to 5, characterised in that the layer (2') supporting the components is made of silicon, germanium or a group III-V alloy.

7. Device according to any of claims 1 to 6, characterised in that a silicon oxide layer having a thickness of less than 50 nm is inserted between the support substrate (1) and the layer (2') supporting the components.

8. Device according to any of claims 1 to 6, characterised in that a layer of AlN, alumina, amorphous diamond-like carbon or high-resistivity polycrystalline silicon is inserted between the support substrate (1) and the layer (2') supporting the components.

9. Device according to any of claims 1 to 8, characterised in that it is a wafer having a diameter greater than or equal to 150 mm.

10. Device according to any of claims 1 to 8, characterised in that it is a chip.

11. Device according to any of claims 1 to 10, characterised in that the superficial layer is between the base layer and the semiconductor layer.

12. Process for manufacturing a device for radiofrequency or power applications, comprising a layer (2') supporting electronic components on a support substrate (1), comprising the following successive steps:

a) formation of a structure comprising a semiconductor layer (2) on the support substrate (1),

(b) manufacture of the components in the semiconductor layer (2),

characterised in that in step (a), a support substrate (1) comprising a base layer (12) having a thermal conductivity of at least 30 W/m K and a superficial layer (13, 14) having a thickness of at least 5 µm, said superficial layer having an electrical resistivity of at least 3000 Ohm.cm and a thermal conductivity of at least 30 W/m K, is used.

13. Process according to claim 12, characterised in that the support substrate (1) is a bilayer substrate comprising a layer (13) of AlN, alumina or amorphous diamond-like carbon having a thickness greater than 5 µm on a silicon base substrate (12).

14. Process according to claim 12, characterised in that the support substrate is a silicon substrate comprising a porous surface region having a thickness greater than 5 µm.

15. Process for manufacturing a device for radiofrequency or power applications, comprising a layer (2') supporting electronic components on a support substrate (1), comprising the following successive steps:

(a) manufacture of the components in a semiconductor layer (2) of a donor substrate (20),

(b) bonding of the semiconductor layer (2') supporting the components on an intermediate substrate (4),

(c) removal of the remainder (22) of the donor substrate (20) to transfer the layer (2') supporting the components onto the intermediate layer (4),

(d) bonding of the layer (2') supporting the components on the support substrate (1),

(e) removal of the intermediate substrate (4),

characterised in that, in step (d), a support substrate (1) comprising a base layer (12) having a thermal conductivity of at least 30 W/m K and a superficial layer (13, 14) having a thickness of at least 5 µm, said superficial layer having an electrical resistivity of at least 3000 Ohm.cm and a thermal conductivity of at least 30 W/m K, is used.

16. Process according to claim 15, characterised in that the support substrate is a bilayer substrate comprising a layer (13) of AlN, alumina or amorphous diamond-like carbon having a thickness greater than 5 µm on a silicon base substrate (12).

17. Process according to claim 15, characterised in that the support substrate is a silicon substrate comprising a porous surface region having a thickness greater than 5 µm.

18. Process according to claim 15, characterised in that the support substrate is an aluminium substrate encased with an AlN or alumina coating having a thickness greater than 5 µm.

19. Process according to claim 15, characterised in that the support substrate is a silicon substrate comprising a surface region doped with gold, with a concentration greater than 10^{15} at/cm^3 and having a thickness greater than 5 µm.

20. Process according to any of claims 15 to 19, characterised in that the donor substrate (20) successively comprises a first substrate (22), a silicon oxide layer (23) having a thickness less than 50 nm and the semiconductor layer (2), and in that, during step (c), said silicon oxide layer (23) is left on the layer (2') supporting the components.

CLAIMS

1. Electronic device for radiofrequency or power applications, comprising a semiconductor layer (2') supporting electronic components on a support substrate (1), characterized in that it comprises a bonding layer (3, 23) between the support substrate (1) and the layer (2') supporting the components, said bonding layer (3, 23) consisting of a silicon oxide layer having a thickness of less than 50 nm, a layer of AlN, of alumina or of high-resistivity polycrystalline silicon, and in that the support substrate (1) comprises a base layer (12) having a thermal conductivity of at least 30 W/m K and a superficial layer (13, 14) having a thickness of at least $5\mu m$, said superficial layer having an electrical resistivity of at least 3000 Ohm.cm and thermal conductivity of at least 30 W/m K.

2. Electronic device according to claim 1, wherein the support substrate (1) comprises a silicon base substrate (12).

3. Electronic device according to claim 1, wherein the support substrate (1) is an aluminum substrate encased with an AlN or alumina coating having a thickness greater than $5\mu m$.

4. Device according to claim 1, wherein the layer (2') supporting the components is made of silicon, germanium or a group III-V alloy.

5. Device according to claim 1, wherein it is a wafer having a diameter greater than or equal to 150 mm.

6. Device according to claim 1, wherein it is a chip.

7. Device according to claim 1, wherein the superficial layer is between the base layer and the semiconductor layer.

8. Process for manufacturing a device for radiofrequency or power applications, comprising a layer (2') supporting electronic components on a support substrate (1), comprising the following successive steps :
   a. formation of a structure comprising a semiconductor layer (2) bonded on the support substrate (1) via a bonding layer (3) formed on the semiconductor layer (2), said bonding layer (3) consisting of a silicon oxide layer having a thickness of less than 50 nm, a layer of AlN, of alumina or of high-resistivity polycrystalline silicon,
   b. manufacture of the components in the semiconductor layer (2),

   characterized in that in step (a), a support substrate (1) comprising a base layer (12) having a thermal conductivity of at least 30 W/m K and a

superficial layer (13, 14) having a thickness of at least 5 μm , said superficial layer having an electrical resistivity of at least 3000 Ohm.cm and thermal conductivity of at least 30 W/m K, is used.

9. Process according to claim 8, wherein the support substrate (1) comprises silicon base substrate (12).

10. Process for manufacturing a device for radiofrequency or power applications, comprising a layer (2') supporting electronic components on a support substrate (1), comprising the following successive steps :
    a. manufacture of the components in the semiconductor layer (2) of a donor substrate (20),
    b. bonding the semiconductor layer (2') supporting the components on an intermediate substrate (4),
    c. removal of the remainder (22) of the donor substrate (20) to transfer the layer (2') supporting the components onto the intermediate substrate (4),
    d. bonding of the layer (2') supporting the components on the support substrate (1),
    e. removal of the intermediate substrate (4),

    characterized in that a bonding layer (23) being at the interface between the support substrate (1) and the layer (2') supporting the components, said bonding layer (23) consisting of a silicon oxide layer having a thickness of less than 50 nm, a layer of AlN, of alumina or of high-resistivity polycrystalline silicon, and in that, in step (d), a support substrate (1) comprising a base layer (12) having a thermal conductivity of at least 30 W/m K and a superficial layer (13, 14) having a thickness of at least 5 μm , said superficial layer having an electrical resistivity of at least 3000 Ohm.cm and thermal conductivity of at least 30 W/m K, is used.

11. Process according to claim 10, wherein the support substrate comprises silicon base substrate (12).