CLAIMS

I/We claim:

1. A method of forming a solid state transducer device, comprising:

forming a solid state emitter from an epitaxial substrate, the solid state emitter having a first semiconductor material, a second semiconductor material, and an active region between the first and second semiconductor materials; and

forming an electrostatic discharge device from the epitaxial substrate.

2. The method of claim 1, further comprising:

selectively etching away a portion of the epitaxial substrate from the solid state emitter; and

forming the electrostatic discharge device from a remaining portion of the epitaxial substrate.

3. The method of claim 1, further comprising carrying the solid state emitter with a first substrate, the first substrate having a conductive structure contacting the solid state emitter.

4. The method of claim 3 wherein forming an electrostatic discharge device comprises:

forming a via through the electrostatic discharge device and at least a portion of the solid state emitter;

depositing a first conductive material in the via, wherein the first conductive material contacts the conductive structure; and

depositing a second conductive material on the solid state emitter and the electrostatic discharge device.

5. The method of claim 4, further comprising depositing an insulative material in the via prior to depositing the first conductive material in the via.

6. The method of claim 4 wherein depositing the first and second conductive materials includes connecting the electrostatic discharge device in parallel with the solid state emitter.

7. The method of claim 1 wherein forming an electrostatic discharge device includes forming multiple series-connected electrostatic discharge junctions.

8. A method of forming a solid state transducer device, comprising:

forming a solid state emitter having a first semiconductor material, a second semiconductor material, and an active region between the first and second semiconductor materials; and

forming an electrostatic discharge device on the solid state emitter.

9. The method of claim 8 wherein:

forming the electrostatic discharge device comprises forming an electrostatic discharge device having a first electrical contact and a second electrical contact; and

wherein the method further comprises electrically coupling the first semiconductor material to the first electrical contact and electrically coupling the second semiconductor material to the second electrical contact.

10. The method of claim 8 wherein forming the electrostatic discharge device comprises forming an electrostatic junction having a first conductive material, a second conductive material, and a third semiconductor material between the first conductive material and the second conductive material.

11. The method of claim 10, further comprising electrically connecting the second conductive material to the second semiconductor material.

12. The method of claim 10 wherein forming the electrostatic discharge device comprises forming a plurality of series-connected electrostatic junctions, with individual electrostatic junctions comprising a portion of the first conductive material, a portion of the second conductive material, and a portion of the third semiconductor material, and wherein the

method further comprises connecting the first conductive material of one electrostatic junction with the second conductive material of an adjacent electrostatic junction.

13. The method of claim 10 wherein forming the electrostatic discharge device further comprises:

forming a via through at least a portion of the solid state emitter; and

electrically connecting the first conductive material to the first semiconductor material with a third conductive material in the via.

14. The method of claim 8 further compromising:

forming the solid state emitter on an epitaxial substrate;

removing a portion of the epitaxial substrate; and

forming the electrostatic discharge device from a remaining portion of the epitaxial substrate.

15. A solid state transducer system, comprising:

a solid state emitter; and

an electrostatic discharge device carried by the solid state emitter, the electrostatic discharge device and the solid state emitter having a shared first contact and a shared second contact, with the first and second contacts being the only externally accessible active electrical contacts for both the solid state emitter and the electrostatic discharge device.

16. The system of claim 15, further comprising:

a power source operably connected to the first contact; and

a controller operably connected to the power source, the controller configured to start and stop current from the power source to the first contact.

17. The system of claim 15 wherein the solid state emitter and the electrostatic discharge device together form a single die.

18. The system of claim 15 wherein the electrostatic discharge device comprises a semiconductor junction.

19. The system of claim 15 wherein the solid state emitter is grown from an epitaxial substrate, and wherein the electrostatic discharge device comprises a portion of the epitaxial substrate.

20. The system of claim 15, further comprising a via in the epitaxial substrate, wherein the first contact is connected to the solid state emitter with the via.

21. A solid state transducer device, comprising:

a single support substrate;

a solid state emitter carried by the single support substrate; and

an electrostatic discharge device carried by the single support substrate, the electrostatic discharge device and the solid state emitter sharing a common first contact and a common second contact, neither the electrostatic discharge device nor the solid state emitter having another support substrate connected between the single support substrate and either the electrostatic device or the solid state emitter.

22. The device of claim 21 wherein the electrostatic discharge device comprises a diode connected between the first contact and the second contact.

23. The device of claim 21 wherein the single support substrate includes an epitaxial substrate on which the solid state emitter is epitaxially formed.

24. The device of claim 21 wherein the electrostatic discharge device is positioned between the substrate and the solid state emitter.

25. The device of claim 21 wherein the solid state emitter is positioned between the electrostatic discharge device and the substrate.

26. The device of claim 21 wherein the electrostatic discharge device comprises:

a first conductive material;

a second conductive material; and

a semiconductor material separating the first and second conductive materials.

27. The device of claim 21 wherein the electrostatic discharge device comprises a plurality of semiconductor junctions operably connected in series.

28. The device of claim 21 wherein the electrostatic discharge device is connected in parallel with the solid state emitter.

CLAIMS

I/We claim:

1. A solid state transducer system, comprising:

a solid state emitter; and

an electrostatic discharge device carried by the solid state emitter, the electrostatic discharge device and the solid state emitter having a shared first contact and a shared second contact, with the first and second contacts being the only externally accessible active electrical contacts for both the solid state emitter and the electrostatic discharge device, wherein the solid state emitter is grown from an epitaxial substrate, and wherein the electrostatic discharge device comprises a portion of the epitaxial substrate.

2. The system of claim 1, further comprising:

a power source operably connected to the first contact; and

a controller operably connected to the power source, the controller configured to start and stop current from the power source to the first contact.

3. The system of claim 1 wherein the solid state emitter and the electrostatic discharge device together form a single die.

4. The system of claim 1 wherein the electrostatic discharge device comprises a semiconductor junction.

5. A solid state transducer system, comprising:

a solid state emitter;

an electrostatic discharge device carried by the solid state emitter, the electrostatic discharge device and the solid state emitter having a shared first contact and a shared second contact, with the first and second contacts being the only externally accessible active electrical contacts for both the solid state emitter and

the electrostatic discharge device, wherein the electrostatic discharge device includes at least a portion of an epitaxial substrate; and

a via in the epitaxial substrate, wherein the first contact is connected to the solid state emitter with the via.

6. The system of claim 5 wherein the electrostatic discharge device comprises a diode connected between the first contact and the second contact.

7. The system of claim 5 wherein the electrostatic discharge device comprises a semiconductor junction.

8. The system of claim 5 wherein the solid state emitter is positioned between the electrostatic discharge device and the substrate.

9. The system of claim 5, further comprising:

a power source operably connected to the first contact; and

a controller operably connected to the power source, the controller configured to start and stop current from the power source to the first contact.

10. The system of claim 5 wherein the solid state emitter and the electrostatic discharge device together form a single die.

11. The system of claim 5 wherein the electrostatic discharge device is connected in parallel with the solid state emitter.

12. A solid state transducer device, comprising:

a single support substrate;

a solid state emitter carried by the single support substrate; and

an electrostatic discharge device carried by the single support substrate, the electrostatic discharge device and the solid state emitter sharing a common first contact and a common second contact, neither the electrostatic discharge device nor the solid state emitter having another support substrate connected between the single support substrate and either the electrostatic device or the solid state emitter,

wherein the solid state emitter is positioned between the electrostatic discharge device and the substrate.

13. The device of claim 12 wherein the electrostatic discharge device comprises a diode connected between the first contact and the second contact.

14. The device of claim 12 wherein the single support substrate includes an epitaxial substrate on which the solid state emitter is epitaxially formed.

15. The device of claim 12 wherein the electrostatic discharge device is connected in parallel with the solid state emitter.

16. A solid state transducer device, comprising:

a single support substrate;

a solid state emitter carried by the single support substrate;

an electrostatic discharge device carried by the single support substrate, the electrostatic discharge device and the solid state emitter sharing a common first contact and a common second contact, neither the electrostatic discharge device nor the solid state emitter having another support substrate connected between the single support substrate and either the electrostatic device or the solid state emitter, wherein the electrostatic discharge device includes at least a portion of an epitaxial substrate; and

a via in the epitaxial substrate, wherein the first contact is connected to the solid state emitter with the via.