CLAIMS

1. A solid-state transducer (SST) die, comprising:

a transducer structure having a first semiconductor material at a first side and a second semiconductor material at an opposite second side;

a plurality of features that separate the transducer structure into a plurality of electrically isolated transducer junctions including at least a first transducer junction and a second transducer junction;

a plurality of first contacts electrically coupled to the first semiconductor material, each of the first and second junctions having at least one first contact;

a plurality of second contacts electrically coupled to the second semiconductor material and extending from the first side of the transducer structure to the second semiconductor material, each of the first and second junctions having at least one second contact;

a barrier material over the first contacts and the second contacts; and

a conductive material over the barrier material, the conductive material comprising a first external terminal in electrical communication with one of the first contacts, a second external terminal in electrical communication with one of the second contacts, and a thermal pad electrically isolated from each of the first and second external terminals.

2. The SST die of claim 1, further comprising an interconnect between second contact on first transducer junction and a first contact on the second transducer junction such that the first and second transducer junctions of the die are electrically connected in series.

3. The SST die of claim 1 wherein each transducer junction comprises an individually addressable light-emitting diode (LED) die.

4. The SST die of claim 1, further comprising a dielectric material over the first contact, the dielectric material having a plurality of openings that are aligned with the first and second contacts.

5. The SST die of claim 4 wherein the first and second contacts and the at least one interconnect are buried.

6. The SST die of claim 4 wherein each SST junction comprises an individually addressable light-emitting diode (LED) die.

7. The SST die of claim 4 wherein each SST junction comprises:

a first semiconductor material on the first side and a second semiconductor material on a second side opposite the first side,

wherein the first contact is coupled to the first semiconductor material and the second contact is coupled to the second semiconductor material.

8. The SST die of claim 7 wherein the second contact extends from the second semiconductor material to the first side.

9. A solid-state transducer (SST) die, comprising:

a transducer structure having a first semiconductor material at a first side and a second semiconductor material at an opposite second side;

a plurality of features that separate the transducer structure into a plurality of electrically isolated transducer junctions including at least a first transducer junction and a second transducer junction;

a plurality of first contacts electrically coupled to the first semiconductor material, each of the first and second junctions having at least one first contact;

a plurality of second contacts electrically coupled to the second semiconductor material and extending from the first side of the transducer structure to the second semiconductor material, each of the first and second junctions having at least one second contact;

an interconnect between second contact on first transducer junction and a first contact on the second transducer junction; and

a third contact connected to the interconnect, the third contact configured to cross-connect to another contact on a second SST die.

10. A solid-state transducer (SST) die, comprising:

a first terminal on a first side;

a second terminal on the first side;

a plurality of SST junctions coupled in series between the first and second terminals, each SST junction comprising:

a first contact; and

a second contact; and

at least one interconnect extending between a first contact of one SST junction and a second contact of an adjacent SST junction;

a barrier material over the first contacts, the second contacts, and the at least one interconnect; and

a conductive material over the barrier material, the conductive material comprising:

the first terminal;

the second terminal; and

a thermal pad electrically isolated from each of the first and second terminals.

11. A light-emitting diode (LED) comprising:

a light-emitting transducer structure having a light-emitting active region positioned between a first semiconductor material at a first side and a second semiconductor material at a second side opposite the first;

a plurality of first contacts electrically coupled to the first semiconductor material at the first side;

a plurality of second contacts electrically coupled to the second semiconductor material and extending from the first side through the light-emitting active region and to the second semiconductor material;

a dielectric material over the first side, the dielectric material having openings aligned with the first contacts and second contacts;

a barrier material over the dielectric material at the first side of the transducer structure; and

a metal substrate over the barrier material, the metal substrate comprising a first external terminal in electrical communication with one of the first contacts, a second external

terminal in electrical communication with one of the second contacts, and a thermal pad electrically isolated from each of the first and second external terminals.

12. The LED of claim 11, further comprising a plurality of features that separate the transducer structure of the LED into a plurality of electrically isolated junctions, each junction including a first contact and a second contact.

13. The LED of claim 12, further comprising an interconnect extending between a first contact of one junction and a second contact of another junction.

14. The LED of claim 11, further comprising a passivation material over the interconnect such that the interconnect is encased in the passivation material.