Claims

What is claimed:

1. A semiconductor device, comprising:

a substrate; and

a band-pass filter formed over the substrate, the band-pass filter including,

(a) a first conductive trace wound to exhibit an inductive propertyies with a first end coupled to a first terminal of the semiconductor device and second end coupled to a second terminal of the semiconductor device,

(b) a first capacitor coupled between the first and second ends of the first conductive trace,

(c) a second conductive trace wound to exhibit an inductive properties with a first end coupled to a third terminal of the semiconductor device and second end coupled to a fourth terminal of the semiconductor device, the second conductive trace having no overlapping portion with the first conductive trace and including a different size and shape asthan the first conductive trace,and

(d) a second capacitor coupled between the first and second ends of the second conductive trace, and

(ec) a third conductive trace wound around the first and second conductive traces to exhibit an inductive propertyiesswith a first distance between the third conductive trace and the first conductive trace and a second distance different than the first distance between the third conductive trace and the second conductive trace.

2. The semiconductor device of claim 1, further including:

a first capacitor coupled between first and second ends of the first conductive trace;

a second capacitor coupled between first and second ends of the second conductive trace; and

a third capacitor coupled between first and second ends of the third conductive trace.

3. The semiconductor device of claim 1, wherein the first and second conductive traces each have an oval, circular, polygonal, or conformal shape.

4. The semiconductor device of claim 1, wherein the first and second conductive traces have a coupling coefficient less than 0.2, and the first and third conductive traces have a coupling coefficient less than 0.2, and the second and third conductive traces have a coupling coefficient less than 0.2.

5. The semiconductor device of claim 1, further including a center tap coupled midway between the first and second ends of the second conductive trace.

6. A semiconductor device, comprising:

a substrate;

a first conductive trace formed over the substrate and wound to exhibit an inductive property~~ies with a first end coupled to a first terminal of the semiconductor device and second end coupled to a second terminal of the semiconductor device~~;

a second conductive trace formed over the substrate and wound to exhibit an inductive property~~ies with a first end coupled to a third terminal of the semiconductor device and second end coupled to a fourth terminal of the semiconductor device~~, the second conductive trace~~ having a different size or shape as the first conductive trace~~ being disposed over the substrate outside a perimeter of the first conductive trace and inductively coupled with the first conductive trace and

including a different size and shape than the first conductive trace; and

a third conductive trace formed over the substrate and wound around the first and second conductive traces to exhibit an inductive property~~ies~~.

7. The semiconductor device of claim 6, further including:

a first capacitor formed over the substrate and coupled between ~~the~~ first and second ends of the first conductive trace; and

a second capacitor formed over the substrate and coupled between ~~the~~ first and second ends of the second conductive trace.

8. The semiconductor device of claim 7, further including a third capacitor formed over the substrate and coupled between first and second ends of the third conductive trace.

9. The semiconductor device of claim 6, wherein the first and second conductive traces each have an oval, circular, polygonal, or conformal shape.

10. The semiconductor device of claim 6, wherein the first and second conductive traces have a coupling coefficient less than 0.2, and the first and third conductive traces have a coupling coefficient less than 0.2, and the second and third conductive traces have a coupling coefficient less than 0.2.

11. The semiconductor device of claim 6, further including a center tap coupled midway between ~~the~~ first and second ends of the second conductive trace.

12. A semiconductor device, comprising:

a substrate;

a first inductor ~~formed on~~ disposed over the substrate;

a second inductor ~~formed on~~ disposed over the substrate outside a perimeter of the first inductor and inductively coupled with the first inductor and including a different size and shape than the first inductor, the first inductor being disposed over the substrate outside a perimeter of the second inductor~~, the second inductor having a different size or shape as the first inductor~~; and

a third inductor formed around the first and second inductors.

13. The semiconductor device of claim 12, wherein the first inductor includes a first conductive trace wound to exhibit an inductive property ~~properties with a first end coupled to a first terminal of the semiconductor device and second end coupled to a second terminal of the semiconductor device~~.

14. The semiconductor device of claim 13, wherein the second inductor includes a second conductive trace wound to exhibit an inductive property~~ies with a first end coupled to a third terminal of the semiconductor device and second end coupled to a fourth terminal of the semiconductor device~~.

15. The semiconductor device of claim 14, wherein the third inductor includes a third conductive trace wound to exhibit an inductive property~~ies~~.

16. The semiconductor device of claim 15, further including:

a first capacitor formed over the substrate and coupled between ~~the~~ first and second ends of the first conductive trace; and

a second capacitor formed over the substrate and coupled between ~~the~~ first and second ends of the second conductive trace.

17. The semiconductor device of claim 16, further including a third capacitor formed over the substrate and coupled between first and second ends of the third conductive trace.

18. The semiconductor device of claim 14, wherein the first and second conductive traces each have an oval, circular, polygonal, or conformal shape.

19. The semiconductor device of claim 14, further including a center tap coupled midway between the first and second ends of the second conductive trace.

20. A method of forming a semiconductor device, comprising:

providing a substrate;

forming a first conductive trace over the substrate~~, the first conductive trace being~~ and wound to exhibit an inductive property~~ies with a first end coupled to a first terminal of the semiconductor device and second end coupled to a second terminal of the semiconductor device~~;

forming a second conductive trace over the substrate~~, the second conductive trace being~~and wound to exhibit an inductive property~~properties with a first end coupled to a third terminal of the semiconductor device and second end coupled to a fourth terminal of the semiconductor device~~, the second conductive trace ~~having~~ being disposed over the substrate outside a perimeter of the first conductive trace and including a different size ~~or~~and shape ~~as~~than the first conductive trace, the first conductive trace being disposed over the substrate outside a perimeter of the second conductive trace; and

forming a third conductive trace over the substrate~~, the third conductive trace being~~and wound around the first and second conductive traces to exhibit an inductive property~~ies~~.

21. The method of claim 20, further including:

forming a first capacitor over the substrate and coupled between ~~the~~ first and second ends of the first conductive trace; and

forming a second capacitor over the substrate and coupled between ~~the~~ first and second ends of the second conductive trace.

22. The method of claim 21, further including forming a third capacitor over the substrate and coupled between first and second ends of the third conductive trace.

23. The method of claim 22, wherein the first, second, and third conductive traces, and first, second, and third capacitors operate~~s~~ as a band-pass filter.

24. The method of claim 20, wherein the first and second conductive traces each have an oval, circular, polygonal, or conformal shape.

25. The method of claim 20, further including a center tap coupled midway between the first and second ends of the second conductive trace.

26. A method of making a semiconductor device, comprising:

providing a substrate;

disposing a first inductor over the substrate;

disposing a second inductor over the substrate outside a perimeter of the first inductor and inductively coupled with the first inductor and including a different size and shape than the

first inductor, and the first inductor disposed over the substrate outside a perimeter of the second inductor; and

forming a third inductor around the first and second inductors.

27. The method of claim 26, wherein the first inductor includes a first conductive trace wound to exhibit an inductive property, the second inductor includes a second conductive trace wound to exhibit an inductive property, the third inductor includes a third conductive trace wound to exhibit an inductive property.

28. The method of claim 27, further including:

forming a first capacitor over the substrate between first and second ends of the first conductive trace; and

forming a second capacitor over the substrate between first and second ends of the second conductive trace.

29. The method of claim 28, further including forming a third capacitor over the substrate between first and second ends of the third conductive trace.

30. The method of claim 27, wherein the first and second conductive traces each have an oval, circular, polygonal, or conformal shape.

31. The method of claim 27, further including providing a center tap midway between first and second ends of the second conductive trace.

32. The method of claim 27, wherein the first and second conductive traces have a coupling coefficient less than 0.2, and the first and third conductive traces have a coupling coefficient less than 0.2, and the second and third conductive traces have a coupling coefficient less than 0.2.