CLAIMS:

1. A single crystal silicon wafer comprising:

two major, parallel surfaces, one of which is a front surface of the single crystal silicon wafer and the other of which is a back surface of the single crystal silicon wafer, a circumferential edge joining the front and back surfaces of the single crystal silicon wafer, a bulk region between the front and back surfaces, and a central plane of the single crystal silicon wafer between the front and back surfaces of the single crystal silicon wafer, wherein:
(a) the bulk region comprises a combination of nitrogen at a concentration of at least $1x10^{14}$ atoms/cm^3 and germanium at a concentration of at least $1x10^{19}$ atoms/cm^3;

(b) the bulk region comprises interstitial oxygen at a concentration of less than 6 ppma (New ASTM: ASTM F 121, 1980-1983; DIN 50438/1, 1978); and

(c) the bulk region of the single crystal silicon wafer has a resistivity of at least 1000 ohm cm.

2. The single crystal silicon wafer of claim 1 wherein the concentration of interstitial oxygen is less than 5 ppma.

3. The single crystal silicon wafer of claim 1 wherein the concentration of interstitial oxygen is less than 4 ppma.

4. The single crystal silicon wafer of claim 1 wherein the concentration of interstitial oxygen is less than 3 ppma.

5. The single crystal silicon wafer of claim 1 wherein the resistivity is at least 3000 ohm cm.

6. The single crystal silicon wafer of claim 1 wherein the resistivity is at least 4000 ohm cm.

7. The single crystal silicon wafer of claim 1 wherein the resistivity is at least 5000 ohm cm.

8. The single crystal silicon wafer of claim 1 wherein the resistivity is at least 10000 ohm cm.

9. The single crystal silicon wafer of claim 1 wherein the resistivity is at least 15000 ohm cm.

10. The single crystal silicon wafer of claim 1 wherein the resistivity is at least 20000 ohm cm.

11. The single crystal silicon wafer of any of claims 1 through 10 wherein the germanium concentration is at least $1x10^{19}$ atoms/cm^3 and less than $1x10^{22}$ atoms/cm^3.

12. The single crystal silicon wafer of any of claims 1 through 10 wherein the germanium concentration is at least $5x10^{19}$ atoms/cm^3.

13. The single crystal silicon wafer of any of claims 1 through 10 wherein the germanium concentration is at least $5x10^{19}$ atoms/cm^3 and less than $1x10^{22}$ atoms/cm^3.

14. The single crystal silicon wafer of any of claims 1 through 13 comprising nitrogen at a concentration of at least $5x10^{15}$ atoms/cm^3 and less than $1x10^{16}$ atoms/cm^3.

15. The single crystal silicon wafer of any of claims 1 through 13 comprising nitrogen at a concentration of at least $1x10^{15}$ atoms/cm^3 and less than $1x10^{16}$ atoms/cm^3.

16. A method of growing a single crystal silicon ingot, the method comprising:

preparing a silicon melt, wherein the silicon melt is prepared by melting polycrystalline silicon in a quartz lined crucible and adding a source of an impurity to the quartz lined crucible, the impurity comprising germanium, nitrogen, or a combination of germanium and nitrogen; and

pulling the single crystal silicon ingot from the silicon melt, the single crystal silicon ingot comprising a central axis, a crown, an end opposite the crown, and a main body between the crown and the opposite end, the main body having a lateral surface and a radius, R, extending from the central axis to the lateral surface, wherein the main body of the single crystal silicon ingot comprises a combination of nitrogen at a concentration of at least $1x10^{14}$ atoms/cm^3 and germanium at a concentration of at least $1x10^{19}$ atoms/cm^3, further wherein the pulling conditions are sufficient to yield a concentration of interstitial oxygen in the main body of the single crystal silicon ingot of less than 6 ppma (New ASTM: ASTM F 121, 1980-

1983; DIN 50438/1, 1978), and further wherein the main body of the single crystal silicon ingot has a resistivity of at least 1000 ohm cm.

17. The method of claim 16 wherein the pulling conditions are sufficient to yield a concentration of interstitial oxygen in the main body of the single crystal silicon ingot of less than 5 ppma.

18. The method of claim 16 wherein the pulling conditions are sufficient to yield a concentration of interstitial oxygen in the main body of the single crystal silicon ingot of less than 4 ppma.

19. The method of claim 16 wherein the pulling conditions are sufficient to yield a concentration of interstitial oxygen in the main body of the single crystal silicon ingot of less than 3 ppma.

20. The method of claim 16 wherein the main body of the single crystal silicon ingot has a resistivity of at least 3000 ohm cm.

21. The method of claim 16 wherein the main body of the single crystal silicon ingot has a resistivity of at least about 4000 ohm cm.

22. The method of claim 16 wherein the main body of the single crystal silicon ingot has a resistivity of at least 5000 ohm cm.

23. The method of claim 16 wherein the main body of the single crystal silicon ingot has a resistivity of at least 10000 ohm cm.

24. The method of claim 16 wherein the main body of the single crystal silicon ingot has a resistivity of at least 15000 ohm cm.

25. The method of claim 16 wherein the main body of the single crystal silicon ingot has a resistivity of at least 20000 ohm cm.

26. The method of any of claims 16 through 25 wherein the main body of the single crystal silicon ingot comprises germanium at a concentration of at least $1x10^{19}$ atoms/cm^3 and less than $1x10^{22}$ atoms/cm^3.

27. The method of any of claims 16 through 25 wherein the main body of the single crystal silicon ingot comprises germanium at a concentration of at least $3x10^{19}$ atoms/cm^3.

28. The method of any of claims 16 through 25 wherein the main body of the single crystal silicon ingot comprises germanium at a concentration of at least $5x10^{19}$ atoms/cm^3 and less than $1x10^{22}$ atoms/cm^3.

29. The method of any of claims 16 through 28 wherein the main body of the single crystal silicon ingot comprises nitrogen at a concentration of at least $2x10^{14}$ atoms/cm^3 and less than $2x10^{15}$ atoms/cm^3.

30. The method of any of claims 16 through 28 wherein the main body of the single crystal silicon ingot comprises nitrogen at a concentration of at least $1x10^{15}$ atoms/cm^3 and less than $1x10^{16}$ atoms/cm^3.

31. A single crystal silicon ingot comprising:

a central axis, a crown, an end opposite the crown, and a main body between the crown and the opposite end, the main body having a lateral surface and a radius, R, extending from the central axis to the lateral surface, wherein:

(a) the main body of the single crystal silicon ingot comprises a combination of nitrogen at a concentration of at least $1x10^{14}$ atoms/cm^3 and germanium at a concentration of at least $1x10^{19}$ atoms/cm^3;

(b) the main body of the single crystal silicon ingot comprises interstitial oxygen at a concentration of less than 6 ppma (New ASTM: ASTM F 121, 1980-1983; DIN 50438/1, 1978); and

(c) the main body of the single crystal silicon ingot has a resistivity of at least 1000 ohm cm.

32. The single crystal silicon ingot of claim 31 wherein the concentration of interstitial oxygen is less than 5 ppma.

33. The single crystal silicon ingot of claim 31 wherein the concentration of interstitial oxygen is less than 4 ppma.

34. The single crystal silicon ingot of claim 31 wherein the concentration of interstitial oxygen is less than 3 ppma.

35. The single crystal silicon ingot of claim 31 wherein the resistivity is at least 3000 ohm cm.

36. The single crystal silicon ingot of claim 31 wherein the resistivity is at least 4000 ohm cm.

37. The single crystal silicon ingot of claim 31 wherein the resistivity is at least 5000 ohm cm.

38. The single crystal silicon ingot of claim 31 wherein the resistivity is at least 10000 ohm cm.

39. The single crystal silicon ingot of claim 31 wherein the resistivity is at least 15000 ohm cm.

40. The single crystal silicon ingot of claim 31 wherein the resistivity is at least 20000 ohm cm.

41. The single crystal silicon ingot of any of claims 31 through 40 wherein the germanium concentration is at least $1x10^{19}$ atoms/cm^3 and less than $1x10^{22}$ atoms/cm^3.

42. The single crystal silicon ingot of any of claims 31 through 40 wherein the germanium concentration is at least $3x10^{19}$ atoms/cm^3.

43. The single crystal silicon ingot of any of claims 31 through 40 wherein the germanium concentration is at least $5x10^{19}$ atoms/cm^3 and less than $1x10^{22}$ atoms/cm^3.

44. The single crystal silicon ingot of any of claims 31 through 43 comprising nitrogen at a concentration of at least $2x10^{14}$ atoms/cm^3 and less than $2x10^{15}$ atoms/cm^3.

45. The single crystal silicon ingot of any of claims 31 through 43 comprising nitrogen at a concentration of at least $1x10^{15}$ atoms/cm^3 and less than $1x10^{16}$ atoms/cm^3.