WHAT IS CLAIMED IS:

1. A method for producing a single crystal silicon ingot from a silicon melt held within a crucible comprising:

adding polycrystalline silicon to the crucible;

heating the polycrystalline silicon to cause a silicon melt to form in the crucible;

pulling a sample rod from the melt, the sample rod having a diameter;

annealing the sample rod to annihilate thermal donors;

measuring a resistivity of the sample rod after annihilation of thermal donors; and

pulling a product ingot from the melt, the product ingot having a diameter, the diameter of the sample rod being less than the diameter of the product ingot.

2. The method as set forth in claim 1 wherein a resistivity of the sample rod is measured by contacting the rod with a resistivity probe.

3. The method as set forth in claim 1 or claim 2 wherein a resistivity of the sample rod is measured without slicing the sample rod into wafers or slugs.

4. The method as set forth in any one of claims 1 to 3 further comprising forming a planar segment on the sample rod, a resistivity of the sample rod being measured on the planar segment.

5. The method as set forth in claim 4 wherein the planar segment extends axially from one end of the sample rod toward a second end of the sample rod.

6. The method as set forth in claim 4 or claim 5 wherein a probe is contacted with the planar segment to measure a resistivity of the sample rod.

7. The method as set forth in any one of claims 1 to 6 further comprising applying a current to the sample rod to measure a resistance of the sample rod.

8. The method as set forth in any one of claims 1 to 7 wherein the diameter of the sample rod is less than 0.75 times the diameter of the product ingot, or less than 0.50 times, less than about 0.25 times or less than 0.1 times the diameter of the product ingot.

9. The method as set forth in any one of claims 1 to 8 wherein the sample rod has an average diameter, the average diameter of the sample rod being less than about 150 mm, less than about 100 mm, less than about 50 mm, less than about 25 mm, less than about 20 mm, from about 5 mm to about 150 mm, from about 5 mm to about 100 mm, from about 5 mm to about 50 mm, from about 5 mm to about 25 mm or from about 10 mm to about 25 mm.

10. The method as set forth in any one of claims 1 to 9 wherein the sample rod has a largest diameter, the largest diameter of the sample rod being less than about 150 mm, less than about 100 mm, less than about 50 mm, less than about 25 mm, less than about 20 mm, from about 5 mm to about 150 mm, from about 5 mm to about 100 mm, from about 5 mm to about 50 mm, from about 5 mm to about 25 mm or from about 10 mm to about 25 mm.

11. The method as set forth in any one of claims 1 to 10 wherein the sample rod has a length of less than about 300 mm, less than about 200 mm or less than about 100 mm.

12. The method as set forth in any one of claims 1 to 11 wherein the product ingot has a resistivity of at least about 1,500 Ω-cm, or at least about 2,000 Ω-cm, at least about 4,000 Ω-cm, at least about 6,000 Ω-cm, at least about 8,000 Ω-cm, at least about 10,000 Ω-cm, from about 1,500 Ω-cm to about 50,000 ohm-cm or from about 8,000 Ω-cm to about 50,000 Ω-cm.

13. The method as set forth in any one of claims 1 to 12 wherein the sample rod has a resistivity of at least about 1,500 Ω-cm, or at least about 2,000 Ω-cm, at least about 4,000 Ω-cm, at least about 6,000 Ω-cm, at least about 8,000 Ω-cm, at least about 10,000 Ω-cm, from about 1,500 Ω-cm to about 50,000 ohm-cm or from about 8,000 Ω-cm to about 50,000 Ω-cm.

14. The method as set forth in any one of claims 1 to 13 comprising determining an average resistivity of the sample rod.

15. The method as set forth in claim 14 wherein the sample rod is secured by a measurement apparatus comprising a clamp that holds the sample rod while contacting the sample rod with a resistivity probe.

16. The method as set forth in any one of claims 1 to 15 wherein the sample rod is annealed at a temperature of at least about 500°C, at least about 650°C, at least about 800°C, from about 500°C to about 900°C, or from about 650°C to about 1100°C.

17. The method as set forth in any one of claims 1 to 16 wherein a length of the anneal is at least about 5 seconds, at least about 30 seconds, at least about 1 minute, at least about 3 minutes, from about 5 seconds to 15 minutes, from about 5 seconds to about 5 minutes or from about 5 seconds to about 3 minutes.

18. A method for determining the resistivity of a polycrystalline silicon melt held within a crucible, the method comprising:

pulling a sample rod from the melt;

annealing the sample rod in a thermal donor kill cycle;

applying a current to the sample rod; and

contacting the sample rod with a resistivity probe while applying current to the sample rod to measure the resistivity of the rod.

19. The method as set forth in claim 18 further comprising forming a planar segment on a surface of the sample rod, the resistivity probe contacting the planar segment to measure the resistivity of the rod.

20. The method as set forth in claim 18 or claim 19 wherein the probe is a two-point resistivity probe.

21. The method as set forth in any one of claims 18 to 20 wherein the sample rod has an average diameter, the average diameter of the sample rod being less than about 150 mm or less than about 100 mm, less than about 50 mm, less than about 25 mm, less than about 20 mm, from about 5 mm to about 150 mm, from about 5 mm to about 100

mm, from about 5 mm to about 50 mm, from about 5 mm to about 25 mm or from about 10 mm to about 25 mm.

22. The method as set forth in any one of claims 18 to 21 wherein the sample rod has a largest diameter, the largest diameter of the sample rod being less than about 150 mm, less than about 100 mm, less than about 50 mm, less than about 25 mm, less than about 20 mm, from about 5 mm to about 150 mm, from about 5 mm to about 100 mm, from about 5 mm to about 50 mm, from about 5 mm to about 25 mm or from about 10 mm to about 25 mm.

23. The method as set forth in any one of claims 18 to 22 wherein the sample rod is secured by a measurement apparatus comprising a clamp that holds the sample rod when contacting the rod with a resistivity probe.

24. The method as set forth in any one of claims 18 to 23 further comprising annealing the sample rod prior to measuring the resistivity of the sample rod.

25. The method as set forth in any one of claims 18 to 24 further wherein the sample rod is annealed at a temperature of at least about 500°C, at least about 650°C, at least about 800°C,from about 500°C to about 900°C, or from about 650°C to about 1100°C.

26. The method as set forth in any one of claims 18 to 25 wherein a length of the anneal is at least about 5 seconds, at least about 30 seconds, at least about 1 minute, at least about 3 minutes, from about 5 seconds to 15 minutes, from about 5 seconds to about 5 minutes or from about 5 seconds to about 3 minutes.