CLAIMS:

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 at a temperature of at least 500°C for about 5 seconds to 15 minutes in a rapid thermal anneal to annihilate thermal donors, the sample rod having an oxygen content of less than 5.5 ppma;

measuring a resistivity of the sample rod after annihilation of thermal donors, the resistivity of the sample rod being measured without slicing the sample rod into wafers or slugs; 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~~3. The method as set forth in ~~any one of~~ claim~~s~~ 1 ~~to 3~~or 2 further comprising forming a planar segment on

the sample rod, a resistivity of the sample rod being measured on the planar segment.

~~5~~4. The method as set forth in claim ~~4~~3 wherein the planar segment extends axially from one end of the sample rod toward a second end of the sample rod.

~~6~~5. The method as set forth in claim ~~4~~3 or claim ~~5~~4 wherein a probe is contacted with the planar segment to measure a resistivity of the sample rod.

~~7~~6. The method as set forth in any one of claims 1 to ~~6~~5 further comprising applying a current to the sample rod to measure a resistance of the sample rod.

~~8~~7. The method as set forth in any one of claims 1 to ~~7~~6 wherein the diameter of the sample rod is less than 0.75 times the diameter of the product ingot.

~~9~~8. The method as set forth in any one of claims 1 to ~~8~~7 wherein the sample rod has an average diameter, the average diameter of the sample rod being less than about 150 mm.

~~10~~9. The method as set forth in any one of claims 1 to ~~9~~8 wherein the sample rod has a largest diameter, the largest diameter of the sample rod being less than 50 mm.

~~11~~10. The method as set forth in any one of claims 1 to ~~10~~9 wherein the sample rod has a length of less than 300 mm.

~~12~~11. The method as set forth in any one of claims 1 to ~~11~~10 wherein the product ingot has a resistivity of at least 1,500 Ω-cm.

~~13~~12. The method as set forth in any one of claims 1 to ~~12~~11 wherein the sample rod has a resistivity of at least 1,500 Ω-cm.

~~14~~13. The method as set forth in any one of claims 1 to ~~13~~12 comprising determining an average resistivity of the sample rod.

~~15~~14. The method as set forth in claim ~~14~~13 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 500°C.~~

~~17. The method as set forth in any one of claims 1 to 16 wherein a length of the anneal is at least 5 seconds.~~

~~18~~15. The method as set forth in any one of claims 1 to ~~17~~14 wherein the sample rod has an average diameter, the average diameter of the sample rod being less than 25 mm.

~~19. The method as set forth in any one of claims 1 to 18 wherein the sample rod is annealed in a rapid thermal anneal to annihilate thermal donors.~~

~~20~~16. The method as set forth in claim ~~19~~15 wherein the sample rod is annealed ~~to a temperature of at least 500°C~~ for 5 seconds to 15 minutes.

~~21~~17. The method as set forth in any one of claims 1 to ~~20~~16 wherein the sample rod is annealed to a temperature of 800°C or more.

~~22~~18. The method as set forth in claim ~~21~~17 wherein the sample rod is annealed for 5 seconds to 15 minutes.

~~23~~19. 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, the sample rod having an average diameter from about 5 mm to about 50 mm;

annealing the sample rod in a thermal donor kill cycle at a temperature from about 650°C to about 1100°C for at least 5 seconds, the sample rod having an oxygen content of less than 5.5 ppma;

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, the resistivity of the sample rod being measured without slicing the sample rod into wafers or slugs.

~~24~~20. The method as set forth in claim ~~23~~19 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.

~~25~~21. The method as set forth in claim ~~23~~19 or claim ~~24~~20 wherein the probe is a two-point resistivity probe.

~~26~~22. The method as set forth in any one of claims ~~23~~19 to ~~25~~21 wherein the sample rod has an average diameter, the average diameter of the sample rod being less than 25 mm.

~~27~~23. The method as set forth in any one of claims ~~23~~19 to ~~26~~22 wherein the sample rod has a largest diameter, the largest diameter of the sample rod being from 5 mm to 50 mm.

~~28~~24. The method as set forth in any one of claims ~~23~~19 to ~~27~~23 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.

~~29~~25. The method as set forth in any one of claims ~~23~~19 to ~~28~~24 further comprising annealing the sample rod prior to measuring the resistivity of the sample rod.

~~30~~26. The method as set forth in any one of claims ~~23~~19 to ~~29~~25 further wherein the sample rod is annealed at a temperature of at least 800°C.

~~31~~27. The method as set forth in any one of claims ~~23~~19 to ~~30~~26 wherein a length of the anneal is at least 1 minute.

~~32~~28. The method as set forth in any one of claims ~~23~~19 to ~~31~~27 wherein the sample rod is annealed in a rapid thermal anneal.

~~33. The method as set forth in claim 32 wherein the sample rod is annealed to a temperature of at least 500°C for 5 seconds to 15 minutes.~~

~~34~~29. The method as set forth in any one of claims ~~23~~19 to ~~32~~28 wherein the sample rod is annealed to a temperature of 800°C or more.

~~35~~30. The method as set forth in claim ~~34~~29 wherein the sample rod is annealed for 5 seconds to 15 minutes.