CLAIMS

What is claimed is:

1. A method for providing isolated power to a component of a plasma processing chamber that is also subject to a set of RF signals, said set of RF signals including at least a first RF signal having a first RF frequency, comprising:

providing a DC voltage signal;

modulating said DC voltage signal into an isolated power signal using an isolation transformer, said isolated power signal having an intermediate frequency that is higher than 60 Hz and lower than said first RF frequency, wherein said set of RF signals includes a plurality of RF signals having different RF frequencies, said first RF frequency representing the lowest RF frequency among said different RF frequencies, said isolation transformer having a primary winding that is not electrically connected to a secondary winding, including:

supplying said DC voltage signal to said primary winding, and

obtaining said isolated power signal from said secondary winding, thereby substantially blocking said first RF frequency; and

delivering said isolated power to said component using said isolated power signal;

wherein said secondary winding is wound with a larger diameter around a core of said isolation transformer resulting in an air gap between said secondary winding and said core for reducing the capacitive coupling between said secondary winding and said core than a diameter with which said primary winding is wound around said core.

2. The method of claim 1 further comprising:

obtaining an AC line signal having a frequency in the range of 50 Hz to 60 Hz; and

rectifying said AC line signal to obtain said DC voltage signal.

~~3. The method of claim 1 wherein said secondary winding is wound with a larger diameter around a core of said isolation transformer than a diameter with which said primary winding is wound around said core.~~

43. The method of claim ~~3~~ 1 further comprising providing an electrostatic shield between said secondary winding and said core.

54. The method of claim 1 further comprising providing an electrostatic shield between said secondary winding and said primary winding.

65. The method of claim 1 wherein said secondary winding is wound over said primary winding.

~~7~~6. The method of claim ~~1~~ 5 further comprising providing an electrostatic shield between said secondary winding and said primary winding.

87. The method of claim 1 wherein said intermediate frequency is between about 500 Hz and about 2 MHz.

~~9. The method of claim 1 wherein said intermediate frequency is between about 5 KHz and about 200 KHz.~~

~~10. The method of claim 1 wherein said intermediate frequency is between about 10 KHz and about 50 KHz.~~

~~11. The method of claim 1 wherein said set of RF signals includes a plurality of RF signals having different RF frequencies, said first RF frequency representing the lowest RF frequency among said different RF frequencies.~~

~~12~~8. The method of claim ~~3~~ 1 wherein said core is formed of a core material having a mu value between about 10 and about 5000.

~~13. The method of claim 3 wherein said core is formed of a core material having a mu value between about 100 and about 2000.~~

~~14. The method of claim 3 wherein said core is formed of a core material having a mu value between about 200 and about 1000.~~

~~15~~9. The method of claim 1 further comprising providing a low-side control circuit for controlling at least one of an amplitude of said DC voltage signal and a turn ratio of said isolation transformer.

~~16~~10. The method of claim 1 further comprising providing a modulation circuit for modulating said isolated power signal.

~~17~~11. The method of claim ~~16~~ 10 further comprising providing a high-side control circuit for controlling said modulation circuit.

~~18~~12. A system for providing isolated power to a component that is also subject to a set of RF signals, said set of RF signals including at least a first RF signal having a first RF frequency, comprising:

first and second terminals for providing a DC voltage signal; and

a modulating circuit to modulate said DC voltage signal into an isolated power signal using an isolation transformer, said isolated power signal having an intermediate frequency that is higher than 60 Hz and lower than said first RF frequency, wherein said set of RF signals includes a plurality of RF signals having different RF frequencies, said first RF frequency representing the lowest RF frequency among said different RF frequencies, said isolation transformer having a primary winding that is not electrically connected to a secondary winding, wherein said DC voltage signal is supplied to said primary winding and said isolated power signal is obtained from said secondary winding thereby substantially blocking said first RF frequency, wherein said isolated power is delivered to said component using said isolated power signal, wherein said secondary winding is wound with a larger diameter around a core of said isolation transformer resulting in an air gap between said secondary winding and said core for reducing the capacitive coupling between said secondary winding and said core than a diameter with which said primary winding is wound around said core.

~~19. The system of claim 18 wherein said secondary winding is wound with a larger diameter around a core of said isolation transformer than a diameter with which said primary winding is wound around said core.~~

~~20~~13. The system of claim ~~18~~ 12 further comprising an electrostatic shield between said secondary winding and said primary winding.

~~21~~14. The system of claim ~~19~~ 12 further providing an electrostatic shield between said secondary winding and said core.

~~22~~15. The system of claim ~~18~~ 12 wherein said secondary winding is wound over said primary winding.

~~23~~16. The system of claim ~~18~~ 15 further providing an electrostatic shield between said secondary winding and said primary winding.

~~24. The system of claim 18 wherein said set of RF signals includes a plurality of RF signals having different RF frequencies, said first RF frequency representing the lowest RF frequency among said different RF frequencies.~~

~~25~~17. A method for providing isolated power to a component of a plasma processing chamber that is also subject to a ~~set~~ plurality of RF signals, said ~~set~~ plurality of RF signals including at least a first RF signal having a first RF frequency, said method comprising:

providing an AC line signal having a frequency in the range of 50 Hz to 60 Hz;

rectifying said AC line signal to obtain a ~~DG~~ quasi-DC voltage signal;

modulating said quasi-DC voltage signal into an isolated power signal using an isolation transformer, said isolated power signal having an intermediate frequency that is higher than 60 Hz and lower than said first RF frequency, said first RF frequency representing the lowest RF frequency among all RF frequencies of said ~~set~~ plurality of RF signals ~~if said set of RF signals comprises more than one RF signal~~, said isolation

transformer having a primary winding that is not electrically connected to a secondary winding, including:

supplying said quasi-DC voltage signal to said primary winding, and

obtaining said isolated power signal from said secondary winding, thereby substantially blocking said first RF frequency;

wherein said secondary winding is wound with a larger diameter around a core of said isolation transformer resulting in an air gap between said secondary winding and said core for reducing the capacitive coupling between said secondary winding and said core than a diameter with which said primary winding is wound around said core; and

delivering said isolated power to said component of said plasma processing chamber using said isolated power signal.