CLAIMS

1. A semiconductor processing chamber comprising:

a substrate support positioned within a processing region of the semiconductor processing chamber;

a lid plate;

a gasbox positioned between the lid plate and the substrate support, the gasbox characterized by a first surface and a second surface opposite the first surface, wherein the gasbox defines a central aperture, wherein the gasbox defines an annular channel in the first surface of the gasbox extending about the central aperture through the gasbox, wherein the gasbox defines a recessed ledge in the first surface of the gasbox extending about the annular channel, and wherein the gasbox comprises an annular cover seated on the recessed ledge and extending across the annular channel defined in the first surface of the gasbox;

a blocker plate positioned between the gasbox and the substrate support, wherein the blocker plate defines a plurality of apertures that operate as a choke for gas flowing therethrough;

a ferrite block positioned between the lid plate and the blocker plate; and

a faceplate positioned between the blocker plate and the substrate support.

2. The semiconductor processing chamber of claim 1, wherein the ferrite block is characterized by an annular shape extending about the central aperture of the gasbox.

3. The semiconductor processing chamber of claim 2, further comprising:

an insulator positioned between the gasbox and the lid plate, wherein the insulator defines a central aperture axially aligned with the central aperture defined through the gasbox, and wherein the ferrite block extends about the insulator.

4. The semiconductor processing chamber of claim 1, wherein the ferrite block comprises a plurality of blocks extending about the gasbox.

5. The semiconductor processing chamber of claim 1, wherein the ferrite block is disposed within a dielectric material.

6. The semiconductor processing chamber of claim 5, wherein the dielectric material is characterized by a dielectric constant below or equal to 3.7.

7. The semiconductor processing chamber of claim 6, wherein the dielectric material comprises polytetrafluoroethylene or polyether ether ketone.

8. The semiconductor processing chamber of claim 1, wherein the gasbox defines a second annular channel within the gasbox, and wherein the ferrite block is seated within the second annular channel.

9. The semiconductor processing chamber of claim 8, wherein a dielectric spacer is positioned on the ferrite block seated within the second annular channel.

10. The semiconductor processing chamber of claim 9, wherein the dielectric spacer defines a recess within the dielectric spacer, and wherein a cover is seated within the recess within the dielectric spacer.

11. The semiconductor processing chamber of claim 10, wherein the dielectric spacer creates a vertical spacing between the cover and the ferrite block, and wherein the dielectric spacer creates a radial gap between the cover and the gasbox.

12. A semiconductor processing chamber comprising:

a substrate support positioned within a processing region of the semiconductor processing chamber;

a lid plate;

a gasbox positioned between the lid plate and the substrate support, the gasbox characterized by a first surface and a second surface opposite the first surface, wherein the gasbox defines a central aperture, wherein the gasbox defines an annular channel in the first surface of the gasbox extending about the central aperture through the gasbox, wherein the gasbox defines a recessed ledge in the first surface of the gasbox extending about the annular channel, and wherein the gasbox comprises an annular cover seated on the recessed ledge and extending across the annular channel defined in the first surface of the gasbox;

a ferrite block positioned between the lid plate and the gasbox;

a blocker plate positioned between the gasbox and the substrate support, wherein the blocker plate defines a plurality of apertures that operate as a choke for gas flowing therethrough; and

a faceplate positioned between the blocker plate and the substrate support.

13. The semiconductor processing chamber of claim 12, wherein the ferrite block is characterized by an annular shape extending about the central aperture of the gasbox.

14. The semiconductor processing chamber of claim 13, further comprising:

an insulator positioned between the gasbox and the lid plate, wherein the insulator defines a central aperture axially aligned with the central aperture defined through the gasbox, and wherein the ferrite block extends about the insulator.

15. The semiconductor processing chamber of claim 13, wherein the ferrite block comprises a plurality of blocks extending about the gasbox.

16. The semiconductor processing chamber of claim 12, wherein the ferrite block is disposed within a dielectric material, and wherein the dielectric material comprises polytetrafluoroethylene or polyether ether ketone.

17. The semiconductor processing chamber of claim 3, wherein the insulator extends along an entire vertical height of the ferrite block.

18. The semiconductor processing chamber of claim 1, wherein the ferrite block is fully encased within a dielectric material that contacts an outer surface of the ferrite block.

19. The semiconductor processing chamber of claim 1, wherein:

the gasbox defines a second annular channel within the first surface of the gasbox;

the second annular channel is radially inward of the annular channel and extends partially through a thickness of the gasbox; and

the ferrite block is seated within the second annular channel.

20. The semiconductor processing chamber of claim 19, wherein:

a dielectric spacer is seated atop the ferrite block seated within the second annular channel;

the dielectric spacer defines a recess within the dielectric spacer, the recess being disposed on an opposite side of the dielectric spacer as the ferrite block;

a cover is seated within the recess within the dielectric spacer; and

the dielectric spacer creates a radial gap between the cover and the gasbox.