CLAIMS

1. A compound semiconductor field effect transistor, comprising:

a multi-layer epitaxial barrier layer on a channel layer, the channel layer coupled to a doped buffer layer; and

a gate on a first tier of the multi-layer epitaxial barrier layer, and through a space between a second tier and a third tier of the multi-layer epitaxial barrier layer, a first distance from the gate to the third tier at a drain region is increased relative to a second distance from the gate to the second tier at the drain region, a third distance from the gate to a closest edge of the second tier at a source region is the same as a fourth distance from the gate to a closest edge of the third tier at the source region, the closest edge of the second tier colinear with the closest edge of the third tier.

2. The compound semiconductor field effect transistor of claim 1, further comprising a body contact electrically coupled to the doped buffer layer.

3. The compound semiconductor field effect transistor of claim 1, in which the doped buffer layer comprises a P-type doped buffer layer.

4. The compound semiconductor field effect transistor of claim 1, further comprising an etch stop layer on the doped buffer layer.

5. The compound semiconductor field effect transistor of claim 1, in which a first thickness of the multi-layer epitaxial barrier layer with respect to the third tier is increased relative to a second thickness of the multi-layer epitaxial barrier layer with respect to the second tier.

6. The compound semiconductor field effect transistor of claim 1, in which the third distance between the gate and the source region is less than the second distance between the gate and the drain region.

7. The compound semiconductor field effect transistor of claim 1, in which the multi-layer epitaxial barrier layer comprises an etch stop layer between the first tier and the second tier, and between the second tier and the third tier.

8. The compound semiconductor field effect transistor of claim 1, in which the compound semiconductor field effect transistor comprises a high-electron-mobility transistor (HEMT) or a pseudomorphic high-electron-mobility transistor (pHEMT).

9. The compound semiconductor field effect transistor of claim 1, in which the doped buffer layer is on an un-doped buffer layer.

10. The compound semiconductor field effect transistor of claim 1, in which the compound semiconductor field effect transistor is integrated into a power amplifier.

11. The compound semiconductor field effect transistor of claim 10, in which the power amplifier is incorporated into at least one of a music player, a video player, an entertainment unit, a navigation device, a communications device, a personal digital assistant (PDA), a fixed location data unit, a mobile phone, and a portable computer.

12. A radio frequency (RF) front end module, comprising:

a chip, comprising a compound semiconductor field effect transistor, the compound semiconductor field effect transistor comprising a channel layer and a multi-layer epitaxial barrier layer, the multi-layer epitaxial barrier layer on the channel layer, the channel layer coupled to a doped buffer layer, and a gate on a first tier of the multi-layer epitaxial barrier layer, and through a space between a second tier and a third tier of the multi-layer epitaxial barrier layer, a first distance from the gate to the third tier at a drain region is increased relative to a second distance from the gate to the second tier at the drain region, a third distance from the gate to a closest edge of the second tier at a source region is the same as a fourth distance from the gate to a closest edge of the third tier at the source region, the closest edge of the second tier colinear with the closest edge of the third tier; and

an antenna coupled to an output of the chip.

13. The RF front end module of claim 12, in which the compound semiconductor field effect transistor comprises a body contact electrically coupled to the doped buffer layer.

14. The RF front end module of claim 12, in which the doped buffer layer comprises a P-type doped buffer layer.

15. The RF front end module of claim 12, further comprising an etch stop layer on the doped buffer layer.

16. The RF front end module of claim 12, in which a first thickness of the multi-layer epitaxial barrier layer with respect to the third tier is increased relative to a second thickness of the multi-layer epitaxial barrier layer with respect to the second tier.

17. The RF front end module of claim 12, in which the third distance between the gate and the source region is less than the second distance between the gate and the drain region.

18. The RF front end module of claim 12, in which the multi-layer epitaxial barrier layer comprises an etch stop layer between the first tier and the second tier, and between the second tier and the third tier.

19. The RF front end module of claim 12, in which the doped buffer layer is on an un-doped buffer layer.

20. A compound semiconductor field effect transistor, comprising:

means for isolating a channel layer from a source region and a drain region of the compound semiconductor field effect transistor, at least a portion of the means for isolating on the channel layer, the channel layer coupled to a doped buffer layer; and

a gate on a first tier of the means for isolating, and through a space between a second tier and a third tier of the means for isolating, a first distance from the gate to the third tier at the drain region is increased relative to a second distance from the gate to the second tier at the drain region, a third distance from the gate to a closest edge of the second tier at the source region is the same as a fourth distance from the gate to a closest edge of the third tier at the source region, the closest edge of the second tier colinear with the closest edge of the third tier.

21. The compound semiconductor field effect transistor of claim 20, further comprising a body contact electrically coupled to the doped buffer layer.

22. The compound semiconductor field effect transistor of claim 1, in which the first distance is a first end-to-end distance, the second distance is a second end-to-end distance, the third distance is a third end-to-end distance, and the fourth distance is a fourth end-to-end distance.

23. The RF front end module of claim 12, in which the first distance is a first end-to-end distance, the second distance is a second end-to-end distance, the third distance is a third end-to-end distance, and the fourth distance is a fourth end-to-end distance.

24. The compound semiconductor field effect transistor of claim 20, in which the first distance is a first end-to-end distance, the second distance is a second end-to-end distance, the third distance is a third end-to-end distance, and the fourth distance is a fourth end-to-end distance.