said first type of conductivity; supplying comprising varying, in particular increasing, a flow of said gas containing dopant ions.

11. The process according to claim **7**, wherein said power device is a bipolar diode, and wherein said active region has in plan view a substantially rectangular shape and is surrounded by said ring region; a peripheral portion of said active region being connected in a continuous way to said guard region, and said columnar regions moreover traversing said active region.

12. The process according to claim **7**, wherein said power device is a bipolar diode, and wherein said active region has in plan view the shape of parallel strips, and is surrounded by said ring region; peripheral strips of said active region being connected to said guard region, and said columnar regions each traversing a respective one of said strips.

13. The process according to claim **7**, wherein said power device is a MOS device, and said active region comprises a plurality of body regions, each formed at least partially inside a respective surface extension of said columnar regions; further comprising forming gate structures between adjacent columnar regions, at least in part above said first top surface, and forming source regions of said second type of conductivity inside said body regions; the step of removing said connection portions in order to separate from one another said surface extensions and interrupting said wrinkled surface layer being moreover envisaged prior to formation of said gate structures.

14. The process according to claim **1**, wherein said body has a second type of conductivity, opposite to said first type of conductivity, and said guard region forms with said body a bipolar diode, of which said guard region is the anode and said body is the cathode; further comprising forming, in a surface portion of said body, distinct from said active portion and from said edge portion, a contact region having said second type of conductivity, for contacting said cathode.

15-43. (canceled)

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