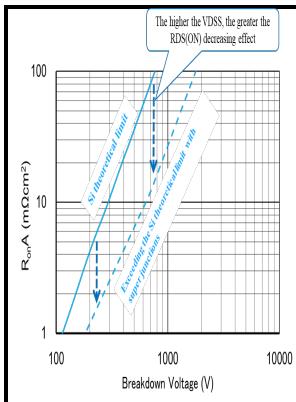


Lateral superjunction power MOSFETs.

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Description: -

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Extended Trench Gate Superjunction Lateral Power MOSFET for Ultra

The superjunction datasheets typically provide two effective values for C_{oss} , defined as follows: $C_{o\ tr}$ — defines the value of a fixed capacitor, which has the same stored charge as the variable C_{oss} at 80 % of the rated voltage. Referring to these drawings, the device structure 3D resurf structure of the power MOSFET as a semiconductor device according to the second embodiment of the invention is described below. The study is based on a meticulous calibration of drift-diffusion simulations against experimental characteristics of a 1 μm gate length SJ multi-gate MOSFET SJ-MGFET aiming at improving density, switching speed, drive current, breakdown voltage BV , and specific on-resistance $R_{on, sp}$.

Superjunction power MOSFETs increase power supply efficiency

Generally a super junction structure is a structure that in a conductive semiconductor region with positive or negative polarity, conductive pillar or plate-like column regions with opposite polarity are inserted at virtually regular intervals so as to maintain charge balance. Here, not only the trench fill technique but also the multi-epitaxial technique may be used to form the super junction structure as shown in FIG.

Exicon Lateral MOSFETs

Although an outward extension of the source metal electrode is used as a field plate in this example, alternatively the field plate may be the floating field plate as described in Sections 8 and 9 which is coupled to the metal electrode and extended outward in the form of an insulating film. Planar MOSFETs typically have a high drain-to-source resistance per unit of silicon area, and come with relatively higher drain source resistances.

Design and fabrication of superjunction power MOSFET devices

Figure 2: Superjunction MOSFET Structure Figure 3: Blocking Voltage and On-resistance Comparison for Planar and Superjunction MOSFETs
Figure 2 shows the physical structure of superjunction MOSFETs based on the idea of charge balancing. The semiconductor device described in any of 1 to 8, wherein one or a plurality of floating field rings are provided in at least part of each peripheral side region or each peripheral corner region in a surface region of the drift region on the first main surface so as to surround the cell region.

Superjunction power MOSFETs increase power supply efficiency

As a result, the superjunction structure has a linear relationship between on-resistance and breakdown voltage.

Lateral Superjunction Power MOSFET

Further improvement in the super junction structure of the peripheral corner regions 5 a, 5 b, 5 c, and 5 d will be described later in Section 5. Toshiba said that this represents a significant gain in power supply efficiency in the region of 0. The results with the proposed model are compared with those of two different complex manufacturer models.

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Then, as shown in FIG. However, large cell densities and die sizes also come with high gate and output charges, which increase the switching losses as well as costs.

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