We have fabricated Super Junction (SJ) p-n diodes by our previously proposed defect-less trench filling technique with pre- and post-annealing in H2. The trench filling technique has been applied to a comparatively low aspect ratio p/n column structure. Electrical measurements of the SJ p-n diode indicate an increase in breakdown voltage from 70V to 195V due to the multi RESURF effect of the p/n column structure. The leakage current of the diode is below $1 \times 10^{-7}$ A/cm² at a reverse bias voltage of 150V. It has been experimentally confirmed that complete depletion occurs when the number of acceptors in the p column is equal to that of donors in the n column.

**Key words**: Super Junction p-n diodes, Multi RESURF effect, Trench filling
3. Schematic process flow of SJ p-n diode

Fig. 1 Schematic process flow of SJ p-n diode

Fig. 2 Cross-sectional SCM image of typical SJ p-n diode
Fig. 3 Reverse (a) and forward (b) I-V characteristics of SJ diode and single-trench diode, respectively. The broken lines indicate ideal slopes for ideal factors $\eta$ of 1 and 2.
Fig. 4  Breakdown voltages as a function of $Q$ and $O$. The dotted line indicates the properties for $O=1.0$
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