

HIGH PURITY SILICON FOR DETECTOR APPLICATIONS

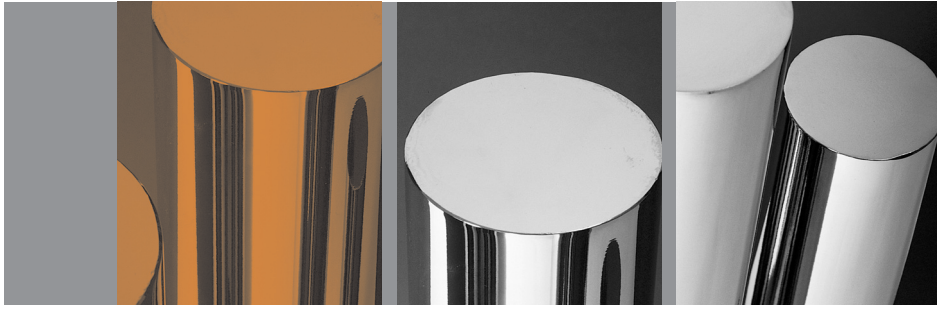
- material solutions for high quality signal detection

Detectors are becoming increasingly important in many high-end applications such as industrial surveillance, health monitoring, optical communications and precision guidance systems. In addition, high volume applications have run with detectors for many years in products that are targeted to consumer industry. One important measure of all detectors is the noise level of the individual detectors. For most high-end applications it is critical to have noise levels at a few e^- to be able to detect low levels of incoming signals, while for other applications the noise level can be significantly higher.

Silicon is the perfect semiconductor material for almost any kinds of detectors. Most obvious is the use of silicon as a photodetector or photoconductor for visible light and near infrared light up to around 1.1 μm . Also, silicon as an electromagnetic radiation and particle detector material is in widely usage in many systems and components. Some of the features that make silicon an excellent choice of material are the purity and the absence of dislocations and defects and this does not come better than in Topsil High Purity Silicon (HPS). HPS Float Zone silicon for detector purposes has the following unique properties:

- Highest resistivity range in the market
- High minority carrier lifetime
- Low levels of performance degrading impurities

Topsil is among the world leading suppliers of Float Zone silicon for a number of applications. Focus on R&D at Topsil have resulted in products with the best performances ever measured on silicon wafers. This combined with more than 40 years of experience in the production of Float Zone material and state-of-the-art wafering processes makes Topsil HPS the best choice for a stable, high quality detector product.



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Topsil offers Float Zone ingot and wafer substrates with the listed typical parameters. Other product parameters than those in the table are possible on request.

Growth method	High Purity Float Zone Silicon
Bulk resistivity range	800-30.000 Ωcm
Resistivity tolerance	$\pm 50\%$
Minority carrier lifetime	> 500 μs depending on bulk resistivity and carrier type
Ingot Diameter	50-154 mm
Crystal Orientation	<100>, <111>*
Type and Dopant	N (phosphorous), P (boron)
Oxygen and Carbon concentration	< 10^{16} cm^{-3}
Wafer thickness	> 200 μm depending on wafer diameter
Wafer surface finish	As-cut, lapped, etched, polished

*<111> is not available in 6" diameter.

For more than 45 years, Topsil has serviced the semiconductor industry with FZ and CZ silicon crystals and wafers. In close collaboration with our customers, research external institutions and partners, our dedicated R&D team has continued to introduce new world-class specified products to the market, in order to achieve our goal of being your full range silicon partner.

With a technological base as one of the few industrial manufacturers of Float-Zone crystals, Topsil has a strong focus on optimised production technology and flexibility, and our ISO 9001 certified quality engagement of the whole organisation, secures a high level of support and on-time delivery of top-quality products.