

CORNERSTONE

Quick reference design guidelines for CORNERSTONE 220 nm SOI Passive MPW #35 – December 2023

[Sign-up deadline – Friday 26th January 2024](#)

[Mask submission deadline – Wednesday 21st February 2024](#)

File format = *.gdsII* or *.oas*.

Manufacturing grid size = 1 nm.

Design area = **11.47 x 4.9 mm²** or **5.5 x 4.9 mm²**.

Top cell name: 'Cell0_*[Name of Institution]*'.

1 Terms & conditions and cost

All design submissions must agree with the terms and conditions:

www.cornerstone.sotonfab.co.uk/terms-and-conditions

Under no circumstances will we accept designs without agreement with the terms.

Therefore, we strongly recommend that the terms and conditions are pre-authorized by your institution prior to the mask submission date.

A purchase order (PO) must be uploaded at the same time as submitting your mask design in order to pay the access fee, detailed in Table 1 below. Purchase orders will not be accepted via email.

Table 1 – Access cost and Delivery Time.

Design Area	Access Cost with Heaters* (Standard)	Access Cost without Heaters* (Standard)	Access Cost with Heaters* (Priority)	Access Cost without Heaters* (Priority)
11.47 x 4.9 mm ²	£14,250	£9,000	£17,900	£11,300
5.5 x 4.9 mm ²	£10,500	£6,250	£13,200	£7,900
Delivery Time**	14 weeks	14 weeks	7 weeks	5 weeks

*Quoted prices are exclusive of VAT, import duties/customs fees, withholding taxes etc.

**The indicated delivery time is subject to possible delays that may occur due to scheduled cleanroom maintenance or unforeseen shutdown periods. Users will receive timely notifications regarding any such occurrences.

Priority batches are designed to accelerate delivery times by utilizing expedited services for obtaining reticles, prioritizing access to cleanroom tools, working out-of-hours, and simplifying intermittent quality checks during the fabrication process, instead relying on the inherent repeatability of the lithography and etching processes. Additionally, the submitted layouts will not undergo further inspection against design rules after the submission deadline. Consequently, users opting for the priority option are required to submit designs that pass the Design Rule Check (DRC) on or before the submission deadline. The CORNERSTONE team would be grateful for the opportunity to work with you prior to the submission deadline to ensure your designs pass DRC. For more information, please visit our website: www.cornerstone.sotonfab.co.uk/design-rules

The anticipated timeline for priority batches, from the submission of the mask to the shipping date, will be reduced to 7 weeks for designs incorporating heaters and 5 weeks for those without heaters. Meanwhile, the standard delivery timeline remains unchanged at 14 weeks for designs, regardless of the inclusion of heaters.

For information about setting up CORNERSTONE as a supplier to your institution, please contact cornerstone@soton.ac.uk.

Section 7 of the CORNERSTONE 35th Call - Design Rules.pdf document details the design submission process in detail.

2 Discounted access

We encourage our users to include the Engineering and Physical Sciences Research Council (EPSRC) funded CORNERSTONE 2 (EP/T019697/1) or CORNERSTONE 2.5 (EP/W035995/1) projects in the “Funding” section of relevant journal publications. This is important to us to be able to demonstrate impact from the funding.

Therefore, if you are able to share the digital object identifier (DOI), we will give you a 5% discount from the access charges listed in Table 1 above for your first published journal paper and 10% for two and more journal papers that reference one of the CORNERSTONE projects.

3 Design rule changes from previous 220 nm SOI platform call (MPW #33)

- *No change in Design Rules*
- *Building Blocks for TM polarisation removed from the Standard Components Library.*

A summary of the design rules and GDS layer numbers can be found in Table 2 below.

Table 2 – Design rules summary.

Layer description	GDS number	Field	Min. feature size	Min. gap	Max. feature length	Target critical dimension
Silicon Etch 1 (70 nm ± 10 nm)	6	Dark	200 nm	250 nm	20 µm	315 nm
			200 nm	300 nm	N/a	
Silicon Etch 2 (120 nm ± 10 nm)	3	Light	350 nm	200 nm	N/a	450 nm
	4	Dark	200 nm	350 nm		
Silicon Etch 3 (100 nm to BOX)	5	Light	250 nm	250 nm	N/a	250 nm
Heater Filaments	39	Light	600 nm	10 µm	N/a	900 nm
Heater Contact Pads	41	Light	2 µm	10 µm	N/a	2 µm
Cell Outline	99	N/a	N/a	N/a	N/a	N/a
Labels*	100	Dark	250 nm	250 nm	N/a	N/a

*Features drawn in the Labels layer will be merged into Silicon Etch 2 by the CORNERSTONE team.

In order to help you ensure that you comply with the design rules, you can also download a design rule check (DRC) checklist from our website and if you have access to Tanner L-Edit software, a .tdb version of the template containing a DRC file that you can run to automatically find any design rule violations (note that the automatic DRC will not check all of the design rules, so it remains very important to read the design rules in detail). In addition, you can execute the KLayout pre-DRC script provided by CORNERSTONE on www.cornerstone.sotonfab.co.uk/design-rules

For users choosing the Priority option, it is essential to provide DRC-free mask layouts on or before the submission deadline. Therefore, users planning to initiate a priority batch should run the KLayout Pre-DRC script and confirm that the submitted design is free of design rule issues before the submission deadline. The CORNERSTONE team will not undertake post-submission DRC for Priority Access users to shorten the delivery timeline.

4 Minimum feature sizes, tolerances and other design rules

- Minimum feature sizes, minimum gaps, and maximum feature widths for each GDS layer are detailed in Table 2.
- The target critical dimension for each GDS layer is listed in Table 2. Note that other feature sizes may have a small dimensional bias.
- A minimum spacing between waveguides of at least 5 μm is recommended to avoid power coupling.
- An overlap of at least 200 nm between GDS layers is essential to account for the alignment tolerance between layers.
- All structures drawn in GDS layer 6 (Grating couplers) must overlap by at least 200 nm with GDS layer 3 (Waveguides).
- An overlap of at least 10 μm between GDS layer 39 (Heater Filaments) and GDS layer 41 (Heater Contact Pads) is recommended for optimal heater performance.
- Ensure all structures drawn in GDS layer 6 (Grating couplers) do not overlap with either GDS layer 39 (Heater Filaments) or GDS 41 (Heater Contact Pads).

5 Technical support

For all queries, email cornerstone@soton.ac.uk.