CORNERSTONE

Quick reference design guidelines for suspended Si MPW #4 – May 2023

Sign-up deadline – Friday 30th June 2023

Mask submission deadline – Friday 28th July 2023

File format = *.gdsII* or .oas.

Manufacturing grid size = 1 nm.

Design area = **11.47 x 4.9 mm²**. You can also use cell dimensions of **5.5 x 4.9 mm²**.

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

1. Design rules summary

A summary of the design rules and GDS layer numbers can be found in Table 1 below.

Table 1 – Design rules summary.

Layer description	Option	GDS no.	Field	Min. feature size	Min. gap	Max. suspended waveguide width	Max. support structure width	Target critical dimension
Silicon Etch 1¥ (500 nm to BOX layer)	CORNERSTONE NOT to bias	404	Dark	200 nm	250 nm	16 µm§	6 µmα	230 nm
	CORNERSTONE to bias	404	Dark	270 nm	180 nm	16 µm§	6 µmα	300 nm
Cell Outline	N/a	99	N/a	N/a	N/a	N/a	N/a	N/a
Labels*¥	N/a	100	Dark	250 nm	250 nm	N/a	N/a	N/a

¥ No islands < 20 µm allowed

§ After HF etch, the expected lateral BOX undercut is 8 µm. Therefore, the maximum width of suspended structures should be 16 µm (see Figure 1).

αWidth of the supporting structure/subwavelength structure <6 µm have proven to work (see Figure 1). **If you try more challenging dimensions, do so at your own risk.**

*Features drawn in the Labels layer will be merged into Silicon Etch 1 by the CORNERSTONE team.

If you have access to Tanner L-Edit software, on our website you can find 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).

2. 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 1.
- The target critical dimension for each GDS layer is listed in Table 1. Note that other feature sizes may have a small dimensional bias.

- **No islands < 20 μm are allowed in GDS layers 404 and 100**. This is because during the HF undercutting process, small features are lifted-off and may redeposit elsewhere on the wafer.
- After HF etch, the expected lateral BOX undercut is 8 μm. Therefore, the maximum width of suspended structures should be 16 μm (see Figure 1).
- Width of the supporting structure/subwavelength structure <6 μm have proven to work (see Figure 1). **If you try more challenging dimensions, do so at your own risk.**
- A minimum spacing between waveguides of at least 75 μm is recommended to avoid suspended waveguides collapsing.
- For gaps in GDS layers 404 and 100 of less than 350 nm, limit the length to a maximum of 20 μm. This is because long, narrow resist features can collapse during resist development.
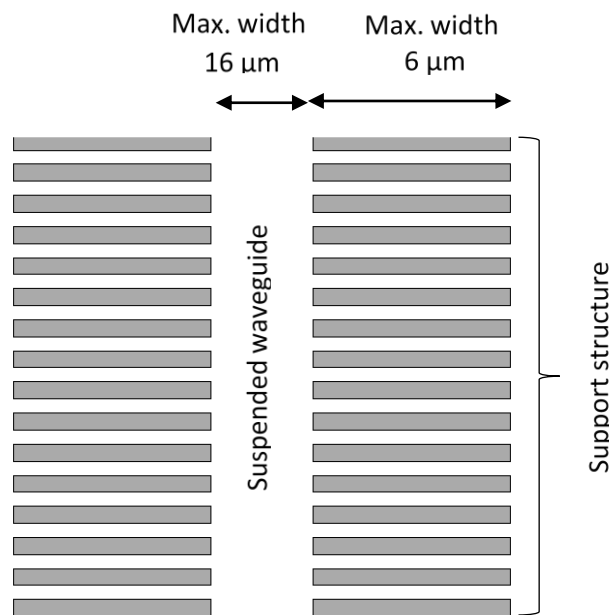

Figure 1: Design rule for suspended waveguide and support structure maximum width

3. Technical support

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