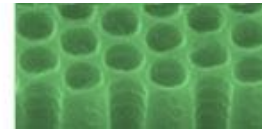# NFC i-Line Stepper

Canon
FPA-2500 i3

Can my process work with the Canon Stepper?

The Canon stepper can do small features, but there are limits and this document will help explain what the system can and can not do. Hopefully this will help in setting the expectation you can have in working with the stepper. This system is a great addition to the NFC collection of process equipment. There are trade offs in using this system.

Die size:
This is the most important issue: The maximum amount you can have on your wafer
is only a 20mm X 20 mm area and your design must fit into that.
Die sizes are limited to a very few sizes.
20 mm X 20 mm
15 mm X 15 mm
10 mm X 10 mm
 5 mm X 5 mm

Example-
If your design happens to be ~ 7.2 mm by 6.8 mm then your design can fit into the 10 mm size as it is too large for the 5 mm size.

Feature size:
As for feature size 0.8 um is easy and as you go smaller you must invest more time
to get it to work correctly. The system was rated at 0.4 um when new, and some
users have been able to get the 0.4 um to work for them. Remember that thin resist is needed for the smallest feature size, and as you go with thicker resist thickness you will reduce the minimum feature size attainable.

Maximum Step height:
Unknown but for small features it is limited ~0.5um or less is the current guess. So
plan on the topography being a limiting factor in being able to achieve small features.

Pattern complexity:
This is limited to the amount you want to spend. The number of flashes determines the cost of the mask. Also remember that having small holes and narrow lines (minimum size) in the same mask layer might not turn out. The benefit of having a stepper tool is that your one design can have a complex design be repeated many times on one wafer, over all reducing mask making costs.

Wafer limits:
The system can process 4 inch whole wafers only. No odd sizes and NO small parts.
Whole wafers only! No backside aligning. Check with staff about wafer thickness limits.

Alignment:
The alignment from layer to layer – Overlay is very good and if your process is able to
keep the alignment marks in good shape then the overlay should give good results. The value
that you can get is around 0.1 um. But remember that you must work at it, and have a process
that does not destroy the alignment marks.

Before you submit your design you should stop by and talk with Tony Whipple or Mark Fisher,
so we can make sure your designs will work and that you understand the process limits involving
the mask. Knowing the process you plan to run we can work together to get the design to work
for you.

So, the real question is, can your design meet these limits:

 Fit into a 20 mm X 20 mm area or smaller?
 Whole 4 inch wafers, one side only no backside alignment?

If you are looking for small feature size then the stepper is worth learning about and start
designing for it. Contact me and we can talk about your process and design to see if things will
work for you. Remember this system was built for industry instead of research so this is made to
do high volume of wafers.   Look below to see a patterned wafer with the same design on it
repeated many times.
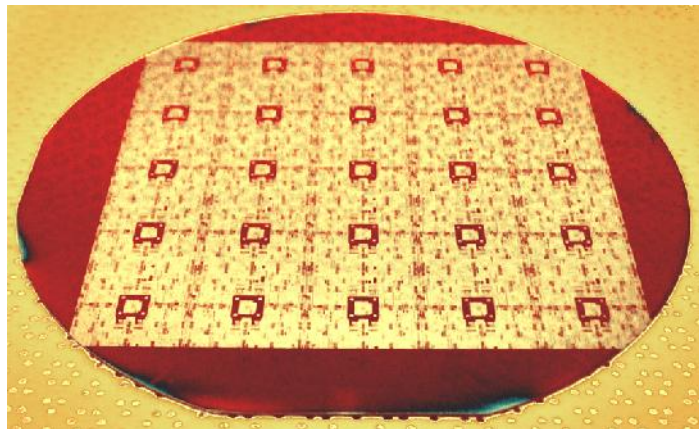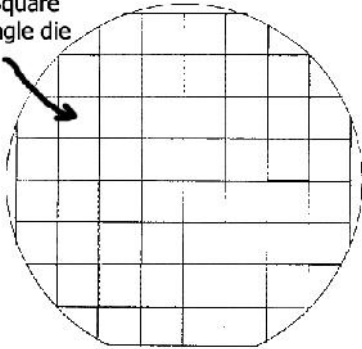
Each die is a small copy of your design.   Here is what a stepper processed wafer looks like.

The Short Course is really two short courses.   The first one is basic operation and first layer only
and this is later done with a hands on follow up during your first run.   There is an advanced
short course / follow up and this is for doing another layer that is aligned to a previous layer.
Some users will only need to do one layer is why this is put in two sections.