
MEMS MASK DESIGN CHECKLIST

Kassegne Research Lab

DOCUMENT REVISION

VERSION	DATE	AUTHOR	REMARKS	DISTRIBUTION	APPROVAL
1.0	3/28/16	Sebastian Shaner	Document Creation	MEMS Mask Designers	SK
1.1	3/28/16	Mieko Hirabayashi	Various Edits	MEMS Mask Designers	SK
1.2	7/08/16	Nha Uyen Huynh	Added alignment mark checks	MEMS Mask Designers	SK

BACKGROUND INFORMATION

Photoresists/Photopolymers/Polymers Used

NAME	POLARITY	THICKNESS RANGE	SPIN-COATER
Polyimide (HD 4100)	-	5 - 30 μm	Brewer (new one)
Polyimide (Durimide 7520)	-	11 - 25 μm	Brewer (new one)
Polyimide (Durimide 115A)	-	3 - 6 μm	Brewer (new one)
PMGI (SF3)	N/A (Lift off Resist for +)	0.2 - 5 μm	Brewer (new one)
Futurrex (NR9 1000PY)	-	0.7 - 2.1 μm	Brewer (new one)
SU-8 (10)	-	5 - 25 μm	Headway Research (old one)
SU-8 (100)	-	50 - 150 μm	Headway Research (old one)
SHIPLEY (S1813)	+	1.3-2 μm	Brewer (new one)
PDMS (Both photo & non-photosensitive)	+	>5 μm	Headway Research (old one)

DESIGN PROCESS

Mask Layout

(1) Layer Process

[Each layer name should indicate whether it is an insulation, sacrificial, or adhesion layer...]

Project Name:

Fund Number (0000 for ME685/585):

Designer(s):

Litho Personnel:

Date:

#	LAYER NAME	MASK #	MATERIAL	THICKNESS	MINIMUM FEATURE SIZE	FOOTPRINT	PR POLARITY	MASK POLARITY
1)								
2)								
3)								
4)								
5)								
6)								
7)								
8)								
9)								
10)								

Checklist for “Layer Process”

**The following general statements must be checked off for each layer... if not, then consult with Dr. Sam and research group leader.*

Positive Photoresist (+)		Negative Photoresist (-)	
<input type="checkbox"/>	Minimum <u>feature size</u> greater than 5 μm	<input type="checkbox"/>	Minimum <u>feature size</u> greater than 8 μm
<input type="checkbox"/>	Aspect ratio (thickness : width) less than 5	<input type="checkbox"/>	Aspect ratio (thickness : width) less than 5
<input type="checkbox"/>	Minimum <u>spacing size</u> greater than 6 μm	<input type="checkbox"/>	Minimum <u>spacing size</u> greater than 8 μm

Things to Note:

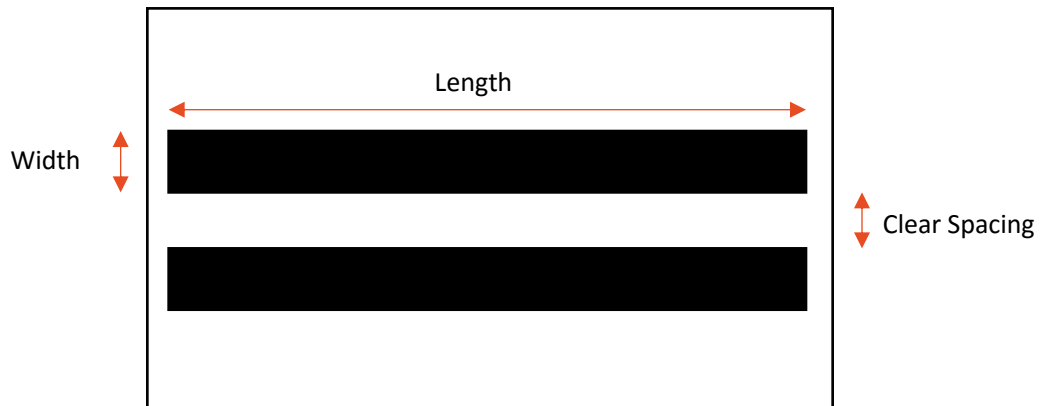
- This checklist is for a transparency mask (subject to change for quartz mask)
- Aspect ratio plays a crucial role in minimum feature size and spacing size.
- The higher the aspect ratio...the larger the minimum feature & spacing size will be.
- More viscous photoresists (i.e. SU-8 100), generally require more spacing between features.

(2) Dimensions

Before deciding on what dimensions to use, consider the following design constraints:

- Anatomical working area (*in vivo*)
- Material properties (i.e. thickness range of PR, biocompatibility, etc.)

[Example: Rectangular traces in a positive field mask]



DESIGN PARAMETER	WIDTH	LENGTH	CLEAR SPACING
Traces (Neuro)	>35um	Up to 7cm	~ 50%>width
Bump Pads (Neuro)	See Spec Sheet for ZIF connector		
Vias (Neuro)	< 30% of electrode Consider min spacing	<30% of electrode Consider min spacing	NA
Microchannels (Fluidics)			
...			

