Selective Aluminum Etch Process

Si wafer, DSP, with thermal oxide (100 nm) and LPCVD nitride (500 nm).

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| CAD Data | Name | Step | Mask Polarity (Digitized Data) [Dark/Light] | Resist Polarity  (Light softens/hardens)  [Positive/Negative] | Purpose |
| GDS Key 15 | PVia | 1 |  |  | (NU) Pad etch |
| GDS Key 3 | Base |  |  |  | 1st tri-layer etch shield |
| GDS Key 4 | Cntr |  |  |  | 2nd tri-layer etch shield |
| GDS Key 12 | Etch | 11 |  |  | Etch anodization features |
| GDS Key 9 | Cont |  |  |  | Etch to disconnect Al over plugs |
| GDS Key 8 | Wire |  |  |  | Nb placement for wires and pads |
| GDS Key 10 | Abs |  |  |  | Absorber placement for select pixels |
| GDS Key 14 | Au |  |  |  | Gold placement as thermalization layer |
| GDS Key 18 | SU8 |  |  |  | SU8 Post placement for collimators |
| GDS Key 7 | DE |  |  |  | Deep etch to release pixel membranes |
| GDS Key 17 | ICol | 12 |  |  | Footprint for implant collimator (max dose) |
| GDS Key 16 | Col | 13 |  |  | Footprint for laser collimator (same dose) |
| GDS Key 20 | Key |  |  |  | Collimator etch for SU8 sockets |
| GDS Key 1 | Plug |  |  |  | Nb plugs to avoid quasiparticle loss |

1. Nb Plug Deposition. Pattern lift-off mask for Nb plugs, deposit Nb, 200 nm, and lift off.
2. Trilayer Deposition. Deposit Al trilayer, Al(265)/Al-Ox/Al(60) (thickness in nm).
3. Base Layer Patterning. Pattern base electrode layer, wiring and pads with resist mask, and ion mill through top Al layer; strip resist.
4. Counter-Electrode Patterning. Pattern top counter-electrode layer with resist mask, ion mill down to base layer and to clear field areas, anodize to 70V; strip resist.
5. Link Etch. Pattern resist mask with windows over anodized Al base wiring where Nb plugs will be formed, ion mill to remove anodized Al and underlying Al (depth TBD); strip resist.
6. Frame Etch: Pattern Etch to remove traces shorting all pads together for the anodization step.
7. Nb Wiring Deposition. Pattern lift-off mask for Nb wiring and pads, deposit Nb, 600 nm, and lift off.
8. Au Pad Deposition. Pattern lift-off mask for Au pads, deposit Au, 300 nm, and lift off.
9. Absorber Deposition. Pattern lift-off mask for Pb absorbers, deposit Pb, thickness TBD, lift off.
10. SU-8 Post Formation. Spin coat wafer with SU-8, thickness TBD, and pattern collimator posts.
11. Backside Etch. Bond wafer to backing wafer, face down, pattern backside resist mask, etch through wafer to release membranes; remove die from backing wafer and clean.

11.