Electronic Supplementary Material (ESI) for Lab on a Chip.

Supplementary Information

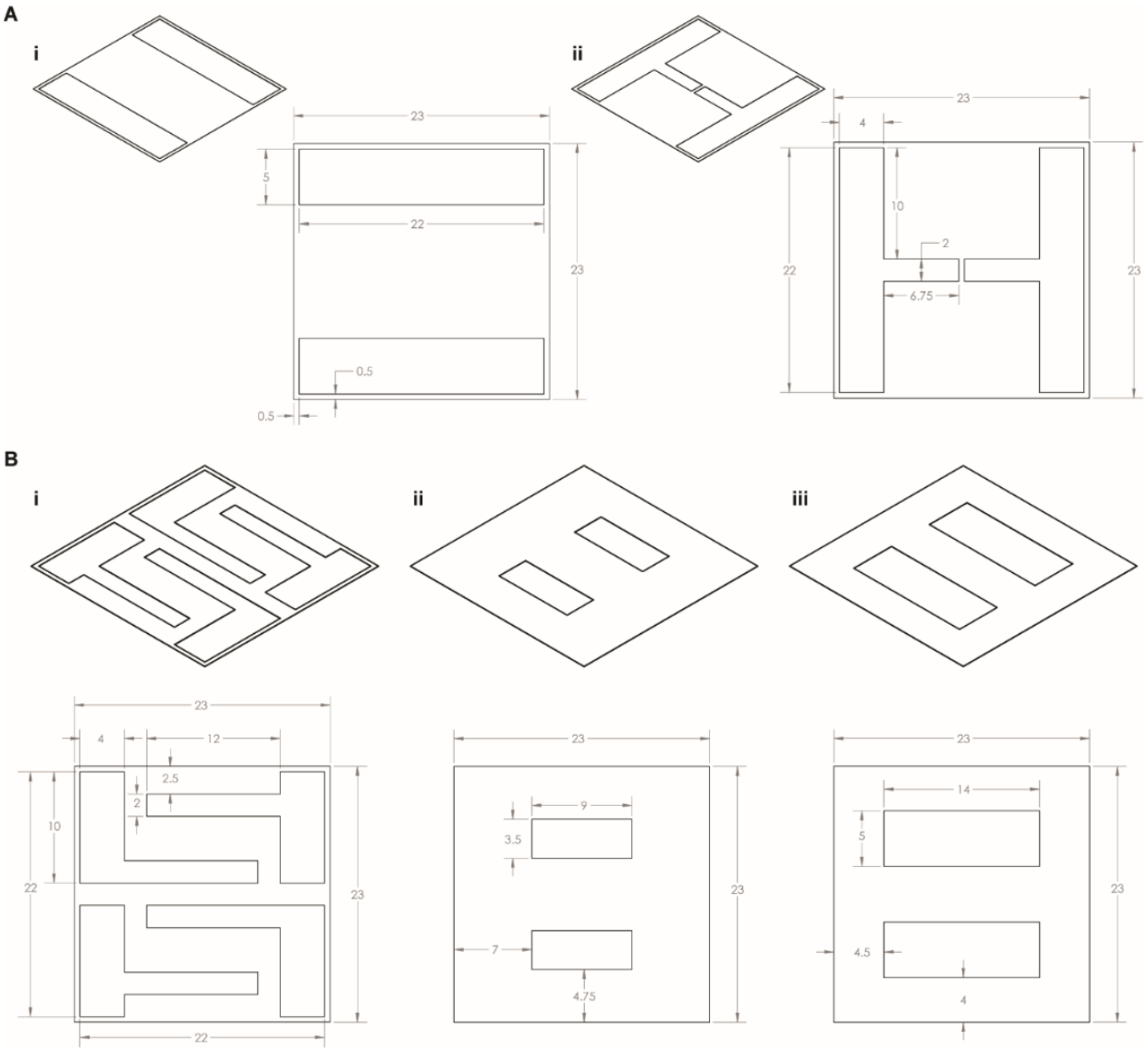

Fig. S1 Technical drawings of tape masks used for material deposition. All designs were laser engraved into adhesive tape. Inserts were removed and masks were aligned onto coverslips for spin-coating or sputtering. A) Tape masks for versions of the device designated for calcium imaging: parallel electrodes (Ai) and point electrodes (Aii). B) Tape masks for the MTF version of the device: ITO (Bi), PIPAAm (Bii), and PDMS (Biii). Dimensions in mm.

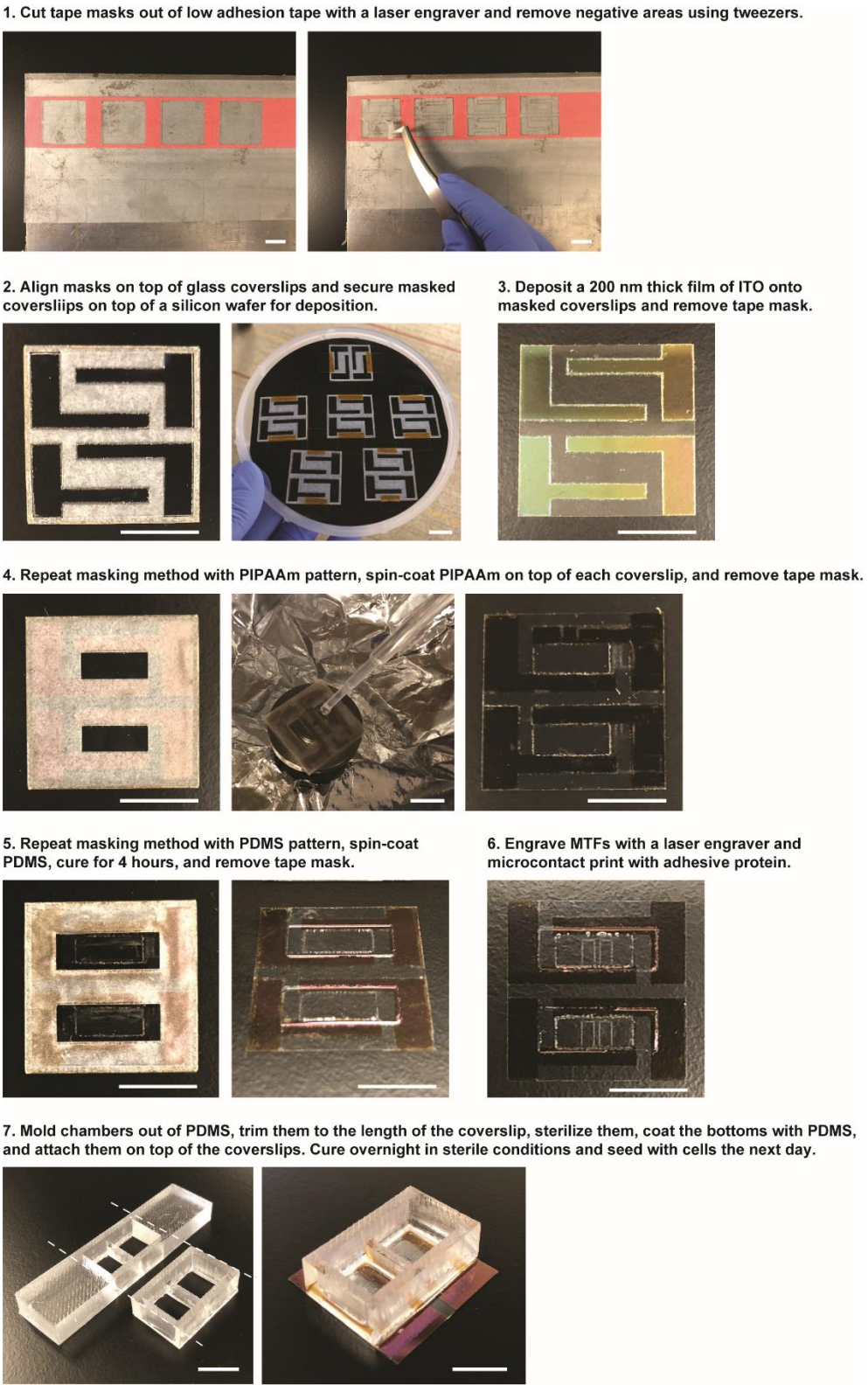

Fig. S2 Step-by-step fabrication process for the multiplexing device in Fig. 4, 5, and 6. Scale bars: 10 mm.

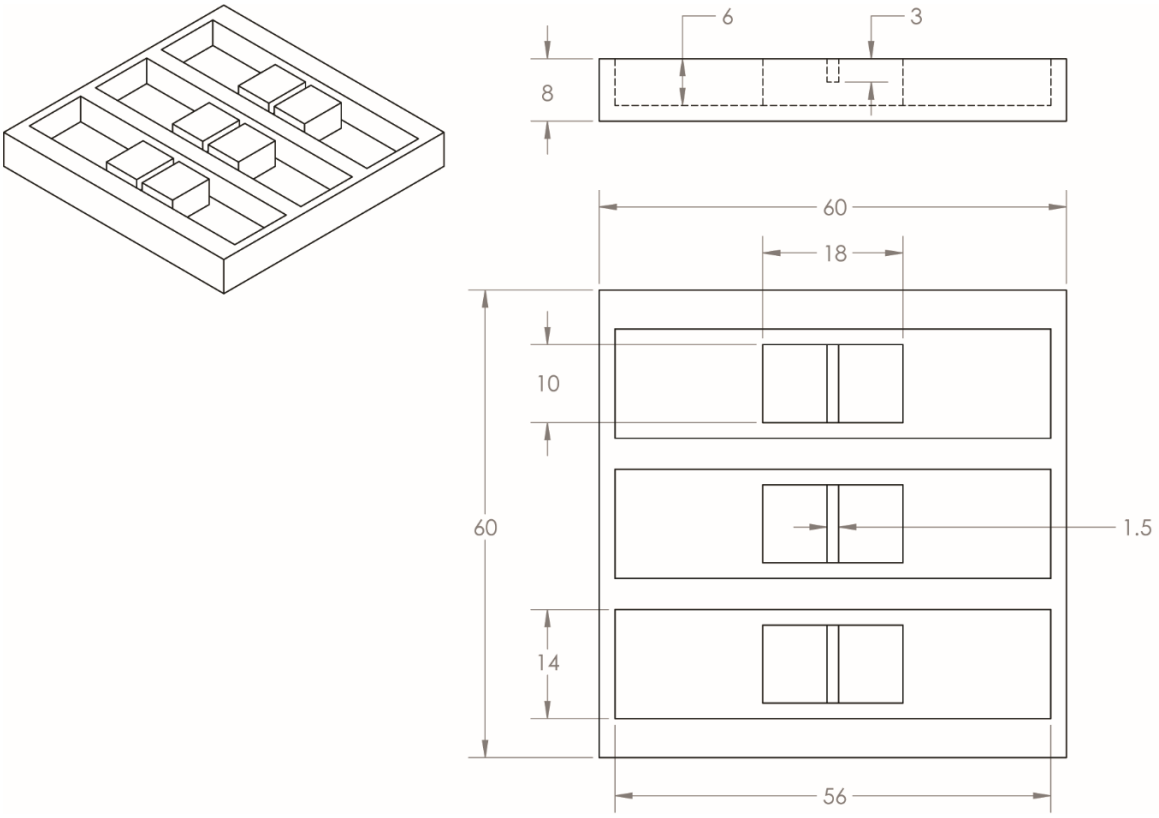

Fig. S3 Technical drawing of the PDMS chamber mold. This design was 3D-printed in a thermoplastic, which was then used for molding the PDMS chambers. Dimensions mm.

Movie S1 Aligned cardiac tissue incubated with calcium-sensitive dye stimulated at 1.0 Hz and 20 V with parallel ITO electrodes. Scale bar: 1 mm.

Movie S2 Aligned cardiac tissue incubated with calcium-sensitive dye stimulated at 1.0 Hz and 20 V with point ITO electrodes. Scale bar: 1 mm.

Movie S3 MTFs paced at 1.0 Hz and 20 V. Blue boxes indicate lengths of MTFs prior to peeling from base substrate. Red "T" bars track the horizontal projection of the representative films. Under the assumption that the film acts as a plane strain beam, these deflections can be converted to contractile stresses. Scale bar: 1 mm.

Movie S4 Two pairs of MTFs within one contractility device paced independently. The top chamber is paced at 1.0 Hz, then switched to 0.5 Hz, then switched back to 1.0 Hz with an external field stimulator. The bottom chamber is paced with another external stimulator at 0.5 Hz, then 1.0 Hz, then back to 0.5 Hz. The stimulation voltage was set at 20 V. Scale bar: 1 mm.