Average activity of targeted cells, per session Mouse J064, run 10 Mouse J064, run 11 Mouse J064, run 14 Mouse RL070, run 28 Mouse RL070, run 29 Mouse RL117, run 26 0.2 Photostimulation Average $\Delta F/F$ Hit 0.1 Miss Time (s) Mouse RL117, run 30 Mouse RL123, run 22 Mouse RL116, run 32 Mouse RL117, run 29 Mouse RL116, run 33 0.2 Average ΔF/F **-**2 **-**2 0 2 **-**2 **-**2 0 Time (s) Time (s) Time (s) Time (s) Time (s) Average activity split by number of cells targeted, averaged across sessions 5 and 10 cells targeted 20 and 30 cells targeted 40 and 50 cells targeted 150 cells targeted 0.2 Average Δ*F/F* 0.0 Z Time (s) <u>-</u>2 2 Time (s) <u>-</u>2 0 6 2 <u>-</u>2 0 <u>-</u>2 0 Time (s) Time (s) Lick response times of all sessions

