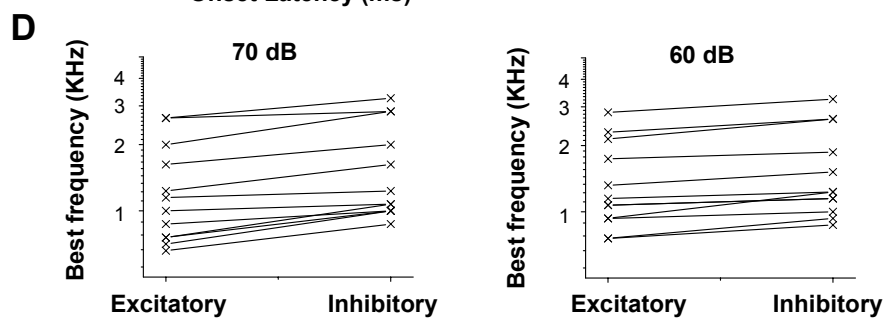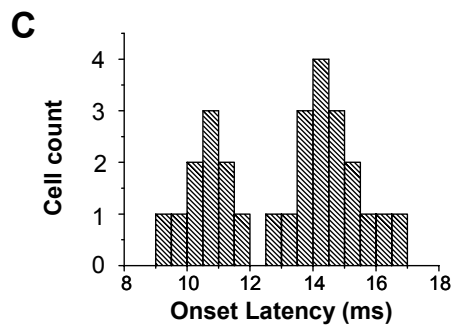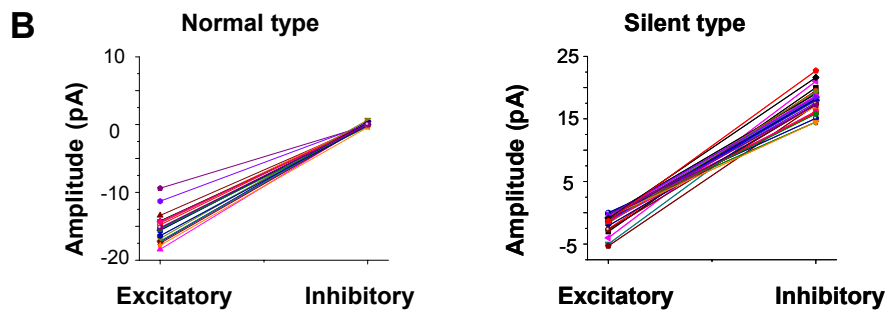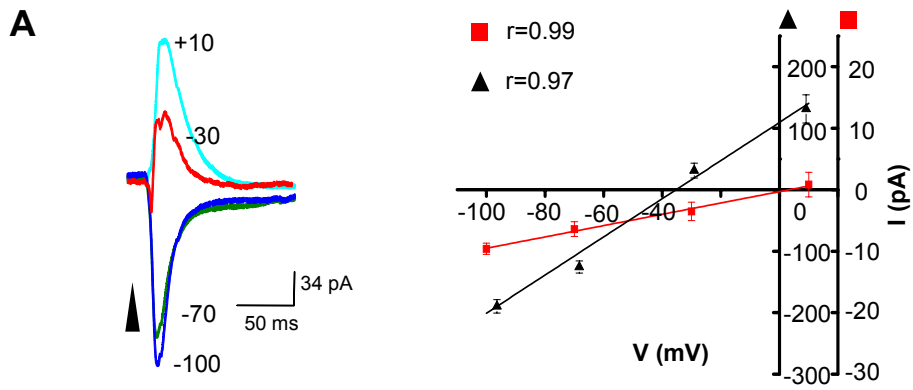**Inventory of Supplementary Information:**

Figure S1 Whole-cell recording quality, onset latency of excitatory input and comparison of the best frequency between excitatory and inhibitory inputs, related to Figure 4.

Figure S2 The effectiveness of the cortical silencing method, and morphologies of functionally identified layer 6 excitatory neurons, related to Figure 6.
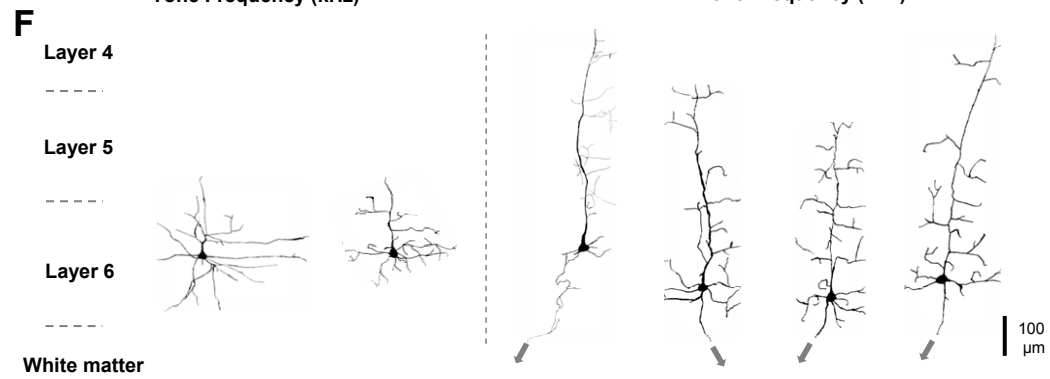
A

B

Normal type

Silent type
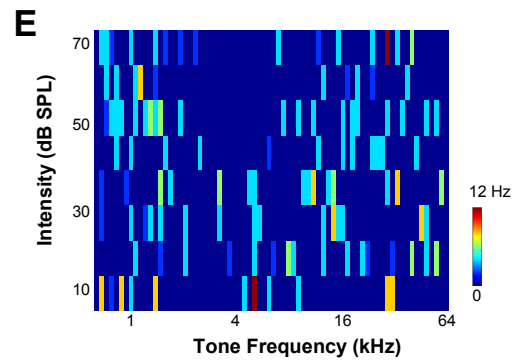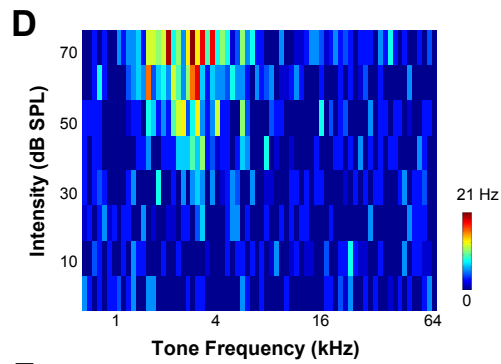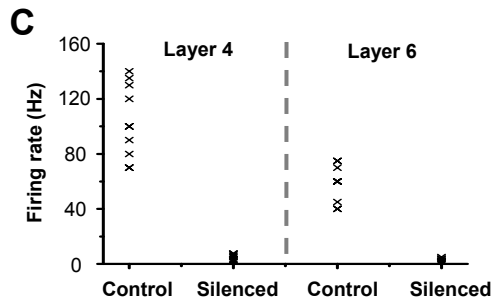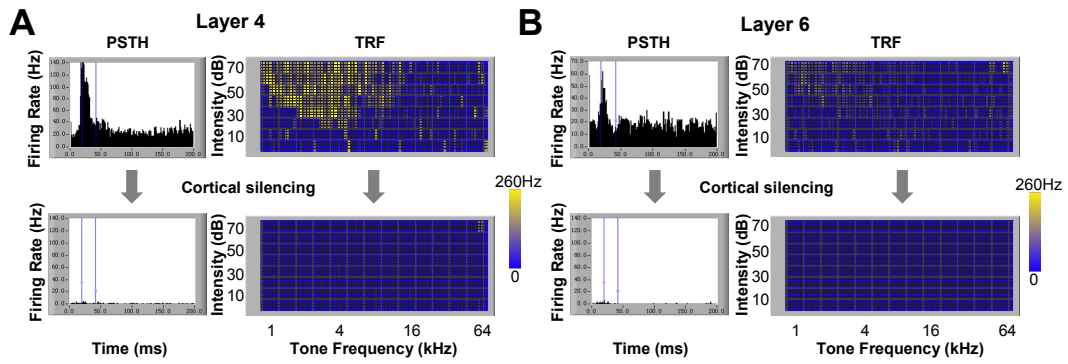

C

D

70 dB

60 dB

Figure S1 Whole-cell recording quality, onset latency of excitatory input and comparison of the best frequency between excitatory and inhibitory inputs, related to Figure 4.

(**A**) Left, synaptic responses recorded at different holding potentials (-100, -70, -30, +10 mV) in an example experiment. Right, I-V curves for synaptic currents averaged from 5 repeats within 0–1 ms (red) and 20–22 ms (black) windows after the onset of responses recorded at -70mV. Error bar, SEM.

(**B**) Left, amplitudes of excitatory (-80mV) and inhibitory currents (0mV) at 2 ms after the onset of the excitatory response for normal-type neurons. Data points for the same cell are connected with a line. Right, amplitudes of excitatory (-80mV) and inhibitory currents (0mV) at 2 ms after the onset of the inhibitory response for silent-type neurons. For each neuron, responses to five effective tones were randomly selected. A total of 12 neurons (5 normal-type and 7 silent- type) are shown.

(**C**) Histogram of average onset latencies of layer 6 excitatory responses around the best frequency at 70dB. Hartigan's dip test indicates that the distribution is significantly bimodal (p < 0.05).

(**D**) Comparison of the best frequencies for excitatory and inhibitory inputs to the same neuron in layer 6 (left: for 70dB tone stimuli; right: for 60dB tone stimuli). Data points from the same cell are connected with a line. All the neurons recorded have preferred frequencies within low frequency range. In general, the best frequency of inhibitory input is slightly higher than the co-activated excitatory input (paired t-test, p<0.01).

A Layer 4

PSTH   TRF

Cortical silencing

260Hz

0

B Layer 6

PSTH   TRF

Cortical silencing

260Hz

0

C

Layer 4   Layer 6

Control Silenced Control Silenced

D

E

21 Hz   12 Hz

0   0

Tone Frequency (kHz)

F

Layer 4

Layer 5

Layer 6

White matter

100 μm

Figure S2 The effectiveness of the cortical silencing method, and morphologies of functionally identified layer 6 excitatory neurons, related to Figure 6.
(**A**) Multiunit recording from an example cortical site in layer 4 before and after cortical silencing. Left, peri-stimulus-spike-timing histogram (PSTH) for all the responses. Two dashed lines define the analysis window. Right, tonal receptive field. Color represents the multiunit firing rate measured within the analysis window.
(**B**) Multiunit activities of an example layer 6 site before and after cortical silencing.
(**C**) Summary of average firing rate before and after cortical silencing (eight sites in layer 4 and six sites in layer 6).
(**D**) Spike TRF of an identified layer 6 normal-type neuron.
(**E**) Spike TRF of an identified layer 6 silent-type neuron.
(**F**) Neuronal morphologies of functionally identified neurons reconstructed from biocytin staining. Two normal-type (left) and four silent-type (right side) neurons are shown. In all the identified silent-type neurons, axons are observed to leave the cortex and enter the white matter. (**D**) is for the first neuron and (**E**) is for the third neuron from left to right, respectively.