Supplementary Figure 1.
We quantified the impact of AP-evoked release from PG cells by measuring the probability that single APs evoked a response in postsynaptic neurons. In these experiments, the postsynaptic cell was either another PG neuron (n=16) or an external tufted cell (TC, n=7). The probability of finding synaptically coupled PG-TC cell pairs was roughly equal to that of PG-PG pairs, and GABA release from a PG neuron always generated a fast IPSC in a synaptically coupled TC. We pooled data across all experiments since there was no significant difference (p>0.13) in the probability of release from a PG neuron onto another PG neuron or a TC. In all of these paired recordings, including 6 pairs in which the probability of AP-evoked release was < 0.1, depolarizations in the presence of TTX produced robust IPSCs in the postsynaptic cell (see Figure 4A,B). On average, single PG cell APs evoked release with a probability of 0.37 ± 0.08 (n=23, Supplemental Fig. 1A). Although there were instances where the release probability was high, the distribution of release probabilities was heavily skewed towards a probability of release less than 0.3. In part, the wide distribution could reflect differences in the number of dendrodendritic contacts formed between each pair of neurons. In agreement with the idea that release probability from individual dendrodendritic sites is low, we found that AP-evoked release from PG cells showed strong paired-pulse facilitation. We analyzed a subset of experiments in which a single presynaptic AP evoked an IPSC with a probability >0.25. In these experiments, the average paired pulse ratio was 2.9 ± 0.6 (n=8), and cells with a lower probability of release to single APs exhibited more facilitation (Supplemental Figure 1B). To compare the relative impact of release evoked by single APs and dendritic Ca²⁺ spikes, we plotted the AP-evoked unitary IPSC charge versus the total IPSC charge generated by a presynaptic Ca²⁺ spike. On average, Ca²⁺ spikes yielded 17.1 ± 3.2 (n=11, Supplemental Fig. 1C) times more total charge transfer than a unitary IPSC. Together these results support the hypothesis that single APs are far less effective triggers of dendritic GABA release than Ca²⁺ spikes.