



Figure 4. The soil moisture detection circuit waveform. (a) In air, the amplitude of  $u_2$  is greater than the amplitude of  $u_1$ . (b) The first resonance occurs approaching 30 pF, approximately where  $|u_1| = |u_2|$ . (c) When the soil moisture is high, the magnitude of  $u_1$  is much larger than  $u_2$ . (d)  $U_{out}$  changes monotonously with  $C_x$ .