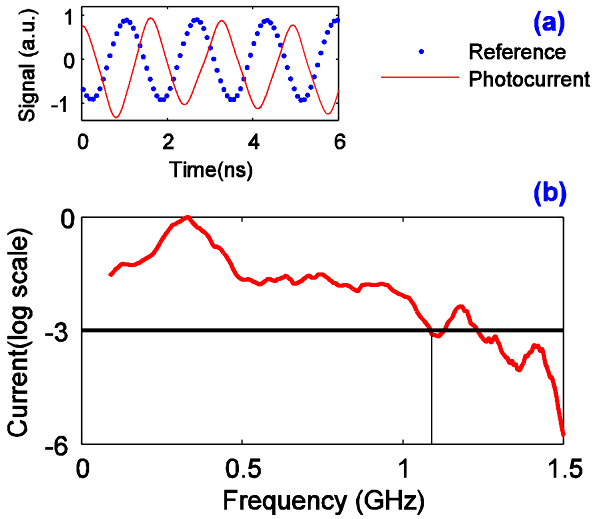

Fig. 5. (a) Input signal (dotted line) and detector signal (solid line) for f = 600 MHz. The applied bias is 7 V and the input power is 30 µW (b) Normalized response of the detector vs. modulation frequency. The –3 dB cutoff occurs at 1.1 GHz (7 V bias and 30 µW input power).

5. Conclusion

We have demonstrated an all-silicon wavelength-selective photoconductor fabricated on silicon-on-insulator with a MSM junction. The detector footprint is very small (15×10 µm if we consider the photonic crystal area). A responsivity as large as 17 mA/W has been achieved around 1.6 µm due to strong optical confinement, and it can operate for a continuous wave input power lower than 10 nW. In variable regime, it can operate above 1 GHz. The collection time is not limited by a region where carrier transport is diffusive as in the *p-i-n* junction; therefore we hope to significantly improve the bandwidth by optimizing the electrical contacts. The selectivity in wavelength could lead to the conception of a compact on-chip spectrometer over the telecom C-band. This demonstration on a silicon-on-insulator platform opens promising perspectives for resonant all-silicon integrated detectors operating in the telecommunication band with a high bandwidth, since a non-linear process such as two-photon absorption may allow to perform some basic signal processing tasks such as noise reduction and pulse reshaping.

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