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Title:Performance and performance variations of sub-1THz detectors fabricated with 0.15 um CMOS foundry process
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Abstract:Antenna-coupled field-effect transistors were integrated as multi-pixel (5×10) detector arrays for electromagnetic radiation between 550 and 600GHz using commercial 0.15m CMOS process technology. Reported is a minimum optical noise-equivalent-power (NEP) of 43 pW/ √ Hz and a maximum (capacitive-loading-limited) optical responsivity of 970V/W (both values averaged). An electrical NEP of 9pW/ √Hz is estimated. Inter-chip variations are analysed with a set of 15 samples showing a low standard deviation of less than 8 for both responsivity and NEP at the optimum operation point. Intra-chip variation is low for non-edge pixels. Both the very good NEP values and the low variations indicate that a cost-efficient CMOS process is well suitable for reliable fabrication of multi-pixel terahertz focal plane arrays.
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