<Attachment>

Summary of Enhanced Sensitivity and Improved Resolution

(1) To improve the performance in low-frequency electromagnetic waves better than NEC's conventional product, NEC developed technology to expand the length of the optical cavity structure from 3 - 4 μm of the conventional value to 15 μm, which is formed between a thick metallic layer (perfect reflector) on a readout integrated circuit and thin metallic layer (THz absorber) on a pixel.

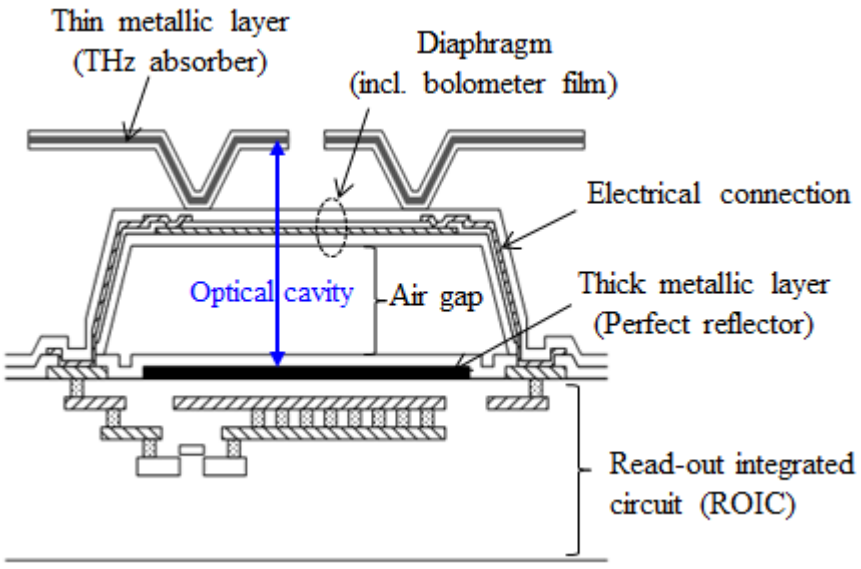
(2) As a result, the MDP value at 0.5 - 0.6 THz frequency (wavelength 500 - 600 μm), was improved ten times when compared with NEC's conventional product.

(3) In consideration of detecting long-wavelength electromagnetic waves as described above, the signal-to-noise ratio can be improved four-times through a 4X4 pixel binning, so that the 40-time enhancement of the MDP value is achieved, combined with the effect of the item (2) above.

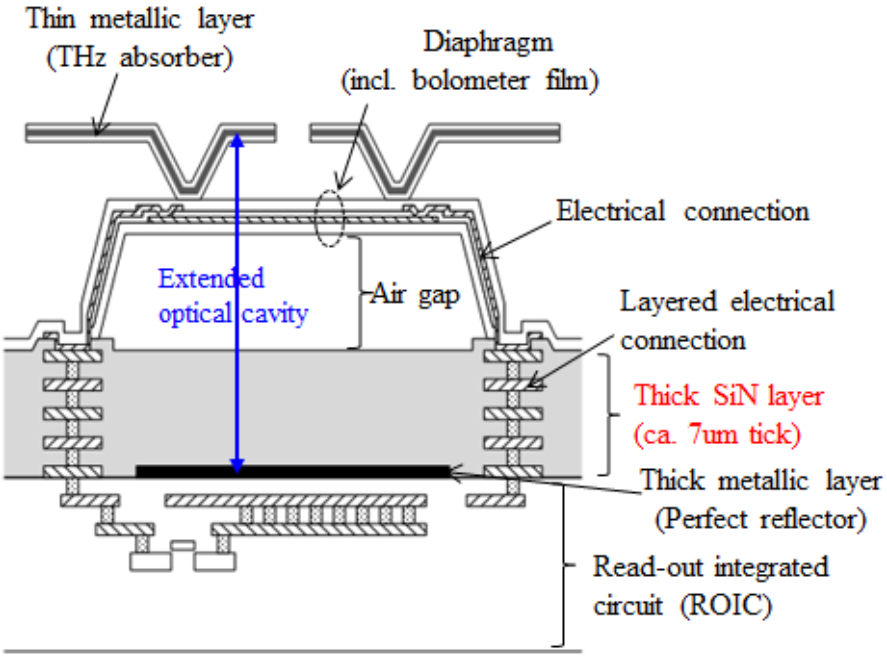
(4) NEC developed technology to expand the number of pixels from the existing 320X240 to 640X480.

(5) Consequently, NEC demonstrated the capability of THz imaging with four times wider FOV than NEC's conventional technologies.

<Development of the new pixel structure to improve the MDP value at lower frequency>

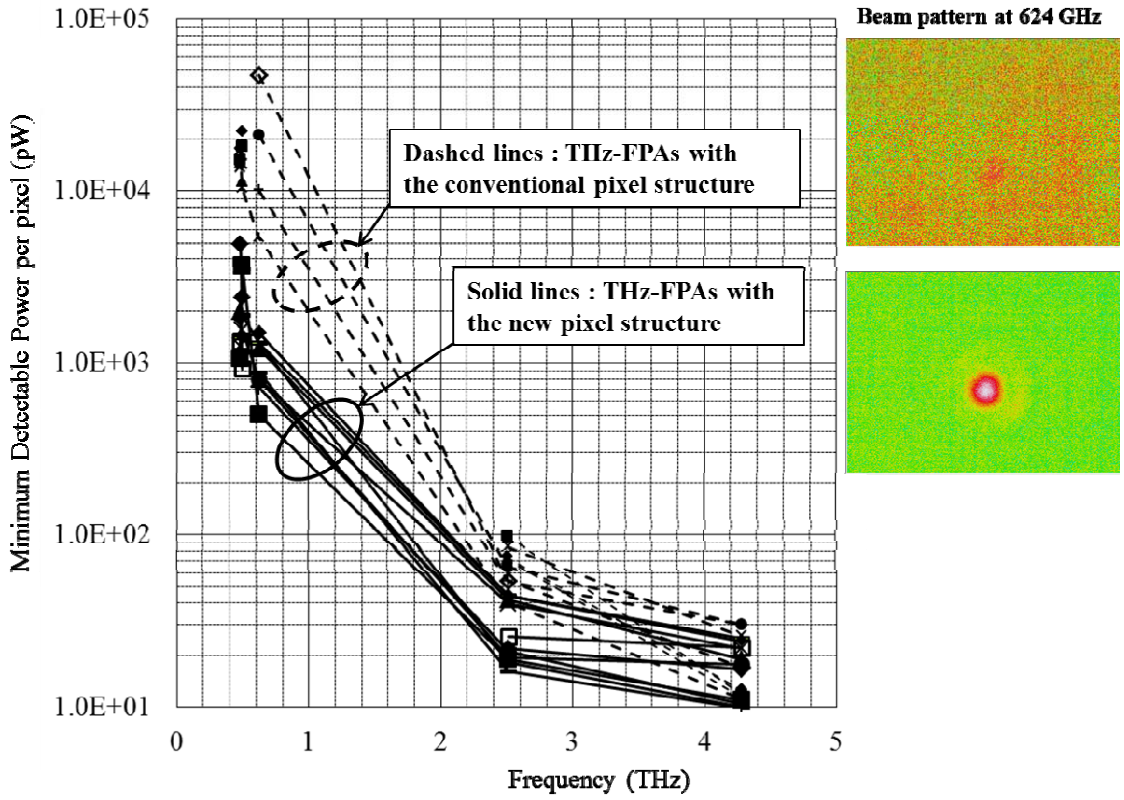


The conventional pixel structure used for the existing THz camera IR/V-T0831

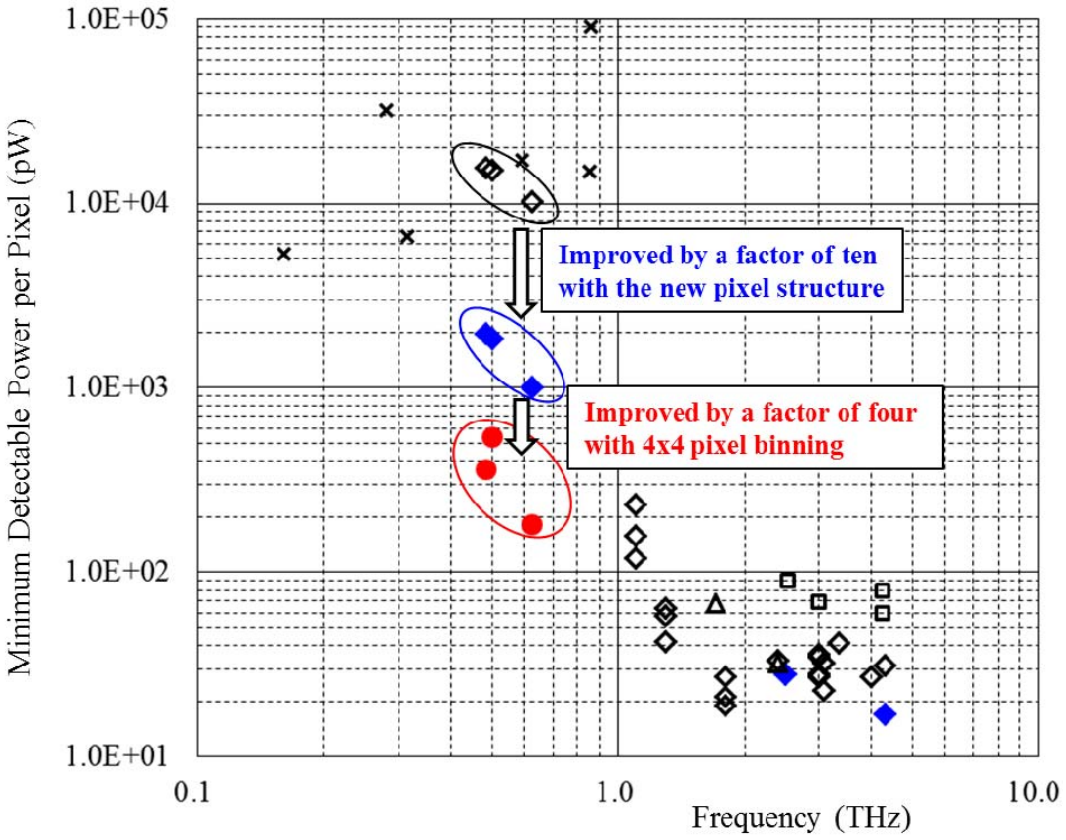


The new pixel structure, where a thick SiN layer is formed to extend optical cavity length

Comparison of Frequency Dependence of Minimum Detectable Power per Pixel



Comparison of the present results with other data



◇ NEC's bolometer (the conventional pixel structure)

◆ NEC's bolometer (the new pixel structure)

● NEC's bolometer (the new pixel structure + 4x4 pixel binning)

△ LETI's bolometer : IRMMW-THz2012, Thu-B-1-2

□INO's bolometer : IRMMW-THz2013, MO13-3, Proc.SPIE, vol.8023, 80230C(2011).

× Antenna-coupled CMOS and so forth (incl. Wuppertal Univ., Goethe Univ., Chalmers Univ., Univ. Florida, TowerJazz)