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(54) **PHOTODIODE DEVICES,
PHOTODETECTORS, AND METHODS OF
FORMING PHOTODIODE DEVICES**

(71) Applicant: **GlobalFoundries Singapore Pte. Ltd.,**
Singapore (SG)

(72) Inventors: **Khee Yong LIM**, Singapore (SG); **Kiok
Boone Elgin QUEK**, Singapore (SG);
Kian Ming TAN, Singapore (SG); **Wei
Sin PHANG**, Singapore (SG);
Xiaoping WANG, Singapore (SG)

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(57) **ABSTRACT**

A photodiode device may include a semiconductor substrate, a multiplication layer disposed in the semiconductor substrate and having a first width, a dielectric layer disposed over the multiplication layer, a charge layer coupled to the multiplication layer and having a second width, and an absorption layer disposed over the charge layer and having a third width. The second width of the charge layer may be smaller than the first width of the multiplication layer, and the third width of the absorption layer may be greater than the second width of the charge layer.

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