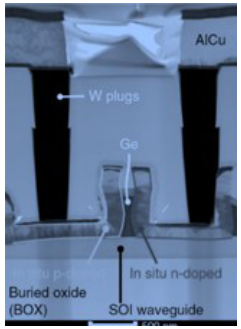
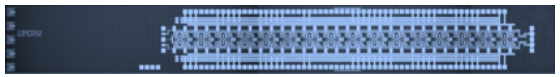
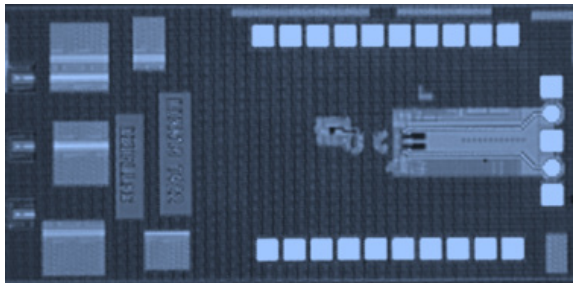
SG25H5EPIC - Demonstrators



240 GHz germanium photodiode

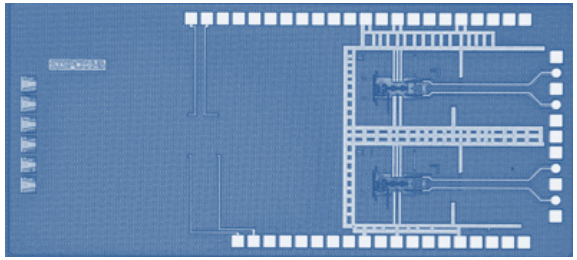
64Gbd monolithically integrated MZM and linear driver





56 Gb/s direct detection optical receiver

64 GBd dual window coherent receiver



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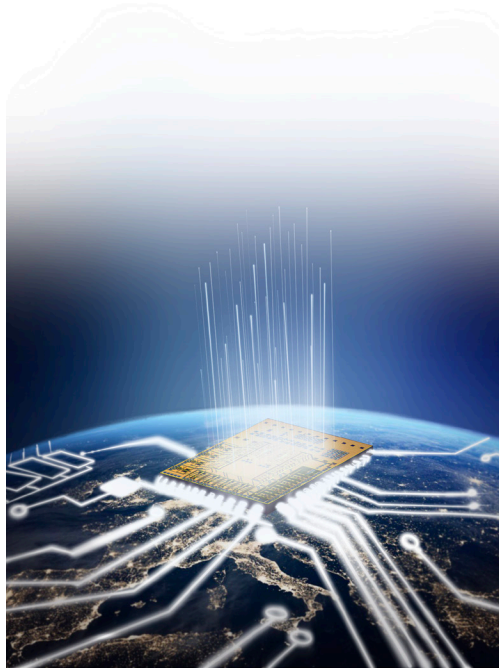
03/2023

Photonic Technologies

Take advantage of IHP's innovative photonic technologies!



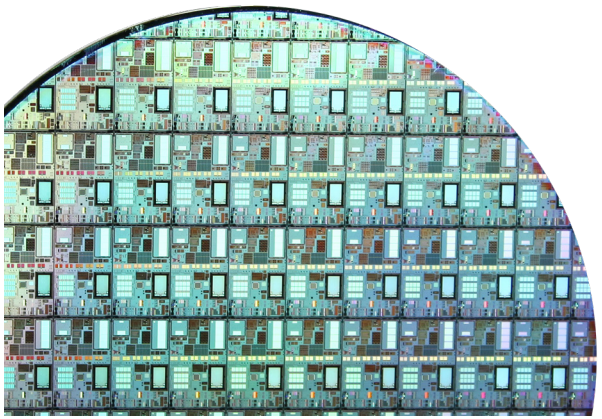
Photonic IC Technology – SG25PIC

IHP develops photonic integrated circuit (PIC) technology offering passive photonic components, modulators and photodetectors to provide early opportunities for realizing photonic integrated designs.

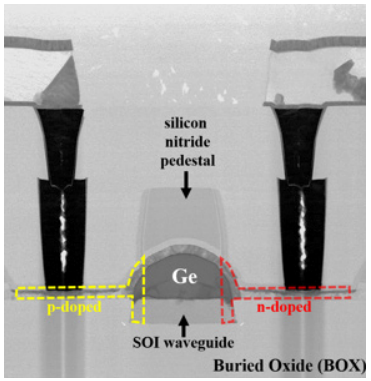
The technology is compatible with fully integrated photonic BiCMOS allowing the re-use of SG25PIC designs in IHP electronic-photonic integrated circuits in SG25H5EPIC.

BASIC TECHNOLOGY FEATURES PIC

- SOI silicon photonics
- 200 mm, 220 nm SOI substrates
- Including local SOI process
- Full back-end of line



Electronic Photonic IC Technology – SG25H5EPIC



Waveguide-coupled Ge PIN photodiode in SG25H5EPIC

SG25H5EPIC PHOTONIC BICMOS PROCESS FEATURES:

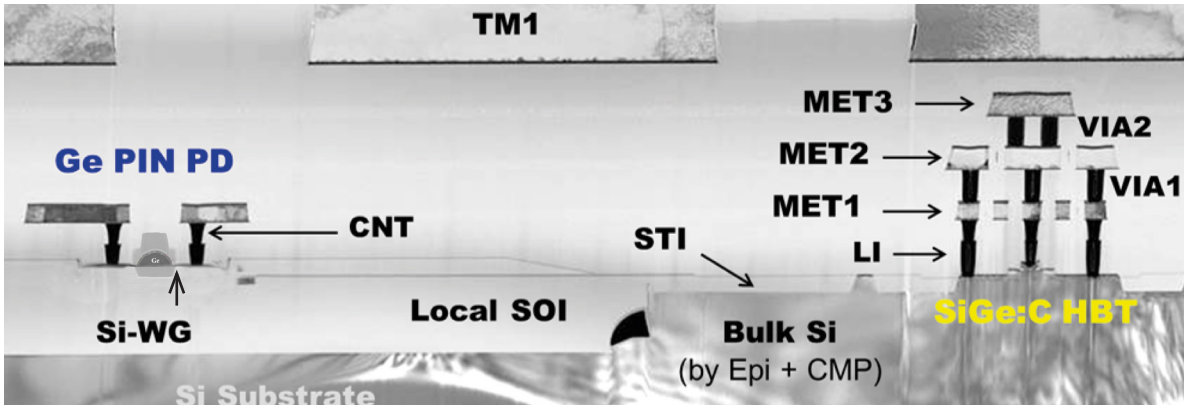
0.25 µm BiCMOS core			
SiGe HBT	f_{max}	f_T	BV_{CEO}
SG25H5	290 GHz	240 GHz	1.9 V
Opto-electronic components			
Ge-PIN @ -2V	I_{dark}	*Responsivity (1300-1550 nm)*	*3dB Bandwidth*
	<200 nA	>0.8 A/W	>60 GHz
p-n phase shifter	$V_\pi L$ (@-1V)		*Loss (@-1V)*
	2.7 V·cm		1.2 dB/mm
Waveguides	450 nm Nano-WG: 3.0 dB/cm		700 nm GRC-WG: < 0.9 dB/cm
Back-End-Of-Line: 5 layers AlCu with 2 and 3 µm thick top level metal			

BASIC TECHNOLOGY FEATURES EPIC

- Monolithic front-end integration
- SiGe BiCMOS (bulk) + SOI silicon photonics
- 200 mm, 220 nm SOI substrates
- Full back-end of line

PROCESS DESIGN KIT FEATURES

- Luceda IPKISS
- Cadence support for basic electronic-photonic circuit design (DRC, LVS, QRC)
- Siemens EDA (S-Edit, L-Edit, ELDO/AFS, Calibre)



TEM X-section of the photonic BiCMOS process: WG-coupled Ge-PIN photodiode on SOI and SiGe HBT fabricated in an adjacent bulk region.