

## UNIQUE SOURCE FOR SPACE MICROELECTRONICS

- 130 nm/250 nm SiGe BiCMOS
- 8" (200 mm) Wafer Processing Pilot Line
- Advanced Design Kits – Digital and Mixed-Signal for ASIC and MMIC design
- Radiation Tolerant / Radiation Hard IPs
- Technology for Harsh Environments
- Multi Project Wafer Service – IC Prototyping
- Low Volume Production
- Design Support

### ABOUT IHP

IHP is a non-profit organization supported by the authorities of the state of Brandenburg and the German Federal government that performs R&D in the field of silicon-based systems, highest-frequency ICs and technologies for wireless and broadband communications especially suited for applications in the highest GHz band thanks to integrated HBT devices with high cut-off frequencies of up to 500 GHz. Manufacturing and Value Added Services for commercial IC production are provided via IHP Solutions GmbH, a fully-owned subsidiary of IHP under private law.

### OUR STRENGTHS

- IP design, back-end and integration
- Process or device characterization
- Silicon evaluation



**We design your circuits  
based on available IPs in  
IHP's technologies!**



IHP – Leibniz- Institute for  
High Performance Microelectronics

Im Technologiepark 25  
15236 Frankfurt (Oder)

[www.ihp-microelectronics.com](http://www.ihp-microelectronics.com),  
[ihp@ihp-microelectronics.com](mailto:ihp@ihp-microelectronics.com)

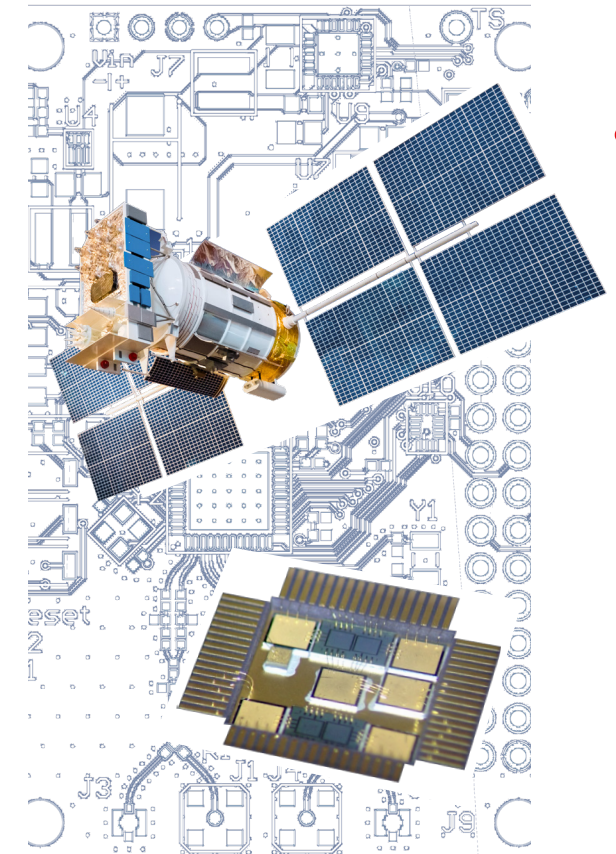
Contact:  
Dr. René Scholz  
[scholz@ihp-microelectronics.com](mailto:scholz@ihp-microelectronics.com)



03/2023



## Radiation Hard Design Kit



## Overview

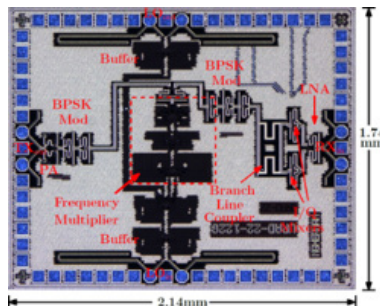
IHP offers research partners and customers access to its powerful SiGe:C BiCMOS technologies and special integrated RF modules. These technologies are especially suited for applications in the higher GHz bands (e.g. for wireless, broadband, radar).

### LIBRARIES AND IPs

- Extended Operating Temperature Range : -55° C to +125° C
- MOS special layouts (ELT, SLT, JIC)
- MIM Capacitors, MOS Varactors, Inductor Models

Radiation Tolerant Libraries  
Radiation Levels :

- Bipolar (HBT) Devices TID > 800 krad
- CMOS TID levels 100 krad(Si) – 300 krad(Si)
- CMOS SEU Threshold > 35MeV.cm<sup>2</sup>/mg -
- CMOS Special Cells SEU Threshold > 65 MeV.cm<sup>2</sup>/mg
- SEL Free > 65 MeV.cm<sup>2</sup>/mg



## Supported EDA Tools for RH PDKs

	cadence	KEYSIGHT TECHNOLOGIES	SONNET
Schematic Capture	✓	✓	
Spice Simulation	✓	✓	
Field Simulation	✓	✓	✓
Layout	✓	✓	
Design Rule Check	✓	✓	
LVS Check	✓	✓	
Parasitic Extraction	✓	✓*	

### SIGe BICMOS PROCESS CAPABILITY

SGB25RH 250nm SiGe BiCMOS	SG13RH 130nm SiGe BiCMOS
SiGe HBTs npn Peak $f_T/f_{MAX}$ 75/95GHz	SiGe HBTs npn Peak $f_T/f_{MAX}$ 220/340GHz
Mixed-Signal MMIC/ASIC up to Ku-Band	Mixed-Signal MMIC/ASIC up to Ka-Band
+2.5 V CMOS Core Voltage	+1.2 V CMOS Core Voltage
+2.5 V/+3.3 V Digital IO Pads	+2.5 V/+3.3 V Digital IO Pads

### MODELING

	Type	scalable	mismatch	statistical	noise	RF
NPN/PNPs	VBIC HICUM	✓	✓	✓	✓	✓
MOSFET	PSP	✓	✓	✓	✓	✓
Varactor	PSP MOSVAR	✓	✓	✓	✓	✓
LDMOS	HISIM	✓	✓	✓	✓	✓
MIM Caps	SPICE	✓	✓	✓		✓
Resistors	SPICE	✓	✓	✓	✓	✓
Inductors	S-Param					✓

## Services

### CMOS DIGITAL BACK-END

- Synthesis, Place & Route, Parasitic Extraction
- Research & Development of RHBD techniques
- Device Modeling
- TID Device Characterization
- SEU Testing with External Partners

### EPPL REGISTERED



Listed on European Preferred Parts List

- SGB25RH validated & listed
- SG13RH is under evaluation process
- Extended life time - endurance tested
- Component Standardisation Section at ESA
- European Space Components Coordination
- Supporting innovative technologies while maintaining quality assurance requirements

### MODULES

Special Modules offered for R&D

- Radiation Hardened LDMOS
- Embedded RF-MEMS

