GLOBALFOUNDRIES®

High-performance SiGe BiCMOS technologies

Highlights

- broad range of processes and NPN f_t performance levels to find the ideal fit for your application
- Leverage a feature-rich combination of active and passive devices to optimize your design
- Achieve hardware results you can count on by utilizing some of the industry's most accurate device models
- Take performance to new levels with SiGe 9HP, the highest f_{max} SiGe BiCMOS process in volume production today
- Access ongoing innovation from the SiGe pioneer for differentiation that matters

Differentiated, performance-optimized offerings for next-generation applications

The high-performance silicon germanium (SiGe) BiCMOS portfolio from GLOBALFOUNDRIES (GF) is designed to deliver the speed, performance and bandwidth that chips for next-generation hardware require. The silicon-proven technologies enable you to maximize performance, integrate extensive digital and RF functionality and exploit an economical silicon technology base.

SiGe HP target applications

	Highest Performance ⟷ Performance/Value				
SiGe Platform	9HP	8XP	8HP	8WL	7WL
Applications					
Automotive RADAR	●	●	●		
Automotive LiDAR			●		
Wireless infrastructure	●	●	●		
Gesture sensing		●			
Optical communications: Data center	●	●			
Optical communications: PON/GPON			●	●	●
High-speed serial interfaces: USB/PCIe		●	●	●	
Test/measurement systems	●	●			
Aerospace and defense	●	●	●		

SiGe HP technologies

Differentiating features and devices

GF's SiGe HP technologies feature low noise figures; high linearity, gain and breakdown and operating voltages; simplified impedance matching; and excellent thermal stability. Advanced SiGe heterojunction bipolar transistors (HBTs) provide superior low-current and high-frequency performance while enabling the technologies to operate at high junction temperatures. Choose the ideal combination of performance and value for your application from a range of process nodes (90 nm to 180 nm) and NPN ft performance levels (310 GHz to 60 GHz).

An advanced copper (Cu) metallization feature, available in SiGe 9HP, 8XP and 8HP, enables you to take advantage of five times the current density at 100°C, or up to 25°C higher operating temperature at the same current density.

SiGe HP technologies at a glance

Featiure*	9HP	8XP	8HP	8WL	7WL
Applications					
Technology node	90 nm	130 nm			180 nm
CMOS supply (V)	1.2, 1.8, 2.5, 3.3	1.2, 2.5		1.2, 1.5, 2.5, 3.3	1.8, 2.5, 3.3, 5.0
Metallization (levels of metal)					
Base	7	5	5	5	4
Option	Up to 10	Up to 8	Up to 8	Up to 8	Up to 7
TSV		●	●		
HBTs					
High performance f_t/f_{max} (GHz)	310/370	250/340	200/265	100/200	60/120
High breakdown Bv_{ceo} (V)		3.3	3.5	4.7	6.0
High breakdown f_t (GHz)	140	70	60	54	29
Medium breakdown Bv_{ceo} (V)	2.4	N/A	N/A	3.4	4.1
Medium breakdown f_t (GHz)	150	N/A	N/A	70	45
FETs					
High V_t	●			●	●
Reg V_t	●	●	●	●	●
Zero V_t					●
Triple well	●	●	●	●	●
Thick gate oxide (V)	2.5, 3.3				
High voltage devices (≥ 5 V)					●
Other bipolars			VPNP		VPNP/LPNP
Resistors					
p+ poly	●	●	●	●	●
Precision p+ poly	●			●	
High resistance poly	●	●	●		
Metal	●	●	●	●	
n+ diffusion	●	●	●	●	●
Silicided poly ballast resistor	●			●	●
Low-resistance sub collector	●	●	●		

** Some features are options. Refer to the latest PDK release for the current feature set.*

SiGe HP technologies

SiGe HP process design kits (PDKs) leverage our experts' decades of experience with SiGe technologies—some of the original scientists and engineers who invented SiGe. The kits provide RF-specific tool support along with leading model-to-hardware correlation accuracy to help you achieve first-time-right results in hardware. Frequent multi-project wafer (MPW) runs enable fast prototyping and a full range of turnkey services is available.

GLOBALFOUNDRIES SiGe 9HP, 8XP, 8XP, 8WL and 7WL technologies on our 200 mm manufacturing process are fully qualified, with PDKs available now.

SiGe HP technologies at a glance (continued)

Featiure*	9HP	8XP	8HP	8WL	7WL
Capacitors					
VN cap	●				
MIM	●	●	●	●	●
Dual MIM	●	●	●	●	●
High Q MIM	●				
Varactors					
NMOS (thin & thick oxide)	●	●	●	●	●
PMOS (thin oxide)	●				
Hyper-abrupt	●	●	●	●	●
Diodes					
PIN	●	●	●		●
Schottky barrier	●	●	●		
BC junction					●
Inductors					
Single spiral	●	●	●	●	●
Series/parallel spirals	●	●	●	●	●
Symmetrical	●	●	●	●	●
Thick metals	●	●	●	●	●
Transmission lines					
RF wire	●	●	●	●	●
Coupled wires	●	●	●	●	●
Coplanar waveguide	●	●	●	●	●
Microwave/millimeter wave passive elements (Unique structures, including bends, tees, stubs)	●	●	●	●	●
Bond Pad (wire bond & lead-free C4 available)	●	●	●	●	●
Memory	●	●	●	●	●
eFuse	●	●	●	●	●
SRAM	●	●	●	●	●

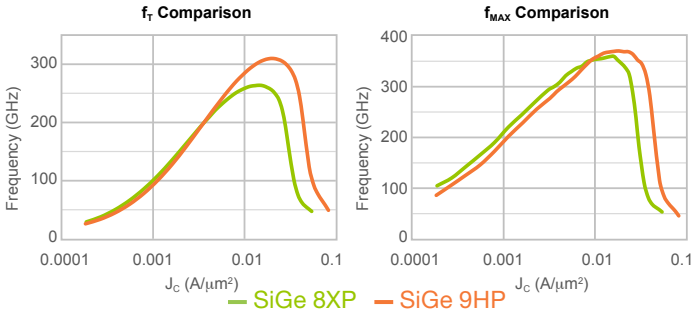
** Some features are options. Refer to the latest PDK release for the current feature set.*

SiGe HP technologies

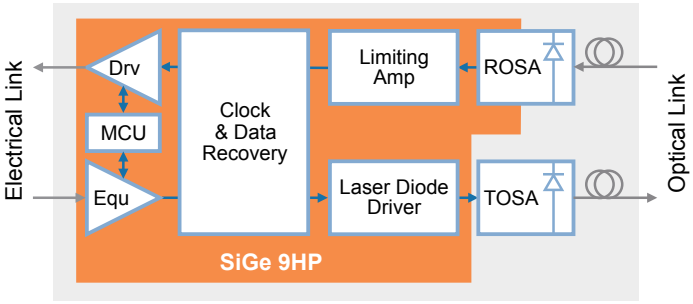
Premier performance

SiGe 9HP is our most advanced SiGe technology. With an f_t/f_{max} of 310/370 GHz, the technology delivers premier RF performance and enables up to 50% more integration density than its 130 nm SiGe 8HP/8XP predecessors.

SiGe 8XP vs. SiGe 9HP f_T and f_{MAX} Comparison



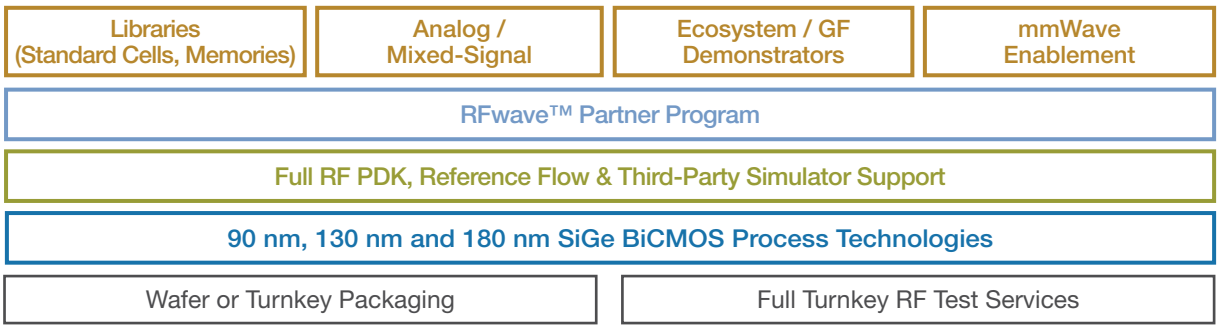
Application example



Example Active Optical Cable / Optical Fiber Module Block Diagram

Comprehensive enablement

SiGe HP technologies are complemented by end-to-end design enablement to help you meet design goals, easily inject differentiation and accelerate time to market.



Learn more

To learn more about GF SiGe technologies, visit globalfoundries.com

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