RF SOI Platforms

7RF SOI and 7SW RF SOI

Highlights

- Multiple options for design flexibility to meet performance, area, integration and budget goals
- Proven, partially-depleted RF SOI are platforms already deployed in billions of chips
- Ongoing platform and technology roadmap enhancements
- Complete services and supply chain support:
  - Regularly scheduled MPWs
  - Packaging and RF test services

Enabling Any Time, Anywhere RF Connectivity

The GlobalFoundries® (GF®) RF silicon-on-insulator (SOI) foundry portfolio includes 7RF SOI and 7SW RF SOI. The technologies are optimized to deliver the performance needed to keep pace with evolving standards and growing complexity:

- High linearity, electrical isolation and low insertion loss over a wide frequency range enable customers to develop front-end chip solutions that minimize interference and noise—while maintaining signal power
- An SOI technology base enables the integration of multiple RF/analog functions—such as the RF switches, multimode/multiband power amplifiers, antenna tuners and power controllers in smartphones—into fewer chips

GF 7RF SOI and 7SW RF SOI technologies have been deployed in billions of chips for leading smartphones and mobile devices. Ongoing device and technology roadmap enhancements give customers added design flexibility to strike the right balance of performance, area and cost in next-generation RF connectivity solutions.

GF RF SOI at a Glance

7RF SOI	7SW RF SOI
Initial GF RF SOI solution. Options include: • Low distortion device (LowD): Boosts performance and enables designers to further reduce insertion loss or chip area • Fewer masks (NoBTQ): Value-optimized solution for potentially complicated RF switches where performance is a secondary design goal • 300 mm substrate (12-inch wafer): Roadmap to enhanced productivity / costs	Up to 30% better performance and 30% smaller chip area compared to 7RF SOI*. Enhancements include: • High Vt FETs, which can help reduce logic circuit power consumption to extend battery life • Dual-oxide option, which enables improved LNA performance for better reception range and battery life • Trap rich substrate option, which can improve harmonic noise suppression for fewer dropped calls • Switch feature that improves Ron*Coff by 20%*, with ample power handling to support a wide range of switching functions

Supply and enablement you can rely on

GF has expanded 7RF SOI and 7SW RF SOI manufacturing capabilities and capacity, with multiple fabs qualified to help customers meet critical time to market windows. Similarly, GF's multiple substrate vendors ensure a reliable supply of high-quality, high-resistivity SOI substrates.

GF 7RF SOI and 7SW RF SOI platforms are complemented by end-to-end support and comprehensive PDKs featuring accurate modeling to help customers achieve predictable results and faster time to market. Frequent, cost-effective MPW runs enable fast prototyping so early hardware results are available.

GF RF SOI Solutions at a Glance

Feature*	7RF SOI	7SW RF SOI
Trap rich substrate option		✓
300 mm substrate option (12-inch wafer)	✓	
CMOS supply (V)	1.5, 2.5, 5.0	2.5
FETs		
Reg V_t	✓	✓
High V_t		✓
5.0 V_t	✓	
Thin oxide LNA	✓	✓
Thin oxide logic	✓	
Resistors		
n+/p+ diffusion	✓	✓
n+/p+ poly	✓	✓
High res poly	✓	✓
Metal	✓	
Capacitors		
Nitride MIM	✓	✓
High voltage MIM	✓	✓
High voltage VN cap	✓	✓
Inductors		
Single spiral	✓	✓
Series/parallel spirals	✓	✓
Symmetrical	✓	✓
Varactors and Diodes		
MOS	✓	✓
Thick metals	✓	Both AM and DM (MA/E1)
Transmission Lines		
RF wire	✓	✓
Coupled wires	✓	✓
Electrical Fuse (OTP memory/passive trimming)	✓	✓

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

LEARN MORE

GF knows RF. Learn how GF's extensive RF SOI portfolio strengthens customers' leadership position at gf.com

SiGe HP process design kits (PDKs) leverage our experts' decades of experience with SiGe solutions—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 customers 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.

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

GF SiGe HP Solutions at a Glance (continued)

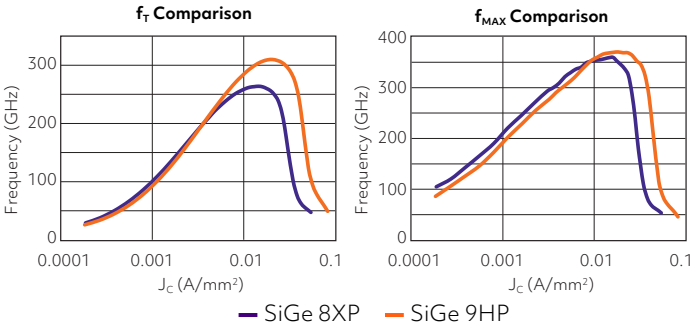
Feature*	9HP	8XP	8HP	8WL	7WL
Capacitors					
VN cap	✓				
MIM	✓	✓	✓	✓	✓
Dual MIM	✓	✓	✓	✓	✓
High Q MIM	✓				
Varactors					
NMOS (thin & thick oxide)	✓	✓	✓	✓	✓
PMOS (thin oxide)	✓				
Hyper-abrupt	✓	✓	✓	✓	✓
Diodes					
PIN	✓	✓	✓		✓
Schottky barrier	✓	✓	✓		
BC junction					✓
Inductors					
Single spiral	✓	✓	✓	✓	✓
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.

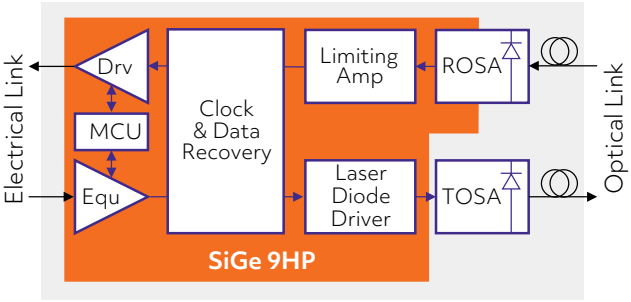
Premier performance

SiGe 9HP is our most advanced SiGe solution. With an ft/fmax of 310/370 GHz, the solution delivers premium RF performance and enables up to 50% more integration density than its 130 nm SiGe 8HP/8XP predecessors.

SiGe 8XP vs. SiGe 9HP fT and fMAX Comparison



Active Optical Cable/Optical Fiber Module Block Example Diagram



Comprehensive enablement

SiGe HP solutions are complemented by end-to-end design enablement to meet customers' design goals, easily inject differentiation and accelerate time to market.

Libraries (Standard Cells, Memories)	**Analog / Mixed-Signal**	**Ecosystem / GF Demonstrators**	**mmWave Enablement**
RFwave™ Partner Program			
Full RF PDK, Reference Flow & Third-Party Simulator Support			
90 nm, 130 nm and 180 nm SiGe BiCMOS Process Platforms			
Wafer or Post-Fab Turnkey Packaging		**Full Post-Fab RF Test Turnkey Services**	

LEARN MORE

Contact Us

GF knows RF. Learn how GF's extensive SiGe portfolio strengthens customers' 5G leadership position at **gf.com**

For MPW schedules, visit **gf.com/design-services/multi-project-wafer-program**