



GLOBALFOUNDRIES®

SiGe 8XP & SiGe 8HP

130 nm SiGe BiCMOS Technologies

Highlights

- Maximize performance and integrate extensive digital and RF functionality in cost-effective silicon technology node
- Take advantage of advanced HBTs for superior low-current and high-frequency performance, even at high junction temperatures
- Boost current density with an optimized Cu metallization feature
- Develop differentiated solutions for demanding high frequency RF applications
- Frequent, cost-effective MPW runs enable fast prototyping and are complemented by end-to-end, expert program management and technical support

Designed to Deliver Advanced Performance and Functionality

High-performance, 130 nm silicon germanium (SiGe) BiCMOS technologies from GLOBALFOUNDRIES—SiGe 8HP and SiGe 8XP—are designed to handle increasing performance, power and area requirements across a demanding set of RF applications, including:

- Microwave backhaul; microwave and 5G mmWave base stations; satellite communications
- Automotive RADAR and LIDAR
- Optical module transimpedance amplifiers and laser drivers
- Test equipment

SiGe 8HP and 8XP enable you to maximize performance and integrate extensive digital and RF functionality while exploiting an economical silicon technology base. The offerings 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 allowing the technologies to operate at high junction temperatures.

The processes utilize identical CMOS and back-end stack options, enabling easy reuse of application-optimized IP. Additionally, the processes share a full suite of RF-centric passive and active devices, including a complete set mmWave elements comprising bends, tees, stubs, meander lines, branch and couplers, power dividers and retrace hybrids.

An advanced copper (Cu) metallization feature provides improved current carrying capabilities. Compared to standard Cu lines, the feature 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 8XP is the most recent addition to GF's 130 nm high-performance SiGe family. SiGe 8XP offers a lower noise figure, higher signal integrity and approximately 25% better HBT performance than SiGe 8HP.

Comprehensive Design Enablement and Design Features

SiGe 8XP and 8HP physical design kits (PDKs) include performance-specific features and high-quality RF passive devices, including through-silicon vias (TSVs), thick metals and high Q inductors.

SiGe 8XP and SiGe 8HP at a Glance

| Feature* | 8XP | 8HP |
|--|-----------|-----------|
| CMOS supply (V) | 1.2, 2.5 | |
| eFuse | ✓ | ✓ |
| TSV | ✓ | ✓ |
| HBTs: | | |
| High performance f_T/f_{max} (GHz) | 250 / 340 | 200 / 265 |
| High breakdown BV_{ceo} (V) | 3.25 | 3.55 |
| FETs: | | |
| Reg V_t | ✓ | ✓ |
| Triple well | ✓ | ✓ |
| Thick gate oxide (V) | 2.5, 3.3 | |
| Other bipolars | VPNP | |
| Resistors: | | |
| N+/P+ poly | ✓ | ✓ |
| High resistance poly | ✓ | ✓ |
| Metal | ✓ | ✓ |
| Diffusion | ✓ | ✓ |
| Capacitors: | | |
| MIM | ✓ | ✓ |
| Dual MIM | ✓ | ✓ |
| Varactors and diodes: | | |
| NMOS (thin and thick oxide) | ✓ | ✓ |
| Hyper-abrupt varactor | ✓ | ✓ |
| PIN diode | ✓ | ✓ |
| Schottky diode | ✓ | ✓ |
| Inductors: | | |
| Single spiral | ✓ | ✓ |
| Series/parallel spirals | ✓ | ✓ |
| Symmetrical | ✓ | ✓ |
| Thick metals | ✓ | ✓ |
| Transmission lines: | | |
| RF wire | ✓ | ✓ |
| Coupled wires | ✓ | ✓ |
| Coplanar waveguide | ✓ | ✓ |
| Microwave/millimeter wave passive elements | ✓ | ✓ |
| Interconnect (wire bond and lead-free C4 available) | ✓ | ✓ |

*Some features listed include optional devices.



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