

The World Leader in High Performance Signal Processing Solutions



Process Technology Options for RF and Microwave

ARMMS 2014
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Analog Devices

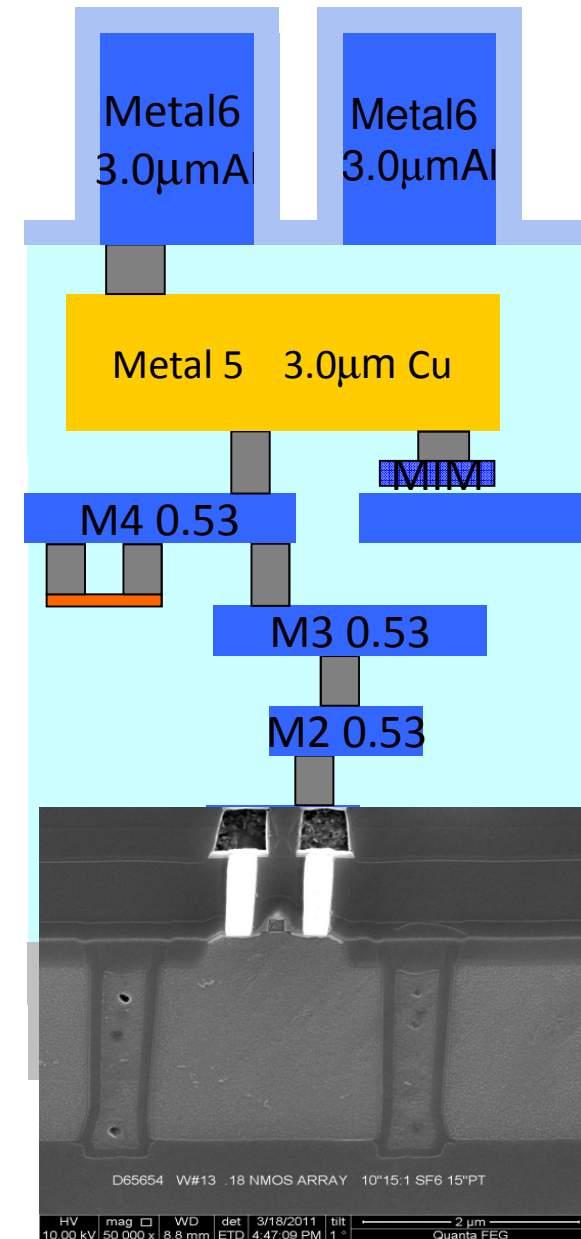


ADI RF / Microwave Process Strategy

Process	Key Strengths	Key Applications	Outlook
RF CMOS	Very low cost digital, High Ft @ 65nm and below	SoCs with high digital content	Expanding up in frequency
XF4C SiGe	Higher Ft, SOI, High-performance PNP & NPN, 0.18u RFCMOS	High Performance, Medium Integration	Growing, replacing GaAs across signal chain
GaAs	High Power, Low Noise	LNAs, PAs	Declining
GaN	Wideband Power	Wideband PAs	Has potential if costs come down

XF3C/4C SiGe BiCMOS Process Features:

- ◆ **Dual Thick Metals**
 - High Q inductors and baluns
- ◆ **High Quality MiM cap and TF resistors**
- ◆ **Complementary Bipolars (PNP & NPN)**
 - 5V/44GHz to 2.2V/120GHz BV/Ft options
- ◆ **Deep Trench Isolation**
 - Eliminates substrate feed-through on integrated products
 - Fully isolated CMOS switch
- ◆ **Low Loss SOI Substrate**
 - Good for RF BW, Low passive losses



Unique Advantage from ADI SiGe BiCMOS on SOI

- ◆ NPN provides very high OIP3 RF Modulator with Low Noise
- ◆ High-Q Inductor provides MC-GSM VCO Phase Noise
- ◆ Trench MOS Switch for Wideband High OIP3 VVA
- ◆ High Speed NPN provides low NF LNA
- ◆ High breakdown NPN provides for high P1dB RF Driver
- ◆ Complimentary NPN/PNP provides high OIP3 IF VGA
- ◆ 0.18um CMOS provides for PLL/DAC/ADC cores

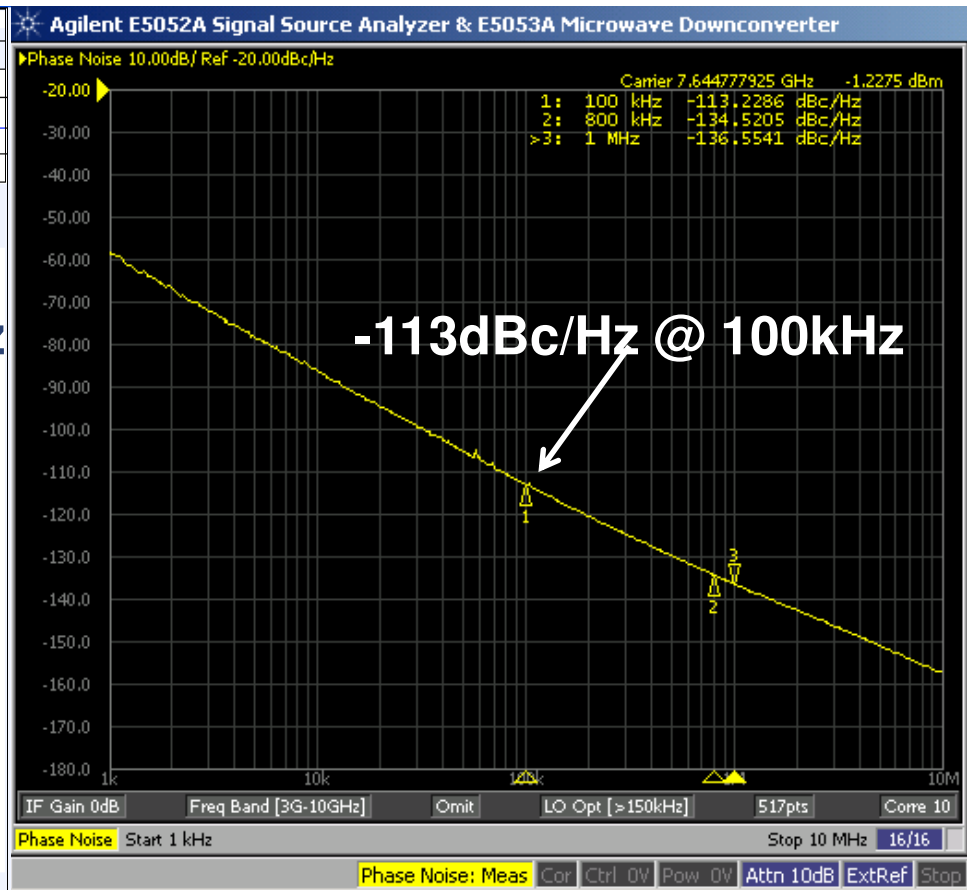
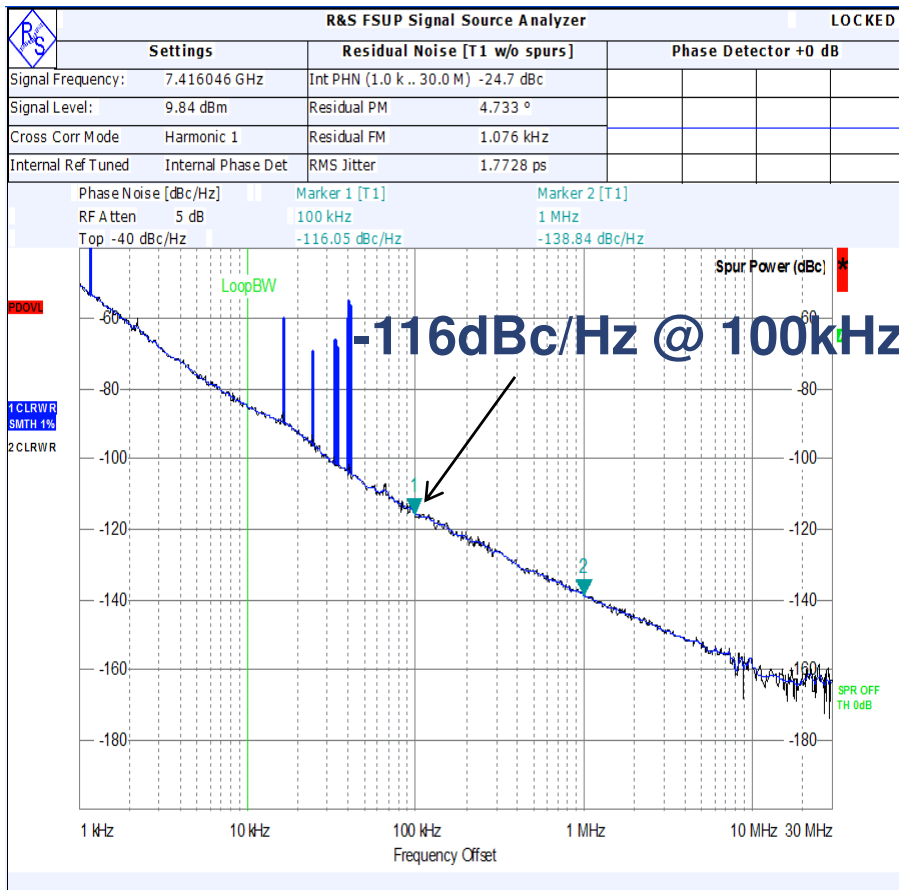
XF3C/4C has a unique set of advanced devices optimized for Highly Integrated, High Performance RFIC's



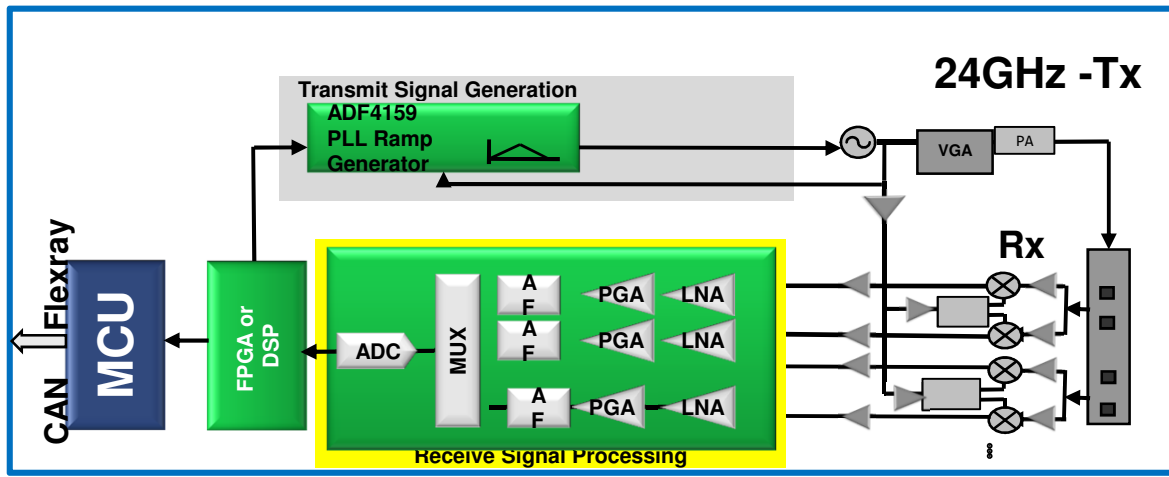
VCO Phase Noise: SiGe Vs. GaAs

VCO on GaAs HBT
15% Tuning range

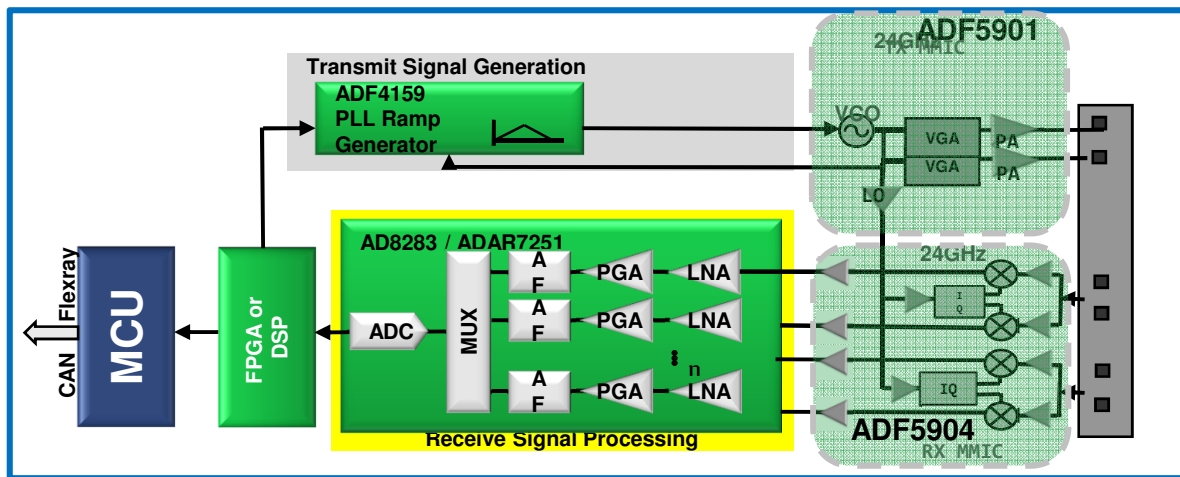
VCO on XF3C SiGe BiCMOS
30% Tuning range



24GHz Radar Sensor Evolution



- ◆ **Current Generation**
 - ◆ RF Discrete
 - ◆ GaAs + Silicon BJT



- ◆ **Next Generation**
 - ◆ RF Integrated MMICs on SiGe BiCMOS



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