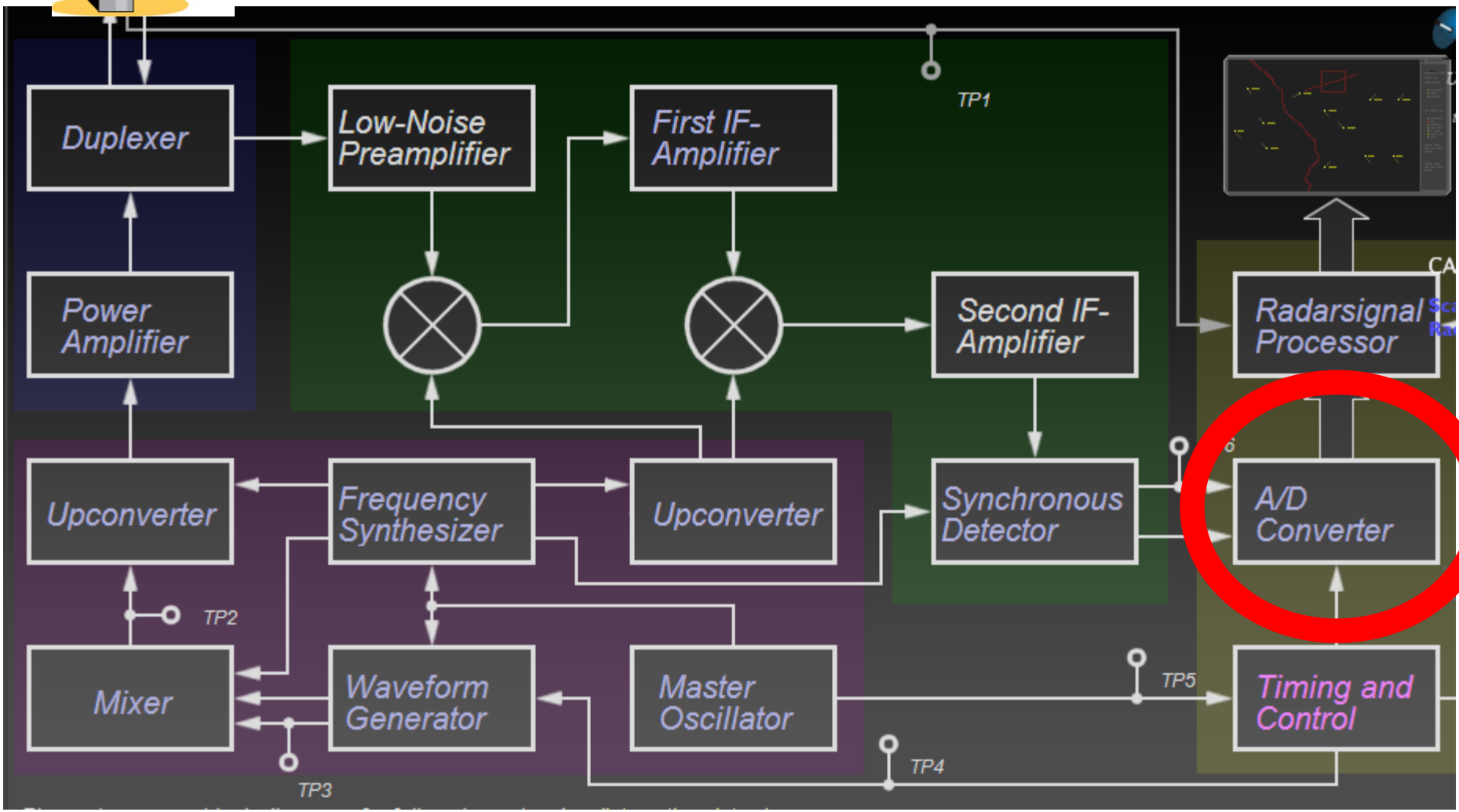
TI Solutions for Industrial Radar

Texas Instruments

Introduction

- **Purpose**
  - To introduce TI's ADC solutions for Radar
- **Objective**
  - To discuss differences between baseband sampling vs high IF sampling
  - To discuss TI's ADC solutions for each approach
- **Content**
  - Typical Radar Signal Chain
  - ADC's for Basband Radar Sampling
  - ADC's for High IF sampling

Radar Signal Chain



TI ADC's for Radar

- **For phase array radars, baseband sampling with two mixing stages is common.**
  - **ADS529x or AFE58xx offer best in class noise with industry leading power levels for multichannel systems**
    - 4, 8, and 16 Ch offerings
    - High speed up to 200MSPS
    - Best power/noise optimization in the industry

- **If power is not a major concern and the number of channels is relatively low a high IF sampling would eliminate one mixing stage and increase performance.**
  - **ADS54xx or ADC12Dxxxx offer unmatched speed performance**
    - 1 or 2 ch offerings
    - High speed up to 3.6GHz
    - Unmatched high speed performance

ADC’s for BaseBand Radar Sampling

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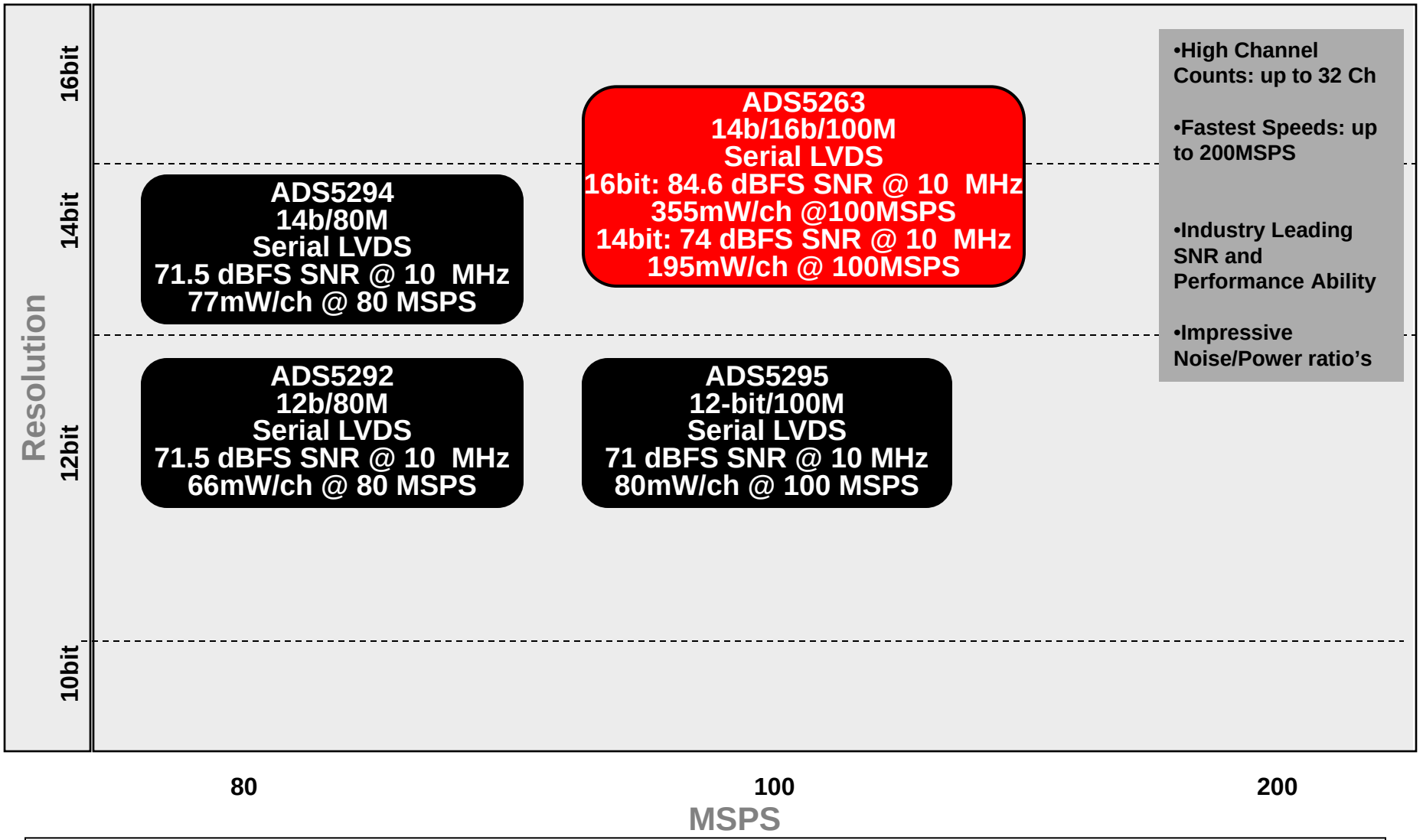
ADS52xx – Multi-channel, High Speed, Lower power ADC's for BaseBand Radar

quad | octal | 16-ch



ADS5295:

8 Channel, 12 Bit, 100MSPS High Performance ADC

Features

- Low Noise/Power Performance
  - 71 dBFS SNR, 85 dBc SFDR at 10 MHz/100MSPS
  - 80 mW/ch@100MSPS
- Digital Processing Block
  - Integrated Decimation Filters by 2,4,8
  - Programmable IIR High Pass Filter
  - Low frequency noise suppression mode
  - Programmable Digital Gain: 0 dB to 12 dB
- Selectable Serial LVDS ADC output:
  - One-Wire Interface: Up to 80 MSPS Sample Rate
  - Two-Wire Interface: Up to 100 MSPS Sample Rate
- 1.8V Supply

Benefits

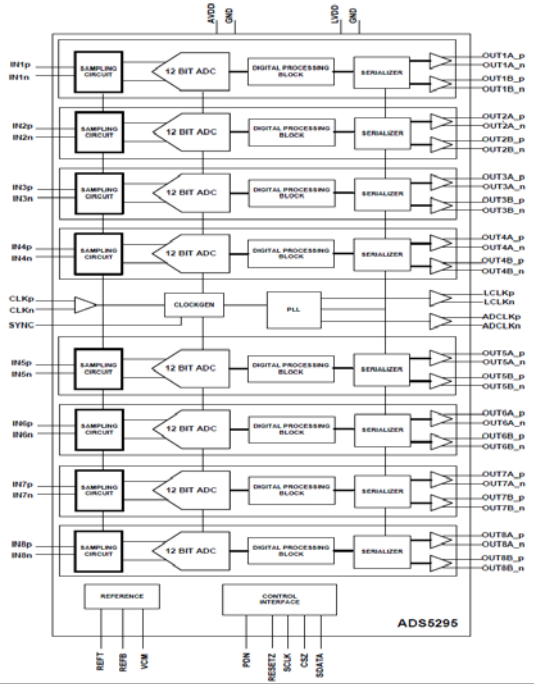
- Optimized for high performance and high channel count data acquisition systems
- Minimizes harmonic interference errors
- Minimizes DC offset errors
- Enables the suppression of noise at low frequencies and improves SNR in the 1MHz band near DC by about 3dB

Applications

- High channel count data acquisition
- Military Radar
- High speed communication applications

Samples: Now
EVM: Now
Production: Released

Package: 12x12 mm TQFP-80



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ADC’s for High IF Radar Sampling

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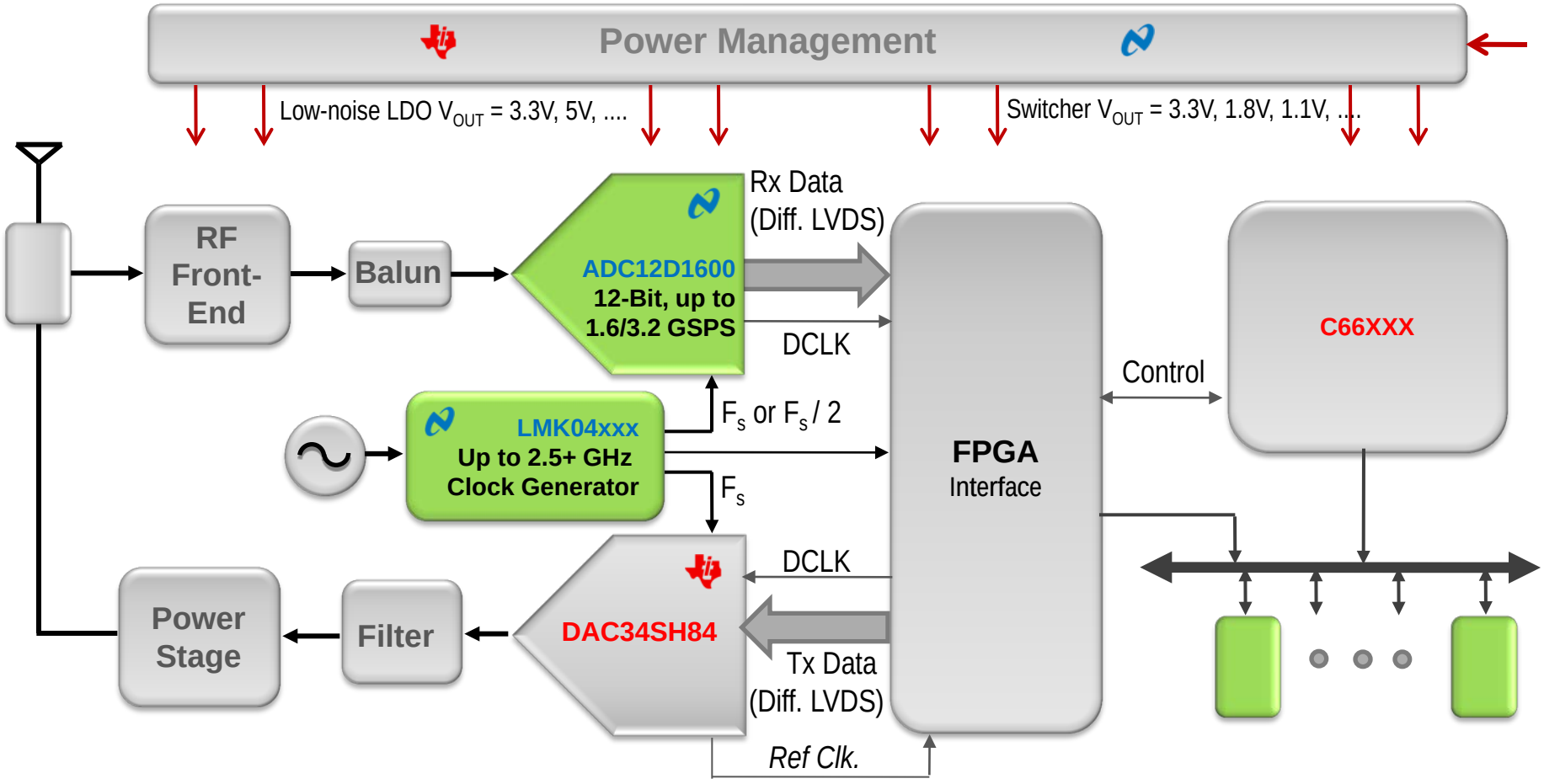
RADAR For High IF sampling



High IF Sampling ADC's for Radar

Product	Resolution	Speed	Multichannel	Power	SFDR	SNR
ADC12D1800/1600/1000/800/500RF	12B	3.6/3.2/2.0/1.6/1.0 GSPS	2	4.4/4.0/3.5/2.5/2.0W	68/68/71/73/74 dB	58.6/59/60.1/60.2/60.4 dB
ADC12D2000RF	12B	-	2	4.4W	68dB	56.5dBFS
ADS5400	12B	1.0 GSPS	1	2.2W	75dBc @ 250MHz	59.1dB @ 250MHz
ADS5402	12B	800MSPS	2	1W/Ch	80dBc @450 MHz	63dBFS @ 450MHz
ADC16DV160	16B	160MSPS	2	650mW/Ch	89dbFS @ 197MHz	76dBFS @197MHz

Summary

- For phase array radars, baseband sampling with two mixing stages is common.
- If power is not a major concern and the number of channels is relatively low a high IF sampling would eliminate one mixing stage and increase performance.
- TI has a broad ADC portfolio to cover both sampling approaches
- To learn more about the ADS5295 please visit www.ti.com/product/ADS5295
- To learn more about the ADC12D1600 please visit www.ti.com/product/ADC12D1600