1-VIA
Enabling Next Generation Connectivity

IP Datasheet
20GSa/s 12-Bit RF-ADC IP

20GSa/s 12-Bit Analogue-to-Digital Converter (ADC)

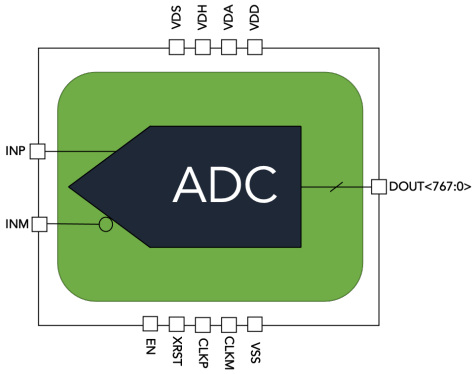
Description

1-VIA's high-speed low-power RF-ADC is targeted at upcoming telecommunication markets such as 5G and Satellite Communications. The RF-ADC has an effective 3dB bandwidth > 9GHz and 10 Effective Number of Bits (ENOB), making it an ideal candidate for FR1 (sub-6 GHz) and FR2 (mmWave 6-100 GHz) 5G deployment scenarios.

The ADC is a standalone macro which employs calibration of time interleaving skew, linearity and offset both at start-up and continuously in the background.

Key Features

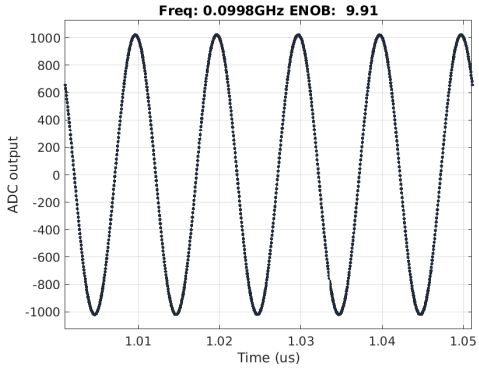
- TSMC: 12/16nm CMOS FinFET
- Resolution: 12-bit
- Sampling rate: 20GSa/s
- Power supplies: 1.8V, 1.2V, 1V and 0.8V
- Power consumption: 800mW
- Differential analog input: $1V_{ppd}$
- 3dB Input bandwidth: > 9GHz
- DNL: ± 0.5 LSB
- INL: ± 0.5 LSB
- SNDR: 61.5dBc
- Background time interleaving skew, linearity
  and offset calibration

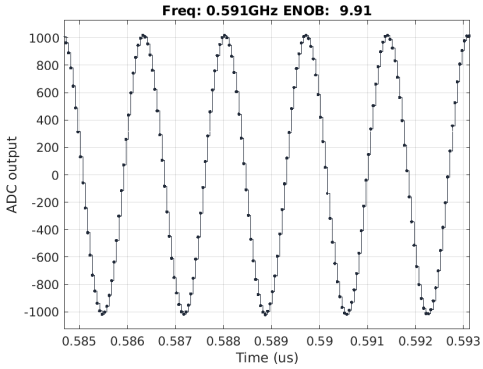


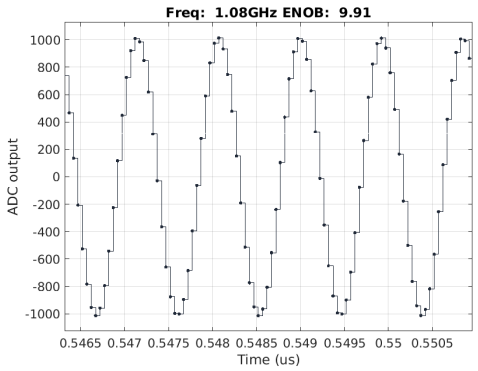
Applications

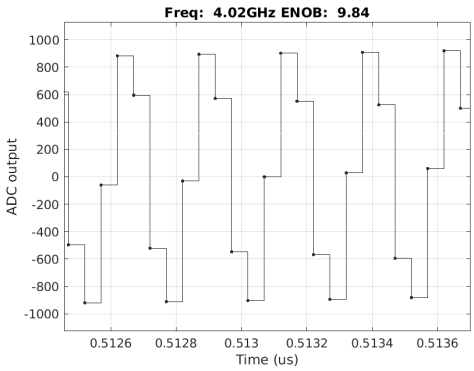
- 5G Base stations
- Automotive Driver Assistance Systems (ADAS)
- Direct-RF
- Multi-carrier and Multi-standard wireless infrastructure
- Satellite communications
- Test equipment

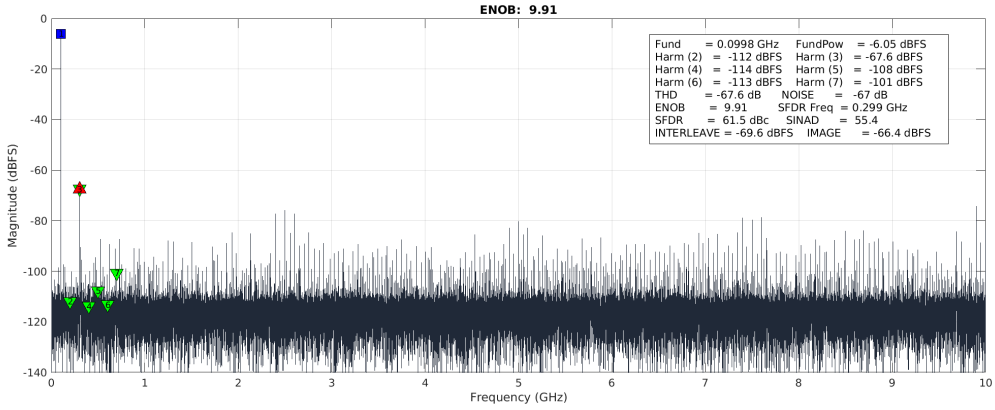
Performance Results

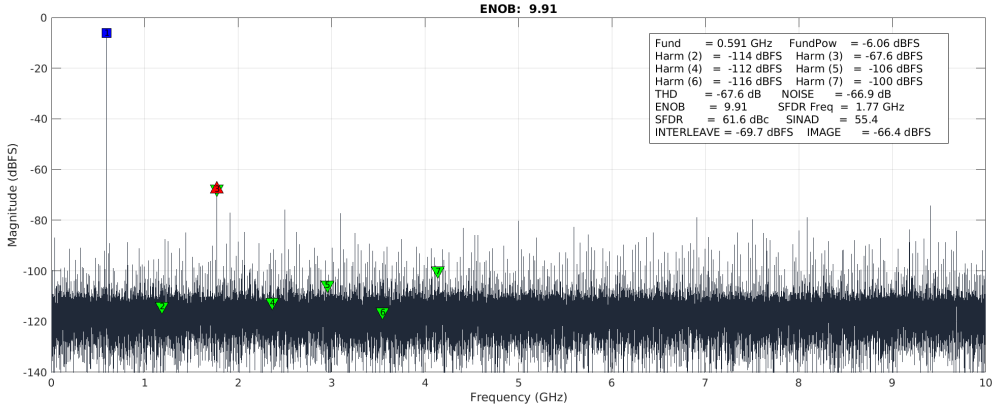


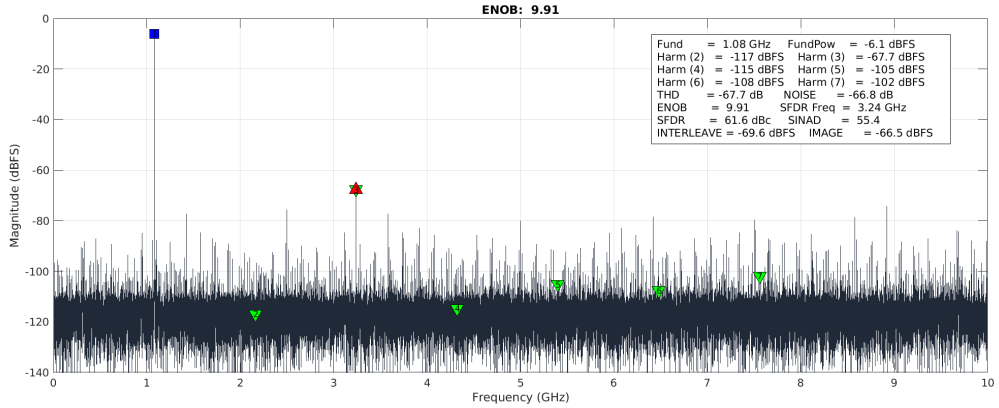


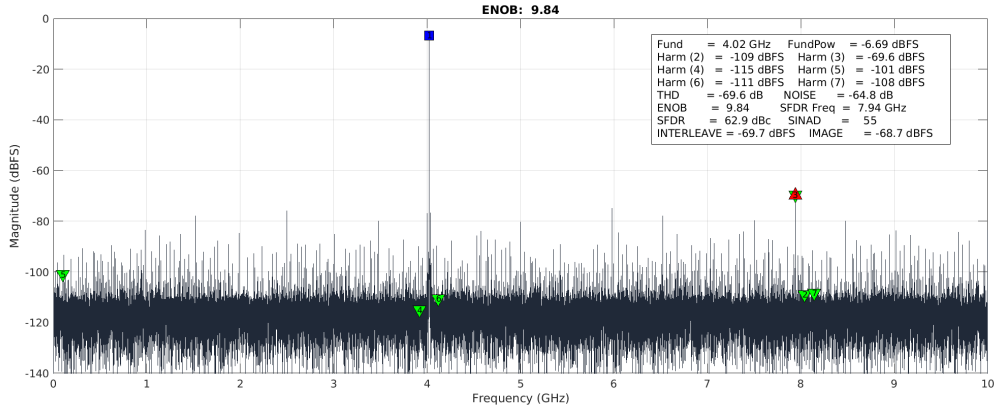


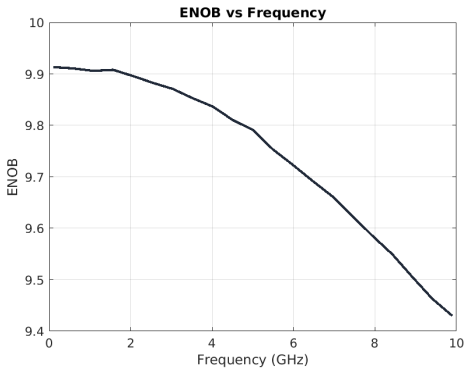


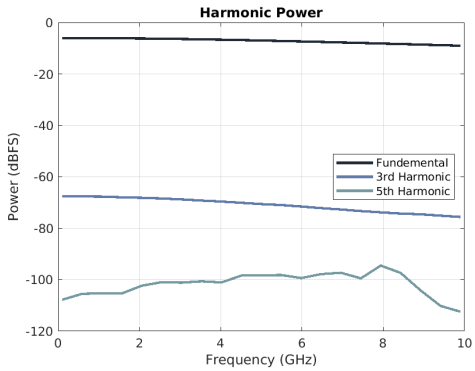


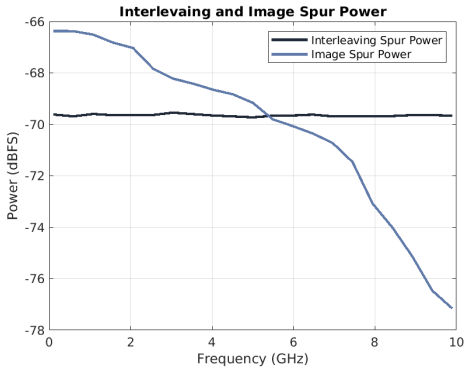


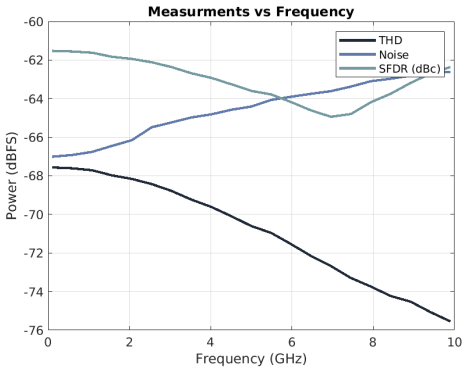

ENOB: 9.91
Fund = 1.08 GHz FundPow = -6.1 dBFS
Harm (2) = -117 dBFS Harm (3) = -67.7 dBFS
Harm (4) = -115 dBFS Harm (5) = -105 dBFS
Harm (6) = -108 dBFS Harm (7) = -102 dBFS
THD = -67.7 dB NOISE = -66.8 dB
ENOB = 9.91 SFDR Freq = 3.24 GHz
SFDR = 61.6 dBc SINAD = 55.4
INTERLEAVE = -69.6 dBFS IMAGE = -66.5 dBFS
Magnitude (dBFS)
Frequency (GHz)


ENOB: 9.84
Fund = 4.02 GHz FundPow = -6.69 dBFS
Harm (2) = -109 dBFS Harm (3) = -69.6 dBFS
Harm (4) = -115 dBFS Harm (5) = -101 dBFS
Harm (6) = -111 dBFS Harm (7) = -108 dBFS
THD = -69.6 dB NOISE = -64.8 dB
ENOB = 9.84 SFDR Freq = 7.94 GHz
SFDR = 62.9 dBc SINAD = 55
INTERLEAVE = -69.7 dBFS IMAGE = -68.7 dBFS
Magnitude (dBFS)
Frequency (GHz)


ENOB vs Frequency
ENOB
Frequency (GHz)


Harmonic Power
Fundemental
3rd Harmonic
5th Harmonic
Power (dBFS)
Frequency (GHz)


Interlevaing and Image Spur Power
Interleaving Spur Power
Image Spur Power
Power (dBFS)
Frequency (GHz)


Measurments vs Frequency
THD
Noise
SFDR (dBc)
Power (dBFS)
Frequency (GHz)

IP Deliverables

- Datasheet
- Characterization report
- Layout view (GDSII)
- Abstract view (LEF)
- Timing View (LIB)
- Behavioural model (Verilog)
- Integration guidelines and support

Above deliverables are subject to agreement.

Disclaimer

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About 1-VIA

At 1-VIA we are continuously developing state-of-the-art, high-speed and low-power transceivers targeting next-generation satellite, data centre, telecommunications and automotive markets. With some of the industry's most skilled and experienced analog/mixed-signal IC designers onboard we have a combined experience of more than 100 years in cutting-edge silicon design of high-speed ADC, DAC and SerDes.

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