

Hittite Microwave

Use of HMCAD1520 Precision Mode  
from 15 to 65 MSPS

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Part Number	Function / Mode	Resolution (bits)	Sample Rate (MSPS)	Power Dissipation <sup>[2][3]</sup>	SNR (dBFS)	SFDR (dBc)	Package
HMCAD1520	High Speed Single Channel	12	640	490 mW	70	60 / 75 [1]	LP7DE
	High Speed Dual Channel	12	320	490 mW	70	60 / 78 [1]	
	High Speed Quad Channel	12	160	490 mW	70	60 / 78 [1]	
	Precision Quad Channel	14	105	603 mW	74	83	
	Precision Quad Channel	14	80	530 mW	75	85	

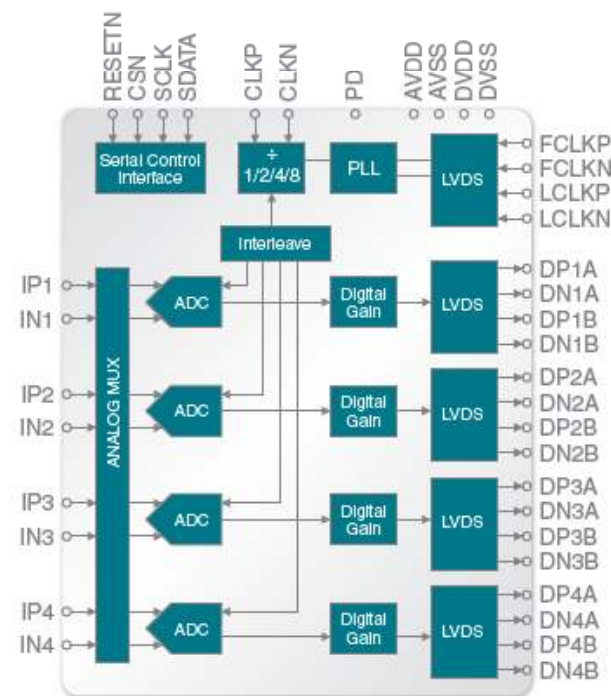
### Features

- ✓ *Multiple Modes*
  - ✓ *Single channel 12-bit up to 640 MSPS*
  - ✓ *Dual channel 12-bit up to 320 MSPS*
  - ✓ *Quad channel 12-bit up to 160 MSPS*
  - ✓ *Quad channel 14-bit up to 105 MSPS*
- ✓ *SPI Configurable Operational Modes*
- ✓ *SPI Configurable Number of Channels*
- ✓ *1µs Switching Time Between Configurations*
- ✓ *Internal 1X to 8X Clock Divider*
- ✓ *LVDS output*
  - ✓ *Full robustness in RSDS (Low Current) Mode*
- ✓ *Ultra Low Power Dissipation*
  - ✓ *Dynamic power vs. sample rate scaling*
- ✓ *Coarse & Fine Gain Control*
- ✓ *48 Pin QFN Package*

<sup>[1]</sup> Excluding Interleaving Spurs

<sup>[2]</sup> Supply Voltage (Vdd) +1.8 Vdc Analog Supply (Avdd) and +1.8Vdc Digital Supply (Dvdd)

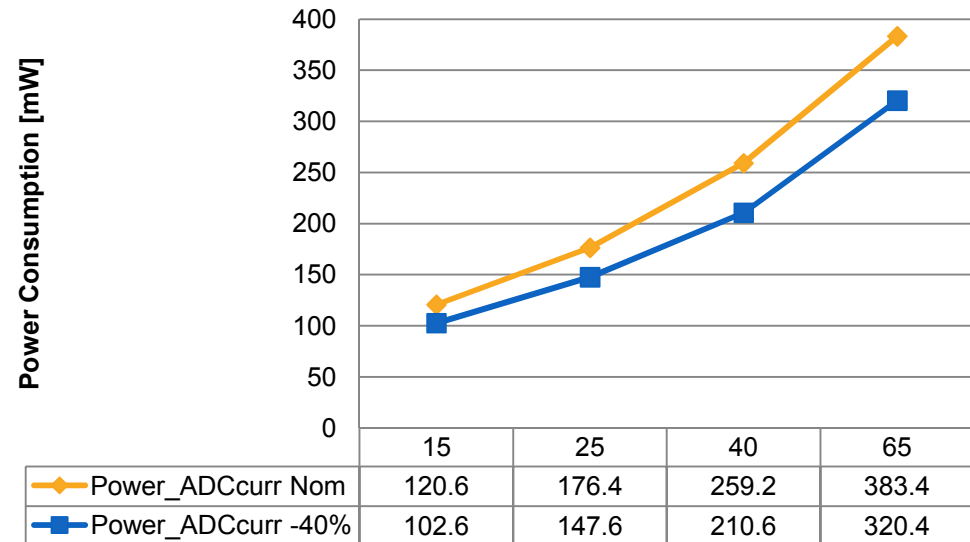
<sup>[3]</sup> Output Supply Voltage (OVdd) +1.7 to +3.6 Vdc



### Measurement setup

- ✓ Supply voltage: 1.8V
- ✓ Temperature: 25°C
- ✓ LVDS: 1.5mA RSDS Mode
- ✓ ADC\_curr register settings
  - ✓ Nominal
  - ✓ -40%
- ✓ Input signal: -1dBFS 8MHz sinewave

### Power consumption vs Sample Rate



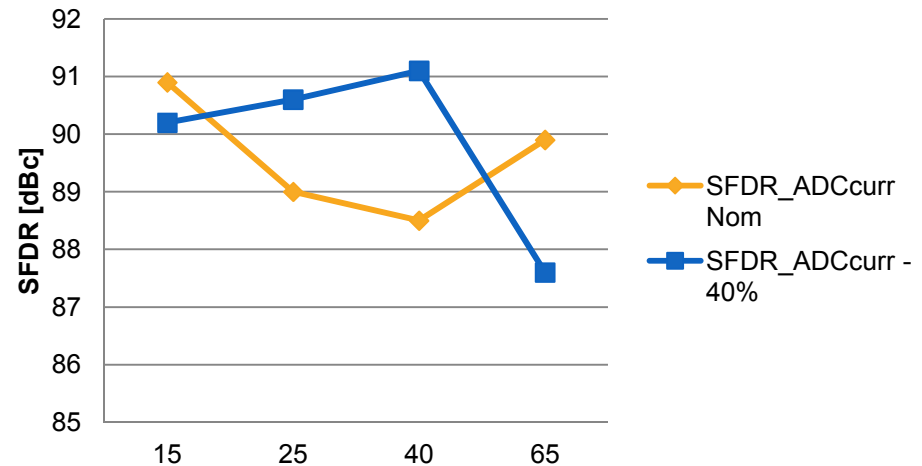
### Measurement conclusions

- ✓ When ADC\_curr register is set to *Nominal*, the HMCAD1520 total ADC power consumption scales from 121 mW to 383 mW when Sample rate is swept from 15 to 65 MSPS
- ✓ When ADC\_curr register is set to *-40%*, the HMCAD1520 total ADC power consumption scales from 103 mW to 320 mW when Sample rate is swept from 15 to 65 MSPS

### Measurement setup

- ✓ Supply voltage: 1.8V
- ✓ Temperature: 25°C
- ✓ LVDS: 1.5mA RSDS Mode
- ✓ ADC\_curr register settings
  - ✓ Nominal
  - ✓ -40%
- ✓ Input signal: -1dBFS 8MHz sinewave

### SFDR vs Sample Rate



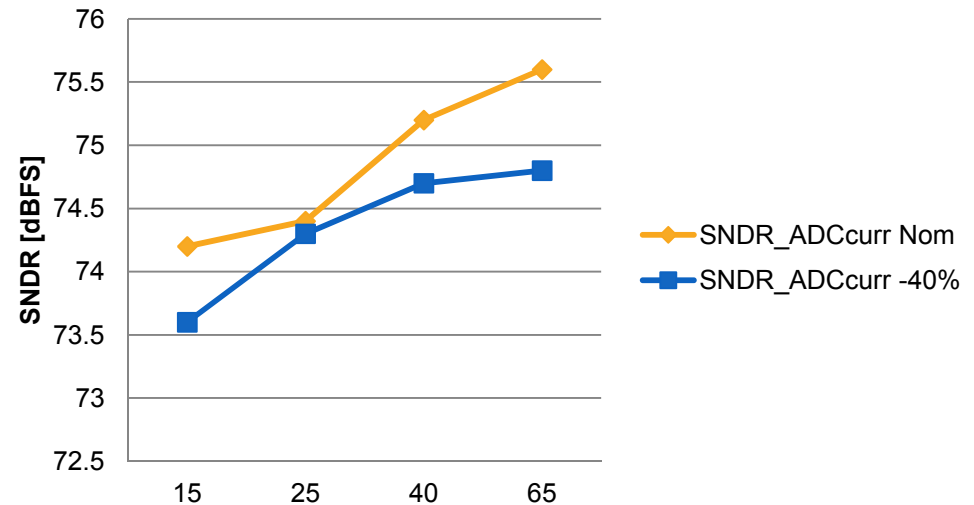
### Measurement conclusions

- ✓ When ADC\_curr register is set to *Nominal*, the HMCAD1520 SFDR stays between 88 and 91dBc with FS between 15 and 65MSPS
- ✓ When ADC\_curr register is set to *-40%*, the HMCAD1520 SFDR stays between 87 and 91dBc with FS between 15 and 65MSPS.

### Measurement setup

- ✓ Supply voltage: 1.8V
- ✓ Temperature: 25°C
- ✓ LVDS: 1.5mA RSDS Mode
- ✓ ADC\_curr register settings
  - ✓ Nominal
  - ✓ -40%
- ✓ Input signal: -1dBFS 8MHz sinewave

### SNDR vs Sample Rate



### Measurement conclusions

- ✓ When ADC\_curr register is set to *Nominal*, the HMCAD1520 SFDR stays between 74 and 75.6dBFS with FS between 15 and 65MSPS
- ✓ When ADC\_curr register is set to *-40%*, the HMCAD1520 SFDR stays between 73.5 and 74.7dBFS with FS between 15 and 65MSPS.

### **Operation HMCAD1520 Precision Mode between 15 and 65MSPS**

- ✓ *HMCAD1520 offers a linear power consumption scaling between 15 and 65MSPS*
- ✓ *Power consumption can be optimized by using the ADC\_curr SPI register*
- ✓ *SFDR and SFDR shows performance similar to industry best both for Nominal and reduced current setting*