

# DAC1005D650:

## Dual 10-bit DAC, Up to 650 Msps; 2x 4x and 8x Interpolating

### Product Feature Sheet

#### Features

- Dual 10-bit resolution
- IMD3: 79 dBc;  $f_s = 640$  Msps;  $f_o = 96$  MHz
- 650 Msps maximum update rate
- SFDR: 75 dBc;  $f_{data} = 80$  MHz;
- $f_s = 640$  Msps;  $f_o = 19$  MHz; PLL on
- Selectable 2x, 4x or 8x interpolation filters
- Typical 0.95 W power dissipation at 4x interpolation
- Input data rate up to 160 Msps
- Power-down and Sleep modes
- Very low noise cap-free integrated PLL
- Differential scalable output current from 1.6 mA to 20 mA
- 32-bit programmable NCO frequency
- On-chip 1.29 V reference
- Dual-port or Interleaved data modes
- External analog offset control (10-bit auxiliary DACs)
- 1.8 V and 3.3 V power supplies
- Internal digital offset control
- LVDS compatible clock
- Inverse (sin x) / x function
- Two's complement or binary offset data format
- Fully compatible SPI port
- 3.3 V CMOS input buffers
- Industrial temperature range from -40 °C to +85 °C

#### Typical Applications

- Wireless infrastructure: LTE, WiMAX, GSM, CDMA, WCDMA, TD-SCDMA
- Communication: LMDS/MMDS, point-to-point
- Direct Digital Synthesis (DDS)
- Broadband wireless systems
- Digital radio links
- Instrumentation
- Automated Test Equipment (ATE)

#### Device Overview

The DAC1005D650 is a high-speed 10-bit dual-channel Digital-to-Analog Converter (DAC) with selectable 2x, 4x or 8x interpolating filters optimized for multi-carrier wireless transmitters.

Thanks to its digital on-chip modulation, the DAC1005D650 allows the complex I and Q inputs to be converted up from BaseBand (BB) to IF. The mixing frequency is adjusted using a Serial Peripheral Interface (SPI) with a 32-bit Numerically Controlled Oscillator (NCO). The phase is controlled by a 16-bit register.

Two modes of operation are available: separate data ports or a single interleaved high-speed data port. In the Interleaved mode, the input data stream is demultiplexed into its original I and Q data and then latched.

The DAC1005D650 also includes a 2x, 4x and 8x clock multiplier which provides the appropriate internal clocks and an internal regulator to adjust the output full-scale current.

#### Absolute Maximum Ratings:

Input/Output Supply Voltage (3.3 V)	-0.5 V to +4.6 V
Analog Supply Voltage (3.3 V)	-0.5 V to +4.6 V
Analog Supply Voltage (1.8 V)	-0.5 V to +3.0 V
Digital Supply Voltage (1.8 V)	-0.5 V to +3.0 V
Input Voltage (pins CLKP, CLKN, VIRES and GAPOUT referenced to AGND)	-0.5 V to +3.0 V
Input Voltage (pins I9 to I0, Q9 to Q0, SDO, SDIO, SCLK, SCS_N and RESET_N referenced to GNDIO)	-0.5 V to +4.6 V
Output Voltage (pins IOUTAP, IOUTAN, IOUTBP, IOUTBN, AUXAP, AUXAN, AUXBP AND AUXBN referenced to AGND)	-0.5 V to +4.6 V
Storage Temperature	-55 °C to +150 °C
Ambient Temperature	-45 °C to +85 °C
Junction Temperature	125 °C

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## Block Diagram

