NXP dual-channel 10, 12, 14 bits, up to 750 Msps D/A converter DAC1408D series

JESD204A-compliant D/A conversion for wideband communication & instrumentation

Optimized for high-speed applications, such as 2.5/3/4G wireless, video broadcast, and instrumentation, this advanced DAC has selectable interpolating filters and a four-lane CGV™ serial interface, and complies with the new JEDEC JESD204A.

Key features

- Dual-channel, 10, 12, 14 bit resolution
- 650 and 750 Msps maximum output rate
- Four-lane JEDEC JESD204A serial digital input
- 32 bit programmable NCO frequency synthesizer with low-power option
- SPI control/status interface
- HVQFN64 package
- MDS (Multi-DAC Synchronisation)
- Interpolation filters: 2x, 4x, 8x

Applications

- Wireless infrastructure: Multicarrier GSM, EDGE, CDMA, WCDMA, TD-SCDMA, WiMAX, LTE
- Multipoint communication infrastructure: LMDS/MMDS
- Broadband wireless systems
- Digital radio links
- High-speed instrumentation
- Automated Test Equipment (ATE)
- Video broadcast equipment

The NXP DAC1408D series, 14 bit digital-to-analog converters with two channels, are equipped with interpolation filters selectable as 2x, 4x, or 8x. It is a high-speed solution optimized for a variety of advanced applications, including single- and multi-carrier wireless infrastructure transmitter signals.
It is available in three resolutions, 10, 12 and 14-bit and supports maximum output sample rates up to 650 and 750 Msps

It uses fully configurable digital on-chip modulation to manage I and Q inputs, up-converting them from baseband to IF. The mixing frequency is adjusted, via an SPI (Serial Peripheral Interface) interface with a 32 bit NCO (Numerically Controlled Oscillator). The phase is controlled by a 16 bit register. Integrated IQ phase compensation, IQ gain matching and DC offset correction features ease DAC to Analog Quadrature Modulator interconnection.

Supporting input data rates up to 312.5 Msps as well as polarity and lane swapping, the DAC1408D series has fourlane CGV™ receivers.

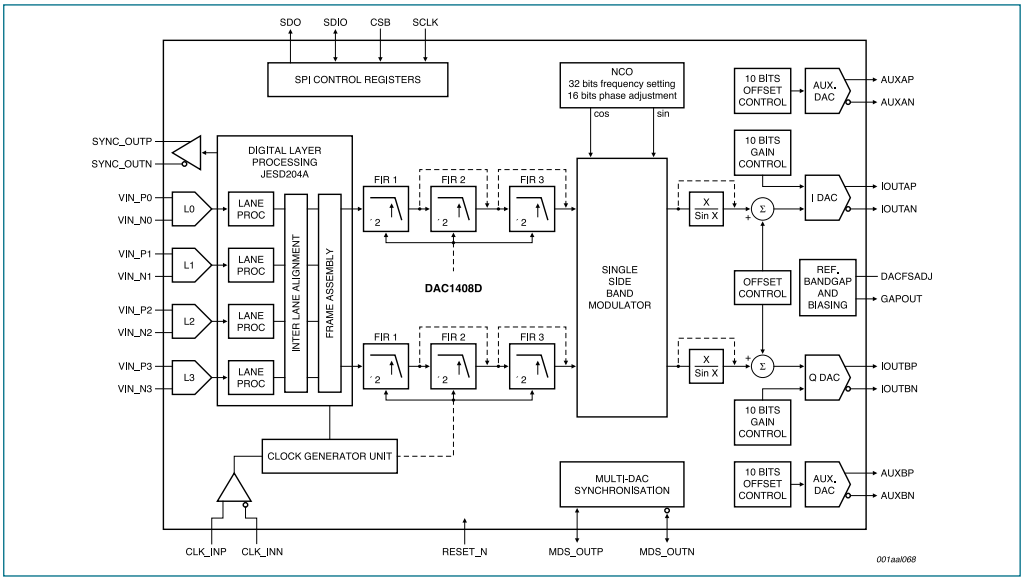
CGV™ (Convertisseur Grande Vitesse) designates NXP's compliant, superset implementation of the JEDEC JESD204A

interface standard, with enhanced rate (4.0 Gbps typical), enhanced reach (100 cm typical), enhanced features (multiple DAC synchronization) and assured FPGA interoperability. Specifically, NXP offers enhancements in terms of transceiver rate (up to 4.0 Gbps versus the standard rate of 3.125 Gbps, a 28% increase) and transmitter reach (up to 100 cm versus the standard reach of 20 cm, a 400% increase). The enhanced CGV features include Multi Device Synchronization (MDS), which is not specified, but informatively discussed in the JEDEC specification. NXP has implemented this optional feature to enable LTE MIMO base station and other advanced multichannel applications. NXP's implementation of MDS enables several DACs data streams to be sample synchronized and phase coherent.

This new interface has numerous advantages over the traditional parallel one: easy PCB layout, lower pin count, reduced PCB layers and cost, lower radiated noise, self-synchronous link, skew compensation.
Other features include a two's complement or binary-offset data format, and 76 dBc IMD3 at F_{DAC} = 640 Msps and F_{OUT} = 140 MHz. DAC1408D series also include an LVDS compatible clock with multiplier capable of x2, x4 and x8 operation and internal regulation to adjust the output full scale current up to 20 mA.

A digital offset correction can be used to adjust the common mode level at the DAC output. And 2 embedded auxiliary DACs -current mode sources allow offset compensation between the DAC and the next stage in your transmission path.

DAC1408D750 block diagram



Example of reference design with DAC1408D750 and FPGA

DAC1408D750 demonstration board, for easy connection to Altera, Xilinx or Lattice evaluation kit

DAC1x08D selection table

Family	Type	Description	LVCMOS	CGV™	Supply voltage (V)	Power Dissipation per channel (mW)	SFDR (dBc)	Interpolation	Package
DAC1408D series	DAC1408D750	Dual 14-bit DAC 750 Msps		•	1.8 / 3.3	700	77	2x, 4x, 8x	HVQFN64 9x9
DAC1208D series	DAC1208D750	Dual 12-bit DAC 750 Msps		•	1.8 / 3.3	700	77	2x, 4x, 8x	HVQFN64 9x9
DAC1008D series	DAC1008D750	Dual 10-bit DAC 750 Msps		•	1.8 / 3.3	700	77	2x, 4x, 8x	HVQFN64 9x9

650Msps maximum output rate is also available for DAC1408D, DAC1208D and DAC1008D

Type	Related demoboard	Description
DAC1408D series	DAC1408D650W0/DB	DAC1408D650 demo board
	DAC1408D650W1/DB	DAC1408D650 demo board with Virtex 5 FPGA
	DAC1408D750W0/DB	DAC1408D750 demo board
	DAC1408D750W1/DB	DAC1408D750 demo board with Virtex 5 FPGA

Demo boards are also available for all resolutions (10, 12 and 14-bit) and all speeds (650 and 750 Msps)

www.nxp.com/dataconverters

Date of release: August 2010
Document order number: 9397 750 16888
Printed in the Netherlands