

# CBTL06GP212

High performance DisplayPort switch with high common-mode voltage support

Rev. 1 — 2 May 2012

Product brief

## 1. General description

The CBTL06GP212 is a six-channel ('hex') multiplexer for DisplayPort and PCI Express applications at Generation 2 ('Gen2') speeds. It provides four differential channels capable of 1 : 2 switching or 2 : 1 multiplexing (bidirectional and AC-coupled) PCI Express or DisplayPort signals, using high-bandwidth pass-gate technology. It provides support for high common-mode/bias voltage on the high speed differential channels. Additionally, it provides for switching/multiplexing of the Hot Plug Detect signal as well as the AUX or DDC (Direct Display Control) signals, for a total of six channels on the display side. The AUX and DDC channels provide a four-position multiplexer such that an additional level of multiplexing can be accomplished when AUX and DDC I/Os are on separate pins of the display source device.

The CBTL06GP212 is designed for Gen2 speeds, at 5.0 Gbit/s for PCI Express or 5.4 Gbit/s for DisplayPort. It consumes 2 mA current (typical) in operational mode and provides a shutdown function to support battery-powered applications.

A typical application of CBTL06GP212 is on motherboards where one of two GPU display sources needs to be selected to connect to a display sink device or connector. A controller chip selects which path to use by setting a select signal HIGH or LOW. Due to the non-directional nature of the signal paths (which use high-bandwidth pass gate technology), the CBTL06GP212 can also be used in the reverse topology, e.g., to connect one display source device to one of two display sink devices or connectors.

## 2. Features

- 1 : 2 switching or 2 : 1 multiplexing of DisplayPort (v1.2 - 5.4 Gbit/s) or PCI Express (v2.0 - 5.0 Gbit/s) signals
  - ◆ 4 high-speed differential channels with 2 : 1 muxing/switching for DisplayPort or PCI Express signals
  - ◆ 1 channel with 4 : 1 muxing/switching for AUX at 1 Mbit/s or DDC signals
  - ◆ 1 channel with 2 : 1 muxing/switching for single-ended HPD signal
- High-bandwidth analog pass-gate technology
- Supports a wide range of common-mode/bias voltage on high speed differential channels
- Supports high-speed signal switching over a wide common-mode range and differential swing
- $R_{ON}$  on DP high-speed channels: 6  $\Omega$
- Low insertion loss:
  - ◆ -0.5 dB at 100 MHz
  - ◆ -1.5 dB at 1.35 GHz
  - ◆ -2.5 dB at 2.7 GHz
- Low crosstalk: -35 dB at 2.7 GHz
- Low off-state isolation: -30 dB at 2.7 GHz
- Low return loss: -8 dB at 2.7 GHz
- Very low intra-pair skew (5 ps typical)
- Very low inter-pair skew (< 80 ps)
- 3 dB bandwidth at 5 GHz
- Switch/multiplexer position select CMOS input
- Shutdown mode CMOS input
- Supports backdrive protection
- Single 3.3 V power supply

- Operation current of 2 mA typical, shut-down current 10 µA maximum
- ESD 2 kV HBM, 500 V CDM
- Available in 5 mm × 5 mm, 0.5 mm ball pitch TFBGA48 package

### 3. Applications

- Motherboard applications requiring DisplayPort and PCI Express switching/multiplexing
- Docking stations
- Notebook computers
- Chip sets requiring flexible allocation of PCI Express or DisplayPort I/O pins to board connectors

### 4. Ordering information

Table 1. Ordering information

Type number	Solder process	Package		Version
		Name	Description	
CBTL06GP212EE/G	Pb-free (SnAgCu solder compound)	TFBGA48	plastic thin fine-pitch ball grid array package; 48 balls; body 5 × 5 × 0.8 mm <sup>[1]</sup>	SOT918-1

[1] Total height including solder balls after printed circuit board mounting = 1.15 mm.

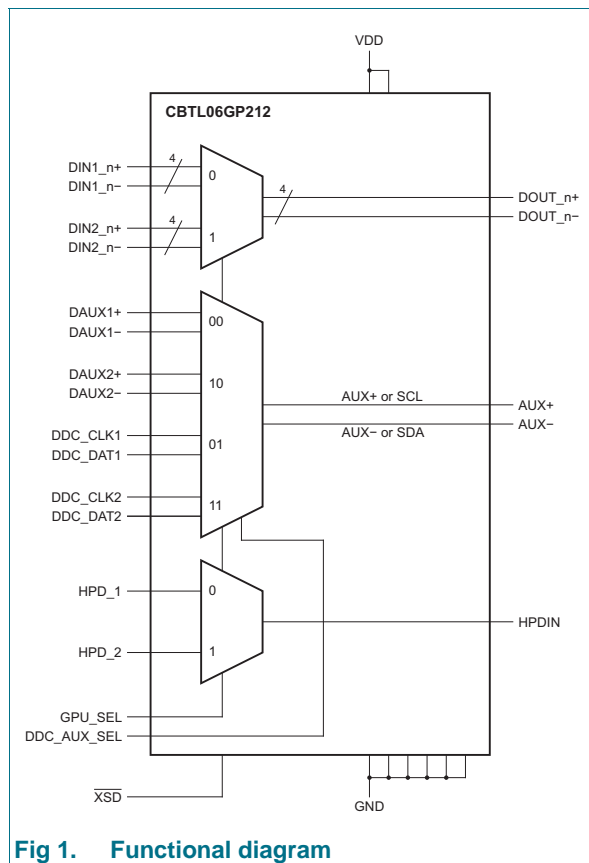


Fig 1. Functional diagram

© NXP B.V. 2012.

All rights reserved.

For more information, please visit: <http://www.nxp.com>  
 For sales office addresses, please send an email to: [salesaddresses@nxp.com](mailto:salesaddresses@nxp.com)

Date of release: 2 May 2012  
 Document identifier: CBTL06GP212