2Gbps Octal Integrated DCL with PPMU, VHH Drive and Receive, Level Setting DACs, and Calibration Registers

FEATURES

- 1.0GHz/2.0Gbps data rate for 1.0V programmed swing
- 650MHz/1.3Gbps data rate for 2.0V programmed swing
- 590mW power dissipation per channel (high-voltage driver and NWC enabled)
- Driver
  - 3-level driver with high-z and reflection clamps
  - Voltage range: –1.5V to +6.5V
  - Precision trimmed output resistance: 50Ω
  - Unterminated swing: 50mV minimum to 8.0V maximum
  - 2.0Gbps max toggle rate at 1.0V programmed swing
  - 3.0ps random jitter
- Comparator
  - Normal window (NWC) and differential mode (DMC)
  - Voltage range: −1.5V to +6.5V
  - 460ps minimum detectable pulse width
  - <220ps ERT/EFT 1.0V, terminated
- Deskew per channel
  - Deskew range: 1.0ns
  - Deskew resolution: 1.5ps
  - Pulse-width adjust range: ±120ps
  - Pulse-width adjust resolution: 2.0ps
- Active load: ±12mA current range
- Per pin PMU (PPMU)
  - Force voltage/compliance range: −1.5V to +6.5V
  - Five ranges: ±60mA, ±1mA, ±100µA, ±10µA, ±2µA
  - Up to 8-channel ganging for 480mA
  - Dedicated go and/or no-go comparators
- VHH driver and comparator (two VHH DUT channels): 15V drive and receive
- DC levels
  - Fully integrated and dedicated 16-bit and 12-bit DACs
  - On-chip gain and offset calibration registers with automatic multiply/add function
- Includes on-chip temperature sensors, OVD, and alarms
- Package: 15mm × 15mm, 324-ball chip scale package ball grid array (BGA)

APPLICATIONS

- Automatic test equipment (ATE)
- Semiconductor/board test systems
- Instrumentation and characterization equipment

GENERAL DESCRIPTION

The ADATE328 is a complete 8-channel ATE solution that performs the pin electronics functions of driver, comparator, and active load (DCL), and four-quadrant per pin parametric measurement unit (PPMU). Dedicated 16-bit and 12-bit digital-to-analog converters (DACs) with on-chip calibration registers provide all necessary DC levels for operation of the part.

The driver features three active states: high, low, and termination mode, as well as a high-impedance inhibit state. The inhibit state, in conjunction with the integrated dynamic clamps, facilitates significant attenuation of transmission line reflections when the driver is not actively terminating the line. The open circuit drive capability is −1.5V to +6.5V to accommodate a wide range of ATE and instrumentation applications.

The ADATE328 can be used as octal single-ended pin electronics channels or as quad differential channels. In addition to per-channel high speed window comparators, the ADATE328 provides a programmable threshold differential comparator for differential ATE applications.

Each ADATE328 also contains two VHH drivers and window comparators, both of which can operate up to +15V at lower speeds. The VHH functions use separate I/O pins but share DACs and controls with Channel 0 and Channel 4, making normal and VHH-mode operation on those channels mutually exclusive.

DC levels for all DCL, PPMU, and VHH functions are generated by dedicated on-chip 16-bit and 12-bit DACs. The ADATE328 includes an integrated calibration function to correct gain and offset errors of each functional block. Calibration coefficients can be stored on chip, with values written to the DACs automatically adjusted using the appropriate correction factors. This feature can be disabled if desired.

Functionally, the ADATE328 is divided into two 4-channel banks sharing a set of common power supplies. Each bank has its own serial programmable interface (SPI) bus to program all functions. Each bank also has an on-chip temperature sensor and over-/undervoltage alarms for monitoring and reporting the device temperature and any output pin or transient PPMU voltage faults that may occur during operation.

For more information on the ADATE328, contact ADATE328@analog.com.

One Analog Way, Wilmington, MA 01887-2356, U.S.A. | Tel: 781.935.5565 |
©2026 Analog Devices, Inc. All rights reserved.

NOTES

Legal Terms and Conditions
Analog Devices, Inc. (“ADI”) believes the information in this data sheet is accurate and reliable as of its date of publication and provides it “as is” without any representation or warranty of any kind. ADI reserves the right to make changes, corrections, modifications, enhancements, improvements, and other updates to the information described in this data sheet, with use of the product subject to ADI’s Terms and Conditions of Sale, available on Analog.com. ANALOG DEVICES word mark and logo, AD, and ADI are registered trademarks and trademarks owned by ADI. This data sheet, trademarks, and its content are owned by ADI and may not be reproduced, distributed, or used except with ADI’s prior written authorization. TO THE MAXIMUM EXTENT PERMITTED BY LAW, IN NO EVENT SHALL ADI BE LIABLE FOR ANY DAMAGES WHATSOEVER, WHETHER DIRECT OR INDIRECT, ARISING OUT OF OR IN CONNECTION WITH THE USE OF, INABILITY TO USE, OR RELIANCE UPON THIS DATA SHEET OR THE INFORMATION CONTAINED HEREIN.