5Gbps Octal Integrated DCL with PPMU, VHH Drive and Receive, Level Setting DACs, and Calibration Registers

FEATURES

- 2.5GHz/5Gbps data rate
- DCL disable mode (typically < 5nA)
- Integrated 16-bit and 12-bit DACs with offset and gain correction
- <1.75W power dissipation per channel (high-voltage driver and NWC enabled)
- High-voltage 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
  - 333ps min pulse width, 0.2V to 2.0V programmed swing
  - 25ps deterministic jitter, 2ps random jitter
- Low-voltage driver
  - Multilevel voltage range: −1.5V to +6.5V
  - Terminated swings: 25mV p-p to 1V p-p into 50Ω
  - 200ps minimum pulse width, 0.1V to 2.0V programmed swing
  - 20ps deterministic jitter, 1ps random jitter
- Comparator
  - Normal window (NWC) and differential mode (DMC)
  - Voltage range: −1.5V to +6.5V
  - 250mV current mode logic (CML) outputs
  - <85ps ERT/EFT 1.0V, terminated
- Active load: ±12 mA current range
- Per pin PMU (PPMU)
  - Force voltage/compliance range: −1.5V to +6.5V
  - Five ranges: ±60mA, ±1mA, ±100µA, ±10µA, ±1µA
  - Up to 8-channel ganging for 480mA
  - Dedicated go and 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 and add function
- Includes on-chip temperature sensors, OVD, and temperature 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 ADATE338 is a complete 8-channel automatic test equipment (ATE) solution that performs the pin electronics functions of drivers, comparator, and active load (DCL), as well as a 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 device.

The high-voltage driver features three active states: high, low, and terminate 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 −1.5 V to +6.5 V to accommodate a wide range of ATE and instrumentation applications.

The low-voltage driver, working in conjunction with the high-voltage driver, provides 25mV p-p to 1V p-p signals at up to 5.0Gbps in a 50Ω environment.

The ADATE338 can be used as an octal single-ended pin electronics channel or as quad differential channels. In addition to per-channel high speed window comparators, the ADATE338 provides a programmable threshold differential comparator for differential ATE applications.

Each ADATE338 contains two VHH drivers and window comparators, both operating up to +15V at lower speeds. The VHH functions use separate input and output (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 ADATE338 includes an integrated calibration function to correct gain and offset errors of each functional block. Functionally, the ADATE338 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 ADATE338, contact ADATE338@analog.com.

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