OPEN Compute Project®

Community Led Hyperscale Open Innovation

OCP – ODSA Project

Commercialization Use Case

Blue Cheetah Analog Design

Bunch of Wires Interface Solutions

Elad Alon

Why ODSA at Blue Cheetah

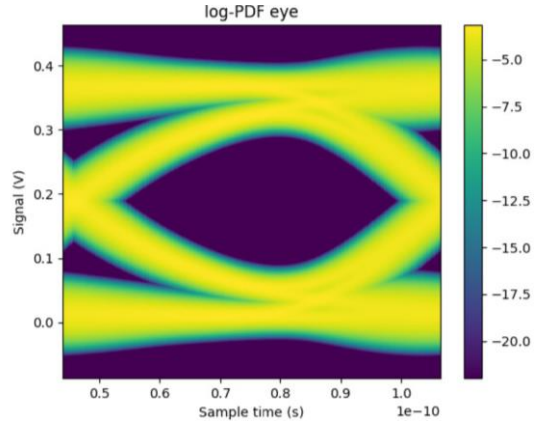
- We support chiplet die-to-die (D2D) solutions that foster the broadest possible use cases and applications
  - ODSA BoW is the first open standard that:
    - Supports organic laminate packages
    - Supports packaging-independent PHY definition
- Blue Cheetah (BCA) has been heavily involved in the development of the BoW PHY specification
    - BCA began participating in BoW PHY and test-chip meetings in early 2021
    - BCA is one of two companies providing test-chips to demonstrate BoW PHY interoperability
    - Technically leading the BoW PHY WG and heavily participating in the BoW link layer WG

	Unterminated	Source-Terminated	Doubly Terminated
TX DC Term.	As required to meet TX rise-time	**36 Ω - 50 Ω** (0.72 - 1.0 Z_{chan})	**36 Ω - 50 Ω** (0.72 - 1.0 Z_{chan})
RX DC Term.	-	-	**50 Ω - 69 Ω** (1.0 - 1.38 Z_{chan})
Within-Slice DC Term. Matching	-	**σ = 1.333%** (8% over 6 σ)	**σ = 0.667%** (4% over 6 σ)

Table 8. Transmit and Receive Termination Resistance Requirements vs. Mode

	BoW-256	BoW-128	BoW-128	BoW-64 or BoW-32	BoW-64 or BoW-32
	Any Termination	Doubly Terminated	Source- or Un-Terminated	Doubly Terminated	Source- or Un-Terminated
$V_{err,det,RX}$	40 mV	40 mV	100 mV	65 mV	150 mV
$V_{err,tot,RX}$	75 mV	75 mV	150 mV	100 mV	200 mV
$t_{err,det,RX}$	32% T_{bit}	32% T_{bit}	32% T_{bit}	28% T_{bit}	28% T_{bit}
$t_{err,tot,RX}$	40.5% T_{bit}	40.5% T_{bit}	40.5% T_{bit}	36.5% T_{bit}	36.5% T_{bit}

Table 12. Receiver Voltage and Timing Requirements for BoW-256



ODSA Use Case at Blue Cheetah

- Blue Cheetah is offering a family of BoW-based D2D solutions:
  - Organic laminate or advanced packaging, 55µm to 130µm bump pitch
  - 0.3 - 0.5pJ/bit, 2 - 16Gb/s/line, <1e-20 raw error rate, <2ns latency, up to 25mm reach
  - Low latency link layer / controller supports die disaggregation of AMBA buses

- Silicon tapeouts in progress
  - 12nm test-chip with 0.5Tb/s/mm / 9 Tb/s/mm^2 bandwidth density on 4-2-4 organic laminate package
    - Will be used in ODSA interop package test vehicle
  - 5nm PHYs embedded into multiple customer chiplets

What is Next for ODSA at Blue Cheetah

- Complete BoW link layer specification targeted for summer 2022
- BCA will tapeout BoW PHYs in 3 more advanced FinFET process technologies by end of Q1 2023
- BCA will continue to provide technical leadership on future versions of BoW spec to support higher data rates, power management, compliance testing, variable slice widths, …

Questions