Virtex UltraScale+ 58G PAM4 FPGA

- Fastest transceiver in a programmable device
- Enables scalable adoption of emerging optics and protocols
- Doubles performance on legacy equipment

OVERVIEW

The Virtex® UltraScale+™ 58G PAM4 FPGA implements the latest 50G/100G/200G/400G optics and protocols with superior port density and performance-per-watt while minimizing system-level cost. It enables new and existing platforms to meet ever increasing demand for bandwidth.

Integrated 58G PAM4 transceiver technology provides flexible connectivity to backplanes, optical modules, and chip-to-chip interfaces. Further integration of KP4-FEC for 50 to 400G Ethernet, 100G Ethernet with KR4-FEC, 150G Interlaken, and up to 500Mb of on-chip RAM enables footprint and BOM cost reductions.

Users can double transmission rates on legacy 25G backplanes and extend ASIC lifetimes by using Virtex UltraScale+ 58G PAM4 FPGAs to bridge to the latest optics modules such as QSFP-DD. Logic and I/O resources are adaptable to evolving optics form factors and standards, enabling you to future-proof your system.

HIGHLIGHTS

Increased System Performance
- 48 transceivers running up to 58Gb/s PAM4 for multi-terabit systems
- 32 transceivers operating at 32.75Gb/s for 25G interoperability
- 38 TOPs (22 TeraMACs) DSP compute performance
- 2,666Mb/s DDR4 in the mid speed grade

Adaptable System Integration
- Integrated 100G Ethernet MAC with KR4-FEC and 150G Interlaken cores
- Integrated blocks for PCI Express® Gen3 x16
- Up to 3.8M system logic cells
- Up to 500Mb of total on-chip integrated memory

BOM Cost Reduction
- Eliminates discrete ICs for Ethernet, gearboxes, memory, and PCIe
- VCXO and fractional PLL integration reduces clocking component cost

Total Power Reduction
- Up to 50% lower system power vs. a 28G discrete gearbox solution
- Voltage scaling options for performance and power
- Tighter CLB packing reduces dynamic power

TARGET APPLICATIONS

- Transport and Metro Networks
- Routers and Switches
- Network Test Equipment
- Military Communications
- Network Security/Firewalls
Product Brief

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FEATURES

16nm low power FinFET+ process technology from TSMC

- Industry-leading process from the #1 service foundry delivers a step function increase in performance-per-watt
- The same scalable architecture and tools as Virtex UltraScale™ FPGAs

Massive I/O bandwidth and dramatic latency reduction

- 28G and 58G backplane support
- 32.75G and 58G chip-to-chip and chip-to-optics support
- High-density I/O for smaller area and greater power efficiency per pin

Integrated 100G Ethernet MAC and 150G Interlaken Cores

- Saves 60K~100K system logic cells per port
- Up to 90% dynamic power savings vs. soft implementation
- KR4-FEC (Ethernet MAC) for optics error correction
- KP4-FEC for PAM4 optics and backplanes

Integrated blocks for PCI Express® with cache coherent CCIX ports

- Complete end-to-end solution for multi-100G ports
- Gen3 x16 for 100G bandwidth per block
- Expanded virtualization for data center applications
- Cache coherent acceleration using CCIX ports

UltraRAM for deep memory buffering

- Up to 360Mb on-chip UltraRAM for SRAM device integration
- 8X capacity-per-block vs. traditional embedded memory
- Deep-sleep power modes

Enhanced DSP slices for diverse applications

- Up to 22 TeraMACs (38 TOPs) of DSP compute bandwidth
- Double-precision floating point using 30% fewer resources
- Complex fixed-point arithmetic in half the resources

Massive memory interface bandwidth

- DDR4 support of up to 2,666Mb/s
- Support for server-class DIMMs (8X capacity vs. Virtex-7 FPGAs)
- Support for DDR3, DDR3L, QDR-IV, and LPDDR3 memory types

UltraScale enhanced clocking and routing

- Lower skew, faster performing clock networks
- Up to one speed grade advantage vs. comparable solutions
- Efficient CLB use and placement for reduced interconnect delay

TAKE THE NEXT STEP

For more information about Xilinx Virtex UltraScale+ 58G PAM4 FPGAs, go to www.xilinx.com/virtex-ultrascale-plus-58g.

Virtex UltraScale+ 58G PAM4 FPGAs are supported by comprehensive developments tools, reference designs, an IP catalog, and evaluation platforms. Visit Virtex UltraScale+ FPGA VCU129 evaluation kit page to start evaluating the latest Virtex UltraScale+ 58G PAM4 FPGAs.

Start by contacting your Xilinx Sales Representative to arrange an on-premises transceiver performance evaluation.