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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

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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 > Built-in KR4-FEC (Ethernet MAC) for optics error correction > Optional built-in 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.