



ADVANCED INFORMATION

Ultra38016

# UltraLogic™ Very High Speed 16K Gate CMOS FPGA

## Features

- Very high speed
  - Loadable counter frequencies greater than 185 MHz
  - Chip-to-chip operating frequencies up to 135 MHz
  - Input + logic cell + output delays under 5.5 ns
- Unparalleled FPGA performance for counters, data path, state machines, arithmetic, and random logic
- High usable density
  - 36 x 32 array of 1152 logic cells provides 48,000 total available gates
  - 16,000 typically usable “gate array” gates
- Available in 208-pin PQFP and 352-pin BGA
- Fully PCI compliant inputs & outputs
- Low power, high output drive
  - Standby current typically 2 mA
  - 16-bit counter operating at 100 MHz consumes 50 mA
  - Minimum I<sub>OL</sub> and I<sub>OH</sub> of 24 mA
- Flexible logic cell architecture
  - Wide fan-in (up to 14 input gates)
  - Multiple outputs in each cell
- Very low cell propagation delay (1.4 ns typical)
- Robust routing resources
  - Fully automatic place and route of designs using up to 100 percent of logic resources
  - No hand routing required
- 292 bidirectional input/output pins
- 8 dedicated input/high-drive pins
- 8 fanout-independent low-skew clock nets
  - 4 fast clocks driven from dedicated inputs
  - 4 global clocks driven from any pin or internal logic
  - Clock skew <0.5 ns
- Input registers
  - Set-up time <2 ns
- Input hysteresis provides high noise immunity
- Full JTAG testability
- 0.65μ triple layer metal CMOS process with ViaLink™ programming technology
  - High-speed metal-to-metal link
  - Non-volatile antifuse technology
- Powerful design tools—Warp3™
  - Designs entered in VHDL, schematics, or mixed

- Fast, fully automatic place and route
- Waveform simulation with back annotated net delays
- PC and workstation platforms
- Extensive third party tools support
  - See Development Systems section

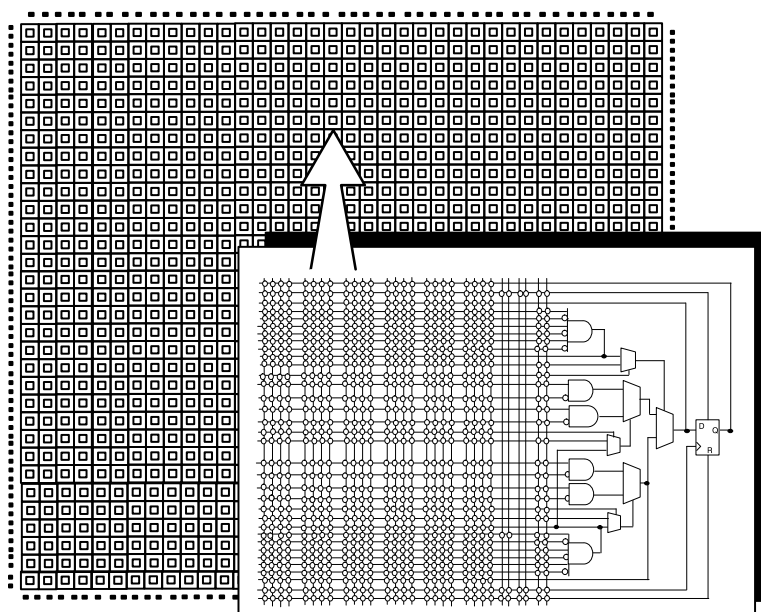
## Functional Description

The Ultra38016 is a very high speed, CMOS, user-programmable ASIC device. The 1152 logic cell field-programmable gate array (FPGA) offers 16,000 typically usable “gate array” gates. This is equivalent to 48,000 EPLD or LCA gates. The Ultra38016 is available in a 208-pin PQFP and 352-pin BGA.

Low-impedance, metal-to-metal ViaLink interconnect technology provides non-volatile custom logic capable of operating at speeds above 200 MHz with input delays under 2 ns and output delays under 3 ns. This permits high-density programmable devices to be used with today’s fastest CISC and RISC microprocessors.

For detailed information about the Ultra38000™ architecture, see the Ultra38000 Family datasheet.

## Logic Block Diagram



208 and 352 PINS, 292 I/O CELLS, 4 INPUT HIGH DRIVE CELLS, 8 INPUT/CLK (HIGH DRIVE) CELLS

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