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SEMICONDUCTOR CORPORATION

PRODUCT BRIEF

Speedster®22i HD FPGA Platform

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Achronix delivers the world's most advanced and highest density field programmable gate arrays (FPGAs), enabling new, innovative, and high-performance programmable designs. Speedster22i HD FPGAs are the only application targeted, high-end FPGAs and are half the power and half the cost of high-end, 28-nm FPGAs.

The Speedster22i HD FPGAs have a synchronous architecture and are built on Intel's advanced 22nm 3-D Tri-Gate transistor technology. Targeted for high bandwidth communication applications, Speedster22i HD FPGAs offer the combination of the highest density with the lowest power consumption.

With familiar industry-standard tools and methodologies, designers are able to use Achronix™ FPGAs to create powerful high-performance systems. Achronix devices incorporate silicon-proven, embedded IP which simplifies the creation of high-speed applications.

	Speedster22i HD Family		
	HD680	HD1000	HD1500
Logic Capacity with embedded IP (effective LUTs)	660,000	1,045,000	1,725,000
Programmable LUTs	400,000	700,000	1,100,000
Number of BRAM Instances	600	1,026	1,728
Number of LRAM Instances	4,320	6,156	10,368
80 Kbit BRAM (total Kb)	48,000	82,080	138,240
640 bit LRAM (total Kb)	2,765	3,940	6,636
Multipliers/MACs 28 × 28	240	756	864
SERDES Lanes 11.3 Gb/s	40	64	48
SERDES Lanes 28 Gb/s			16
10G Ethernet MAC (Hard IP)	20	24	48
40G Ethernet MAC (Hard IP)	4	6	12
100G Ethernet MAC (Hard IP)	2	2	4
Interlaken LLC (Hard IP)	1	2	4
PCI Express LLC (Hard IP)	1	2	2
DDR3/DDR2 controller (Hard IP)	4	6	6
Number of PLLs	16	16	16

	Available SerDes and I/O for each package option (11.3 Gbps SerDes, 28 Gbps SerDes, User I/O)		
	HD680	HD1000	HD1500
FBGA2597 (52.5-mm x 52.5-mm, 1-mm ball pitch)		64, 0, 960	48, 16, 960
FBGA1932 (45-mm x 45-mm, 1-mm ball pitch)	40, 0, 684	40, 0, 684	
FBGA1520 (40-mm x 40-mm, 1-mm ball pitch)	18, 0, 684		

The Hard IP Advantage

Speedster22i HD devices are the first FPGAs to include fully integrated hard IP protocol functions targeted for communications applications. The hard IP in Speedster22i HD devices includes the entire I/O protocol stack for 10/40/100 Gigabit Ethernet, Interlaken, PCI Express Gen 1/2/3 and memory controllers for 1866 Mbps DDR3. In other FPGAs, these functions are implemented in the programmable fabric which consumes up to 500,000 equivalent look-up-tables (LUTs), makes timing closure difficult, and increases the cost and power consumption of the FPGA solution. Additionally, the embedded hard IP in Speedster22i HD FPGAs eliminate the cost of purchasing, integrating and testing these functions as soft IP.

Applications

The unprecedented performance, coupled with the flexibility of a reprogrammable solution, makes Achronix FPGAs ideal for applications requiring high-data throughput, such as:

- Networking
- Optical / Telecom
- Encryption
- High-performance computing
- Video and imaging
- Test and measurement
- Military and aerospace

The 22nm Advantage

For the communications target applications, the embedded hard IP consumes up to 90% less power than implementing the same functionality in the programmable fabric of general purpose FPGAs. Additionally, Intel's advanced 22-nm Tri-Gate transistors consume 50% less power and are nearly 40% faster than transistors built on 28-nm planar processes. For the HD devices, these combined factors result in up to 50% less total power consumption than mainstream FPGAs.

Embedded (Hard) IP

10/40/100G Ethernet	12 × 10G, 3 × 40G, or 1 × 100G
Interlaken	Up to 11.3 Gbps, x1 up to ×12
PCI Express	Gen1, Gen2, Gen3, ×1, ×4, ×8
DDR3/DDR2 Controller	400 to 1866 Mbps, 8 to 72 bits wide

Made in the USA

Achronix has formed a strategic relationship with Intel to build Speedster22i HD FPGAs. Based on Intel's world-class 22nm process technology, Speedster22i HD FPGAs are the first full-featured programmable devices to offer a complete onshore supply chain option.

The Achronix Speedster22i FPGA platform uniquely enables applications that require an end-to-end supply chain within the United States. Being built at an onshore location offers significant advantages to programmable logic users who demand the highest level of security. Additionally, Speedster22i HD FPGAs benefit from the high device reliability inherent to the Intel supply chain.

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SEMICONDUCTOR CORPORATION

Achronix Semiconductor – Headquarters
2953 Bunker Hill Lane, Suite 101
Santa Clara, CA 95054
Tel: 408-889-4100
Email: info@achronix.com
www.achronix.com