Semicustom Products
FPGA to ASIC Conversion

COBHAM

Fact Sheet
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www.cobham.com/HiRel

The most important thing we build is trust

OVERVIEW

Cobham Semiconductor Solutions (formerly Aeroflex) has over 35 years experience converting FPGA based designs and second sourcing of gate array or cell-based designs to Cobham radiation-hardened and commercial process technologies intended for HiRel and space applications. Cobham maintains and continually improves translation libraries and IP for FPGA and second source conversions

Examples of past FPGA conversions and capabilities include:

- Microsemi (formerly Actel): RH1020, RH1280, RTSX-S or RTAX-S/SL FPGA designs
- Xilinx: XC2, XC3, XC4000S, XC8100, Virtex II, Virtex 4, Virtex 5, Virtex 5QV and Virtex 7 FPGA designs
- Altera: MAX 5000 and MAX 7000 FPGA designs
- Honeywell: HR2000, HX2000 gate array designs
- Legacy LSI: 5K, 10K, 20K gate array designs

ADVANTAGES

- Turnkey FPGA ASIC service
  - FPGA netlist or RTL to GDS
  - Multiple supply voltage options, 1.0v to 5.0v core and IO
  - Form/fit/functional equivalent packaging options
  - QML Q, V and Y design, assembly, test and qualification flows
  - QML screened or qualified chip capacitors
  - Typical radiation hardness, TID > 100krad(Si), SEL immune

- High coverage automatic test program generation
  - Stuck-at and transition delay fault test patterns
  - Input, output and bidirectional parametric test patterns
  - JTAG interface

- Production burn-in
  - Dynamic test patterns, high toggle coverage
  - Demonstrated <1 FIT rates

- Mature design methodology
  - Netlist (FPGA, Verilog or VHDL RTL or structural netlist) hand-off
  - Customer provided STA constraints and functional patterns
  - Cobham design-for-test serial scan, memory BIST and JTAG insertion
  - Start to finish formal verification
  - Place and route with clock and reset tree insertion

- Mature digital ASIC technology offering, process technology and libraries
  - 0.6µ (UT06_CRH)
  - 0.25µ (UT025_HBD)
  - 130nm (UT130nHBD)
  - 90nm (UT90nHBD)
  - Robust memory and IO offerings
  - HSSL (SerDes) IP available in advanced process nodes
  - Long term supply agreements available

PACKAGING OPTIONS:

- Microsemi (Actel) and Xilinx compatible 84, 172, 208, 256 and 352 ceramic quad flat pack package (CQFP)
- Microsemi (Actel) compatible 624 ceramic column grid array package (CCGA)
- Xilinx compatible 1752 ceramic land grid array (1752 CGA)
- Chip capacitor attach optional
- Power and ground pin compatibility
- Numerous other standard and custom package options available

DESIGN SYSTEM TOOLKIT

- Gate and cell-based standard cell, compiled memory, IO and analog IP for synthesis and simulation
- Logic rules checkers
- Tester rules checkers
- All design kits available via website download
- Design-for-test guidelines and requirements
- Design kit manuals

FPGA vs Industry Comparison (example)

	Actel RTAX250-RTAX4000	Cobham UT0.6μm (Gate Array)	Cobham UT0.25μm (Cell Based)	Cobham UT130nm (Cell Based)	Cobham UT90nm (Cell Based)
Usable Gates	30K/500K	500K	3M	15M	50M
Feature Size	0.15μm	0.6μm	0.25μm	0.13μm	0.09μm
Core Voltage	3.3V, 2.5V, 1.8V	5V, 3.3V	2.5V, 3.3V	1.5V	1.0V
I/O Voltage	1.5V	5V or 3.3V or 2.5V	2.5V or 3.3V	1.8, 2.5V, 3.3V	1.8V, 2.5V
Cold Sparing/5V Tolerant I/Os	Yes/Yes	Yes/Yes	Yes/Yes	No/No	No/No
I/O	Yes	CMOS, TTL, PCI	LVTTL, PCI I/O, PCI Core (Synopsys)	LVTTL, PCI I/O, PCI Core (Synopsys)	LVTTL, SSTL
LVDS/PLL	No	No	Yes	Yes	Yes 3.125Ghz SerDes
Max Frequency	500MHz	215MHz/70MHz/30MHz	1.3GHz	1.5GHz	3.125GHz
Package	208CQFP, 352CQFP, 484CCGA, 624CCGA	84 CQFP, 172 CQFP 208CQFP, 256CQFP 352 CQFP, 472 CCGA	208CQFP, 256CQFP 352CQFP 484CCGA, 624CCGA	624 CCGA or 1280 Flip Chip	624 CCGA 729 CCGA 729 Flip Chip 1752 Flip Chip
TID krad(Si)	200k	100k Cond A	100k to >1M Cond A	100k to 330k Cond A	>100k Cond A
SEU tolerant IP		F/F, IO	F/F, Memory, IO	F/F, Memory, IO	F/F, Memory, IO, SerDes
SEL	>104MeV	>128MeV @125°C Guaranteed	>110MeV @125°C Guaranteed	>115MeV @125°C Guaranteed	>120MeV @125°C Guaranteed
QML Qualification - Class Q, V, Y	Class B	1997	2004	2014	2015
Demonstrated reliability (FIT rate)	8 @55°C	0.4 @55°C	4.1 @55°C	<150 @55°C	<150 @55°C

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