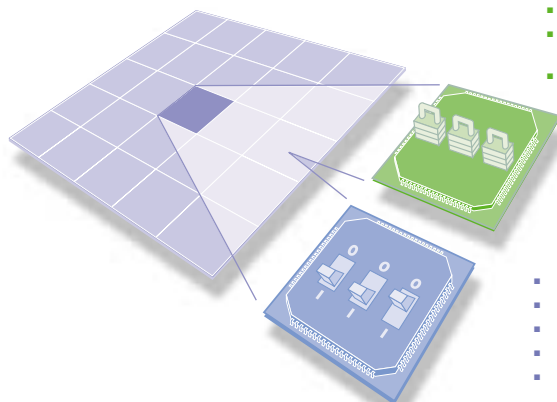


Actel's Flash to ASIC Conversion Program

The Cost Effective Solution for High Volume Applications

Actel offers a **risk free conversion path** for high volume designs using ProASIC™ or ProASIC^{PLUS} FPGAs by remapping the functionality of the ProASIC Flash FPGA family into a cost-effective standard cell ASIC. These pin-for-pin replacements are designed from the existing FPGA database, which means a reduced risk for the customer.

From Flash to ASIC



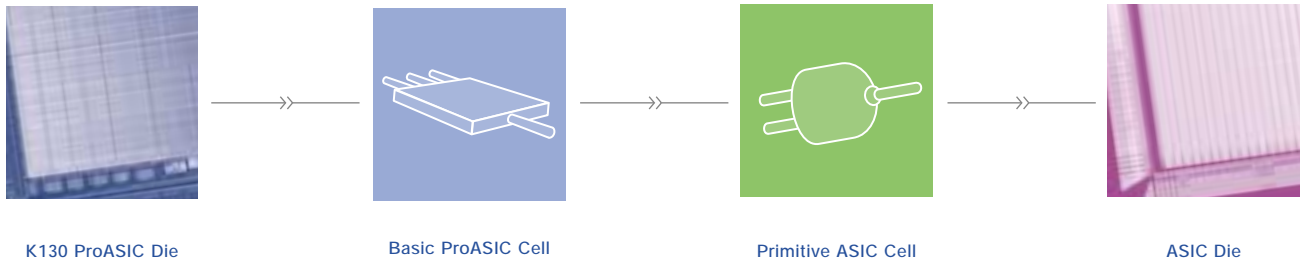
- ProASIC**
- Reprogrammable Design
 - Low-Volume Production Solution
 - Quick Development Cycle

- ASIC**
- Fixed Design
 - High-Volume Production Solution
 - Long Development Cycle

- Common Features**
- Single Chip
 - Nonvolatile
 - Live at Power Up
 - Fine Grained Architecture
 - Low Power

Key Features

- Support for all ProASIC and ProASIC^{PLUS} family members
- Proven Cost Reduction Migration Path for High Volume Designs
- ProASIC's Fine Grained Architecture Simplifies Conversion and Reduces Risk
- Fully Pin/Feature/Voltage Compatible with ProASIC/ProASIC^{PLUS}
- Support for All ProASIC/ProASIC^{PLUS} Packages
- Fast Turn Around Times



ProASIC Architecture Simplifies Conversion

ProASIC: Fine-Grained Architecture for Easy Conversion

Based on a standard Flash/CMOS process, the ProASIC and ProASIC^{PLUS} families combine high density and low power with nonvolatility and reprogrammability. With a unique fine-grained architecture offering predictable performance, improved utilization, and greater routing efficiency, ProASIC devices allow designers to easily meet performance goals. These same product features allow an easy conversion to a standard cell ASIC. ProASIC's fine-grained (three input, one output) architecture is the closest in the industry to that of an ASIC (two input, one output), making design conversion quick and easy. A designer can quickly develop and debug a prototype system using ProASIC and then, after production ramps to high volume, easily convert to a more cost-effective standard cell ASIC solution.

Like an ASIC, ProASIC requires no PROMs or other external components. There are no power up differences between ProASIC and an ASIC — both are nonvolatile and live at power up. Total development expenses will be minimized while taking advantage of time to production savings because a conversion yields a simple one-to-one FPGA replacement with a fully footprint-compatible ASIC without any changes to the printed circuit board.

Synthesis tools, designed for optimal performance with fine-grained architectures, are well suited for use with Actel's ProASIC devices. The fine-grained nature of ProASIC's architecture yields designs that utilize logic resources efficiently with minimal timing issues, as opposed to the coarse-grained architectures of some FPGAs, which lead to difficulty in prediction of utilization and performance. This architectural similarity between ProASIC and ASICs speeds the conversion process and significantly minimizes risks.

Advantages of Flash to ASIC Conversion

Cost Effective High Volume Applications

If your annual quantity of a programmable device requires very high volumes, it could make sense to consider a conversion. At low to moderate volumes, FPGAs are a better alternative to ASICs because they do not have the NRE charges that make ASICs an expensive solution. But at high volumes, the non-recurring engineering expenses associated with a conversion are easily amortized into the reduced overall unit cost, resulting in desirable annual cost savings.

Time to Market

Today, everyone is competing to get their product to market faster than the competition. For fast time to market, nothing beats an FPGA for flexibility and rapid prototyping. Once the design is finalized and production ramps up, a conversion gives the designer the best of both worlds: short design cycles and low production costs.

Low Power

If total system power consumption is an important issue, a conversion has possible advantages. With the inherent efficiency of the routing structure and the architecture of the logic cell, the ProASIC and ProASIC^{PLUS} families already feature low standby and low operating current but a conversion to ASIC could lower power consumption even further.

System Integration

Since ASICs have much higher gate counts than FPGAs, the functionality of several FPGAs can easily be integrated into a single ASIC. By consolidating multiple FPGAs and other support chips into a single conversion, you will reduce component count, thus saving board space and improving system reliability.

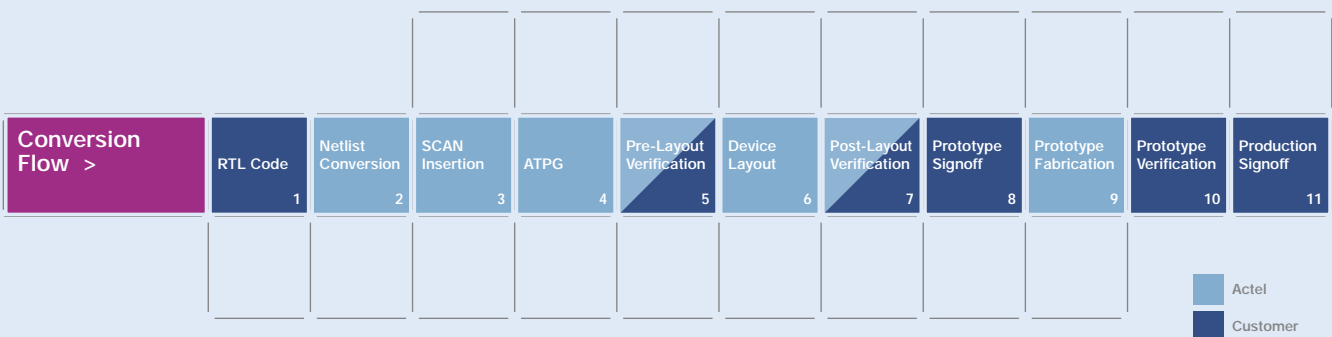
Customer Participation Requirements

To Be Supplied by Customer:

- Netlist
- Pin Assignments
- Functional Test Vectors
- Timing Constraints

Design Services Covered by NRE:

- Netlist Conversion (optional)
- Re-synthesis Into Standard Cell Technology
- Scan Insertion (optional)
- ATPG (optional)
- BIST (optional)
- JTAG Interface (optional)
- Develop Test Fixturing
- Develop Test Program
- Mask Fabrication
- Prototype Fabrication



ProASIC Product Offering

| ProASIC 500K Family Selector Guide | A500K050 | A500K130 | A500K180 | A500K270 |
|---------------------------------------|----------|----------|----------|----------|
| System Gates | 100,000 | 290,000 | 370,000 | 475,000 |
| ASIC Gates | 25,000 | 75,000 | 100,000 | 125,000 |
| Logic Tiles | 5,376 | 12,800 | 18,432 | 26,880 |
| Embedded RAM Bits | 14k | 45k | 54k | 63k |
| User I/Os | 204 | 306 | 362 | 440 |

| ProASIC ^{PLUS} APA Family Selection Guide | APA075 | APA150 | APA300 | APA450 | APA600 | APA750 | APA1000 |
|--|--------|---------|---------|---------|---------|---------|-----------|
| System Gates | 75,000 | 150,000 | 300,000 | 450,000 | 600,000 | 750,000 | 1,000,000 |
| ASIC Gates | 20,000 | 40,000 | 80,000 | 100,000 | 150,000 | 200,000 | 300,000 |
| Logic Tiles | 3,072 | 6,144 | 8,192 | 12,288 | 21,504 | 32,768 | 56,320 |
| Embedded RAM Bits | 27k | 36k | 72k | 108k | 126k | 144k | 198k |
| User I/Os | 158 | 242 | 290 | 344 | 454 | 562 | 712 |

For more information regarding **Flash to ASIC Conversion Services** please contact your local **Actel** sales representative.



www.actel.com

Actel Corporation

955 East Arques Avenue
Sunnyvale, CA USA 94086
Telephone 408.739.1010
Facsimile 408.739.1540

Actel Europe Ltd.

Maxfli Court, Riverside Way
Camberley, Surrey GU15 3YL
United Kingdom
Telephone +44 0 1276.401450
Facsimile +44 0 1276.401490

Actel Japan

EXOS Ebisu Building 4F
1-24-14 Ebisu Shibuya-ku
Tokyo 150, Japan
Telephone +81 0 3.3445.7671
Facsimile +81 0 3.3445.7668