

# Titanium FPGAs

You only have a few square millimeters to spare, and you need to pack in as much computing power as you can. Efinix's next-generation Titanium FPGAs can help. Titanium FPGAs are fabricated on a 16 nm process, delivering high performance with the lowest possible power and a small physical size. They feature the innovative Quantum® compute fabric that, with its enhanced compute capability, makes Titanium FPGAs ideal for embedded hardware acceleration applications. With a wide range of logic element (LE) densities from 35K to 1M, and compatibility with the Efinix RISC-V SoCs, they can help you turn a tiny chip into an accelerated embedded compute system.

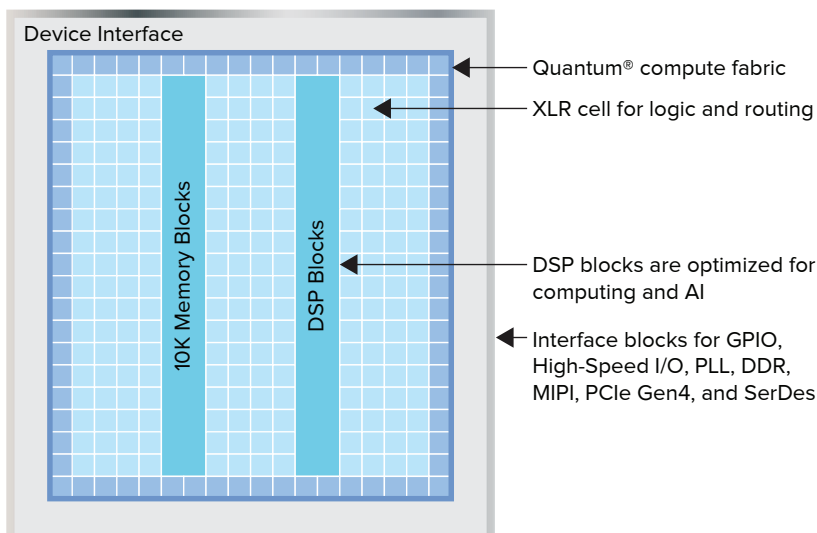


## Quantum® Compute Fabric

The Quantum compute fabric is made up of configurable tiles, the eXchangeable logic and routing (XLR) cell, that optimizes routing efficiency and speed while achieving high utilization ratios. The fabric also has highly configurable, 10K embedded memory blocks along with dedicated, high-speed, DSP blocks. Together, these features deliver optimum performance for a wide array of applications from edge compute to industrial automation and video processing.

The 16 nm process node gives Titanium FPGAs a small footprint with low power consumption, making them ideal for highly integrated applications.

**Figure 1 Titanium FPGA Block Diagram**



- 16 nm process
- Low power
- High performance
- Small size
- Quantum® compute fabric

Table 1 Resources and Interfaces

| Feature               | Ti35   | Ti60   | Ti90         | Ti120        | Ti135        | Ti180        | Ti200        | Ti375        | Ti550        | Ti750        | Ti1000       |
|-----------------------|--------|--------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Logic Elements (LEs)  | 36,176 | 62,016 | 92,534       | 123,379      | 133,844      | 176,256      | 198,288      | 370,137      | 550,000      | 750,000      | 1,000,004    |
| 10K RAM blocks (Mb)   | 1.53   | 2.62   | 6.88         | 9.18         | 9.95         | 13.11        | 14.75        | 27.53        | 40.92        | 55.8         | 74.4         |
| DSP blocks            | 93     | 160    | 336          | 448          | 486          | 640          | 720          | 1,344        | 2,006        | 2,736        | 3,648        |
| PLLs                  | 4      | 4      | 10           | 10           | 12           | 10           | 12           | 12           | 12           | 12           | 12           |
| GPIO                  | 34     | 34     | 80           | 80           | 181          | 80           | 181          | 181          | 200          | 200          | 200          |
| High-speed I/O        | 146    | 146    | 232          | 232          | 235          | 232          | 235          | 235          | 320          | 320          | 320          |
| LPDDR4/4x             | —      | —      | x32          | x32          | 2 x32        | x32          | 2 x32        | 2 x32        | 2 x72        | 2 x72        | 2 x72        |
| MIPI D-PHY 2.5 Gbps   | —      | —      | 4 TX<br>4 RX | 4 TX<br>4 RX | 3 TX<br>3 RX | 4 TX<br>4 RX | 3 TX<br>3 RX | 3 TX<br>3 RX | 3 TX<br>3 RX | 3 TX<br>3 RX | 3 TX<br>3 RX |
| 16 Gbps Serdes        | —      | —      | —            | —            | x16          | —            | x16          | x16          | x24          | x24          | x24          |
| 25.8 Gbps Serdes      | —      | —      | —            | —            | —            | —            | —            | —            | x8           | x8           | x8           |
| Hardened RISC-V block | —      | —      | —            | —            | Quad Core    | —            | Quad Core    | Quad Core    | Quad Core    | Quad Core    | Quad Core    |
| PCIe® Gen4 (16G)      | —      | —      | —            | —            | 2 x4         | —            | 2 x4         | 2 x4         | 2 x8         | 2 x8         | 2 x8         |

Refer to the FPGA data sheet or Titanium Selector Guide for details on which resources are available in each package.

#### Ti35 and Ti60

Designed for highly integrated mobile and edge devices that need low power, a small footprint, and a multitude of I/Os.

- Mobile
- Edge
- AI IoT
- Sensor fusion

#### Ti90, Ti120, and Ti180

2.5 Gbps MIPI interfaces for multi-camera, high definition vision systems, edge computing, and hardware acceleration.

- Vision systems
- Edge computing
- Hardware acceleration
- Machine learning

#### Ti135, Ti200 and Ti375

Combines the compute power and transceiver interfaces required for compute and industrial automation.

- Industrial automation
- Automotive
- Medical imaging
- Machine vision

#### Ti550, Ti750 and Ti1000

High-performance platform with the density and interfaces needed in the most demanding applications.

- Communications
- PCIe accelerator cards
- FPGA-based servers
- Smart storage

Table 2 Package Options

| Package        | Pitch (mm) | Size (mm) | Ti35 | Ti60 | Ti90 | Ti120 | Ti135 | Ti180 | Ti200 | Ti375 | Ti550 | Ti750 | Ti1000 |
|----------------|------------|-----------|------|------|------|-------|-------|-------|-------|-------|-------|-------|--------|
| 64-ball WLCSP  | 0.4        | 3.5x3.4   |      | ✓    |      |       |       |       |       |       |       |       |        |
| 100-ball FBGA  | 0.5        | 5.5x5.5   | ✓    | ✓    |      |       |       |       |       |       |       |       |        |
| 225-ball FBGA  | 0.65       | 10x10     | ✓    | ✓    |      |       |       |       |       |       |       |       |        |
| 361-ball FBGA  | 0.65       | 13x13     |      |      | ✓    | ✓     |       | ✓     |       |       |       |       |        |
| 400-ball FBGA  | 0.8        | 16x16     |      |      | ✓    | ✓     |       | ✓     |       |       |       |       |        |
| 484-ball FBGA  | 0.8        | 18x18     |      |      | ✓    | ✓     |       | ✓     |       |       |       |       |        |
| 529-ball FBGA  | 0.8        | 19x19     |      |      | ✓    | ✓     | ✓     | ✓     | ✓     | ✓     |       |       |        |
| 676-ball FBGA  | 0.8        | 22x22     |      |      |      |       | ✓     |       | ✓     | ✓     |       |       |        |
| 900-ball FBGA  | 0.8        | 25x25     |      |      |      |       | ✓     |       | ✓     | ✓     |       |       |        |
| 1156-ball FBGA | 1.0        | 35x35     |      |      |      |       | ✓     |       | ✓     | ✓     | ✓     | ✓     | ✓      |