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.
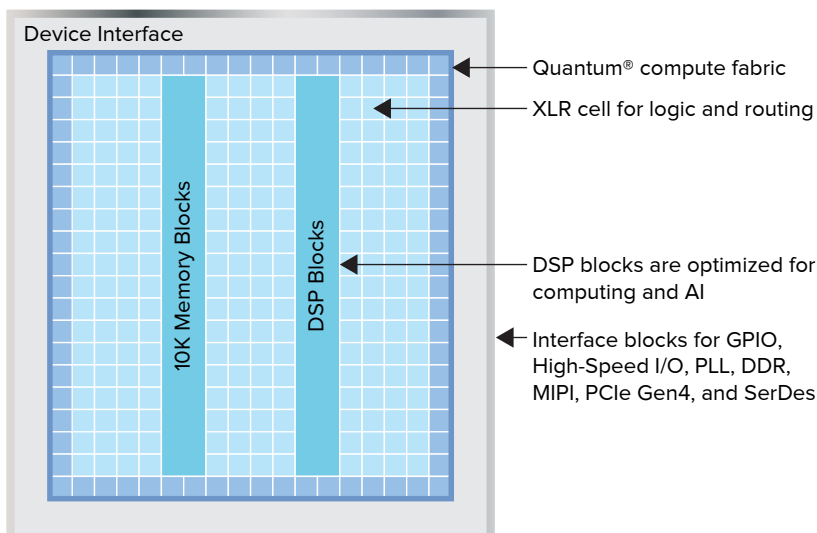
Quantum® Compute Fabric

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.
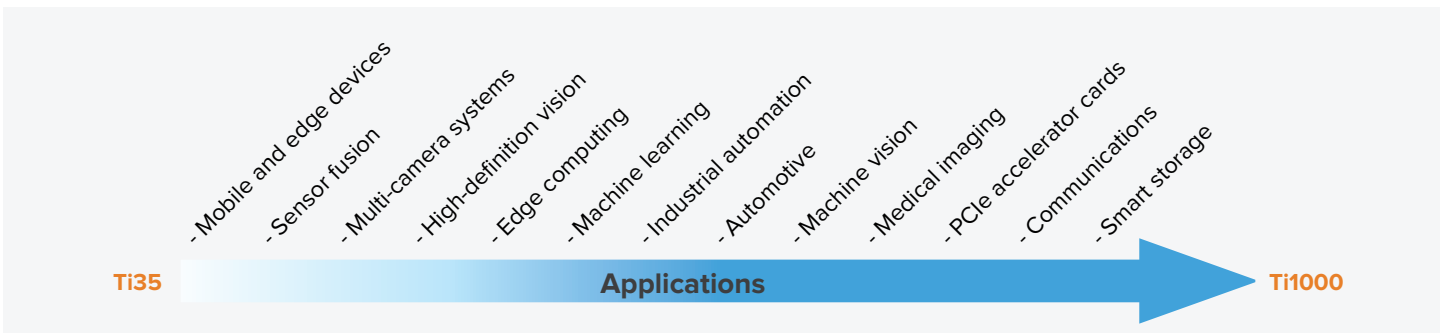
Figure 1   Titanium FPGA Block Diagram

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

Titanium FPGA Overview

Table 1 Resources and Interfaces

Feature	Ti35	Ti60	Ti85	Ti90	Ti120	Ti135	Ti165	Ti180	Ti240	Ti375	Ti550	Ti750	Ti1000
Logic Elements (LEs)	36,176	62,016	83,232	92,534	123,379	132,192	162,800	176,256	236,888	370,137	550,000	750,000	1,000,004
10K RAM blocks (Mb)	1.53	2.62	6.18	6.88	9.18	9.83	12.1	13.11	17.62	27.53	40.92	55.8	74.4
DSP blocks	93	160	300	336	448	480	590	640	860	1,344	2,006	2,736	3,648
PLLs	4	4	9	8	8	9	12	8	12	12	12	12	12
High-voltage I/O	34	34	133	80	80	133	181	80	181	181	200	200	200
High-speed I/O	146	146	139	232	232	139	235	232	235	235	320	320	320
LPDDR4/4x	—	—	x32	x32	x32	x32	2 x32	x32	2 x32	2 x32	2 x72	2 x72	2 x72
MIPI D-PHY 2.5 Gbps	—	—	2 TX 2 RX	4 TX 4 RX	4 TX 4 RX	2 TX 2 RX	3 TX 3 RX	4 TX 4 RX	3 TX 3 RX	3 TX 3 RX	3 TX 3 RX	3 TX 3 RX	3 TX 3 RX
Transceivers	—	—	2 x4	—	—	2 x4	4 x4	—	4 x4	4 x4	6 x4	6 x4	6 x4
25.8G Transceivers	—	—	—	—	—	—	—	—	—	—	x8	x8	x8
Hardened RISC-V block	—	—	Quad Core	—	—	Quad Core	Quad Core	—	Quad Core	Quad Core	Quad Core	Quad Core	Quad Core
PCIe® Gen4 (16G)	—	—	1 x4	—	—	1 x4	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.

Applications — Ti35 to Ti1000: Mobile and edge devices, Sensor fusion, Multi-camera systems, High-definition vision, Edge computing, Machine learning, Industrial automation, Automotive, Machine vision, Medical imaging, PCIe accelerator cards, Communications, Smart storage

Table 2 Package Options

Package	Pitch (mm)	Size (mm)	Ti35	Ti60	Ti85	Ti90	Ti120	Ti135	Ti165	Ti180	Ti240	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	✓	✓											
256-ball FBGA	0.8	13x13	✓	✓											
361-ball FBGA	0.65	13x13				✓	✓			✓					
400-ball FBGA	0.5	10x10			✓			✓							
400-ball FBGA	0.8	16x16				✓	✓			✓					
484-ball FBGA	0.8	18x18			✓	✓	✓	✓	✓	✓	✓	✓			
529-ball FBGA	0.8	19x19				✓	✓		✓	✓	✓	✓			
576-ball FBGA	0.65	16x16			✓			✓							
676-ball FBGA	0.65	18x18							✓		✓	✓			
676-ball FBGA	0.8	22x22			✓			✓							
900-ball FBGA	0.8	25x25							✓		✓	✓			
1156-ball FBGA	1.0	35x35							✓		✓	✓	✓	✓	✓

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