

TJ-Series FPGAs

Enabling the AI-Driven World

You only have a few square millimeters to spare, and you need to pack in as much computing power as you can. Elitestek's TJ-Series FPGAs are fabricated on a 16 nm process and deliver high performance with efficient power in a compact size. They enable AI acceleration, data analysis, real-time decision making, and other compute-intensive workloads for applications such as [machine vision](#), [automotive](#), [hand-held medical devices](#), and next-generation edge applications. They feature the innovative Quantum® compute fabric that, with its enhanced compute capability, makes TJ-Series FPGAs ideal for embedded hardware acceleration applications. With a wide range of logic element (LE) densities from 35K to 2M, and compatibility with the Elitestek [RISC-V SoCs](#), they can help you turn a tiny chip into an accelerated embedded compute system.

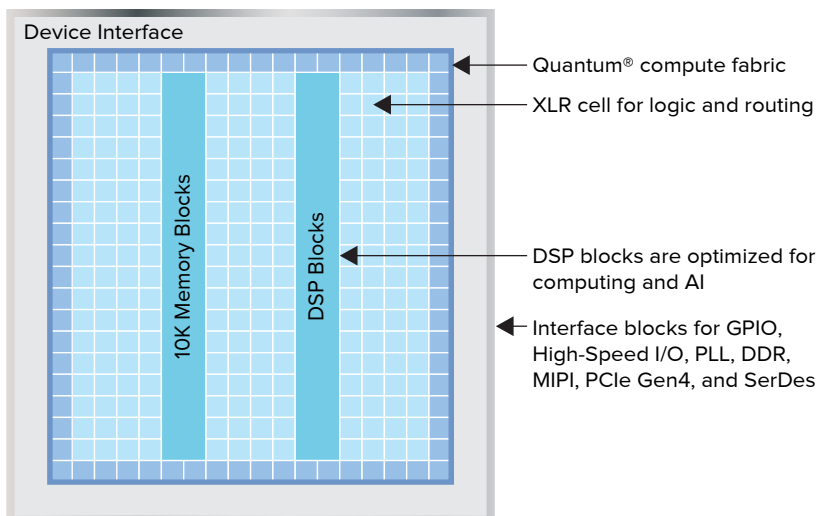
Quantum® Compute Fabric

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 TJ-Series FPGAs a small footprint with low power consumption, making them ideal for highly integrated applications.



Figure 1 TJ-Series FPGA Block Diagram



- 16 nm process
- Energy Efficient
- High performance
- Small footprint
- Quantum® compute fabric

Machine Vision



Medical Imaging



Industrial Automation



Automotive

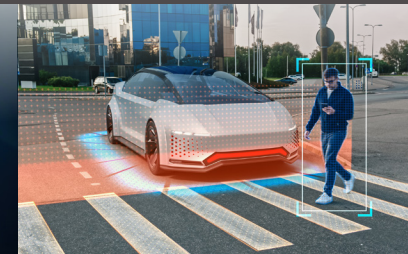


Table 1 TJ-Series FPGAs without Transceivers

Feature			Ti35	Ti60	Ti90	Ti120	Ti125	Ti180	TJ180
Logic Elements (LEs)			36,176	62,016	92,534	123,379	122,792	176,256	176,256
10K RAM blocks (Mb)			1.53	2.62	6.88	9.18	5.9	13.11	13.11
DSP blocks			93	160	336	448	288	640	640
PLLs			4	4	8	8	7	8	8
High-voltage I/O			27	27	74	74	35	74	54
High-speed I/O			142	142	210	210	200	210	190
MIPI D-PHY, support CSI-2/DSI (Gbps)			1.5	1.5	1.5	1.5	2.5	1.5	1.5
LPDDR4/4x			—	—	x32	x32	—	x32	x16
MIPI D-PHY 2.5 Gbps (Hard IP)			—	—	4 TX 4 RX	4 TX 4 RX	—	4 TX 4 RX	2 TX 2 RX
Package	Pitch (mm)	Size (mm)	Ti35	Ti60	Ti90	Ti120	Ti125	Ti180	TJ180
64-ball WLCSP	0.4	3.5x3.4		✓					
100-ball FBGA ⁽¹⁾	0.5	5.5x5.5	✓	✓					
225-ball FBGA ⁽²⁾	0.5	8x8					✓		
225-ball FBGA	0.65	10x10	✓	✓			✓		
256-ball FBGA	0.8	13x13	✓	✓					
324-ball FBGA	0.8	15x15					✓		
361-ball FBGA	0.65	13x13			✓	✓		✓	
400-ball FBGA	0.8	16x16			✓	✓		✓	
484-ball FBGA ⁽³⁾	0.65	15x15							✓
484-ball FBGA	0.8	18x18			✓	✓		✓	
529-ball FBGA	0.8	19x19			✓	✓		✓	

1. The 100 pin package is available as a regular package as well as a SiP that incorporates SPI flash and HyperRAM in addition to the FPGA.

2. The 225 pin package is a SiP that incorporates SPI flash and two HyperRAM in addition to the FPGA.

3. The 484 pin package is a SiP that incorporates LPDDR DRAM in addition to the FPGA.

Table 2 TJ-Series FPGAs with Transceivers

Feature			TJ85	TJ135	TJ240	TJ375	TJ660	TJ800	TJ1250	TJ2000
Logic Elements (LEs)			83,232	132,192	236,888	370,137	656,916	796,262	1,233,020	1,974,067
10K RAM blocks (Mb)			6.18	9.83	17.62	27.53	38.9	47.2	73.1	117
DSP blocks			300	480	860	1,344	1,260	1,536	2,380	3,808
PLLs			9	9	12	12	12	12	12	12
High-voltage I/O			84	84	103	103	180	180	180	180
High-speed I/O			139	139	234	234	300	300	300	300
MIPI D-PHY, support CSI-2/DSI (Gbps)			1.5	1.5	1.5	1.5	2.5	2.5	2.5	2.5
LPDDR4/4x			x32	x32	2 x32	2 x32	3 x32	3 x32	4 x32	4 x32
MIPI D-PHY 2.5 Gbps (Hard IP)			2 TX 2 RX	2 TX 2 RX	3 TX 3 RX	3 TX 3 RX	—	—	—	—
16 Gbps Transceivers			x8	x8	x16	x16	—	—	—	—
25.8 Gbps Transceivers			—	—	—	—	x24	x24	x40	x40
PCIe® Gen4 (16G)			1 x4	1 x4	2 x4	2 x4	2 x8	2 x8	3 x8	3 x8
Hardened Quad-Core RISC-V Processor			RV32	RV32	RV32	RV32	RV64	RV64	RV64	RV64
Package	Pitch (mm)	Size (mm)	TJ85	TJ135	TJ240	TJ375	TJ660	TJ800	TJ1250	TJ2000
441-ball FBGA	0.5	11x11	✓	✓						
484-ball FBGA	0.8	18x18	✓	✓	✓	✓				
529-ball FBGA	0.8	19x19			✓	✓				
576-ball FBGA ⁽⁴⁾	0.65	16x16	✓	✓						
676-ball FBGA	0.8	22x22	✓	✓						
900-ball FBGA	0.8	25x25			✓	✓	✓	✓		
1156-ball FBGA	1.0	35x35			✓	✓	✓	✓	✓	✓
1521-ball FBGA	1.0	40x40						✓	✓	✓

4. The TJ135 576-ball FBGA is offered as a standard FPGA package or as a SiP integrating SPI flash and LPDDR4 DRAM.

Refer to the FPGA data sheet or [TJ-Series Selector Guide](#) for details on which resources are available in each package.