

Efinix™ Trion™ FPGA Overview

The Efinix™ Trion™ programmable platform, built on Efinix Quantum™ technology, delivers substantial Power-Performance-Area advantages over traditional FPGA products. Trion FPGAs feature programmable logic and a routing fabric built using Quantum technology. The fabric is wrapped with an I/O interface in a small footprint package that is required by many high-volume applications such as mobile and IoT. In addition to logic and routing, the fabric includes embedded memory blocks and multiplier blocks (or DSP blocks).

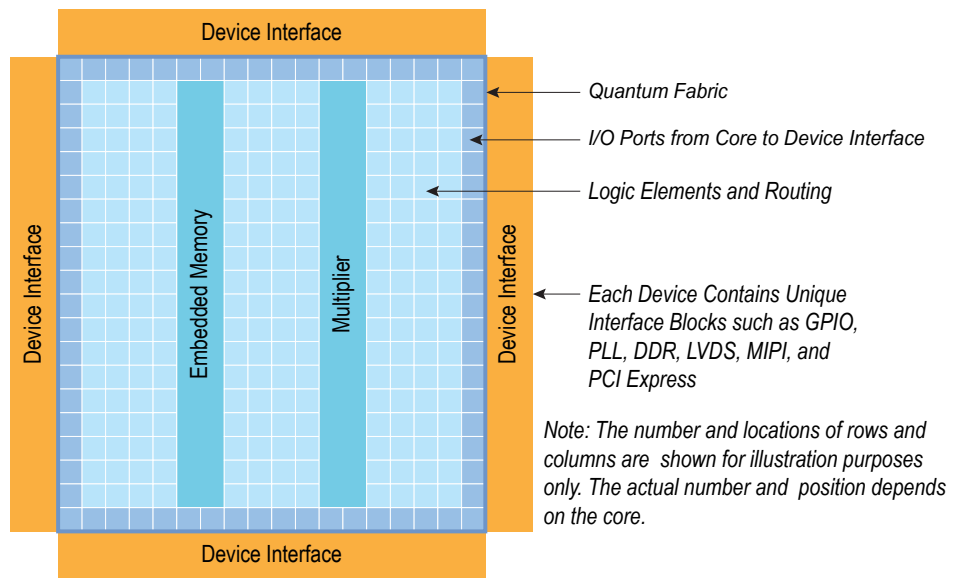


Figure 1 Trion FPGA Block Diagram

Feature	T4	T8	T13	T20	T45	T70	T100	T150
Logic Elements (LEs)	3,888	7,384	12,828	19,728	44,860	70,080	101,520	150,180
Mask Programmable Memory (MPM)	√	√	—	—	—	—	—	—
Embedded RAM bits (kb)	76.8	122.88	727.04	1,044.48	1,027.52	3,379.2	5,632	7,680
18x18 Multipliers	4	8	24	36	120	200	350	500
PLLs	1	1	4	4	7	7	7	7
Maximum GPIO (1)	59	59	62	62	102	102	160	160
LVDS (RX + TX)	—	—	13	13	26	26	39	39
DDR3/LPDDR3 (800 Mbps)	—	—	x16	x16	x32	x32	x32	x32
MIPI 4-lane DPHY CSI-2 controller	—	—	2	2	3	3	3	3
PCI Express Gen 1/2	—	—	—	—	—	—	x4	x4
Typical Standby I _{CC} (Ultra-Low Power[ULP] option)	100 μA	100 μA	500 μA	500 μA				

(1) The LVDS and DDR interface have dedicated I/O; therefore, the maximum GPIO does not include the I/O count for those interfaces. Additionally, if your design does not use LVDS, you can use its dedicated I/O as GPIO instead.

Table 1 Trion Resources and Interfaces

The initial phase of the Trion platform consists of eight devices, built on SMIC’s 40LL process, with a logic density range from 4K to 150K logic elements (LEs) and standard interfaces such as GPIO, PLLs, oscillators, MIPI, DDR, LVDS, PCI Express, etc. Trion FPGAs target general-purpose custom logic markets (mobile, IoT, general consumer, industrial, and medical) as well as fast-growing markets such as compute acceleration and deep learning in edge devices.

Standard I/O Interfaces

The initial rollout of Trion FPGAs supports the following interfaces:

- **MIPI**—4-lane MIPI D-PHY with a hardened CSI-2 controller and up to 6 Gbps per PHY. Achieves low power, low cost, and easy implementation for MIPI CSI-2
- **LVDS**—Up to 800 Mbps LVDS data rate with up to 31.2 Gbps aggregate bandwidth.
- **DDR**—Provides DDR3/LPDDR3 support. Up to 800 Mbps DDR line rates with up to 25.6 Gbps peak bandwidth. DDR Interface includes hardened PHY and memory controller, providing low power, low cost, and easy to integrate memory interface.
- **PCI Express**—Supports Gen1/Gen2, x1, x2, x4 lanes with root complex and end point support.

Mask Programmable Memory (MPM)

The T4 and T8 FPGAs are equipped with optional MPM. With this feature, you use on-chip MPM instead of an external serial flash device to configure the FPGA. This option is

for systems that require an ultra-small factor and the lowest cost structure such that an external serial flash device is undesirable and/or not required at volume production. MPM is a one-time factory programmable option that requires a Non-Recurring Engineering (NRE) payment. To enable MPM, you submit your design to our factory; our Applications Engineers (AEs) convert your design into a single configuration mask to be specially fabricated.

Efinity Software Support

The Efinity™ software provides a complete tool flow from RTL design to bitstream generation, including synthesis, place-and-route, and timing analysis. The software has a graphical user interface (GUI) that provides a visual way to set up projects, run the tool flow, and view results. The software also has a command-line flow and Tcl command console. The software-generated bitstream file configures Trion devices. The software supports the Verilog HDL language.

Early Customer Program

Initial Trion FPGAs are available now, and Efinix is qualifying customers for its early access program. If you would like to be considered to be part of our early access program, please contact us at sales@efinixinc.com.



Feature	T4	T8	T13	T20	T45	T70	T100	T150
20-ball WLCSP (contact factory for dimensions)	√	√						
49-ball FBGA (0.4 mm, 3x3 mm)	√	√						
81-ball FBGA (0.5 mm, 5x5 mm)	√	√						
90-ball WLCSP (contact factory for dimensions)			√	√				
144-ball FBGA (0.5 mm, 6.5x6.5 mm)			√	√				
289-ball FBGA (0.5 mm, 9x9 mm)			√	√	√	√		
484-ball FBGA (0.6 mm, 14x14 mm)					√	√	√	√
676-ball FBGA (0.6 mm, 16x16 mm)							√	√

Table 2 Package Options