Competitive Overview

Virtex Series FPGA
Competitive Cross Reference

Virtex™-E – 1.8V **Virtex Series Key Features: Density/Performance, SelectRAM+™, SelectI/O™, DLLs, SelectLINK™**

Devices	Package	Package I/O	Logic Gates	Typical Gate Range	Flip-Flops*	Output Drive (mA)	Maximum RAM Bits	Maximum Device I/O	Logic Cells
XCV50E	CS144 PQ240 FG256	94 158 176	21K	20K-56K	2064	2/24	80K	176	1728
EP20K60E							32K	204	2560
XCV100E	CS144 PQ240 FG256	94 158 176	32K	30K-95K	2988	2/24	80K	176	2700
EP20K100E							53K	252	4160
XCV200E	CS144 PQ240 FG256 FG456	94 158 176 284	64K	60K-200K	5556	2/24	128K	284	5292
EP20K160E							81K	316	6400
XCV300E	PQ240 FG256 BG432 FG456	158 176 316 312	83K	80K-400K	7116	2/24	224K	316	6912
EP20K200E							106K	382	8320
XCV400E	PQ240 BG432 FG676	158 316 404	130K	130K-560K	10812	2/24	310K	404	10800
EP20K300E							147K	408	11520
XCV600E	HQ240 BG432 FG676 FG680 FG900	158 316 444 512 512	187K	185K-980K	15360	2/24	504K	512	15552
EP20K400E							212K	502	16640
EP20K600E							311K	624	24320
XCV1000E	HQ240 BG560 BG680 FG860 FG900 FG1156 BG560	158 404 512 660 660 660 404	332K	330K-1.5M	26556	2/24	768K	660	27648
XCV1600E	BG680 FG860 FG900 FG1156	512 660 700 724	420K	420K-2M	33276	2/24	1062K	724	34992
EP20K1000E							327K	716	38400
XCV2000E	BG560 FG680 FG860 FG1156	404 512 660 804	518K	520K-2.5M	40812	2/24	1240K	804	43200
EP20K1500E							456K	858	54720
XCV2600E	BG560 FG680 FG860 FG1156 BG560	404 512 660 804 404	685K	600K-3.2M	53196	2/24	1525K	804	57132
XCV3200E	FG680 FG860 FG1156	512 660 804	876K	800K-4M	67308	2/24	1846K	804	73008

Virtex™ – 2.5V **Virtex Series Key Features: Density/Performance, SelectRAM+™, SelectI/O™, DLLs**

Devices	Package	Package I/O	Logic Gates	Typical Gate Range	Flip-Flops*	Output Drive (mA)	Maximum RAM Bits	Maximum Device I/O	Logic Cells
XCV50	CS144 PQ240 TQ144 BG256 FG256	94 166 98 180 176	21K	34K-58K	1536	2/24	56K	180	1728
EPF10K30E							24K	220	1728
XCV100	CS144 PQ240 TQ144 BG256 FG256	94 166 98 180 176	32K	72K-109K	2400	2/24	78K	196	2700
EPF10K50E							40K	254	2880
XCV150	PQ240 BG256 BG352 FG256 FG456	166 180 260 176 260	47K	93K-165K	3456	2/24	102K	260	3888
EP20K100							52K	250	4160
EPF10K100B/E							25K	338	4992
XCV200	PQ240 BG256 BG352 FG256 FG456	166 180 260 176 284	64K	146K-237K	4704	2/24	130K	284	5292
EPF10K130E							65K	413	6656
XCV300	PQ240 BG352 BG342 FG456	166 260 316 312	83K	176K-323K	6144	2/24	160K	324	6912
EP20K200							104K	320	8320
EPF10K200E							98K	470	9984
XCV400	HQ240 BG432 BG560	166 316 404	130K	282K-468K	9600	2/24	230K	404	10800
XCV600	FG676 HQ240 BG432 BG560 FG676 FG680	404 166 316 404 444 512	187K	365K-661K	13824	2/24	312K	512	15552
EP20K400							208K	496	16640
XCV800	HQ240 BG432 PG560 FG676 FG680	166 316 404 444 512	254K	511K-888K	18816	2/24	406K	556	21168
XCV1000	BG560 FG680	404 512	332K	622K-1,124K	24576	2/24	512K	660	27648

* I/O Flip-Flops not counted.

High End FPGA Products & Benefits Snapshot	
Virtex-E • System-level integrated FPGA up to 3.2 million gates and 311MHz • Differential signaling: LVPECL, LVDS, Bus LVDS 36 I/O pairs at 622 MHZ • Up to 832K bits of True Dual-Port(™) Block RAM • Up to 1014K bits of Distributed RAM • Delivers Terabit memory bandwidth • 8 DLLs. Supports Double Data Rate Memory and backplane applications • 1.8V operation	**Virtex** • System-level integrated FPGA up to 1M gates and 200MHz • Up to 128K bits True Dual-Port RAM • Up to 384K bits Distributed RAM • 4 DLLs. Supports Double Data Rate Memory and backplane applications • Optimized for synthesis and IP-based design methodology • 2.5V operation
Total Solution	
Software & Cores • 50% faster compile times, increased performance, Internet-based design features. • Array of fully verified, predictable and parameterizable cores.	

Virtex Series FPGA Competitive Cross Reference

Competitive Feature Comparison

Device	Timing Generation	5 Volt Tolerant I/O	I/O Standards Supported												Differential Signaling		
			LVTTL	LVCMOS	PCI33	PCI66	GTL/GTL+	SSTL2	SSTL3	AGP	HSTL Class I	HSTL Class III	HSTL Class IV	CTT	LVDS	Bus LVCS	LVPECL
Virtex-E	8 DLL	✓*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Virtex	4 DLL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
APEX 20K	1 PLL		✓	✓	✓												
APEX 20KE	4 PLL		✓	✓	✓	✓	✓	✓	✓	✓	✓				✓		

* Requires 100 ohm external resistor

Competitive Feature Comparison

Device	Memory Access								
	Internal			External					
	Block	CAM	Distributed	SRAM	SSRAM	SGRAM	SDRAM	DDR	ZBT
Virtex-E	✓	**	✓	✓	✓	✓	✓	✓	✓
Virtex	✓	**	✓	✓	✓	✓	✓	✓	✓
APEX 20K	✓								
APEX 20KE	✓	✓		✓	✓	✓	✓		

** Supported with existing memory resources (see Application Notes on SPW)

Virtex-E is the Superior Programmable Solution

Superior Virtex-E LVDS Support

- Altera's APEX E LVDS only provides for 32 I/Os.
  Virtex-E supports LVDS, Bus LVDS, and LVPECL for up to 344 I/O pairs. Virtex-E Select I/O+ technology offers complete flexibility of choosing which standard is used on any given pin.
- Altera claims 622 MHz, but only for 16 inputs and 16 outputs, which is 10 Gbps.
  Virtex-E offers 36 pairs at 622 Mbps and delivers significantly higher LVDS Bandwidth by offering 344 I/O pairs at 311MHz per pair, which is a 107 Gbps (Gigabits per second) data rate.
- APEX E does not support backplane applications with Bus LVDS.
  Virtex-E offers Bus LVDS for all densities and speeds.
- APEX E does not support LVPECL
  Virtex-E offers LVDS and LVPECL up to 622MHz for all densities. LVPECL is the industry standard for transmission of on-board clocks at greater than 100MHz.

Superior Virtex Clock Management

- Altera's analog PLLs do not support precise clock management.
  Designers can achieve an exact 50/50 duty cycle using Virtex DLLs, which is crucial for Double Data Rate (DDR) applications. APEX PLLs can not offer this precision

Superior Virtex-E logic and RAM offering

- Virtex-E offers 3.2 million gate densities in Q2/00 and up to 832K bits of Block RAM, plus distributed RAM. Compare that to Altera's 2.5 million gates in the middle of Y2000 with only 456K Block RAM bits.
- APEX provides only block RAM and an interface to external RAM. Virtex offers more RAM and more types of RAM.
- Virtex interfaces to the industry's highest performance memories, including:
  - 200 MHz ZBT SRAM
  - 266 MHz Double Data Rate (DDR) memory
- Altera claims the dedicated CAM in APEX E, but the Virtex and Virtex-E offers CAM built from either distributed RAM or Block RAM at equivalent densities to those offered in APEX E. Most designs will require higher CAM densities than those offered with on-board dedicated CAM from Altera. In those cases, Virtex-E offers a faster external memory interface than APEX's.