



FPGA Replacement for 5-Volt Xilinx Products

Introduction

Proteus is a Chip Express FPGA replacement program. In its initial release, Proteus is available as a 5-volt product family serving the needs of specific Xilinx 4000E/EX devices and a Proteus 3.3-volt product family serving the Xilinx 4000XL/XLA family of devices.

Using the single-wafer/one-mask and wafer-lot/two-mask manufacturing capabilities of Chip Express, Proteus products deliver cost-effective component value as compared to an FPGA. Proteus replacement parts are designed and implemented in 0.35 μ m and 0.6 μ m CMOS technologies that offer performance/power benefits over comparable FPGAs.

Features

- Pin list compatible Xilinx 4000XL/XLA replacement
- Fabricated using 0.6 μ m CMOS process

- Supports 3.3-volt and 5-volt core supplies
- Supports 3.3-volt I/O
- High-speed embedded synchronous memory
- On-chip analog phase locked loops
- Hard-wired connectivity
- Low power consumption

Additional Information

For further information on the Proteus family of replacement solutions, please refer to the following documents:

- Proteus FPGA Replacement for 3.3-Volt Products (CEC002)
- Proteus Reliability Test Data Reports (CEC004)

Proteus 5-Volt Product Family Overview

Parameter	R4013E	R4020E	R4025E	R4028EX	R4036EX
Available gates	13000	20000	25000	28000	36000
Min RAM bits	24576	24576	24576	24576	24576
Max user I/O	192	224	256	256	288

DC Electrical Specifications –5-Volt Proteus Products

Absolute Maximum Ratings

Symbol	Description	Min	Max	Unit
V _{DD}	Supply voltage	0	7.0	V
V _{DDIO}	I/O supply voltage	0	5.5	V
V _{IN}	DC input voltage	-0.3	V _{DD} +0.3	V
T _J	Junction temperature	--	150	°C
T _{STG}	Storage temperature	-65	150	°C
T _{SOL}	Soldering lead temperature (10 seconds)	--	210	°C

Recommended Operating Conditions

Symbol	Description		Min	Max	Units
V _{DD}	Supply voltage	Commercial (0°C ≤ T _J ≤ 100°C)	4.75	5.25	V
		Industrial (-40°C ≤ T _J ≤ 115°C)	4.75	5.25	V
V _{IH}	Input high voltage	TTL inputs	2.0	V _{DD}	V
		CMOS inputs	0.7 V _{DD}	V _{DD}	V
V _{IL}	Input low voltage	TTL inputs	0	0.8	V
		CMOS inputs	0	0.3 V _{DD}	V
T _{in}	Input signal transition time		--	10	nS

DC Characteristics Over Operating Conditions

Symbol	Description		Min	Max	Units
V _{OH}	Output high voltage	TTL outputs	3.5	--	V
		CMOS outputs	3.5	--	V
V _{OL}	Output low voltage	TTL outputs	--	0.45	V
		CMOS outputs	--	0.45	V
I _{IN}	Input leakage current		-10	10	μA
C _{IN}	Input capacitance	QFP packages	--	--	Note 1
		BGA packages	--	--	Note 1

Note 1: Please refer to the Proteus Package Guide (CEC006).

Package and Device Availability

Packaging for Proteus Compatible Xilinx Series E Devices

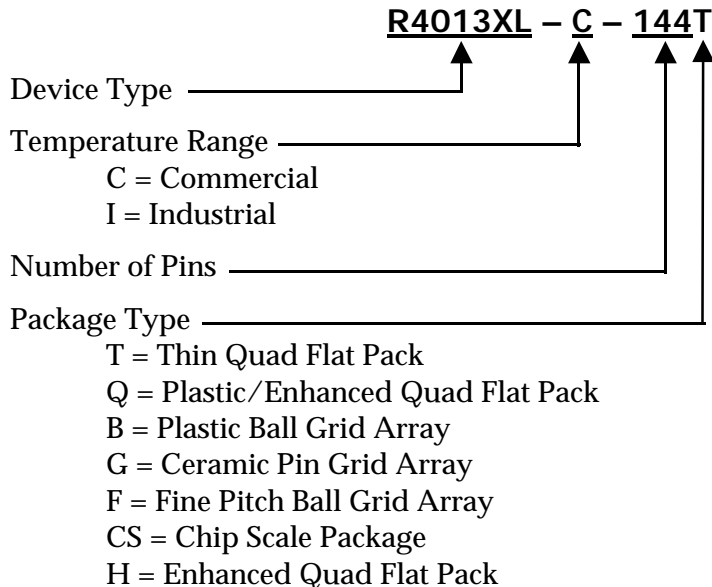
FPGA SERIES	160 PQFP	208 HQFP	208 PQFP	223 CPGA	225 PBGA	240 HQFP	240 PQFP	299 CPGA	304 HQFP
XC4013E	X	X	X	N/A	N/A	X	X		
XC4020E		X		N/A			X	N/A	
XC4025E				N/A		X		N/A	X

Packaging for Proteus Compatible Xilinx Series EX Devices

FPGA SERIES	208 HQFP	240 HQFP	299 CPGA	304 HQFP	352 PBGA	411 CPGA	432 PBGA
XC4028EX	X	X	N/A	X	X		
XC4036EX		X		X	X	N/A	N/A

- X = Compatibility match between Xilinx and Proteus devices
 N/A = Xilinx device exists, but there is no Proteus solution
 Note: All Xilinx speed grades are supported by Proteus

Ordering Information



Package Compatibility Matrix

Proteus Part Number	Temperature Range	Package Type	Xilinx Equivalent
R4013E-C-160Q	Commercial	160PQFP	XC4013E-PQ160C
R4013E-C-208H	Commercial	208HQFP	XC4013E-HQ208C
R4013E-C-208Q	Commercial	208PQFP	XC4013E-PQ208C
R4013E-C-240Q	Commercial	240PQFP	XC4013E-PQ240C
R4013E-C-240H	Commercial	240HQFP	XC4013E-HQ240C
R4013E-I-160Q	Industrial	160PQFP	XC4013E-PQ160I
R4013E-I-208H	Industrial	208HQFP	XC4013E-HQ208I
R4013E-I-208Q	Industrial	208PQFP	XC4013E-PQ208I
R4013E-I-240Q	Industrial	240PQFP	XC4013E-PQ240I
R4013E-I-240H	Industrial	240HQFP	XC4013E-HQ240I
R4020E-C-208H	Commercial	208HQFP	XC4020E-HQ208C
R4020E-C-240Q	Commercial	240PQFP	XC4020E-PQ240C
R4020E-I-208H	Industrial	208HQFP	XC4020E-HQ208I
R4020E-I-240Q	Industrial	240PQFP	XC4020E-PQ240I
R4025E-C-240H	Commercial	240HQFP	XC4025E-HQ240C
R4025E-C-304Q	Commercial	304HQFP	XC4025E-HQ304C
R4025E-I-240H	Industrial	240HQFP	XC4025E-HQ240I
R4025E-I-304Q	Industrial	304HQFP	XC4025E-HQ304I
R4028EX-C-208H	Commercial	208HQFP	XC4028EX-HQ208C
R4028EX-C-240H	Commercial	240HQFP	XC4028EX-HQ240C
R4028EX-C-304Q	Commercial	304HQFP	XC4028EX-HQ304C
R4028EX-C-352B	Commercial	352PBGA	XC4028EX-BG352C
R4028EX-I-208H	Industrial	208HQFP	XC4028EX-HQ208I
R4028EX-I-240H	Industrial	240HQFP	XC4028EX-HQ240I
R4028EX-I-304Q	Industrial	304HQFP	XC4028EX-HQ304I
R4028EX-I-352B	Industrial	352PBGA	XC4028EX-BG352I
R4036EX-C-240H	Commercial	240HQFP	XC4036EX-HQ240C
R4036EX-C-304Q	Commercial	304HQFP	XC4036EX-HQ304C
R4036EX-C-352B	Commercial	352PBGA	XC4036EX-BG352C
R4036EX-I-240H	Industrial	240HQFP	XC4036EX-HQ240I
R4036EX-I-304Q	Industrial	304HQFP	XC4036EX-HQ304I
R4036EX-I-352B	Industrial	352PBGA	XC4036EX-BG352I

For More Information

For additional information about Proteus, please visit our website (<http://www.chipexpress.com/proteus.html>) or contact the Chip Express sales office nearest you:

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