



FPGA Replacement for Altera FLEX 10K Series Products

Introduction

Proteus for Altera FLEX 10K Series PLDs is the latest addition to the Proteus FPGA Replacement Program from Chip Express. Proteus devices are now available to replace OEM production FPGAs from Xilinx and PLDs from Altera. Both Altera and Xilinx 3.3-volt and 5-volt products are included as part of the Proteus FPGA Replacement Program.

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 the competing FPGAs. The information contained within this datasheet is specific to replacement of Altera FLEX 10K and 10KA/V devices.

Features

- Pin list compatible Altera FLEX 10K, 10KA, 10KV replacement
- Fabricated using 0.35 μ m and 0.6 μ m CMOS processes
- 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
- Industrial and commercial temperature ranges supported

Additional Information

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

- Proteus Package Guide: Altera FLEX 10K Series Products (CEC024)
- Proteus Reliability Test Data Reports (CEC004)
- Proteus FPGA Replacement for 3.3-Volt Xilinx Products (CEC002)
- Proteus FPGA Replacement for 5-Volt Xilinx Products (CEC003)
- Proteus Package Guide for Xilinx Products (CEC006)

Proteus 5-Volt Product Family Overview

Parameter	10K10	10K20	10K30	10K40	10K50	10K70
Available Gates	10000	20000	30000	40000	50000	70000
Min RAM bits	24576	24576	32768	32768	32768	32768
Max user I/O	134	189	189	189	189	189

DC Electrical Specifications – Proteus 5-Volt Product Family

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)		V
		Industrial (-40°C ≤ T _J ≤ 115°C)		V
V _{IH}	Input high voltage	TTL inputs		V
		CMOS inputs		V
V _{IL}	Input low voltage	TTL inputs		V
		CMOS inputs		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		V
		CMOS outputs		V
V _{OL}	Output low voltage	TTL outputs		V
		CMOS outputs		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 for Altera FLEX 10K Series Products (CEC024).

Proteus 3.3-Volt Product Family Overview

Parameter	10K10A	10K30A	10K50V	10K100A
Available Gates	10000	30000	50000	70000
Min RAM bits	24576	32768	32768	32768
Max user I/O	150	191	189	189

DC Electrical Specifications – Proteus 3.3-Volt Product Family

Absolute Maximum Ratings

Symbol	Description	Min	Max	Unit
V_{DD}	Supply voltage	-0.3	4.6	V
V_{DDIO}	I/O supply voltage	-0.3	6.5	V
V_{IN}	DC input voltage	-0.3	3.9	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 ($0^{\circ}\text{C} \leq T_J \leq 100^{\circ}\text{C}$)		V
		Industrial ($-40^{\circ}\text{C} \leq T_J \leq 115^{\circ}\text{C}$)		V
V_{IH}	Input high voltage	TTL inputs		V
		CMOS inputs		V
V_{IL}	Input low voltage	TTL inputs		V
		CMOS inputs		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		V
		CMOS outputs		V
V_{OL}	Output low voltage	TTL outputs		V
		CMOS outputs		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 for Altera FLEX 10K Series Products (CEC024).

Package and Device Availability

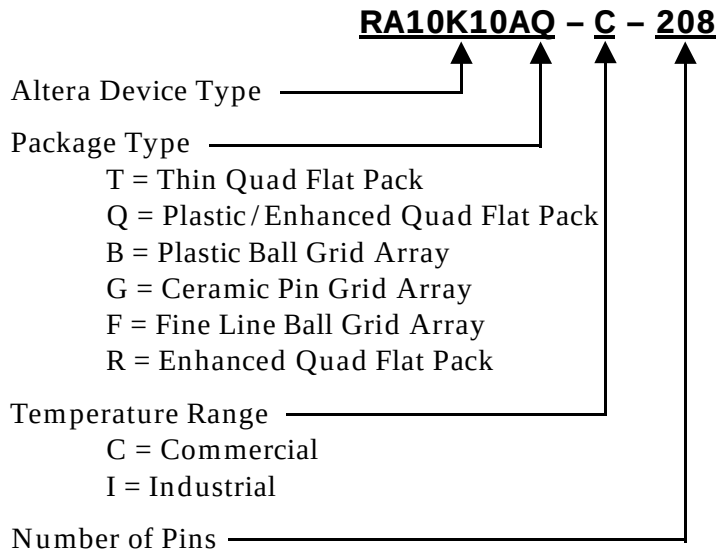
FPGA Series	84 PLCC	100 TQFP	144 TQFP	208 PQFP	208 RQFP	240 PQFP	240 RQFP	403 CPGA	503 CPGA	599 CPGA	256 FBGA	356 PBGA	484 FBGA	600 PBGA
EPF10K10	N/A		X	X	X									
EPF10K10A		N/A		X	X						X		N/A	
EPF10K20			X	X	X	X	X							
EPF10K30				X	X	X	X					N/A		
EPF10K30A			X	X	X	X	X				X	N/A	N/A	
EPF10K40				X	X	X	X							
EPF10K50						X	X	N/A				N/A		
EPF10K50V						X	X					N/A	N/A	
EPF10K70						X	X		N/A					
EPF10K100A						X	X		N/A			N/A	N/A	N/A
EPF10K130V										N/A				N/A
EPF10K250A										N/A				N/A

X = Compatibility match between Altera and Proteus devices

N/A = Altera device exists, but there is no Proteus replacement

Note: All Altera speed grades are supported by Proteus

Ordering Information



Package Compatibility Matrix

Proteus Part Number	Temperature Range	Package Type	Altera Equivalent
RA10K10AF-C-256	Commercial	256FBGA	EPF10K10A
RA10K10T-C-144	Commercial	144TQFP	EPF10K10
RA10K10Q-C-208	Commercial	208PQFP	EPF10K10
RA10K10R-C-208	Commercial	208RQFP	EPF10K10
RA10K10AT-C-144	Commercial	144TQFP	EPF10K10A
RA10K10AQ-C-208	Commercial	208PQFP	EPF10K10A
RA10K10AR-C-208	Commercial	208RQFP	EPF10K10A
RA10K10AF-I-256	Industrial	256FBGA	EPF10K10A
RA10K10T-I-144	Industrial	144TQFP	EPF10K10
RA10K10Q-I-208	Industrial	208PQFP	EPF10K10
RA10K10R-I-208	Industrial	208RQFP	EPF10K10
RA10K10AT-I-144	Industrial	144TQFP	EPF10K10A
RA10K10AQ-I-208	Industrial	208PQFP	EPF10K10A
RA10K10AR-I-208	Industrial	208RQFP	EPF10K10A
RA10K20T-C-144	Commercial	144TQFP	EPF10K20
RA10K20Q-C-208	Commercial	208PQFP	EPF10K20
RA10K20R-C-208	Commercial	208RQFP	EPF10K20
RA10K20Q-C-240	Commercial	240PQFP	EPF10K20
RA10K20R-C-240	Commercial	240RQFP	EPF10K20
RA10K20T-I-144	Industrial	144TQFP	EPF10K20
RA10K20Q-I-208	Industrial	208PQFP	EPF10K20
RA10K20R-I-208	Industrial	208RQFP	EPF10K20
RA10K20Q-I-240	Industrial	240PQFP	EPF10K20
RA10K20R-I-240	Industrial	240RQFP	EPF10K20
RA10K30Q-C-208	Commercial	208PQFP	EPF10K30
RA10K30R-C-208	Commercial	208RQFP	EPF10K30
RA10K30Q-C-240	Commercial	240PQFP	EPF10K30
RA10K30R-C-240	Commercial	240RQFP	EPF10K30
RA10K30AF-C-256	Commercial	256FBGA	EPF10K30A
RA10K30AT-C-144	Commercial	144TQFP	EPF10K30A
RA10K30AQ-C-208	Commercial	208PQFP	EPF10K30A
RA10K30AR-C-208	Commercial	208RQFP	EPF10K30A
RA10K30AQ-C-240	Commercial	240PQFP	EPF10K30A
RA10K30AR-C-240	Commercial	240RQFP	EPF10K30A
RA10K30Q-I-208	Industrial	208PQFP	EPF10K30
RA10K30R-I-208	Industrial	208RQFP	EPF10K30
RA10K30Q-I-240	Industrial	240PQFP	EPF10K30
RA10K30R-I-240	Industrial	240RQFP	EPF10K30
RA10K30AF-I-256	Industrial	256FBGA	EPF10K30A

Proteus Part Number	Temperature Range	Package Type	Altera Equivalent
RA10K30AT-I-144	Industrial	144TQFP	EPF10K30A
RA10K30AQ-I-208	Industrial	208PQFP	EPF10K30A
RA10K30AR-I-208	Industrial	208RQFP	EPF10K30A
RA10K30AQ-I-240	Industrial	240PQFP	EPF10K30A
RA10K30AR-I-240	Industrial	240RQFP	EPF10K30A
RA10K40Q-C-208	Commercial	208PQFP	EPF10K40
RA10K40R-C-208	Commercial	208RQFP	EPF10K40
RA10K40Q-C-240	Commercial	240PQFP	EPF10K40
RA10K40R-C-240	Commercial	240RQFP	EPF10K40
RA10K40Q-I-208	Industrial	208PQFP	EPF10K40
RA10K40R-I-208	Industrial	208RQFP	EPF10K40
RA10K40Q-I-240	Industrial	240PQFP	EPF10K40
RA10K40R-I-240	Industrial	240RQFP	EPF10K40
RA10K50Q-C-240	Commercial	240PQFP	EPF10K50
RA10K50R-C-240	Commercial	240RQFP	EPF10K50
RA10K50VQ-C-240	Commercial	240PQFP	EPF10K50V
RA10K50VR-C-240	Commercial	240RQFP	EPF10K50V
RA10K50Q-I-240	Industrial	240PQFP	EPF10K50
RA10K50R-I-240	Industrial	240RQFP	EPF10K50
RA10K50VQ-I-240	Industrial	240PQFP	EPF10K50V
RA10K50VR-I-240	Industrial	240RQFP	EPF10K50V
RA10K70Q-C-240	Commercial	240PQFP	EPF10K70
RA10K70R-C-240	Commercial	240RQFP	EPF10K70
RA10K70Q-I-240	Industrial	240PQFP	EPF10K70
RA10K70R-I-240	Industrial	240RQFP	EPF10K70
RA10K100AQ-C-240	Commercial	240PQFP	EPF10K100A
RA10K100AR-C-240	Commercial	240RQFP	EPF10K100A
RA10K100AQ-I-240	Industrial	240PQFP	EPF10K100A
RA10K100AR-I-240	Industrial	240RQFP	EPF10K100A

For More Information

Chip Express Corporation
 2323 Owen Street
 Santa Clara, CA 95054
www.chipexpress.com
 Phone: (408) 988-2445
 Fax: (408) 988-2449
 Toll Free: 1-800-95-CHIPX
 Email: moreinfo@chipx.com