Military Logic Cell™ Arrays

XC2018B, XC3020B, XC3042B, XC3090B Product Specifications

INTRODUCTION

Xilinx introduced the first field programmable gate array (FPGA) in 1985. The development of the PGA was the result of a number of technical breakthroughs and truly represents the latest in advanced technology for microelectronic applications. Due to its density and the convenience of user programmability, the Logic Cell™ Array is an important new alternative in the ASIC market. Xilinx continues to concentrate its resources exclusively on expanding its growing family of programmable gate arrays and associated development systems. See the Xilinx Programmable Gate Array Data Book for a complete description of the architecture of both the 2000 and 3000 series arrays.

MIL-STD-883 CLASS B INTRODUCED

Xilinx continues its leadership in field programmable gate arrays (FPGA) by announcing the first military qualified FPGA's. These four devices meet all requirements of MIL-STD-883 paragraph 1.2.1

Device	Logic Capacity (gates)	Configurable Logic Blocks	User I/Os	Program Data (bits)
XC2018B	1800	100	74	17,878
XC3020B	2000	64	64	14,779
XC3042B	4200	144	96	30,784
XC3090B	9000	320	144	64,160

MILITARY PACKAGING

Xilinx offers two military packaging alternatives. In addition to the industry standard ceramic pin grid array (CPGA) packages we offer a ceramic quad flat package (CQFP) that meets the JEDEC standard outline drawing #MO-082. This CQFP has 25 mil pin-to-pin spacing. It is shipped with the leads unformed allowing selection of cavity up or cavity down and lead forming at the point of board assembly for better contact.

Device	Total I/O	Surface Mount Ceramic QFP	Surface Mount User I/O	Through Hole Ceramic PGA	Through Hole User I/O
XC2018	74	—	—	CPGA 84	74
XC3020	64	CQFP 100	64	CPGA 84	64
XC3042	96	CQFP 100	82	CPGA 132	96
XC3090	144	CQFP 164	142	CPGA 175	144

STANDARD MILITARY DRAWINGS (SMD)

The Standard Military Drawing program (SMD) is a program initiated by the Federal government to simplify the procurement of Integrated Microcircuits (especially the more advanced technologies) by military contractors. The Defense Electronics Supply Center (DESC) issues the SMD that is consistent with the Xilinx military product specification and test conditions. DESC assigns an SMD specification number and releases the drawing. This drawing is then availble for use by all departments and agencies of the Department of Defense. The Xilinx device can then be easily procured by a military contractor by specifying the SMD# instead of the Xilinx part number. This eliminates the need for a separate Source Control Drawing (SCD) and greatly reduces paperwork.

DESC has assigned the XC2018B device SMD# 5962-88638, the XC3020B device SMD# 5962-89948, the XC3042B device SMD# 5962-89713 and the XC3090B device SMD# 5962-89823. Contact your Xilinx representative or DESC for more information.

LCA IDEAL FOR MILITARY APPLICATIONS

Field programmable gate arrays are taking market share from mask gate arrays in the commercial market are expected to be even more successful in the military market. Approximately 50% of all logic sales in the U.S. military market are ASIC's today. That number is expected to grow to 70% by 1993. FPGA's offer lower costs and more flexibility than mask gate arrays.

The LCA is especially suited to military ASIC applications. With a FPGA one specification can be written to cover multiple applications. Xilinx programmable gate arrays are "configured" by downloading software to the part - no fuses are blown. There is no requirement for post-programming testing for fault verification. The device is never obsolete because it can be reprogrammed many times.

Because Xilinx FPGA's are standard parts, they can be stocked in inventory at Xilinx, at Xilinx distributors or at the user site. One part can be stocked for multiple applications, minimizing inventory costs. Another benefit of being a standard product is the inherent high reliability of a high volume memory product rather than a low volume custom circuit. Non-recurring engineering costs (NRE) are never required for a FPGA thereby providing cost effective solutions in military volumes and allowing very inexpensive design iterations.

For maximum security the configuration data may be "down-loaded" from a remote site thereby eliminating the potential of tampering with the configuration data locally. The FPGA can be made non-volatile in this instance with the addition of a small battery backup.

One of the most effective advantages of the Xilinx FPGA is the ability to reconfigure some or all of the device while it remains in the circuit. This opens up entirely new possibilities allowing the same gates to be used by different functions at different times.

IMPORTANT BENEFITS FOR MILITARY DESIGNS

Cost Containment

- No NRE
  - — Very cost effective in military volumes
  - — Low cost design iterations
- Standard Product
  - — No overrun charges
  - — Simplified product qualification.
  - — No test vectors to write
  - — Simplified documentation (SMD)

Reliability

- Standard Product
  - — Reliability of hi-volume memory product
- Fully tested by Xilinx
  - — Fault coverage assured by vendor

Security

- No design information needed by manufacturer
  - — Secure design process. Design data held to vendor at user site.
- Remote configuration
  - — Ensures secure design data capability

Flexibility

- Standard product
  - — An ASIC where one spec can be used for multiple applications
  - — An ASIC stocked by distribution
- Reprogrammable
  - — Logic can be changed "on the fly"
- No FAB turnaround
  - — Design changes in minutes

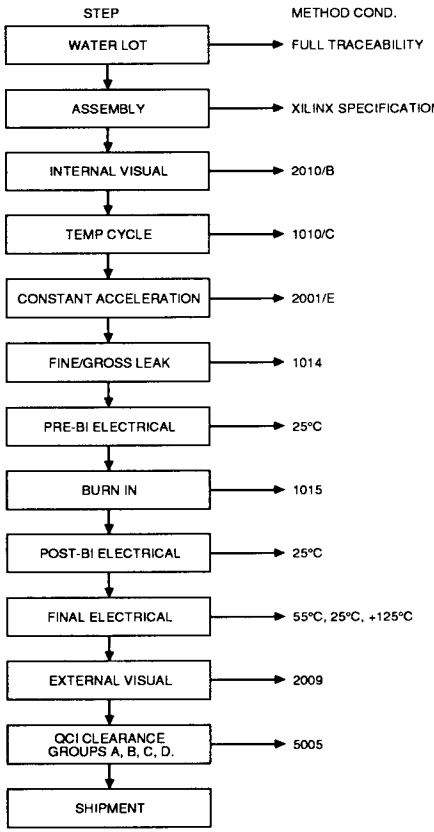
MIL-STD-883 CLASS B COMPLIANCE

Xilinx is now serving military customers in accordance with MIL-STD-883 Class B paragraph 1.2.1 together with the attendant requirements of MIL-M-38510. This includes full compliance with all processing requirements of Method 5004 and all Quality Conformance Inspection (QCI) requirements of Method 5005 (Groups A,B,C,D).

MIL-M-38510 (as invoked by MIL-STD-883)
Military Specification Microcircuits—General Specification (describes the design, processing and assembly workmanship guidelines)

MIL-STD-883
Military Standards—Test Methods and Procedures for Microelectronics (delineates the detailed testing and inspection methods for military integrated circuits)

MIL-STD-883 Class B—Method 5004 Processing Flow



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MIL-STD-883 CLASS B–METHOD 5005 QUALITY CONFORMANCE INSPECTION (QCI) TESTING

Every lot of devices shipped to the requirements of MIL-STD-883C is required to be qualified by four kinds of Quality Conformance Inspection (QCI) Tests. The QCI requirements specified by the Defense Electronics Supply Center (DESC) undergo regular revisions. Xilinx rigorously incorporates these revisions into our QCI testing in conformance with the requirements of MIL-STD-883C. These are:

Group A—Electrical tests done to data sheet limits at all three temperatures of the military temperature range, –55°C to +125°C. These are performed on a sample from the same lot being shipped.

Group B—Mechanical tests performed on a sample of devices of the same device/package type assembled within the same 6 week widow of the lot being shipped. This group consists of up to 8 subgroups including physical dimensions, mark permanency, solderability, internal visual/mechanical, bond strength, internal water vapor content, fine & gross leak, and ESD sensitivity.

Group C—Package related reliability tests performed on a sample of devices made with die from the same 1 year window. This group consists of up to 2 subgroups including (1) life testing (1000 hr at 125°C) and (2) temperature cycling, constant acceleration, fine & gross leak, and a visual examination.

Group D—Package related reliability tests performed on a sample of devices made in the same package within the same 1 year window. This group consists of up to 8 subgroups: physical dimensions; lead integrity and seal; thermal shock/temperature cycling/moisture resistance/seal/visual; mechanical shock vibration (variable frequency)/constant acceleration/seal/visual; salt atmosphere/seal/visual; internal water-vapor content; adhesion of lead finish; lid torque.