

UG0795
User Guide
RMA Procedures for FPGA Failures





Power Matters.™

Microsemi Corporate Headquarters

One Enterprise, Aliso Viejo,
CA 92656 USA

Within the USA: +1 (800) 713-4113

Outside the USA: +1 (949) 380-6100

Fax: +1 (949) 215-4996

Email: sales.support@microsemi.com

www.microsemi.com

© 2017 Microsemi Corporation. All rights reserved. Microsemi and the Microsemi logo are trademarks of Microsemi Corporation. All other trademarks and service marks are the property of their respective owners.

Microsemi makes no warranty, representation, or guarantee regarding the information contained herein or the suitability of its products and services for any particular purpose, nor does Microsemi assume any liability whatsoever arising out of the application or use of any product or circuit. The products sold hereunder and any other products sold by Microsemi have been subject to limited testing and should not be used in conjunction with mission-critical equipment or applications. Any performance specifications are believed to be reliable but are not verified, and Buyer must conduct and complete all performance and other testing of the products, alone and together with, or installed in, any end-products. Buyer shall not rely on any data and performance specifications or parameters provided by Microsemi. It is the Buyer's responsibility to independently determine suitability of any products and to test and verify the same. The information provided by Microsemi hereunder is provided "as is, where is" and with all faults, and the entire risk associated with such information is entirely with the Buyer. Microsemi does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other IP rights, whether with regard to such information itself or anything described by such information. Information provided in this document is proprietary to Microsemi, and Microsemi reserves the right to make any changes to the information in this document or to any products and services at any time without notice.

About Microsemi

Microsemi Corporation (Nasdaq: MSCC) offers a comprehensive portfolio of semiconductor and system solutions for aerospace & defense, communications, data center and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; enterprise storage and communication solutions, security technologies and scalable anti-tamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Microsemi is headquartered in Aliso Viejo, California, and has approximately 4,800 employees globally. Learn more at www.microsemi.com.

Contents

1	Revision History	1
1.1	Revision 1.0	1
2	RMA Procedures	2
2.1	RMA Procedure for Functional/Electrical Failure	2
2.2	RMA Procedure for Hardware Failure	2
2.3	RMA Procedure for Programming Failure	3
2.3.1	Non-RH/RT Devices	3
2.3.2	RH/RT Devices	5
2.4	RMA Procedure for Visual/Mechanical Failure	5

Tables

Table 1	Antifuse FPGAs (non -F speed grade) Maximum Allowed Programming Failures	3
Table 2	Axcelerator Family (all speed grades) Maximum Allowed Programming Failures	3
Table 3	SX32A and SX72A (all speed grades) Maximum Allowed Programming Failures	4
Table 4	-F Antifuse (other than SX32A and SX72A) FPGAs Maximum Allowed Programming Failures ...	4
Table 5	Flash / Re-programmable Devices	4

1 Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the current publication.

1.1 Revision 1.0

Revision 1.0 is the first publication of this document.

2 RMA Procedures

There are various types of FPGA device failures. For handling the FPGA failures, follow the appropriate return material authorization (RMA) procedures described below. Tech Support provides only the technical evaluation of the RMA request. RMA request will further be reviewed by RMA team before it can be fully approved for processing.

2.1 RMA Procedure for Functional/Electrical Failure

If the FPGA is programmed correctly but does not function as expected (such as output stuck at high, incorrect output) in the board is considered as functional failure. If the FPGA is programmed correctly but exhibits incorrect electrical behavior (such as high current, lower voltage level at the output) is considered as electrical failure.

The following actions should be taken for functional and electrical failures:

1. Open a case through Customer Portal - soc.microsemi.com/mycases
2. Attach the completed *FA checklist* (fill in the tab “**Electrical-Functional**”) in the case opened through Customer Portal.
3. You are also responsible for providing all the design files necessary to perform the failure analysis. This includes, but is not limited to: source files (schematic or HDL), Designer database file (*.adb), board schematics, test vectors and testbench, programming files, and timing analysis results. Additional files may be requested by Technical Support. If any of these files are missing, it may hinder or impede our ability to perform a failure analysis
4. Technical Support will get back to you with further instructions after the investigation
5. If the failure is legitimate functional or electrical failure and not an apparent user error then Technical Support will instruct you to send the device/s for FA. The instruction will include how and where to send the device/s

Note: If the failed device/s are not RH/RT, they can be sent for FA using FA case number (RMA number is not required). RMA number is only required for RT/RH devices. RMA’s decision regarding replacement of the failed device/s will be made after the completion of the FA.

2.2 RMA Procedure for Hardware Failure

The following actions should be taken for hardware failures such as eval/demo/dev kits, programming adapter modules, sockets, adapter sockets, programmers (such as FlashPro5, Silicon Sculptor 3) and debuggers (such as Silicon Explorer II).

1. Open a case through Customer Portal - soc.microsemi.com/mycases
2. Provide necessary evidence (such as test results, log files, pictures and so on) about the failures
3. Technical Support will get back to you with RMA instructions after the investigation
4. Once Technical Support sends you the RMA instructions, your point of contact would be RMA@microsemi.com (you can copy customer.service@microsemi.com). Technical Support will not be responsible for providing any updates to the RMA request anymore
5. RMA’s decision will be communicated to you by RMA@microsemi.com

2.3 RMA Procedure for Programming Failure

The following sections describe the actions to be taken in case of programming failures.

2.3.1 Non-RH/RT Devices

If the programming failure quantity is within the range of values provided in the following tables, Table 1 to Table 5, you do not need to open a Tech Support case. Submit RMA request directly to RMA@microsemi.com with the completed [RMA form](#). If you are a distributor you can submit RMA request through the online RMA system - <https://ops.microsemi.com/newrma/>

For fallout with quantities greater than those listed in the following tables, Table 1 to Table 5, a case must be initiated with Technical Support to investigate the issue further, as documented below -

1. Open a case though Customer Portal - soc.microsemi.com/mycases
2. Attach the completed [FA checklist](#) (fill in the tab "**Programming**") in the case opened through Customer Portal
3. Attach programming log file in the case opened through the Customer Portal.

Table 1 • Antifuge FPGAs (non -F speed grade) Maximum Allowed Programming Failures

Sample Size	Maximum Number of Programming Failures Allowed
<10	1
10-18	2
19-30	3
31-45	5
46-60	7
61-75	8
76-99	10
100	3%

4. For details of SX32A and SX72A devices, see [Table 3](#), page 4

Table 2 • Accelerator Family (all speed grades) Maximum Allowed Programming Failures

Guidelines for AX125, AX250 and AX500		Guidelines for AX1000 and AX2000	
Sample Size	Maximum Number of Programming Failures Allowed	Sample Size	Maximum Number of Programming Failures Allowed
<10	2	<10	3
10-18	3	10-18	5
19-30	4	19-30	6
31-45	8	31-45	8
46-60	10	46-60	11
61-75	12	61-75	13
76-99	15	76-99	15
>100	8%	>100	12%

Table 3 • SX32A and SX72A (all speed grades) Maximum Allowed Programming Failures

Sample Size	Maximum Number of Programming Failures Allowed
<10	4
10-18	6
19-30	8
31-45	11
46-60	14
61-75	16
76-99	19
100	15%

Table 4 • -F Antifuse (other than SX32A and SX72A) FPGAs Maximum Allowed Programming Failures

Sample Size	Maximum Number of Programming Failures Allowed
<10	3
10-18	5
19-30	7
31-45	10
46-60	12
61-75	14
76-99	15
100	12%

Table 5 • Flash / Re-programmable Devices

Devices	Programming Failure Rate Allowance
IGLOO®/e (including ARM-enabled), IGLOO nano, IGLOO PLUS, ProASIC®3/e (including ARM-enabled), Military ProASIC3/EL, ProASIC3 nano, ProASIC3L, SmartFusion®, and Fusion® (including ARM-enabled)	0.5%
ProASIC and ProASIC ^{PLUS} ® (including -F)	1% if total volume programmed <1000, 0.5% if volume >1000

2.3.2 RH/RT Devices

For all programming failures on RH/RT devices, a case must be initiated with Technical Support to investigate the issue further, as documented below:

1. Open a case through Customer Portal - soc.microsemi.com/mycases
2. Attach the completed *FA checklist* (fill in the tab “**Programming**”) in the case opened through Customer Portal
3. Attach programming log file in the case opened through the Customer Portal

2.4 RMA Procedure for Visual/Mechanical Failure

Visual/ mechanical failures are related to the failures/damages external to the devices. Hence your claim is valid if you file the case immediately after the incoming inspection (prior to any other processing of the devices). If you handled the device besides the incoming inspection, your claim is forfeited. The following actions should be taken for visual/mechanical failures for all devices:

1. Open a case through Customer Portal - soc.microsemi.com/mycases
2. Attach the completed *FA checklist* (fill in the tab “**Visual Mechanical**”) in the case opened through Customer Portal)
3. Attach pictures of the failed devices. Do not mark the devices with sticky paper, rather take closeup pictures and mark the picture to highlight the area of concern
4. Attach pictures of the outer box
5. Technical Support will get back to you with RMA instructions after the investigation