Report

on the

Certificate

Z10 088989 0031 Rev. 00

of the

Safety Controller
AM263x

Applicant

Texas Instruments Incorporated

12500, TI Boulevard
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USA

Report No.: TD101226C

Version 1.0 of 2023-07-26

Testing Laboratory for Safety Components

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Modification History

Rev.	Status	Date	Author	Modification / Description
1.0	Active	2023-07-26	Christian Nowak	

Table 1: Modification history

1 Target of Evaluation (ToE)

In July 2022 Texas Instruments Incorporated requested TÜV SÜD Rail GmbH to test and certify the AM263x according to the standard listed in clause 4 of this report. The project number related to this Technical Report is 717525871.

The ToE is a product used in safety related applications. The AM263x is a Safety Controller approved for

- SIL 3 according to IEC 61508

2 Scope of Testing

2.1 Test Specimen

The AM263x MCU family is designed for motor control and digital power control applications. The family consists of multiple pin-to-pin compatible devices with up to four 400-MHz Arm® Cortex®-R5F cores. The multiple Arm® cores can be optionally programmed to run in lock-step mode for different functional safety configurations.

The AM263x was developed as compliant item according to IEC 61508:2010. The development safety lifecycle was tailored according to the applicable requirements for a compliant item.

2.2 Nomenclature and Identification of AM263x

The AM263x tested is identified by hardware version as follows:

Name	Package	Silicon
AM263x	nFBGA (324-pin)	AM263ZCZ PG1.1

Table 2: HW identification of AM263x

Orderable Part # for AM2632:
• AM2632COMFHAZCZR • AM2632COLFHAZCZR • AM2632COKFHAZCZR • AM2632CNEFHAZCZR • AM2632CNDFHAZCZR
Orderable Part # for AM2634:
• AM2634COMFHAZCZR • AM2634COLFHAZCZR • AM2634COKFHAZCZR • AM2634COEFHAZCZR • AM2634CODFHAZCZR

3 Certification Requirements

The certification of the AM263x is according to the regulations and standards listed in clause 4 of this document. This certifies the successful completion of the following test segments.

I. Functional Safety including
- Functional safety management (FSM) and safety lifecycle
- Avoidance of systematic faults / Systematic capability
- Hardware Safety Requirements (including assumptions of use)
- Analysis of the device structure (IP/Element FMAs)
- Quantitative analysis of the hardware (FMEDA)
- Fault injection and simulation
- Dependent Failure Analysis (DFA)
- Criteria for coexistence of elements
- Hardware functional test and design verification
- Hardware qualification
- Development Tool qualification

II. Safety information in the product documentation (safety manual, user manual, installation and operating instructions).

III. Product-Related Quality Assurance in Manufacture and Product Development

3.1 Certification Documentation

The detailed technical evaluation is documented in the most recent version of the Technical Report:

Document No.	Description	Project No.
TD101200T	Technical Report	717525871
Safety related requirements, conditions and restrictions can be found in the following user documentation		
SPRUJ14	Safety Manual / Installation Manual	717525871

Table 3: Technical Report

Based on the specified purpose of use of the AM263x in safety critical process applications, the certification is based on the set of standards listed in clause 4 of this document. The issuance of the certificate states compliance with these references unless specifically noted otherwise.

4 Standards and Guidelines

The regulations and guidelines which form the basis of the type testing are listed below.

No.	Reference	Description
/N1/	IEC 61508-1:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 1: General requirements
/N2/	IEC 61508-2:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 2: Requirements for electrical/electronic/ programmable electronic safety-related systems

Table 4: Basic safety standards

4.1 Safety Information in the Product Documentation (safety manual, operating instructions, labelling)

No.	Reference	Description
/N3/	IEC 61508-2: 2010	Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems

Table 5: Safety information standards

4.2 Quality Management System

No.	Reference	Description
[M1]	QMS	Quality Management System TÜV SÜD Rail GmbH
	TR_RA_P_04.50	Test Program Functional Safety TR_RA_P_04.51 Definition Scope of testing TR_RA_P_04.07 Product Modification TR_RA_P_04.52 Concept Phase & Safety Lifecycle TR_RA_P_04.53 Detail Phase Hardware TR_RA_P_04.54 Detail Phase Software TR_RA_P_04.55 Safety Manual TR_RA_P_04.56 Result of Testing
[M2]	D-PL-11190-08-00	DAkkS accreditation according to DIN EN ISO 17025:2018 / EN ISO/IEC 17025:2017

Table 6: Quality Management System

5 Results

5.1 Functional Safety

The tests performed and quality assurance measures implemented by the Texas Instruments Incorporated have shown that the AM263x complies with the testing criteria specified in clause 4 subject to the conditions defined in clause 6 and is suitable for safety-related use in applications up to

- up to SIL 3 in accordance with IEC 61508

6 Implementation Conditions and Restrictions

The use of the AM263x shall comply with the current version of the safety parts of the user manual, and the following implementation and installation requirements have to be followed, if the AM263x is used in safety-related installations.

- The guidelines and requirements specified in the user documentation shall be followed. Only modules certified for safety-related operation shall be used for safety-critical functions. Especially the requirements of the system integration section of the safety manual have to be regarded
- The impact on the overall safety concept and the safety function has to be well understood and analysed if a safety mechanism described in the safety manual is not used.
- All safety mechanisms implemented by the system integrator have to be developed and verified according to the targeted safety standards.
- All specific characteristics and behaviours of the AM263x required by the final safety function have to be developed and verified according to the targeted safety standards. This includes also timing aspects like reaction times, test intervals or test execution times.
- The system integrator has to understand the conditions and restrictions defined in the documentation of the AM263x.

7 Certificate Number

This report specifies technical details and implementation conditions required for the application of AM263x to the certificate:

Z10 088989 0031 Rev. 00

Technical Certifier

Digital unterschrieben von Christian Dirmeier
Datum: 2023.07.26 14:23:49 +02'00'

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