Report

on the

Certificate

Z10 088989 0028 Rev. 00

of the

Safety Controller
DRA829/TDA4VM

Applicant

Texas Instruments Incorporated
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Report No.: TD99728C

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Testing Laboratory for Safety Components

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Modification History

Rev.	Status	Date	Author	Modification / Description
1.0	Active	2022-11-28	Axel Köhnen	initial

Table 1: Modification history

1 Target of Evaluation (ToE)

In May 2020 Texas Instruments Incorporated requested TÜV SÜD Rail GmbH to test and certify the DRA829/TDA4VM ASIC hardware as part of Texas Instruments Jacinto 7 family of products according to the standard listed in clause 4 of this report. The project number related to this Certificate Report is 717521003.

The ToE is a product used in safety related applications. The DRA829/TDA4VM is a Safety Controller and should be approved for

- up to SIL 3 for the MCU domain
- up to SIL 2 for the Main domain
- Systematic Capability SC3

according to IEC 61508

The DRA829/TDA4VM processor family is targeted at ADAS and Autonomous Vehicle (AV) applications and is built to meet the complex processing needs of modern industrial embedded products. Key cores include next generation DSP with scalar and vector cores, dedicated deep learning and traditional algorithm accelerators, latest ARM and GPU processors for general compute, an integrated next generation imaging subsystem (ISP), video codec, Ethernet hub and isolated MCU island.

2 Scope of Testing

2.1 Test Specimen

The target of evaluation are generic safety microcontroller devices based on the Jacinto™ 7 family of products platform architecture DRA829/TDA4VM.

The assessment is based on a tailored safety lifecycle for a compliant item according to IEC 61508:2010. The certificate report gives an overview of the results of the certification process and the general safety relevant conditions and restrictions related to the use of the DRA829/TDA4VM in safety-related systems.

2.2 Nomenclature and Identification of DRA829/TDA4VM

The DRA829/TDA4VM tested is identified by hardware as follows:

Name	Package	Silicon
DRA829/TDA4VM	FCBGA (827)	XJ721EGALF (ES 1.1)

Table 2: HW Identification of DRA829/TDA4VM

Product Root Part Numbers

- TDA4VM88**zY**BALF**c**
- TDA4VM67**zY**BALF**c**
- TDA4VM21**zY**BALF**c**
- DRA829JM**zY**BALF**c**
- DRA829VM**zY**BALF**c**

Valid options:

z = Device Speed Grade	TDA4VMx	DRA829x
T	yes	yes
L	yes	n/a
E	yes	n/a

Y = Device Type
C
5
R
D
P

c = Carrier designator
R
Blank

3 Certification Requirements

The certification of the DRA829/TDA4VM 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.
TD99609T	Technical Report	717521003
Safety related requirements, conditions and restrictions can be found in the following user documentation		
SPRUIR0_DRA829_TDA4VM_Safety_ Manual - Industrial.pdf v11, 2022-11-10	Safety Manual / Installation Manual	717521003

Table 3: Technical Report

4 Standards and Guidelines

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

4.1 Functional Safety

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

4.2 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-IS-11190-01-00	DAkkS accreditation according to DIN EN ISO/IEC 17020:2012; inspection body type A
[M3]	D-PL-11190-08-00	DAkkS accreditation according to DIN EN ISO 17025:2018 / EN ISO/IEC 17025:2017

Table 5: 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 DRA829/TDA4VM 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 for the MCU domain
- up to SIL 2 for the Main domain
- Systematic Capability SC3

according to IEC 61508

6 Implementation Conditions and Restrictions

The use of the DRA829/TDA4VM shall comply with the current version of the safety related information in the user manual and safety manual, and the following implementation and installation requirements have to be followed, if the DRA829/TDA4VM 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 analyzed 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 behaviors of the DRA829/TDA4VM 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 DRA829/TDA4VM.

7 Certificate Number

This report specifies technical details and implementation conditions required for the application of DRA829/TDA4VM to the certificate:

Z10 088989 0028 Rev. 00

Technical Certifier

Digital unterschrieben von Christian Dirmeier
Datum: 2022.11.29 10:46:50 +01'00'

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