



Report No. MCR-25-0105
Date: March 28, 2025

RENESAS SEMICONDUCTOR RELIABILITY REPORT

DEVICE: RAJ2930004AGM#HA1

APPLICATION: Automotive

Quality Assurance Div.
Renesas Electronics Corporation

Notice

- 1 Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation or any other use of the circuits, software, and information in the design of your product or system. Renesas Electronics disclaims any and all liability for any losses and damages incurred by you or third parties arising from the use of these circuits, software, or information.
- 2 Renesas Electronics hereby expressly disclaims any warranties against and liability for infringement or any other claims involving patents, copyrights, or other intellectual property rights of third parties, by or arising from the use of Renesas Electronics products or technical information described in this document, including but not limited to, the product data, drawings, charts, programs, algorithms, and application examples.
- 3 No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
- 4 You shall be responsible for determining what licenses are required from any third parties, and obtaining such licenses for the lawful import, export, manufacture, sales, utilization, distribution or other disposal of any products incorporating Renesas Electronics products, if required.
- 5 You shall not alter, modify, copy, or reverse engineer any Renesas Electronics product, whether in whole or in part. Renesas Electronics disclaims any and all liability for any losses or damages incurred by you or third parties arising from such alteration, modification, copying or reverse engineering.
- 6 Renesas Electronics products are classified according to the following two quality grades: “Standard” and “High Quality”. The intended applications for each Renesas Electronics product depends on the product’s quality grade, as indicated below.

“Standard”: Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; industrial robots; etc.

“High Quality”: Transportation equipment (automobiles, trains, ships, etc.); traffic control (traffic lights); large-scale communication equipment; key financial terminal systems; safety control equipment; etc.

Unless expressly designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not intended or authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems; surgical implantations; etc.), or may cause serious property damage (space system; undersea repeaters; nuclear power control systems; aircraft control systems; key plant systems; military equipment; etc.). Renesas Electronics disclaims any and all liability for any damages or losses incurred by you or any third parties arising from the use of any Renesas Electronics product that is inconsistent with any Renesas Electronics data sheet, user’s manual or other Renesas Electronics document.

- 7 No semiconductor product is absolutely secure. Notwithstanding any security measures or features that may be implemented in Renesas Electronics hardware or software products, Renesas Electronics shall have absolutely no liability arising out of any vulnerability or security breach, including but not limited to any unauthorized access to or use of a Renesas Electronics product or a system that uses a Renesas Electronics product. RENESAS ELECTRONICS DOES NOT WARRANT OR GUARANTEE THAT RENESAS ELECTRONICS PRODUCTS, OR ANY SYSTEMS CREATED USING RENESAS ELECTRONICS PRODUCTS WILL BE INVULNERABLE OR FREE FROM CORRUPTION, ATTACK, VIRUSES, INTERFERENCE, HACKING, DATA LOSS OR THEFT, OR OTHER SECURITY INTRUSION (“Vulnerability Issues”). RENESAS ELECTRONICS DISCLAIMS ANY AND ALL RESPONSIBILITY OR LIABILITY ARISING FROM OR RELATED TO ANY VULNERABILITY ISSUES. FURTHERMORE, TO THE EXTENT PERMITTED BY APPLICABLE LAW, RENESAS ELECTRONICS DISCLAIMS ANY AND ALL WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO THIS DOCUMENT AND ANY RELATED OR ACCOMPANYING SOFTWARE OR HARDWARE, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE.
- 8 When using Renesas Electronics products, refer to the latest product information (data sheets, user’s manuals, application notes, “General Notes for Handling and Using Semiconductor Devices” in the reliability handbook, etc.), and ensure that usage conditions are within the ranges specified by Renesas Electronics with respect to maximum ratings, operating power supply voltage range, heat dissipation characteristics, installation, etc. Renesas Electronics disclaims any and all liability for any malfunctions, failure or accident arising out of the use of Renesas Electronics products outside of such specified ranges.
- 9 Although Renesas Electronics endeavors to improve the quality and reliability of Renesas Electronics products, semiconductor products have specific characteristics, such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Unless designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not subject to radiation resistance design. You are responsible for implementing safety measures to guard against the possibility of bodily injury, injury or damage caused by fire, and/or danger to the public in the event of a failure or malfunction of Renesas Electronics products, such as safety design for hardware and software, including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult and impractical, you are responsible for evaluating the safety of the final products or systems manufactured by you.
- 10 Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. You are responsible for carefully and sufficiently investigating applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive, and using Renesas Electronics products in compliance with all these applicable laws and regulations. Renesas Electronics disclaims any and all liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
- 11 Renesas Electronics products and technologies shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You shall comply with any applicable export control laws and regulations promulgated and administered by the governments of any countries asserting jurisdiction over the parties or transactions.
- 12 It is the responsibility of the buyer or distributor of Renesas Electronics products, or any other party who distributes, disposes of, or otherwise sells or transfers the product to a third party, to notify such third party in advance of the contents and conditions set forth in this document.
- 13 This document shall not be reproduced or duplicated in any form or disclosed to any third party, in whole or in part, without prior written consent of Renesas Electronics.
- 14 Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products.

(Note 1) “Renesas Electronics” as used in this document means Renesas Electronics Corporation and also includes its directly or indirectly controlled subsidiaries.

(Note 2) “Renesas Electronics product(s)” means any product developed or manufactured by or for Renesas Electronics.

Q100 Qualification Test Results for RAJ2930004AGM # HA1

Test	#	Reference	Test Conditions	Lots	S.S.	Total	Results Fail of Total	Comments: (N/A =Not Applicable)
------	---	-----------	-----------------	------	------	-------	--------------------------	------------------------------------

TEST GROUP A – ACCELERATED ENVIRONMENT STRESS TESTS

PC	A1	JESD22 A113 J-STD-020	Preconditioning: (Test @ Rm) SMD only; Moisture Preconditioning for HAST, UHST, TC and PTC ; Peak Reflow Temp=260°C	Min.MSL=3			MSL=3	
HAST	A2	JESD22 A101	Highly Accelerated Stress Test: (Test @ Rm/Hot) Ta=110°C, RH=85%, specified voltage, 264h	3	77	231	0 of 231	
UHST	A3	JESD22 A102	Unbiased Highly Accelerated Stress Test: (Test @ Rm) Ta=110°C, RH=85%, 264h	3	77	231	0 of 231	
TC	A4	JESD22 A104	Temperature Cycle: (Test @ Hot) Ta=-55°C to 150°C, 1000cycles	3	77	231	0 of 231	
PTC	A5	JESD22 A105	Power Temperature Cycle: (Test @ Rm/Hot) Ta=-40°C to 125°C, specified voltage, 1000cycles	1	45	45	0 of 45	
HTSL	A6	JESD22 A103	High Temperature Storage Life: (Test @ Rm/Hot) Ta=150°C, 1000h	1	45	45	0 of 45	

Test	#	Reference	Test Conditions	Lots	S.S.	Total	Results Fail of Total	Comments: (N/A =Not Applicable)
------	---	-----------	-----------------	------	------	-------	--------------------------	------------------------------------

TEST GROUP B – ACCELERATED LIFETIME SIMULATION TESTS

HTOL	B1	JESD22 A108	High Temp Operating Life: (Test @ Rm/Cold/Hot) Ta=125°C, specified voltage, 1000hrs	3	77	77	0 of 231	
ELFR	B2	AEC-Q100-008	Early Life Failure Rate: (Test @ Rm/Hot) Ta=125°C, specified voltage, 48hrs	3	800	2400	0 of 2400	
EDR	B3	AEC-Q100-005	NVM Endurance & Data Retention Test: (Test @ Rm/Hot)	---	---	---	---	N/A Nonvolatile memory only.

TEST GROUP C – PACKAGE ASSEMBLY INTEGRITY TESTS

WBS	C1	AEC-Q100-001 AEC-Q003	Wire Bond Shear Test: (Cpk > 1.67)	30 bonds	5 parts	30 bonds	Pass	Cpk > 1.67
WBP	C2	Mil-STD-883 Method 2011 AEC-Q003	Wire Bond Pull: (Cpk > 1.67)	30 bonds	5 parts	30 bonds	Pass	Cpk > 1.67
SD	C3	JESD22 B102 JSTD-002D	Solderability: (>95% coverage)	1	15	15	Pass	>95% coverage
PD	C4	JESD22 B100, JESD22 B108 AEC-Q003	Physical Dimensions: (Cpk > 1.67)	3	10	30	Pass	Cpk > 1.67
SBS	C5	AEC-Q100-010 AEC-Q003	Solder Ball Shear: (Cpk > 1.67); 5 balls from min. of 10 devices	---	---	---	---	N/A BGA Package only.
LI	C6	JESD22 B105	Lead Integrity: (No lead cracking or breaking); Through-hole only; 10 leads from each of 5 devices	---	---	---	---	N/A Through-hole device only.

Test	#	Reference	Test Conditions	Lots	S.S.	Total	Results Fail of Total	Comments: (N/A =Not Applicable)
------	---	-----------	-----------------	------	------	-------	--------------------------	------------------------------------

TEST GROUP D – DIE FABRICATION RELIABILITY TESTS

EM	D1	JESD61	Electromigration:	---	---	---	Pass	
TDDB	D2	JESD35	Time Dependant Dielectric Breakdown:	---	---	---	Pass	
HCI	D3	JESD60 & 28	Hot Carrier Injection:	---	---	---	Pass	
NBTI	D4	JESD90	Negative Bias Temperature Instability:	---	---	---	Pass	
SM	D5	JESD61,87 & 202	Stress Migration:	---	---	---	Pass	

Test	#	Reference	Test Conditions	Lots	S.S.	Total	Results Fail of Total	Comments: (N/A =Not Applicable)
------	---	-----------	-----------------	------	------	-------	--------------------------	------------------------------------

TEST GROUP E- ELECTRICAL VERIFICATION

TEST	E1	User/Supplier Specification	Pre and Post Stress Electrical Test:	All	All	All	0 of All	
HBM	E2	AEC-Q100-002	Electrostatic Discharge, Human Body Model: (Test @ Rm/Hot); (2KV HBM)	1	3	3	0 of 3 ESD Level= HBM: 2	HBM target: High-voltage pin >8KV, all other pin >2KV HBM Classification follows ANSI/ESDA/JEDEC JS-001-2017
CDM	E3	AEC-Q100-011	Electrostatic Discharge, Charged Device Model: (Test @ Rm/Hot); (750V corner leads, 500V all other leads)	1	3	3	0 of 3 ESD Level= CDM: C2a	Target: Corner pin: 750V Pass, All other pin: 500V Pass CDM Classification follows AEC-Q100-011 Rev. D
LU	E4	AEC-Q100-004	Latch-Up: (Test @ Rm/Hot)	1	6	6	0 of 6	
ED	E5	AEC-Q100-009 AEC-Q003	Electrical Distributions: (Test @ Rm/Hot/Cold) (where applicable, Cpk>1.67)	3	30	90	PASS	
FG	E6	AEC-Q100-007	Fault Grading:	—	—	—	PASS	Fault Grading Target >98%
CHAR	E7	AEC-Q003	Characterization: (Test @ Rm/Hot/Cold)	—	—	—	PASS	According to Renesas standard procedure.
EMC	E9	SAE J1752/3	Electromagnetic Compatibility (Radiated Emissions)	—	—	—	—	N/A
SC	E10	AEC Q100-012	Short Circuit Characterization	—	—	—	—	N/A Not required for the specifications of this device.
SER	E11	JESD89-1 JESD89-2 JESD89-3	Soft Error Rate	—	—	—	—	N/A Device with >1Mbit SRAM or DRAM only.
LF	E12	AEC-Q005	Lead (Pb) Free: (see AEC-Q005)	—	—	—	—	Solderability: See SD (C3) result. Solder heat resistance: N/A (Wave Solder is Not recommended.) Whisker: Performed on product TEG with test method based on JESD201.

Test	#	Reference	Test Conditions	Lots	S.S.	Total	Results Fail of Total	Comments: (N/A =Not Applicable)
------	---	-----------	-----------------	------	------	-------	--------------------------	------------------------------------

TEST GROUP F – DEFECT SCREENING TESTS

PAT	F1	AEC-Q001	See AEC-Q001. This is highly recommended by Automotive Electronic Council to institute.	All	All	All	Reject units outside Avg	Apply to mass production according to Renesas standard procedure.
SBA	F2	AEC-Q002	See AEC-Q002. This is highly recommended by Automotive Electronic Council to institute.	All	All	All	Reject units outside criteria	Apply to mass production according to Renesas standard procedure.