GR5525 Reliability Report

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Preface

Purpose

This document introduces GR5525 family reliability qualification results, to help users know this product's reliability performance.

Audience

This document is intended for:

- GR5525 user

- GR5525 hardware developer

Release Notes

This document is the initial release of *GR5525 Reliability Report*, corresponding to GR5525 System-on-Chip (SoC) series.

Revision History

Version	Date	Description
1.0	2023-10-09	Initial release

Contents

1 Introduction

The Goodix GR5525 family is a single-mode, low-power Bluetooth 5.3 System-on-Chip (SoC). This report aims to provide a detailed description of the methods used to verify that the product under test meets Goodix stringent quality and reliability requirements. Each test is described and the results are presented. The evaluations done for this qualification are included in the following sections.

2 Reliability Test Items and Results

2.1 Electrostatic Discharge: Human Body Model (HBM)

Table 2-1 Test requirements

Reference Standard	ESDA/JEDEC JS-001
Test Parameter	I-V curve/Function test
Model	Human body model
Test Conditions	RP = 1.5 kΩ, C = 100 pF Power to power (+/-) IO to power (+/-) IO to IO (+/-)
Sample Size	3 units per mode
Accept Criteria	0 fail

Table 2-2 Test results

Test Point	Result
±2000 V/Class 2	PASS

2.2 Electrostatic Discharge: Charged Device Model (CDM)

Table 2-3 Test requirements

Reference Standard	ESDA/JEDEC JS-002
Test Parameter	I-V curve/Function test
Model	Charged device model
Test Conditions	RP = 0 Ω, C = 0 pF All pins (+/-) to common ground
Sample Size	3 units per mode
Accept Criteria	0 fail

Table 2-4 Test results

Test Point	Result
±500 V/Class C2a	PASS

2.3 Latch Up (LU)

Table 2-5 Test requirements

Reference Standard	JESD-78
Test Parameter	I-V curve/Function test
Model	Current/Voltage trigger
Test Conditions	I trigger/Over voltage, Class I
Sample Size	3 units per mode
Accept Criteria	0 fail

Table 2-6 Test results

Test Point	Result
±200 mA	PASS
1.5*VCCmax	PASS

2.4 High Temperature Operating Life Test (HTOL)

Table 2-7 Test requirements

Reference Standard	JESD22-A108
Test Parameter	Function test
Model	Arrhenius model for temperature acceleration factor and voltage $$\text{AF} = \exp\left[\gamma_v * \left(V_{stress} - V_{op}\right)\right] * \exp\left[\frac{Ea}{K}\left(\frac{1}{T_{op}} - \frac{1}{T_{stress}}\right)\right]$$
Test Conditions	125°C, 1000 hrs., VCCmax
Sample Size	77 units x 3 lots
Accept Criteria	0 fail

Table 2-8 Test results

Time Point	Result		
	Lot 1	Lot 2	Lot 3
168 hrs.	PASS	PASS	PASS
500 hrs.	PASS	PASS	PASS
1000 hrs.	PASS	PASS	PASS

2.5 Pre-Conditioning (Pre-Con)

Table 2-9 Test requirements

Reference Standard	JESD22-A113

Test Parameter	Function test/Appearance inspection
Model	None
Test Conditions	Baking 125°C 24 hrs., soaking 30°C/60% RH 192 hrs., 3x reflow
Sample Size	75 units x 1 lot
Accept Criteria	0 fail

Table 2-10 Test results

Time Point	Result
	Lot 1
Pre-con over.	PASS

2.6 Temperature Cycling Test (TCT)

Table 2-11 Test requirements

Reference Standard	JESD22-A104
Test Parameter	Function test/Appearance inspection
Model	None
Test Conditions	-65°C to 150°C, 500 cycles
Sample Size	25 units x 1 lot
Accept Criteria	0 fail

Table 2-12 Test results

Time Point	Result
	Lot 1
500 cycles	PASS

2.7 Highly Accelerated Temperature and Humidity Stress Test (HAST)

Table 2-13 Test requirements

Reference Standard	JESD22-A118
Test Parameter	Function test/Appearance inspection
Model	None
Test Conditions	130°C, 85% RH, VCCmax, 96 hrs.
Sample Size	25 units x 1 lot
Accept Criteria	0 fail

Table 2-14 Test results

Time Point	Result
	Lot 1
96 hrs.	PASS

2.8 Unbiased Highly Accelerated Temperature and Humidity Stress Test (UHAST)

Table 2-15 Test requirements

Reference Standard	JESD22-A118
Test Parameter	Function test/Appearance inspection
Model	None
Test Conditions	130°C, 85% RH, 96 hrs.
Sample Size	25 units x 1 lot
Accept Criteria	0 fail

Table 2-16 Test results

Time Point	Result
	Lot 1
96 hrs.	PASS

2.9 High Temperature Storage Test (HTST)

Table 2-17 Test requirements

Reference Standard	JESD22-A103
Test Parameter	Function test/Appearance inspection
Model	None
Test Conditions	150°C, 1000 hrs.
Sample Size	25 units x 1 lot
Accept Criteria	0 fail

Table 2-18 Test results

Time Point	Result
	Lot 1
500 hrs.	PASS
1000 hrs.	PASS