



Reliability Test Report

Product Name: CA-IS322X

Report Version: V1.1

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1. Overview

Reliability testing of microelectronic products is a risk mitigation process designed to ensure the service life of device in customer applications. Semiconductor wafer manufacturing process and package-level reliability can be assessed in a variety of ways and may include accelerated environmental test conditions. Chipanalog evaluates manufacturability of the device to verify a robust silicon and assembly flow to ensure continuity of supply to customers. Chipanalog qualifies new devices, significant changes, and product families based on JEDEC JESD47. CA-IS322X series chips are packaged with the same wafer. The differences between part numbers are the package and bonding diagram. The data shown is representative of the material sets, processes, and manufacturing sites used by the device family.

2. Part Number List

Package Type	Part Number
SOIC16-WB(W)	CA-IS3221AW/CA-IS3221BW/CA-IS3221CW/ CA-IS3222AW/ CA-IS3222BW/CA-IS3222CW
SOIC14-WB(K)	CA-IS3221AK/CA-IS3221BK/CA-IS3221CK/ CA-IS3222AK/ CA-IS3222BK/CA-IS3222CK
SOIC16-NB(N)	CA-IS3221AN/CA-IS3221BN

Note: JEDEC specification is designed to also qualify a family of similar components utilizing the same fabrication process, design rules, and similar circuits. The family qualification may also be applied to a package family where the construction is the same and only the size and number of leads differs.

3. Product Information

3.1. Wafer Information

Wafer	SHENNONG, NVWA
Fab Process	18BCD

3.2. Package Information

Assembly site	UNIMOS	UNIMOS	JCET
FT site	UNIMOS	UNIMOS	JCET
Package	SOIC16-WB(W)	SOIC14-WB(K)	SOIC16-NB(N)
Lead frame	Cu	Cu	Cu
Bond wire	25um Au	25um Au	25um AuPdCu
MSL level	MSL3	MSL3	MSL3

4. Reliability Qualification Plan

4.1. Device Qualification Test Requirements

Stress	Ref.	Abbv.	Conditions	Duration /Accept
Electrical Parameter Assessment	JESD86	ED	Per Datasheet	Per Datasheet
High Temperature Operating Life	JESD22-A108, JESD85	HTOL	$T_J \geq 125^\circ\text{C}$ $V_{CC} \geq V_{CC \text{ max}}$	1000 hrs/0 Fail
Human Body Model ESD	JS-001	ESD-HBM	$T_A = 25^\circ\text{C}$	Classification
Charged Device Model ESD	JS-002	ESD-CDM	$T_A = 25^\circ\text{C}$	Classification
Latch-Up	JESD78	LU	Class I or Class II	0 Fail

4.2. Nonhermetic Package Qualification Test Requirements

Stress	Ref.	Abbv.	Conditions	Duration /Accept
MSL Preconditioning	JESD22-A113	PC	Per appropriate MSL level per J-STD-020	Electrical Test (optional)
High Temperature Storage	JESD22-A103 & A113	HTSL	150°C , 1000 hrs	1000 hrs/0 Fail
Temperature Humidity Bias	JESD22-A101	THB	85°C , 85% RH, $V_{CC \text{ max}}$	1000 hrs/0 Fail
Highly Accelerated Temperature and Humidity Stress	JESD22-A110	HAST	$130^\circ\text{C}/110^\circ\text{C}$, 85% RH, $V_{CC \text{ max}}$	96/264 hrs/0 Fail
Temperature Cycling	JESD22-A104	TC	-65°C to $+150^\circ\text{C}$	500 cycles/0 Fail
Unbiased Temperature/Humidity	JESD22-A118	uHAST	$130^\circ\text{C}/110^\circ\text{C}$, 85% RH	96/264 hrs/0 Fail
Bond Pull Strength	M2011	BPS	Characterization, Pre Encapsulation	$Ppk \geq 1.66$ or $Cpk \geq 1.33$
Bond Shear	JESD22-B116	BS	Characterization, Pre Encapsulation	$Ppk \geq 1.66$ or $Cpk \geq 1.33$
Solderability	M2003 JESD22-B102	SD	Characterization	0 Fail

Note: Either HAST or THB may be chosen.

5. Reliability Test Results

5.1. Device Reliability Test Results

Stress	Condition	Duration	Sample Size	Result	Classification
ED	Per Datasheet	/	10*3 lots	Pass	/
HTOL	T _A = 135°C, 1000 hrs, V _{cc1} = 18V, V _{cc2} = 30V, input f = 1kHz	1000 hrs	77*3 lots	Pass	/
ESD-HBM	T _A = 25°C	/	3*1 lot	Pass	Class 3A
ESD-CDM	T _A = 25°C	/	3*1 lot	Pass	Class C3
LU	T _A = 25°C	/	3*1 lot	Pass	Class I A

5.2. Package Reliability Test Results

Package Type: SOIC16-WB(W)					
Stress	Condition	Duration	Sample size	Result	
PC	MSL 3	/	231*3 lots	Pass	
HTSL	T _A = 150°C	1000 hrs	45*3 lots	Pass	
HAST	130°C/85% RH, V _{cc1} = 18V, V _{cc2} = 25V	96 hrs	77*3 lots	Pass	
TC	-65°C to +150°C	500 cycles	77*3 lots	Pass	
uHAST	130°C/85% RH	96 hrs	77*3 lots	Pass	
BS	JESD22-B116	/	30 bonds/5 ea.	Pass	
BPS	M2011	/	30 bonds/5 ea.	Pass	
SD	Steam aging 8hrs,245°C dipping 5S		22 leads*3 lots	Pass	
Package Type: SOIC16-NB(N)					
Stress	Condition	Duration	Sample size	Result	
PC	MSL 3	/	231*3 lots	Pass	
HTSL	T _A = 150°C	1000 hrs	45*3 lots	Pass	
HAST	130°C/85% RH, V _{cc1} = 18V, V _{cc2} = 25V	96 hrs	77*3 lots	Pass	
TC	-65°C to +150°C	500 cycles	77*3 lots	Pass	
uHAST	130°C/85% RH	96 hrs	77*3 lots	Pass	

BS	JESD22-B116	/	30 bonds/5 ea.	Pass
BPS	M2011	/	30 bonds/5 ea.	Pass
SD	Steam aging 8hrs,245°C dipping 5S		22 leads*3 lots	Pass

Note:

1. Package reliability test of SOIC14-WB(K) may be referred to SOIC16-WB(W).
2. Package reliability test of SOIC16-NB(N) comes from 1 lot of CA-IS3221AN and 2 lots generic data of same package family.

6. Conclusion

CA-IS322X series products are qualified with JEDEC standards.

Disclaimer

This information is provided to assist customers in design and development. It could change for technology innovation without notice.

The devices are shipped after passing final test. Customers are responsible to conduct sufficient engineering and additional qualification testing to determine whether a device is suitable for use in their applications.

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Revision History

Revision	Change Log	Date
V1.0	Initial release	Jun. 2023
V1.1	Add SOIC16-NB(N) reliability results	Nov. 2023