

## PRODUCT / PROCESS CHANGE NOTIFICATION

### 1. PCN basic data

1.1 Company		STMicroelectronics International N.V
1.2 PCN No.		AMS/20/12354
1.3 Title of PCN		New material set in ST Bouskoura for Automotive Grade products assembled in TSSOP8 package (General Purpose Analog)
1.4 Product Category		See product list
1.5 Issue date		2020-10-13

### 2. PCN Team

2.1 Contact supplier	
2.1.1 Name	ROBERTSON HEATHER
2.1.2 Phone	+1 8475853058
2.1.3 Email	heather.robertson@st.com
2.2 Change responsibility	
2.2.1 Product Manager	Marcello SAN BIAGIO
2.2.2 Marketing Manager	Salvatore DI VINCENZO
2.2.3 Quality Manager	Jean-Marc BUGNARD

### 3. Change

3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Materials	New direct material part number (same supplier, different supplier or new supplier), Mold compound	Assembly plant : ST Bouskoura

### 4. Description of change

	Old	New
4.1 Description	<ul style="list-style-type: none"> <li>- Molding compound : Sumitomo G630AY</li> <li>- Die attach : Ablestick 8601-S25</li> <li>- Lead frame : Copper preplated NiPdAgAu</li> <li>- Wire : Copper 1mil</li> <li>- Equipment : 20 years old equipments (DA ASM AD889 + WB ASM Eaggle 60)</li> </ul>	<ul style="list-style-type: none"> <li>- Molding compound : Sumitomo G700KC</li> <li>- Die attach : Ablestick 8601-S25</li> <li>- Lead frame : Copper preplated NiPdAu</li> <li>- Wire : Copper 1mil</li> <li>- Equipment : Latest generation of equipment (DA ASM 832i + WB KnS Connex ELA)</li> </ul>
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	No impact	

### 5. Reason / motivation for change

5.1 Motivation	Progressing on activities related to quality continuous improvement, ST is glad to announce a new material set for General Purpose Analog products in TSSOP8 package produced in ST Bouskoura. The goal of this PCN is to qualify a new material set as well as to move to brand new equipment replacing obsolete machines. This new set of material was developed to improve our product robustness.
5.2 Customer Benefit	QUALITY IMPROVEMENT

### 6. Marking of parts / traceability of change

6.1 Description	New Finished good codes
-----------------	-------------------------

### 7. Timing / schedule

7.1 Date of qualification results	2020-09-24
7.2 Intended start of delivery	2021-02-05
7.3 Qualification sample available?	Upon Request

#### 8. Qualification / Validation

<b>8.1 Description</b>	12354 Auto-TSSOP8SHD Qual plan_New material set.pdf		
<b>8.2 Qualification report and qualification results</b>	Available (see attachment)	Issue Date	2020-10-13

#### 9. Attachments (additional documentations)

12354 Public product.pdf  
12354 Auto-TSSOP8SHD Qual plan\_New material set.pdf

#### 10. Affected parts

<b>10. 1 Current</b>		<b>10.2 New (if applicable)</b>
<b>10.1.1 Customer Part No</b>	<b>10.1.2 Supplier Part No</b>	<b>10.1.2 Supplier Part No</b>
	LM258AWYPT	
	LM258WYPT	
	LM258YPT	
	LM2903HYPT	
	LM2903WYPT	
	LM2903YPT	
	LM2904AHYPT	
	LM2904AWYPT	
	LM2904AYPT	
	LM2904WYPT	
	LM2904YPT	
	LMV358IYPT	
	TS1872IYPT	
	TS9222IYPT	
	TS922AIYPT	
	TS922IYPT	
	TS952IYPT	
	TS972IYPT	
	TSC1021AIYPT	
	TSC1021BIYPT	
	TSC102IYPT	
	TSC1031IYPT	
	TSV358AIYPT	
	TSV358IYPT	

**IMPORTANT NOTICE – PLEASE READ CAREFULLY**

Subject to any contractual arrangement in force with you or to any industry standard implemented by us, STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2018 STMicroelectronics – All rights reserved

**PRODUCT/PROCESS  
CHANGE NOTIFICATION**

---

**PCN AMS/20/12354**

---

**Analog, MEMS & Sensors (AMS)**

**New material set in ST Bouskoura for Automotive Grade  
products assembled in TSSOP8 package  
(General Purpose Analog)**

## WHAT:

Progressing on activities related to quality continuous improvement, ST is glad to announce a new material set for General Purpose Analog products in TSSOP8 package produced in ST Bouskoura.

The goal of this PCN is to qualify the new material set as described below and to move to brand new equipment replacing obsolete machines.

This new set of material was developed to improve our product robustness.

Please find more information related to material change in the table here below

Material	Current process	Modified process	Comment
Diffusion location	ST Ang Mo Kio (Singapore)/ UMC / ST Agrate	ST Ang Mo Kio (Singapore)/ UMC / ST Agrate	No change
Assembly location	ST Bouskoura	ST Bouskoura	No change
Molding compound	Sumitomo G630AY	Sumitomo G700KC	Move to high reliability compound
Die attach	Ablestick 8601-S25	Ablestick 8601-S25	No change
Leadframe	Copper preplated NiPdAgAu	Copper preplated NiPdAu	Reducing risk of discoloration sporadically encountered
Wire	Copper 1 mil	Copper 1 mil	No change
Equipment	20 years old equipments DA ASM AD889 WB ASM Eaggle 60	Latest generation of equipment DA ASM 832i WB KnS Connex ELA	To reduce risk of sporadic excursion Traceability thanks to 2D code on leadframe

## WHY:

This material change will contribute to ST's continuous quality product improvement and ensure a consistent assembly process through all the TSSOP production lines.

## HOW:

The qualification program consists mainly of comparative electrical characterization and reliability tests.

You will find here after the qualification test plan which summarizes the various test methods and conditions that ST uses for this qualification program.

## WHEN:

The new material set will be implemented in Q1/2021 in Bouskoura.

## Marking and traceability:

Unless otherwise stated by customer's specific requirement, the traceability of the parts assembled with the new material set will be ensured by new internal sales type, date code and lot number.

The changes here reported will not affect the electrical, dimensional and thermal parameters keeping unchanged all the information reported on the relevant datasheets.

There is -as well- no change in the packing process or in the standard delivery quantities.  
Shipments may start earlier with the customer's written agreement.

# Reliability Qualification plan

*New Halogen free material set for TSSOP in  
ST Bouskoura*

General Information		Locations
<b>Product Line</b>	0158, 0393, 0922, 1022, 3702 Low power Dual op amp bipolar, Low power Dual comparator bipolar, Rail to rail Dual op amp, biCMOS, Current sense amplifier	Wafer fab
<b>Product Description</b>	<i>LM2904YPT, LM2903YPT, TS922IYPT, TSC1021YPT, TS3702IPT</i> AMS	Assembly plant
<b>P/N</b>	<i>General Purpose Analog &amp;RF</i>	
<b>Product Group</b>	<i>TSSOP8</i>	Reliability Lab
<b>Product division</b>	<i>Bipolar, , HF2CMOS, BCD3S, HC1PA</i>	
<b>Package</b>		
<b>Silicon Process technology</b>		

Note: This report is a summary of the reliability trials performed in good faith by STMicroelectronics in order to evaluate the potential reliability risks during the product life using a set of defined test methods.

This report does not imply for STMicroelectronics expressly or implicitly any contractual obligations other than as set forth in STMicroelectronics general terms and conditions of Sale. This report and its contents shall not be disclosed to a third party without previous written agreement from STMicroelectronics.

**TABLE OF CONTENTS**

<b>1</b>	<b>APPLICABLE AND REFERENCE DOCUMENTS.....</b>	<b>9</b>
<b>2</b>	<b>GLOSSARY .....</b>	<b>9</b>
<b>3</b>	<b>RELIABILITY EVALUATION OVERVIEW .....</b>	<b>9</b>
3.1	OBJECTIVES.....	9
3.2	CONCLUSION .....	9
<b>4</b>	<b>DEVICE CHARACTERISTICS .....</b>	<b>10</b>
4.1	DEVICE DESCRIPTION .....	10
4.2	CONSTRUCTION NOTE.....	15
<b>5</b>	<b>TESTS RESULTS SUMMARY .....</b>	<b>16</b>
5.1	TEST VEHICLE .....	16
5.2	TEST PLAN AND RESULTS SUMMARY .....	16
<b>6</b>	<b>ANNEXES .....</b>	<b>18</b>
6.1	DEVICE DETAILS .....	18
6.2	TESTS DESCRIPTION .....	19

## **1 APPLICABLE AND REFERENCE DOCUMENTS**

Document reference	Short description
JESD47	Stress-Test-Driven Qualification of Integrated Circuits

## **2 GLOSSARY**

<b>DUT</b>	Device Under Test
<b>PCB</b>	Printed Circuit Board
<b>SS</b>	Sample Size

## **3 RELIABILITY EVALUATION OVERVIEW**

### **3.1 Objectives**

To qualify a new material set for products in TSSOP8 package produced in ST Bouskoura

### **3.2 Conclusion**

Qualification Plan requirements have to be fulfilled without issue. It is stressed that reliability tests have to show that the devices behave correctly against environmental tests (no failure). Moreover, the stability of electrical parameters during the accelerated tests have to demonstrate the ruggedness of the products and safe operation, which is consequently expected during their lifetime.

## 4 DEVICE CHARACTERISTICS

### 4.1 Device description

**LM2904YPT**



**LM2904, LM2904A**  
**LM2904W, LM2904AW**  
 Datasheet

Low-power dual operational amplifier



#### Features

- Frequency compensation implemented internally
- Large DC voltage gain: 100 dB
- Wide bandwidth (unity gain): 1.1 MHz (temperature compensated)
- Very low supply current/amplifier, essentially independent of supply voltage
- Low input bias current: 20 nA (temperature compensated)
- Low input offset current: 2 nA
- Input common-mode voltage range includes negative rail
- Differential input voltage range equal to the power supply voltage
- Large output voltage swing 0 V to [(V<sub>CC</sub> <sup>+</sup>) -1.5 V]

#### Description

This circuit consists of two independent, high gain operational amplifiers (op amps) that have frequency compensation implemented internally. They are designed specifically for automotive and industrial control systems. The circuit operates from a single power supply over a wide range of voltages. The low power supply drain is independent of the magnitude of the power supply voltage.

Application areas include transducer amplifiers, DC gain blocks and all the conventional op amp circuits which can now be more easily implemented in single power supply systems. For example, these circuits can be directly supplied from the standard 5 V which is used in logic systems and easily provides the required electronic interfaces without requiring any additional power supply.

In linear mode, the input common-mode voltage range includes ground and the output voltage can also swing to ground, even though operated from a single power supply.

Maturity status link		
	Enhanced V <sub>IO</sub>	Enhanced ESD
LM2904		
LM2904A	✓	
LM2904W		✓
LM2904AW	✓	✓

#### Related products

TSB572	Dual op-amps for low-power consumption (380 $\mu$ A with 2.5 MHz GBP)
LM2902 LM2902W	Quad op-amps version
LM2904WH LM2904AH	High temperature version (150 °C)

LM2903YPT,



# LM2903

## Low-power dual voltage comparator

### Datasheet - production data



### Related products

- See the LM2903W for similar devices with higher ESD performances
- See the LM2903H for similar devices with operating temperature up to 150 °C

### Description

This device consists of two independent low-power voltage comparators designed specifically to operate from a single supply over a wide range of voltages. Operation from split power supplies is also possible.

In addition, the device has a unique characteristic in that the input common-mode voltage range includes the negative rail even though operated from a single power supply voltage.

### Features

- Wide single supply voltage range or dual supplies +2 V to +36 V or  $\pm 1$  V to  $\pm 18$  V
- Very low supply current (0.4 mA) independent of supply voltage (1 mW/comparator at +5 V)
- Low input bias current: 25 nA typ.
- Low input offset current:  $\pm 5$  nA typ.
- Input common-mode voltage range includes negative rail
- Low output saturation voltage: 250 mV typ. ( $I_O = 4$  mA)
- Differential input voltage range equal to the supply voltage
- TTL, DTL, ECL, MOS, CMOS compatible outputs
- Automotive qualification

**TS922IYPT****TS922, TS922A****Datasheet****Rail-to-rail, high output current, dual operational amplifier**

Flip-chip with backcoating



SO8



TSSOP8

**Features**

- Rail-to-rail input and output
- Low noise: 9 nV/ $\sqrt{\text{Hz}}$
- Low distortion
- High output current: 80 mA (able to drive 32  $\Omega$  loads)
- High-speed: 4 MHz, 1 V/ $\mu\text{s}$
- Operating from 2.7 to 12 V
- Low input offset voltage: 900  $\mu\text{V}$  max. (TS922A)
- ESD internal protection: 2 kV
- Latch-up immunity

**Applications**

- Line drivers and actuator drivers
- Portable speakers
- Instrumentation with low noise as key factor
- Multimedia systems and portable equipments

**Description**

The TS922 and the TS922A devices are rail-to-rail dual BiCMOS operational amplifiers optimized and fully specified for 3 V and 5 V operations. These devices have high output currents which allow low-load impedances to be driven.

Very low noise, low distortion, low offset, and a high output current capability make these devices an excellent choice for high quality, low voltage, or battery operated audio systems.

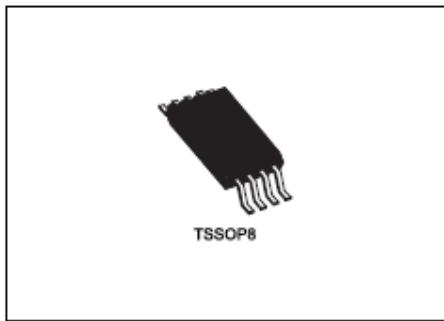
The devices are stable for capacitive loads up to 500 pF.

**Product status link**[TS922 and TS922A](#)

**TSC1021HYP**

**TSC1021**
**High-side current sense amplifier**

Datasheet - production data



TSSOP8

**Related products**

- See TSC103 for higher common-mode operating range (2.9 V to 70 V)

**Applications**

- Automotive current monitoring
- Notebook computers
- Server power supplies
- Telecom equipment
- Industrial SMPS
- Current sharing
- LED current measurement

**Features**

- Wide common-mode operating range independent of supply: 2.8 V to 30 V
- Wide common-mode survival range: -32 V to 60 V (reversed battery and load-dump conditions)
- Maximum input offset voltage:
  - $\pm 1.5$  mV for  $T_{amb} = 25$  °C
  - $\pm 2.3$  mV for  $-40$  °C  $< T_{amb} < 125$  °C
- Maximum total output voltage error:
  - $\pm 1.5$  % for  $T_{amb} = 25$  °C
  - $\pm 2.5$  % for  $-40$  °C  $< T_{amb} < 125$  °C
- Maximum variation over temperature:
  - $dV_{os}/dT = 8$   $\mu$ V/°C
  - $dV_{out}/dT = 100$  ppm/°C
- Low current consumption:  $I_{cc\ max} = 300$   $\mu$ A
- -40 °C to 125 °C operating temperature range
- Internally fixed gain: 20 V/V, 50 V/V
- EMI filtering

**Description**

The TSC1021 measures a small differential voltage on a high-side shunt resistor and translates it into a ground-referenced output voltage.

The TSC1021 has been specifically designed for automotive conditions: load-dump protection up to 60 V, reverse-battery protection up to -32 V, ESD protection up to 4 kV and internal filtering for EMI performance.

Input common-mode and power supply voltages are independent: the common-mode voltage can range from 2.8 to 30 V in operating conditions and up to 60 V in absolute maximum ratings while the TSC1021 can be supplied by a 5 V independent supply line.

The TSC1021 is housed in a tiny TSSOP8 package and integrates a buffer that provides low impedance output to ease interfacing and avoid accuracy losses. The overall device current consumption is lower than 300  $\mu$ A.

**TSX3702IPT**

**TS3702**

## Micropower dual CMOS voltage comparators

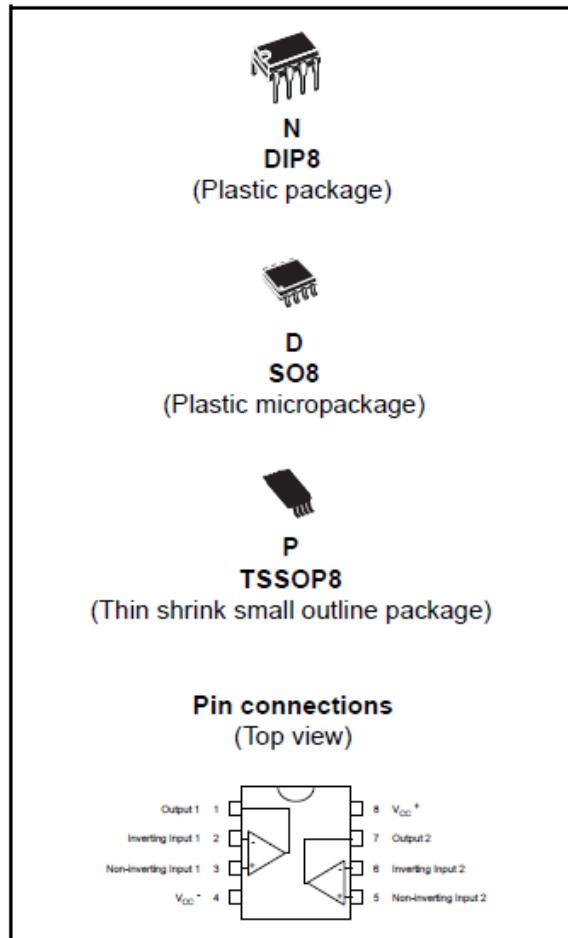
### Features

- Push-pull CMOS output (no external pull-up resistor required)
- Extremely low supply current: 9 $\mu$ A typ / comparator
- Wide single supply range: 2.7V to 16V or dual supplies ( $\pm 1.35$ V to  $\pm 8$ V)
- Extremely low input bias current: 1pA typ
- Extremely low input offset currents: 1pA typ
- Input common-mode voltage range includes GND
- High input impedance:  $10^{12}\Omega$  typ
- Fast response time: 2 $\mu$ s typ for 5mV overdrive
- Pin-to-pin and functionally compatible with bipolar LM393

### Description

The TS3702 is a micropower CMOS dual voltage comparator with extremely low consumption of 9 $\mu$ A typ / comparator (20 times less than bipolar LM393). The push-pull CMOS output stage allows power and space saving by eliminating the external pull-up resistor required by usual open-collector output comparators.

Thus response times remain similar to the LM393.



## 4.2 Construction note

	P/N <b>LM2904YPT</b>	P/N <b>LM2903YPT</b>	P/N <b>TS922IYPT</b>	P/N <b>TSC1021IAIYPT</b>	P/N <b>TS3702IPT</b>
<b>Wafer/Die fab. information</b>					
Wafer fab manufacturing location	ST Singapore	ST Singapore	ST Singapore	ST Singapore	ST Singapore
Technology	Bipolar	Bipolar	HF2CMOS	BCD3S	HC1PA
Die finishing back side	RAW SILICON	RAW SILICON	RAW SILICON	RAW SILICON	RAW SILICON
Die size (microns)	1070x1010 $\mu\text{m}^2$	950x870 $\mu\text{m}^2$	1720x1190 $\mu\text{m}^2$	1280x1750 $\mu\text{m}^2$	1366x1136 $\mu\text{m}^2$
Bond pad metallization layers	AlSiCu	AlSiCu	AlSiCu	AlSiCu	AlSi
Passivation type	Nitride	Nitride	P-VAPOX/NITRIDE	USG-PSG-SiON-PIX	HDP/TEOS/SiN/Polyimide
<b>Wafer Testing (EWS) information</b>					
Electrical testing manufacturing location	ST Singapore	ST Singapore	ST Singapore	ST Singapore	ST Singapore
<b>Assembly information</b>					
Assembly site	ST Bouskoura	ST Bouskoura	ST Bouskoura	ST Bouskoura	ST Bouskoura
Package description	TSSOP8	TSSOP8	TSSOP8	TSSOP8	TSSOP8
Molding compound	EME G700KC	EME G700KC	EME G700KC	EME G700KC	EME G700KC
Frame material	Cu	Cu	Cu	Cu	Cu
Die attach process	Epoxy Glue	Epoxy Glue	Epoxy Glue	Epoxy Glue	Epoxy Glue
Die attach material	8601S-25	8601S-25	8601S-25	8601S-25	8601S-25
Wire bonding process	Thermosonic ball bonding	Thermosonic ball bonding	Thermosonic ball bonding	Thermosonic ball bonding	Thermosonic ball bonding
Wires bonding materials/diameters	Cu 1 mil	Cu 1 mil	Cu 1 mil	Cu 1 mil	Cu 1 mil
Lead finishing process	electroplating	electroplating	electroplating	electroplating	electroplating
Lead finishing/bump solder material	NiPdAu	NiPdAu	NiPdAu	NiPdAu	NiPdAu
<b>Final testing information</b>					
Testing location	ST Bouskoura	ST Bouskoura	ST Bouskoura	ST Bouskoura	ST Bouskoura

## 5 TESTS PLAN SUMMARY

### 5.1 Test vehicle

Lot #	Process/ Package	Product Line	Comments
1	Bipolar/TSSOP8	0158	
2	Bipolar/TSSOP8	0393	Lot CZ0230BGRR
3	HF2CMOS/TSSOP8	0922	
4	BCD3S/TSSOP8	1022	
5	HC1PA/TSSOP8	3702	

### 5.2 Test plan and results summary

Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS					Note
						Lot 1 0158	Lot 2 0393	Lot3 0922	Lot 4 1022	Lot5 3702	
HTB/ HTOL	N	JESD22 A-108	Ta = 150°C or 125°C, BIAS		168 H	77	0/77	0/77	77	77	
					1000 H	77	77	0/77	77	77	
ELFR	N	JESD22 A-008	Ta = 125°C, BIAS			800		800	800	800	
HTSL	N	JESD22 A-103	Ta = 150°C		168 H	77	77	77	77	77	
					500 H	77	77	77	77	77	
					1000 H	77	77	77	77	77	
PC		JESD22 A-113	Drying 24 H @ 125°C Store 168 H @ Ta=85°C Rh=85% Over Reflow @ Tpeak=260°C 3 times		Final	Below sample + 22units	PASS	Below sample + 22units	Below sample + 22units	Below sample + 22units	
AC	Y	JESD22 A-102	Pa=2Atm / Ta=121°C		96 H	77	0/77	77	77	77	
TC	Y	JESD22 A-104	Ta = -65°C to 150°C		100 cy	77	77	77	77	77	
					200 cy	77	77	77	77	77	
					500 cy	77	77	77	77	77	
					1000cy	77	77	77			
THB	Y	JESD22 A-101	Ta = 85°C, RH = 85%, BIAS		168 H	77		0/77	77	77	
					500 H	77		0/77	77	77	
					1000 H	77		77	77	77	
<b>Other Tests</b>											
ESD	N	AEC Q101- 001, 002 and 005	CDM								
						3	3	3	3	3	
SD	N		After ageing 8h and 16h			X	X	X			
WBS	N		Wire bond Shear			5	5	5			
WBP	N		Wire bond Pull			5	5	5			
PD	N		Physical dimension			10	10	10			
ED	N		Electrical distribution			80	80	80			

This qualification is following the TSSOP14 PCN AMS/20/12117 on which we implemented the same changes. See below the results already available for TSSOP14

### 5.3 Test vehicle

Lot #	Process/ Package	Product Line	Comments
1	Bipolar/TSSOP14	0124	CZ01308ARQ CZ01302CRR
2	HF5CMOS/TSSOP14	V994	CZ9510KTRF CZ9510KTRG
3	HVG8A/TSSOP14	UY43	CZ9510KURL, CZ9510KURN

### 5.4 Test plan and results summary

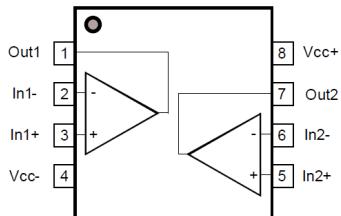
Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS				Note
						Lot 1 0124	Lot 4 V994	Lot5 UY43		
HTB/ HTOL	N	JESD22 A-108	Ta = 150°C or 125°C, BIAS		168 H	0/77	0/77	0/77		
					500 H	0/77	0/77	0/77		
					1000 H	0/77	0/77	0/77		
HTSL	N	JESD22 A-103	Ta = 150°C		168 H	0/50			2x0/50	
					500 H	0/50			2x0/50	
					1000 H	0/50			2x0/50	
PC		JESD22 A-113	Drying 24 H @ 125°C Store 168 H @ Ta=85°C Rh=85% Over Reflow @ Tpeak=260°C 3 times		Final	PASS	PASS	PASS		
AC/ UHAST	Y	JESD22 A-102	Pa=2Atm / Ta=121°C		96 H	2x0/77	2x0/77	2x0/77		
TC	Y	JESD22 A-104	Ta = -65°C to 150°C		100 cy	0/77	2x0/77	2x0/77		
					500 cy	0/77	2x0/77	2x0/77		
					1000cy	0/77	2x0/77	2x77		
THB	Y	JESD22 A-101	Ta = 85°C, RH = 85%, BIAS		168 H	0/77	0/77	0/77		
					500 H	0/77	0/77	0/77		
					1000 H	70/7	0/77	0/77		

## 6 ANNEXES

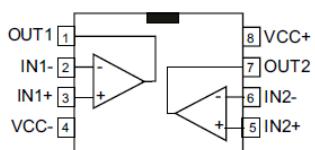
### 6.1 Device details

#### 6.1.1 Pin connection

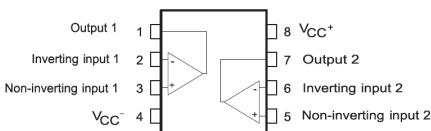
LM2904



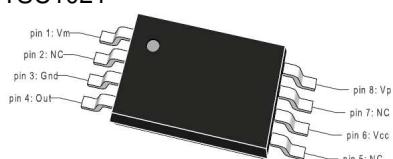
LM2903



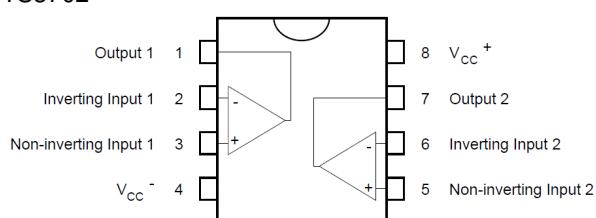
TS922



TSC1021



TS3702



## 6.2 Tests Description

Test name	Description	Purpose
<b>Die Oriented</b>		
<b>HTOL</b> High Temperature Operating Life	The device is stressed in static or dynamic configuration, approaching the operative max. absolute ratings in terms of junction temperature and bias condition.	To determine the effects of bias conditions and temperature on solid state devices over time. It simulates the devices' operating condition in an accelerated way. The typical failure modes are related to, silicon degradation, wire-bonds degradation, oxide faults.
<b>HTB</b> High Temperature Bias		
<b>HTRB</b> High Temperature Reverse Bias	The device is stressed in static configuration, trying to satisfy as much as possible the following conditions: low power dissipation; max. supply voltage compatible with diffusion process and internal circuitry limitations;	To determine the effects of bias conditions and temperature on solid state devices over time. It simulates the devices' operating condition in an accelerated way.
<b>HTFB / HTGB</b> High Temperature Forward (Gate) Bias		To maximize the electrical field across either reverse-biased junctions or dielectric layers, in order to investigate the failure modes linked to mobile contamination, oxide ageing, layout sensitivity to surface effects.
<b>HTSL</b> High Temperature Storage Life	The device is stored in unbiased condition at the max. temperature allowed by the package materials, sometimes higher than the max. operative temperature.	To investigate the failure mechanisms activated by high temperature, typically wire-bonds solder joint ageing, data retention faults, metal stress-voiding.
<b>ELFR</b> Early Life Failure Rate	The device is stressed in biased conditions at the max junction temperature.	To evaluate the defects inducing failure in early life.
<b>Package Oriented</b>		
<b>PC</b> Preconditioning	The device is submitted to a typical temperature profile used for surface mounting devices, after a controlled moisture absorption.	As stand-alone test: to investigate the moisture sensitivity level. As preconditioning before other reliability tests: to verify that the surface mounting stress does not impact on the subsequent reliability performance. The typical failure modes are "pop corn" effect and delamination.
<b>AC</b> Auto Clave (Pressure Pot)	The device is stored in saturated steam, at fixed and controlled conditions of pressure and temperature.	To investigate corrosion phenomena affecting die or package materials, related to chemical contamination and package hermeticity.
<b>TC</b> Temperature Cycling	The device is submitted to cycled temperature excursions, between a hot and a cold chamber in air atmosphere.	To investigate failure modes related to the thermo-mechanical stress induced by the different thermal expansion of the materials interacting in the die-package system. Typical failure modes are linked to metal displacement, dielectric cracking, molding compound delamination, wire-bonds failure, die-attach layer degradation.

Test name	Description	Purpose
<b>TF / IOL</b> Thermal Fatigue / Intermittent Operating Life	The device is submitted to cycled temperature excursions generated by power cycles (ON/OFF) at T ambient.	To investigate failure modes related to the thermo-mechanical stress induced by the different thermal expansion of the materials interacting in the die-package system. Typical failure modes are linked to metal displacement, dielectric cracking, molding compound delamination, wire-bonds failure, die-attach layer degradation.
<b>THB</b> Temperature Humidity Bias	The device is biased in static configuration minimizing its internal power dissipation, and stored at controlled conditions of ambient temperature and relative humidity.	To evaluate the package moisture resistance with electrical field applied, both electrolytic and galvanic corrosion are put in evidence.
<b>Other</b>		
<b>ESD</b> Electro Static Discharge	The device is submitted to a high voltage peak on all his pins simulating ESD stress according to different simulation models. CBM: Charged Device Model HBM: Human Body Model MM: Machine Model	To classify the device according to his susceptibility to damage or degradation by exposure to electrostatic discharge.
<b>LU</b> Latch-Up	The device is submitted to a direct current forced/sunk into the input/output pins. Removing the direct current no change in the supply current must be observed.	To verify the presence of bulk parasitic effect inducing latch-up.

## ANNEX 1 Preliminary results

Bonding Strength a T0

Bond shear test

	<b>0158</b>	<b>0393</b>
Ball shear average (g)	38.2	39.4
Ball shear Min (g)	34.9	35.3
Ball shear Max (g)	40.4	44.2
Cpk	3.32	1.91
Failure mode	OK	OK

Pull Test

	<b>0158</b>	<b>0393</b>
Pull test average (g)	14.7	13.97
Pull Test Min (g)	11.4	11.8
Pull test Max (g)	16.3	16.31
Cpk	3.31	3.16
Failure mode	OK	OK



## Public Products List

Public Products are off the shelf products. They are not dedicated to specific customers, they are available through ST Sales team, or Distributors, and visible on ST.com

**PCN Title :** New material set in ST Bouskoura for Automotive Grade products assembled in TSSOP8 package (General Purpose Analog)

**PCN Reference :** AMS/20/12354

**Subject :** Public Products List

Dear Customer,

Please find below the Standard Public Products List impacted by the change.

TS922IYPT	TSC1021AIYPT	LMV358IYPT
LM258YPT	TS9222IYPT	TSC1031IYPT
TS922AIYPT	LM258WYPT	LM2903YPT
LM2904YPT	LM2904WYPT	TS1872IYPT
TSC103IYPT	LM2903WYPT	TSV358IYPT
LM2904AYPT	TS952IYPT	TSC102IYPT
LM258AWYPT	LM2903HYPT	LM2904AHYPT
LM2904AWYPT	TSC1021BIYPT	TSV358AIYPT
TS972IYPT		



### **IMPORTANT NOTICE – PLEASE READ CAREFULLY**

Subject to any contractual arrangement in force with you or to any industry standard implemented by us, STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2018 STMicroelectronics – All rights reserved