PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	AMS/21/12687
1.3 Title of PCN	Qualification of TSHT for products assembled in Mini SO package
1.4 Product Category	See product list
1.5 Issue date	2021-04-16

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
2.1.2 Marketing Manager	Salvatore DI VINCENZO
2.1.3 Quality Manager	Giuseppe LISI

3. Change		
3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Transfer	Line transfer for a full process or process brick (process step, control plan, recipes) from one site to another site: Assembly site (SOP 2617)	Assembly plant : - Carsem - TSHT

4. Description of change		
	Old	New
4.1 Description	Assembly plant : - Carsem	Assembly plant : - Carsem - TSHT
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	No impact	

5. Reason / motivation for change	
5.1 Motivation	The qualification of TSHT for Mini SO package will allow us to rationalize our production tool and provide better delivery service
5.2 Customer Benefit	SERVICE IMPROVEMENT

6. Marking of parts / traceability of change	
6.1 Description	New Finished good codes

7. Timing / schedule	
7.1 Date of qualification results	2021-03-15
7.2 Intended start of delivery	2021-07-15
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description	12687 12687 PCN standard-MiniSO TSHT.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2021-04-16

9. Attachments (additional documentations)
12687 Public product.pdf 12687 12687 PCN standard-MiniSO TSHT.pdf

10. Affected parts		
10. 1 Current		10.2 New (if applicable)
10.1.1 Customer Part No	10.1.2 Supplier Part No	10.1.2 Supplier Part No
L6920DBTR	L6920DBTR	
	L6920DCTR	
L6926013TR	L6926013TR	
L6928D013TR	L6928D013TR	
	LMC6482IST	
	LMV823AIST	
	LMV823IST	
	TSB572IST	
	TSV358AIST	
	TSV623AIST	
	TSV623IST	
	TSV6293AIST	
	TSV6293IST	
	TSV633AIST	
	TSV633IST	
	TSV6393AIST	
	TSV6393IST	
	TSV853IST	
	TSX3702IST	
	TSX393IST	
	TSX562AIST	
	TSX562IST	
	TSX632AIST	
	TSX632IST	
	TSX922IST	
	TSX923IST	
	TSX9292IST	

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PRODUCT/PROCESS
CHANGE NOTIFICATION

PCN AMS/21/12687

Analog, MEMS & Sensors (AMS)

New assembly site for General Purpose Analog products in MiniSO8/MiniSO10 packages

WHAT:

Progressing on activities related to process modernization and quality improvement, ST is pleased to announce the introduction of TSHT/China as an added subcontractor for Assy and Test & Finishing activities for some products assembled in our MiniSO8/10 package.

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	
Assembly location	Amkor Philippines Carsem Malaysia	TSHT China	
Molding compound	Sumitomo G700 Sumitomo G770 Hitachi CEL 8240	Hitachi CEL 9220	
Die attach	Henkel 8290 / QMI519	Henkel 8200T/Henkel8600/	
Leadframe	Copper	Copper	
Plating	NiPdAu / Matte Sn	Matte Sn	
Wire	Gold 1.2Mils/1mil / 0.8Mil	Gold 1.3mils /Gold 1mil/ Copper Pd coated 1 mil/ 0.8 mil	

WHY:
The purpose of the introduction of TSHT for both Assy and Test & Finishing activities for the here above listed commercial products is to further improve the rationalization of our manufacturing assets and provide a better support to our customers by enhancing the manufacturing process for higher volume production.

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 Q3/2021 in TSHT China.

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

AMS Back-end qualification
MSOP 8/MSOP10
Production transfer to TSHT

General Information	
Product Line	*UT06, UT45, UT46, 0462, V633, 0193, 0358, UY36*
Product Description	Dual comparator bipolar, Dual op amp bipolar, Dual precision op amp,
P/N	*L6926013TR, L6928D013TR, L6920DCTR, TS972IST, TSV633IST, LM2903WST, LM2904WST, TSX7192IST,*
Product Group	*AMS*
Product division	*General Purpose Analog &RF*
Package	*MiniSO8, MiniSO10*
Silicon Process technology	*BCD5, HF2CMOS, Bipolar, HCMOS5, HVG8A*

Locations	
Wafer fab	*ST Singapore , ST Agrate*
Assembly plant	*TSHT China*
Reliability Lab	*ST Grenoble, TSHT*

TABLE OF CONTENTS

1 APPLICABLE AND REFERENCE DOCUMENTS

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

2 GLOSSARY

DUT	Device Under Test
PCB	Printed Circuit Board
SS	Sample Size

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

To qualify a new assembly site, TSHT China, for products in MiniSO8/10 package for Analog products.

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

L6926013TR

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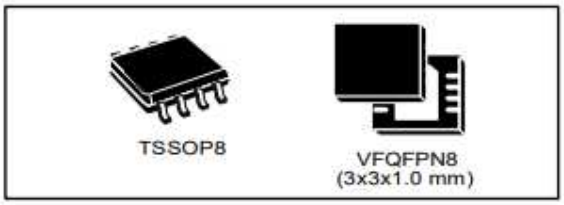
L6926

High efficiency monolithic synchronous step-down regulator

Datasheet - production data



Features

- 2 V to 5.5 V battery input range
- High efficiency: up to 95%
- Internal synchronous switch
- No external Schottky diode required
- Extremely low quiescent current
- 1 µA max. shutdown supply current
- 800 mA max. output current
- Adjustable output voltage from 0.6 V
- Low-dropout operation: up to 100% duty cycle
- Selectable low noise/low consumption mode at light load
- Power Good signal
- ± 1% output voltage accuracy
- Current mode control
- 600 kHz switching frequency
- Externally synchronized from 500 kHz to 1.4 MHz
- OVP
- Short-circuit protection

Applications

- Battery-powered equipment
- Portable instruments
- Cellular phones
- PDAs and handheld terminals
- DSC
- GPS

Description

The device is a DC-DC monolithic regulator specifically designed to provide high efficiency. The L6926 supply voltage can be as low as 2 V to be used in single Li-Ion cell supplied applications. Output voltage can be selected by an external divider down to 0.6 V. Duty cycle can saturate 100% allowing low-dropout operation. The device is based on a 600 kHz fixed frequency, current mode architecture. Low consumption mode operation can be selected at light load conditions, allowing switching losses to be reduced. The L6926 is externally synchronized by a clock, which makes it useful in noise sensitive applications. Other features like Power Good, overvoltage protection, short-circuit protection and thermal shutdown (150 °C) are also present.

Table 1: Device summary

Order code	Package	Packing
L6926	TSSOP8	Tube
L6926013TR	TSSOP8	Tape and reel
L6926Q1	VFQFPN8	Tube
L6926Q1TR	VFQFPN8	Tape and reel

L6928D013TR

L6928

High efficiency monolithic synchronous step-down regulator

Datasheet - production data


TSSOP8


VFQFPN8
(3x3x1.0 mm)

Applications

- Battery-powered equipment
- Portable instruments
- Cellular phones
- PDAs and handheld terminals
- DSC
- GPS

Features

- 2 V to 5.5 V battery input range
- High efficiency: up to 95%
- Internal synchronous switch
- No external Schottky diode required
- Extremely low quiescent current
- 1 µA max. shutdown supply current
- 800 mA max. output current
- Adjustable output voltage from 0.6 V
- Low-dropout operation: up to 100% duty cycle
- Selectable low noise/low consumption mode at light load
- Power Good signal
- ± 1% output voltage accuracy
- Current mode control
- 1.4 MHz switching frequency
- Externally synchronized from 1 MHz to 2 MHz
- OVP
- Short-circuit protection

Description

The device is a DC-DC monolithic regulator specifically designed to provide high efficiency. The L6928 supply voltage can be as low as 2 V to be used in single Li-Ion cell supplied applications. Output voltage can be selected by an external divider down to 0.6 V. Duty cycle can saturate 100% allowing low-dropout operation. The device is based on a 1.4 MHz fixed frequency, current mode architecture. Low consumption mode operation can be selected at light load conditions, allowing switching losses to be reduced. The L6928 is externally synchronized by a clock, which makes it useful in noise sensitive applications. Other features like Power Good, overvoltage protection, short-circuit protection and thermal shutdown (150 °C) are also present.

Table 1: Device summary

Order code	Package	Packing
L6928D	TSSOP8	Tube
L6928D013TR	TSSOP8	Tape and reel
L6928Q1	VFQFPN8	Tube
L6928Q1TR	VFQFPN8	Tape and reel

L6920DCTR

L6920DC

Synchronous rectifier step up converter

General features

- 0.8V start up input voltage
- Up to 5.5V operating input voltage
- Internal synchronous rectifier
- Adjustable output voltage from 1.8V to 5.5V
- 3.3V and 5V fixed output voltages
- Low battery voltage detection
- Reverse battery protection
- 550mA minimum input current limit
- Switching frequency up to 1MHz
- 1.23V reference voltage available

Applications

- Conversion from 1 to 3 alkaline,
- NiMH, NiCd battery cells or 1 lithium ION
- PDA and handheld instruments
- Digital cameras
- Cellular phones
- GPS
- Distributed power

MSOP8

Description

The L6920DC is a high efficiency monolithic step up switching converter IC especially designed for battery powered application.

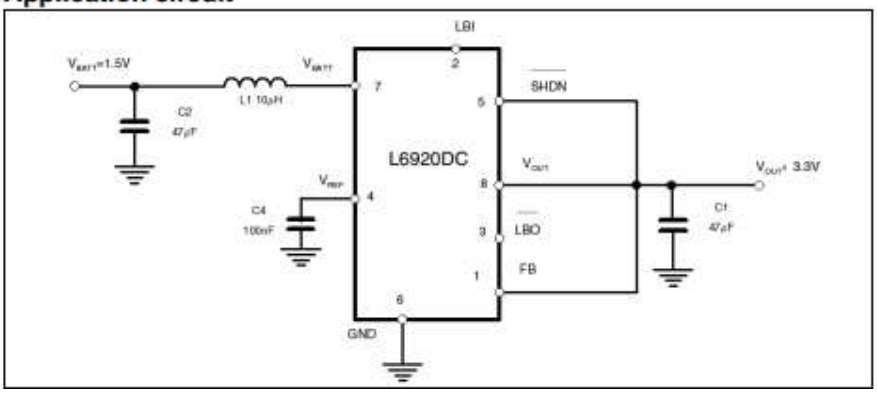
Package is MSOP8 in order to minimize PCB space. It requires only three external components to realize the conversion from the battery voltage to the selected output voltage.

The minimum output voltage is 1.8V: suitable to supply the most advanced ASIC and µP.

High switching frequency allows for a low profile, small sized inductor and output capacitor to be used.

Reference voltage, low battery detection and Shutdown are provided together with over current, over voltage.

Application circuit



TS972IST

TS971, TS972, TS974

Output rail-to-rail very low noise operational amplifier

Features

- Rail-to-rail output voltage swing ±2.4 V at V_{CC} = ±2.5 V
- Very low noise level: 4 nV/√Hz
- Ultra low distortion: 0.003%
- High dynamic features: 12 MHz, 4 V/µs
- Operating range: 2.7 to 10 V
- ESD protection (2 kV)
- Latch-up immunity (class A)

Applications

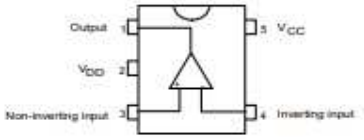
- Portable devices (CD players, PDAs)
- Portable communication (cell phones, pagers)
- Instrumentation and sensoring
- Professional audio circuits

Description

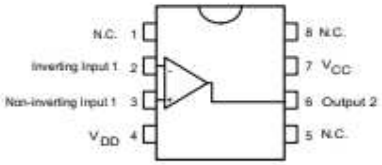
The TS97x family of operational amplifiers operates with voltages as low as ±1.35 V and features output rail-to-rail signal swing. The TS97x are particularly well suited for portable and battery-supplied equipment. Very low noise and low distortion characteristics make them ideal for audio pre-amplification.

The TS971 is available in a variety of packages to suit all types of applications. For applications where space-saving is critical, the SOT23 package (2.8 x 2.9 mm) or the DFN package (3 x 3 mm) simplify the board design because they can be placed everywhere.

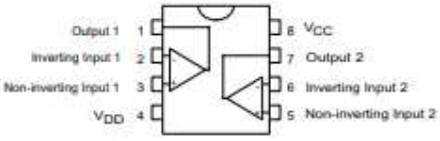
TS971ILT (SOT23-5L)



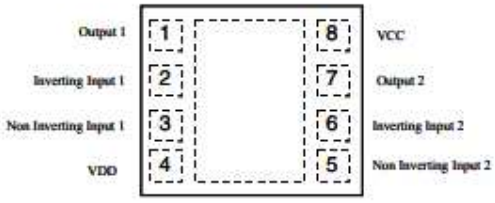
TS971ID-TS971IDT (SO-8)



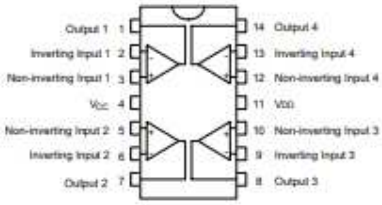
TS972ID-TS972IDT (SO-8)
TS972IPT (TSSOP8)



TS972IQT (DFN8)



TS974ID-TS974IDT (SO-14)
TS974IPT (TSSOP14)



TSV633IST

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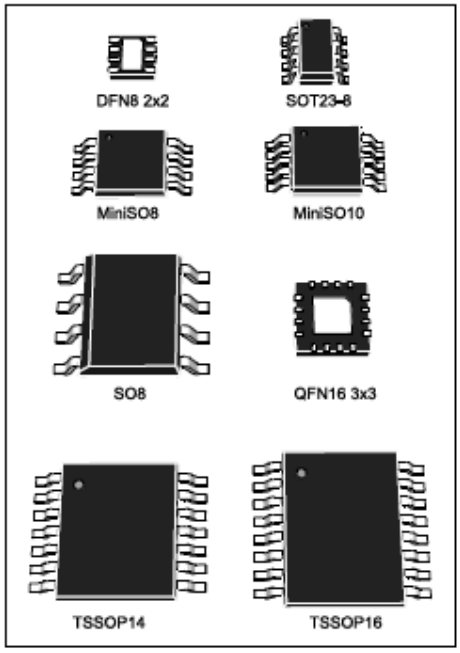
TSV63x, TSV63xA

Dual and quad, rail-to-rail input/output, 60 µA, 880 kHz operational amplifiers

Datasheet - production data



Features

- Rail-to-rail input and output
- Low power consumption: 60 µA typ at 5 V
- Low supply voltage: 1.5 V - 5.5 V
- Gain bandwidth product: 880 kHz typ
- Unity gain stable on 100 pF capacitor
- Low power shutdown mode: 5 nA typ
- Low offset voltage: 800 µV max (A version)
- Low input bias current: 1 pA typ
- EMI hardened op amps
- Automotive qualification

Related products

- See the TSV52x series for higher merit factor (1.15 MHz for 45 µA)
- See the TSV61x (120 kHz for 9 µA) or TSV62x (420 kHz for 29 µA) for more power savings

Applications

- Battery-powered applications
- Portable devices
- Signal conditioning
- Active filtering
- Medical instrumentation

Description

The TSV63x and TSV63xA series of dual and quad operational amplifiers offers low voltage operation and rail-to-rail input and output.

This family features an excellent speed/power consumption ratio, offering an 880 kHz gain-bandwidth product while consuming only 60 µA at 5 V supply voltage. The devices also feature an ultralow input bias current and TSV633 and TSV635 have a shutdown mode.

These features make the TSV63x and TSV63xA family ideal for sensor interfaces, battery-supplied and portable applications, and active filtering.

Table 1: Device summary

Reference	Dual version		Quad version	
	Without standby	With standby	Without standby	With standby
TSV63x	TSV632	TSV633	TSV634	TSV635
TSV63xA	TSV632A	TSV633A	TSV634A	TSV635A

LM2903WST

LM2903W

Low-power, dual-voltage comparator

Datasheet – production data

Features

- Wide, single supply voltage range or dual supplies +2 V to +36 V or ±1 V to ±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: ±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
- ESD internal protection: 2 kV

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.

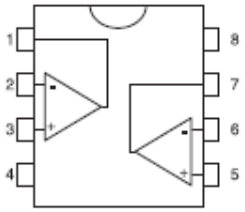
The input common-mode voltage range includes negative rail even though operated from a single power supply voltage.

All pins are protected against electrostatic discharge up to 2 kV. Consequently, the input voltages must not exceed the V_{CC}^+ or V_{CC}^- magnitudes.

D
SO-8
(Plastic micropackage)

P
TSSOP8
(Thin shrink small outline package)

Pin connections (top view)



1 - Output 1
2 - Inverting input 1
3 - Non-inverting input 1
4 - V_{CC}^-
5 - Non-inverting input 2
6 - Inverting input 2
7 - Output 2
8 - V_{CC}^+

LM2904WST,

life.augmented

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_{CC} +) -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_{IO}	Enhanced ESD
LM2904		
LM2904A	✓	
LM2904W		✓
LM2904AW	✓	✓

Related products	
TSB572	Dual op-amps for low-power consumption (380 µA with 2.5 MHz GBP)
LM2902 LM2902W	Quad op-amps version
LM2904WH LM2904AH	High temperature version (150 °C)

TSX7192ST

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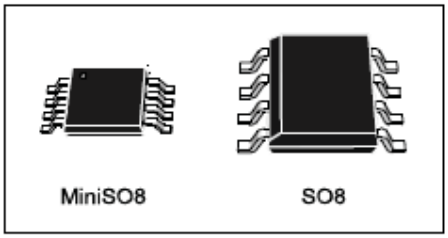
TSX7192

Low-power, precision, rail-to-rail, 9.0 MHz, 16 V operational amplifiers

Datasheet - production data



Features

- Low input offset voltage: 200 µV max.
- Rail-to-rail input and output
- Low current consumption: 850 µA max.
- Gain bandwidth product: 9 MHz
- Low supply voltage: 2.7 to 16 V
- Stable when used with Gain ≥ 10
- Low input bias current: 50 pA max.
- High ESD tolerance: 4 kV HBM
- Extended temp. range: -40 °C to 125 °C
- Automotive qualification

Related products

- See the TSX7191 for single op amp version
- See the TSX712 for lower speeds with similar precision
- See the TSX562 for low-power features
- See the TSX632 for micro-power features
- See the TSX922 for higher speeds

Applications

- Battery-powered instrumentation
- Instrumentation amplifier
- Active filtering
- High-impedance sensor interface
- Current sensing (high and low side)

Description

The TSX7192 dual, operational amplifier (op amp) offers high precision functioning with low input offset voltage down to a maximum of 200 µV at 25 °C. In addition, its rail-to-rail input and output functionality allows this product to be used on full range input and output without limitation. This is particularly useful for a low-voltage supply such as 2.7 V that the TSX7192 is able to operate with.

Thus, the TSX7192 has the great advantage of offering a large span of supply voltages, ranging from 2.7 V to 16 V. It can be used in multiple applications with a unique reference.

Low input bias current performance makes the TSX7192 perfect when used for signal conditioning in sensor interface applications. In addition, low-side and high-side current measurements can be easily made thanks to rail-to-rail functionality. The TSX7192 is a decompensated amplifier and must be used with a gain greater than 10 to ensure stability.

High ESD tolerance (4 kV HBM) and a wide temperature range are also good arguments to use the TSX7192 in the automotive market segment.

4.2 Construction note

	P/N L6926013TR	P/N L6928D013TR	P/N L6920DCTR		
Wafer fab manufacturing location	ST Agrate	ST Agrate	ST Agrate		
Technology	BCD5	BCD5	BCD5		
Die finishing back side	RAW SILICON	RAW SILICON	RAW SILICON		
Die size (microns)	1327x1988	1327x1988	1440x1906		
Passivation type	Teos + PTeos + SiOn	Teos + PTeos + SiOn	Teos + PTeos + SiOn		
Wafer Testing (EWS) information					
Electrical testing manufacturing location	ST Singapore	ST Singapore	ST Singapore		
Assembly information					
Assembly site	TSHT	TSHT	TSHT		
Package description	MiniSO8	MiniSO8	MiniSO8		
Molding compound	Hitachi CEL-9220	Hitachi CEL-9220	Hitachi CEL-9220		
Frame material	Cu	Cu	Cu		
Die attach process	Epoxy Glue	Epoxy Glue	Epoxy Glue		
Die attach material	Henkel 8200T	Henkel 8200T	Henkel 8200T		
Wire bonding process	Thermosonic ball bonding	Thermosonic ball bonding	Thermosonic ball bonding		
Wires bonding materials/diameters	Cu 0.8 mil Pd Coated	Cu 0.8 mil Pd Coated	Cu 0.8 mil Pd Coated		
Lead finishing process	electroplating	electroplating	electroplating		
Lead finishing/bump solder material	Matte Sn	Matte Sn	Matte Sn		
Final testing information					
Testing location	TSHT	TSHT	TSHT		

	P/N TS972IST	P/N TSV633IST	P/N *LM2903WST*	P/N *LM2904WST*	P/N TSX7192IST
Wafer fab manufacturing location	ST Singapore	UMC Taiwan	ST Singapore	ST Singapore	UMC Taiwan
Technology	HF2CMOS	HCMOS5	Bipolar	Bipolar	HF5CMOS
Die finishing back side	RAW SILICON	RAW SILICON	RAW SILICON	RAW SILICON	RAW SILICON
Die size (microns)	1100x960	1052x982			
Passivation type	PVAPOX+Nitride	PSG+Nitride	Nitride	Nitride	PSG + NITRIDE
Wafer Testing (EWS) information					
Electrical testing manufacturing location	ST Singapore	ST Singapore	ST Singapore	ST Singapore	ST Singapore
Assembly information					
Assembly site	TSHT	TSHT	TSHT	TSHT	TSHT
Package description	MiniSO8	MiniSO10	MiniSO8	MiniSO8	MiniSO8
Molding compound	Hitachi CEL-9220	Hitachi CEL-9220	Hitachi CEL-9220	Hitachi CEL-9220	Hitachi CEL-9220
Frame material	Cu	Cu	Cu	Cu	Cu
Die attach process	Epoxy Glue	Epoxy Glue	Epoxy Glue	Epoxy Glue	Epoxy Glue
Die attach material	Henkel 8200T	Henkel 8200T	Henkel 8200T	Henkel 8200T	Henkel 8200T
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 Pd Coated	Cu 1 mil Pd Coated	Cu 1 mil Pd Coated	Cu 1 mil Pd Coated	Cu 1 mil Pd Coated
Lead finishing process	electroplating	electroplating	electroplating	electroplating	electroplating
Lead finishing/bump solder material	Matte Sn	Matte Sn	Matte Sn	Matte Sn	Matte Sn
Final testing information					
Testing location	TSHT	TSHT	TSHT	TSHT	TSHT

5 TESTS PLAN SUMMARY

5.1 Test vehicle

Lot #	Process/ Package	Product Line	Comments
1	BCD5/miniSO8	UT06	
2	BCD5/miniSO8	UT45	
3	BCD5/miniSO8	UT46	
4	HF2CMOS/MiniSO8	0462	
5	HCMOS5/MiniSO10	V633	
6	Bipolar/MiniSO8	0193	
7	Bipolar/MiniSO8	0358	
8	HVG8A/MiniSO8	UY36	

5.2 Test plan summary

Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS					Note
						Lot 1 UT06	Lot 2 UT45	Lot3 UT46			
HTSL	N	JESD22 A-103	Ta = 150°C		168 H	0/77	0/77	0/77			
					500 H	0/77	0/77	0/77			
					1000 H	0/77	0/77	0/77			
PC		JESD22 A-113	Drying 24 H @ 125°C Store 192 H @ Ta=30°C Rh=60% Over Reflow @ Tpeak=260°C 3 times		Final	PASS	PASS	PASS			
UHAST	Y	JESD22 A-102	85%RH / Ta=130°C		96 H	0/77	0/77	0/77			
TC	Y	JESD22 A-104	Ta = -55°C to 150°C		100 cy	0/77	0/77	0/77			
					200 cy	0/77	0/77	0/77			
					500cy	0/77	0/77	0/77			

Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS					Note
						Lot4 0462	Lot5 V633	Lot 6 0193	Lot 7 0358	Lot 8 UY36	
HTB/ HTOL	N	JESD22 A-108	Ta = 125°C or 125°C, BIAS		168 H		3x0/77	0/77	0/77	0/77	
					500 H		3x0/77	0/77	0/77	0/77	
					1000 H		3x0/77	0/77	0/77	0/77	
HTSL	N	JESD22 A-103	Ta = 150°C		168 H	0/50	0/50	0/50	0/50	0/50	
					500 H	0/50	0/50	0/50	0/50	0/50	
					1000 H	50	0/50	0/50	0/50	0/50	
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	PASS	PASS	
UHAST	Y	JESD22 A-102	85%RH / Ta=130°C		96 H	0/77	0/77	0/77	0/77	0/77	
TC	Y	JESD22 A-104	Ta = -55°C to 150°C		100 cy	0/77	0/77	0/77	0/77	0/77	
					200 cy	0/77	0/77	0/77	0/77	0/77	
					500 cy	0/77	0/77	0/77	0/77	0/77	
					1000cy		0/77	0/77	0/77		
THB	Y	JESD22 A-101	Ta = 85°C, RH = 85%, BIAS		168 H		3x0/77	0/77	0/77	0/77	
					500 H		3x0/77	0/77	0/77	77	
					1000 H		0/77	0/77	0/77	77	

6 ANNEXES

6.1 Tests Description

Test name	Description	Purpose
Die Oriented		
HTOL High Temperature Operating Life **HTB** High Temperature Bias	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.
HTRB High Temperature Reverse Bias **HTFB / HTGB** High Temperature Forward (Gate) 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. 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.
HTSL 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.
ELFR 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.
Package Oriented		
PC 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.
AC 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.
TC 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
TF / IOL 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.
THB 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.
Other		
ESD 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.
LU 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.

Public Products List

Publict 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 : Qualification of TSHT for products assembled in Mini SO package

PCN Reference : AMS/21/12687

Subject : Public Products List

Dear Customer,

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

L6926013TR	TSX3702IST	TSX562AIST
L6920DBTR	LMV823AIST	LMC6482IST
TSV6293IST	TSV6393IST	TSX922IST
TSB572IST	L6920DCTR	TSV623IST
TSX632IST	TSX9292IST	TSX923IST
TSV6393AIST	TSX632AIST	TSV853IST
TSV853AIST	LMV823IST	TSV623AIST
TSV358AIST	TSX393IST	TSV633AIST
L6928D013TR	TSX562IST	TSV6293AIST
TSV633IST		

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