PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	AMS/23/14400
1.3 Title of PCN	Introduction of additional products in SC70 (Sot323) package on Hefei TF Assembly & Test production lines General Purpose Analog
1.4 Product Category	See product list
1.5 Issue date	2023-11-17

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	Jean-Marc BUGNARD

3. Change		
3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Transfer	Product transfer from one site to another site, even if test or process line is qualified	Hefei TF

4. Description of change		
	Old	New
4.1 Description	Assembly & Test : - Carsem M	Assembly & Test : - Carsem M - Hefei TF
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	No impact	

5. Reason / motivation for change	
5.1 Motivation	Increase Assembly and Test Volume Capacity for SOT323 5lds products
5.2 Customer Benefit	CAPACITY INCREASE

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

7. Timing / schedule	
7.1 Date of qualification results	2023-11-07
7.2 Intended start of delivery	2024-02-20
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description	14400 PCN report _HEFEI-SC70phase2.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2023-11-17

9. Attachments (additional documentations)
14400 Public product.pdf 14400 PCN report _HEFEI-SC70phase2.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
	STLQ50C33R	
	STWD100PYW83F	
	TS3011ICT	
	TSV521AICT	
	TSV521ICT	
	TSV611AICT	
	TSV611ICT	
	TSV631AICT	
	TSV631ICT	

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.

R311SCH1

PRODUCT/PROCESS
CHANGE NOTIFICATION

PCN AMS/23/14400

Analog, MEMS & Sensors (AMS)

Introduction of additional products in SC70 (Sot323) package on Hefei TF Assembly & Test production lines General Purpose Analog

WHAT:

SC70(Sot323) line in Heifei Tongfu is running in volume since 2023 for some General Purpose products. ST is pleased to announce the introduction of additional products on this assembly line.

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

Material	Current process	Modified process	Comment
Diffusion location	UMC (Taiwan)/ST Crolles/ St Singapore/ST Catania	UMC (Taiwan)/ST Crolles/ St Singapore/ST Catania	No change
Assembly location	Carsem Malaysia	Heifei Tongfu	
Molding compound	Hitachi CEL8240HF10	Hitachi CEL8240HF10	
Die attach	Ablestick 8006 Henkel QMI519	Sumitomo CRM-119AR-B Ablestick 8200T	
Leadframe	Copper	Copper	
Plating	NiPdAu	Matte Sn	
Wire	Gold 1 mil and 0.8mil	1mil CuPd	

WHY:

The purpose of the extension to additional product of usage of SC70 Heifei Tonfu is to 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:

ST will start the production of these additional products in Hefei tongfu China in Q1’24.

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.

R311SCH1

Reliability Evaluation Report

New assembly plant HEFEI Tongfu
SC70 (Sot 323) package

General Information	
Product Line	088171/ V80101 /V798
Product Description	Rail-to-rail 0.9 V nanopower comparator/ Op Amplifier low power, 200 mA low quiescent current very low noise LDO
P/N	TS881ICT/ TSV851ICT/ LDK120C33R
Product Group	AMG
Product division	GPA
Package	SOT 323 5LDS
Silicon Process technology	HCMOS7A/ HF5CMOS/BCD6S

Locations	
Wafer fab	ST CROLLES/ UMC Taiwan/ ST Catania
Assembly plant	HEFEI TONGFU MICROELEC
Reliability Lab	Hefei/Grenoble

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

The objective of this evaluation is to qualify HEFEI TONGFU MICROELEC plant for SOT323 5L package for Standard op amp and comparator.
The line under qualification will serve several part numbers.
The qualification plan is made by similarity and based on the JESD47 specification.

3.2 Conclusion

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

Reliability agreement for qualification.

4 DEVICE CHARACTERISTICS

4.1 Device description

Line 088171:

SC70-5 (top view)

SOT23-5 (top view)

Description

The TS881 device is a single comparator featuring ultra low supply current (210 nA typical with output high, V_{CC} = 1.2 V, no load) with rail-to-rail input and output capability. The performance of this comparator allows it to be used in a wide range of portable applications. The TS881 device minimizes battery supply leakage and therefore enhances battery lifetime.

Operating from 0.85 V to 5.5 V supply voltage, this comparator can be used over a wide temperature range (-40 to +125 °C) keeping the current consumption at an ultra low level.

The TS881 device is available in the SC70-5 and the SOT23-5 package, allowing great space saving on the PCB.

Features

- Ultra low current consumption: 210 nA typ.
- Propagation delay: 2 µs typ.
- Rail-to-rail inputs
- Push-pull output
- Supply operation from 0.85 V to 5.5 V
- Wide temperature range: -40 to +125 °C
- ESD tolerance: 8 kV HBM / 300 V MM
- SMD package

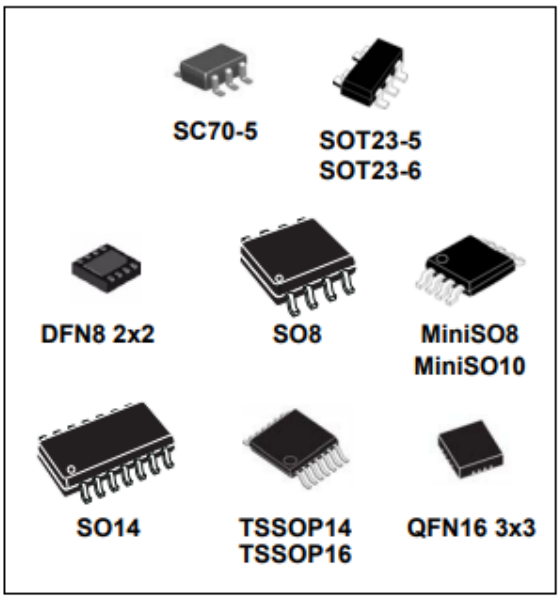
Applications

- Portable systems
- Signal conditioning
- Medical

Line V80101:

Low-power, high-accuracy, general-purpose operational amplifier

Datasheet - production data



Features

- Low power consumption: 180 µA max at 5 V
- Low power shutdown mode: 50 nA max
- Low offset voltage: 0.8 mV max at 25 °C
- Tiny packages
- Extended temperature range: -40 °C to 125 °C
- Low supply voltage: 2.3 V - 5.5 V
- Gain bandwidth product: 1.3 MHz
- Automotive qualification

Benefits

- Longer lifetime in battery-powered applications
- Higher accuracy without calibration
- Smaller form factor than equivalent competitor devices
- Application performances guaranteed over wide temperature ranges

Related products

- See LMV82x series for higher gain bandwidth product (5.5 MHz)

Applications

- Battery-powered applications
- Portable devices
- Automotive signal conditioning
- Active filtering
- Medical instrumentation

Description

The TSV85x, TSV85xA series of single, dual, and quad operational amplifiers offer low voltage operation with a rail-to-rail output swing. The TSV85x, TSV85xA series outperforms the industry standard LMV321, proposing lower supply voltage capability, enhanced input offset voltage, and smaller packages.

The devices are offered with either industry standard pinouts or with a power-saving shutdown feature that reduces the supply current to a maximum of 50 nA at 25 °C.

The wide temperature range, high ESD tolerance, and automotive grade qualification ease the use in harsh automotive applications.

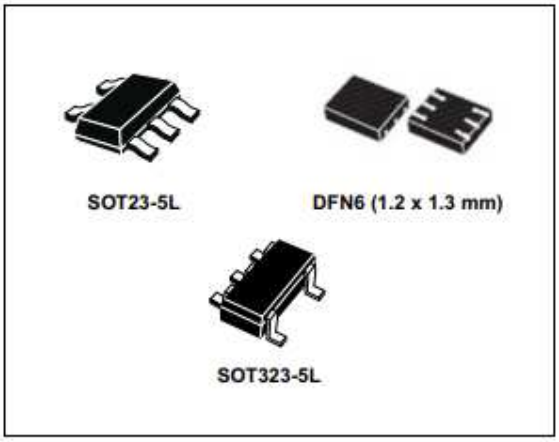
Table 1. Device summary

	Without shutdown feature		With shutdown feature	
	Standard Vio	Enhanced Vio	Standard Vio	Enhanced Vio
Single	TSV851	TSV851A	TSV850	TSV850A
Dual	TSV852	TSV852A	TSV853	TSV853A
Quad	TSV854	TSV854A	TSV855	TSV855A

LDK120

200 mA low quiescent current very low noise LDO

Datasheet - production data



Features

- Input voltage from 1.9 to 5.5 V
- Very low dropout voltage (100 mV typ. at 100 mA load)
- Low quiescent current (max. 100 µA, 1 µA in OFF mode)
- Very low noise
- Output voltage tolerance: ± 2.0% @ 25 °C
- 200 mA guaranteed output current
- Wide range of fixed output voltages available on request: from 0.8 V to 3.5 V with 100 mV step
- Adjustable version: from 0.8 V to V_{IN}-V_{drop}
- Logic-controlled electronic shutdown
- Compatible with ceramic capacitor C_{OUT} = 1 µF
- Internal current and thermal limit
- Available in SOT23-5L, SOT323-5L and DFN6 (1.2 x 1.3 mm) packages
- Temperature range: -40 °C to 125 °C

Applications

- Mobile phones
- Personal digital assistants (PDAs)
- Cordless phones and similar battery-powered systems
- Digital still cameras

Description

The LDK120 low drop voltage regulator provides 200 mA of maximum current from an input supply voltage in the range of 1.9 V to 5.5 V, with a typical dropout voltage of 100 mV.

It is stabilized with a ceramic capacitor on the output.

The very low drop voltage, low quiescent current and low noise features make it suitable for low power battery-powered applications.

An enable logic control function puts the LDK120 in shutdown mode allowing a total current consumption lower than 1 µA.

The device also includes a short-circuit constant current limiting and thermal protection.

life.augmented

R311SCH1

Construction note

	New Plant Qualification		
	P/N TS881ICT	**P/N LMV321LICT**	**P/N LDK120C33R**
Wafer/Die fab. information			
Wafer fab manufacturing location	ST CROLLES	UMC Taiwan	ST Catania
Process family	HCMOS7A	HF5CMOS	BCD6S
Die finishing back side	Raw Silicon	RAW SILICON	RAW SILICON
Die size	600x 600 µm²	702 x 702 µm²	782x736µm²
Bond pad metallization layers	Ti/AlCu/TiN	AlCu/TinArc	Ti/AlCu/TiNARC
Passivation type	PSG + NITRIDE	USG-PSG-SiON-PIX	TEOS/SiN/Polyimide
Wafer Testing (EWS) information			
Electrical testing manufacturing location	ST Singapore	ST Singapore	ST Singapore
Assembly information			
Assembly site	HEFEI Tongfu	HEFEI Tongfu	HEFEI Tongfu
Package description	SOT 323 5L	SOT 323 5L	SOT 323 5L
Molding compound	Hitachi CEL-8240HF10NF	Hitachi CEL-8240HF10NF	Hitachi CEL-8240HF10NF
Frame material	Copper	Copper	Copper
Die attach process	Glue	Glue	Glue
Die attach material	8200T Ablestik - conductive glue	CRM-1191AR-B Sumitomo- No conductive glue	8200T Ablestik - conductive glue
Wire bonding process	Thermosonic ball bonding	Thermosonic ball bonding	Thermosonic ball bonding
Wires bonding materials/diameters	1.0 MILS PdCu	1.0 MIL PdCu	1.0 MIL PdCu
Lead finishing process	Electroplating	Electroplating	Electroplating
Lead finishing/bump solder material	Pur TiN	Pur TiN	Pur TiN
Final testing information			
Testing location	Hefei Tongfu	Hefei Tongfu	Hefei Tongfu

	New Plant Qualification additional lines	
	P/N STLQ50	**P/N STWD100**
Wafer/Die fab. information		
Wafer fab manufacturing location	ST Catania	ST Singapore
Process family	BCD6	HCMOS4TZ
Die finishing back side	Cr/NiV/Au	Raw Silicon
Die size	710 x 684 µm²	750X650 µm²
Bond pad metallization layers	Ti/AlCu/TiNARC	Ti/AlSiCu/TiN
Passivation type	TEOS/SiN/Polyimide	PSG+Silicon Nitride+Polyimide
Wafer Testing (EWS) information		
Electrical testing manufacturing location	ST Singapore	ST Singapore
Assembly information		
Assembly site	HEFEI Tongfu	HEFEI Tongfu
Package description	SOT 323 5L	SOT 323 5L
Molding compound	Hitachi CEL-8240HF10NF	Hitachi CEL-8240HF10NF
Frame material	Copper	Copper
Die attach process	Glue	Glue
Die attach material	8200T Ablestik – conductive glue	CRM-1191AR-B Sumitomo- No conductive glue
Wire bonding process	Thermosonic ball bonding	Thermosonic ball bonding
Wires bonding materials/diameters	0.8mil PdCu	1.0 MIL PdCu
Lead finishing process	Electroplating	Electroplating
Lead finishing	Matte Sn	Matte Sn
Final testing information		
Testing location	HEFEI Tongfu	HEFEI Tongfu

5 TESTS RESULTS SUMMARY

5.1 Test vehicle

Lot #	Product Line	Comments
1-3	TS881ICT	3 LOTS COMPLETED
4-8	TSV851ICT	5 LOTS COMPLETED
9-11	LDK120C33R	3 LOTS COMPLETED
12-14	STLQ50	3 LOTS ON GOING
15-17	STWD100	3 LOTS ON GOING

PRODUCTS	QUALIFICATION STATUS
TS3011ICT	QUALIFICATION DONE
TSV521AICT	
TSV521ICT	
TSV611AICT	
TSV611ICT	
TSV631AICT	
TSV631ICT	
STLQ50C33R	QUALIFICATION MARCH 2024
STLQ50C50R	
STWD100PYW83F	

Detailed results in below chapter will refer to P/N and Lot #.

5.2 Test plan and results summary

Test	PC	Std ref.	Conditions	SS	Steps	TS881ICT	TSV851ICT				Note
						Lot 1-3	Lot 4-8	Lot 9 – 11	Lot 12-14	Lot 15-17	
Package Oriented Tests											
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	**3 X PASS**	**5 X PASS**	**3 X PASS**	**MSL1**	**MSL1**	
uHAST	Y	JESD22 A-118	T°=130°C; Pres.=2.3 atm; HR=85%		96 H	**3 X 0/77**	**5 x 0/77**	**3 X 0/77**	**3 x 77**	**3 x 77**	
HTSL		JESD22 A-103	Ta = 150°C		1000 H	**3 X 0/77**	**5 x 0/77**	**3 X 0/77**	**3 x 77**	**3 x 77**	
TC	Y	JESD22 A-104	Ta = -65°C to 150°C		500 cy	**3 X 0/77**	**5 x 0/77**	**3 X 0/77**	**3 x 77**	**3 x 77**	
THB	Y	JESD22 A-101	Ta = 85°C, RH = 85%, BIAS		1000 H	**0/77**	**0/77**	**3 X 0/77**		**77**	
Other Tests											
BPS	N	MIL – STD683	Bond Pull Strength	5	10 bonds	**3X PASS**	**5 X PASS**	**3X PASS**	**3 x 5**	**3 x 5**	
SD		J-STD 002	solderability	5	5 units	**3X PASS**	**5 X PASS**	**3X PASS**	**3 x 5**	**3 x 5**	
BS	N	AECQ100 - 001	Bond shear strength	5	10 bonds	**3X PASS**	**5 X PASS**	**3X PASS**	**3 x 5**	**3 x 5**	
CA	N		Construction analysis	100			**PASS**				

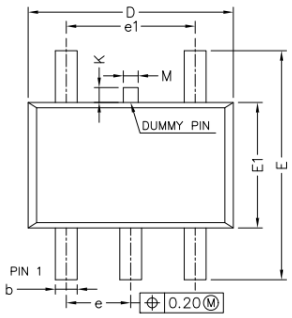
In case of rejects include a short description of the failure analysis and corrective actions.

6 ANNEXES

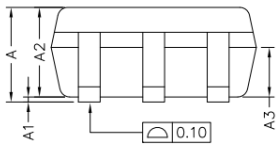
6.1.1 Package outline/Mechanical data

DIMENSIONS				
REF.DIM.	DATA BOOK (mm)			NOTES
	MIN	NOM	MAX	
A	0.80		1.10	
A1	0		0.10	
A2	0.80	0.90	1	
A3	0.40	0.50	0.60	
b	0.17		0.30	
b1	0.17	0.22	0.25	
c	0.12		0.20	
c1	0.12	0.15	0.16	
D	2.02	2.07	2.12	
E	2.20	2.30	2.40	
E1	1.21	1.26	1.31	
e	0.60	0.65	0.70	
e1	1.20	1.30	1.40	
L	0.26	0.33	0.46	
L1	0.52 REF			
M	0.10	0.15	0.20	2
K	0		0.20	2
θ	0°		8°	
θ1	10°	12°	14°	
θ2	10°	12°	14°	

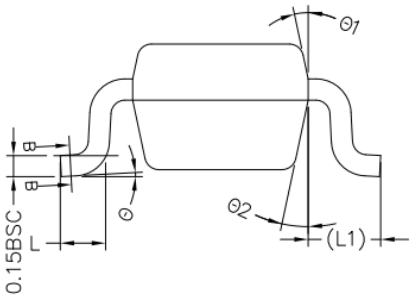
TOP VIEW



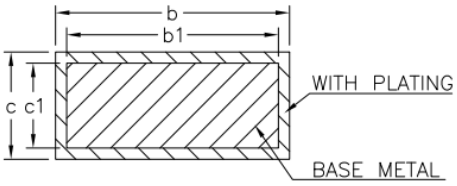
SIDE VIEW

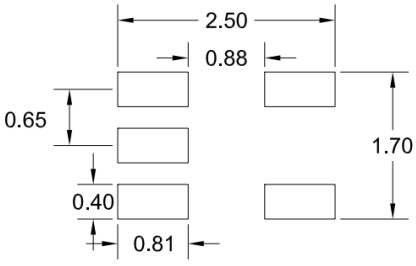


SIDE VIEW



SECTION B–B





6.2 Tests Description & Reliability equipment used

Test name	Description	Purpose
Die Oriented		
HTOL Higt 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.
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.
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.

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 : Introduction of additional products in SC70 (Sot323) package on Hefei TF Assembly & Test production lines General Purpose Analog

PCN Reference : AMS/23/14400

Subject : Public Products List

Dear Customer,

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

TSV521AICT	TSV631AICT	TSV631ICT
TSV611ICT	STWD100PYW83F	STLQ50C50R
TS3011ICT	TSV521ICT	STLQ50C33R
TSV611AICT		

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.