

SL3ICS3001

UCODE HSL bumped wafer specification

Rev. 3.0 — 6 July 2009
070730

Product data sheet addendum
PUBLIC

1. General description

The SL3ICS3001FW is a contactless tag IC designed for tags and labels for RFID and AIDC system applications.

This specification describes electrical, physical and dimensional properties of Au-bumped, sawn wafers on FFC.

Functionality of the integrated circuit are described in [Ref. 2 “Data sheet - SL3ICS3001 UCODE HSL, document number: 0728**”](#).

2. Ordering information

Table 1. Ordering information

Type number	Package		Version
	Name	Description	
SL3ICS3001FW/V1	Wafer	Bumped, sawn wafer on FCC, 150 µm, inked	-

3. Mechanical specification

3.1 Wafer

- Designation: each wafer is scribed with batch number and wafer number
- Diameter: 200 mm (8")
- Thickness: 150 µm ± 15 µm
- Bond pad location: see [Figure 1 “Bondpad plan SL3ICS3001”](#)
- Electrical connection substrate: RFN
- Orientation of dies relative to notch: see [Figure 2 “Chip orientation and bondpad locations SL3ICS3001”](#)
- Process: C075EE
- Batch size: 24 wafers
- Minimum average yield per batch: 30 %

3.2 Wafer backside

- Material: Si
- Treatment: ground and stress release
- Roughness: R_a max. 0.5 μm , R_t max. 5 μm

3.3 Chip dimensions

- Die size without scribe: 0.91 mm x 0.84 mm = 0.76 mm²
- Die size with scribe: 0.99 mm x 0.92 mm = 0.91 mm²
- Scribe lines:
 - x-line: 86.4 μm (scribe line width is measured on top metal layer)
 - y-line: 86.4 μm (scribe line width is measured on top metal layer)

3.4 Passivation on front

- Type: sandwich structure
- Material: PSG / Nitride (on top)
- Thickness: 500 nm / 600 nm

3.5 Au bump

- Bump material: > 99.9% pure Au
- Bump hardness: 35 – 80 HV 0.005
- Bump shear strength: > 70 MPa
- Bump height: 18 μm
- Bump height uniformity:
 - within a die: $\pm 2 \mu\text{m}$
 - within a wafer: $\pm 3 \mu\text{m}$
 - wafer to wafer: $\pm 4 \mu\text{m}$
- Bump flatness: $\pm 1.5 \mu\text{m}$
- Bump size:
 - RFP, RFN: 60 x 60 μm (pad RFN is connected to substrate and ground)
 - TP1, TP2: 60 x 60 μm (pads TP1 and TP2 are disconnected when the wafer is sawn)
- Bump size variation: $\pm 5 \mu\text{m}$
- Under bump metallization: sputtered TiW

3.6 Fail die identification

All fail dies are inked according to electrical test results.

Electronic wafer mapping covers the electrical test results and additionally the results of mechanical/visual inspection.

For details please refer to [Ref. 1 "Data sheet - General specification for 8" wafer on UV-tape, document number: 1005**"](#).

4. Limiting values

Table 2. Limiting values^{[1][2]}

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
I_{IN}	input current		-	± 10	mA
T_{stg}	storage temperature bare die		-55	+125	°C
P_{tot}	power dissipation		-	30	mW
T_{amb}	operating temperature		-40	+85	°C
V_{ESD}	electrostatic discharge voltage	Human Body Model ^[3]	-	± 1	kV

- [1] Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any conditions other than those described in the Operating Conditions and Electrical Characteristics section of this specification is not implied.
- [2] This product includes circuitry specifically designed for the protection of its internal devices from the damaging effects of excessive static charge. Nonetheless, it is suggested that conventional precautions be taken to avoid applying greater than the rated maxima.
- [3] For ESD measurement, the die chip has been mounted into a CDIP8 package.

5. Characteristics

5.1 DC characteristics

This section provides additional information to the data sheet ([Ref. 2](#)) and overrules the data sheet in case of a conflict.

Table 3. Electrical characteristics

$T_{amb} = -25$ to 85 °C

Symbol	Parameter	Conditions	Min	Max	Unit	
$V_{RFP,min}$	minimum supply voltage for communication		[1]	1.15	1.55	V
$V_{RFP,write}$	minimum supply voltage for EEPROM programming		[1]	2.10	2.40	V
$I_{RFP,typ}$	chip current	$V_{RFP} = 1.9$ V	-	17	μ A	
R_{Mod}	chip input resistance	modulator turned on; $I_{RFP} = 10$ mA	-	180	Ω	

EEPROM characteristics

t_{ret}	retention time	$T_{amb} \leq 55$ °C	10	-	year
$N_{endu(W)}$	write endurance	$T_{amb} = 22$ °C	100000	-	cycle

[1] The measured operating voltage is the open-circuit voltage of a source with a 50Ω output impedance.

5.2 AC characteristics

This section provides additional information to the data sheet ([Ref. 2](#)) and overrules the data sheet in case of a conflict.

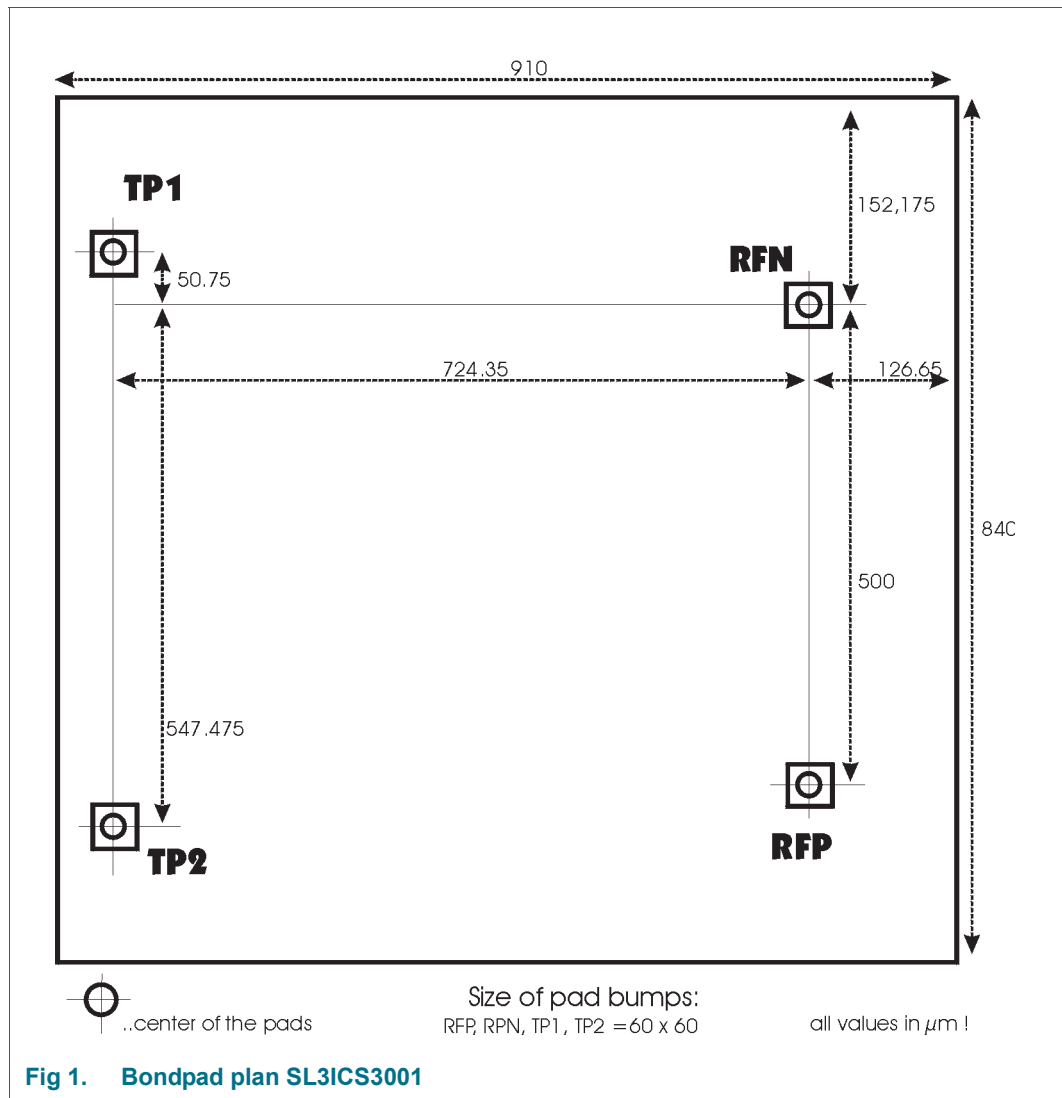
Table 4. Electrical AC characteristics

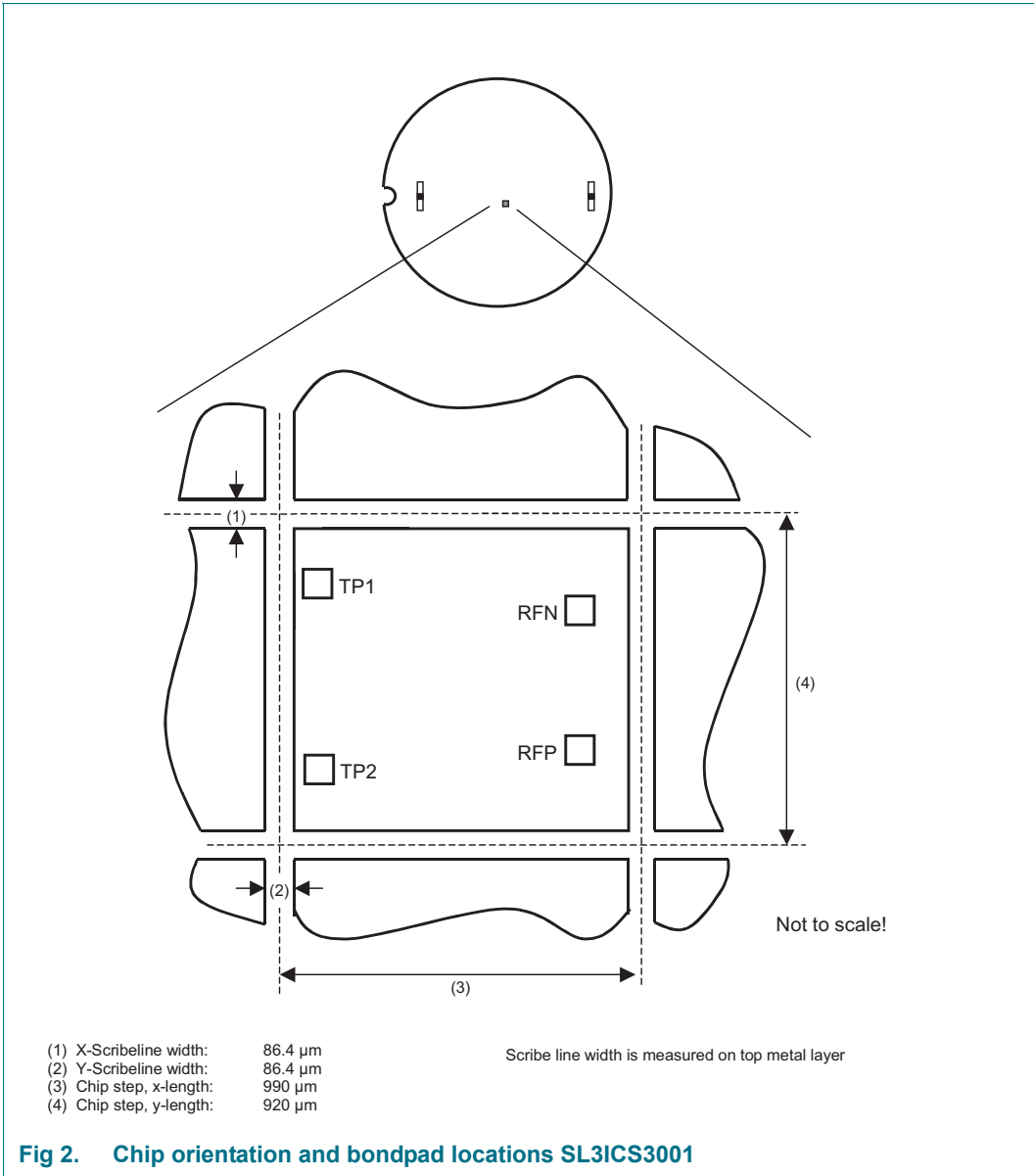
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Z_{867}	input impedance	$T = 22$ °C, $f = 867$ MHz	[1]	-	$41 - j865$	Ω
Z_{915}		$T = 22$ °C, $f = 915$ MHz	[1]	-	$34.5 - j815$	Ω
Z_{2450}		$T = 22$ °C, $f = 2450$ MHz	[1]	-	$11.5 - j295$	Ω
P_{867}	minimum operating power	$f = 869.5$ MHz	[2]	-	-15	dBm
P_{915}		$f = 915$ MHz	[2]	-	-14	dBm
P_{2450}		$f = 2450$ MHz	[2]	-	-9	dBm

[1] Measured at typical "minimum operating power".

[2] Values apply for operation with low modulation index (18 %) and high return datarate (4x forward link).

6. Chip orientation and bond pad locations





7. References

- [1] **Data sheet** - *General specification for 8" wafer on UV-tape*, document number: 1005**1
- [2] **Data sheet** - *SL3ICS3001 UCODE HSL*, document number: 0728**

8. Revision history

Table 5. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
070730	20090706	Product data sheet addendum	-	070710
Modifications:	<ul style="list-style-type: none"> The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. Legal texts have been adapted to the new company name where appropriate. Section 2 "Ordering information": updated Section 3 "Mechanical specification": updated Section 7 "References": updated 			
070710	October 2003	Preliminary data sheet addendum	-	-

1. ** ... document version number

9. Legal information

9.1 Data sheet status

Document status ^{[1][2]}	Product status ^[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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11. Tables

Table 1. Ordering information	1	Table 4. Electrical AC characteristics	5
Table 2. Limiting values ^{[1][2]}	4	Table 5. Revision history	8
Table 3. Electrical characteristics	5		

12. Figures

Fig 1. Bondpad plan SL3ICS3001	6	SL3ICS3001	7
Fig 2. Chip orientation and bondpad locations			

13. Contents

1	General description	1
2	Ordering information	1
3	Mechanical specification	1
3.1	Wafer	1
3.2	Wafer backside	2
3.3	Chip dimensions	2
3.4	Passivation on front	2
3.5	Au bump	2
3.6	Fail die identification	3
4	Limiting values	4
5	Characteristics	5
5.1	DC characteristics	5
5.2	AC characteristics	5
6	Chip orientation and bond pad locations	6
7	References	8
8	Revision history	8
9	Legal information	9
9.1	Data sheet status	9
9.2	Definitions	9
9.3	Disclaimers	9
9.4	Trademarks	9
10	Contact information	9
11	Tables	10
12	Figures	10
13	Contents	10

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