# SL2 ICS51

## Wafer addendum

Rev. 3.0 — 21 March 2007
136630

Product data sheet
PUBLIC

## 1. General description

This specification describes the electrical, physical and dimensional properties of Au-bumped sawn wafers on FFC of I•CODE SLI-L HC Label ICs on an NXP C075EE process and is the base for delivery of tested I•CODE SLI-L HC Label ICs.

## 2. Ordering information

**Table 1. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Ordering Code |
| SL2 ICS5101EW/V7 | | bumped sawn wafer on UV-tape | 9352 842 02005 |

## 3. Mechanical specification

### 3.1 Wafer

- Diameter: 8”
- Thickness: 150 µm ± 15 µm

### 3.2 Wafer backside

- Material: Si
- Treatment: ground + stress releave
- Roughness: $R_a$ max. 0.5 µm

  $R_t$ max. 5 µm

### 3.3 Chip dimensions

- Chip size: 940 x 986 $\mu m^2$
- Scribe lines: 50 / 50 µm

### 3.4 Passivation

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

founded by Philips

### 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: ± 2 μm
  - within a wafer: ± 3 μm
  - wafer to wafer: ± 4 μm
- Bump flatness: ± 1.5 μm
- Bump size:
  - LA, LB: 60 x 60 $\mu m^2$
  - VSS[1], TEST[1]: 60 x 60 $\mu m^2$
- Bump size variation: ± 5 μm
- Under bump metallization: sputtered TiW

1.Pads VSS and TEST are disconnected when wafer is sawn.


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## 3.6 Reference die definition (SECS II Wafer map format)

- Physical appearance: no chip structure, full die size
- Local coordinates: x=-66, y= -12

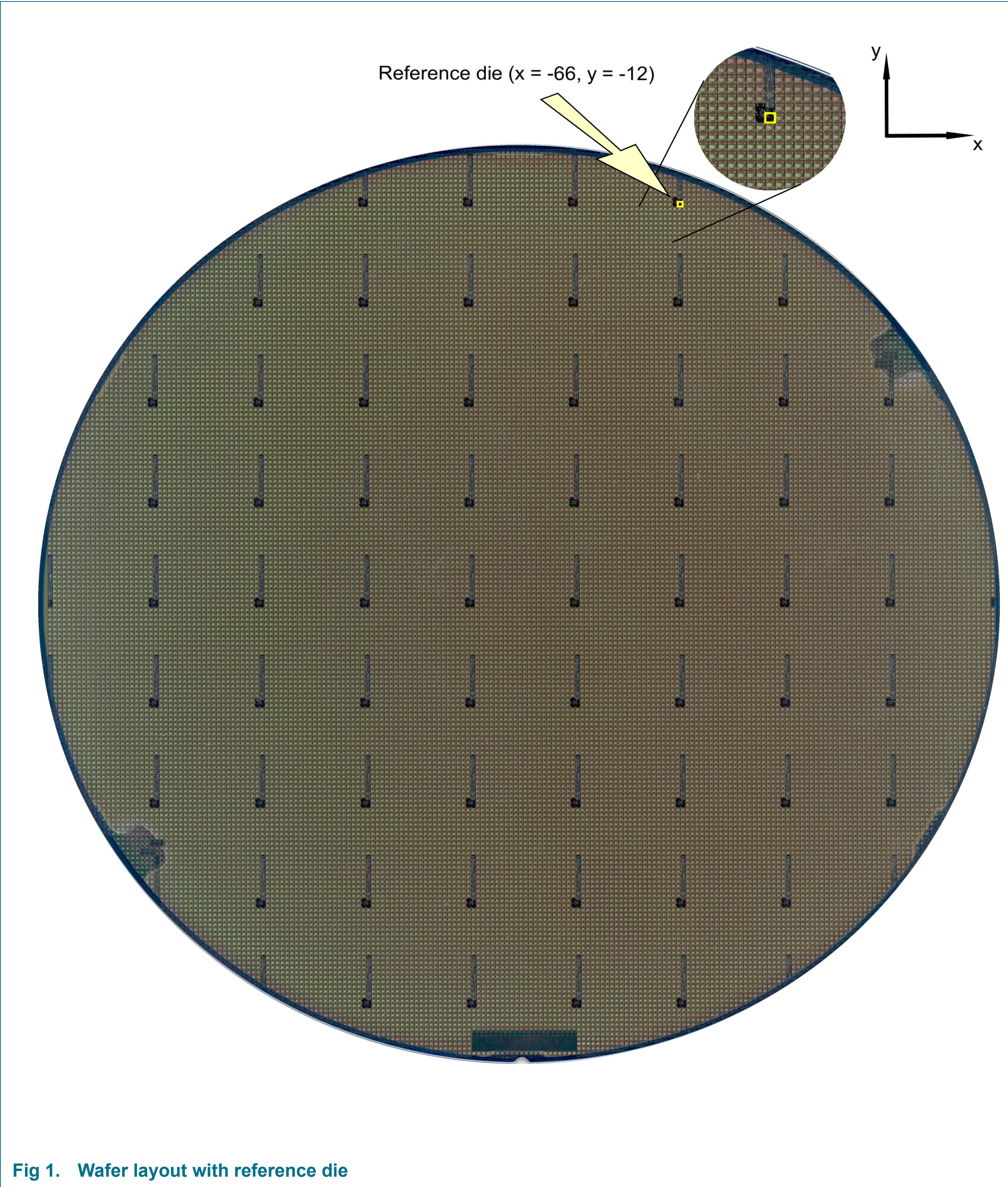


Fig 1. Wafer layout with reference die



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# 4. Fail die identification

## 4.1 Fail die identification

No inkdots are applied to the wafer.

Electronic wafer mapping (SECS II format) covers the electrical test results and additionally the results of mechanical/visual inspection.

## 4.2 Wafer mapping

Wafer mapping for failed die information is available on Floppy-Disk.

Format: SECS II format



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# 5. Limiting values

**Table 2. Limiting values[1][2]**

*Absolute Maximum Ratings*

| Symbol | Parameter | | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| $T_{STOR}$ | Storage temperature range | | -55 | | +140 | °C |
| Tj | Junction temperature | | -55 | | +140 | °C |
| $V_{ESD}$ | Electrostatic discharge voltage | [3] | | | ±2 | $kV_{peak}$ |
| $I_{max\ LA-LB}$ | Maximum input peak current | | | | ±60 | $mA_{peak}$ |
| $T_{jop}$ | Operating junction temperature | | -25 | | +85 | °C |
| $I_{LA-LB}$ | Input current | [4] | | | 30 | $mA_{rms}$ |

[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] MIL-STD-883D, Method 3015.7, Human Body Model

[4] The voltage between LA and LB is limited by the on-chip voltage limitation circuitry (corresponding to parameter $I_{LA-LB}$)



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# 6. Characteristics

## 6.1 Electrical characteristics

$T_{op}$= -25 to 85°C

**Table 3. Characteristics [1]**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{LA\text{-}LB}$ | Minimum Supply Voltage for READ/WRITE | | | | 2.5 | 2.7 | $V_{rms}$ |
| $f_{op}$ | Operating Frequency | | [2] | 13.553 | 13.560 | 13.567 | MHz |
| $C_{res}$ | Input Capacitance between LA – LB | $V_{LA\text{-}LB}$ = 2 $V_{rms}$ | [3] | 92 | 97 | 102 | pF |
| $P_{min}$ | Minimum Operating Supply Power | | [4] | | 280 | | μW |
| m | Modulation of RF Voltage for Demodulator Response | $m = \frac{V_{max} - V_{min}}{V_{max} + V_{min}}$ | [5] | | | | % |
| $tP_{sm}$ | Modulation Pulse Length of RF Voltage | | [5] | | | | μs |
| tD | Demodulator Response Time | m ≥ 10 %, 100 % | [5] | | | | μs |
| Rmod | Load Modulation | | [5] | | | | Ω |
| $t_{ret}$ | EEPROM Data Retention | $T_{amb}$ ≤ 55 °C | | 10 | | | Years |
| $n_{write}$ | EEPROM Write Endurance | | | 100000 | | | Cycles |

[1] Typical ratings are not guaranteed. These values listed are at room temperature.

[2] Bandwidth limitation (±7 kHz) according to ISM band regulations.

[3] Measured with an HP4285A LCR meter at 13.56 MHz

[4] Including losses in resonant capacitor and rectifier

[5] refer to ISO/IEC 15693-2 and 15693-3 including pulse shapes and tolerances; proper coil design assumed



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## 7. Chip orientation and bond pad locations

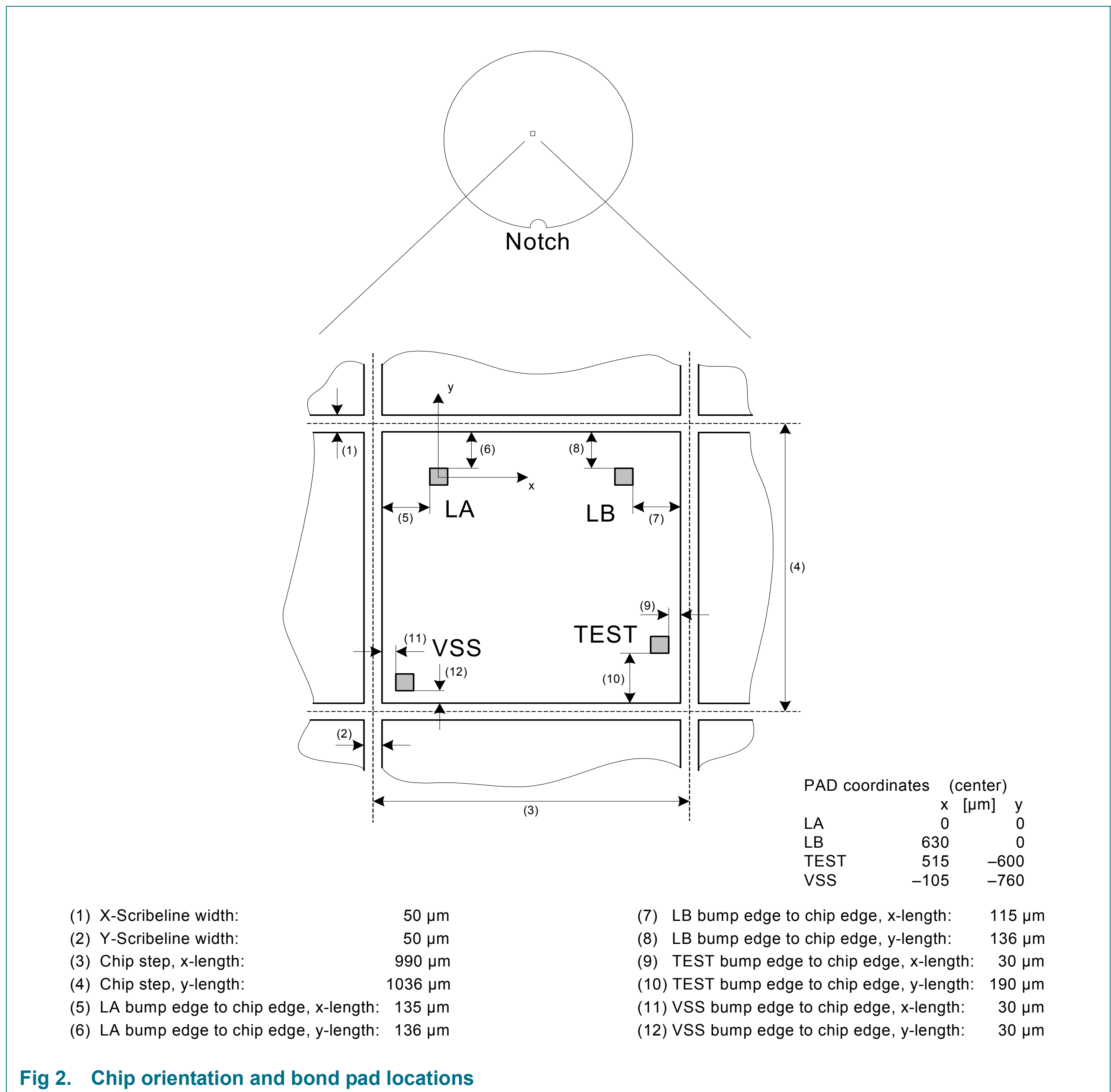


**Fig 2. Chip orientation and bond pad locations**

## 8. Final wafertest specification

- Minimum yield per wafer: 30 % of 27367 potential good dies.
- Minimum yield per lot: 30 %



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## 9. References

- Data sheet 'General specification for 8" wafers on UV-tape'
- Data sheet 'General quality specification'
- Application note 'SECS II wafer map format'
- Data sheet 'I•CODE SLI-L/I•CODE SLI-L HC, Functional Specification'
- Application note 'I•CODE coil design guide'



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## 10. Revision history

**Table 4. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| 136630 | 21 March 2007 | Product data sheet | | |
| Modifications: | • The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.<br>• Legal texts have been adapted to the new company name. | | | |



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# 11. Legal information

## 11.1 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".

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**Date of release: 21 March 2007**
**Document identifier: 136630**