# DATA SHEET

## ADDENDUM

## SL2 ICS10

# I•CODE EPC

Smart Label IC

Bumped Wafer Specification

Product Specification
Revision 3.0

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Philips
Semiconductors

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# Bumped Wafer Specification SL2 ICS10

**CONTENTS**

# Bumped Wafer Specification SL2 ICS10

## 1 SCOPE

This specification describes electrical, physical and dimensional properties of Au-bumped, sawn wafers on FFC of I•CODE EPC Smart Label IC.

## 2 REFERENCE DOCUMENTS

### 2.1 Philips Documents

- Data Sheet ‘General Specification for 8” Wafer’
- Data Sheet ‘General Quality Specification’
- Data Sheet ‘I•CODE EPC Smart Label IC, Functional Specification’
- Data Sheet ‘Specification of the IBIS Wafermap’
- Application Note ‘Coil Design Guide’

## 3 MECHANICAL SPECIFICATION

### 3.1 Wafer

- Diameter: 200 mm (8")
- Thickness: 150 µm ± 15 µm

### 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

- Chip size: x = 760 µm, y = 560 µm
- Scribe line: x-line: 60 µm<br>y-line: 80 µm

### 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: ± 2 µm
  - within a wafer: ± 3 µm
  - wafer to wafer: ± 4 µm
- Bump flatness: ± 1.5 µm
- Bump size:
  - LA, LB 90 x 90 µm
  - TestIO/Vss(1) 60 x 60 µm
- Bump size variation: ± 5 µm
- Under bump metallisation: sputtered TiW

(1) TestIO and Vss are floating after sawing.

## 4 FAIL DIE IDENTIFICATION

Every die is electrically tested according to data sheet. Identification of chips with electrical parameters not conform with the data sheet is done by inking and wafer mapping (all dies at wafer periphery are identified as ‘FAIL’).

The ink information refers to unsawn wafers. At sawn wafers (on FFC) additional ICs are marked as ‘FAIL’ in the wafer map if damaged during the sawing process. These ICs will not be inked.

### 4.1 Wafer Mapping

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

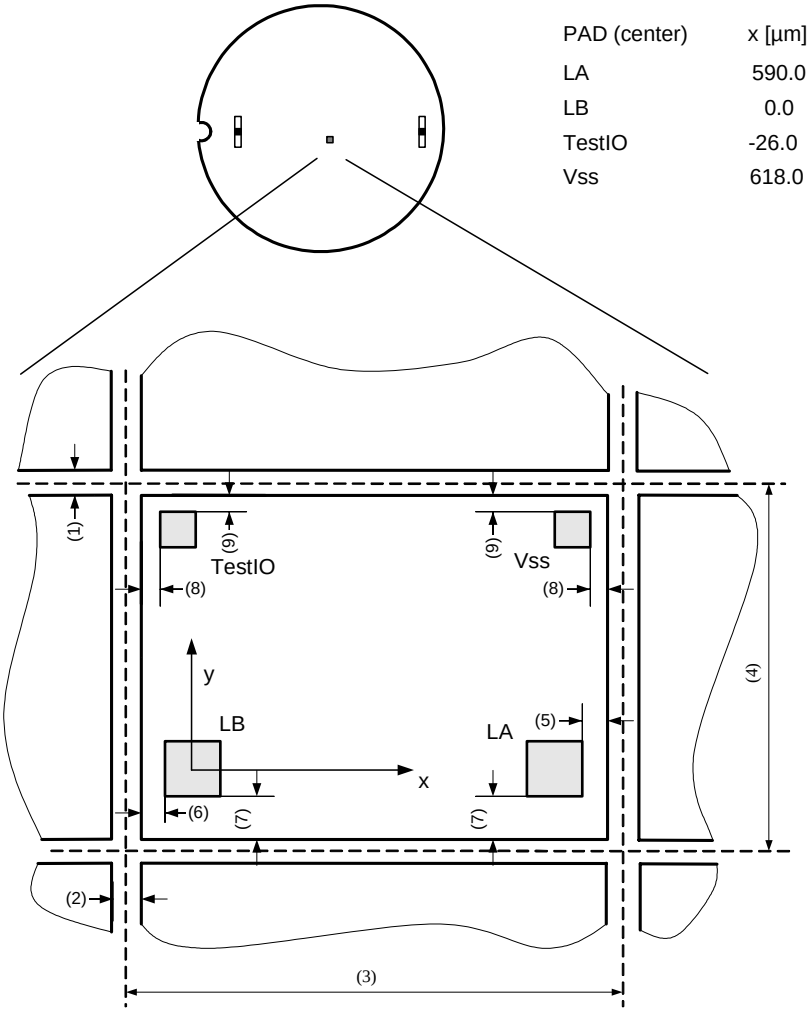
Format: IBIS format

## 5 ORDERING INFORMATION

| TYPE NAME | DESCRIPTION | ORDERING CODE |
|---|---|---|
| SL2 ICS10 01DW/V4 | Bumped die on sawn wafer | 9352 751 61005 |

## 6 CHIP ORIENTATION AND BONDPAD LOCATIONS

| PAD (center) | x [µm] | y [µm] |
|---|---|---|
| LA | 590.0 | 0.0 |
| LB | 0.0 | 0.0 |
| TestIO | -26.0 | 381.0 |
| Vss | 618.0 | 381.0 |




| | | | |
|---|---|---|---|
| (1) x-Scribeline width: | 60 µm | (6) LB bump edge to chip edge, x-length: | 39 µm |
| (2) y-Scribeline width: | 80 µm | (7) LA, LB bump edge to chip edge, y-length: | 71 µm |
| (3) Chip step, x-length: | 840 µm | (8) TestIO, Vss bump edge to chip edge, x-length: | 28 µm |
| (4) Chip step, y-length: | 620 µm | (9) TestIO, Vss bump edge to chip edge, y-length:: | 33 µm |
| (5) LA bump edge to chip edge, x-length: | 41 µm | | |

Fig.1 Bondpad plan SL2 ICS10.

## 7 ELECTRICAL SPECIFICATIONS

### 7.1 Absolute Maximum Ratings(1)(2)

| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| $T_{stg}$ | Storage Temperature Range | | –55 | | + 140 | °C |
| $T_j$ | Junction Temperature | | –55 | | + 140 | °C |
| $V_{ESD}$ | ESD Voltage Immunity | JEDEC, JESD 22 – A114-B, Human Body Model | | | ± 2 | $kV_{peak}$ |
| $I_{max\ LA-LB}$ | Maximum Input Peak Current | | | | ± 60 | $mA_{peak}$ |

**Notes**

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.

### 7.2 Operating Conditions

| SYMBOL | PARAMETER | TEST CONDITIONS | MIN | TYP(1) | MAX | UNIT |
|---|---|---|---|---|---|---|
| $T_{jop}$ | Operating Junction Temperature | | –25 | | +85 | °C |
| $I_{LA-LB}$ | Input Current(2) | | | | 30 | $mA_{rms}$ |
| $V_{LA-LB\ rd}$ | Minimum Supply Voltage for READ | | | 2.6 | 2.9 | $V_{rms}$ |
| $V_{LA-LB\ wr}$ | Minimum Supply Voltage for WRITE | | | 2.6 | 2.9 | $V_{rms}$ |
| $f_{op}$ | Operating Frequency(3) | | 13.553 | 13.560 | 13.567 | MHz |

**Notes**

1. Typical ratings are not guaranteed. These values listed are at room temperature.
2. The voltage between LA and LB is limited by the on-chip voltage limitation circuitry (corresponding to parameter $I_{LA-LB}$).
3. Bandwidth limitation (± 7 kHz) according to ISM band regulations.

### 7.3 Electrical Characteristics

$T_{op}$ = –25 to +85 °C

| SYMBOL | PARAMETER | TEST CONDITIONS | MIN | TYP(1) | MAX | UNIT |
|---|---|---|---|---|---|---|
| $C_{res}$ | Input Capacitance between LA – LB(2) | $V_{LA-LB}$ = 2 $V_{rms}$ | 22.3 | 23.5 | 24.7 | pF |
| $P_{min\ rd}$ | Minimum Operating Supply Power for READ(3) | | | 400 | | µW |
| $P_{min\ wr}$ | Minimum Operating Supply Power for WRITE(3) | | | 400 | | µW |
| $t_{ret}$ | Data Retention | $T_{amb} \leq 55$ °C | 5 | | | Years |

**Notes**

1. Typical ratings are not guaranteed. These values listed are at room temperature.
2. Measured with an HP4285A LCR meter at 13.56 MHz.
3. Including losses in resonant capacitor and rectifier.

## 8 FINAL WAFERTEST SPECIFICATION

- Minimum yield per wafer: 30 % of 56276 potential good dies.

## 9 DATA SHEET STATUS

| LEVEL | DATA SHEET STATUS(1) | PRODUCT STATUS(2)(3) | DEFINITION |
|---|---|---|---|
| I | Objective data | Development | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice. |
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**Notes**

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3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

## 10 DEFINITIONS

**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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## 12 REVISION HISTORY

**Table 1** Bumped Wafer Specification SL2 ICS10 Revision History

| REVISION | DATE | CPCN | PAGE | DESCRIPTION |
|---|---|---|---|---|
| 3.0 | Jan 2004 | - | | **Contents updated. Status now -> Product Specification** |
| | | | 4 | Chapter 5 “ORDERING INFORMATION”:<br>- added Ordering Code |
| 1.1 | Oct 2003 | - | | **Contents updated.** |
| | | | 3 | Chapter 3 “MECHANICAL SPECIFICATION”:<br>- rewording |
| | | | 5 | Chapter 6 “CHIP ORIENTATION AND BONDPAD LOCATIONS”:<br>- changed chip orientation and bondpad locations |
| | | | 6 | Chapter 7 “ELECTRICAL SPECIFICATIONS”:<br>- rewording |
| 1.0 | Feb. 2003 | - | | **Initial version.** |

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**Contact information**

For additional information please visit **http://www.semiconductors.philips.com**. Fax: **+31 40 27 24825**
For sales offices addresses send e-mail to: **sales.addresses@www.semiconductors.philips.com**.



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