

# DATA SHEET

## **ADDENDUM**

**mifare**<sup>®</sup>

**Standard Card IC**

**MF1 IC S50 05**

Specification “bumped sawn wafer on UV-tape”

Product Specification

August 2004

Revision 3.0

PUBLIC

**Bumped sawn wafer on UV-tape****Standard Card IC MF1 IC S50 05****CONTENTS**

1	SCOPE.....	3
2	REFERENCE DOCUMENTS.....	3
2.1	Philips Documents.....	3
3	MECHANICAL SPECIFICATION .....	3
3.1	Wafer.....	3
3.2	Wafer Backside .....	3
3.3	Chip Dimensions .....	3
3.4	Passivation.....	3
3.5	Au Bump.....	3
4	ORDERING INFORMATION .....	3
4.1	Bumped die on sawn wafer .....	3
5	CHIP ORIENTATION AND BONDPAD LOCATIONS .....	4
6	ELECTRICAL SPECIFICATIONS .....	5
6.1	Absolute Maximum Ratings .....	5
6.2	AC Characteristics.....	5
7	DEFINITIONS .....	6
8	LIFE SUPPORT APPLICATIONS .....	6
9	REVISION HISTORY .....	6
	Contact Information.....	7

---

MIFARE<sup>®</sup> is a registered trademark of Philips Electronics N.V.

## Bumped sawn wafer on UV-tape

## Standard Card IC MF1 IC S50 05

### 1 SCOPE

The MF1 ICS 50 05 is a contactless Smart Card IC designed for card IC coils following the MIFARE<sup>®</sup> Card IC Coil Design Guide and is qualified to work properly in Philips' reader environment, which is built according to Philips' specification.

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

### 2 REFERENCE DOCUMENTS

#### 2.1 Philips Documents

- Data Sheet "General Specification for 8" Wafer on UV-tape"
- Data Sheet "Au Bumps Layout Rules and Specification"
- Data Sheet "Standard Card IC MF1 IC S50 Memory Contents After Test"
- Data Sheet "Standard Card IC MF1 IC S50 Functional Specification"
- Product Qualification Package "Standard Card IC MF1 IC S50 05"
- Application Note "MIFARE<sup>®</sup> Card IC Coil Design Guide"

### 3 MECHANICAL SPECIFICATION

#### 3.1 Wafer

- Diameter: 8"
- Thickness: 150  $\mu\text{m} \pm 15 \mu\text{m}$
- Flatness: not applicable
- PGDW: 24892

#### 3.2 Wafer Backside

- Material: Si
- Treatment: ground and etched
- Roughness:  $R_a$  max. 0.5  $\mu\text{m}$   
 $R_t$  max. 5  $\mu\text{m}$

#### 3.3 Chip Dimensions

- Chip size: 1.11 x 1.06 mm
- Scribe lines:
  - x-line: 91.2  $\mu\text{m}$
  - y-line: 91.2  $\mu\text{m}$

#### 3.4 Passivation

- 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  $\mu\text{m}$
- 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:
  - LA, LB, VSS<sup>1</sup> 104 x 104  $\mu\text{m}$
  - TESTIO<sup>1</sup> 89 x 104  $\mu\text{m}$
- Bump size variation:  $\pm 5 \mu\text{m}$
- Under bump metallisation: sputtered TiW

### 4 ORDERING INFORMATION

#### 4.1 Bumped die on sawn wafer

- Order Code: MF1ICS5005W/V1D
- 12NC: 9352 774 55005

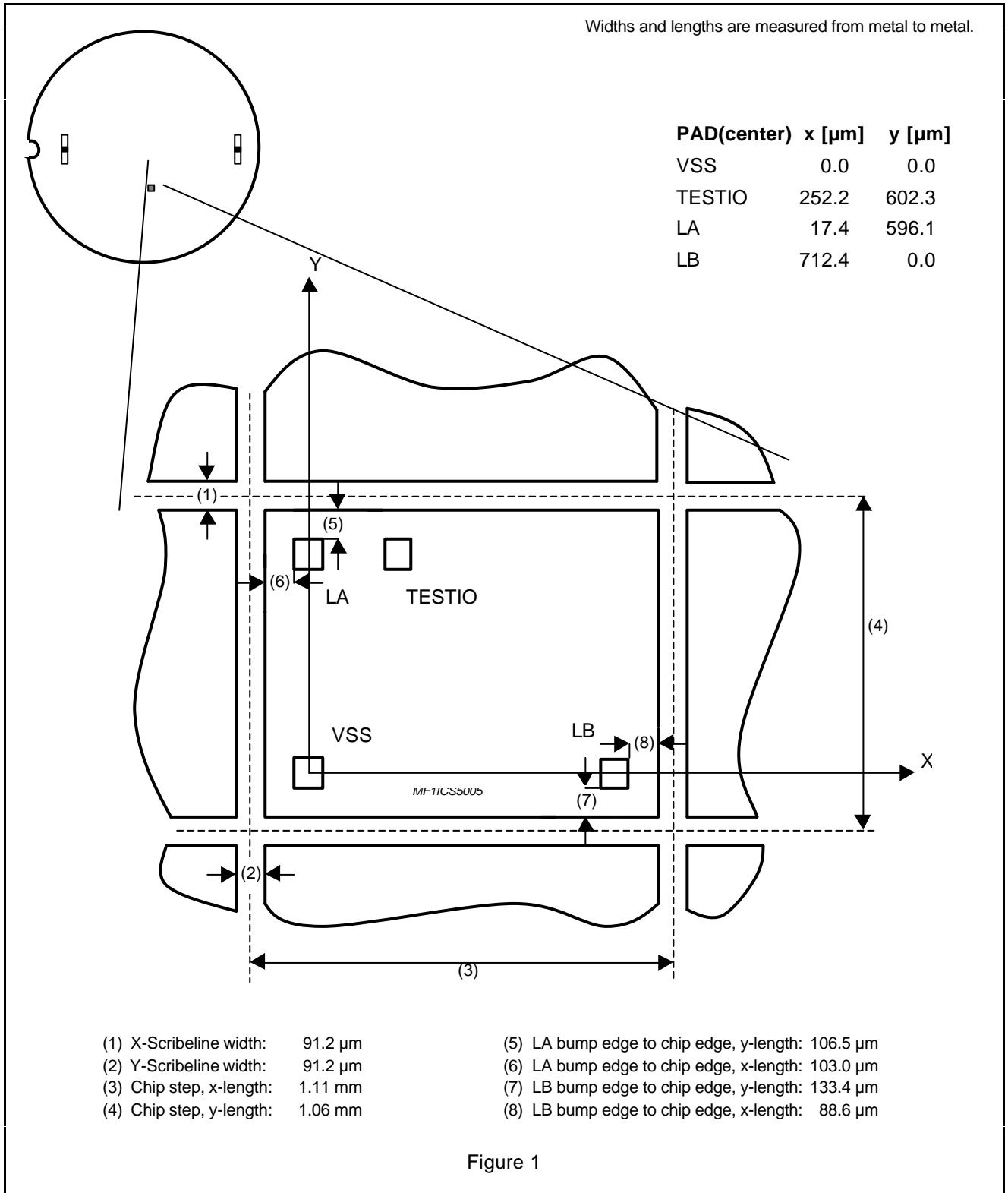
Note: Substrate is connected to VSS.

<sup>1</sup> Pads VSS and TESTIO are disconnected when wafer is sawn.

**Bumped sawn wafer on UV-tape**

**Standard Card IC MF1 IC S50 05**

**5 CHIP ORIENTATION AND BONDPAD LOCATIONS**



**Bumped sawn wafer on UV-tape****Standard Card IC MF1 IC S50 05****6 ELECTRICAL SPECIFICATIONS****6.1 Absolute Maximum Ratings**

SYMBOL	PARAMETER	MIN	MAX	UNIT
$I_{IN}$	input current	-	30	mA
$P_{TOT}$	total power dissipation	-	200	mW
$T_{STOR}$	storage temperature	-55	125	°C
$T_{OP}$	operating temperature	-25	70	°C
$V_{ESD}$	electrostatic discharge voltage <sup>2</sup> LA-LB	2	-	kV
$I_{LU}$	latchup current	±100		mA

**6.2 AC Characteristics**

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
$f_{IN}$	input frequency		-	13.56	-	MHz
$C_{IN}$	Input capacitance (LCR meter HP4258)	22°C, Cp-D, 13.56 MHz, 2 V	14.4	16.1	17.4	pF
$t_W$	EEPROM write time		-	2.9	-	ms
$t_{RET}$	EEPROM data retention		10			years
$N_{WE}$	EEPROM write endurance		$10^5$			cycles

<sup>2</sup> MIL Standard 883-C method 3015; Human body model: C = 100 pF, R = 1.5 kΩ

**Bumped sawn wafer on UV-tape****Standard Card IC MF1 IC S50 05****7 DEFINITIONS**

<b>Data sheet status</b>	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). 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 section of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

**8 LIFE SUPPORT APPLICATIONS**

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so on their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.

**9 REVISION HISTORY****Table 1** Bumped Wafer Specification MF1 IC S50 05 Revision History

<b>REVISION</b>	<b>DATE</b>	<b>CPCN</b>	<b>PAGE</b>	<b>DESCRIPTION</b>
3.0	August 2004	-		Initial version.

# ***Philips Semiconductors - a worldwide company***

## **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](mailto:sales.addresses@www.semiconductors.philips.com).

© Koninklijke Philips Electronics N.V. 2002

SCA74

All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner.

The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without any notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

**Philips  
Semiconductors**

*Let's make things better.*



**PHILIPS**