

DATA SHEET

ADDENDUM

mifare[®]

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**

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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® 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® 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: $1.11 \times 1.06\ \text{mm}$
- 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: $500\ \text{nm} / 600\ \text{nm}$

3.5 Au Bump

- Bump material: $> 99.9\%$ pure Au
- Bump hardness: $35 - 80\ \text{HV } 0.005$
- Bump shear strength: $> 70\ \text{MPa}$
- 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, VSS¹ $104 \times 104\ \mu\text{m}$
 - TESTIO¹ $89 \times 104\ \mu\text{m}$
- Bump size variation: $\pm 5\ \mu\text{m}$
- Under bump metallisation: sputtered TiW

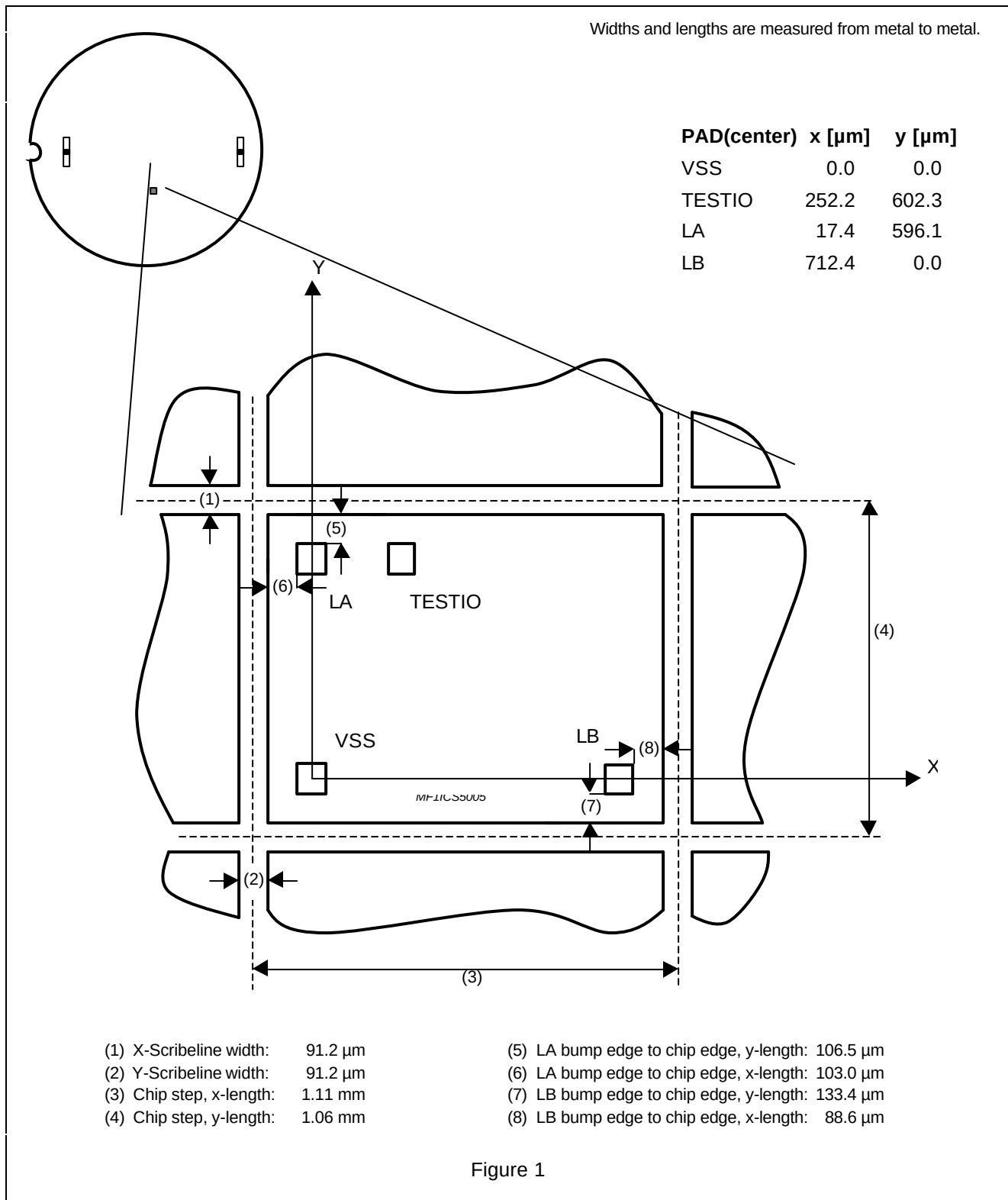
4 ORDERING INFORMATION

4.1 Bumped die on sawn wafer

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

Note: Substrate is connected to VSS.

¹ 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 ² 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

² 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**

Data sheet status	
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.
Limiting values	
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.	
Application information	
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

REVISION	DATE	CPCN	PAGE	DESCRIPTION
3.0	August 2004	-		Initial version.

Philips Semiconductors - a worldwide company

Contact Information

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