MF1 IC S50 06

Wafer specification addendum

Rev. 3.2 — 16 March 2007
075932

Product data sheet
PUBLIC

1. General description

The MF1 ICS 50 06 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 NXP reader environment, which is built according to NXP specification.

This specification describes electrical, physical and dimensional properties of wafers.

2. Ordering information

Table 1. Ordering information

Type number	Package		
	Name	Description	Ordering Code
MF1ICS5006W/V5D		Die on sawn wafer	9352 798 43005

3. Mechanical specification

3.1 Wafer

- Diameter: 8”
- Thickness: 150 µm ± 15 µm
- Flatness: not applicable
- PGDW: 23775

3.2 Wafer backside

- Material: Si
- Treatment: ground and stress relieve
- Roughness: R_a max. 0.5 µm

  R_t max. 5 µm

3.3 Chip dimensions

- Chip size: 1.10 x 1.03 mm
- Scribe lines: x-line: 86.4 µm

  y-line: 86.4 µm

3.4 Passivation

- Type: sandwich structure
- Material: PSG / Nitride
- Thickness: 500 nm / 600 nm

3.5 Bond pads

- Pad size: 118 × 118 μm[1] (LA, LB)[2]
- Material: Al-Cu
- Thickness: 0.76 μm

Remark: Substrate is connected to VSS.

3.6 Fail die identification

All fail dies are inked according to electical test results and additionally the results of mechanical / visual inspection.

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

1. Passivation window: 90x90μm
2. Pads VSS and TESTIO are disconnected when wafer is sawn

4. Limiting values

Table 2. Limiting values[1][2][3]

In accordance with the Absolute Maximum Rating System (IEC 134)

Symbol	Parameter	Min	Max	Unit
I_{IN}	Input Current	-	30	mA
P_{tot}	Total power dissipation per package	-	200	mW
T_{stg}	Storage temperature range	-55	+125	°C
T_{amb}	Operating temperature	-25	70	°C
V_{ESD}	electrostatic discharge voltage LA-LB [4]	2		kV

[1] Stresses above one or more of the limiting values may cause permanent damage to the device

[2] These are stress ratings only. Operation of the device at these or any other conditions above those given in the Characteristics section of the specification is not implied

[3] Exposure to limiting values for extended periods may affect device reliability

[4] MIL Standard 883-C method 3015; Human body model: C = 100 pF, R = 1.5 kW

5. Characteristics

Table 3. Electrical characteristics [1][2][3]

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	15.9	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

[1] Stresses above one or more of the limiting values may cause permanent damage to the device

[2] These are stress ratings only. Operation of the device at these or any other conditions above those given in the Characteristics section of the specification is not implied

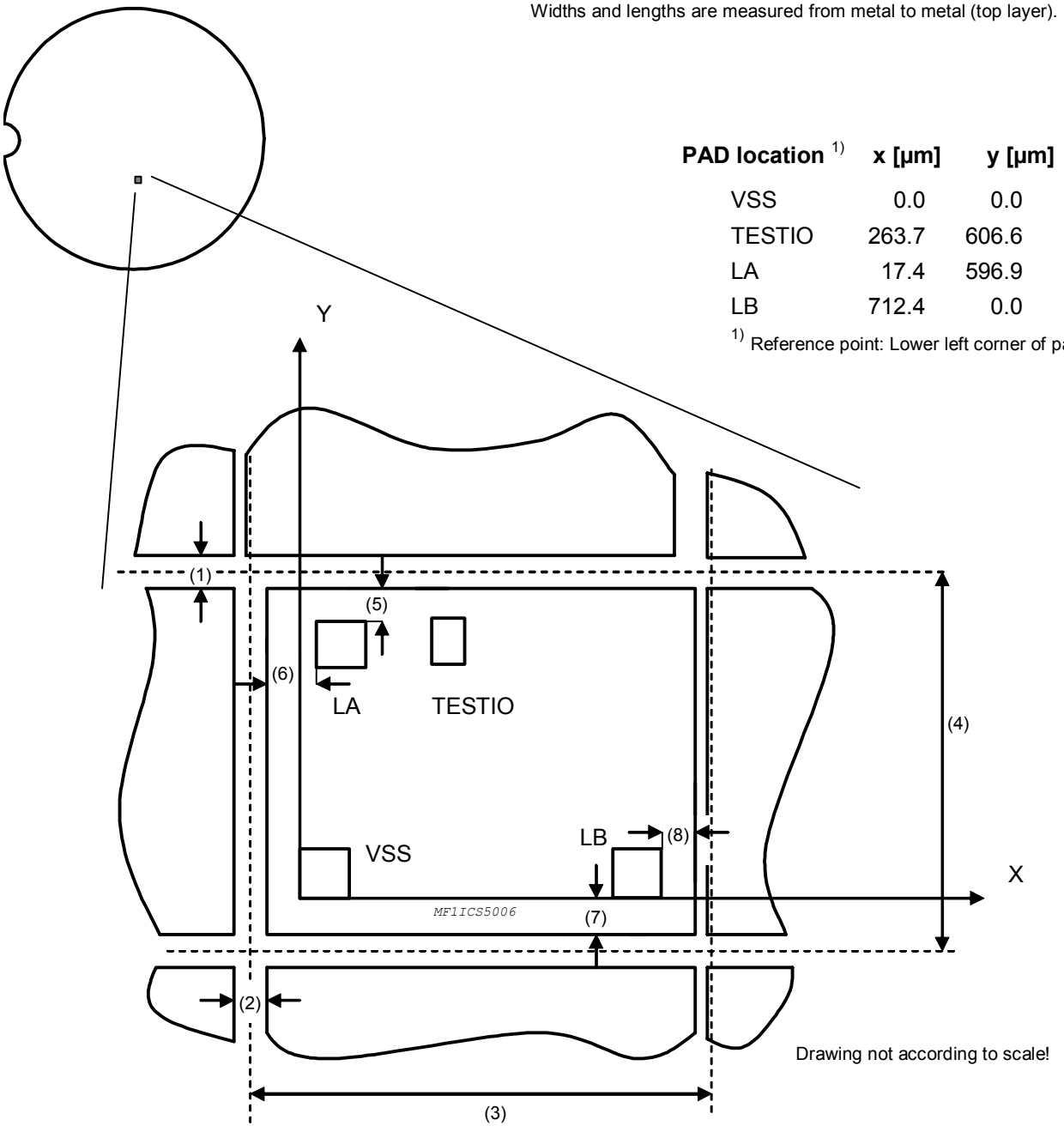
[3] Exposure to limiting values for extended periods may affect device reliability

6. Chip orientation and bond pad locations

Widths and lengths are measured from metal to metal (top layer).

PAD location [1]	x [µm]	y [µm]
VSS	0.0	0.0
TESTIO	263.7	606.6
LA	17.4	596.9
LB	712.4	0.0

[1] Reference point: Lower left corner of pad.



(1) X-Scribeline width:	66.4 µm	(5) LA pad edge to chip edge, y-length:	110.9 µm
(2) Y-Scribeline width:	86.4 µm	(6) LA pad edge to chip edge, x-length:	107.5 µm
(3) Chip step, x-length:	1.10 mm	(7) LB pad edge to chip edge, y-length:	137.8 µm
(4) Chip step, y-length:	1.03 mm	(8) LB pad edge to chip edge, x-length:	93.1 µm

Fig 1. Chip orientation and bond pad locations

7. Application information

8. References

- Data sheet “General specification for 8” wafers”
- Data sheet “Standard card IC MF1 IC S50 memory contents after test”
- Data sheet “Standard card IC MF1 IC S50 functional specification”
- Application note “Mifare, card IC coil design guide”

9. Revision history

Table 4. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
075930	June 2005			
075931	Febuary 2007	Product data sheet		3.0
075932	16 March 2007	Product data sheet	treatment information	Revision 3.1
Modifications:	• 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.			

10. Legal information

10.1 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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12. Tables

13. Figures

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