

FEATURE

- Compatible with ISO/IEC 14443A Standard
- No external power supply required
- 13.56MHz operating frequency
- Supports 4-byte or 7-byte UID
- **Total** embedded 4096 bit EEprom memory
- 100% ASK demodulator
- Supports cascaded two level 7 byte serial number
- 106 kbps for high data rate,
- Manchester encoding TX data output

EEPROM Memory

- 4 bytes x 8 bits of data memory organized in 120 pages
- 1 page (4 bytes) One Time Programming area (UCData 0 ~ UCData 3) for fixed data programming.
- Data retention up to 10 years
- Private 32bits password protected Self destruct function

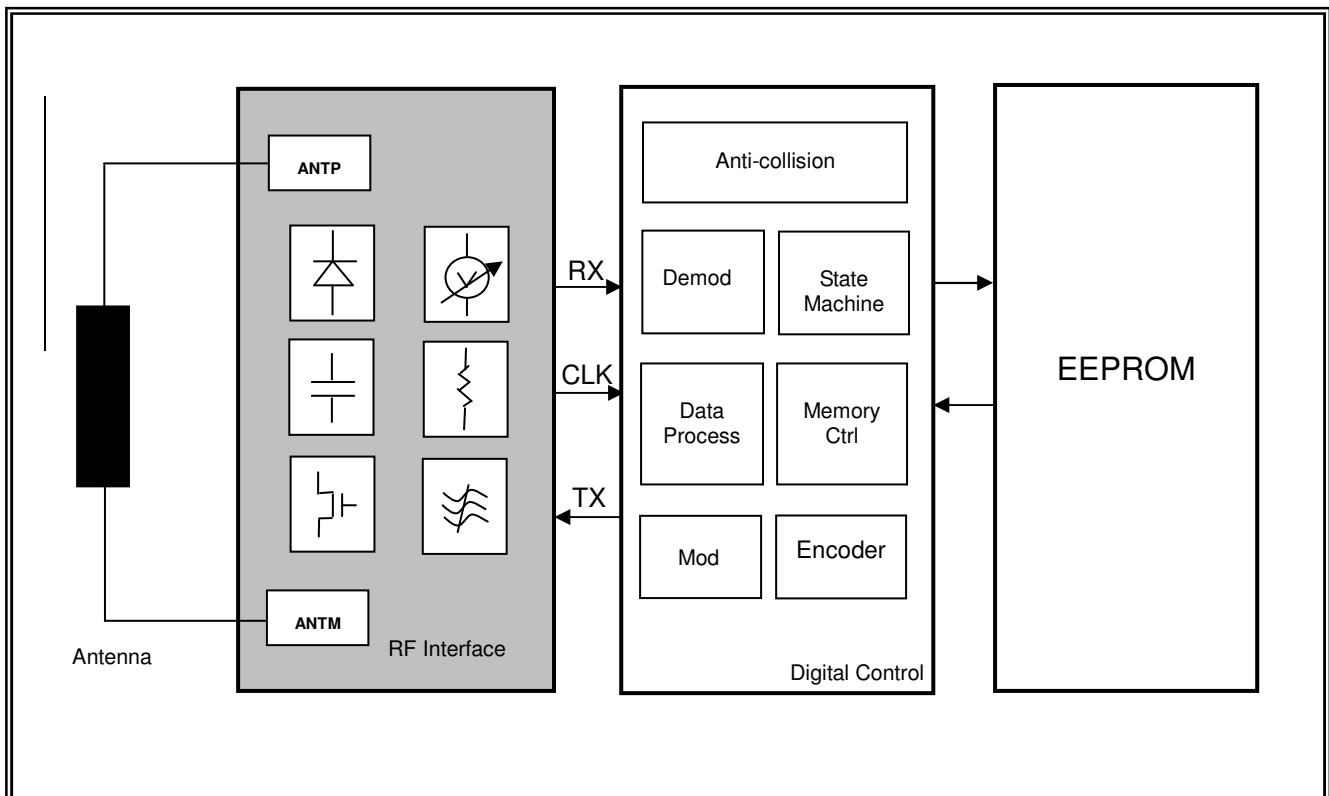


Figure 1: A9213-A Block System Diagram



Rev 1.0

General Description

A9213-A is a contactless RFID Tag IC for use with proximity coupling device according to ISO/IEC 14443A standard. The communication protocol complies with parts 2 and 3 of the ISO/IEC 14443A specification.

Anti-collision

A9213-A's anti-collision function allows multiple RFID tags operating in reader's magnetic field simultaneously. The anti-collision function enables the detection and operation of A9213-A when other A9213-A equipped tags are also present.

Cascaded Unique Identification Number

A9213-A's unique identification number (UID) is 7 bytes long and supports cascade level-2 format according to ISO / IEC 14443-3. A9213-A can also support the legacy 4 byte long UID for backward compatibility.

Rev 1.0

Pin Descriptions

Symbol	Type	Description
ANTM	-	Antenna pad A
ANTP	-	Antenna pad B
TIO1	-	Reserved
TIO2	-	Reserved
TIO3		Reserved

Table 1

Rev 1.0

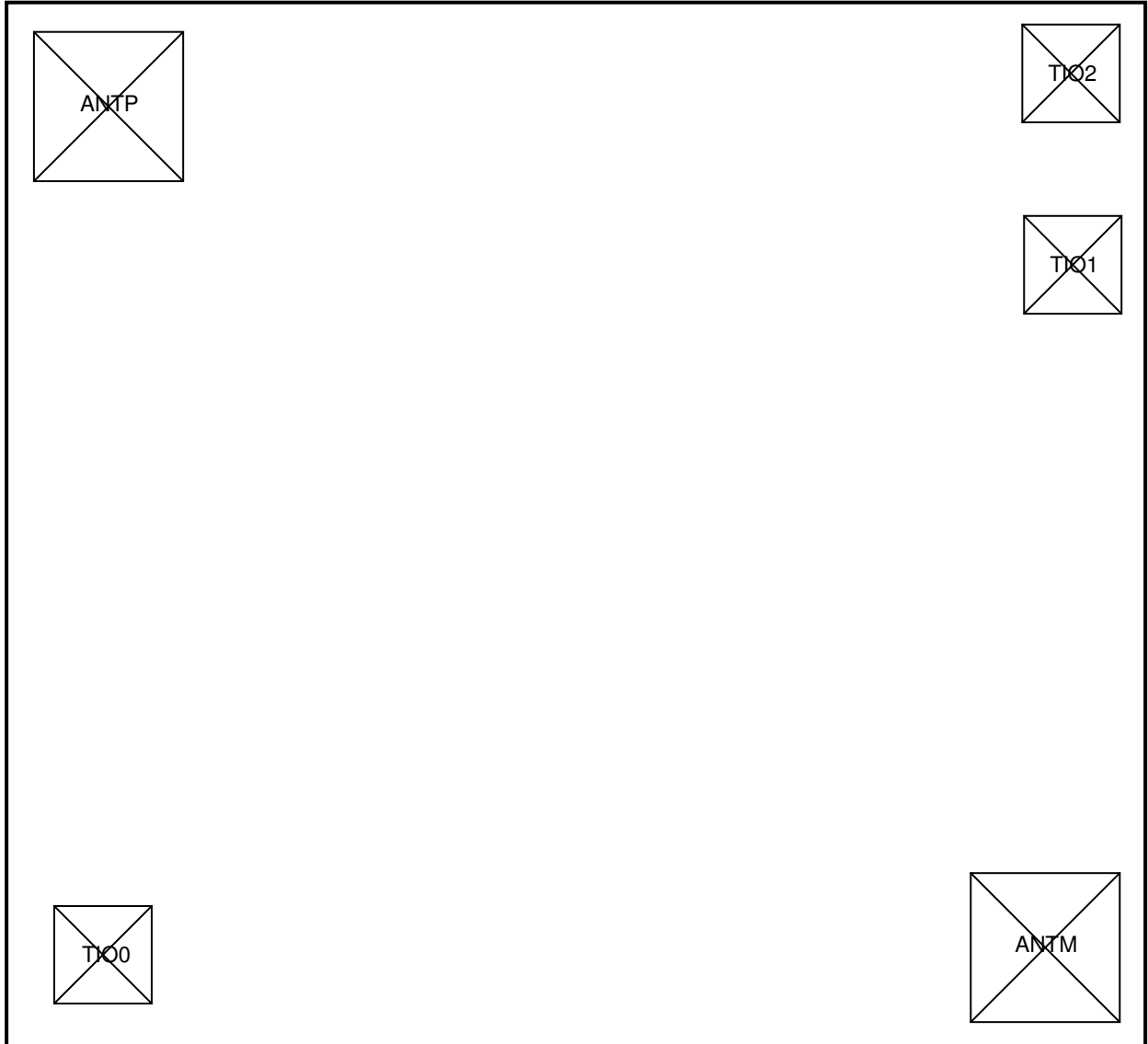
Floor Plan

Figure 2: A9213-A Pin-out Diagram

EEPROM Memory Mapping

Page	Byte Addr	Byte0	Byte1	Byte2	Byte3
0	0x00~0x03	SN0	SN1	SN2	BCC0
1	0x04~0x07	SN3	SN4	SN5	SN6
2	0x08~0x0b	BCC1	Reserved	Lock0	Lock1
3	0x0c~0x0f	UCData0	UCData1	UCData2	UCData3
4	0x10~0x13	Data0	Data1	Data2	Data3
5	0x14~0x17	Data4	Data5	Data6	Data7
6	0x18~0x1b	Data8	Data9	Data10	Data11
7	0x1c~0x1f	Data12	Data13	Data14	Data15
8	0x20~0x23	Data16	Data17	Data18	Data19
9	0x24~0x27	Data20	Data21	Data22	Data23
10	0x28~0x2b	Data24	Data25	Data26	Data27
11	0x2c~0x2f	Data28	Data29	Data30	Data31
12	0x30~0x33	Data32	Data33	Data34	Data35
13	0x34~0x37	Data36	Data37	Data38	Data39
14	0x38~0x3b	Data40	Data41	Data42	Data43
15	0x3c~0x3f	Data44	Data45	Data46	Data47
16	0x40~0x43	Data48	Data49	Data50	Data51
::	::::	::::	::::	::::	::::
::	::::	::::	::::	::::	::::
123	0x1ec~0x1ef	Data476	Data477	Data478	Data479
124	0x1f0~0x1f3	Reserved	Reserved	Reserved	Reserved
125	0x1f4~0x1f7	Reserved	Reserved	Reserved	Reserved
126	0x1f8~0x1fb	Reserved	Reserved	Reserved	Reserved
127	0x1fc~0x1ff	Reserved	Reserved	Reserved	Reserved

Table2: EEPROM Memory Mapping Table



Rev 1.0

Unique Identifier (UID)

MSB			LSB
56		9	8 1
IC Manufacturer Serial Number			IC Mfg Code (0x33)

The UID, in ISO/IEC 14443A format, is programmed by IC manufacturer during production process and cannot be changed afterwards.

Bit56 ~ Bit 9: 48-bit unique serial number

Bit 8 ~ Bit 1: IC manufacturer code for AMIC



Rev 1.0

RFID Tag IC Command List

	Command	Command Code	Description
1	REQA	0x26	Request Type A
2	WUPA	0x52	Wake Up Type A
3	SEL	0x93/0x95	Select for 2-layer anticollision
4	HLTA	0x50	Halt Type A
5	READ	0x30	Read page data
6	WRITE	0xA2	Write page data
7	CWRITE	0xA0	Compatibility write
8	KILL	0xF1	Self Destruct

Rev 1.0

Absolute Maximum Rating

Parameter	Symbol	Min	Type	Max	Unit
Storage Temperature	T_{sto}	-55	-	140	°C
Junction Temperature	T_j	-55	-	140	°C
Electrostatic Discharge Voltage	V_{ESD}	-	-	2K ₍₁₎	V
Maximum input peak current	$I_{Max P-M}$	-	-	50	mA
Operating junction temperature	T_{jop}	-40	-	120	°C
Input current	I_{P-M}	-	-	30	mA

(1) Applicable for ANTP and ANTM pads

DC Electrical Characteristics

Parameter	Symbol	Condition	Min	Typical	Max	Unit
Operating Frequency	f_{OP}			13.560	TBD	MHz
Input Capacitance	C_{in}	V_{P-M}	23.4	26.0	28.6	pf
EEPROM Data Retention	t_{ret}	T		10		Years
EEPROM Write Endurance	n_{wr}		1	-	5	Cycles

10. Mechanical Specification

- Wafer diameter: 8"
- Wafer thickness: SAWN wafer ($150\mu\text{m} \pm 15\ \mu\text{m}$)
- Backside material: Si
- Backside treatment: Etched; to achieve 30~50% brightness relative to surface
- Backside roughness: Not specified
- Chip size: 914.9 μm x 1235.36 μm
- Scribe line: 80 μm
- Passivation type: PSG and SIN
- Passivation material: PSG and SIN
- Passivation Thickness: PSG2.5K Å and SIN 3K Å

Rev 1.0

11. Gold Bump Specification

- Bump material: >99.9% pure Au
- Bump hardness: 35 – 80 HV 0.005
- Bump shear strength: >70MPa
- Bump height: 18 μ m
- Bump height uniformly:
 - Within a die $\pm 2 \mu$ m
 - Within a wafer $\pm 3 \mu$ m
 - Wafer to wafer $\pm 4 \mu$ m
- Bump flatness: $\pm 1.5 \mu$ m
- Bump size:
 - ANTP, ANTM: 80 μ m x 80 μ m;
 - TIO0 TIO1, TIO2: 60 μ m x 60 μ m
 - Variation: $\pm 5 \mu$ m
- Under bump metallization: Sputtered TiW



Rev 1.0

Order Information

<i>Part Number</i>	<i>Form Factor</i>	<i>Packaging</i>
A9213-A-W0	Bare dice	Sawn wafer (wafer on blue tape)
A9213-A-W1	Dice with Au Bump	Sawn wafer (wafer on blue tape)
A9213-A-M2	MOA2 / IOA2 module	Reel



Rev 1.0

Revision History

Rev	Date	Description	By
1.0	Jan. 2011	Initial creation	LL