HT1x
HITAG 1 transponder IC

1. General description

HITAG 1 based transponders are highly integrated and do not need any additional components beside the external coil.

Data between Key (RWD) and transponder is transmitted bidirectionally, in Half Duplex Mode. The HITAG 1 transponder IC offers also an encrypted data transmission.

The AntiCollision (AC) Mode, which is used mainly in long range operation, allows to handle several transponders that are at the same time in the communication field of the antenna, thus achieving highest operating reliability and permitting to handle several transponders quickly and simultaneously.

The HITAG 1 transponder IC provides two protocol modes, Standard and Advanced Mode. The Advanced Protocol Mode operates compared to the Standard Protocol Mode with an increased number of Startbits and a 8-bit Cyclic Redundancy Check (CRC) sent by the transponder IC at read operations.

HITAG 1 transponder IC offer a memory of 2 kbit.

2. Features and benefits

Identification transponder for use in contactless applications

Operating frequency 125 kHz

Data transmission and energy supply via RF link, no internal battery

Non-volatile memory of 2 kbit

Organized in 64 pages, 4 bytes each

10 years non-volatile data retention

100000 erase/write cycles

Selective read/write protection of memory content

Mutual authentication function

3. Applications

Logistics

Asset tracking

Gas cylinder ID

Industrial automation

4. Quick reference data

Table 1.   Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Wafer EEPROM characteristics						
t_{ret}	retention time	T_{amb} 55 C	10	-	-	year
$N_{endu(W)}$	write endurance		100000	-	-	cycle
Interface characteristics						
C_i	input capacitance	between LA and LB HT1ICS3002W/V6F	189	210	231	pF

5. Ordering information

Table 2.   Ordering information

Type number	Package			
	Name	**Description**		**Version**
HT1ICS3002W/V6F	Wafer	sawn wafer on FFC, 150 m, 8 inch, UV, inkless		-
HT1MOA4S30/E/3	PLLMC	plastic leadless module carrier package; 35 mm wide tape		SOT500-2[1]

[1]   This package is also known as MOA4

6. Block diagram

The HITAG 1 transponder IC requires no external power supply. The contactless interface generates the power supply and the system clock via the resonant circuitry by inductive coupling to the RWD. The interface also demodulates data transmitted from the RWD to the HITAG 1 transponder IC, and modulates the magnetic field for data transmission from the HITAG 1 transponder IC to the RWD.

Data are stored in a non-volatile memory (EEPROM). The memory has a capacity of 2 kbit and is organized in blocks.
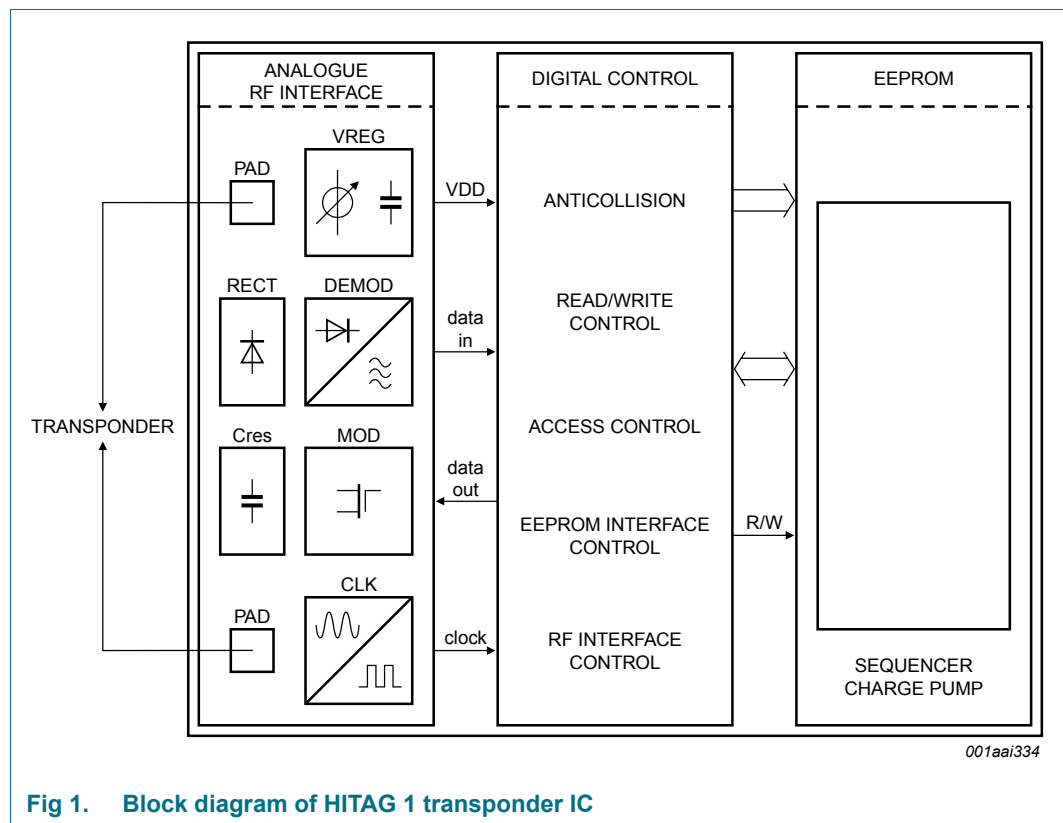

Fig 1.   Block diagram of HITAG 1 transponder IC

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7. Functional description

7.1 Memory map

The 2 kbit memory area of the HITAG 1 transponder IC is divided into 16 blocks. Each block comprises 4 pages with 4 bytes (1 byte = 8 bits) each. A page is the smallest access unit.

Addressing is done pagewise (page 0 to 63) whereas access is gained either pagewise or blockwise by entering the respective start address.

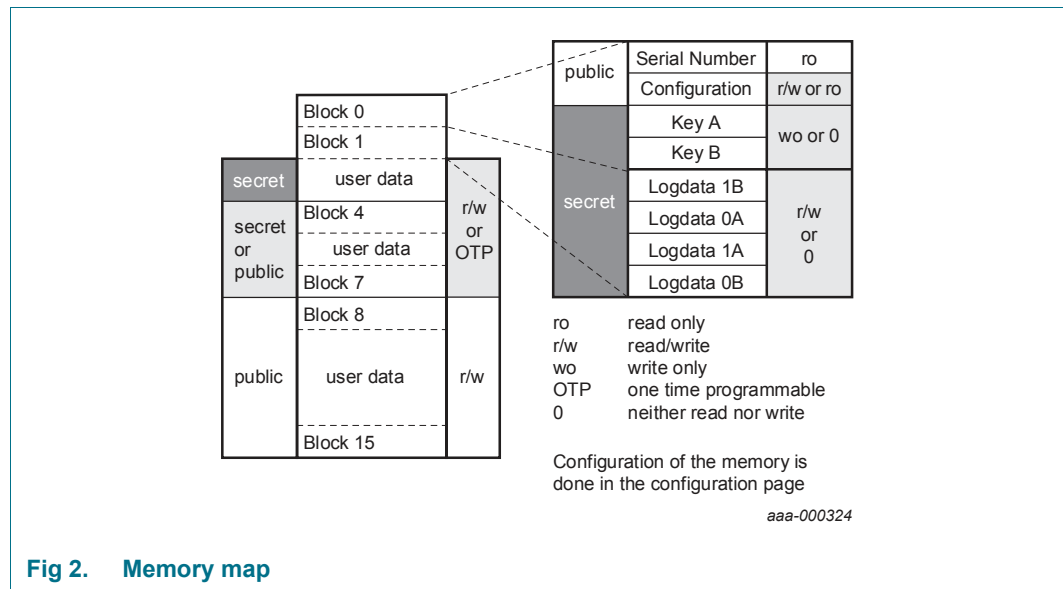Block access is only available for blocks 2 to 15, page access is available for pages 0 to 63.

Fig 2.   Memory map

Areas (or settings) with light dark background can be configured by the customer within the Configuration Page (page 1 of block 0).

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8. Limiting values

Table 3. **Limiting values - HT1ICS3002W/V6F[1]**

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DD}	supply voltage		0.5	6.5	V
V_{ESD}	electrostatic discharge voltage	MIL-STD 883D, Method 3015.7, Human Body	2	-	kV
I_{lu}	latch-up current	MIL-STD 883D, Method 3023	100	-	mA
$I_{i(max)}$	maximum input current	IN1-IN2	-	30	mA
T_j	junction temperature		˜55	+140	C

[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.

Table 4. **Limiting values - HT1MOA4S30 [1]**

Symbol	Parameter	Conditions	Min	Max	Unit
T_{stg}	storage temperature		˜55	+125	C
T_{amb}	ambient temperature	$R_{th(j-a)}$ 30 K/W @ I_{in} = 30 mA	˜25	+85	C

[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.

9. Abbreviations

Table 5. **Abbreviations**

Acronym	Description
AC	AntiCollision
CRC	Cyclic Redundancy Check
EEPROM	Electrically Erasable Programmable Read-Only Memory
IC	Integrated Circuit
RF	Radio Frequency
RWD	Read Write Device

10. Revision history

Table 6. **Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
HT1X_SDS v.3.1	20141210	Product short data sheet	-	HT1X_SDS v.3.0
Modifications:	• Section 11 "Legal information": License statement "ICs with HITAG functionality" removed • Section 5 "Ordering information": updated • Table 4: Title updated			
HT1X_SDS v.3.0	20110916	Product short data sheet	-	-

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11. Legal information

11.1 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".

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