

An5530 – HID- 470

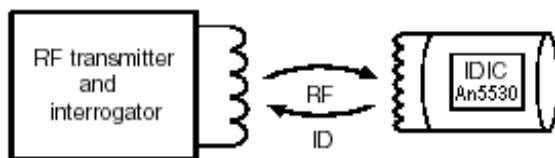
96-bit Read-only

IDIC for RF Identification

Features

- Low-power, Low-voltage CMOS
- Rectifier, Voltage Limiter, Clock Extraction On-chip (No Battery)
- Small Size
- Factory Electrically Programmable ROM
- Operating Temperature Range -40°C to +125°C
- Radio Frequency (RF): 100 kHz to 450 kHz
- Transmission options
 - Code Length: 96 bits
 - Bitrate [bit/s]: RF/50
 - Modulation: FSK (frequency shift keying)
- On-chip resonant capacitor 470 pF \pm 5% (Mask option 580 pF \pm 5%)

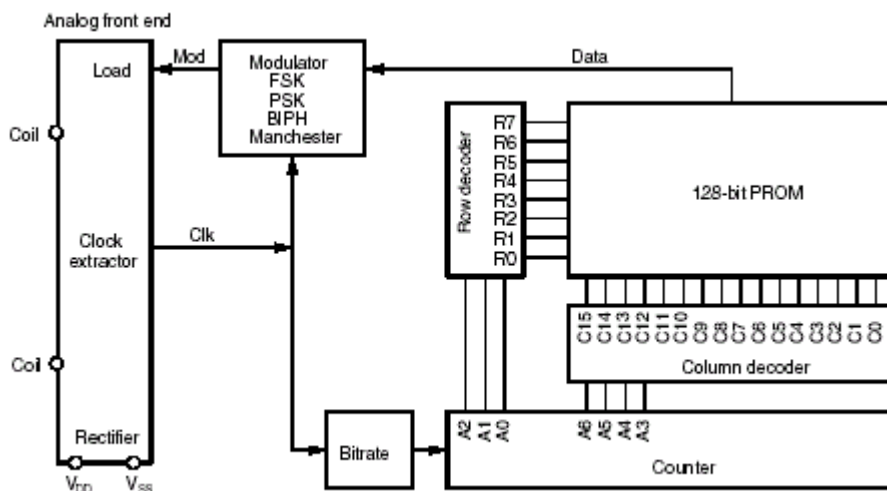
Figure 1. Application



Description

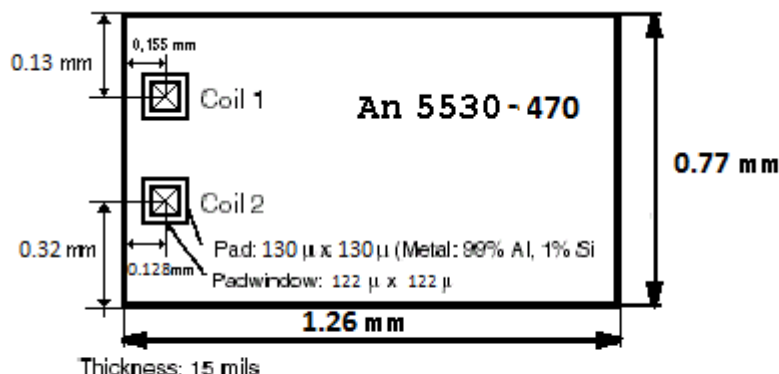
The An5530 is part of a closed coupled identification system. It receives power from an RF transmitter which is coupled inductively to the IDIC. The frequency is typically 100 kHz to 450 kHz. Receiving RF, the IDIC responds with a data stream by damping the incoming RF via an internal load. This damping-in-turn can be detected by the interrogator. The identifying data are stored in a 128-bit PROM on the An5530, realized as an array of electrically-programmable fuses. The logic block diagram for the An5530 is shown in figure 2. The data are output bit-serially as a code of length 96 bits. The chips are factory-programmed with a unique code.

Figure 2. Block Diagram



Chip Dimensions

Figure 3. Chip Size



Functional Description

Read Operation After power up, once the An5530 has detected the incoming RF field, the IC continuously

transmits the identification code as long as the RF signal is applied. The transition from the last bit to bit 1 of the next sequence occurs without interruption. Data is transmitted by damping the incoming RF signal by an internal load. These load changes are detected by the reader station.

Different kinds of modulation and bitrates are optionally available.

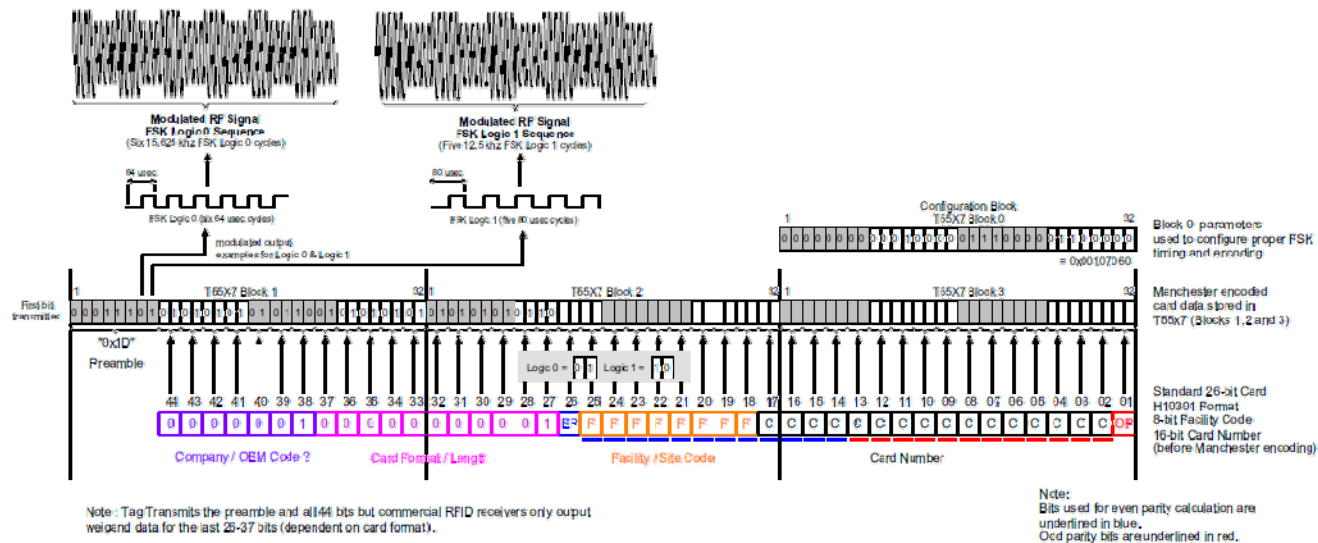
Rectifier For internal power supply, an on-chip Grates bridge rectifier is used which consists of four poly-Si diodes. A Zener diode, which protects the circuit against overvoltage on the coil inputs, and a smoothing capacitor for the internal supply are also provided.

Damping Load Incoming RF will be damped by the power consumption of the IC itself and by an

internal load, which is controlled by the modulator. The loads are p-channel transistors connected between V_{DD} and the coil inputs.

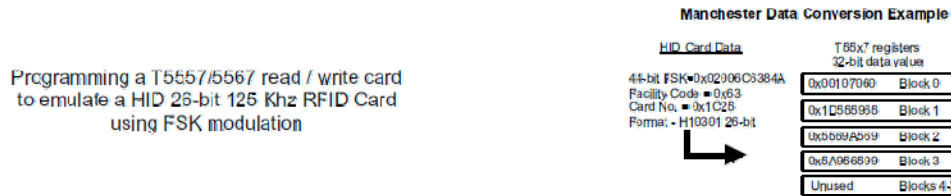
The IDIC includes mask options for the load circuit: single-side, double-side and alternate-side modulation.

Timing Diagram for Modulation Options



Note: Tag Transmits the preamble and all 144 bits but commercial RFID receivers only output weird data for the last 26-37 bits (dependent on card format).

Note:
Bits used for even parity calculation are underlined in blue.
Odd parity bits are underlined in red.



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Parameters	Symbol	Value	Unit
Maximum current into Coil1 and Coil2	I_{coil}	10	mA
Maximum power dissipation (diode)	P_{tot}	100	mW ⁽¹⁾
Maximum ambient air temperature with voltage applied	T_{amb}	-40 to +125	°C
Storage temperature	T_{stg}	-65 to +200	°C

Absolute Maximum Ratings

Note: 1. Free-air condition. Time of application: 1 s

Stresses above those listed under 'Absolute Maximum Ratings' may cause permanent damage to the device.

Functional operation of the device at these conditions is not implied.

Electrical Characteristics

$T_{amb} = 25^{\circ}\text{C}$, reference terminal is V_{DD} , operating voltage $V_{DD} - V_{SS} = 3\text{ V DC}$, unless otherwise specified

No.	Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
1	Operating voltage	Condition for logic test	V_{SS}	-1.5		-5.0	V
2	Operating temperature		T_{amb}	-40		125	°C
3	Input frequency (RF)		f_{CLK}	100		450	kHz
4	Operating current	$f_{CLK} = 125\text{ kHz}$, $V_{SS} = -2\text{ V}$	I_{CC}		3 ⁽¹⁾		mA
5	Clamp voltage	$I = 4\text{ mA}$	V_{CL}	6.7		10	V

Note: 1. Typical parameters represent the statistical mean values

