



GoldKey Technology Corporation

I4001_Data_Sheet

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Document Revision History			
Revision	Revised Reasons and Content Brief	Revised Page	Revised Date
A	Current Version.	6 Pages in Total	14, Jun., 2001

Read-Only RF Identification Device (64-Bit Memory)

Description

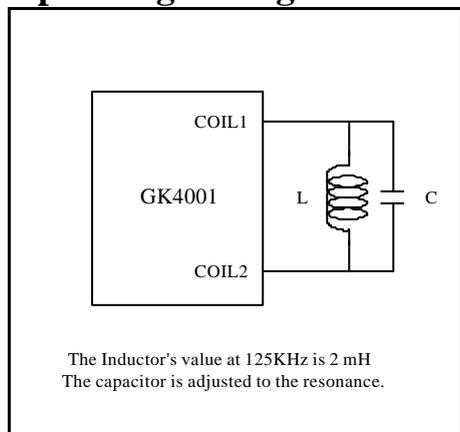
GK4001 is a contactless transponder integration circuit chip. The chip that runs batteryless operations receives power and transmits signals through an external coil placed in a magnetic field provided by a corresponding device. 64 bits of data preprogrammed in an EPROM array are sent to the corresponding device repetitively when the chip is in the field range. The serial output data contains a 9-bit header, 40 bits of data, 14 parity bits, and a stop bit. The way to modulate the output data uses Manchester Coding, with a bit rate corresponding to 64 periods of the field frequency. To obtain the chip function, an external coil is required and in parallel an external capacitor is adjusted

with the coil to form an adequate resonance. Major applications of the product include contactless ID cards, serial number identification devices, and animal identification transponders.

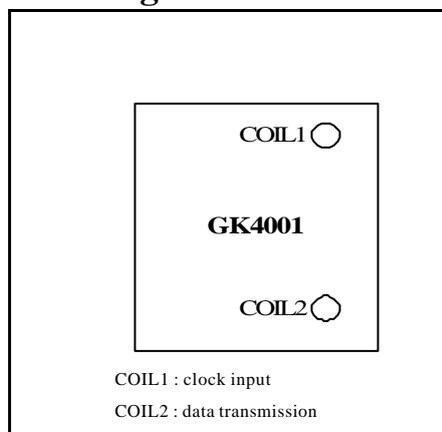
Features

- Operation frequency at 125 KHz
- 64 bits of factory-preprogrammed EPROM array
- On-chip full wave rectifier
- On-chip buffer capacitance and voltage limiter
- RF transmission is insensitive to metal
- Large operation range
- Very small footprint for easy implementation

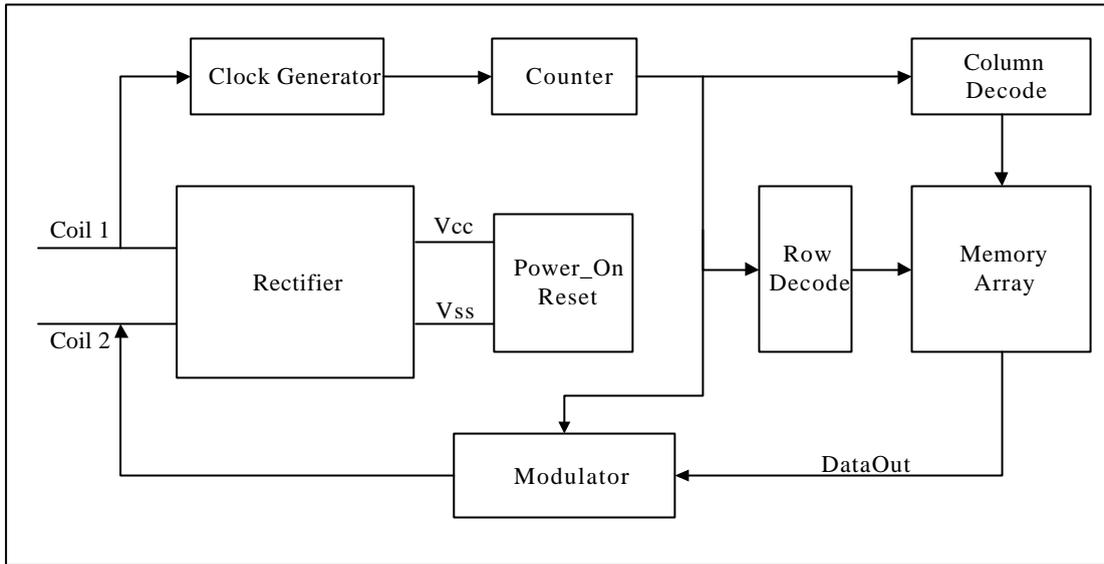
Operating Configuration



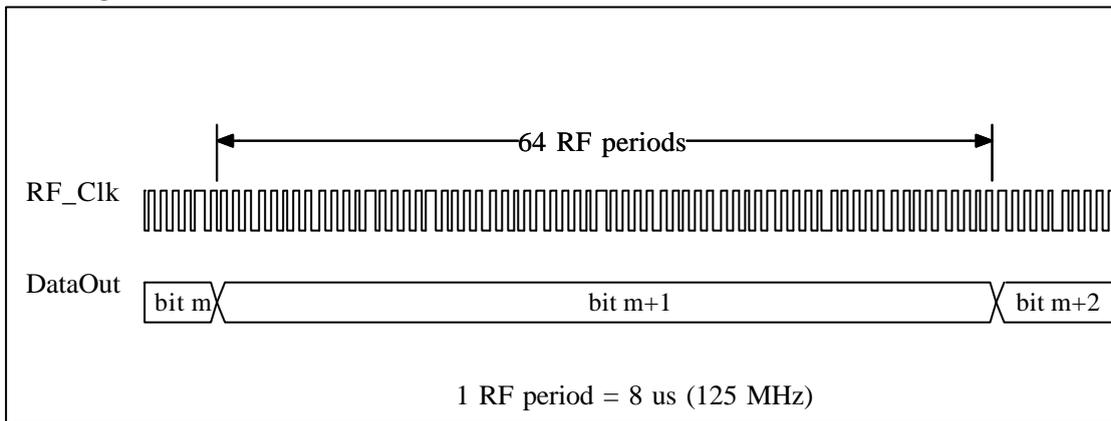
Pin Assignment



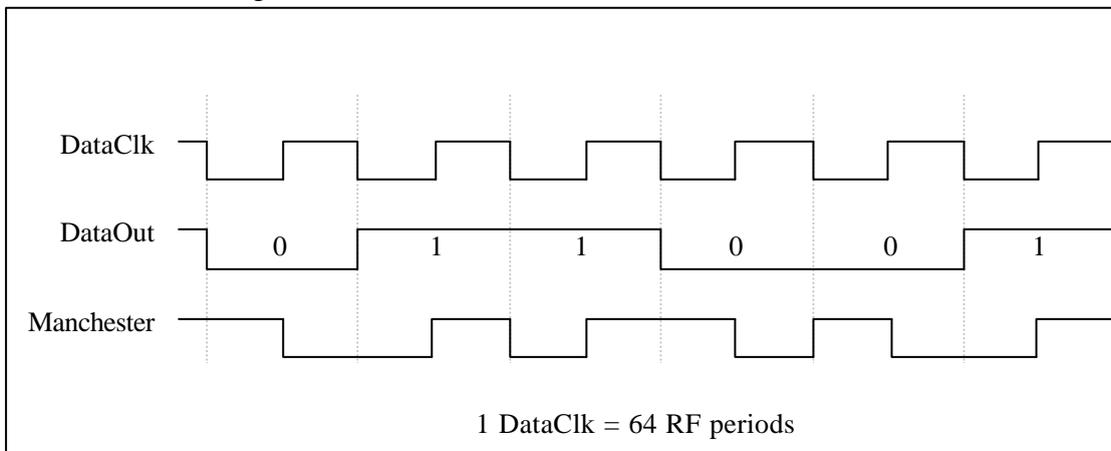
■ Block Diagram



■ Timing Waveform



■ Manchester Coding



Function Description

Power On Reset

When the tag enters the RF field, this circuit will generate a power on reset to initialize the internal logic. The delay (release point) of reset is determined by the voltage that generates by the rectifier to make sure there has sufficient DC voltage.

Modulator

The Modulator performs Manchester encoded by the serial data reading from the EPROM. The timing diagram is shown in figure 2. A logic "1" means there is a positive edge in the middle of a bit period (64 RF periods), while a logic "0" causes a negative edge.

Clock Generator / Counter

This circuit will generate a system clock base on the frequency of the RF field.

The clock is derived from serial counter and used as the timing of baud rate and modulation rate.

Rectifier

The AC voltage generate by the incident RF field will be converted to DC supply voltage of the chip by this on-chip bridge circuit. The peak voltage on the chip is clamped to prevent damage to the chip in strong RF field.

Baud Rate

GK4001 with a typical data rate of 2 Kbits/s and Bit period = 64 RF periods.

Column and Row Decoders

The Column and Row Decoders address the EPROM array to generate a serial data stream for modulation.

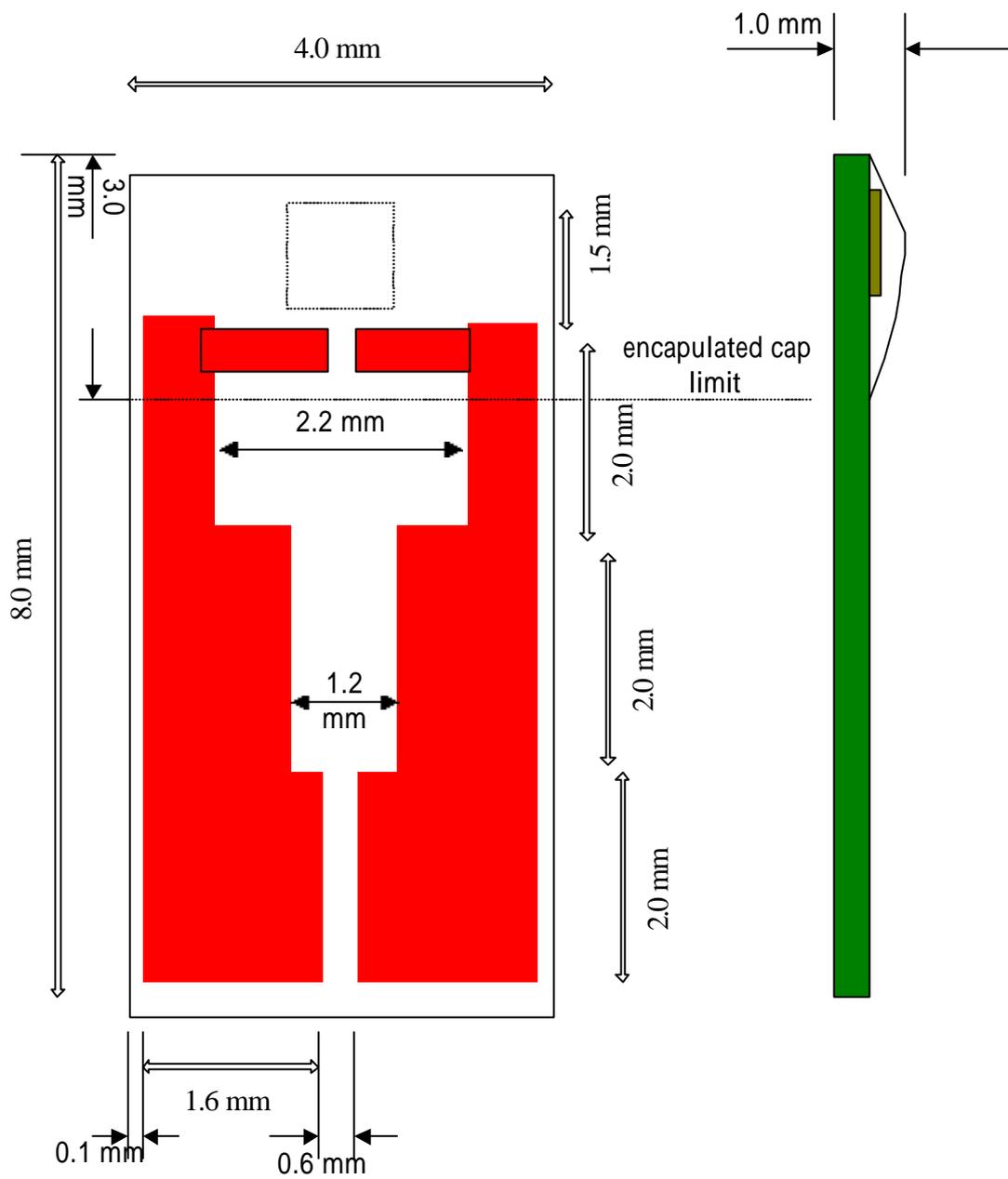
Absolute Maximum Ratings

Parameters	Symbol	Value	Unit
Maximum current on Coil1 and Coil2	I_{coil}	30	mA
Maximum power dissipation	P_{disp}	40 (5V)	mW
Ambient Temperature with power supply	T_{amb}	-25 to +70	
Storage temperature	T_{store}	-35 to +100	

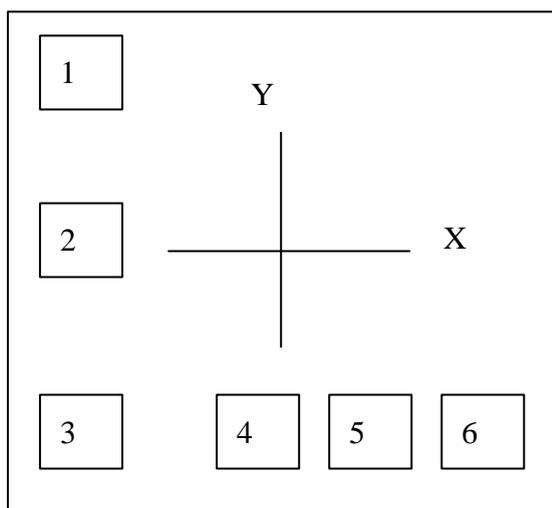
Operating Characteristics

Parameters	Symbol	Min.	Typ.	Max.	Unit
RF frequency	f_{col}	100	125	400	KHz
Turn on voltage	V_{tn}	2.4			V
Operating current(5V)	I_{oph}	8			μ A
Operating current(3V)	I_{opl}	1.6			μ A
Operating temperature	T_{op}	-25		70	C

Dimensions of PCB version [mm]



Chip Dimensions [um]



Chip Size: 780 X 850

Pad Name Function

1	C1	Coil Terminal 1
2	VDD	Positive Internal Supply Voltage
3	C2	Coil Terminal 2
4	PGMB	Code Program Input
5	VPPX	Program Voltage Input
6	VSS	Negative Internal Supply Voltage