

## ● Introduction

125KHz RFID reading module series are compact size and helps to shorten and simplify RFID products development schedule. Supports DC input range between 3.3~5.4V (or customized for 12V). Low power consumption and epoxy potted design suitable for integration with either portable or stationary product. The OEM/ODM is welcomed.



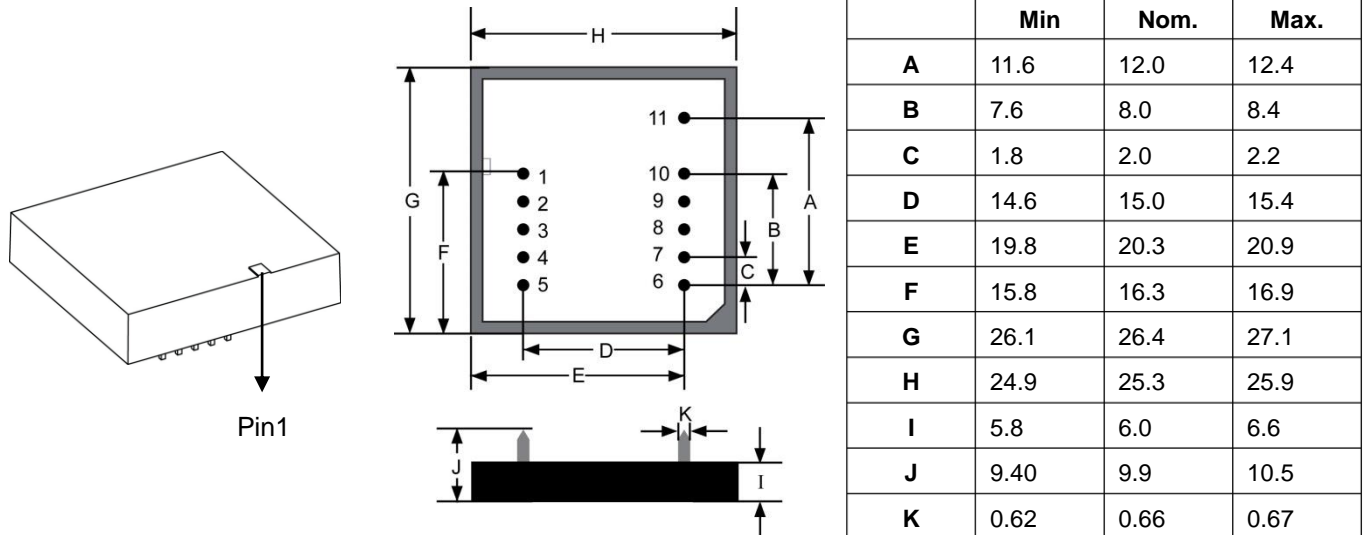
## ● Features

1. AM 125KHz contactless proximity reading module specially for EM cards.
2. Either Wiegand 26, ABA or ASCII format output selected by pin connection.
3. Read only for EM cards, and the data are sent by Data 0 and Data 1.
4. Lower cost with effective performance.
5. Compact size.

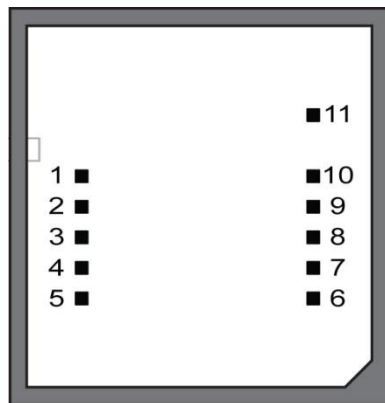
## ● Specification

|                                    |  |         |        |
|------------------------------------|--|---------|--------|
| RFID frequency                     | 125KHz ASK   |         |        |
| Applicable cards                   | EM4001, EM4100, EM 4102, TEMIC 5557(ISO1785) or compatible                     |         |        |
| Reading range                      |  | 3.3V DC | 5V DC  |
|                                    | Proximity card (T)0.8mm:   | 2±1cm   | 8±1cm  |
|                                    | Proximity card (T)1.8mm:   | 3±1cm   | 9±1cm  |
|                                    | Specific card:   | 4±1cm   | 11±1cm |
| Output format                      | Wiegand 26 bits, ABA, ASCII  |         |        |
| Power input                        | +3.3V through +5.4V  |         |        |
| Power Consumption                  | 5VDC @ 30mA nominal / 3.3VDC @ 14mA nominal                                    |         |        |
| Encoding                           | Manchester 64-bit, modulus 64  |         |        |
| Transmission spec.                 | 9,600 bps N, 8, 1  |         |        |
| Standby / Working current          | 40mA±10% @5V DC / 45mA±10% @ 5V DC<br>14.4mA±10% @3.3V DC / 14mA±10% @ 3.3V DC |         |        |
| Material                           | ABS  |         |        |
| Dimensions(L) x(W) x(H)<br>mm/inch | 26 x 25 x 7 / 1 x 1 x 0.3  |         |        |
| Operating temperature              | -10℃~75℃   |         |        |
| Storage temperature                | -20℃~85℃   |         |        |

● **Dimension: Unit: mm[inch]**



● **Bottom view**

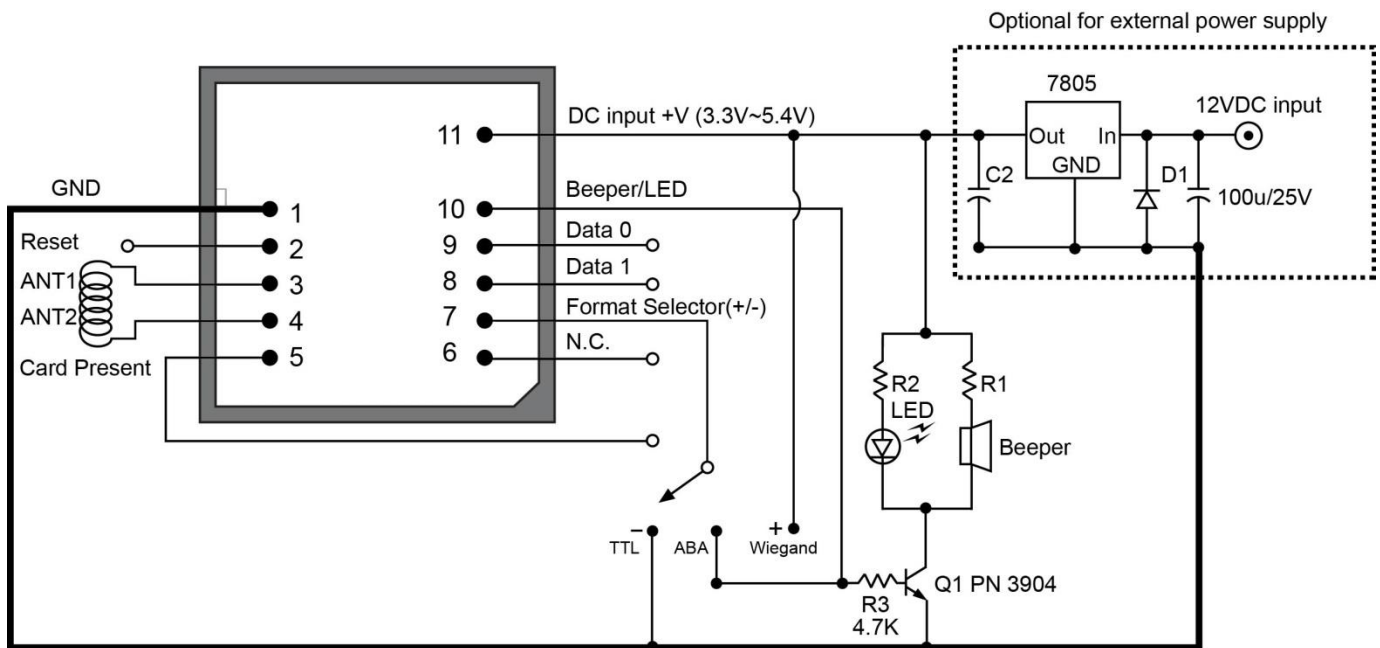


1. Ground
2. Reset
3. Antenna
4. Antenna
5. Card Present Output
6. N.C.
7. Format Selector(+/-)
8. Data 1
9. Data 0
10. Beeper/LED
11. +3.3V ~ +5.4V

● **Pin assignments**

| Pin No. | Description                              | Wiegand26      | ABA                 | ASCII           |
|---------|--|----------------|---------------------|-----------------|
| Pin 1   | Ground                                   | GND 0V         | GND 0V              | GND 0V          |
| Pin 2   | Reset                                    | N.C.           | N.C.                | N.C.            |
| Pin 3   | To External Antenna and Tuning Capacitor | Antenna        | Antenna             | Antenna         |
| Pin 4   | To External Antenna                      | Antenna        | Antenna             | Antenna         |
| Pin 5   | Card Present Output                      | No function    | Card Present output | No function     |
| Pin 6   | Future                                   | N.C.           | N.C.                | N.C.            |
| Pin 7   | Format Selector(+/-)                     | Connect to +5V | Connect to Pin 10   | Connect to GND  |
| Pin 8   | Data 1                                   | D1             | Magstripe clock     | CMOS            |
| Pin 9   | Data 0                                   | D0             | Data*               | TTL(to IC UART) |
| Pin 10  | 3.1 kHz Logic                            | Beeper/LED     | Beeper/LED          | Beeper/LED      |
| Pin 11  | DC Voltage Supply                        | +3.3V ~ +5.4V  | +3.3V ~ +5.4V       | +3.3V ~ +5.4V   |

- **Wiring example**



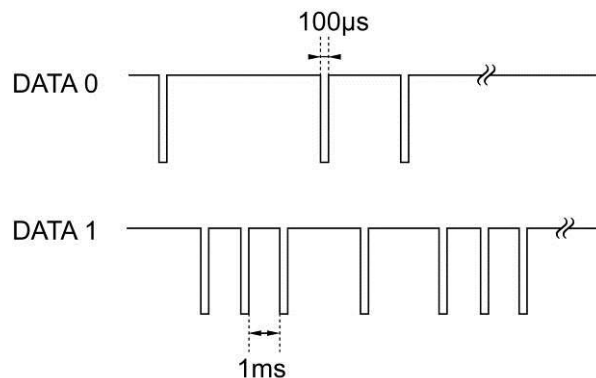
- **Data formats**

### Wiegand 26 bits output format

|                           |   |   |   |   |   |   |   |   |    |    |    |    |                          |    |    |    |    |    |    |    |    |    |    |    |    |
|---------------------------|---|---|---|---|---|---|---|---|----|----|----|----|--------------------------|----|----|----|----|----|----|----|----|----|----|----|----|
| 1                         | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14                       | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| P                         | E | E | E | E | E | E | E | E | E  | E  | E  | E  | O                        | O  | O  | O  | O  | O  | O  | O  | O  | O  | O  | O  | P  |
| Summed for even parity(E) |   |   |   |   |   |   |   |   |    |    |    |    | Summed for Odd parity(O) |    |    |    |    |    |    |    |    |    |    |    |    |

P=Starts Even parity bit and stop Odd parity bit.

Even parity “E” is generated by summing from bit2 to bit13; Odd parity “O” is generated by summing from bit14 to bit25.



## UART output format

|            |                   |                    |    |    |            |
|------------|-------------------|--------------------|----|----|------------|
| STX(02Hex) | CARD ID(10 ASCII) | CHECK SUM(2 ASCII) | CR | LF | ETX(03Hex) |
|------------|-------------------|--------------------|----|----|------------|

The 1 byte (2 ASCII characters) Check sum is the “Exclusive OR” of the 5 hex bytes(10 ASCII)Data characters.

If the card no. is 0000318F59, you will get the following ASCII with check sum.

STX

ETX

**Hex with check sum :** 02H, 30H, 30H, 30H, 30H, 33H, 31H, 38H, 46H, 35H, 39H, 45H, 37H, 03H

**Check sum algorithm :**  $00H \oplus 00H \oplus 31H \oplus 8FH \oplus 59H = \underline{E7}$  (check sum)

**XOR=Exclusive OR**

### Transmission Spec.

Baud rate : 9,600 bps

Parity bit : none

Data bit : 8

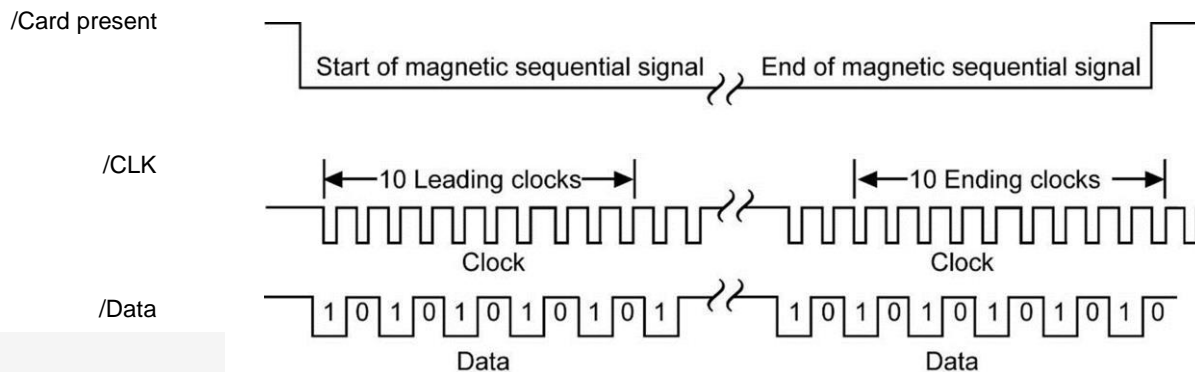
Stop bit : 1

## Magnetic stripe ABA Track2 output format

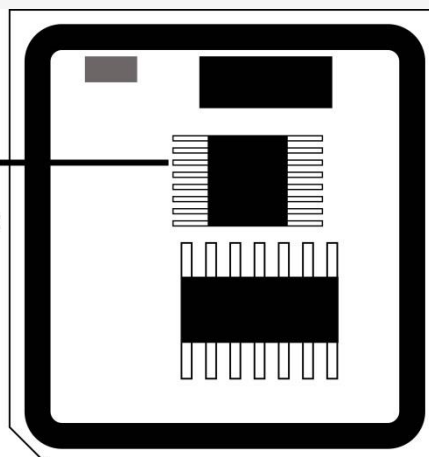
| 10 Leading Zeros | SS | CARD ID | ES | LRC | 10 Ending Zeros |
|------------------|----|---------|----|-----|-----------------|
|------------------|----|---------|----|-----|-----------------|

SS is the start sentinel character of 11010, ES is the end character of 11111, LRC is the longitudinal redundancy check.

## ABA Track2 timing graph:



Normal:  
Low  
Presenting card:  
Hi



## Application

POS system



Time attendance



Access control



Logistics



Production control

