

## Product data

### Features

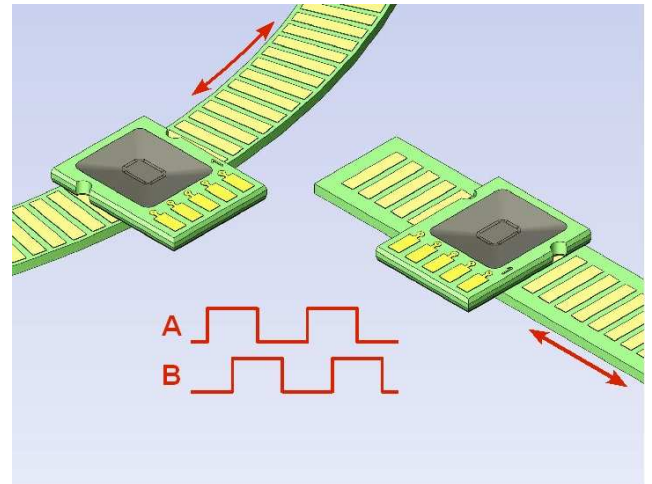
- Differential inductive sensing principle
- Insensitive to magnetic interference fields
- Robust against oil, water, dust, particles
- Ultra-thin package, 0.9 mm thick
- Pads for surface-mount soldering of cable
- Thin and low-cost PCB-type target strips/discs

### Applications

- Brushed and brushless motors
- Industrial / laboratory / office automation
- Linear stages and X-Y tables
- Assembly / Pick & Place equipment
- Linear motor, voice coil actuator
- Pneumatic/hydraulic actuator

### General Specifications

Output format.....A quad B  
 Phase shift..... $90 \pm 45^\circ$   
 Duty cycle..... $50 \pm 25\%$   
 Resolution.....0.3 - 300  $\mu\text{m}$ , adjustable  
 Maximum speed.....0.05 – 50 m/s, adjustable  
 Airgap.....up to 1 mm, see Table 1  
 Supply..... $5.0 \pm 0.5 \text{ V}$ , 15 mA typ  
 Temperature.....0 – 100°C  
 Target material.....Copper on FR4  
 Nominal target period.....1.2 mm



### Description

The ID1101 encoder kit consists of a sensor element and a PCB-type target. The dual-channel sensor-element provides incremental A and B output signals in quadrature. The A quad B signal may be interpolated as shown in Figure 1 and Table 1. The target is either a strip for linear applications or a disc/ring for rotational applications.

### Interpolation

The maximum interpolation factor that can be adjusted depends on the Signal to Noise Ratio (SNR). The noise depends on the bandwidth and thus on the maximum speed. The signal depends on the distance between sensor and target (the signal increases exponentially when the airgap is reduced). The resolution, maximum speed and the airgap are thus dependent on each other, as shown in Table 1.

Table 1 Maximum airgap as a function of resolution and maximum speed.

| Res/period | Bits | Pulse | Max speed (target periods/second) |     |     |     |      |     |     |
|------------|------|-------|-----------------------------------|-----|-----|-----|------|-----|-----|
|            |      |       | 10                                | 39  | 156 | 625 | 2.5k | 10k | 40k |
| 2          | 1    | 1.1   | 1.1                               | 1.1 | 0.9 | 0.9 | 0.7  | 0.7 |     |
| 3          | 2    | 1.1   | 1.1                               | 0.9 | 0.9 | 0.7 | 0.7  | 0.7 |     |
| 4          | 4    | 1.1   | 0.9                               | 0.9 | 0.9 | 0.7 | 0.7  | 0.5 |     |
| 5          | 8    | 0.9   | 0.9                               | 0.9 | 0.7 | 0.7 | 0.5  | 0.3 |     |
| 6          | 16   | 0.9   | 0.7                               | 0.7 | 0.7 | 0.5 | 0.3  | 0.1 |     |
| 7          | 32   | 0.7   | 0.7                               | 0.5 | 0.5 | 0.3 | 0.1  | -   |     |
| 8          | 64   | 0.5   | 0.5                               | 0.3 | 0.3 | 0.1 | -    | -   |     |
| 10         | 256  | 0.3   | 0.3                               | 0.3 | 0.1 | -   | -    | -   |     |
| 11         | 512  | 0.3   | 0.3                               | 0.1 | -   | -   | -    | -   |     |
| 12         | 1024 | 0.1   | 0.1                               | -   | -   | -   | -    | -   |     |

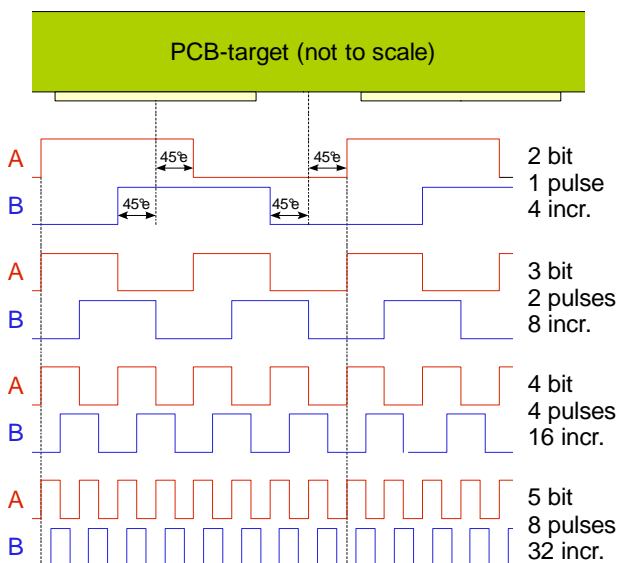
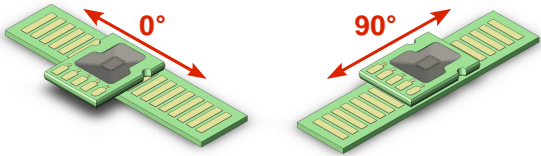


Fig. 1 A quad B signals over one period of 1.2 mm without (2 bit) or with interpolation ( $\geq 3$  bit).

## Ordering information

Ordering code: ID1101-ABBCC  
 The combination of speed (BB) and resolution (CC) must be an existing combination according to Table 1 (colored case).

| A | Orientation |
|---|-------------|
| 0 | 0°          |
| 1 | 90°         |



| BB | Speed (target periods/second) |    |          |
|----|-------------------------------|----|----------|
| 00 | 10 Hz                         | 07 | 1.25 kHz |
| 01 | 20 Hz                         | 08 | 2.5 kHz  |
| 02 | 39 Hz                         | 09 | 5 kHz    |
| 03 | 78 Hz                         | 10 | 10 kHz   |
| 04 | 156 Hz                        | 11 | 20 kHz   |
| 05 | 313 Hz                        | 12 | 40 kHz   |
| 06 | 625 Hz                        |    |          |

| CC | Resolution per target-period |      |        |        |
|----|------------------------------|------|--------|--------|
|    | Linear                       | Bits | Pulses | Incr.* |
| 02 | 300 μm                       | 2    | 1      | 4      |
| 03 | 150 μm                       | 3    | 2      | 8      |
| 04 | 75 μm                        | 4    | 4      | 16     |
| 05 | 37.5 μm                      | 5    | 8      | 32     |
| 06 | 18.8 μm                      | 6    | 16     | 64     |
| 07 | 9.4 μm                       | 7    | 32     | 128    |
| 08 | 4.7 μm                       | 8    | 64     | 256    |
| 10 | 1.2 μm                       | 10   | 256    | 1024   |
| 11 | 0.6 μm                       | 11   | 512    | 2048   |
| 12 | 0.3 μm                       | 12   | 1024   | 4096   |

\* One increment corresponds to the distance between two adjacent A-B transitions.

### Linear and rotational targets

Linear and rotational targets are available from POSIC.

### Evaluation kit

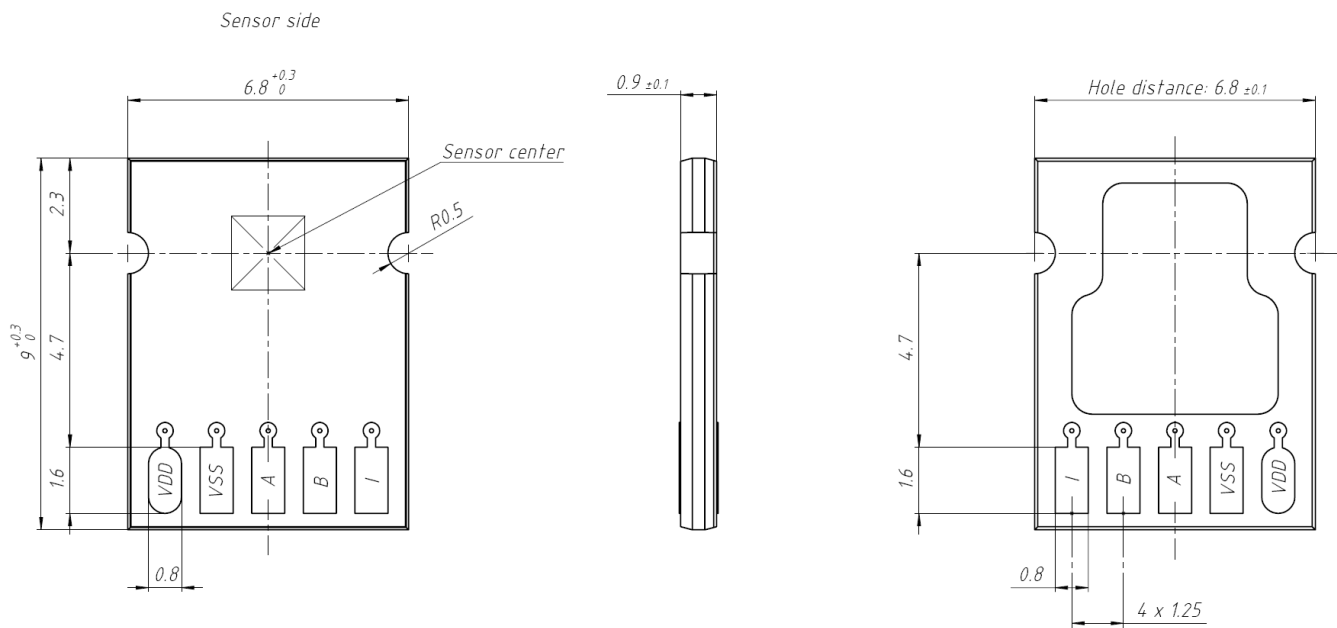
The evaluation kit for the ID1101 sensor contains one Sensor Evaluation Board, a linear and/or rotational target and two ID1101-00408 sensors.

Detailed information on the Evaluation Kit for incremental applications can be downloaded from POSIC's website [www.posic.com](http://www.posic.com).

### Sensor and target customization.

Customization of sensors and/or targets for a specific application is offered as an engineering service by POSIC.

## Technical drawing



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