

## AKL Sensors

### Digital Output Gear Tooth And Encoder Sensors

#### Features:

- ⇒ Large Airgap
- ⇒ 50% Duty Cycle
- ⇒ DC (Zero Speed) Operation
- ⇒ Precise Spacing Between Sensor Elements
- ⇒ Excellent Temperature and Voltage Performance
- ⇒ Small, Low Profile Surface Mount Package

#### Applications:

- ⇒ Anti-lock Brake System Sensors
- ⇒ Transmission Speed Sensors
- ⇒ Industrial Linear and Angular Speed Sensing
- ⇒ Linear and Angular Position Sensing

#### Description:

NVE offers these products specifically for use as sensors for gear tooth wheels or magnetic encoders with a digital output signal. The pulse output from the sensor corresponds with the gear teeth passing in front of it. When a gear tooth or magnetic pole is in front of the sensor, the sensor's output goes high; when the gear tooth or magnetic pole moves away, the output returns to low. This repeats at every tooth/pole, resulting in a pulse train output that provides speed information from the gear or encoder. Three part numbers are currently available: the AKL001-12 is designed for gear teeth or encoders with a pitch of 2.5 to 6mm, the AKL002-12 for a pitch of 1 to 2.5mm, and the AKL003-12 for a pitch of 0.6 to 1.5mm.

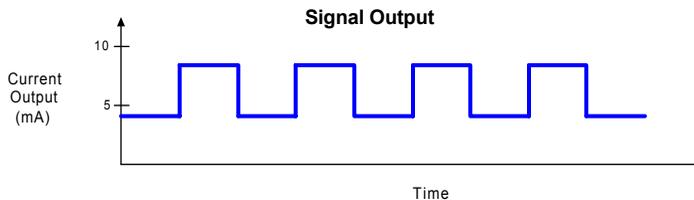
In order to minimize the number of wires leading to the sensor, the part is configured as a two wire device. The two output states are indicated with a change of current through the part. Therefore, when the part is in the digital low state, current is about 3mA. When the part is in the digital high state, the current increases to about 10mA. If necessary, the 2-wire output of the AKL series parts can be easily converted to a 3-wire current sinking output with the circuit shown in the GT Sensor applications section.

The parts are rated for the full automotive and industrial temperature range, -40°C to +150°C. They feature reverse battery protection, and have an operational voltage range of 4.5V to 48V. They operate from DC to 10 KHz. The parts are available in low profile, surface mount TDFN SO8 packages.

## Specifications:

| Property   | Min | Typ  | Max  | Unit               |
|--|-----|------|------|--------------------|
| Input Voltage  | 4.5 |      | 48   | Volts <sup>1</sup> |
| Supply Current in Off State<br>(Input Voltage=12V)                     | 3.2 | 4.0  | 4.8  | mA <sup>2</sup>    |
| Supply Current in On State<br>(Input Voltage=12V)                      | 7.0 | 8.0  | 9.0  | mA <sup>2</sup>    |
| Output Duty Cycle  | 40  | 50   | 60   | %                  |
| Operating Temperature Range  | -40 |      | +150 | °C                 |
| AKL001-12 Airgap, Over Full Temperature and Voltage Range <sup>3</sup> | 1.0 |      | 3.5  | mm                 |
| AKL002-12 Airgap, Over Full Temperature and Voltage Range <sup>3</sup> | 1.0 |      | 2.5  | mm                 |
| Frequency of Operation   | 0   |      | 10K  | Hz                 |
| ESD  |     | 2000 |      | V <sup>3</sup>     |

| Absolute Maximum Ratings   |                 |
|----------------------------|-----------------|
| Parameter                  | Limit           |
| Supply Voltage             | 60V             |
| Reverse Battery Voltage    | -60V            |
| Continuous Output Current  | 16mA            |
| Junction Temperature Range | -40°C to +175°C |
| Storage Temperature Range  | -65°C to +200°C |



Notes:

1. The supply voltage must appear across the power and ground terminals of the part. Any additional voltage drop due to the presence of a series resistor is not included in this specification.
2. Supply currents can be factory programmed to different levels, for example 3mA and 6mA, or 7mA and 14mA; contact NVE for details.
3. Pin to pin voltage, Human Body Model for ESD
4. Airgap measured with standard ferrous gear tooth, contact NVE for details.

## IC Drawings:

The AKL Series products use the ABL sensor elements described earlier in this section. The AKL001-12 part uses the ABL004 sensor element, the AKL002-12 uses the ABL005 sensor element, and the AKL003-12 uses the ABL006 sensor element. Please see the IC drawings in the ABL series section for more information.

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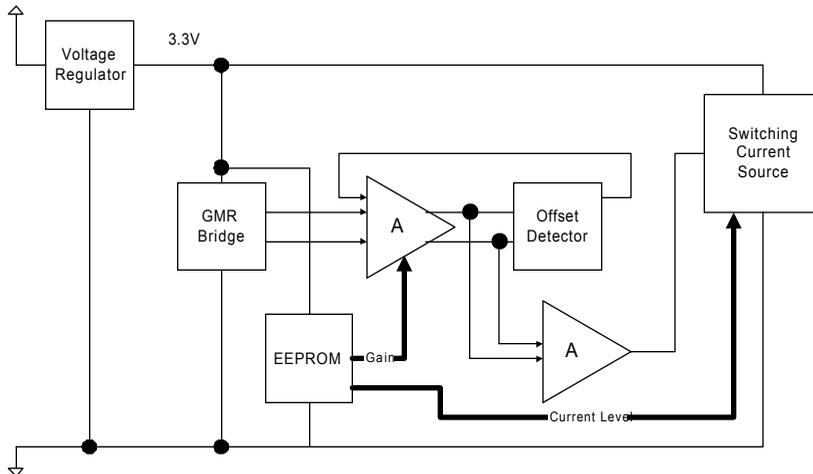
Web: [www.rhopointcomponents.com](http://www.rhopointcomponents.com) Email: [sales@rhopointcomponents.com](mailto:sales@rhopointcomponents.com)

## Part Numbers and Configurations:

| Part Number | Single or Dual Bridge | Element Spacing (Microns) | Marking     |
|-------------|-----------------------|---------------------------|-------------|
| AKL001-12   | Single                | 1000                      | Part Number |
| AKL002-12   | Single                | 500                       | Part Number |
| AKL003-12   | Single                | 300                       | Part Number |

## Schematic:

A block diagram of the AKL series parts is shown below:

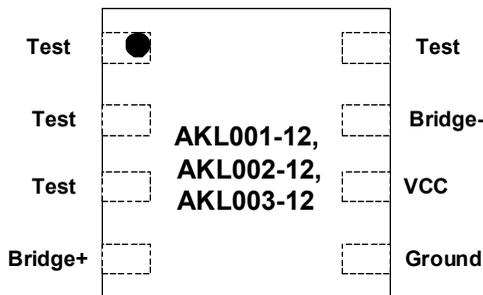


## Packages:

The AKL series parts are available in the TDFN8 SO8 package. Please see the package drawing section in the Appendix for dimensions.

## Pin Configuration:

TDFN8-SO8 Package



Note: Bridge + and Bridge - are provided for analysis purposes only. NVE does not recommend connecting these pins in a production product, for ESD and loading reasons. Also, all pins labeled 'Test' must be floating, *i.e.* not connected to each other, or any other circuit node.

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