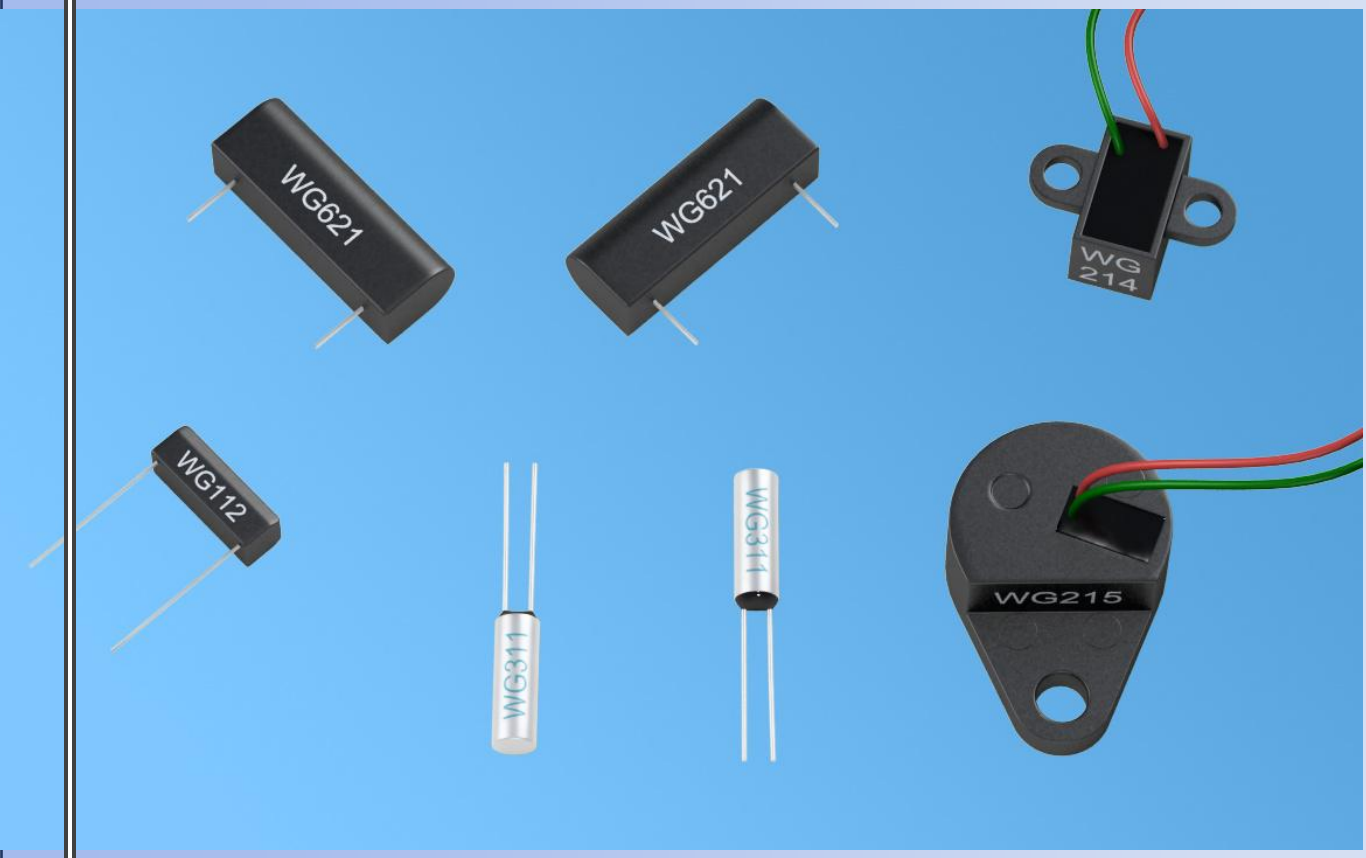
Zero Power Consumption Sensor WG631S



Nanjing AH

A magneto-electric micro-energy harvesting sensor
without external power supply

◆ Features

- No need the power supply when it works.

- Bipolar excitation working mode
  The sensor outputs a pair of positive and negative electrical pulse signal when the magnetic field polarity changes for a circle.

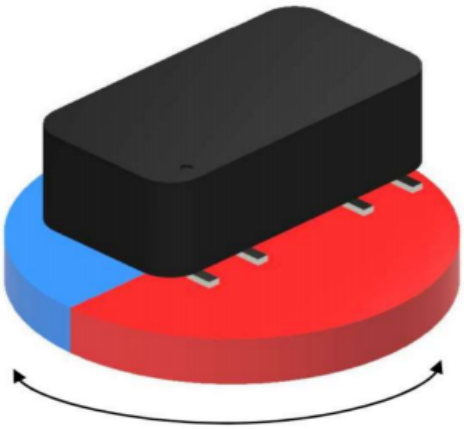
- Non-Contact Electromagnetic Acquisition
  No mechanical points or sparks between the magnetic field sensing device and the triggering magnetic field, intrinsically safe device.

- Constant pulse energy
  The value of the pulse energy output from the sensor is independent of the frequency of magnetic field variations and remains constant even at very low magnetic field variations. At higher magnetic field frequencies, higher energy values are generated due to additional inductive effects.

- Stable working performance
  Only when the external magnetic field polarity changes, and magnetic strength reaches the excitation threshold, the sensor will outputs a pulse signal, so the vibration won't happen. Constant pulse output energy even after millions of transitions. The operation is stable and reliable.

- LAN management
  The output signal can be remote transmitted by the signal lines, so it's suitable for LAN management.

- Wide operating temperature range, strong environmental adaptability.



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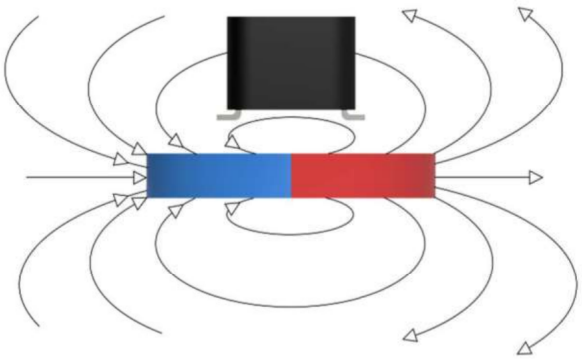
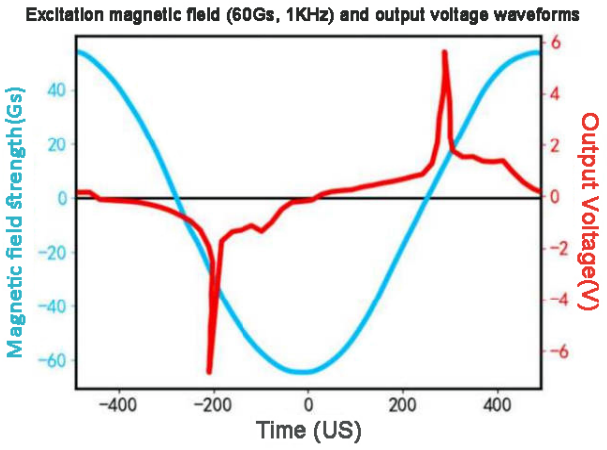
◆ Principle description

Zero power consumption sensoris produced based on Wiegand effect theory, that is, after appropriate treatment of the metallurgical phase of the alloy wire will change, its outer shell coercivity than the inner shell coercivity is much larger, relying on this magnetic difference and a certain amount of applied magnetic field conditions, you can make the inner core of the magnetic field changes in the direction of the outer shell and the direction of this would be the same or the opposite, and with the certain of the external magnetic field can repeat the change of magnetic field, this phenomenon is known as the Wiegand effect. Sensors developed based on this effect are generally known as Wiegand sensors, i.e. zero power magnetic sensors.

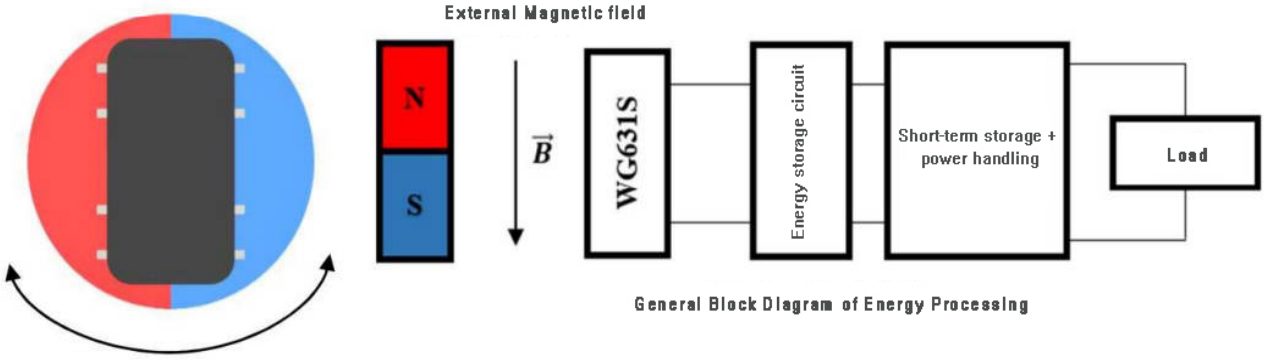
Manufactured on the basis of the Wiegand effect, it is capable of actively generating energy, and when in use, without the need for an external power supply, it can generate sharp voltage pulse signals, i.e., the polarity of the external magnetic field is alternately changed once, and a positive or negative pulse is output to the outside world. The pulses generated can be used not only as a self-powered pulse signal generator, but also to provide energy for ultra-low power devices. This therefore makes zero-power magnetic sensors uniquely suited for low-power and energy-saving applications.





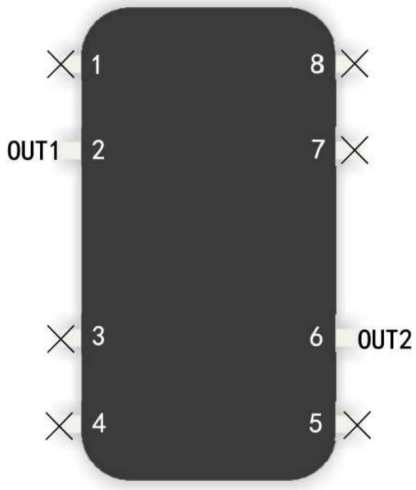
◆ Application

Power zero-power magnetic sensors can not only be used as passive pulse signal generators, the pulse energy generated can also be used as a power supply for electronic components. The continuous generation of pulse energy can provide the required energy compensation for the circuit. The use of special ultra-low-power chips, a single pulse energy to meet the system's triggered or intermittent work requirements. Examples include multi-turn encoders based on mechanical energy harvesting, medical transdermal devices based on wireless power transmission, and self-powered IoT sensors.



General Block Diagram of Energy Processing

◆ Pin Description



Note: OUT1, OUT2 are all output pins

◆ Parameter

Parameter	Simble	Min.	Typ.	Max.	Unit
Excitation magnetic field	*B*	*5.5*	*8*	*12*	*mT*
Pulse signal amplitude	V_O	*5.5*	—	—	*V*
Pulse Width	τ	*10*	—	*30*	*us*
Internal DC resistance	*R*	*240*	—	*300*	*Ω*
Operate Frequency	*f*	—	—	*5*	*kHz*
Operate Temperature	*T*	*-40*	—	*125*	*℃*

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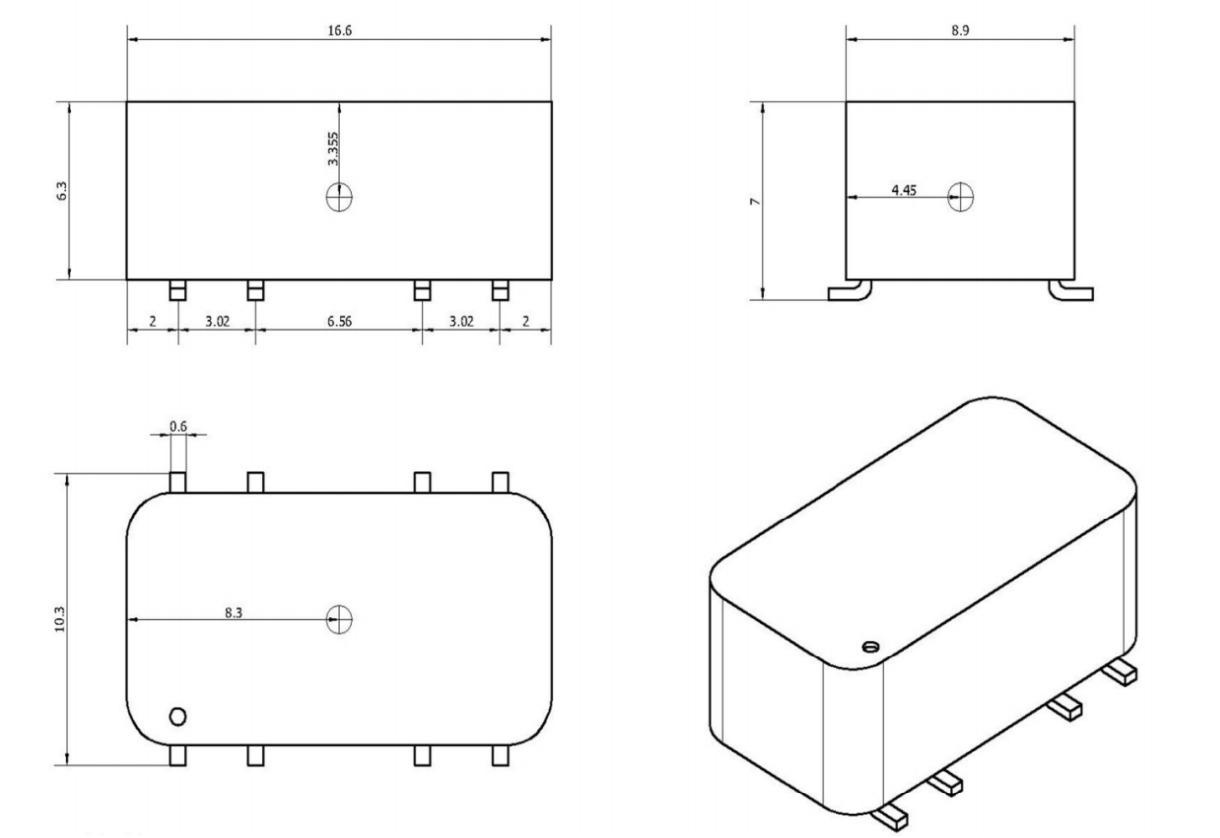
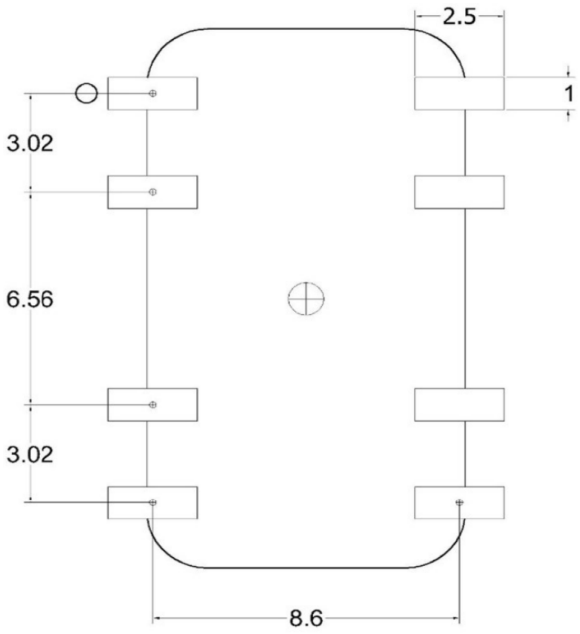
◆ Dimension



Unit: mm

⊕: Sensing centre point

◆ Packaging Size for Reference



Unit: mm

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