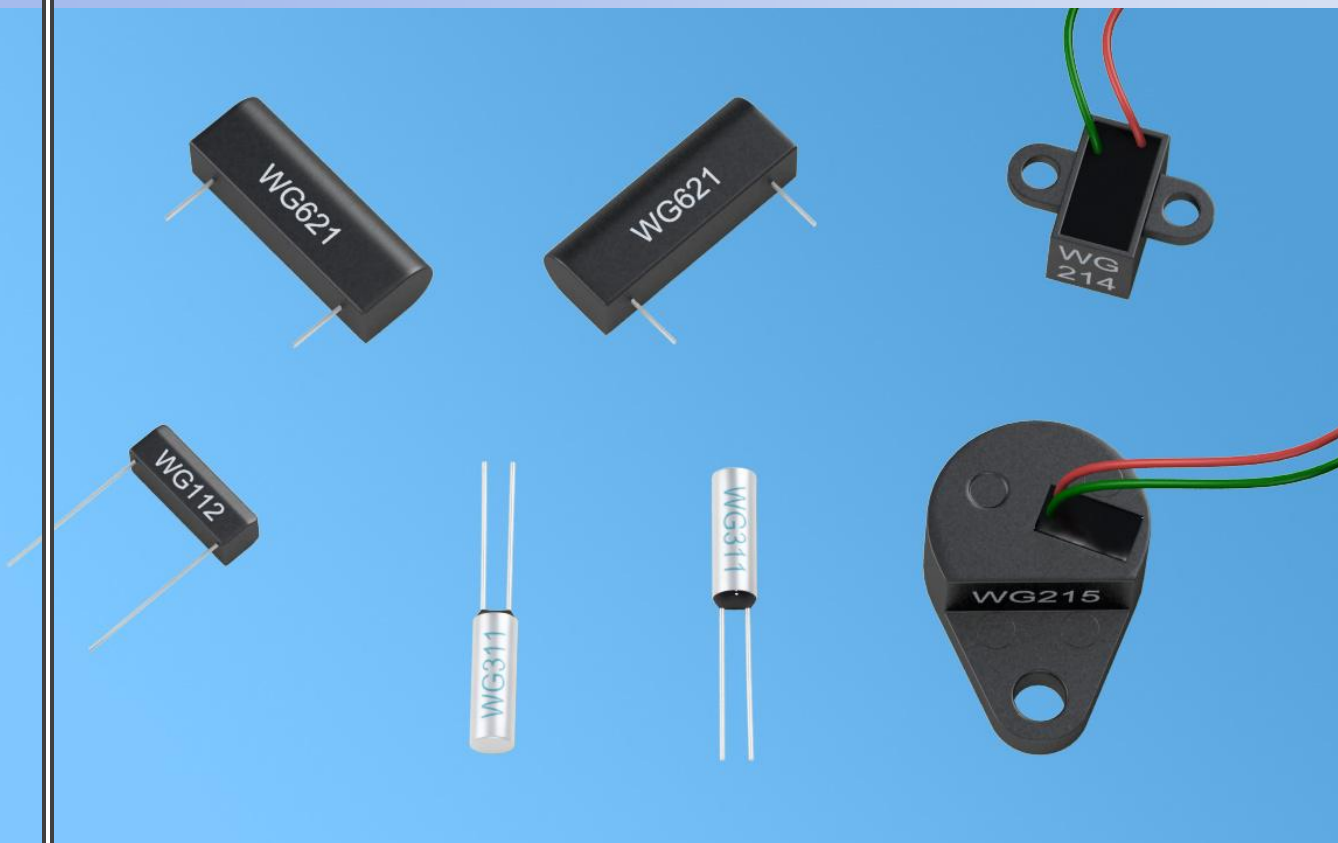


Zero Power Consumption Sensor WG641S



Atiny
Nanjing AH

◆ 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.

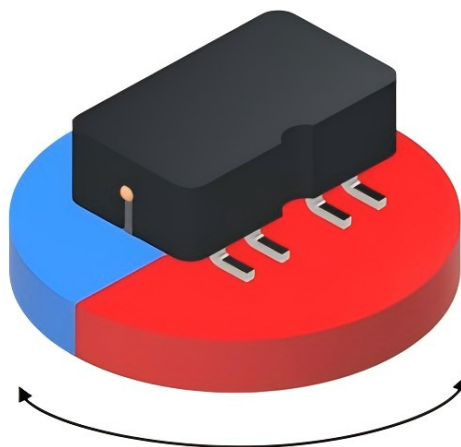
▶ Stable working performance

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.

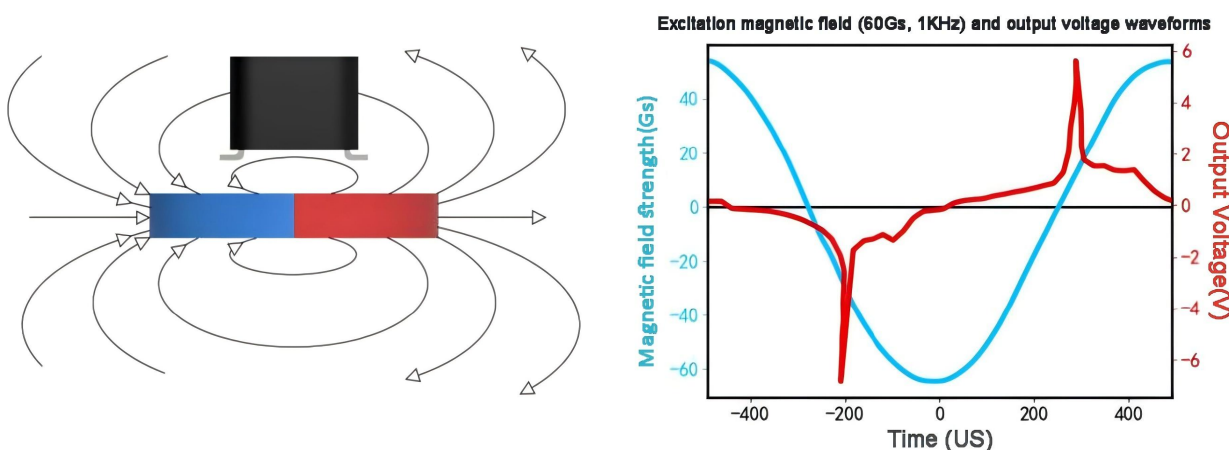
▶ Wide operating temperature range, strong environmental adaptability.



◆ Principle Description

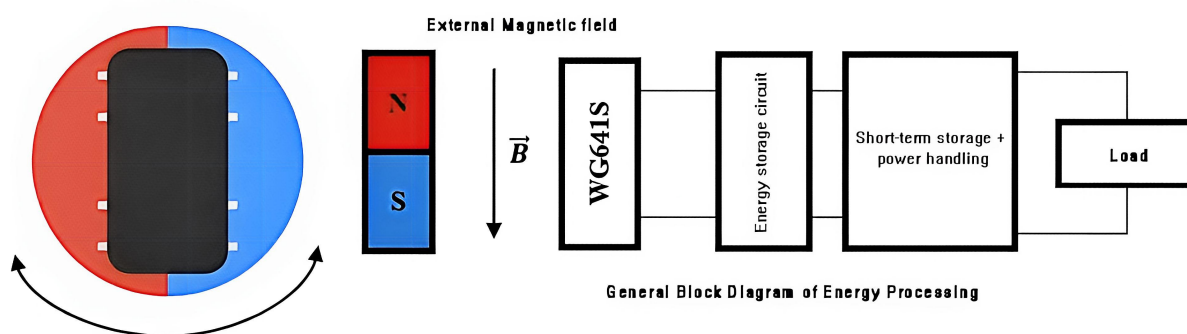
Zero power consumption sensor is produced based on Wiegand effect theory, that is, after appropriate treatment of the metallurgical phase of the alloy wire will change, its outer shell coercivity than the inner shell coercivity is much larger, relying on this magnetic difference and a certain amount 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, needn't the 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. It makes zero-power magnetic sensors uniquely suited for low-power and energy-saving applications.

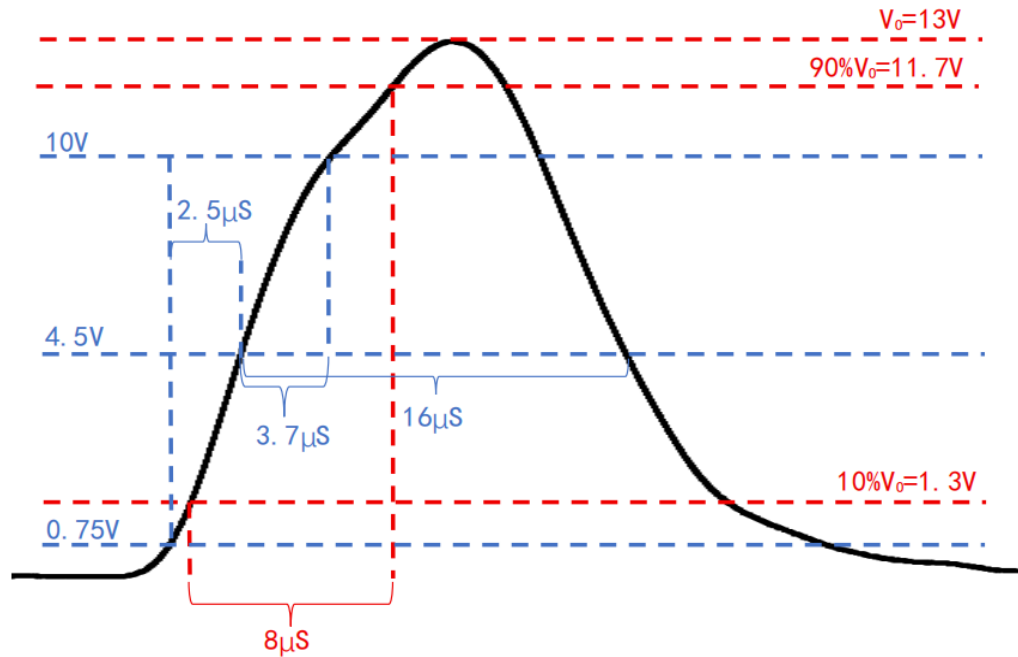


◆ Application

Power-type 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 percutaneous devices based on wireless power transmission, and self-powered IoT sensors.



◆ Typical Waveform



$$①SR_0 = ((11.7 - 1.3) / 8) \text{ V} / \mu\text{S} \approx 1.3 \text{ V} / \mu\text{S}$$

No-load test output waveform

Test frequency: 1 ~ 3KHz.

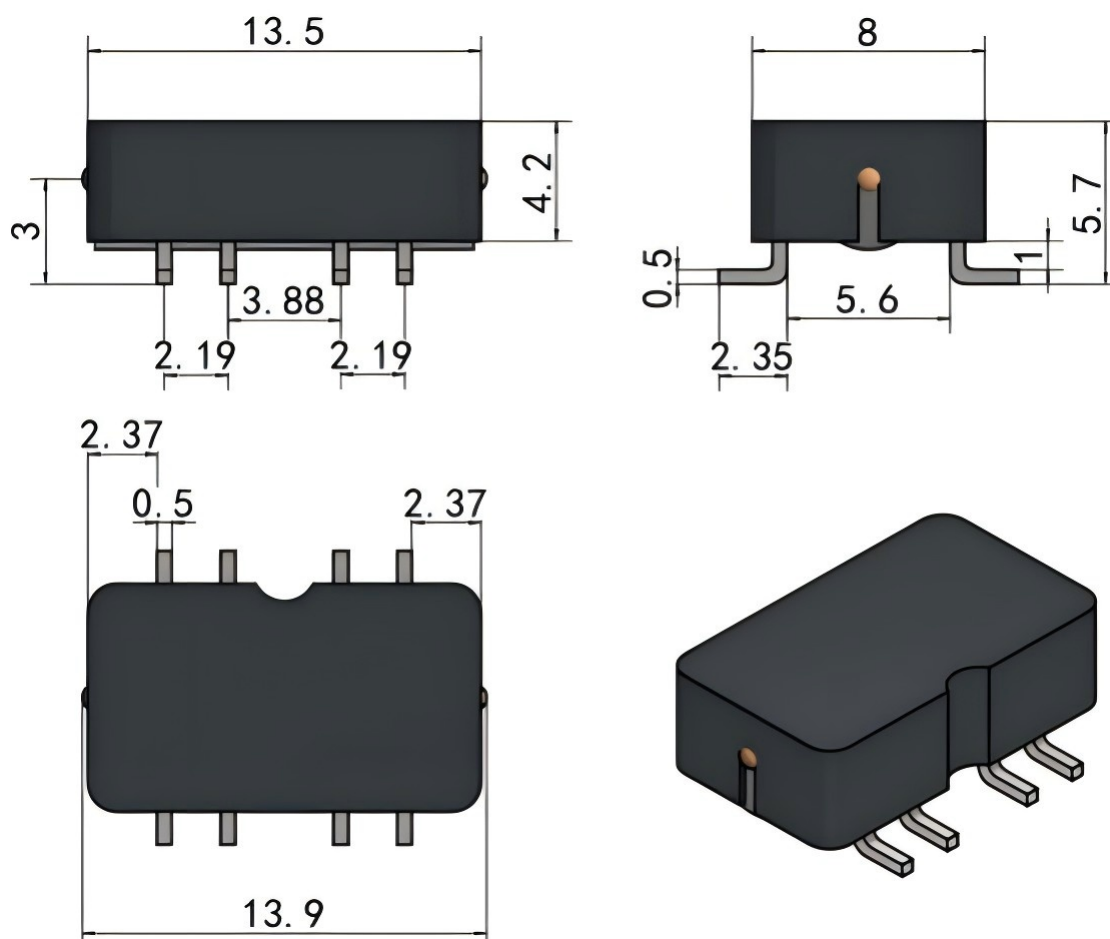
SR_0 : No-load test output waveform slew rate. Slew rate $SR = (V_p[90\%] - V_p[10\%]) / tr$, tr : rise time $[V_p10\% \sim 90\%]$.

◆ Parameter

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Excitation magnetic field	B	5.5	8	12	mT	— (Can be customized according to customer needs)
Pulse signal amplitude	V_o	5.5	10	—	V	No-load test(The minimum pulse signal amplitude can be customized according to customer requirements.)
Pulse width	τ	10	—	30	μs	No-load test
Slew rate	SR_o	0.2	—	—	$V/\mu s$	No-load test
Internal DC resistance	R	180	—	240	Ω	—
Inductance	L	19.5	—	24.5	mH	3KHz、1V
Operating frequency	f	—	3	—	KHz	—
Operating temperature	T_o	-40	—	125		— (Can be customized according to customer needs)
Storage temperature	T_s	-40	—	125		—
Operating humidity	RH_o	—	—	90%	—	—
Storage humidity	RH_s	—	—	90%	—	—

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

◆ Dimension



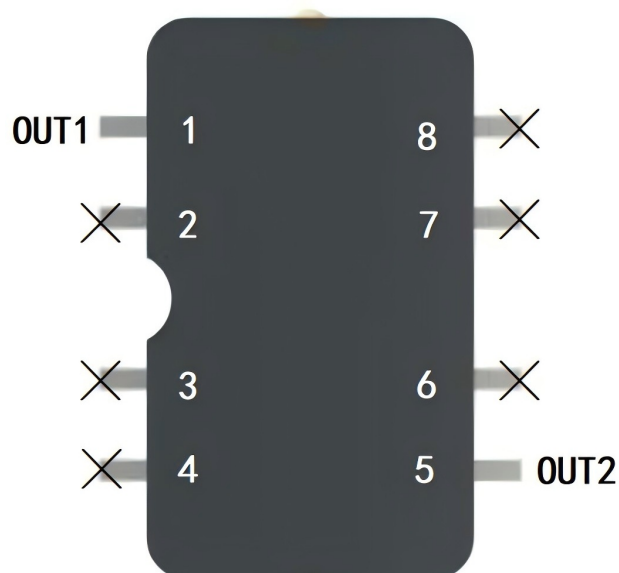
Unit: mm

Tolerance: ± 0.05 ;

Vertical distance from the bottom pin plane of the sensing wire: 3 ± 0.15 ;

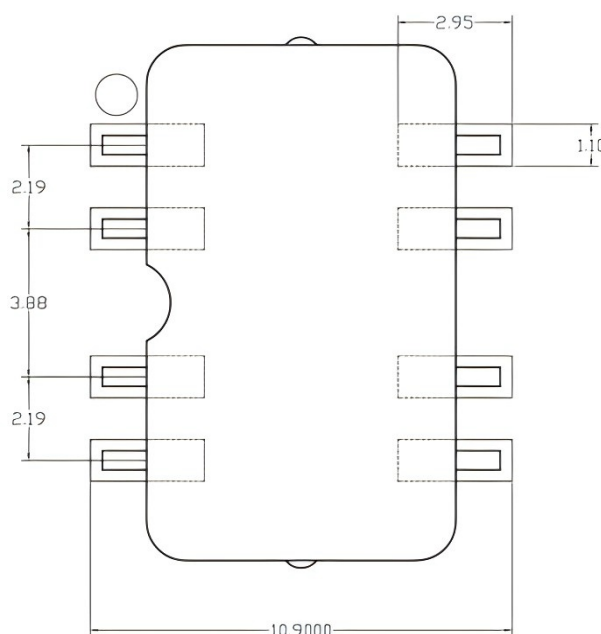
Dimensions and packaging specifications are customizable according to customer requirements

◆ Pin Description



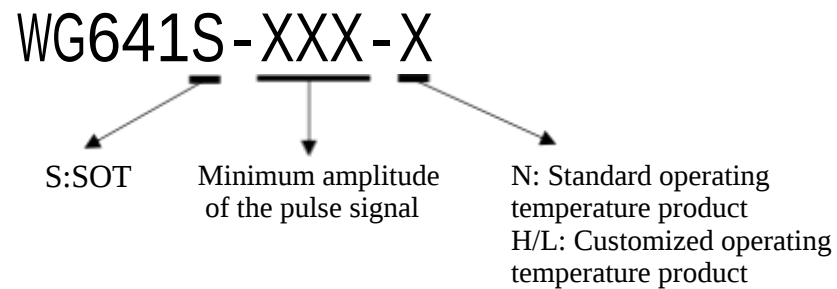
Note: OUT1, OUT2 are all output pins

◆ Packaging Size for Reference



Unit: mm
Tolerance: ± 0.05

◆ Product Model Description



For example, WG641S-055-N: Product Model WG641, with surface-mount packaging, featuring a minimum pulse signal amplitude of 5.5 V and operating temperature ranging from -40°C to 125°C.