

abuse [V-T-U2] If you **abuse** something you treat it badly. **używać niewłaściwie**

active element [N-COUNT-U4] An **active element** is a part of an electronics product that is able to create energy. **element czynny**

activity [N-COUNT-U3] **Activity** is action or movement. **aktywność, działanie**

age [N-COUNT-U2] The **age** of something is how long it has existed. **wiek (np. produktu)**

alter [V-T-U15] To **alter** a sound is to change it. **modyfikować, zmieniać**

amplify [V-T-U14] To **amplify** a signal is to increase the power of a signal. **wzmacniać (np. sygnał)**

amplitude [N-UNCOUNT-U5] **Amplitude** is the distance between the middle and the bottom or top of an electrical wave. **amplituda**

analog [ADJ-U5] If a signal is **analog**, it uses signals that change the voltage to form a pattern, which is similar to the data being sent. **analogowy (sygnał)**

analog-to-digital converter [N-COUNT-U5] An **analog-to-digital converter** is a device that changes analog information into digital information. **przetwornik analogowo-cyfrowy**

anode [N-COUNT-U8] An **anode** is the part of a diode where current flows in from the outside. **anoda**

apart [ADJ-U3] If a piece of equipment is **apart**, it is in parts, or it is not together. **w częściach, na części**

audio taper pot [N-COUNT-U12] An **audio taper pot** is another name for a log taper pot. **potencjometr logarytmiczny**

band [N-COUNT-U8] The **band** on a diode is used to identify the terminal of the cathode. **pasek na diodzie oznaczający katodę**

base [N-COUNT-U14] The **base** is the part of a transistor that is between the emitter and the collector. It changes the flow of current between the other two terminals. **baza tranzystora**

bias [N-UNCOUNT-U14] **Bias** is a fixed voltage, applied to a device, in order to control its operation. **napięcie wstępne, bias**

biasing element [N-COUNT-U8] A **biasing element** is a potential source used with diodes. **układ biasujący**

bipolar transistor [N-COUNT-U14] A **bipolar transistor** is made up of three elements that are linked by two junctions. The three elements are the base, collector, and emitter. Transistors are used to amplify and/or switch electronic signals. **tranzystor bipolarny**

blow [V-T-U9] To **blow** a fuse is to exceed the limit of the fuse. **przeciążyć (o bezpieczniku)**

break down [PHRASAL V-U1] If something **breaks down**, it stops working suddenly. **zepsuć się**

bridge rectifier [N-COUNT-U8] A **bridge rectifier** has four rectifiers arranged in a diamond-like configuration. **prostownik mostkowy**

capacitor [N-COUNT-U6] A **capacitor** is a device made of two or more plates separated by an insulator, that is used to store electricity and discharge it back to a circuit. **kondensator**

carbon composition resistor [N-COUNT-U11] A **carbon composition resistor** is a resistor made of carbon that is found in nearly every electronic device. **rezystor węglowy**

cathode [N-COUNT-U8] A **cathode** is the part of a diode where current flows out from the inside. **katoda**

ceramic [N-UNCOUNT-U7] **Ceramic** is a hard material made by heating clay at a high temperature. **ceramika**

ceramic capacitor [N-COUNT-U6] A **ceramic capacitor** uses ceramic as its insulator, has a small range, and is found in radio circuits and bypass applications. **kondensator ceramiczny**

charge up [PHRASAL V-U15] To **charge up** a battery, is to allow it to accumulate the power needed to run. **naładować (np. baterię)**

chip [N-COUNT-U10] A **chip** is an integrated circuit which is used in computers, cell phones, and many other electronic devices. **chip**

circuit [N-COUNT-U4] A **circuit** is the complete path of an electric current. **obwód elektryczny**

closed [ADJ-U4] If a circuit is **closed**, the current can travel from one end of the power source to the other. A circuit needs to be closed in order to work. **zamknięty (np. obwód)**

coil [N-COUNT-U9] A **coil** is a strip of metal that is wound in a spiral. **zwój**

collector [N-COUNT-U14] The **collector** is the semiconductor part of a transistor. After charge carriers leave the base, they flow into the collector. **kolektor (w tranzystorze)**

color code [N-COUNT-U11] A **color code** is a series of colors that represent numbers that are used to state a resistor's resistance value in ohms. **system identyfikacji za pomocą kolorów**

compensate [V-T-U15] To **compensate**, is to pay for or make up the difference for something. **rekompensować, wyrównywać, równoważyć**

component [N-COUNT-U4] A **component** is an element in a circuit. **część, element (np. obwodu)**

conditions [N-COUNT PLURAL-U2] The **conditions** something is kept in is the environment it is used in. **warunki**

contact [N-COUNT-U13] A **contact** is a device used to conduct current. **gniazdko elektryczne**

control [V-T-U13] To **control** equipment is to make it work or move in the way that you want it to. **sterować, regulować (o urządzeniu)**

corrosion [N-UNCOUNT-U1] **Corrosion** is damage to metal due to water. **korozja**

crystal [N-COUNT or UNCOUNT-U7] **Crystal** is very high quality clear glass. **kryształ (szkło wysokiej jakości)**

custom [ADJ-U10] If an electronic device is **custom** made, it is specially designed for a specific purpose. **(zrobiony) na zamówienie, dostosowany (do potrzeb),**

cycle [N-COUNT-U5] A **cycle** is one repetition of a waveform. **cykl fali**

cylinder [N-COUNT-U9] A **cylinder** object is shaped with circular ends and straight sides. **walec**

dead [ADJ-U3] If a wire or a piece of electronic equipment is **dead**, it is not working at all. **rozładowany lub nie działający**

defective [ADJ-U10] If an electronic device is **defective**, it does not work properly. **wadliwy, źle działający**

depletion mode [N-UNCOUNT-U14] **Depletion mode** is an operating mode where reverse gate-source voltage is used to reduce the amount of free carriers in the channel. This makes the channel smaller and raises its resistance. Depletion mode transistors are “normally on” devices. **kanał zubożony**

detect [V-T-U15] To **detect** is to notice an object or a change in pattern. **zauważyć, wykryć**

digital [ADJ-U5] If something is **digital**, it uses signals that are based on the binary numbers of 0 and 1. Digital signals are easier to track and store than analog ones. **cyfrowy**

diode [N-COUNT-U8] A **diode** is a one way valve that allows current to flow through it. **dioda**

disintegrate [V-I-U11] To **disintegrate** is to fall apart or break down. **rozpaść się**

display [N-COUNT-U3] The **display** is the screen on an electronic device. **wyświetlacz**

dissipate [V-I or T-U11] To **dissipate** is to spread out or cause something to spread out. **rozpraszać**

double rectifier [N-COUNT-U8] A **double rectifier** has two rectifiers sharing one terminal. **prostownik podwójny**

drain [N-COUNT-U14] A **drain** does the same job as a collector. It is found inside FET transistors. After charge carriers leave the gate, they flow into the drain. **dren**

duty cycle [N-COUNT-U5] A **duty cycle** is the percentage of time spent in the “on” state in relation to the “off” state. **współczynnik wypełnienia**

electrical stress [N-UNCOUNT-U1] **Electrical stress** is damage to a machine caused by a surge of power. **uszkodzenie spowodowane przepięciem**

electrolytic capacitor [N-COUNT-U6] An **electrolytic capacitor** offers the highest capacity relative to its size, has a small range, and performs coupling and timing functions. **kondensator elektrolityczny**

eliminate [V-T-U3] To **eliminate** is to take something away so that it is not considered or chosen. **wyeliminować, wykluczać**

emitter [N-COUNT-U14] An **emitter** is the part of a transistor where charge-carrying holes originate. **emiter**

encased [ADJ-U7] If something is **encased**, it is covered completely by something else. **wbudowany, osadzony w**

enhancement mode [N-UNCOUNT-U14] **Enhancement mode** is an operating mode where the channel is free of charge carriers when the gate source voltage is zero. Enhancement mode transistors are “normally off” devices. **kanał wzbogacony**

evaluation [N-COUNT-U2] An **evaluation** is an examination of something, leading to a conclusion about the best action to take. **ewaluacja, szacowanie**

exceed [V-T-U9] To **exceed** a limit is to go past an allowed amount or limit. **przekroczyć (limit, granicę)**

exhibit [V-T-U2] If a machine **exhibits** something, it shows something. **pokazywać**

external [ADJ-U3] If something is **external**, it is on the outside, not on the inside. **zewnętrzny**

failure [N-UNCOUNT-U1] **Failure** is when something cannot achieve its purpose. **niepowodzenie**

fall time [N-COUNT-U5] The **fall time** is the amount of time it takes for the transition to fall from ninety percent to ten percent of its final height. **czas opadania**

fan [N-COUNT-U10] A **fan** is put inside a device to keep the chip from overheating. **wiatrak chłodzący**

farad [N-COUNT-U6] A **farad** is the unit that measures the ability of a capacitor to store energy, known as capacitance. **farad (jednostka pojemności elektrycznej)**

filter [N-COUNT-U7] A **filter** is a device that removes unwanted things that pass through it. **filtr**

frequency [N-UNCOUNT-U5] **Frequency** is the amount of cycles that take place in one second of time. **częstotliwość**

fuse [N-COUNT-U9] A **fuse** protects a circuit against current surges. **bezpiecznik**

gang [V-T-U12] To **gang** components is to arrange them into a group or a set. **ustawić**

gate [N-COUNT-U14] A **gate** does the same job as a base. It is the controlling terminal that changes the flow of current between the source and the drain. **bramka**

generate [V-T-U7] To **generate** something is to produce that thing. **generować, tworzyć**

gradual [ADJ-U2] If an action is **gradual**, it happens slowly over a long period of time. **stopniowy**

graphics card [N-COUNT-U14] A **graphics card** is a circuit board that controls the images that come on a computer screen and generates 3D images. **karta graficzna**

harmonic energy [N-UNCOUNT-U5] **Harmonic energy** is sounds that are made at multiples of the same frequency as a base noise. **energia harmoniczna**

heat stress [N-UNCOUNT-U1] **Heat stress** occurs when the power supply generates a lot of heat when it powers a large piece of equipment. The heat causes damage. **uszkodzenie spowodowane przegrzaniem**

hiss [N-COUNT-U3] A **hiss** is a harsh s-sounding noise. **syk**

holder [N-COUNT-U9] A **holder** is something that contains a fuse. **oprawka bezpiecznika**

hot side [N-COUNT-U9] The **hot side** is where wires that are not grounded are located. **strona „gorąca” (gdzie przewody nie są uziemione)**

hum [N-COUNT-U3] A **hum** is a deep, constant vibrating sound. **buczenie**

idle [ADJ-U2] If a device is **idle**, it is turned on, but nobody is using it. **bezczynny (o urządzeniu)**

incoming [ADJ-U15] If a current is an **incoming** current, it is running towards the object, not away from it. **przychodzący**

in common [ADJ PHRASE-U2] If two things have something **in common**, they are similar in some way. **wspólny (np. cecha)**

in operation [ADJ PHRASE-U2] If something is **in operation**, it is currently working. **działający**

in parallel [ADJ PHRASE-U4] If a circuit is **in parallel**, several components are joined across the power source's two terminals. **w połączeniu równoległym**

in series [ADJ PHRASE-U4] If a circuit is **in series**, the current has to pass through a first circuit component, before it is able to pass through a second or third one. **w połączeniu szeregowym**

insulator [N-COUNT-U6] An **insulator** is a material that does not conduct electricity. **izolator**

interchange [V-T-U11] To **interchange** things is to have each thing replace the position or function of the other(s). **wymieniać, zamieniać**

isolate [V-T-U12] To **isolate** something is to separate it from other things. **izolować**

junction field effect transistor (JFET) [N-COUNT-U14] A **junction field effect transistor (JFET)** is a type of transistor that is made up of three elements. These elements are called the gate, the source and the drain. The JFET does not need much signal current in order to turn on. **tranzystor polowy złączowy**

large scale integrated chip (LSI) [N-COUNT-U14] A **large scale integrated chip (LSI)** is an integrated circuit that contains thousands of semiconductors. **układ scalony o dużej skali integracji**

lead [N-UNCOUNT-U7] A **lead** is a metal prong used to mount a device to a circuit board. **pin, nóżka (np. w płycie obwodu)**

leg [N-COUNT-U4] A **leg** is a section of an electrical circuit. **przewód pod napięciem w obwodzie elektrycznym**

light-emitting diode (LED) [N-COUNT-U8] A **light-emitting diode (LED)** emits light when a current passes through it. **dioda LED**

limit [V-T-U11] To **limit** something is to prevent something from increasing beyond a certain point. **ograniczać**

linear regulator [N-COUNT-U15] A **linear regulator** controls outgoing voltage coming from a less stable inbound voltage, is inexpensive, and produces better sound than a switching regulator. **regulator liniowy**

linear taper pot [N-COUNT-U12] A **linear taper pot** is a pot that provides an even change in resistance for each degree of rotation from end to end. **potencjometr liniowy**

log taper pot [N-COUNT-U12] A **log taper pot** is a pot that uses a logarithmic resistance curve to adjust sound volume so that it appears to change at a constant rate. **potencjometr logarytmiczny**

malfunctioning [ADJ-U3] If a piece of equipment is **malfunctioning**, it is not working properly. **źle działający**

manufacturer [N-COUNT-U2] A **manufacturer** is a company or person that makes products. **producent**

mark [N-COUNT-U6] A **mark** is a letter, word, or symbol printed on or etched into something. **symbol, znak**

maximum [N-COUNT-U8] The **maximum** is the highest amount or degree that is possible. **maksimum**

mechanical wear [N-UNCOUNT-U1] **Mechanical wear** is when products stop working because moving parts break. **zużycie mechaniczne**

metal oxide resistor [N-COUNT-U11] A **metal oxide resistor** is a type of resistor with a tighter tolerance than carbon or wire-wound resistors. **rezystor metalowo-tlenkowy**

metal-oxide semiconductor field-effect transistor (MOSFET) [N-COUNT-U14] A **metal-oxide semiconductor field-effect transistor (MOSFET)** is a type of transistor that is like a JFET. However, it takes even less signal current to turn on a MOSFET. **tranzystor polowy MOSFET**

microscopic [ADJ-U10] If an object is **microscopic**, it is too small to see with the naked eye. **mikroskopijny**

mortality [N-UNCOUNT-U1] **Mortality** is the fact that things die. It is usually used to talk about people, but can also be used to describe the fact that some products in a batch will fail. **śmiertelność, umieralność; wadliwość produktu**

normally closed [ADJ-U13] If something is **normally closed**, it means that the contacts are touching, even when the relay or switch is in the “off” position. Electricity can pass between the contacts. **normalnie zamknięty (o styku)**

normally open [ADJ-U13] If something is **normally open**, it means that the contacts do not touch when the relay or switch is in the “off” position. Electricity cannot pass between the contacts. **normalnie otwarty (o styku)**

open [ADJ-U4] If a circuit is **open**, there is a break in it that stops current from flowing from one end of the power source to the other. **otwarty (np. obwód)**

opposition [N-UNCOUNT-U11] **Opposition** is an action done to resist or stop something else. **sprzeciw, opór, opozycja**

origin [N-COUNT-U4] An **origin** is the place where something starts to exist. In a circuit, the origin is the place where current comes from. **pochozenie**

output [N-UNCOUNT-U15] **Output** is the voltage, sound, or anything else that a speaker or other object produces. **sygnał, moc wyjściowa**

passage [N-UNCOUNT-U13] **Passage** is movement through, past, or over a location. **przejście (np. przez coś, obok czegoś)**

peak inverse voltage (PIV) [N-COUNT-U8] The **peak inverse voltage (PIV)** refers to the highest value of the input voltage that a diode can handle before allowing it to pass. **szczytowe napięcie wsteczne**

phase relationship [N-COUNT-U5] A **phase relationship** is the relative position in time of two different signals. It is shown in degrees. **relacja fazowa**

physical stress [N-UNCOUNT-U1] **Physical stress** is damage caused to a machine by the way it is treated. **uszkodzenia fizyczne**

piezoelectric effect [N-COUNT-U7] The **piezoelectric effect** is when pressure is applied to a material and it results in the production of electricity. The same materials vibrate when subjected to electricity. **efekt piezoelektryczny**

plastic capacitor [N-COUNT-U6] A **plastic capacitor** uses polystyrene as its insulator, has excellent stability, and performs bypass and coupling functions. **rezystor polimerowy**

plate [N-COUNT-U6] A **plate** is flat piece of metal or other material. **plytka**

pole [N-COUNT-U13] A **pole** is a set of contacts. **biegun**

potentiometer (pot) [N-COUNT-U12] A **potentiometer (pot)** is an electronic component, typically with three leads, that varies how much current flows through a circuit, and can be used to adjust analog signals (such as volume and power supply). **potencjometr**

power surge [N-COUNT-U1] A **power surge** is a sudden, great increase in the power supply. **skok napięcia**

protect [V-T-U9] To **protect** something is to keep it from being harmed or damaged. **chronić**

pulse [N-COUNT-U8] A **pulse** is a short and sudden change in a current. **impuls**

pulse-width modulation (PWM) [N-UNCOUNT-U15] **Pulse-width modulation (PWM)** is a method that is used to control the power that is going to an electrical device. **modulacja szerokości impulsów**

quartz [N-UNCOUNT-U7] **Quartz** is a form of silicon that occurs in nature and is used in making watches and electronics. **kwarc**

range [N-COUNT-U6] A **range** is a series of numbers bounded on either side by a highest and lowest amount. **zakres**

rating [N-COUNT-U6] A **rating** is the upper limit of voltage a capacitor can handle before failing. **maksymalne napięcie kondensatora**

rectangular [ADJ-U9] If an object is **rectangular**, it has four right angles. **prostokątny**

rectifier [N-COUNT-U8] A **rectifier** is a large diode that forces an alternating current to become direct. **prostownik**

rectify [V-T-U4] To **rectify** is to correct a problem. When current is rectified, it is changed into a current with one polarity. **sprostować (np. nieprawdę), prostować (o prądzie)**

regulate [V-T-U15] To **regulate** a current is to control it. **regulować**

relay [N-COUNT-U13] A **relay** is a switch that is controlled by another electrical circuit. Many relays use an electromagnet. **przełącznik**

remote control [N-COUNT-U3] A **remote control** is a device that controls a machine from a distance. **pilot zdalnego sterowania**

represent [V-T-U11] To **represent** is to be the symbol for something. **symbolizować**

reservoir [N-COUNT-U4] A **reservoir** is something that can store energy. It is used to keep voltage even. **zbiornik w maszynie**

resistance [N-UNCOUNT-U1] **Resistance** is a force that stops something else from moving effectively. **opór**

resistance curve [N-COUNT-U12] A **resistance curve** is a graphic representation of how a pot's resistance value changes as another variable changes. **krzywa oporu**

resistor [N-COUNT-U11] A **resistor** is a component that limits the flow of electricity in an electronic device. **rezystor, opornik**

resonator [N-COUNT-U7] A **resonator** is a device that oscillates at certain frequencies. **rezonator, wzmacniacz**

reversed polarity [N-UNCOUNT-U1] **Reversed polarity** is when an electric current runs through a machine the wrong way. **odwrócona polaryzacja**

rheostat [N-COUNT-U12] A **rheostat** is a pot with a wiper and a single lead connecting to the resistive element. **reostat**

rise time [N-COUNT-U5] The **rise time** is the amount of time it takes for the transition to rise from ten percent to ninety percent of its final height. **czas narastania**

rotary [ADJ-U12] If something is **rotary**, it can be rotated around an axis. **obrotowy**

sawtooth wave [N-COUNT-U5] A **sawtooth wave** is a type of wave that forms a pattern like that found on the blade of a saw. **fala piłokształtna**

scramble [V-T-U3] To **scramble** is to jumble or distort something. **poprzestawiać, pomieszać**

series pass transistor [N-COUNT-U15] A **series pass transistor** converts inbound voltage into a lower constant voltage. **tranzystor szeregowy**

shaft [N-COUNT-U12] A **shaft** is a straight rod that is typically used to transmit motion and torque. **wał**

short circuit [N-COUNT-U4] A **short circuit** is when current skips over part of the circuit and travels straight to the other end of the power source. **zwarcie**

shorted [ADJ-U4] If something is **shorted**, it causes current to skip over part of a circuit and travel to the other end of the power source. **zwarty**

shut down [PHRASAL V-U13] To **shut down** is to stop working. **wyłączyć się**

signal [N-COUNT-U5] An electronic **signal** is a signal that carries information between two pieces of electronic equipment. **sygnał**

silicon [N-UNCOUNT-U10] **Silicon** is a natural, non-metallic element that is used to make many electronic devices. **krzem**

sine wave [N-COUNT-U5] A **sine wave** is a type of smooth wave that has a pure tone. It can be used to show the strength of an alternating current. **fala sinusoidalna**

slab [N-COUNT-U7] A **slab** is a piece of stone or other hard material that is flat and usually thick. **płyta (np. kamienna)**

slice [N-COUNT-U7] A **slice** is a flat piece of material cut from a larger piece of that material. **plaster (odcięta część większej całości)**

slow-blow fuse [N-COUNT-U9] A **slow-blow fuse** demands a high start-up current and has a time-delay. **bezpiecznik wolny**

small scale integrated chip (SSI) [N-COUNT-U10] A **small scale integrated chip (SSI)** is a chip that contains only a few semiconductors. **układ scalony małej skali integracji**

source [N-COUNT-U14] A **source** does the same job as an emitter. It is the part of a transistor where charge-carrying holes originate. **tranzystorowe źródło prądowe**

spring [N-COUNT-U9] A **spring** is a strip of steel that recovers its shape when compressed. **sprężyna**

square wave [N-COUNT-U5] A **square wave** is a type of wave made by repeatedly and quickly turning a signal all the way on and then all the way off. **fala kwadratowa**

stage [N-COUNT-U4] A **stage** is a part of an electronics product that does one job. **część urządzenia wykonująca dane zadanie**

substrate [N-COUNT-U12] A **substrate** is a base layer supporting a circuit. **podłoże (obwodu)**

sudden [ADJ-U2] If an action is **sudden**, it happens very quickly. **nagły**

surface-mount [N-COUNT-U9] A **surface-mount** fuse attaches to the flat surface of an object. **bezpiecznik do montażu powierzchniowego**

switch [N-COUNT-U13] A **switch** is a device used to allow or prevent the passage of current. **przełącznik**

switching regulator [N-COUNT-U15] A **switching regulator** controls outgoing voltage that occurs from a less stable inbound voltage. It is more diverse than a linear regulator, and is better quality. **regulator impulsowy**

tantalum capacitor [N-COUNT-U6] A **tantalum capacitor** uses ceramic as its insulator, has a small range, and performs filtering and bypass functions in the presence of high frequencies. **kondensator tantalowy**

tap [V-T-U3] To **tap** is to hit something lightly with a finger. **stukać (np. palcem)**

terminal [N-COUNT-U12] A **terminal** is a point where a conductor from an electrical device connects to external circuits. **końcówka, zacisk, przyłącze**

throw [N-COUNT-U13] A **throw** is a position that a switch can be in. **pozycja przełącznika**

transistor [N-COUNT-U10] A **transistor** is a semiconductor used in electronics to function as a signal enhancer or a switch. **tranzystor**

trimmer capacitor [N-COUNT-U6] A **trimmer capacitor** is a capacitor with a rotating plate and a fixed insulator that performs frequency adjustments for tuned circuits and oscillators. **kondensator trymer**

trimpot [N-COUNT-U12] A **trimpot** is a small linear taper pot used to perform internal circuit adjustments such as in power supply. **potencjometr trymer**

unconnected [ADJ-U13] If something is **unconnected**, it is not linked to a system. **rozłączony, niepołączony**

valve [N-COUNT-U8] A **valve** is a device that controls the flow of something. **zawór**

variety [N-COUNT-U13] A **variety** is a group or amount of people or objects that are all different. **różnorodność**

vibrate [V-I-U7] To **vibrate** is to shake back and forth in regular movements that are short and quick. **wibrować**

voltage regulator [N-COUNT-U15] A **voltage regulator** compensates for excess and spare voltage by dispersing it evenly. **regulator napięcia**

warm up [PHRASAL V-U3] To **warm up** a machine is to run it until it is at the right temperature to work properly. **rozgrzać (urządzenie)**

waveform [N-COUNT-U5] A **waveform** is a signal, as shown on a graph. **fala**

wear out [PHRASAL V-U1] If something **wears out**, it is used so much that eventually it doesn't work as well, or it stops working. **zużywać się**

wiper [N-COUNT-U12] A **wiper** is a movable metal contact that touches the resistive element. When it is turned it increases resistance relative to one outer lead, while decreasing it relative to the other. **szczotka**

wire [V-T-U4] To **wire** something is to link together long, thin threads of metal inside a piece of electrical equipment. **okablować**

wire-wound resistor [N-COUNT-U11] A **wire-wound resistor** is a type of resistor with a wire coiled around it, that can dissipate more heat than a carbon composition resistor, but is not suitable for a high-frequency circuit, as they have some inductance. **rezystor drutowy**

zener diode [N-COUNT-U15] A **zener diode** allows a current to move forward as well as backward when the voltage is higher than a certain value. **dioda Zenera**