

# Electronics I Glossary

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**Abstract**—This glossary contains definitions of useful terms in electronics. Please note that all terms are numbered except for the 26 NATO phonetic alphabet terms, which should be included in the total number of words.

## A LPHA

### Active Region

The area of a transistor I-V curve where current no longer increases with an increased voltage. Power is dissipating, quiescence achieved

#### 2) Anode

A negatively polarized electrode, pin, or terminal.

#### 3) Astable Multivibrator

A positive feedback device that utilizes hysteresis and transient response to generate a tuneable square wave from a DC input.

## B RAVO

#### 4) Bandpass Filter

A type of electronic filter that allows a selected range of frequencies to pass through.

#### 5) Bandreject Filter

Like a flipped over bandpass filter. Only blocks a selected range of frequencies from passing through.

#### 6) Bandwidth

The size of a defined range of frequencies.

#### 7) Base

The terminal of a bipolar junction transistor that controls the open and closed switch behavior.

#### 8) Biasing

#### 9) Bipolar

When + and - references are used at the rails. There is a common ground.

#### 10) Bipolar Junction Transistor

A type of semiconducting transistor.

#### 11) Biquad

#### 12) Bode Plot

A logarithmic scale graph showing gain vs. frequency.

#### 13) Brain Box

A colloquial term for an Engine Control Module (ECM).

#### 14) Buffer

A type of circuit isolator, i.e unity gain follower

#### 15) Bulk Capacitor

#### 16) Bypass Capacitor

A Bypass Capacitor is a capacitance that shorts AC signals to ground, so that any AC noise that may be present on a DC signal is removed, producing a much cleaner and pure DC signal. Usually about  $0.1\mu F$

## C HARLIE

#### 17) C

The speed of light  $3 \times 10^8 m/s$

#### 18) Capacitor

A passive transient linear device that stores energy in an electric field.

#### 19) Cathode

A positively polarize electrode, pin, or terminal

#### 20) Center Tap Transformer

A tranformer that with a central common terminal: offering a positive and negative voltage on either side with equal magnitude.

#### 21) Clamp Diodes

A diode that is used to force a voltage on the anode.

#### 22) Collector

The positive terminal of a BJT.

#### 23) Common Mode Rejection Ratio (CMRR)

$$CMRR = 20 \log_{10} \left( \frac{A_d}{A_{cm}} \right)$$

#### 24) Common Path

A shared (common) ground reference.

#### 25) Cut-off

The area of a transistor I-V curve where there is no current

## D ELTA

#### 26) DC Restorer

#### 27) Denormalization

## 28) Dielectric

A material that increases the affect of an electric field: often used to increase capacitance. Typically denoted by a  $\kappa$

## 29) Differential Amplifier

## 30) Diode

A semiconducting device that allows current to travel in only one direction.

## 31) Distributed Parameter

A component with properties along a length or area rather than localized at a point. Must be used to model a component when the component is not much smaller than one wavelength.

## 32) Drain

The terminal of a MOSFET where current flows out towards the common path.

**E** CHO

## 33) Electromagnetic Interference EMI

Also called radio-frequency interference (RFI) when in the radio frequency spectrum, is a disturbance generated by an external source that affects an electrical circuit by electromagnetic induction, electrostatic coupling, conduction, or radiation.

## 34) Electrolytic Capacitor

A type of polarized capacitor that uses an electrolyte and oxide layer to increase the dielectric constant.

## 35) Electronic Design Automation (EDA)

Specialized software used to design and simulate electronic devices

## 36) Emitter

The negative terminal of a BJT.

## 37) Energy Assurance Plan (EAP)

**F** OXTROT

## 38) Semiconductor Fabrication Plant (Fab)

A high-tech factory where semiconductor devices are manufactured.

## 39) Farad

The base SI unit for capacitance.

## 40) Filter

A circuit that only allows certain frequencies through.

## 41) Forward Voltage

The voltage at which a semiconducting device begins to conduct.

## 42) Fudge Factor

An extra term added to an equation

## 43) Full Wave Rectifier

A device that restricts the output voltage to one pole and inverts the sign of the opposite pole.

**G** OLF

## 44) Gain

A logarithmic measure of amplification.

45) Gate-to-source Voltage ( $V_{GS}$ )

The voltage between the gate and the source of a MOSFET, responsible for controlling the switch state.

## 46) General Interconnect

A way

## 47) Giga-

The metric prefix meaning one billion ( $10^9$ ) times the base unit.

**H** OTEL

## 48) Half Wave Rectifier

A device that restricts the output voltage to one pole.

## 49) High side switch

A type of switch where the switching device is between the supply and the rest of the circuit.

## 50) Hysteresis

Non-symmetric switching behavior of a circuit; the point of switching on is different from the point of switching off.

**I** NDIA

## 51) IGBTs

## 52) Interconnect

## 53) Interconnect Shielding

**J** ULIET**K** ILO

## 54) Kelvin Leads

A clip, often a crocodile clip, that connects a force-and-sense pair to measure very low resistances

using four-terminal sensing.

- 55) Kilo-  
The metric prefix meaning one thousand ( $10^3$ ) times the base unit.

## L IMA

- 56) Length of Channel (L)  
The length of a MOSFET channel; the dimension spanning the source and drain.
- 57) Low pass filter  
A type of AC filter that eliminates high frequencies.
- 58) Low side switch  
A type of switch where the switching device is placed between the main circuit and the common path.
- 59) Lumped Parameter

## M IKE

- 60) Mega-  
The metric prefix meaning one million ( $10^6$ ) times the base unit.
- 61) Memristor
- 62) Metal Oxide Varistor
- 63) Micro-  
The metric prefix meaning one millionth ( $10^{-6}$ ) of the base unit.
- 64) Milli-  
The metric prefix meaning one thousandth ( $10^{-3}$ ) of the base unit.
- 65) MOSFET  
Metal Oxide Semiconducting Field Effect Transistor. Voltage ( $V_{GS}$ ) controls the current ( $I_D$ ).

## N OVEMBER

- 66) Nano-  
The metric prefix meaning one billionth ( $10^{-9}$ ) of the base unit.
- 67) Negative Feedback
- 68) Normalized response

## O SCAR

- 69) Omega ( $\omega$ )  
Symbol indicating angular frequency
- 70) Operational Amplifier (Op-Amp)  
An active device that enables isolation, comparison, and amplification.
- 71) Over Voltage ( $V_O$ )  
When  $V_{GS} - V_t > 0$ .
- 72) Oxide Capacitance ( $C_{OX}$ )  
The capacitance of the oxide layer of a MOSFET.
- 73) Oxide Thickness ( $t_{OX}$ )  
The thickness of the oxide layer of a MOSFET.

## P APA

- 74) Pico-  
The metric prefix meaning one trillionth ( $10^{-12}$ ) of the base unit.
- 75) Positive Feedback  
In the context of an operational amplifier, it implies some kind of connection from the output terminal to the non-inverting input.
- 76) Power Supply  
A nonlinear circuit that can reliably supply a specific voltage or specific current.
- 77) Power Supply Distribution

## Q UEBEC

- 78) Quiescent  
When a device is dissipating power without a signal input.

## R OMEO

- 79) Rectification  
Forcing polarity on a signal.
- 80) Resistor  
A purely resistive linear device with no transient properties.
- 81) Rheostat  
A type of variable resistor used to control power.

## S IERRA

- 82) Sallen-Key LPF Circuit  
A 2-pole circuit with a non-inverting amplifier.

83) Saturation (for BJTs)  
The regime of operation for BJTs where increasing  $V_{BE}$  increases  $I_C$ .

84) Saturation (for MOSFETs)  
The regime of operation for MOSFETs where  $V_{GS}$  is positive and increasing  $V_{DS}$  does not affect  $I_D$

85) Shielding  
A piece of metal, wrapped around a wire or electronic device used to minimize EMI noise and radiation.

86) Summing Amplifier  
A type of amplifier that adds voltages: can be inverting or non-inverting

87) Schottky Diode  
A low forward voltage, high switching speed, high reverse leakage current diode.

## TANGO

88) Temperature (T)

89) Thermal Model Electronics  
A way to model the thermal behavior of electronic devices using circuit schematic symbols.

90) Threshold Voltage ( $V_t$ )  
The minimum  $V_{GS}$  required to turn a MOSFET on.

91) Transformer  
An inducting device that can step up or step down AC voltage while having little power loss.

92) Transistor  
A three terminal, active, semiconducting device that acts as an electronic switch.

93) Triaxial Cable  
A cable with three concentric conductors used to minimize EMI.

94) Triode  
The operating regime of a MOSFET where increasing  $V_{DS}$  increases  $I_D$ .

95) Twisted pair  
Two wires wrapped around one another to minimize loop area, thereby decreasing EMI.

## U NIFORM

96) Unipolar  
Simply a voltage and ground as references. As opposed to Bipolar with + and - reference voltages.

## V ICTOR

97) V-I Response  
A visual comparison of the voltage and current response of an electronic device.

98) Virtual Ground  
A voltage that is very close to ground caused by amplifier feedback.

## W HISKEY

99) Width of Channel (W)  
The width of a MOSFET channel.

## X -RAY

## Y ANKEE

## Z ULU

100) Zener Diode  
A special type of diode with a set reverse breakdown voltage.

101) Zener Regulator  
A type of power regulator that clamps voltage using a Zener Diode.