

**MODERN
DICTIONARY
of
ELECTRONICS**

SEVENTH EDITION

REVISED AND UPDATED

Rudolf F. Graf



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maximum permeability—The highest permeability reached as induction or magnetization is increased.

maximum power transfer theorem—The maximum power will be absorbed by one network from another joined to it at two terminals, when the impedance of the receiving network is varied, if the impedances (looking into the two networks at the junction) are conjugates of each other.

maximum record level—In direct recording, the amount of record-head current required to produce 3-percent third-harmonic distortion of the reproduced signal at the record-level set frequency. Such distortion must result from magnetic-tape saturation, not from electronic circuitry.

maximum response speed—The maximum pulse frequency that can be applied to a stepper motor at random and result in synchronized steps. The motor must not miss in step while operating within this range.

maximum retention time—The maximum time interval between writing into a storage element of a charge storage tube and reading an acceptable output.

maximum saturation—The highest value of saturation possible for a specified hue.

maximum sensitivity—The smallest signal input that produces a specified output.

maximum signal level—In an amplitude-modulated system, the level corresponding to copy black or copy white—whichever has the higher amplitude.

maximum sound pressure—For any given cycle of a periodic wave, the maximum absolute value of the instantaneous sound pressure. The most common unit is the microbar.

maximum storage time—In a storage tube, the length of time after writing during which an acceptable output can be read. *See also* maximum usable viewing time.

maximum system deviation—In a frequency-modulation system, the greatest permissible deviation in frequency.

maximum torque—*See* pull-out torque.

maximum undistorted output—Also called maximum useful output. The maximum power an amplifier can deliver without producing excessive harmonics.

maximum usable frequency—Abbreviated MUF. 1. In radio transmission by ionospheric reflection, the highest frequency that can be transmitted by reflection from regular ionized layers. 2. The highest frequency at which the ionosphere reflects signals to earth. Any signals of higher frequency than the MUF penetrate the ionosphere and enter space.

maximum usable viewing time—Also called maximum storage time. The length of time during which the visible output of a storage tube can be viewed, without rewriting, before a specified decay occurs.

maximum useful output—*See* maximum undistorted output.

maximum working voltage—The maximum voltage stress (dc or ac) that may be applied to a component under specified conditions of use.

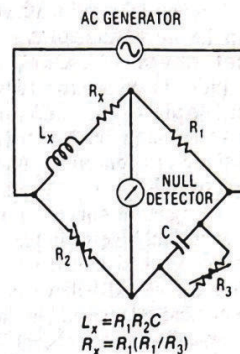
maximum writing rate—The maximum spot speed that produces a line of specified density on a photographic negative or on the screen of a cathode-ray tube.

maxterm form—A function expanded into a product of sums, such as $(A + B)(C - D)(E + F)$.

maxwell—The cgs electromagnetic unit of magnetic flux, equal to 1 gauss per square centimeter, or one magnetic line of force.

Maxwell bridge—A four-arm ac bridge normally used for measuring inductance in terms of resistance and capacitance (or capacitance in terms of resistance

and inductance). One arm has an inductor in series with a resistor, and the opposite arm has a capacitor in parallel with a resistor. The other two arms normally are nonreactive resistors. The balance is independent of frequency.



Maxwell bridge.

Maxwell inductance bridge—A four-arm ac bridge for comparing inductances. Two adjacent arms have inductors, and the other two arms usually have nonreactive resistors. The balance is independent of frequency.

Maxwell mutual-inductance bridge—A four-arm ac bridge for measuring mutual inductance in terms of self-inductance. Mutual inductance is present between the supply circuit and the arm that includes one coil of the mutual inductor. The other three arms normally are nonreactive resistors. The balance is independent of frequency.

Maxwell's equations—Fundamental equations, developed by J. C. Maxwell, for expressing radiation mathematically and describing the condition at any point under the influence of varying electric and magnetic fields.

Maxwell's law—A movable portion of a circuit will always travel in the direction that gives maximum flux linkages through the circuit.

Maxwell triangle—A graph that defines the chromaticity values of a color in terms of three coordinates.

maxwell-turn—A unit of magnetic linkage equal to one magnetic line of force passing through one turn of a circuit.

mayday—International distress call for radiotelephone communication. It is derived from the French *m'aidez*, meaning "help me."

Mbps—Millions of bits per second (bps).

mc—Abbreviation for megacycle—an obsolete term superseded by MHz (megahertz).

MCM—1. Abbreviation for multichip module. An electronic package containing several chips on a single substrate. 2. *See* Monte Carlo method.

McNally tube—A velocity-modulated vacuum tube that produces low-power UHF oscillations. It is used as a local oscillator in some radar receivers.

MCW—Abbreviation for modulated continuous wave.

MD—Abbreviation for mini-disc.

m-derived filter—A type of constant-k filter in which the constant-k elements are multiplied by the factor m or a function of m . Generally, the m-derived filter has more elements and provides sharper cutoff and more uniform attenuation in the pass region. It may provide high-pass, low-pass, bandpass, or band-stop filtering action.

viscosimeter—See viscometer.

viscosity—1. The frictional resistance offered by one part or layer of a liquid as it moves past an adjacent part or layer of the same liquid. 2. The property of a liquid that resists internal flow; measured in units of poise or centipoise. Low-viscosity materials are usually thin, while high-viscosity materials are thick.

viscous and magnetic damping—Damping by virtue of the viscosity of a fluid around the sensing element or of a magnetic field.

viscous-dampened arm—A phonograph pickup arm mounted on a liquid cushion of oil, which provides high damping to eliminate arm resonances. It also protects the record groove and stylus; the arm does not fall on the record when dropped, but floats down gently.

visibility factor—Also called display loss. Ratio of the minimum input-signal power detectable by ideal instruments connected to the output of a receiver to the minimum signal power detectable by a human operator through a display connected to the same receiver. The visibility factor may include the scanning loss.

visible emission—Also called visible light. Radiation that is characterized by wavelengths of about 0.38 to 0.77 micrometer.

visible light—Electromagnetic wavelengths that can be seen by the human eye, ranging from 380 to 770 nanometers.

visible radiation—Radiation with wavelengths ranging from about 0.4 and 0.7 micrometer, corresponding to the visible spectrum of light.

visible spectrum—That region of the electromagnetic spectrum to which the retina is sensitive and by which the eye sees. It extends from about 400 to about 750 nanometers in wavelengths of the radiation.

vision—The series of processes in which luminous energy incident on the eye is perceived and evaluated.

visual-aural range—Abbreviated VAR. A special type of VHF range providing a pair of radial lines of position that are reciprocal in bearing and are displayed to the pilot on a zero-center, left-right indicator. This facility also provides a pair of reciprocal radial lines of position located 90° from the above visually indicated lines. These are presented to the pilot as aural A-N radio-range signals, which provide a means for differentiating between the two visually indicated lines (and vice versa).

visual carrier frequency—The frequency of the television carrier that is modulated by the picture information.

visual communication—Communication by optical signs such as flags and lights.

visualization—Graphic representation of abstract data usually relayed in text and numbers.

visual radio range—Abbreviated VRR. A radio range whose course is followed by means of visual instruments.

visual scanner—1. A device that generates an analog or digital signal by optically scanning printed or written data. 2. See scanner, 2.

visual signal device—A pilot light, annunciator, or other device that provides a visual indication of the condition of the circuit or system being supervised.

visual storage tube—An electron tube that stores and visually displays information by means of a cathode-ray beam scanning and charge storage mechanism.

visual telephony—The transmission of picture information (television) by means of telephone lines.

visual transmitter—Also called a picture transmitter. In television, the radio equipment for transmission of the picture signals only.

visual transmitter power—The peak power output during transmission of a standard television signal.

vitreous—1. Having the nature of glass. 2. A term used in ceramic technology to indicate fired characteristics approaching being glassy, but not necessarily totally glassy.

vitreous binder—A glassy material used in compounds to bind other particles together. This takes place after melting the glass and cooling.

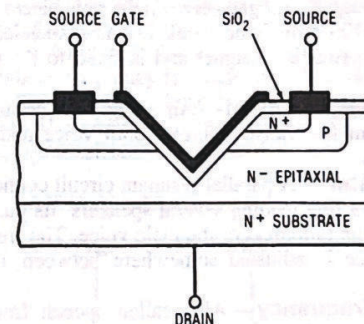
vitrification—1. The progressive reduction in porosity of a ceramic material as a result of heat treatment or some other process. 2. The reduction of porosity in a ceramic product through the formation of a glassy bond.

VLF—Abbreviation for very low frequency.

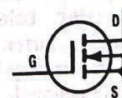
VLSI—Abbreviation for very large-scale integration. Generally considered to be an IC with more than 1000 gates.

VLSI circuit—Abbreviation for very large-scale integrated circuit. See gate array, 3.

VMOS—1. Abbreviation for V-groove metal-oxide silicon—a variation of MOS technology. A manufacturing process (called isotropically etched double-diffusion MOS process) based on the technique of using V-shaped grooves in the silicon wafer to provide a third-dimensional surface. This allows for a smaller chip geometry than the (older) process using a two-dimensional area technique of manufacture. With smaller geometry, the same diameter wafer can, theoretically, yield more chips (roughly 50 percent more) and thereby reduce the unit cost per chip considerably. The cost of processing a wafer generally remains constant no matter how many chips it contains. 2. Abbreviation for vertical MOS. A semiconductor device in which current travels vertically in the semiconductor chip. A cross section shows a four-layer diffusion consisting of n+ at the top (source), p as the channel, n- as the drift region, and n+ as the drain. The layers' dimensions are precisely controlled by diffusion processes. Unlike conventional bipolar transistors, VMOS devices exhibit high density because of their short channel spacing: 1 μm compared with bipolar devices typical 5 μm .



Structure.



Symbol.

VMOS transistor.