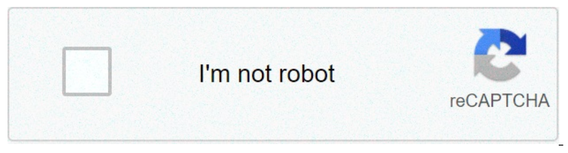

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1. Introduction of electronic components -Deepra Goswami 2. Electronic components: electronic component is essential fundamental block of any electronic system used to influence electrons and their associated fields. Each component can have one or more basic properties and behaves accordingly. 3. Classification of active electronic components 4. Components The active components are those that conducted on the supply of certain external energy requires electricity to operate. Power supply usually inject in the circuit. The examples Ã ¢ diodes, transisters, ci, transformer etc 5. Diodes Ã˜ diode is a valve one for electricity. I is a two-end semiconductor device, these two terminals are called anode and cathode. Ã˜ allows electricity to flow into one direction. 6. Most diodes have painted line on one side indicating the direction or flow. The negative side is normally white Ã˜ power flow through the diode only when the positive voltage applied to the anode and negative voltage is connected to the cathode I if these voltages are inverted, so the current does not scroll. 7. V-i Diode Characterstics 8. Various types of diode 9. Light Emitting diode (LED) This is one of the most used diodes in our daily life. This is also a normal PN junction diode except instead of silicone and germanium, the materials like gallium arsenide, gallium phosphuro arsenide used in the building. 10. LED structure 11. LED operating principle I Like a normal PN junction diode, this is connected in a polarization condition forward so that the diode behaviors. It is the conduction takes place in a LED when free electrons in the conduction band combine with holes in the valence band. This recombination process emits light. This process is called as electrolyuminescence. 12. The color of the emitted light depends on the distance between the energy bands. Ã˜ The materials used also due to the effect of colors such as Gallio's phosphuro arsenide emits both red or yellow, emits red or green gallium phosphide and gallium nitrate emits blue light. Considering Gallium Arsenyuro emits infrared light. Ã˜ LEDs for non-visible infrared light are used especially in the remote controls. 13. A transistor a transistor is a semiconductor device 3 three terminal in which a voltage is applied to one of the terminals (called base) can control current flowing through the other two terminals (called collector and basic). Ã˜ These 3 terminals are called emitter, base and collector 14. It is a fundamental element of circuitry in mobile phones, computers and many other electronic devices. Ã˜ transistor has a very fast answer and is used in various functions including voltage, amplification, switching adjustments, oscillators etc. I transistors can be packed individually or can be a part of an IC (integrated circuit). I For some of the ICs have billions of very small IA transistors. 15. Types of NPN transistors Ã˜: When a type P semiconductor is sandwitched between two type N semiconductors, then NPN is called. Good charging carriers are electrons. Ã˜ PNP: When a semiconductor of type N is sandwitched between two type P semiconductors, then it is called NPN. Good charging carriers are holes. 16. Transistor effect field (FET) Ã˜ FET is a transistor using an electric field to control the electrical behavior of the device. Ã˜ Fet are also known as unipolar transistors as they carry out single-loading type. I The appliance consists of an active channel through which vectors, electrons or holes are applied flows from the source to drain. Ã˜ channel conductivity is the function of the potential applied to of Gate and Source. 17. Feta S 3 clamps are: 1. Source (s), through which the vectors enter the channel. Conventionally, the current entering the channel is designed by is. 2. Exhaust (D), through which the vectors leave the channel. Conventionally, the current current The drain is designated by ID. Exhaust voltage to voltage is VDS. 3. Port (g), the terminal that modulates the conductivity of the channel. Applying the voltage to G you can check ID. 18. TYPES OF FETS Ã˜,> JFET: JUDCONTI effect effect transistor effect Ã˜,> MOSFET: MOSFET Assidio Metalde Trassistore Effector Metal Assocer Player Effect Effect Trassistore Ã˜,> MNOS: Nitride Oxide Semiconductor Transistor Metallic Ã˜,> DGMOSFET: Dual Gate Mosfet Ã˜,> Modfet: Modulation Doped Fet Ã˜,> TFET: Transistor Tranze effect field effect etc. 19. MOSFET Ã˜,> MOSFET STANDS for metal oxide bell silicon bell transistor or metallic semiconductor field field transistor. Ã˜,> This is also called as a field effect transistor with IGFet Isolated meaning. Ã˜,> The FET is managed both in exhaustion and improvement mode. 20. Ã˜,> The following figure shows how a practical musfet appears. 21. MOSFET construction Ã˜,> The construction of a MOSFET is a bit similar to the JFet. Ã˜,> A layer of oxide is deposited on the substrate to which the gate terminal is connected. This oxide layer acts as an insulator (SiO2 island from the substrate), and therefore the Mosfet has another name as Igfet (insulated gate). Ã˜,> With bias voltage of the negative gate, it acts as exhaustion MOSFET while with the BIAS voltage of the positive gate acts as an improvement mosfet. 22. Ã˜,> The following figure shows the construction of a MOSFET. 23. Ã˜,> The voltage at the gate controls the operation of the MOSFET. In this case, both positive and negative tensions can be applied to the gate as it is isolated from the channel. Ã˜,> In the construction of the Mosfet, a slightly drugged substrate is widespread with a strongly drugged region. Depending on the substrate used, they are called as P-Type and N. 24 MOSFETs. Classification of MOSFET Ã˜,> depending on the type of materials used in the construction and type of operation, MOSFETs are classified as in the following figure . 25. Ã˜,> Let's consider a channel MOSFET N to understand its operation. A slightly drug-type S substrate is taken on the basis of which two regions of the NPED drug addicts are spread, which act as a source and discharge. Ã˜,> between these two N + regions, the diffusion occurs to form a channel N, which connects the discharge and the source. Ã˜,> a thin layer of silicon dioxide (SiO2) is cultivated throughout the surface and the holes are made to draw ohmic contacts for the exhaust and source terminals. N-MOSFET 26. N-MOSFET structure 27. Ã˜,> a layer of aluminum conduction is laid on the whole channel, on this si2layer from the source to be downloaded which constitutes the gate. The SiO2 substrate is connected to the common or ground terminals. Ã˜,> Due to its construction, the MOSFET has a much less chip area of the BJT, which is 5% of the occupation with respect to the bipolar junction transistor. This device can be used in mode. They are exhaustion and improvement methods. 28. Working of the channel N - channel (exhaustion mode) MOSFET Ã˜,> For now, we have an idea that there is no PN junction between gate and channel in this, unlike a fet. 29. Ã˜,> We can also observe this, the diffused channel N (between two N + + regions), the insulating dielectric SIO2 and the metallic gate metallic layer together form a parallel plate condenser. Ã˜,> If NMos should be processed in exhaustion mode, the gate terminal must be a negative potential while discharge is positive. Ã˜,> When no voltage between gate and source is applied, some current flows due to tension between drainage and source. Let a negative voltage is applied to VGG. Then the minority vectors I.E. The holes are attracted and satisfy A SiO2 layer. But majority carriers, I.E., electrons are rejected. 30. Ã˜,> With a certain quantity of negative potential to VGG a certain amount of current discharge ID flows through the source to be drained. Ã˜,> When this negative potential is further increased, the electrons are exhausted and the current ID decreases. So the most negative is applied VGG, the minor will be the value of the current discharge ID. Ã˜,> the channel channel exhaust becomes more depleted relative to the source (as in FET) and the current flow decreases due to this effect. So it is called as depletion mode MOSFET. 31. Work N - Channel (Enhancement mode) MOSFET Even the MOSFET can be worked in enhancement mode, if we can change the polarity of the voltage VGG. Then, consider the MOSFET with gate voltage VGG source being positive, as shown in the following figure. 32. When voltage is not applied between gate and source, some current flows due to the voltage between drain and source. I leave some positive voltage is applied VGG. Then the minority carriers ie holes, are rejected and the majority carriers ie electrons get attracted towards the SiO2 layer. i with a certain amount of positive potential VGG to a certain amount of drain current ID passes through the exhaust source. i When this positive potential further increases, the current ID increases due to the flow of electrons from source and these are pushed further due to the voltage applied to the VGG. To here the more positive of the VGG applied, the more the value of the drain current ID will be. A The current flow is improved due to increased electron flow better than in the depletion mode. So this mode is referred to as Advanced mode MOSFET. 33. Hence the more positive of the VGG applied, the more the value of the drain current ID will be. A The current flow is improved due to increased electron flow better than in the depletion mode. So this mode is referred to as Advanced mode MOSFET. 34. The P-MOSFET The construction and working of a PMOS is same NMOS. A lightly doped n-substrate is held which two heavily doped P + regions are diffused. To these two P + regions act as source and drain. A thin SiO2 layer is grown on the surface. Â holes are cut through this layer to come into contact with the P + regions, as shown in the following figure. 35. STRUCTURE OF P-MOSFET 36. The drain characteristics of a MOSFET are drawn between the drain current and voltage VDS Drain source ID. The characteristic curve is as shown below for different input values. Characterstics DISCHARGE 37. Features transferring define the variation of the VDS value with the change of ID and VGS in both depletion mode and enhancement. The under transfer characteristic curve is drawn for the drain current with respect to the gate voltage source. Characterstics TRANSFER 38. OP-AMP (IC-741) The An operational amplifier is an amplifier directly coupled high-gain. A offers the gain of the order of 106. Op-Amp IC-741 output + VCC -Vee inverting input inverting input - + 39. An operational amplifier is provided as a single integrated circuit package. The there are 8 pins in it, pins 7 are active, 4 pins are for excitation / input, 1 is not used here called IC-741. Â usually consists of one or more differential amplifiers and followed by a level shifter and an output stage. i It is a versatile device that a DC amplifying nonchÃ © AC. PIN SCHEME 40. IDEAL OP-AMP characterstics à infinite voltage gain. The Infinite input resistance so that almost any signal source can drive it and there's no load on the previous stage. output resistance to zero so that the output can drive an infinite number of other devices. The band Infinite so that any frequency signal from 0 Hz to A can be amplified without attenuation. To infinite CMRR so that the common mode output noise voltage is equal to zero. To Infinite slew rate so that the output voltage changes occur simultaneously with input voltage variations. 41. Equivalent circuit of Op-Amp For Vo = (V1-V2) = I amplifies ADVD The difference between the two entry voltages. It does not amplify the entry same voltages. The polarity of the output voltage depends on the polarity of the voltage difference vd. 42. Ideal transfer voltage characteristics 43. Internal circuit of the op-amp intermediate stage input and internship level of output stage output stage non-inverting phase i / p inverting i / p P dual dual Differential Differential Amplifier O / P Dual I / P Differential Differential Amplifier Amplifier / P / P / P / P Differential Amplifier Emitter Using the Dual I / P Constant Current Source Balanced Differential Amplifier O / P 44. Continue .... Ã˜,> The input stage is the double entry output differential amplifier. This phase generally offers most of the amplifier voltage gain and also establishes the UP-AMP input resistance. Ã˜,> The intermediate stage is usually another differential amplifier, driven by the exit of the first phase. On most amplifiers, the intermediate stage is dual input, unbalanced output. Ã˜,> due to direct coupling, the DC voltage at the intermediate stage exit is well above the ground potential. Therefore, the translator (shift) circuit of the level is used after the intermediate phase down to zero volt compared to the ground. Ã˜,> The final phase is usually a phase of output of the supplementary push symmetry amplifier. The output stage increases the voltage oscillation and raises the UP-Amp ground supply functionality. Ã˜,> a well-designed output phase also provides low resistance to output. 45. Applications Ã˜,> was originally designed for the calculation of these mathematical functions as added, subtraction, multiplication and integration. Ã˜,> So the name of the operating amplifier derives from its original use for these mathematical operations and is shortened to the UP-AMP. Ã˜,> With the addition of suitable external feedback components, the modern OP-AMP day can be used for a variety of applications, such as the amplification of the AC and DC signal, active filters, oscillators, comparators, Regulators and others. 46. â € In many industrial and consumer applications, measurement and control of physical conditions are very important. Ã˜,> for E.G. Temperature and humidity measurements within a dairy product or meat system allow the operator to make the necessary changes to maintain product quality. Ã˜,> Similarly, the precise control of the temperature of the plastic oven is necessary to produce a particular type of plastic. 47. Diagram of the Apmlifier instrumentation circuit 48. Input stage of the intermediate application and internal stage stage phase quantity of the transducer + indicator of the preamplifier instrumentation and automatic line of the Transmission or / P 49 process controller. Continue. .. Ã˜,> Some transducers produce outputs with sufficient strength to perform their use directly, many do not. Ã˜,> To amplify the low-level output signal of the transducer so that it can drive the indicator or display both the main function of the instrumentation amplifier. Ã˜,> The instrumentation amplifier is intended for precise and low-level amplification of low level in which low thermal drifts and times, high input resistance and accurate accurate cycle gain are required. Furthermore, low energy consumption, a high rejection ratio in common mode and a high frequency is desirable for superior performance. 50. Timer (IC-555) Ã˜,> IC 555 was introduced in 1970 by Signatics Corporation. Ã˜,> is used for the generation of square wave (asymmetrical and symmetrical), tooth saw, and various other applications such as distant, monostable and bistable multibrator. Ã˜,> The more versatile linear integrated circuits are the timer 555. 51. Ã˜,> 555 is a monolithic timing circuit that can produce precise and highly stable delays or oscillation. Ã˜,> the device is available as one 8-pin metal, a 8-pin mini dip. Ã˜,> The timer works fundamentally in one of the two modes: monostable multi-binder (one-shot) or as a real-way multivibrator (in free execution). Ã˜,> The important features of the timer 555 are these: it works on a power supply voltage from +5 to + 18 V in both modes with both free-coounking modes (available) and one-shot (monostable); Has a cycle of adjustable duties; The timing comes from microseconds through hours; It has a high current output; It can found or sink 200 but. Ã˜,> a sample of Applications include mono-stable and abstract multiBrators, DC-DC converters, digital logical probes, waveform generators, analogue frequency meters and speedometers, temperature measurement and control, infrared transmitters, thief and toxic gas alarms, Voltage regulators, electric eyes and many others. 52. PIN Diagram 53. Functional block diagram of the 555 Timer 2/3 VCC 1/3 VCC 54. Description PIN and operation Ã˜,> PIN 1: Land All voltages are measured compared to this terminal. Ã˜,> PIN 2: Trigger The timer output depends on the width of the external trigger pulse applied to this pin. The output is low if the voltage to this pin is greater than 2/3 Vcc. However, when a negative width pulse greater than 1/3 Vdc to this pin is applied, the 2 output comparator is low, which in turn interrupts the high timer output. The output remains high as long as the trigger terminal is kept at low voltage. 55. Ã˜,> PIN 3: Exit There are two ways in which a load can be connected to the output terminal: between PIN 3 and Earth (pin 1) or between PIN 3 and supply voltage + VCC (pin 8). When the output is low, the load current flows through the load connected between PIN 3 and + VCC in the terminal and the sink current is called. However, the current through the fundamental load is zero when the output is low. For this reason, the load connected between PIN 3 and + VCC is normally called the load and connected between PIN 3 and the ground is called the load normally off. On the other hand, when the output is high, the current through the load connected between PIN 3And + VCC (normally on the load) is zero. However, the output terminal provides the current of the load normally off. This current is called current of origin. The maximum value of the sink or source current is 200 mA. 56. Ã˜,> pin 4: reset. The timer 555 can be restored (disabled) by applying a negative impulse to this pin. When the restore function is not in use, the reset terminal must be connected to + Vdc to avoid any possibility of fake trigger. Ã˜,> PIN 5: Control voltage An external voltage applied to this terminal changes the threshold and voltage of the trigger. In other words, imposing a tension on this pin or connecting a pot between this pin and the ground, the width of the output waveform impulse can be varied. When not used, the control pin must be bypassed to the ground with a 0.01-Î¼F condenser to avoid noise problems. 57. Ã˜,> PIN 6: threshold This is the non-inverting input terminal of the comparator 1, which monitors the voltage through the external condenser. When the voltage to this pin is the 2/3 V threshold voltage, the output of the comparator 1 is high, which in turn changes the exit of the low timer. Ã˜,> PIN 7: Exhaust This pin is internally connected to the transistor manifold, when the output is high, the transistor is off and acts as a circuit open to the external condenser C connected through it. On the other hand, when the output is low, Q1 is saturated and acts as a short circuit, the external condenser on the ground is short-circuited. Ã˜,> PIN 8: + VCC The +5 V power supply voltage A +18 is applied to this pin with respect to earth (pin 1). 58. Equivalent circuit of the 555 timer 59. Passive components Ã˜,> Passive electronic components are those that do not have the ability to control the current by another signal. Ã˜,> They start their operation once connected. Ã˜,> No external energy is needed for their operation. Ã˜,> For example, resistors, condensers, inductors, LDRs, etc. 60. Resistor Ã˜,> It is a device that resists the current flow. Ã˜,> resistors are available in varieties of resistance values (what they resist current, measured in units Ohm) and power power (how much power can manage without burning, measured in watts). 61. Resistor symbol 62. potentiometer Ã˜,> A potentiometer is a 3-terminal resistor with a sliding or rotating contact that forms an adjustable voltage divider. Ã˜,> If only two terminals are used, one end of one end The wiper, acts as variable resistance 63. Resistor dependent on light (LDR) Ã˜,> A LDR is a component that has a resistance (variable) that change with the intensity of light falling on it. Ã˜,> This allows you to be used in the light detection circuits. 64. Condenser Ã˜,> This is a device that can temporarily store an electric charge. Ã˜,> The capacitors are available in different varieties, the two most common are the ceramic and electrolytic disc. Ã˜,> The quantity of a capacitor capacity is usually measured in Micro Farads, UF. 65. Inductor Ã˜,> A inductor is also called a coil, choke or reactor, it is a passive electric component with two terminals that stores energy in the form of a magnetic field when the electric current flows through it. Ã˜,> A inductor is typically consisting of an insulating wire injury in a coil around a nucleus. 66. Condenser symbol Various types of condensers 67. Logical gates Ã˜,> Logic gates are the basic blocks of any digital system. Ã˜,> is an electronic circuit with one or more of an entrance and just an exit. Ã˜,> At any time, each terminal is in one of the two low binary conditions (0) or high (1), represented by different voltage levels. Ã˜,> The relationship between the entrance and the exit is based on a specific logic. Ã˜,> On the basis of this, there are 7 different logical doors: and, or, not, Nand, Nor, Xor, Xnor etc. 68. And Gate Ã˜,> a circuit that performs operation is shown in the figure. It has N INPUT (N> = 2) and an exit. Ã˜,> logical diagram: Ã˜,> Table of the truth: 69. O gate Ã˜,> a circuit that performs an operation is shown in the figure. It has N INPUT (N> = 2) and an exit. Ã˜,> Logic diagram: Ã˜,> Table of the truth: 70. Don't gate Ã˜,> Not Gate is also known as an inverter. It has an entrance A and a single exit Y. Ã˜,> Logical diagram: Ã˜,> Table of the truth: 71. NAND GATE Ã˜,> An operation is not known as NAND operation. It has N INPUT (N> = 2) and an exit. Ã˜,> Logical diagram: Ã˜,> Table of the truth: 72. Nor Gate Ã˜,> An operation not or operation is known as an operation. It has N INPUT (N> = 2) and an exit. Ã˜,> Logical diagram: Ã˜,> Table of the truth: 73. Xor Gate Ã˜,> Xor or ex or or exclusive-or gate is a special type of gate. It can be used in the ADDER in the ADDER complex and the subrocer. It has N INPUT (N> = 2) and an exit. Ã˜,> logic diagram: Ã˜,> Table of the truth: 74. Xnor Gate Ã˜,> Xnor or Ex- or Exclusive-Nor Gate is a special type of gate. It can be used in the ADDER in the ADDER complex and the subrocer. It has N INPUT (N> = 2) and an exit. Ã˜,> Logical diagram: Ã˜,> Table of truth: 75. DC A DC Booster DC circuit or Boost converter Ã˜,> A process that changes a DC voltage in a different DC voltage is called DC A DC conversion. Ã˜,> a boost converter is a DC to DC converter with greater output voltage of the source voltage. Ã˜,> a boost converter is sometimes called step-up converter because Ã ¢ â,¬ Ã ¢ â,¬ Ã ¢ â,¬ Ã ¢ â,¬ "replace the origin tension. Ã˜,> DC Boosters AD DCs are available as ICS that require few components and are also available as complete hybrid circuit modules, ready for use with an electronic assembly. 76. The basic DC diagram to DC Boost Converter 77. Thank you

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