Principle of lead-acid battery charging and discharging protection circuit

How a lead acid battery is charged and discharged?

There are huge chemical process is involved in Lead Acid battery's charging and discharging condition. The diluted sulfuric acid H 2 SO 4 molecules break into two parts when the acid dissolves. It will create positive ions 2H+and negative ions SO 4 -. As we told before,two electrodes are connected as plates,Anode and Cathode.

What is a lead acid battery?

A Lead Acid Battery consists of the following things,we can see it in the below image: A Lead Acid Battery consists of Plates,Separator,and Electrolyte,Hard Plastic with a hard rubber case. In the batteries,the plates are of two types,positive and negative. The positive one consists of Lead dioxide and negative one consists of Sponge Lead.

What happens when a lead-acid battery is discharged?

Figure 4 : Chemical Action During Discharge When a lead-acid battery is discharged, the electrolyte divides into H 2 and SO 4 combine with some of the oxygen that is formed on the positive plate to produce water (H 2 O), and thereby reduces the amount of acid in the electrolyte.

What are the parts of a lead acid battery?

The lead acid battery is most commonly used in the power stations and substations because it has higher cell voltage and lower cost. The various parts of the lead acid battery are shown below. The container and the platesare the main part of the lead acid battery.

How is a lead acid storage battery formed?

The lead acid storage battery is formed by dipping lead peroxide plate and sponge lead plate in dilute sulfuric acid. A load is connected externally between these plates. In diluted sulfuric acid the molecules of the acid split into positive hydrogen ions (H +) and negative sulfate ions (SO 4 - -).

What happens when a lead-acid battery is charged in the reverse direction?

As a lead-acid battery is charged in the reverse direction,the action described in the discharge is reversed. The lead sulphate (PbSO 4) is driven out and back into the electrolyte (H 2 SO 4). The return of acid to the electrolyte will reduce the sulphate in the plates and increase the specific gravity.

protection circuitry. The main advantage of Lead Acid battery is economical and simple to manufacture, Self-discharge is lowest compared to all other batteries, capable of discharging ...

This paper introduces a new method of charging and discharging and the resulted effectiveness of this method to the lead acid battery life prolongation is shown. 1. INTRODUCTION. To prolong ...

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Lead acid batteries require proper protection circuits to prevent overcharging and over-discharging, which can degrade performance and shorten the lifespan of the battery. The LM10C and BD139 transistor are two important components that can be used to design an effective and simple lead acid battery protector.

Definition: The lead acid battery which uses sponge lead and lead peroxide for the conversion of the chemical energy into electrical power, such type of battery is called a lead acid battery. The lead acid battery is most commonly used in the power stations and substations because it has higher cell voltage and lower cost. Construction of Lead ...

In this tutorial we will understand the Lead acid battery working, construction and applications, along with charging/discharging ratings, requirements and safety of Lead ...

Working of Lead Acid Battery: The battery operates by converting stored chemical energy into electrical energy through a series of electron exchanges between its lead ...

Working Principle of Lead Acid Battery. When the sulfuric acid dissolves, its molecules break up into positive hydrogen ions (2H +) and sulphate negative ions (SO 4 --) and move freely. If the two electrodes are immersed in solutions and connected to DC supply then the hydrogen ions being positively charged and moved towards the electrodes and ...

This document provides information about lead-acid batteries, including: 1. It describes the basic components and chemistry of lead-acid batteries, including electrodes, electrolyte, plates, and charging/discharging reactions. 2. It discusses different types of lead-acid batteries like flooded, VRLA, tubular, and flat plate designs. 3. It ...

However, unlike lead-acid or nickel batteries, lithium-ion batteries require precise control of the charging and discharging process. Improper charging can cause lithium-ion batteries to swell or even explode. Deep discharge can also lead to battery failure. An ideal lithium-ion battery charger should have voltage and current stabilization as well as a balancing ...

The BD139 transistor is commonly used in battery protection circuits as a switch that can turn on or off the charging or discharging currents. It also has a high gain and low saturation voltage, which makes it suitable for ...

Figure 5 : Chemical Action During Charging. As a lead-acid battery charge nears completion, hydrogen (H 2) gas is liberated at the negative plate, and oxygen (O 2) gas is liberated at the positive plate.This action occurs since the charging ...

AFE and MCU realize the protection to the circuit by controlling MOS. 3.MOS MOS is the abbreviation of

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Metal-Oxide-Semiconductor Field-Effect Transistor, referred to as field effect transistor, which acts as a switch in the circuit and controls the on and off of the charging circuit and the discharging circuit respectively. Its on-resistance is ...

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This paper introduces a new method of charging and discharging and the resulted effectiveness of this method to the lead acid battery life prolongation is shown. 1. INTRODUCTION. To prolong the life of automotive batteries is a crucial issues for the sustainable development and improve the ...

When a lead-acid battery is discharged, the electrolyte divides into H 2 and SO 4 combine with some of the oxygen that is formed on the positive plate to produce water (H 2 O), and thereby reduces the amount of acid in the electrolyte.

The circuit design for the proposed battery deep discharge protection circuit can be witnessed in the following diagram: As can be seen, the circuit has a very components, and its working can be understood through the following points: There are a couple of power transistors coupled with each other where, the base of the TIP36 transistor forms the collector load of the ...

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