

Optocoupler series voltage regulator



Article Overview

An optocoupler in a series voltage regulator provides isolated feedback from the output to the control circuitry, enabling stable voltage regulation while maintaining electrical isolation.

Role of the Optocoupler

In series voltage regulators, especially in isolated switch-mode power supplies (SMPS) or high-voltage linear regulators, the optocoupler acts as a bridge between the output (secondary) side and the control (primary) side. It transmits the feedback signal without direct electrical connection, ensuring galvanic isolation and protecting low-voltage control circuits from high-voltage outputs. The optocoupler typically consists of an LED on the secondary side and a phototransistor on the primary side. The LED current is modulated according to the output voltage, and the phototransistor converts this optical signal back into an electrical signal to adjust the regulator's control element, such as a series MOSFET or pass transistor.

Integration with Shunt Regulators

A precision shunt regulator (e.g., TL431 or LT1431) is often used to sense the output voltage. The shunt regulator compares the output voltage to a reference and adjusts the current through the optocoupler LED accordingly. This forms a closed-loop feedback system that maintains a stable output voltage under varying load and input conditions. The LED current is proportional to the voltage error, and the phototransistor modulates the control signal to the series pass element, effectively regulating the output....

Article Content

ANP113 | Feedback loop compensaion of a current-mode Flyback

Optocouplers provide a mechanically-robust isolation barrier with very high voltage ratings (e.g. 5 kV) in a small package size,

Shunt Regulator Design Procedures for Secondary Feedback Loop

We discussed step-by-step design procedures for shunt regulator in isolated converter system. And was able to review its basic

How Optocouplers Work

FREE COURSE!! Learn about optocouplers. We'll look at how they are used to control circuits, how they work and

Don't Let Your Feedback Loop Fall Flat: Bias Your ...

In an isolated SMPS, the optocoupler is the bridge between the secondary-side voltage sensing and the primary-side

Application Examples

Figure 1 shows the internal pin connection of a 4 pin AC-input SFH620A-x optocoupler TCET1600, K814P series; and figure 2, of a 4

Optocouplers/Isolators | Vishay

Optocouplers/Isolators As safety products, optocouplers are designed to protect sensitive control circuitry or people from high

Optoelectronic Feedback Control Techniques for Linear and Switch

INTRODUCTION The power supply designer is continually being pressured to provide units which have higher efficiency, better

AN-3001 Optocoupler Input Drive Circuits

Optocoupler Input Drive Circuits An optocoupler is a combination of a light source and a photosensitive detector. In

How to use a optocoupler in circuit?

D. If you are using a 5V voltage driver, the smallest current limiting resistor is (5V

Optocoupler_Feedback_Drive_Techniques_Using_the_UC3901_and_

OPTOCOUPLER FEEDBACK DRIVE TECHNIQUES USING THE UC 3901 AND UC3903
Numerous techniques and devices are

Optocoupler feedback for a dual power supply and over current

Sometimes multiple output regulators take feedback from multiple outputs and sort of average them. The optocoupler

Optocoupler_Feedback_Drive_Techniques

IMPORTANT NOTICE Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to

Use an optocoupler to make a simple low-dropout regulator

This dropout voltage can be even less if you use a FET. In the circuit in Figure 1, the optocoupler's LED determines the

Adjusting Voltage regulator with PWMed optocoupler

I have LD1084V adjustable voltage regulator powering servo and want to control its output from MCU. Optocoupler

Understanding Optocoupler Biasing for Stable Isolated

Introduction In switch-mode power supply (SMPS) designs, optocouplers are critical

AN-107.qxd

Introduction This application note describes isolation amplifier design principles for the LOC Series linear optocoupler devices. It

Optoelectronic Feedback Control Techniques for Linear and Switch

This circuit responds to positive unipolar voltages, as found at the voltage output of the power supply. Initially, when the power supply

Optocouplers/Isolators | Vishay

Optocouplers from Vishay feature high isolation voltages, wide temperature ranges, and a wide range of output configurations to

Optocoupler Tutorial and Optocoupler Application

Optocoupler Tutorial Summary Optocouplers and Opto-isolators are great electronic devices that allow devices such

Optocoupler Tutorial and Optocoupler Application

The optocoupler can be used in many different applications as an interface between low voltage digital, such as 3.3V

Shunt Regulator Design Procedures for Secondary Feedback Loop

Optocoupler voltage at No Load condition (1) For further explanation, system designer should set a proper I_{OPTNL} first. We design it

Optocoupler

This handbook begins with a selection guide followed by sections discussing critical optocoupler design parameters such as

How Optocouplers work

Optocoupler. In this video we learn how optocouplers work and also look at some simple

Optocoupler Application Note

Gain of optocoupler dependent on applied voltage and individual device characteristics. A resistor can be placed in series with the

LOC Series Linear Optocouplers

This application note describes isolation amplifier design principles for the LOC Series linear optocoupler devices. It describes the

Understanding Optocoupler Biasing for Stable Isolated

This shunt regulator monitors the SMPS output voltage through a resistor divider and adjusts

Make sure your optocoupler is properly biased

If the optocoupler is current-starved, the output voltage will keep rising until the proper amount of LED current conducts through the

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