

Optical Coupler Transistor Functionality



Article Overview

A phototransistor optocoupler transfers electrical signals across isolated circuits by converting LED-emitted light into a transistor-controlled current, providing both signal transmission and electrical isolation.

Principle of Operation

A phototransistor optocoupler consists of an infrared LED and a phototransistor enclosed in a light-proof package. When a current flows through the LED, it emits infrared light proportional to the input signal. This light travels through the optical medium and strikes the base-collector region of the phototransistor, causing electrons to move from the valence band to the conduction band. This generates a collector-emitter current in the phototransistor, effectively reproducing the input signal on the output side while maintaining electrical isolation between circuits .

Transistor Functionality

The phototransistor behaves similarly to a standard npn bipolar junction transistor (BJT). Its collector current (I_C) is controlled by the light intensity from the LED rather than a direct electrical input. The current-transfer ratio (CTR), defined as I_C divided by the LED current (I_F), is a key parameter that determines the efficiency of signal transfer. CTR can vary with LED current, temperature, and device aging, so circuit designs often include margins to account for these variations .

Applications and Advantages

Phototransistor optocouplers are widely used for:

- Isolated signal transmission between high-voltage and low-voltage circuits

Article Content

Optoisolators: What They Are and How They Work | Electrical4U

An optoisolator is an electronic component that transfers electrical signals between two isolated circuits by using light.

Optocoupler Circuits, Working, Characteristics, Interfacing

PDF file

Basic Characteristics and Application Circuit Design of Transistor

Photocouplers optically links, via transparent isolating material, a light emitter and a photodetector. Used as an interface between

Optocoupler Tutorial and Optocoupler Application

What is an Optocoupler? An optocoupler (also called an opto-isolator, photo-coupler, or optical isolator) is a solid

Understanding Phototransistor Optocouplers

In order to design a reliable application with optocouplers, it is important to understand and consider not only its main

Using Opto Couplers

Each logic family (e.g. LSTTL or CMOS types) may have different logic voltage levels and different input and output current

Optocoupler Circuits, Working, Characteristics, Interfacing

Optocoupler Internal Construction Optocoupler Pinout Optocoupler Characteristics Important OptoCoupler

What is an Optocoupler, Optoisolator, Photocoupler

Photocouplers, Opto-couplers & Opto-isolators Explained Understand exactly what photocouplers, optocouplers & optoisolators are

What is Optocoupler and How it works?

As we have already learnt about transistors, an ideal transistor will not allow any current to pass through it if the base

Optical Coupler

6.1.2.3 The optical coupler Due to the circuit cannot support the large load voltage, an optical coupler is used to protect the controller

Optocoupler Tutorial and Optocoupler Application

Make Your Own Optocoupler Simple home made opto-couplers can be constructed by using individual components.

What Is Optocoupler and Its Application with Examples

I Introduction This article focuses on the electronic component known as the Optocoupler.

What Is Optocoupler | Opto-coupler Working And Application

Opto-coupler is also called photocoupler, optoisolator or optical isolator. An optocoupler is mainly used to prevent an electrical

Introduction of Optocouplers

A lot of electronic equipment nowadays is using opt coupler in the circuit. An opt coupler or sometimes refer to as opt isolator allows

Opto Coupled Devices

& Opto Sensors Optocouplers or opto isolators consisting of a combination of an infrared LED (also IRED or ILED) and an infra red

Guidelines for reading an optocoupler datasheet

When stacking multiple couplers, the current sharing needs some consideration. The emitter infrared diode has a negative

ANO007 | Understanding Phototransistor Optocouplers

In order to design a functionally robust and reliable application with optocouplers, it is essential to understand not only the device"s

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Application Note Understanding Phototransistor Optocouplers ANO007 by Eleazar Falco 01. INTRODUCTION An

Optocoupler Basics: Definition, Types, and Features

/ Fiber Optic / Optocoupler Basics: Definition, Types, and Features Optocoupler Basics: Definition, Types, and Features An

What is Photocoupler | Optocoupler | Optoisolator

An optocoupler (also known as an optoisolator or Photocoupler) consists of two core components housed within a

Transistor Output Optocouplers Frequently Asked Questions (FAQs)

A: Optocouplers are well known as optoisolators providing an isolated galvanic barrier between the input and output utilizing infrared

Transistor Output Optocouplers Frequently Asked Questions (FAQs)

It describes the two main parameters of optocouplers and is obtained by dividing the output current of the transistor by the forward

Optocouplers Selection Guide: Types, Features, Applications

Transistor optocouplers are slower than photodiode types but much faster than photocells. Depending on the biasing of an individual

Optocoupler Circuits | Nuts & Volts Magazine

Simply described, an optocoupler device is a sealed, self-contained unit that houses independently-powered optical (light) Tx and Rx

Opto coupled Devices

In this case the emitter connection can be left unconnected and the base connection used as an output, then the output photo

Optocoupler | Explore Our Workshop | Jameco Electronics

Understand what an optocoupler is and how it works at our electronics workshop at Jameco Electronics. Explore tutorials on how

How Photocouplers / Optocouplers Are Used | Renesas

The Transistor on the Output Side Operates as a Switch When photocouplers are used as switching devices, the phototransistor on

Optocoupler Tutorial for Beginners

Inside this device, two transistors are connected in a Darlington pair. This gives you a higher current gain and

Phototransistor Optocouplers: Understanding & Design

APPLICATION NOTE ANO007 | Understanding Phototransistor Optocouplers Eleazar Falco 01. INTRODUCTION An optocoupler,

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