

# analog optical isolators

## Features

- High input-to-output voltage isolation
- True resistance element output
- Single- or dual-element outputs available
- Low cost
- Suitable for AC or DC use
- Wide range of input-to-output characteristics
- Low drive current
- Low “on” resistance, high “off” resistance
- Complete solid-state construction

## Typical Applications

- DC isolators
- Feedback elements in automatic gain control circuits
- Audio limiting and compression
- Noiseless switching
- Logic interfacing
- Remote gain control for amplifiers
- Photochoppers
- Noiseless potentiometers

## Principle of Operation

Analog Optical Isolators are used in many different types of circuits and applications.

## Available Related Products

VTL5C series  
LT3011 series  
LT9900 series

Datasheets available upon request.

## Description

PerkinElmer Optoelectronics has been a leading manufacturer of analog optical isolators (AOI) for over twenty years and makes a broad range of standard parts under its trademark VACTROL®.

There are many kinds of optical isolators, but the most common is the LED/phototransistor type. Other familiar types use output elements such as light-sensitive SCRs, Triacs, FETs and ICs. The major application for these silicon-based devices is to provide electrical isolation of digital lines connected between different pieces of equipment. The principle of operation is very simple. When an input current is applied to the LED, the output phototransistor turns on. The only connection between the LED and phototransistor is through light—not electricity—thus the term optical isolator. These optical isolators are primarily digital in nature with fast response times for interfacing with logic gates. Rise and fall times of a few microseconds, faster for some isolators, are typical.

The AOI also uses an optical link between input and output. The input element is an LED and the output element is always a photoconductive cell or, simply a photocell. Together, the coupled pair act as an electrically variable potentiometer. Since the output element of the AOI is a resistor, the voltage applied to this output resistor may be DC and/or AC and the magnitude may be as low as zero or as high as the maximum voltage rating. Because the input will control the magnitude of a complex waveform in a proportional manner, this type of isolator is an analog-control element. AOIs may be used in the ON-OFF mode but the fastest response time is only in the millisecond range. A level-sensitive Schmitt trigger is required between the AOI and logic gates when used in digital circuits.

## Absolute Maximum Ratings @25°

Maximum Temperatures	
Storage and Operating:	–40°C to 75°C
Cell Power:	175 mW
Derate Above 30°C:	3.9 mW/°C
LED Current:	40 mA
Derate Above 30°C:	0.9 mA/°C
LED Reverse Breakdown Voltage:	3.0 V
LED Forward Voltage Drop @20 mA:	2.0 V (1.65 V Typ.) VTL5C8 = 2.8 V (2.2 V typ.) VTL5C9 = 2.8 V (2.2 V typ.) VTL5C10 = 2.8 V (2.2 V typ.)
Minimum Isolation Voltage @	
70% Rel. Humidity:	2500 VRMS
Output Cell Capacitance:	5.0 pF
Input/Output Coupling Capacitance:	0.5 pF