What is the purpose of a fingerprint optical sensor module

Overview

Fingerprint Sensor Types Explained: Optical, Capacitive, Ultrasonic. Optical fingerprint sensors are the oldest and one of the most widely used fingerpri.

Key Takeaways

An optical fingerprint recognition module is a biometric device that captures and identifies fingerprints using light and image sensors to create a digital fingerprint template.

How It Works

An optical fingerprint module operates on the principle of optical imaging. When a user places their finger on the sensor, a high-brightness light source (such as LEDs) illuminates the fingerprint surface. The ridges and valleys of the fingerprint reflect light differently, and a lens and image sensor (CCD or CMOS) capture these variations to form a detailed 2D image of the fingerprint.

The captured image is then processed by a built-in microprocessor, which extracts unique fingerprint features such as ridge lines, bifurcation points, and endpoints. These features are converted into a digital template that can be stored and later compared with registered fingerprints for authentication.

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Components

An optical fingerprint module typically includes: Light source: LEDs or OLED/AMOLED pixels for illuminationOptical system: Lens or prism to focus reflected lightImage sensor: CCD or CMOS sensor to capture the fingerprint imageProcessing unit: Microprocessor for feature extraction and template creationProtective cover: Glass or platen to safeguard the sensor surface ApplicationsOptical fingerprint modules are widely used in: Smartphones and tablets for device unlockingElectronic door locks and access control systemsTime-attendance machines in workplacesKiosks and desktop biometric readers where moderate security is sufficient Advantages and LimitationsAdvantages: High accuracy in capturing fingerprint detailsNon-contact or light-touch operationEasy integration with devices that have sufficient space Limitations: Bulkier than capacitive modules due to optical componentsPerformance can degrade if the finger is wet, dirty, or damagedVulnerable to spoofing with high-quality images or prosthetics if not combined with anti-counterfeiting measures Optical fingerprint modules remain a popular choice for moderate-security environments and applications where cost-effectiveness and reliable recognition are priorities.

Article Content

Fingerprint Sensor Types Explained: Optical, Capacitive, Ultrasonic ...

Optical fingerprint sensors are the oldest and one of the most widely used fingerprint technologies, relying on light and imaging to capture a finger pattern. They effectively take a

How Does an Optical Fingerprint Module Work?

Different from traditional capacitive fingerprint sensors, optical fingerprint modules use light and image sensors to scan the texture of fingerprints, thereby generating fingerprint images.

How do fingerprint sensors work?

Technically, they work by reflecting light onto ultra-sensitive sensors made of semiconductor oxidized metal that convert light into electronic signals. In other words, they cast

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What is Fingerprint Sensor Module? The fingerprint module is a key to transform an ordinary access control and attendance terminal into a fingerprint recognition device. It captures, stores and matches

Optical Fingerprint Modules vs Capacitive Fingerprint Modules —

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Explore the core differences between optical fingerprint modules and capacitive fingerprint modules in biometric sensor technology — from recognition accuracy and form factor to

A Review of Fingerprint Sensors: Mechanism, Characteristics, and

The second section discusses the mechanism of optical fingerprint sensors and details the structure of various types of optical fingerprint sensors, enumerating the characteristics and

How Fingerprint Sensors Work and Where They''re Used

This covers everything about the fingerprint sensor module, which is widely used for fingerprint detection and is very user-friendly for various projects. With this module, you can easily

Fingerprint Sensor – Working & Its Applications

Many modern IoT applications rely on fingerprint sensors for added safety and security, and to easily identify users. Fingerprint sensors are widespread in smartphones and other

How Do Fingerprint Scanners Work? Optical vs Capacitive

The way an optical scanner works is by shining a bright light over your fingerprint and taking a digital photo. The light-sensitive microchip makes the digital image by looking at the ridges

A Review of Fingerprint Sensors: Mechanism, Characteristics, and

Optical fingerprint sensors are mature and use in fingerprint sensors with large sizes, such as attendance systems, etc. The capacitive fingerprint sensor is further integrated on the basis

How Do Fingerprint Scanners Work? Optical vs Capacitive

Fingerprint sensors are widespread in smartphones and other wearables, as well as in smart industry and smart home applications for entry identification and data security. The two most

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Computerworld covers a range of technology topics, with a focus on these core areas of IT: generative AI, Windows, mobile, Apple/enterprise, office

Fingerprint Sensor : Working, Interfacing & Its Applications

This article discusses brief information on a fingerprint sensor – working with applications. What is a Fingerprint Sensor? A fingerprint sensor

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Fingerprint Sensing | Springer Nature Link

This chapter surveys available fingerprint acquisition techniques: from the traditional “ink on paper” to live-scan sensing based on optical, capacitive, and ultrasonic technologies. Technological

Fingerprint Sensor Types Explained: Optical, Capacitive, Ultrasonic ...

Learn how optical, capacitive, ultrasonic and thermal fingerprint sensor types work, with pros, cons and best uses for secure authentication.

How fingerprint scanners work: Optical, capacitive, and ultrasonic ...

Ultrasonic fingerprint scanners aren''t the only option if you want to hide the sensor in the display. Optical-capacitive fingerprint scanners are being used for this purpose too.

4 Types Of Fingerprint Scanners: Deep Dive Into How

What is a fingerprint scanner? A fingerprint scanner, often referred to as a fingerprint sensor or reader, is an electronic device designed to capture and

The Fingerprint File: 4 Fingerprint Sensor Types

Discover the 4 types of fingerprint sensors available for security and authentication purposes. Get the scoop and explore the world of fingerprint biometrics!

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

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