



Vishay Intertechnology, Inc.

COMPANY OVERVIEW



About Vishay Intertechnology

Global Industry Leader

Vishay Intertechnology was founded in 1962 by Dr. Felix Zandman, with a loan from his cousin Alfred P. Slaner. The Company was named after Dr. Zandman's ancestral village in Lithuania, in memory of family members who perished in the Holocaust. The Company's initial product portfolio consisted of foil resistors and foil resistance strain gages. In 1985, having grown from a start-up into the world's leading manufacturer of these products, the Company began a series of strategic acquisitions to become a broad-line manufacturer of electronic components. Today, Vishay Intertechnology is one of the world's largest manufacturers of discrete semiconductors and passive electronic components.

As Vishay Intertechnology grew through innovations and acquisitions, its resistive foil technology products became non-core businesses. In 2010, Vishay Intertechnology spun off these non-core businesses into an independent company listed on the New York Stock Exchange: Vishay Precision Group (NYSE: VPG).

Vishay Intertechnology supports customers in virtually every major market sector. Vishay components are used every day in designs around the world, for applications in industrial, communications, transportation, consumer, medical, and defense products. Vishay has manufacturing plants in the Americas, Asia, Europe, and Israel, as well as sales offices worldwide. Its innovations in technology, successful acquisition strategy, superior product quality, and "one-stop shop" service to customers have made the Company a global industry leader.

Solutions for Growth

Vishay is very well positioned to provide components for new macroeconomic growth drivers such as connectivity, mobility, and sustainability. Through its R&D, engineering, quality programs, and sales initiatives, it generates a steady stream of innovative components to enable designers to create new generations of end products.

In tablets, smartphones, and wearables, Vishay components support power management, wireless connectivity, display interface, and touch screen controls, provide protection from the electrostatic discharge (ESD) that can cause component and system failure, and perform other functions. Vishay components are also found in wireless charging devices, mobile payment systems and other near-field communications systems, servers, network devices, base stations, solid-state drives, telematics systems, and other products and systems in our increasingly interconnected world.

In the area of mobility, to take just one example, Vishay components support a wide range of functions in electric power steering, including electromagnetic interference (EMI) filtering, quiescent current switch-off, three-phase motor switching, current sensing, and voltage division. Vishay components also are used in transmission control units, exhaust systems, start-stop systems, climate controls, braking and safety, lighting, infotainment, proximity and gesture recognition, and more. In hybrid vehicles, Vishay components are used in main inverters, high-voltage bus systems, and energy recuperation. Power capacitors, inductors, and high-power resistors are used to move high-speed trains, buses, intralogistic devices, aircraft, ships, and other carriers in modern infrastructure.

In the area of sustainability, Vishay components are used in the main inverters, power filters, and pitch and system controls of wind turbines. Components in wind turbine systems include high-power semiconductor modules, high-voltage MOSFETs, power ICs, diodes and rectifiers, optical isolators, shunt resistors, crowbar resistors, inductors, and power capacitors. Vishay components are used in solar panels and inverters, and for on-panel power conversion. They are used in smart meters and smart grids, power transmission and distribution systems, power grid quality stabilization, oil and gas exploration equipment, energy harvesting, and more.

Market and Technology Leader

Semiconductors

- Low-voltage power MOSFETs
- Power rectifiers
- Infrared components
- TVS avalanche breakdown diodes

Passive Components

- Thin film SMD resistors
- Power inductors and custom magnetics
- Wirewound and other power resistors
- Wet and conformal-coated tantalum capacitors
- Capacitors for power electronics
- Leaded film resistors

Strategic Acquisitions

2014	Capella Microsystems Holy Stone Polytech	2000	Cera-Mite Electro-Films Spectrol
2013	MCB Industrie	1998	Siliconix Telefunken
2012	HiRel Systems	1994	Vitramon
2011	Huntington Electric: Resistor businesses	1993	Roederstein
2008	KEMET: Wet tantalum capacitor business	1992	Sprague
2007	International Rectifier: PCS business	1988	Sfernice
2002	BCcomponents Beyschlag	1987	Draloric
2001	General Semiconductor Infineon: Infrared components business Mallory (NACC) Tansitor	1985	Dale

Vishay Intertechnology Products

Semiconductors

Vishay Intertechnology manufactures several kinds of discrete semiconductors. These typically perform a single function, such as switching, amplifying, rectifying, or transmitting electrical signals. Vishay Intertechnology also manufactures selected ICs, which combine the functions of multiple components on a single chip, as well as modules, which include multiple components in a single package.

Vishay Intertechnology's semiconductors portfolio includes MOSFETs (low-voltage, medium-voltage, and high-voltage), ICs (both power and analog), a wide range of diodes and rectifiers, and many different types of optoelectronic products.

➔ Semiconductor Brands

Vishay General Semiconductor
Vishay Semiconductors
Vishay Siliconix

Optoelectronics

Vishay Intertechnology's optoelectronics portfolio includes infrared receivers used in consumer electronics for remote control and in industrial applications for long-range sensing of objects; optocouplers and solid-state relays to optically isolate high-voltage sources from low-voltage control circuitry found in industrial applications like motor control loop feedback, control of valves, and solenoids, and to drive high-voltage IGBTs and MOSFETs; and infrared emitters for TV remote controls, automotive adaptive cruise control and heads-up-displays, smoke detectors, and a host of industrial applications. The optoelectronics product portfolio also includes reflective and transmissive optical sensors to determine the presence or proximity of objects and for encoding applications; phototransistors and PIN photodiodes to detect visible and infrared light; LEDs for a variety of automotive and industrial lighting applications; and infrared transceivers for wireless data transfer. Vishay's growing portfolio of digital output sensors, including ambient light, RGB, UV, and gesture control sensors, has been enhanced by the integration of in-house IC design capabilities.

Diodes and Rectifiers

Diodes are used in a wide range of electronic systems to route, switch, and block radio frequency (RF) signals. Vishay Intertechnology diodes include all types of rectifiers; small-signal switching, Zener and PIN diodes; and products for transient voltage suppression (TVS), electrostatic discharge (ESD) protection, and electromagnetic interference (EMI) filtering. Rectifiers convert alternating current (AC) into direct current (DC), a unidirectional current required for operation of many electronic systems. Vishay Intertechnology rectifiers, including patented TMBS® and FRED Pt® devices in low-profile eSMP® packages, save space, reduce power losses, and improve efficiency in automotive, industrial, telecommunications, computing, and other applications. TVS product lines include PAR® devices that offer 185 °C junction temperature performance and are targeted at automotive applications. The Vishay Intertechnology diodes and rectifiers portfolio also includes power modules, which integrate multiple electronic components.

MOSFETs and ICs

Vishay Siliconix MOSFETs and ICs enable more efficient use of power and space, enabling improved designs wherever they are used — in smartphones, cloud computing, automobiles, medical equipment, consumer electronics, and many other applications. The Vishay Siliconix portfolio includes discrete power MOSFETs, power conversion ICs, analog switches, and power management ICs across a large range of voltages and in many different package

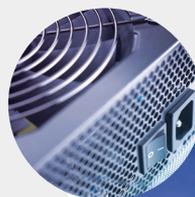
types. Together, they provide customers with the opportunity to optimize their designs with the right mix of integration, performance, and smaller form factors.

In the world of power semiconductors, advances in silicon and packaging technology are highly complementary, and Vishay Siliconix has been synonymous for decades with excellence in both. Since introducing the first TrenchFET® power MOSFET more than 20 years ago, Vishay Siliconix has produced generation after generation of best-in-class performance levels for discrete devices, as well as for power ICs that integrate multiple power management and control functions. Packaging inventions used in all Vishay Siliconix product lines have enabled ever higher levels of integration, power density, size optimization, and thermal capabilities that play a key role in the creation of more competitive, powerful, and efficient designs.



Passive Components

Passive components from Vishay Intertechnology are used to store electrical charges, to limit or resist electrical current, and to help in filtering, surge suppression, measurement, timing, and tuning applications.



→ Passive Component Brands

Vishay BCcomponents
Vishay Beyschlag
Vishay Cera-Mite
Vishay Dale
Vishay Draloric
Vishay Electro-Films
Vishay ESTA
Vishay HiRel Systems
Vishay MCB

Vishay Milwaukee
Vishay Roederstein
Vishay Sfernice
Vishay Spectrol
Vishay Sprague
Vishay Thin Film
Vishay Vitramon
and others...



Resistors

Resistors are used in all electronic circuits to restrict current flow. Resistive products manufactured by Vishay Intertechnology include single (discrete) resistors based on thin film, thick film, metal electrode leadless face (MELF), metal oxide film, plastic film, carbon film, and wirewound technologies; Power Metal Strip® resistors; battery management shunts; fuses; and pyrotechnic initiators and igniters. Vishay Intertechnology manufactures resistor networks and arrays, in which multiple resistors are combined in a single package. The Company also manufactures non-linear resistors, which suppress voltage increases due to temperature and voltage changes, as well as variable resistors, including potentiometers, trimmers, sensors, and magnetic encoders.

Vishay Intertechnology innovations include industry-first Power Metal Strip® resistors for precision current monitoring of sensitive circuits, such as those in electric power meters, industrial systems, and automotive electronic controls for engines, transmissions, and pollution reduction systems. They are ideal for all types of current sensing, voltage division, and pulse applications. The Power Metal Strip family includes very high-power versions.

Other innovative resistive products include high-temperature chip resistor arrays (with operating temperatures of up to 230 °C), water-cooled power resistors (with power ratings up to 2500 watts), thermal fuses for automotive applications, and miniature thick film resistors for hearing aids and high-frequency probe tips, to name just a few.

Inductors and Other Magnetics

Vishay Intertechnology has a broad line of both standard and custom inductors and transformers that are used in a wide variety of applications, from RF signal filtering to DC/DC power conversion. With an offering that ranges from miniature chip inductors to complex, multi-terminal devices, Vishay Intertechnology has one of the broadest standard product lines of any magnetics manufacturer. Vishay Intertechnology is recognized as a market leader in custom magnetics used in implantable and external medical devices, instrumentation, avionics and aerospace controls, industrial equipment, and alternative energy systems. Vishay Intertechnology is one of the largest suppliers of high-reliability custom magnetics in North America.

Vishay Intertechnology innovations include patented IHLP® inductors, which feature higher frequency operation, higher current ratings, better temperature stability, and smaller sizes than competing devices. These inductors are used as energy storage devices for DC/DC converters and high-current filters for computers, tablets, disc drives, industrial systems, and automotive applications. The IHLP inductor family is always expanding and includes composite-coupled inductors designed for SEPIC DC/DC converters, dual inductors for Class D amplifiers, and a variety of unique products for today's power supply and high-current filter applications.

Vishay Intertechnology also provides wireless charging coils, crystals, oscillators, specialized coaxial and edgeboard connectors, and specialty power supplies.

Capacitors

Capacitors are used in almost all electronic circuits to store energy and discharge it when needed. Applications include power conversion, DC-linking, frequency conversion, bypass, decoupling, and filtering.

Types of capacitors manufactured by Vishay Intertechnology include tantalum (both solid and wet), ceramic (both multilayer chip and disc), film, power, heavy-current, and electrolytic aluminum. Vishay Intertechnology capacitors range from tiny surface-mount devices for hearing aids and mobile devices to large heavy-current capacitors used in industrial applications.

Vishay Intertechnology innovations include metalized film power capacitors with the highest RMS current rating for their size in the industry, non-magnetic multilayer ceramic chip capacitors optimized for use in MRI equipment and other end products, MICROTAN® tantalum capacitors with proprietary multi-array packaging (MAP) that provides a significant reduction in DC leakage and better stability, the industry's first wet tantalum capacitors in true surface-mountable molded packages for mission-critical applications, and ultra-stable QUAD HIFREQ multilayer chip capacitors (MLCCs) for RF applications. Vishay Intertechnology also manufactures ENYCAP™ hybrid energy storage capacitors that feature industry-high energy density.



Semiconductors

- MOSFETs
- ICs
- Rectifiers
- Small-Signal Diodes
- Protection Diodes
- Thyristors / SCRs
- IGBTs
- Power Modules
- Optoelectronics

Passive Components

- Resistors
- Magnetics
- Capacitors

**A WORLD OF
SOLUTIONS**