

DIODES

I N C O R P O R A T E D



**Analog | Discrete
Logic | Mixed-Signal**

[diodes.com](https://www.diodes.com)

Products to meet your design needs...

OVERVIEW

Diodes Incorporated is a leading global designer and manufacturer of discrete, analog, mixed-signal, and logic semiconductors.

We enable innovation by leveraging our broad product portfolio, company-owned operations, and leading-edge packaging technology to meet your needs.

Our broad range of application-specific solutions, coupled with a worldwide network of engineering, testing, manufacturing, and customer service sites, positions us as a premier provider for high-volume, high-growth markets.

DISCRETE

Diodes Incorporated provides product designers with a broad range of discrete semiconductor components that are renowned for their quality, reliability, and high performance.

Combining leading-edge silicon and packaging technologies, Diodes provides a broad portfolio of benchmark-performing discrete semiconductors.

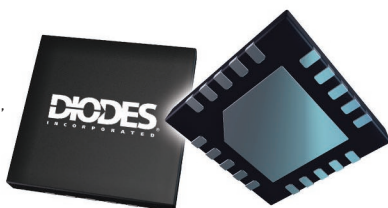


ANALOG & POWER MANAGEMENT

The best analog and power management ICs provide circuit designers with the most advantageous combination of efficiency, functionality, and package size. Our Analog ICs include industry-standard devices as well as differentiated ASSPs. Its power management devices incorporate leading-edge topologies to meet the markets' efficiency and standby power requirements.

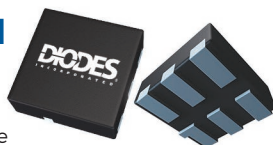
CONNECTIVITY & TIMING

Diodes Incorporated is a leading designer and manufacturer of essential solutions for the timing, switching, bridging, and conditioning of high-speed signals required by today's ever-increasing speed and bandwidth-demanding applications. Its serial connectivity solutions cover a broad range of protocols including PCIe®, SATA 2.0/3.0, SAS 2.0/3.0, HDMI™ 2.1, DisplayPort™ 2.0, USB 2.0/3.0/3.1/3.2/4.0, USB Type-C®, Thunderbolt™, and 10/25/40/100/400/800GE. Diodes provides a full-timing portfolio including crystals and crystal oscillators as well as clock ICs covering kHz to GHz with jitter in the low femtoseconds.



LOGIC & VOLTAGE TRANSLATION

Our logic portfolio covers single- and dual-gate logic, the ubiquitous standard logic, voltage translators, analog switches, and advanced interface logic (UARTs) offering the right operating voltages and driving capabilities for today's applications.



...across a wide range of existing and emerging applications

MARKETS

As part of its global footprint, Diodes Incorporated is focused on these high-growth, high-volume markets:

AUTOMOTIVE

Diodes Incorporated offers a wide portfolio of automotive-compliant products targeted at high-growth, high-reliability applications, such as Connected Driving (merging of ADAS, Telematics, and Infotainment), Comfort, Style and Safety (including lighting and brushless DC motor control), and Powertrain (covering conventional, hybrid, and electric vehicles).

Our automotive-compliant products, designed and tested in-house, are qualified to automotive standards AEC-Q100/Q101/104/200 and are manufactured in facilities that have been certified to IATF 16949/VDA6.3 manufacturing routes. These parts are fully supported by Production Part Approval Process (PPAP) documentation and are specific-change controlled.

COMMUNICATIONS

Diodes Incorporated offers highly effective products to enhance solutions in areas such as telecom infrastructures, enterprise networks, wireless networks, and connected devices. A broad portfolio of MOSFETs, rectifiers, protection devices, high-speed signal switches and multiplexers, ultra-low jitter XOs, clock generators, and clock buffers provides for highly efficient and cost-effective solutions to be developed.



COMPUTING

By addressing the key requirements of the computing industry—speed, power efficiency, cost effectiveness, and reliability—Diodes Incorporated's broad portfolio of products are used in all computing areas, such as notebooks, motherboards, printers, servers, data centers, cloud computing, storage, and adapters. Diodes also provides leading-edge solutions for USB Type-C connectivity.

CONSUMER

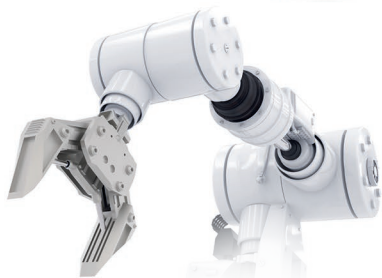
Cost-effective solutions and a high-volume logistic capability position Diodes Incorporated to effectively deliver discrete, analog, mixed-signal, and logic solutions to this fast-moving market sector.



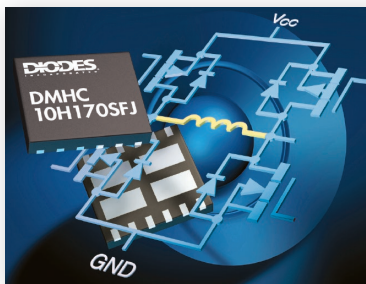
INDUSTRIAL

Our extensive portfolio of bipolar and MOSFET transistors, diodes, standard analog, and power management ICs ensure reliable and effective power management in potentially harsh industrial environments.

For embedded applications, Diodes offers a wide variety of products, including specialized timing products like processor-specific XO, clocks, and PCIe and USB solutions.

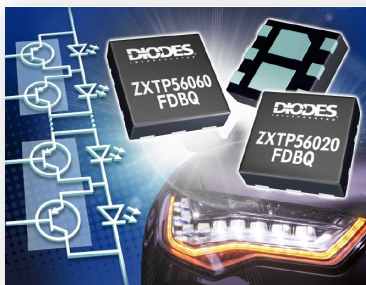


Discrete



MOSFET

- N- and P-channel, from small-signal to power MOSFETs
- 8V to 700V in single, dual, complementary, and H-bridge (quad) configurations
- Packages from the tiny DFN0604 to the PowerDI1012 and PowerDI8080
- Shielded-gate trench, and lateral (LD-MOS) technologies
- Smart load switches
- Automotive-compliant variants qualified to AEC-Q101



Bipolar Transistors

- Technology leadership up to 900V
- Very low $V_{CE(sat)}$ for either higher current handling or reduced temperature operation
- Excellent gain hold at high peak currents for improved driving of Si/SiC MOSFETs or IGBTs
- NPN, PNP, single, dual, complementary, matched, pre-bias, darlington, and special function transistors
- Wide selection of package options to cover most application requirements
- Automotive-compliant variants qualified to AEC-Q101



IntelliFET™ Self-Protected MOSFET

- Low $R_{DS(ON)}$ high-side and low-side switching
- 60V single and dual configurations
- Protection from short-circuit, overvoltage, overtemperature, overcurrent, ESD input, and load-dump events.
- Auto restart
- Logic-level input
- High continuous current rating
- Automotive-compliant variants qualified to AEC-Q10x



Diodes and Rectifiers

- Switching diodes—single, dual, triple, quad
- Zener diodes—tolerances as tight as $\pm 2.0\%$
- Low leakage diodes— $I_R < 5nA$
- Schottky diodes—single, dual, and quad
- FRED (fast recovery epitaxial diodes), PFC (power factor correction) diodes, up to 60A, 1000V
- Standard, fast, and ultra-fast recovery rectifiers
- Bridge rectifiers up to 1200V
- Automotive-compliant variants qualified to AEC-Q101



Super Barrier Rectifier (SBR®)

- Industry-leading rectifier with ultra-low forward voltage (V_F) and reverse leakage current (I_R)
- Low V_F for higher efficiency
- Reduced high temperature I_R gives immunity to thermal runaway
- Ratings: V_{RRM} up to 400V and IO up to 60A
- I_R of M series in nano scale
- Broad range of packages from DFN1006 to TO220
- Automotive-compliant variants qualified to AEC-Q101



Protection Devices

- TVS for ESD protection up to 30kV on datalines including USB, HDMI™, DVI, Thunderbolt™, MIPI, and Ethernet
- Low-capacitance TVS down to 0.15pF for high speed
- Available in footprints down to 0.4mm x 0.2mm
- General-purpose Zener TVS from 18W to 6.6kW
- Thyristor surge protection devices up to 100A
- Automotive-compliant variants qualified to AEC-Q101

Power Management



AC-DC Products for Offline and IOT Power Supplies

- Primary-side regulation (PSR) controllers and switchers
- High-voltage non-isolated buck switchers
- High-efficiency green mode PWM and QR controllers
- CC and CV controllers for secondary-side regulation
- Synchronous MOSFET controllers and rectifiers
- USB-PD sink and source decoders for USB charging solutions



DC-DC Switching Regulators

- Buck, buck-boost, and boost options
- Wide voltage input range
- Low quiescent current and high efficiency at light load
- Best-in-class EMI design
- High power-density and small footprint solutions
- Easy to use with less external component count and simple PCB layout
- Automotive-compliant variants qualified to AEC-Q100



Load and USB Switches

- USB Type-A/B/C/PD and HDMI port overcurrent protection
- High-side power supply load switches for 0.6 to 20V rails
- Overcurrent-protected single- and dual-channel power switches
- Reverse-current, overcurrent, overvoltage, overtemperature, and surge protection
- UL recognized and IEC 60950-1 CB scheme certified
- Automotive-compliant variants qualified to AEC-Q100



Gate Drivers

- Wide portfolio of gate drivers rated up to 600V
- Three-phase, half-bridge, high-side/low-side gate drivers for driving N-MOSFETs or IGBTs
- Inverting and non-inverting, dual, or single low-side drivers
- Automotive-compliant variants qualified to AEC-Q10x



Li-ion Battery Protection IC

- Supports broad single-cell Li-ion/Li polymer battery applications
- Dedicated processes ensure battery safety
- Small footprint with and without internal co-packaged low $R_{DS(ON)}$ MOSFET
- Automotive manufacturing flow ensures high quality



LED Lighting and IoT Power Solutions

- Automotive-compliant LED drivers qualified to AEC-Q10x
- Innovative, reliable, low standby, and cost-effective connected lighting and IoT power solutions
- High-performance DC-DC and linear LED drivers for industrial and commercial LED lighting applications
- 0.5% channel-to-channel matching, multiple channel LCD backlight LED drivers
- Small footprint, low thermal, and high power-density packages

Analog



Sensors

- Omnipolar, unipolar, latch, & linear hall sensor products
- Wide input voltage range from 1.6V_{IN} to 28V_{IN} to cover battery-powered, industrial, and automotive applications
- Micropower, ultra-low noise, and ultra-low switch point drift
- Two-wire AH32xxQ latches and unipolar Hall switches with self-diagnostics are ISO 26262-ready.
- Automotive-compliant variants qualified to AEC-Q100



Linear and Low Dropout Voltage Regulators

- Ultra-low I_Q, low-dropout, and ultra-small footprint
- High PSRR
- Wide input voltage families with fixed output voltages
- Tight tolerance over commercial and industrial temperature ranges
- Automotive-compliant variants qualified to AEC-Q100
- Industry-standard '78 and '78L families



Op-Amps and Comparators

- Industry-standard, general-purpose op-amps and comparators: AS3xx/LM290x series
- Industry-standard, low-voltage, general-purpose op-amps and comparators: LMV3, AZV8, and AZV3 series
- Precision zero-drift, 1.8V micropower, CMOS operational amplifier AS2333/Q
- Single, dual, and quad configurations
- Automotive-compliant variants qualified to AEC-Q100



Industry Standard Analog

- LM4040/1 equivalent shunt references
 - 1.2V, 2.5V, 3.0V, 3.3V, 4.096V, and 5V
 - Extra-low knee current shunt references
- 2.5V, 1.24V TL/TLV431 equivalent shunt regulators
 - Extra-low knee current AP431S
- Microprocessor supervisors/reset generators
- ULN200xA multi-channel peripheral drivers
 - ULN62003A low loss DMOS output
- Automotive-compliant variants qualified to AEC-Q100



Current Monitors

- Simple high-side current measurement without upsetting OV reference point
- ZXCT199 precision bidirectional current monitor
- ZXCT108x high-side current monitors with operation up to 60V
- Simple SOT23 micropower current monitors
- ZXCT1xxxQ automotive-compliant high-side current monitors qualified to AEC-Q100



Audio Amplifiers

- Output powers from 1.5W to 30W/channel
- Low-EMI filterless design, anti-saturation, and power-limit features improve audio quality with lower solution cost
- Booster converter integrated for dynamic/piezo/ceramic speaker load in wireless speakers, IoT, and security or mobile apps
- High-quality headphone amplifier for headsets, gaming, or TV/monitor apps
- Automotive-compliant variants qualified to AEC-Q100

Connectivity, Timing, and Logic



Switches/Mux

- Data rates up to 20Gbps
- High-speed signal multiplexer switches (USB, PCIe, USB Type-C, GE/10GE, HDMI, DP, MIPI, SAS, SATA, ThunderBolt)
- High-speed crossbar switches
- LVDS receivers/transceivers
- Audio switches, bus switches, VGA switches
- Automotive-compliant variants qualified to AEC-Q100



Signal Integrity

(ReDrivers/Repeaters/Active Switches)

- PCIe 5.0 linear ReDrivers
- 10Gbps ethernet (10GE) linear ReDrivers
- USB 3.2 linear ReDrivers
- SATA 3.0 ReDrivers
- SAS 3.0 linear combo ReDrivers
- HDMI 2.1/DisplayPort 2.0 ReDrivers
- USB Type-C and DP-ALT 4:4/6:4 10Gbps ReDrivers
- Automotive-compliant ReDrivers qualified to AEC-Q100



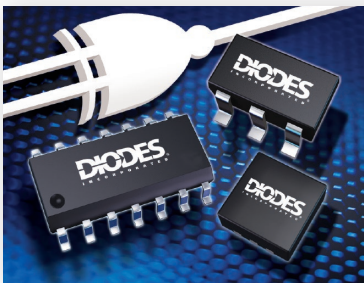
PCIe Packet Switches/Bridges/UARTs

- PCIe 3.0 packet switches
- PCIe-PCI/PCIx bridges
- PCIe, PCI, I²C/ SPI, 8-bit to UART
- PCIe to USB/PCIe
- Automotive-compliant PCIe 2.0 packet switches qualified to AEC-Q100



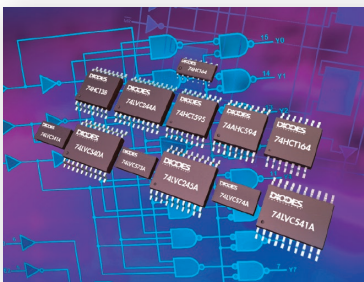
Timing

- Timing IC (clock generators, buffers, RTC)
- Less than 0.2ps RMS phase jitter clock generators
- As low as 0.01ps additive jitter buffer families
- PCIe 5.0 clock generators and clock buffers
- Automotive-compliant PCIe clocks, Fanout Buffers, RTC
- Crystals and crystal oscillators (XO, VCXO, TCXO)
- Ultra-low jitter XO with less than 100fs RMS jitter
- Automotive-compliant crystals and XO qualified to AEC-Q200/104



General Logic

- Single-gate, dual-gate, standard logic, and shift registers
- Eight technology families: LV, LVC/E, AHC/T, AUP, HC/T
- DFN0808, DFN1010, DFN1410, QFN4525, SOT25/26/353/363/553, SO-14/-16, TSSOP-14/-16/20
- Automotive-compliant single-gate logic 74LVC1GxxQ and 74AHC(T)1GxxQ
- Universal level shifter/voltage translators: automotive-compliant variants available



Special Logic

- Analog switches
- Registers and multiplexers
- Buffers, transceivers, and line drivers
- I/O expanders: automotive-compliant variants available
- I²C mux
- I²C hot-swappable IC



Diodes Incorporated's discrete, analog, mixed-signal, and logic products provide our customers with leading-edge solutions for next-generation systems.

Discrete products include bipolar transistors, MOSFETs, diodes and rectifiers (inc. SBR, SCR, and Triacs), Bridge Rectifiers, protection products, and functional arrays.

Analog and mixed-signal products cover these main areas: power management ICs (inc. LED drivers), standard linear, sensors, signal switching, signal integrity, connectivity, and timing products.

Logic products includes single-gate, dual-gate, and standard logic gates as well as voltage translators, analog switches, registers, and multiplexers.

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