

A photograph of an industrial laser cutting process. A bright laser beam is cutting through a metal plate, creating a shower of bright orange sparks. The metal plate has a grid of small circular holes. The background shows parts of the industrial machinery.

OPTOCOUPLER SOLUTIONS

Fairchild power semiconductors
maximize efficiency and reliability.





Fairchild Semiconductor is a leader in the design and manufacture of optocouplers. We offer a broad range of package platforms and incorporate various combinations of input and output configurations. Our offerings include simple function optocouplers for low bandwidth/general switching applications, high performance optocouplers for high and wide/high gain and gate driving applications, high voltage optocouplers for AC load switching applications and other specific functions that provide unique performance characteristics.



Unique combination of power devices, design expertise, and manufacturing experience delivered to our customers, allow them to power amazing electronic products.

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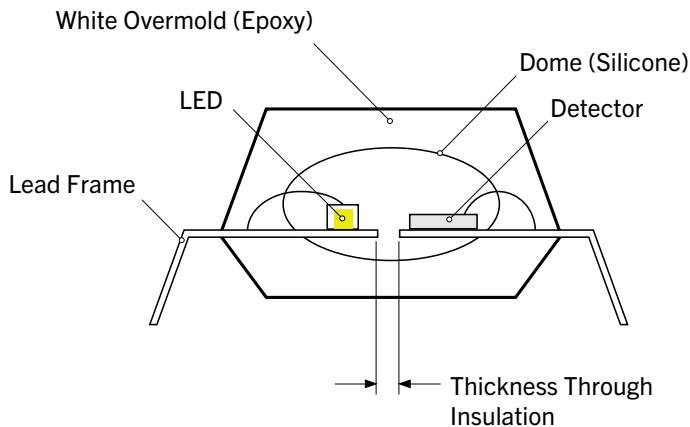
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Optoplanar® Technology Story

Fairchild's comprehensive portfolio of high performance optocouplers offers best-in-class noise immunity as a result of its Optoplanar® coplanar packaging technology. The Optoplanar® technology ensures a safe insulation thickness of more than 0.4 millimeters to attain reliable high voltage isolation, certified by UL1577 and DIN_EN/IEC60747-5-5 standards.

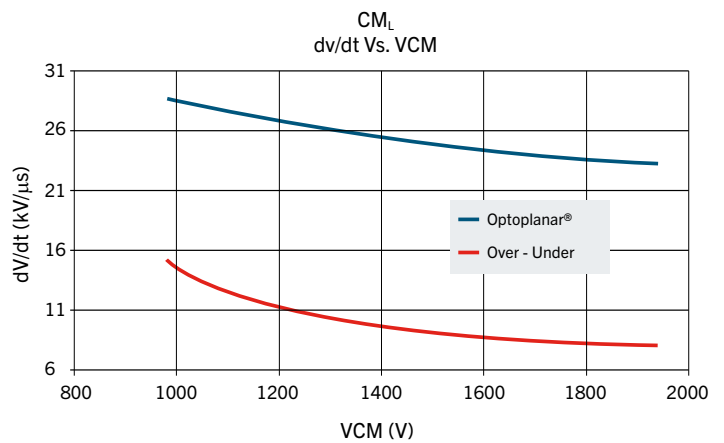
Rugged and Reliable Optocoupler Solutions

Fairchild delivers a unique combination of power devices, design expertise, and manufacturing experience to its customers, allowing them to power amazing electronic products. The new products were developed after customer input and incorporated several features that specifically addressed the critical challenges they faced. This is part of our customer-centric focus and our goal of being the go-to source for innovative power management solutions.



Applications by sector

- [Home Appliance & White Goods](#)
- [Industrial Automation](#)
- [Industrial Motion & Motor Control](#)
- [Power Supply](#)
- [Smart Grid & Metering](#)
- [Solar/Renewable/UPS](#)
- [Telecommunication Infrastructure](#)
- [Welding & Induction Heating](#)



High Performance Optocouplers - common mode noise immunity comparison



IGBT/MOSFET Gate Driver Optocoupler Series

The [IGBT/MOSFET Gate Driver Optocoupler series](#) provides fast switching to drive power IGBTs and MOSFETs while improving system efficiency. The new Gate Driver Optocoupler Series in a wide body 16-pin small outline plastic (SOP) package, integrates critical protection features necessary for preventing fault conditions that lead to destructive thermal runaway of IGBTs. It reduces design complexity as most protection features are built-in, eliminating the need for the board designer to specify additional components. The new Gate Driver Optocoupler series in wide body 5-pin SOP package delivers high isolation performance in a compact package, while maintaining wide creepage and clearance distances.

Rugged and reliable gate driver solutions

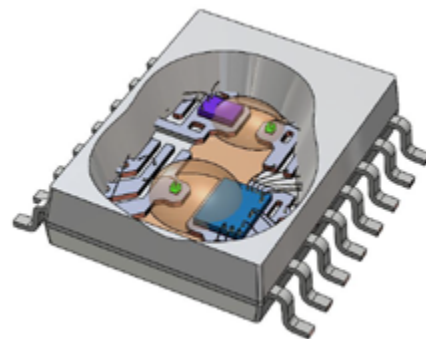
These IGBT/MOSFET gate drive optocouplers utilize Fairchild's Optoplanar® coplanar packaging technology and optimized IC design to achieve high insulation voltage and high noise immunity, characterized by high common mode rejection. These devices offer a 1,414 V peak working voltage to permit the device to directly drive medium power IGBTs. The use of P-channel MOSFETs at output stage enable lower dynamic power consumption per cycle during switching that current solutions.

Design Advantages

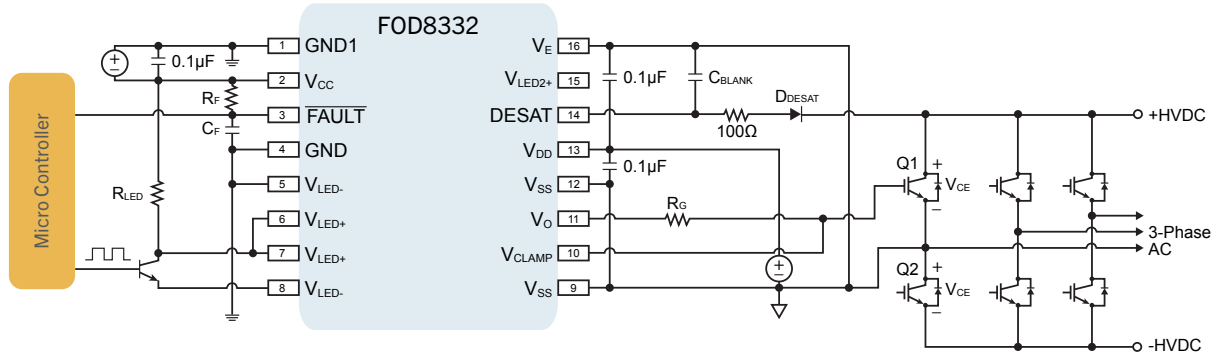
- High noise immunity characterized by CMTI @ 35 kV/μs minimum, $V_{CM} = 1500 V_{PEAK}$
- 2.5 A peak output current driving capability for medium power IGBT
- P-channel MOSFETs at output stage enable output voltage swing close to supply rail
- Wide supply voltage range: 15V to 30V
- Under-voltage lockout (UVLO) with hysteresis
- Fast switching speed over full operating temperature range
- Extended industrial temperature range: -40°C to 100°C
- The insulation safety is evaluated in accordance with UL1577 and DIN-EN/IEC 60747-5-5 standards

Applications

- Isolated IGBT/Power MOSFET Gate Drive
- Renewable Energy - Solar Inverter, Wind Power Inverter
- AC and Brushless DC Motor Drive
- Industrial Inverter
- Uninterruptible Power Supply
- Induction Heating



IGBT/MOSFET GATE DRIVER OPTOCOUPLEDERS



Example of Application Circuit

Part Number	Description	Package
FOD8316	2.5A Output Current, IGBT Drive Optocoupler with Desaturation Detection and Isolated Fault Sensing	Wide Body 16-pin SOP
FOD8318	2.5A Output Current, IGBT Drive Optocoupler with Active Miller Clamp, Desaturation Detection, and Isolated Fault Sensing	Wide Body 16-pin SOP
FOD8332	Input LED Drive, 2.5 A Output Current, IGBT Drive Optocoupler with Desaturation Detection, Isolated Fault Sensing, and Active Miller Clamp	Wide Body 16-pin SOP
FOD8333	Input LED Drive, 2.5 A Output Current, IGBT Drive Optocoupler with Desaturation Detection, Isolated Fault Sensing, Active Miller Clamp, and Automatic Fault Reset	Wide Body 16-pin SOP
FOD8320	High Noise Immunity, 2.5A Output Current, Gate Drive Optocoupler in Optoplanar® Wide Body SOP 5-Pin (10 mm Creepage and Clearance Distance)	Wide Body 5-pin SOP
FOD8321	2.5A Output Current, Gate Drive Optocoupler in Optoplanar® Wide Body SOP 5-Pin (8 mm Creepage and Clearance Distance)	Wide Body 5-pin SOP
FOD8383	2.5 A Output Current, High-Speed, MOSFET/IGBT Gate Drive Optocoupler in Optoplanar® Wide-Body SOP 5-Pin (10 mm Creepage and Clearance Distance)	Wide Body 5-pin SOP
FOD8384	2.5 A Output Current, High-Speed, MOSFET/IGBT Gate Drive Optocoupler in Optoplanar® Wide-Body SOP 5-Pin (8 mm Creepage and Clearance Distance)	Wide Body 5-pin SOP

High-Speed Logic Gate Optocouplers

Fairchild's 3.3V/5V [high-speed logic gate optocouplers](#) support isolated communications between systems without conducting ground loops or hazardous voltages. Each high-speed optocoupler utilizes Fairchild's proprietary Optoplanar® coplanar packaging technology and optimized design. This design delivers excellent noise immunity, characterized by high common mode transient immunity and power supply rejection specifications, and allows these devices to operate in noisy industrial environments (100% better than our closest competitors).

*Excellent Common Mode
Transient Immunity*

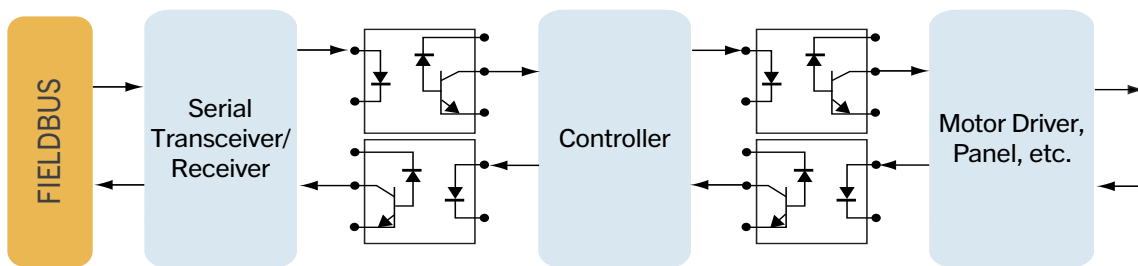
Fairchild's high-speed logic gate optocoupler, FOD8160 housed in a wide-body SOP 5-pin package allowing 10mm creepage and clearance distance. This enables robust, high-speed data communication in systems meeting very high safety standards such as IEC 62109 for solar inverters.

Design Advantages

- Best-in-class common mode transient immunity; 20kV/us minimum (@ $V_{CM} = 2,000\text{ V}$) allowing these devices to operate in noisy industrial environments (100% better than our closest competitors)
- 3.3 V or 5 V supply voltage facilitates logic level translation
- High isolation voltage, featuring > 0.4 mm isolation gap, certified by UL1577 and DIN_EN/IEC60747-5-5 certification for increased reliability
- Simplify system design of high-speed data signals isolation at bus interfaces, such as Profibus, CAN, DeviceNet, other fieldbus standards, RS485, I2C, SPI, USB, etc.

Applications

- Industrial Fieldbus Networks
- Industrial Inverters
- Integrated Power Systems



Typical Isolated Data Communication Application



Snubberless TRIAC Driver Optocouplers

The [snubberless TRIAC Driver Optocouplers](#) feature a built-in active dv/dt clamp providing best-in-class noise immunity (dv/dt) of 10,000V/ μ s, which is superior to the average dv/dt rating (1,500V/ μ s) of common TRIAC drivers. This superior performance eliminates the RC snubber network required for lower dv/dt-rated opto TRIAC drivers. This saves valuable design time and reduces bill of materials (BOMs). High noise immunity makes these products ideal for noisy industrial environments as they offer a more robust solution for isolating solid-state relays, AC motor controls and lighting ballasts.

*High dv/dt Immunity
Eliminates False Triggering*

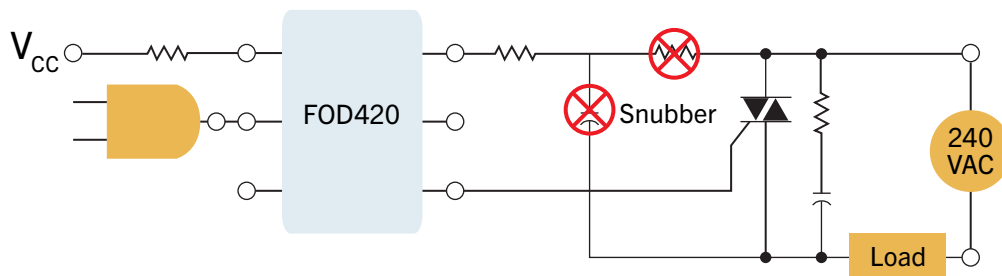
The FOD41XX family features an integrated zero-cross inhibit circuit which prevents the device from switching near the peak of the AC mains. The FOD42XX are random phase drivers which allow the device to switch at any AC mains voltage level.

Design Advantages

- High static and commutating dv/dt immunity (10kV/ μ s)
- High blocking voltage (VDM)
 - FOD420/4216/410/4116 – 600V minimum
 - FOD4208/4218/4108/4118 – 800V minimum
- Low input drive current (IFT)
 - FOD420/4208/410/4108 – 2mA maximum
 - FOD4216/4218/4116/4118 – 1.3mA maximum
- High current sink capability
 - 300mA maximum (continuous)
 - 3A maximum (peak, non repetitive)
 - 5000V isolation voltage rating

Applications

- Solid State Relays
- Consumer Appliances
- Industrial Controls



Example of Application Circuit

PHOTOTRANSISTOR OPTOCOUPLER

Realize increased design margins and stable parameters in high temperature environments with Fairchild's new [FODM8801](#) OptoHiT™ high temperature [phototransistor optocoupler](#). You'll achieve high noise immunity and reliable isolation at high operating temperatures, up to 125°C, as this series implements Fairchild's coplanar Optoplanar® packaging technology. In addition, the [FODM8801](#) offers excellent CTR linearity over temperature and operates at a very low input current (IF). The optocoupler consists of an aluminum gallium arsenide (AlGaAs) infrared light emitting diode optically coupled to a phototransistor.

Reliable Isolation and Minimized System Failure

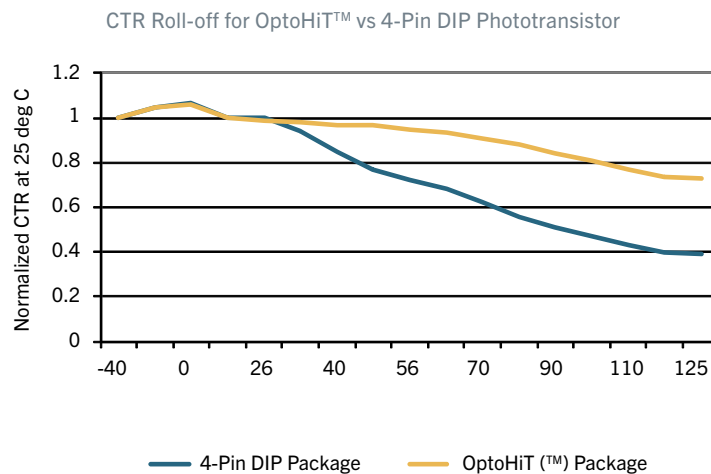
The [FODM8801](#) is packaged in a compact, half-pitch, mini-flat, 4-pin package (1.27mm lead pitch). Benefits also include board space savings and design flexibility, ultimately allowing for overall reductions in system cost.

Applications

- Primarily suited for DC-DC converters
- For ground loop isolation, signal to noise isolation
- Communications: adapters, chargers
- Consumer: appliances, set top boxes
- Industrial: power supplies, motor control, programmable logic control

Applications

- Guaranteed Current Transfer Ratio (CTR) specifications across full temperature range from -40 °C to +125 °C
 - Excellent CTR linearity at high temperature
 - CTR at very low input current, IF (1 mA, 1.6 mA, and 3 mA)
- Guaranteed switching specifications over extended operating temperature range
- Half-pitch Mini-Flat Package (MFP) can further save on board real estate giving hardware designers more flexibility and allowing for overall systems cost savings
- High isolation voltage certified by UL1577 (3,750 VAC_{RMS} for 1 min.) and DIN_EN/IEC60747-5-5 certification for increased reliability



Automotive

- Brake Systems
- Direct Fuel Injection
- Electric Coolant Pump
- Electric Fuel Pump
- Electric Oil Pump
- Electric Power Steering
- Electrically Driven A/C Compressor
- Engine Cooling Fan
- HID Lighting
- Ignition
- Power Inverters

Cloud/Servers/Data Centers

- Server (PSU & Motherboard)
- Solid State Drive (SSD)
- Uninterruptible Power Supply

Computing and Storage

- Desktop PC
- Notebook PC
- Server
- Solid State Drive (SSD)
- Uninterruptible Power Supply

Home Appliance & White Goods

- Air Conditioner
- Digital Power Generator
- Fan Motor / Pump
- Induction Heating
- Low Voltage Inverter
- Refrigerator
- Uninterruptible Power Supply
- Washing Machine / Dishwasher
- Pedestal/Ceiling/Range Hood Fan

Industrial Automation

- Sensors
- Human Machine Interface (HMI)
- Industrial Motion & Motor Control

Industrial Motion & Motor Control

- Air Conditioner
- Engine Cooling Fan
- Fan Motor / Pump
- Low Voltage Inverter
- Refrigerator
- Washing Machine / Dishwasher

Lighting

- Backlighting BLU
- Fluorescent Lamp
- HID Lamp
- LCD TV & Monitor (CCFL BLU)
- LED Lighting
- LED TV & Monitor (LED BLU)
- PDP-TV
- Portable LED Drivers

Machine-to-Machine (M2M)

- GPS
- Industrial Automation
- Mobile Wireless
- Smart Meter
- Smart Home & Home Entertainment

Medical

- A/C Powered Hair Removal Unit
- Automatic External Defibrillator
- Blood Glucose Monitor
- Electronic / Digital Stethoscope
- Hearing Aid
- Medical Pump / Fan / Motor Application
- Medical USB Port
- Portable, Coin Cell & AA based Battery
- Portable, Single & Dual Cell Li Battery
- Positive Airway Pressure Machine
- Pulse Oximeter

Mobile Wireless

- Charger (CC/CV)
- Mobile Handsets
- MP3 & Cloud Portable Player
- Tablets
- USB

Motion Tracking

- 3D Character Animation
- 3D Wearable Technology
- Human Motion Measurement
- Inertial Sensor Modules

Networking & Gateway

- Critical Embedded Power
- Firewall & Security Appliances
- Modem
- Routers
- Switches

Portable Consumer

- Audio
- Digital Still Camera
- GPS
- MP3 & Cloud Portable Player
- USB

Power Supply

- Charger (CV/CC)
- Computing & Storage
- Home Appliances & White Goods
- Portable Consumer
- Smart Grid & Metering
- Smart Home & Home Entertainment
- Telecommunication Infrastructure

Smart Grid & Metering

- Smart Meter
- Solar Inverter

Smart Home & Home Entertainment

- Audio
- Digital Still Camera
- DVD
- LCD TV & Monitor (CCFL BLU)
- LED TV & Monitor (LED BLU)
- Notebook PC
- PDP TV
- Set-top Box
- TV & Monitor
- USB

Solar/Renewable Energy/UPS

- Central Inverter System
- Micro Converter System
- Micro Inverter System
- Solar Inverter
- Uninterruptible Power Supply

Travel Adaptors & Power Banks

- Adaptors
- Chargers (CC/CV)
- Mobile Wireless
- Portable Consumer
- USB

Telecom Infrastructure

- Critical Embedded Power
- Optical Networking & Infrastructures
- Telecommunication Systems
- Video Broadcasting, Processing, Communication System

Wearables

- 3D Wearable Technology

Welding & Induction Heating

- Induction Heating
- Welding Machine

ABOUT FAIRCHILD

Fairchild is all about power management. And to that end, we provide a unique combination of design and manufacturing expertise to our customers, allowing them to power amazing electronic products. Our mission is to help you build the absolute best product possible and to ensure that we meet or exceed your time-to-market and quality requirements.

This product guide and the Fairchild website will enable you to find the information and products you need to meet the power demands of your design. If questions remain about product specs or you require design assistance, please contact us directly. Often, the solution to a particular problem involves a unique combination of products or a process modification that wasn't obvious in the spec review. Fairchild is committed to help you find that solution. We want your power design experience to be amazing.



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