



Advantages

- Saves board space with MicroFET package
- Low profile package
- Guaranteed low $R_{DS(ON)}$ at 4.5V/2.5V/1.8V V_{GS}
- Excellent thermal performance

Applications

- Handsets
- Ultraportable devices

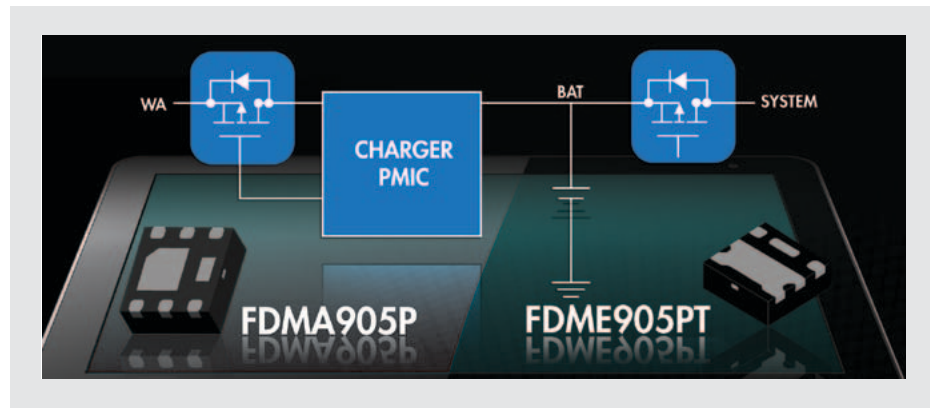
For more information, please visit:

www.fairchildsemi.com/pf/FD/FDMA905P.html

www.fairchildsemi.com/pf/FD/FDME905PT.html

Ultra Small Battery and Load Switching Solutions

Offering designers a small-sized battery or load switching solution, with excellent thermal characteristics, two new single P-Channel PowerTrench® MOSFETs are now available. Fairchild's FDMA905P and FDME905PT feature low on-state resistance in a low profile MicroFET™ package (0.8mm and 0.55mm max, respectively). The devices offer exceptional thermal performance for their physical size, and are also well-suited for linear mode applications.



Product Number	B_{VDS} (V)	V_{GS} (V)	V_{GS} (th) (V) Typ	$R_{DS(ON)}$ (m Ω) Typ			Qg Typ (nC) @ $V_{GS} = 4.5V$	I_D (A)	P_D (W)	Package
				4.5V	2.5V	1.8V				
FDMA905P	12	± 8	0.7	14	17	21	21	10	2.4	2.0mm x 2.0mm x 0.8mm
FDME905PT	12	± 8	0.7	18	22	28	14	8	2.1	1.6mm x 1.6mm x 0.55mm

SINGLE-STAGE PFC PRIMARY SIDE REGULATION LED DRIVERS

Advantages

- Excellent PF (≥ 0.9)
- Low THD (Class-C)
- Power efficiency $\geq 85\%$
- Minimizes BOM for smaller lamp size
- Accurate Constant Current (CC) control, independent online voltage, output voltage and magnetizing inductance variation
- Linear frequency control for better efficiency and simple design
- Open-LED protection
- Short-LED protection

Applications

- LED lighting

For more information, please visit:

www.fairchildsemi.com/applications/diagrams/led-lighting.html

www.fairchildsemi.com/pf/FL/FL7730.html

www.fairchildsemi.com/pf/FL/FL7732.html

Evaluation Boards

LED lighting application evaluation boards are available at

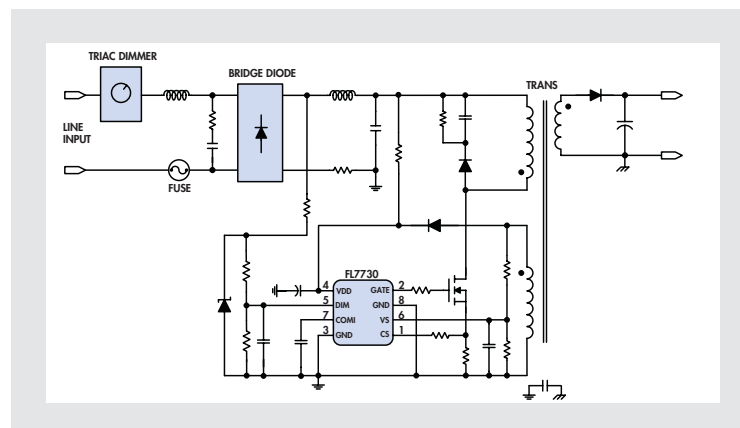
www.fairchildsemi.com/products/evaluationboards/

Latest available board: FEBFL7701_L30U003A: 2.4W LED ballast board with FL7701, non-isolation, PFC Buck controller.

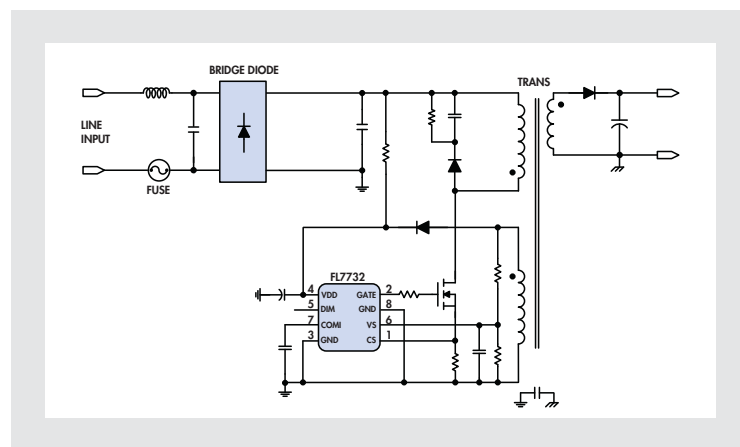
Simplify Design Complexity in LED Lighting Applications

Implementing dimming capabilities in a conventional TRIAC dimmer infrastructure is challenging because of compatibility issues. Additionally, small space requirements remain a consideration in $\leq 20W$ LED lighting applications. To address these obstacles, Fairchild developed the FL7730 single-stage primary side regulation (PSR) controller with power factor correction (PFC), TRIAC and analog dimming compatibility, as well as the FL7732 for non-dimmable applications.

To improve power factor (≥ 0.9) and THD (Class-C), both devices feature constant on-time control with an internal error amplifier and low bandwidth compensator. Precise Constant Current accuracy/control ($\pm 5\%$) regulates accurate output current, independent of input and output voltage, allowing designers to achieve high and improved lighting quality.



Typical Application Diagram of FL7730 (Dimmable)



Typical Application Diagram of FL7732 (Non-Dimmable)

Product Number	Topology	PFC	Dimming	CC Variance (%)	Internal MOSFET	Package
FL7730	PSR PFC Flyback	Yes	Yes	5	No	SOIC-8
FL7732	PSR PFC Flyback	Yes	No	± 5	No	SOIC-8

Advantages

- Low EMI design allows filterless operation
- High noise rejection using differential audio inputs
- High efficiency boost regulator provides higher output power over battery voltages
- Boost shutdown at lower output power increases efficiency and reduces quiescent current consumption
- AGC monitors battery voltage and dynamically adjusts gain, extending battery runtime

Applications

- Mobile handsets
- Smart phones
- Tablets
- Multimedia Internet devices (MID)
- Portable media players

For more information, please visit:

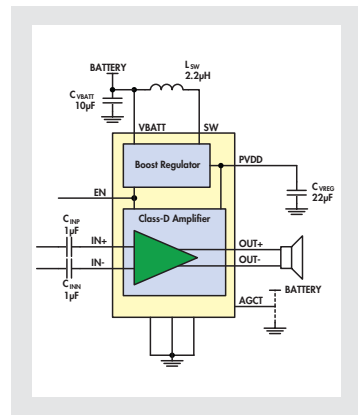
www.fairchildsemi.com/pf/FA/FAB3103.html

Achieve Loud and Clear Sound While Extending Battery Life

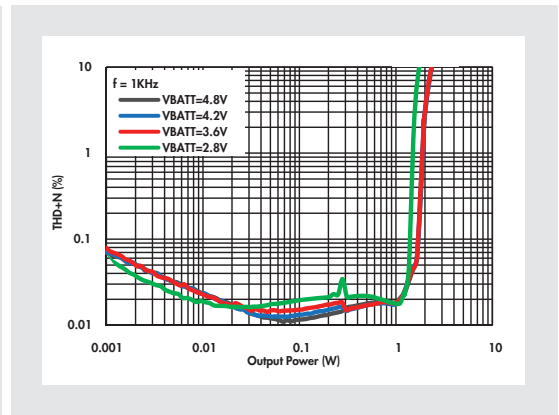
Customer demand is driving the need for louder and clearer speaker sound in mobile devices. While minimizing impact on battery life, designers can achieve the performance they require with Fairchild's FAB3103. The 2.3W Class-D audio amplifier with integrated boost regulator and battery automatic gain control (AGC) allows for high audio output power over a power supply range of 2.5V to 5.2V from a 3.6V Li-Ion battery.

At low power output, the device's boost regulator automatically shuts down for greater efficiency and lower quiescent current consumption, resulting in longer battery runtime. The FAB3103 audio amplifier also features battery AGC that reduces gain when the power supply voltage is low in order to limit maximum power consumption, reducing distortion and preventing early device software shutdown.

Available in a 12-bump, WLCSP, the FAB3103 device also offers several protection features including short circuit protection, low voltage shutdown, and click-and-pop suppression.



Typical Application Circuit



Total Harmonic Distortion + Noise vs. Output Power

Product Number	Supply Voltage (V)	Output Power at 10% THD+N	Output Power at 1% THD+N	THD+N at 0.1 W	Features		Package (mm x mm)
		3.6V, 8Ω (W)	3.6V, 8Ω (W)	3.6V, 8Ω (%)	Speaker Amplifier	Integrated Boost Converter	
FAB3103	2.5 to 5.2	2.3	1.85	0.01	Filterless Class-D	Class-G	12-WLCSP, 1.86 x 1.44

AUDIO JACK DETECTION SWITCH

Advantages

- Detects two different audio jack configurations
- Enables use of all existing headsets in new devices without manual configuration
- Automatically routes GND and MIC to audio jack terminals
- Ability to detect 3- or 4-pole audio accessories

Applications

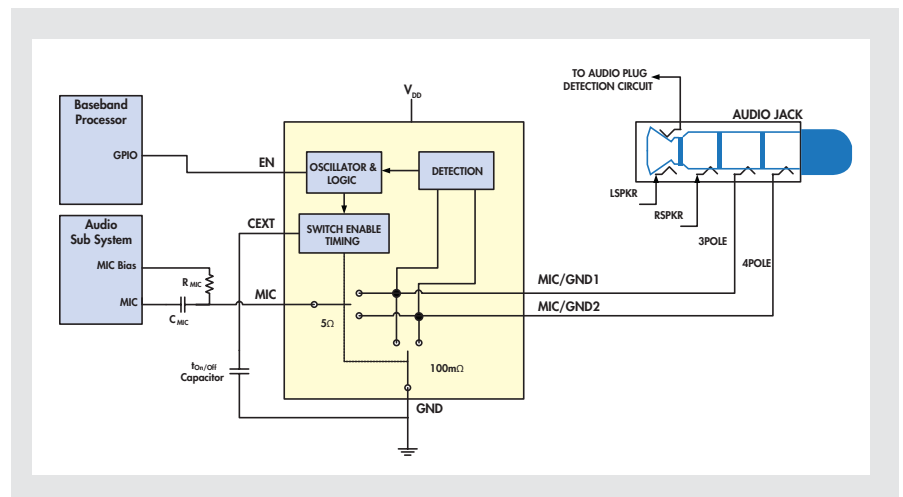
- Mobile handsets
- Smart phones
- Tablets
- Laptops
- PMP/MP3

For more information, please visit:

www.fairchildsemi.com/pf/FS/FSA8049.html

Meet Audio Standards with a Single Device

Designers no longer have to choose supporting one audio jack configuration standard (OMTP or CTIA) over the other, or rely on a more complex design with additional components. Fairchild's FSA8049 MIC/GND cross point switch detects two different audio jack configurations and connects properly to each standard, enabling the use of all existing headsets in new devices without manual configuration. This functionality allows the end-user to plug accessories, such as headsets, with different audio pole configurations into the device and have them operate correctly. The FSA8049 is available in a space-saving 9-ball WLCSP 1.16mm x 1.16mm package.



Typical Application Diagram of Mobile Phone Audio Jack with FSA8049

Product Number	Detection	V _{DD} (V)	THD (MIC)	R _{ON(GND)}	ESD (IEC 61000-4-2)	Package
FSA8049	Audio Plug, GND & MIC Polarity	2.5 to 4.4	0.002%	80mΩ	15kV (Air Gap), 8kV (Contact)	1.16mm x 1.16mm 9 ball WLCSP

MicroDIP BRIDGE RECTIFIER FAMILY

Advantages

- Low package profile, 1.45mm (max)
- Requires only 35mm² of board space
- High surge current capability: 30A (max)
- Glass passivated junction rectifiers
- UL certification: E352360

Applications

- Mobile device battery chargers
- Power adapters
- Power-over-Ethernet (PoE) devices
 - IP surveillance cameras

For more information, please visit:

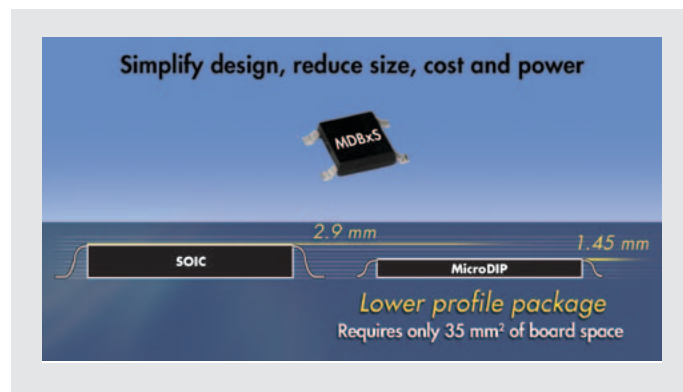
www.fairchildsemi.com/pf/MD/MDB6S.html

www.fairchildsemi.com/pf/MD/MDB8S.html

www.fairchildsemi.com/pf/MD/MDB10S.html

Low Package Height, Critical for Small Space Designs

Now designers can reduce space and simplify board layout with Fairchild's new series of MicroDIP bridge rectifiers. With the ability to increase reliability and lower overall manufacturing costs, the series provides one of the lowest package heights for 1A bridge rectifiers. The MDBxS family meets the need for small space design solutions critical for mobile device battery chargers, power adapters and Power-over-Ethernet (PoE) devices including IP surveillance cameras. The family currently consists of three parts—MDB6S (600V), MDB8S (800V) and MDB10S (1000V), with 50V – 400V versions in development.



MDBxS Family of Low Profile 1A Bridge Rectifiers

Product Number	V _{RRM} (V)	V _{RMS} (V)	I _{F(ave)} (A)	I _{FSM} (A)	V _{FM} (V)	I _{RM} (μA)	R _{θJA} (°C/W)
MDB6S	600	420	1	30	1.1	10	250
MDB8S	800	560	1	30	1.1	10	250
MDB10S	1000	700	1	30	1.1	10	250

SURFACE MOUNT PACKAGE SCHOTTKY RECTIFIER

Advantages

- **Low profile, surface mount package: SMB/DO-214AA**
- **High reverse voltage:**
 $V_{RRM} = 200V$
- **Low power loss, high efficiency**
- **High surge current:**
 $I_{FSM} = 80A$

Applications

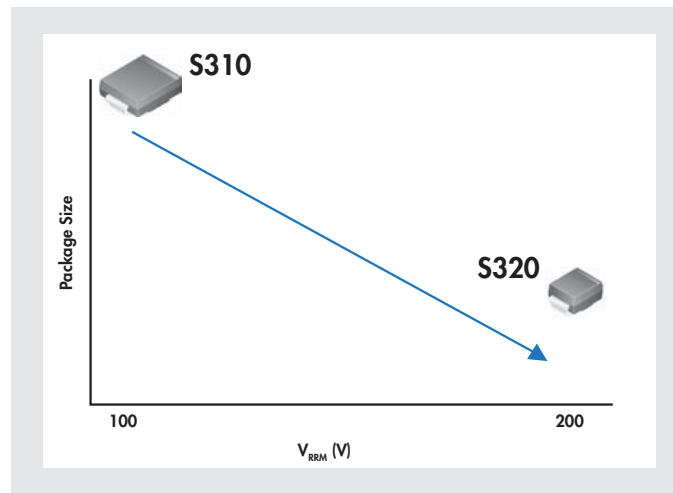
- **Power supplies**
 - Output rectification
 - Flyback/Free-wheeling diode
- **Polarity protection**

For more information, please visit:

www.fairchildsemi.com/pf/S3/S320.html

Schottky Rectifier Offers High Reverse Voltage and Smaller Surface Mount Packages

Designers of power supplies for industrial, wireless infrastructure and alternative energy systems no longer have to trade off between a high reverse voltage and a small surface mount package when choosing a rectifier. The S320 Schottky rectifier offers both a maximum repetitive peak reverse voltage of 200V and a low profile, industry-standard, mini surface mount package (SMB/DO-214AA). With a maximum forward voltage of 0.9V, the S320 has lower power loss than similar standard silicon rectifiers resulting in a higher overall power efficiency of the power supply. In addition, the S320 has a wide operating temperature range of -65°C to +150°C. The S320 is just the latest addition to Fairchild's broad portfolio of Schottky rectifiers.



Twice the Performance in a Smaller Package

Product Number	V _{RRM} (V)	I _{F(av)} (A)	I _{FSM} (A)	V _{FM} (mV)	R _{θJA} (°C/W)	I _{RM} (μA)	Package
S320	200	3	80	0.9	160	7	SMB

New Semiconductor Solutions Meet the Challenges of Efficient and Effective Generation of Renewable Power

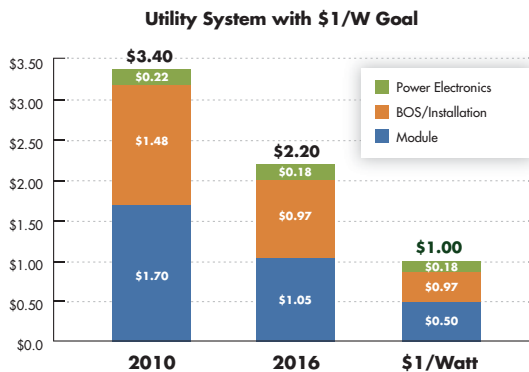
The following article is an abridged version with sections from Fairchild's backgrounder on solutions for the generation of renewable power.

Challenges Facing Solar Power Generation

Higher cell efficiency, lower system costs, reliability and geopolitical systems all pose challenges to this market's growth. The cost of a solar electric system is represented as dollar/watt. The current cost of a utility based solar electric system is \$3.3/W (Source: DOE). Government programs are funding research to help drive down the cost to \$1/W to help this market expansion. The different cost components that make up this system cost are provided in figure below. The panels represent more than 50% of the system cost; the balance of system (BOS) represents 43% and solar inverters represent 6%. In order to reach the aggressive \$1/W target, advancement in all PV system components is compulsory. Power electronics, while a small portion of the total cost, will drive harvesting efficiency and therefore is critical.

Reaching Cost Reduction Targets will require advances in all PV system components

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy



Panel manufacturers have made significant progress in cost reductions through new manufacturing processes and improvements in the conversion efficiencies of the solar cells. As the panel costs drop further in the future, the BOS and Solar Inverter costs will become a dominant part of the total system cost.

Engineering Connections offers blogs, videos, online seminars and podcasts that help designers solve their design challenges and speed time-to-market. Get the latest information at www.fairchildsemi.com/engineeringconnections.

Component Choices for Efficient, Cost-Effective and Reliable Implementations

Regardless of which topology is used, designers must make careful choices when selecting the individual components. The necessary improvements in performance, cost, reliability and efficiency require special attention to the following factors and their ultimate impact on the overall system:

Component count:

cost, size, total power dissipation, reliability

Heat/thermal management:

reliability, size/weight, cost

Minimization of losses and parasitics:

system performance, total power dissipation

Fairchild is committed to the development of components that will help designers implement systems optimized for these three important factors. Key building blocks for future harvesting and conversion implementations include:

- **IGBTs, and high- and mid-voltage MOSFETs** (high-voltage includes SuperFET[®], SuperFET[®] II and SupreMOS[®] MOSFETs; mid-voltage MOSFETs incorporate PowerTrench[®] technology). These products feature high current handling capability and low conduction and switching loss.
- **Gate drivers**, with a wide range of options that include optically isolated; high-speed low side; and high-voltage.
- **Bypass and blocking diodes** that maximize energy prevent energy loss in storage systems.
- **High-voltage silicon carbide (SiC)** devices that offer significant improvement on both cost and efficiency in energy conversion systems as well as higher reliability.



To obtain the complete backgrounder that includes the discussion on Fairchild solutions, converter topologies and complementary renewable technologies visit www.fairchildsemi.com/applications/solar-inverter/index.html

For datasheets, application notes, samples and more, please visit: www.fairchildsemi.com**PRODUCTS****APPLICATIONS****DESIGN SUPPORT****ABOUT FAIRCHILD****POWER MANAGEMENT****Power Factor Correction**

- Continuous Conduction Mode (CCM) PFC Controllers
- Critical/Boundary Conduction Mode (CrCM/BCM) PFC Controllers
- Interleaved PFC Controllers
- PFC + PWM Combination (Combo) Controllers

Off-Line and Isolated DC-DC

- AC-DC Linear Regulators
- Flyback & Forward PWM Controllers
- Flyback & Forward PWM Controllers with Integrated MOSFET
- LLC Resonant & Asymmetric Half Bridge PWM Controllers
- LLC Resonant & Asymmetric Half Bridge PWM Controllers with Integrated MOSFETs
- Primary-Side Regulation CV/CC Controllers
- Primary-Side Regulation CV/CC Controllers with Integrated MOSFET
- Standard PWM Controllers
- Supervisory/Monitor ICs
- Synchronous Rectifier Controllers

Non-Isolated DC-DC

- Charge-pump Converters
- DrMOS FET plus Driver Multi-Chip Modules
- Step-down Controllers (External Switch)
- Step-down Regulators, Non-Synchronous (Integrated Switch)
- Step-down Regulators, Synchronous (Integrated Switch)
- Step-up Regulators (Integrated Switch)

MOSFET and IGBT Gate Drivers

- 3-Phase Drivers
- Half-Bridge Drivers
- High- & Low-Side Drivers
- High-Side Drivers
- Low-Side Drivers

Voltage Regulators

- LDOs
- Positive Voltage Linear Regulators
- Negative Voltage Linear Regulators
- Shunt Regulators
- Voltage Detector
- Voltage Stabilizer
- Voltage to Frequency Converter

Motion Control

- BLDC/PMSM Controller
- Motion-SPM™ (Smart Power Modules)
- PFC SPM® (Smart Power Modules)

Diodes & Rectifiers

- Bridge Rectifiers
- Circuit Protection & Transient Voltage Suppressors (TVS)
- Diacs
- Rectifiers
- Schottky Diodes & Rectifiers
- Small Signal Diodes
- Zener Diodes

IGBTs

- Discrete IGBTs
- Ignition IGBTs

MOSFETs

- Discrete MOSFETs
- Level-Shifted Load Switches
- MOSFET/Schottky Combos

Transistors

- BJTs
- Darlingtons
- Digital/Bias-Resistor Transistors
- JFETs
- RF Transistors
- Small Signal Transistors

Advanced Load Switches

- Advanced Current Limited Load Switches
- Slew Rate Controlled Load Switches

Battery Management

- Battery Charger ICs
- Current Sensing

Ground Fault Interrupt Controllers

- Ground Fault Interrupt (GFI) Controllers

Backlight Unit (BLU)

- CCFL Inverter ICs

SIGNAL PATH ICs**Amplifiers & Comparators**

- Comparators
- Operational Amplifiers

Audio Amplifiers

- Audio Subsystems
- Audio Headphone Amplifiers
- Digital Microphone Amplifiers
- Audio Speaker Amplifiers

Battery Protection ICs

- Battery Protection ICs

Interface

- LVDS
- Serializers/Deserializers (µSerDes™)
- USB Transceivers

Signal Conditioning

- Video Filter Drivers
- Video Switch Matrix/Multiplexers

Signaling, Sensing & Timing

- Signaling, Sensing & Timing
- Timing

Switches

- Accessory Switches
- Analog Switches
- Audio Jack Detection Switches
- Audio Switches
- Bus Switches
- MIPI Switches
- Multi-media Switches
- USB Switches
- Video Switches

LOGIC**Buffers, Drivers, Transceivers**

- Buffers
- Line Drivers
- Transceivers

Flip Flops, Latches, Registers

- Counters
- Flip Flops
- Inverters
- Latches
- Registers

Gates

- AND Gates
- NAND Gates
- OR Gates
- NOR Gates
- Schmitt Triggers
- Configurable Gates

Multiplexer/Demultiplexer/Decoders

- Decoders
- Demultiplexers
- Multiplexers
- Multivibrators

Voltage Level Translators

- Voltage Level Translators

LIGHTING ICs

- Fluorescent Lamp ICs
- HID ICs
- LED Lighting ICs
- Portable LED Drivers

OPTOELECTRONICS**High Performance Optocouplers**

- Low Voltage, High Performance
- High Speed Logic Gate
- High Performance Transistor
- IGBT/MOSFET Gate Driver
- Specific Function

Infrared

- Emitting Diodes
- Photo Sensors
- Photo Sensor – Transistors
- Ambient Light Sensors
- Reflective Sensors
- Optical Interrupt Switches

Phototransistor Optocouplers

- Isolated Error Amplifier
- Phototransistor Output - DC Sensing Input
- Phototransistor Output - AC Sensing Input
- Photo Darlington Output

TRIAC Driver Optocouplers

- Random Phase TRIAC Driver
- Zero Crossing TRIAC Driver

AUTOMOTIVE PRODUCTS**Automotive Discrete Power**

- Automotive Ignition IGBTs
- Automotive IGBTs
- Automotive N-Channel MOSFETs
- Automotive P-Channel MOSFETs
- Automotive Rectifiers

Automotive High Voltage Gate Drivers (HVICs)

- Automotive High Voltage Gate Drivers (HVICs)

High Side Smart Switches

- High Side Smart Switches