

MICREL[®]

MICREL[®]
USER-DEFINED
ANALOG
POWER
SOLUTIONS

THE TECHNOLOGY-RICH
ANALOG IC
MANUFACTURER

M-EZANALOG[™]

MPD8021



DESIGN YOUR OWN
SINGLE-CHIP ANALOG POWER IC
USING THE MICREL[®] MPD8021

THAT'S RIGHT.
SINGLE-CHIP.
AND EASY TO USE.

MICREL SEMICONDUCTOR: YOUR CUSTOM ANALOG IC MANUFACTURER

Full-Featured Kit

The M-EZAnalog™ MPD8021 contains a full range of high-performance features for versatile, optimized analog power IC designs. This “parts cabinet” includes:

— ARE YOU READY?

- 12 N-Channel fully floating DMOS power FETs (that can be paralleled for single, half-bridge or bilateral switches)
- 40 high-voltage PMOS FETs (for level shifting, high-voltage amplifiers)
- 12 high-voltage DMOS FETs (for level shifting, voltage amplifiers)
- 20 high-voltage, grounded-source DMOS FETs (for level shifting, current mirrors)
- Devices to build more than 100 CMOS gates
- 12 CMOS/TTL compatible I/O buffers
- 13 low-voltage CMOS transistor arrays (for op amps, comparators and digital circuitry)
- 14 dual-oscillator PNPs and 12 NPNs (for bandgaps, low-offset amplifiers, comparators and temperature sensors)
- High- and low-value resistors and capacitors
- 12V and 6V Zener diodes (for gate-to-source clamps and voltage references)
- 67 I/O pads (36 include 2kV ESD protection)
- -55 to +125°C operation
- Multiple packaging options

Micrel® MPD8021 Delivers a Cost-Effective, Versatile Single-Chip Solution for:

- Two- and Three-Phase Motor Control Applications
- High-Voltage Linear Supplies
- Relay and Solenoid Drivers
- Multi-output Switching Supplies
- High-Voltage Controlled Bus Drivers
- Half- and Full-Wave Bridge Drivers
- High-Voltage Signal Processing
- Lamp Drivers with Current Limit and Overtemperature Protection

That's right.

Cost-Effective: Micrel's easy-to-use EZAnalog™ Design Kit is FREE on the Internet.

Single Chip: Why use multiple discretes when one analog ASIC will do?

Versatile: The MPD8021 can be used for complex high-voltage applications. You, the customer, control your proprietary designs. Now your intellectual property is safe from your competitors!

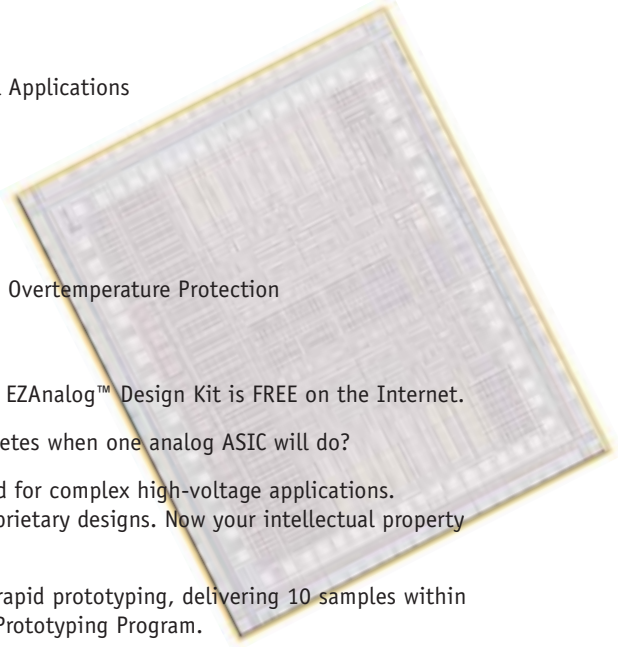
Quick Turnaround: Micrel provides rapid prototyping, delivering 10 samples within 6 weeks, using the Micrel® EZAnalog™ Prototyping Program.

Micrel's M-EZAnalog™ MPD8021 Packs the Punch for High Voltage

Leading Technology Integration: The M-EZAnalog™ MPD8021 is a semicustom, high-voltage, mixed-signal power ASIC (application-specific integrated circuit). Micrel's unique high-voltage transient protection comes built-in with the MPD8021, making it easy to design into bus systems with $\pm 80V$ transients, like those used in avionics.

Micrel delivers fast turnaround by applying a unique metal interconnect pattern, based on the client's design, to a stock MPD8021 wafer. Once a design is production ready, Micrel's proven fabrication and test group provides timely deliveries of high-quality, fully-tested, proprietary analog ASICs at competitive prices.

Customers design their proprietary ASICs using a low-cost commercially-available SPICE simulator and free Design Kit. For breadboard circuits, “kit parts” that are actual working designs, featuring access to many internal functions, are available free of charge through your local representative.



With the M-EZAnalog™ MPD8021, Designing Your Solution is Simple

1 Point Your Web browser to <http://www.micrel.com> or <http://www.ezanalogue.com>

2 Download the 8021 design information

3 Follow the simple How-to Guide

How simple? Let Micrel show you:

- Download the MPD8021 Technical Bulletin & Design Manual and familiarize yourself with the component cabinet. Example devices are available free of charge through your local representative. These will enable you to build test breadboards or measure component performance in the laboratory.

- Contact your local representative regarding how to obtain free SPICE models.

- Using your favorite SPICE simulator, design the requisite circuits using the SPICE models and subcircuits available on the Internet.

- Using GDSII-compatible layout software, hookup your design using one metal and one feedthrough layer. You can use the example layouts available on the Internet to help speed up this process. If you do not own a layout tool, one can be purchased from several different vendors.

ESD ADVISORY: Don't forget to protect your design!

- Perform design rule checks and connectivity checks on your layout to certify you have connected your simulated schematic correctly. In conjunction with the prototyping program, Micrel provides Design Rule Checking (DRC) as a service.

- E-mail your layout database to ezhelp@micrel.com along with the completed MICREL[®] MPD8021 order form, including your company's purchase order number. Those customers who have not established a credit account with Micrel must submit the prototyping charge with their order.

- In less than 6 weeks, Micrel will ship 10 packaged MPD8021s in a standard 68-lead ceramic LCC package for your evaluation. Prototypes will not be tested. The package lids will not be sealed so that, if necessary, microprobing may be performed to assist with troubleshooting.

- The prototyping process can be repeated as many times as is necessary for the same \$25,000 NRE, to complete our specification-compliant design.

- The test program will be created to your specifications after your prototype verification process — NRE quotation requires test matrix.

All logic and analog circuitry is powered by a single +3V to +12V supply. The high-voltage section functions from +20V to +100V. This section includes a charge pump that can drive a N-Channel MOSFET gate above the high-voltage supply in high-side switching applications, offering additional design versatility.

Versatile Applications: With easy-to-use design tools and quick turnaround capability, the single-chip M-EZAnalog™ MPD8021 offers wide flexibility for a variety of high-voltage interface applications. Your imagination may be the limit.

What's the Bottom Line?

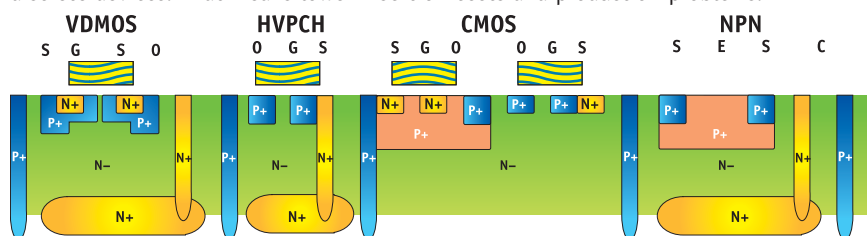
Lower Cost: A single-chip MPD8021 can cost less than a design containing several discrete components.

Higher Reliability: One highly-reliable MPD8021 easily beats the MTBF (Mean Time Between Failure) generated by literally many separate devices.

Protecting Your IP: Your intellectual property — your proprietary design — is sealed away from your competitors in a single-chip MPD8021 that is only available to your company.

Higher Performance: For example, adding thermal shutdown and fail-safe protection is easy with the single-chip MPD8021. Just use the on-chip temperature sensor to turn off gate drive to the on-chip FETs.

Fewer Production Problems: A single-chip MPD8021 is easier to use than many discrete devices. That means lower insertion costs and production problems.



Cross section shows four of the many types of devices available on the MPD8021 product. This junction-isolated process includes VDMOS, LDMOS, HVPCH, digital and analog CMOS, NPN, PNP, diodes, capacitors and resistors all available for discretionary wiring on the same product. VDMOS transistors are not restricted to grounded-source applications.

Only Micrel Has the Right High-Voltage Technology for the MPD8021

The versatile, high-performance M-EZAnalog™ MPD8021 is made possible by Micrel[®] proprietary process technology that integrates bipolar, CMOS and DMOS devices on a single monolithic silicon substrate. Micrel uses a high-voltage bipolar-based process (isolated epitaxial regions with buried layer) as opposed to CMOS-based processes (diffused tub regions with a base region for vertical bipolar devices). This bipolar-oriented process is best suited for applications which require interfacing with voltages greater than 20V at high speed with modest amounts of control logic (fewer than 200 gates).

Besides managing high voltage, Micrel[®] technology provides designers several device types to solve the toughest of control issues. The MPD8021 array offers a wide range of devices. For example, complementary bipolar devices for precision analog functions, such as bandgap references and low-offset amplifiers, and 110V (typ.) power DMOS for driving external loads, such as motors, solenoids and pin diodes.

Importantly, Micrel[®] technology uses a junction-isolated process which offers customers a solution to high-voltage, high-speed design problems at a very competitive price.

About Micrel

Micrel provides customers with total solutions in analog ICs. By "total solutions," we mean the best possible choices between Micrel's variety of analog standard products, custom and foundry services.

Custom and semicustom analog ICs are a major part of our total-solutions strategy. Often, only a ground-up or tailored design provides the leading edge difference needed for success.

"By meeting our customers' needs, we've been profitable and growing for more than 20 years — something few IC manufacturers can say. This stellar performance reflects our successful dedication in offering customers the right custom, semicustom and standard products at the right time."

—Ray Zinn,
President, CEO and Chairman

We're Your Business Partner!

We successfully serve diverse markets because we possess the expertise, experience and technologies to meet the needs of our customers. This way, we succeed as they succeed, as viable partnerships should.

Key Micrel Markets Include:

- Portable battery-powered computing equipment
- Telecommunications and networking
- Cellular telephones
- PC Cards (PCMCIA) and sockets
- Medical electronics
- Automotive electronics
- Desktop computers
- OEM power supplies
- Industrial
- Avionics
- Military

These growing markets attest to Micrel's versatility as a technology-rich analog IC manufacturer providing total solutions for customers.

Our vertically-integrated design, process and test operation enables tightly-coupled design-to-production flow — and the highest possible conformance to performance specifications.

Builds on standard product expertise. To develop customized circuits, we leverage our extensive expertise in standard analog ICs. We manufacture and market more than 2,500 standard products that help drive our technologies and expertise to produce better custom solutions.

Industry Leading Analog Processes

Micrel's production processes include BiCMOS, bipolar, CMOS and DMOS as core technologies. These come in N-well, P-well and dual-well configurations across a broad range of voltages and operating currents. And, they're used in an upgraded six-inch facility for more capacity.

Quality Counts

Micrel never negotiates quality. We design it in.

And we're never satisfied. We continuously strive to improve the quality of our products and services through active engagement with our customers and suppliers.

Aggressive quality goals. Micrel is fully ISO 9001 certified.

Micrel: Your Powerful Analog IC Manufacturer of Custom, Semicustom, Standard and Foundry Solutions — from Design Start to Finished Product.

Need Information?

Get started now with the M-EZAnalog™ MPD8021. Download the M-EZAnalog™ Internet Design Kit at Micrel's website:

<http://www.micrel.com>
or www.ezalog.com

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