Since its inception in 1983, IXYS Corporation, a Silicon Valley power semiconductor company, has been developing technology-driven products to improve power conversion efficiency, generate clean energy, improve automation and provide advanced products in the transportation, medical and telecom industries. IXYS (Nasdaq: IXYS) is a worldwide pioneer in the development of power semiconductors and high voltage integrated circuits (HVICs) necessary for reducing the world’s dependence on fossil fuels.

Diminishing natural resources, demand for cheap energy and environmental directives for energy efficiency represent a significant challenge. IXYS’ power semiconductors and mixed-signal ICs play a vital role in reducing energy costs and consumption by optimizing the energy efficiency of everyday products. With a customer base of over 2,500 telecommunications, transportation, industrial, medical and consumer companies, IXYS is a worldwide provider of semiconductors.

A forerunner in the alternative and renewable energy industry, IXYS focuses on providing power semiconductors for equipment used in harnessing wind and solar power for conversion to the U.S. electrical power grid. IXYS recently developed solar cell arrays and cards for charging portable batteries in applications ranging from traditional alkaline batteries, laptops, cell phones and RFID tags to sensors.

IXYS continues to invest in new technologies through acquisitions and internal R&D aimed at complementing IXYS strengths in power, as well as expanding its market opportunity into emerging high growth markets, including energy management and power quality. Both of these markets are gaining more attention due to the increasing use of electricity, and the strategic importance of energy conservation worldwide.

IXYS, and its subsidiaries, offer a diversified product base that addresses worldwide needs for power conversion, electrical efficiency and renewable energy. For more information, visit: www.ixys.com

**MAIN MARKETS**

**POWER SEMICONDUCTORS**

IXYS has three power MOS product lines, which include power metal-oxide semiconductor field-effect transistors (MOSFETs), insulated gate bipolar transistors (IGBTs) and BIMOSFETs.

IXYS' power MOSFETs are used primarily in large power conversion systems and are focused on voltage applications ranging from 60 to 2,500 volts. Its power MOSFETs have on-state resistance among the lowest available for a given die size and voltage.

Its IGBTs are used principally in alternating current (AC) motor drives, power systems and defibrillators. Activated by voltage rather than current, IGBTs switch electricity at higher power levels than power MOSFETs.

IXYS’ bipolar products consist of rectifiers (convert AC to DC power), thyristors (switches turned on by controlled signal and turned off when output current is reduced to zero) and GTOs.

Applications and customers for IXYS’ power semiconductors include:

- **Telecom:** To regulate the high voltage electricity required for cell phone base stations, Internet server farms and storage area networks. IXYS’ power semiconductors ensure that the proper voltage is available to keep all the systems up and working.
- **Industrial & Motor Drive:** To control the power of robotic arms, automation and factory conveyor belts.
- **Transportation:** To handle the high voltage requirements of electrified mass transit systems. Trains in Europe and Japan are based on an electrical grid; other countries’ transportation systems will likely follow suit.
IXYS has multiple products in the hybrid car market, ranging from ISOPlus™ Direct Copper Bond (DCB) isolated discrete and module packages to GigaMOS™ Trench Power MOSFETs. IXYS’ history in electric automobiles dates back to the early 1990s, when General Motors launched the first electric car, EV1. The EV1 roadster was loaded with IXYS chips, making the electric vehicle a marvel of engineering. Despite meaningful pent-up marketplace interest in the car, GM never offered the EV1 for public sale because of its expense.

- **Medical Electronics:** To control the immediate high voltage power demands of medical electronic equipment. IXYS is a key chip provider for portable defibrillators and advanced diagnostic systems (MRIs, X-rays, ultrasound, surgical lasers and more). IXYS received FDA approval for its IGBT in portable defibrillators; the semiconductor controls the high voltage necessary to power the defibrillator (1,000 volts).
- **Consumer:** To meet power consumption levels, while offering energy efficiency. Each individual pixel in a plasma TV display requires a high voltage pulse. Consumers demand “energy efficiency” in their household appliances -- microwaves, washing machines, dishwashers, refrigerators. IXYS’ chips regulate/control electrical output.

**INTEGRATED CIRCUITS**

Through its subsidiary, Clare Inc., IXYS designs, manufactures and markets optically isolated solid state relays (OptoMOS®), mixed-signal custom ASICs and ASSP integrated circuits (ICs) for the telecommunications market. IXYS’ deep heritage in analog/mixed-signal and high-voltage design enables the company to pioneer highly-integrated semiconductor solutions that both replace magnetics and enhance performance in wireline interface applications.

Adaptive innovation is the watchword of not only IXYS’ product design philosophy, but also the approach to the customer markets. It is also one of IXYS’ key competitive advantages, enabling creative innovative products aimed at the critical last inch of the last mile of the global telecommunications network.

IXYS’ experience in high-voltage and mixed-signal applications has also led to entry into other high-growth areas, including the industrial, consumer and new, emerging flat panel display markets.

Applications and customers for IXYS’ integrated circuits include:

- **Power Management:** Addressing demand for longer battery life, finely regulated power quality and power reliability
- **Telecom:** Mixed signal/advanced high voltage integrated circuits required in VoIP gateway; SSRs for high voltage switching and power isolation; ICs for integrated telecom & linear opto-couplers
- **Industrial & Motor Drive:** Motor controls, power switch, power supplies, electric utility meters, fuel pumps, energy management, elevator/escalator controls, factory automation, industrial controls, battery monitors
- **Transportation:** To handle the high voltage requirements of electrified mass transit systems. Trains in Europe and Japan are based on an electrical grid; other countries’ transportation systems will likely follow suit
- **Medical Electronics:** Ultrasound imaging
- **Aerospace/Defense:** Avionics controls, ship-to-shore communications, electronic countermeasures, munitions, surveillance
- **Consumer:** For flat panel displays (plasma and LCDs), flexible displays, lighting appliances, digital cameras, PDAs

**MICROCONTROLLERS – DIGITAL POWER MANAGEMENT**

In February 2010, IXYS acquired Zilog, Inc., a trusted supplier of application specific, embedded microcontroller units (MCUs) that are system-on-chip (SoC) solutions for industrial and consumer markets. By introducing MCUs that enable digital power management and embedded control, IXYS is able to create more cost-effective system integration solutions for its diversified customer base.

Digital power management is one of the fastest growing applications in the power markets. Zilog’s 35-year history in microcontrollers with its legendary Z80 and Z8 architectures parallels IXYS’ pioneering technologies in power MOSFETs, IGBTs and HVICs. With the expected rebound in MCU sales in 2010, growth opportunities abound for refined power control in many applications.
IXYS expects to increase its penetration in the automotive electronic and electric market by producing cost-effective integrated product offerings, including the power semiconductors, driver ICs and Zilog MCUs that are essential for automotive controls and driving displays. In IXYS’ prime industrial market, IXYS plans to deploy MCUs that are suited for motor control, power control and automation. In the telecommunications and security industries, Zilog’s MCUs complement IXYS’ ICs, which can be deployed in modems, VOIP, FIOS and automated alarm systems. For the medical market, the Zilog MCU platform complements IXYS’ power and IC products in defibrillators, imaging and diagnostics. MCU product offerings will be expanded to include low-power and sensing technologies for energy management applications, including smart lighting and intrusion detection.

**RF POWER & SYSTEMS:**
Through its subsidiaries, Microwave Technology, Inc. and IXYS RF (IXYS Colorado), IXYS is a leading manufacturer of radio frequency (RF) and microwave discrete semiconductor products, GaA Schottky diodes, MOSFET Driver ICs, wireless amplifier products, microwave amplifiers, MMIC amplifiers, and hybrid modules. The products are found in industrial RF applications, medical applications (MRI machines, increasing electronic content, better image resolution), military/aerospace and telecommunications (amplifiers for WiFi/WiMAX base stations, MMICs for cellular handset).

IXYS supplies customers with reliable MOSFET and GaAs technologies, married with industry leading package designs that rely on advanced proprietary and patented techniques for outstanding performance and reliability. IXYS offers industry standard packages as well as proprietary industry leading packages including the ultra low inductance DE Series RF package, ISOPLUS247, and Mirror TO-247.

IXYS has built a reputation for its product line of small internally matched modular surface mount transmit and receive amplifier modules aimed at multi-carrier and/or digitally modulated (high linearity) wireless infrastructure and military communication systems. Employing thin film hybrid microcircuit construction, IXYS produces and markets various standard modular amplifier products to 26 GHz. These modules are also building elements for IXYS to design and manufacture standard as well as custom connectorized amplifiers for defense and telecommunication applications.

**RENEWABLE ENERGY:**
Harnessing energy has taken on new dimensions at IXYS. Over the past 12 years, IXYS has been actively involved in the renewable energy industry, as solar panels and windmills popped up worldwide.

**Wind Energy:** In almost every position in the supply chain for wind-generated electricity, there is a need for power semiconductors to efficiently translate the raw energy into clean energy able to be used by the consumer. IXYS was one of the first suppliers of power semiconductor chips to control the high voltage conversion from wind power to the electric grid.

In 1995, IXYS started working with an Indian small wind turbine supplier that had a 3MW wind farm project. By the end of 2007, the Indian turbine company supplied over 7,500 MW worldwide. IXYS supplied power semiconductors to the company’s first turbine, and has been the Indian company’s leading supplier ever since. We also supply chips to companies in Holland, Spain and other European locales, as well as technology-leading countries including Japan.

In a very simple explanation: Wind turbines generate electricity in variable voltage or variable frequency AC, since the wind can not be easily regulated to control the speed of a windmill. However, the electric utility grid is fixed voltage (fixed frequency AC energy), so power conversion technology must be employed in order for the technology to be effective.

Inverters serve as the gateway between renewable energy resources and the AC electrical grid. IXYS supplies phase control devices, namely Wespack SCRs, to customers who use thyristor AC regulators to connect the output of the wind generator to the grid and provide frequency synchronization between the generator (wind) and the fixed grid frequency.

With today's attention to the use of raw materials, the Wespack thyristor is smaller in thickness and optimizes the silicon content that was traditionally resident in previous standard capsules. With its minimal material usage in the package, Wespack is a natural future choice in these applications, as next generation projects for multi megawatt systems come on line. Wespack offers higher power density at lowest cost. Additionally, the reduced use of materials...
(copper & molybdenum) in the package offer good 'green' credentials in minimizing use of material and energy resources in their manufacture.

IXYS’ Press Pack IGBTs can also be utilized in the wind turbine application either as the mast head converter/inverter or the ground based synchronization element. The Insulated Gate Bipolar Transistor (IGBT) is basically a switch used to control electrical current and voltage. The press pack IGBT offers unrivalled reliability, when compared to current IGBT plastic module propositions from other suppliers. The innovative way the IGBT chip is integrated into hermetic ceramic capsule technology removes the module design weak points of soldering the die and wire bonding. For the higher reliability of wind turbine systems, which are expensive to maintain especially when located remotely or off-shore, Westcode’s high reliability press pack technology is a natural solution to a green initiative.

**Solar Energy:** Where once solar energy was relegated to solar panels for household heating and lighting, the paradigm has changed. For IXYS’ part, the company is focusing on solar products that can replace or extend the lifetime of batteries. IXYS introduced the first solar cell for charging portable batteries back in 2003, but it has been only in the past year that the technology and applications have gained momentum.

As portable devices pack greater functionality/features without increasing battery power, power management requirements have increased. These products require multiple supply rails, battery charging and a variety of power management capabilities – all of which are implemented to maximize battery life. At the end of the day, however, portable products have to be plugged into an AC outlet to “juice up” the battery -- which in turn puts a strain on the U.S. electric grid.

IXYS decided to develop its own solar cells for applications where the cost of electricity is highest – the battery. IXYS developed solar cell arrays and cards for direct charging of and providing electricity for portable batteries. The IXYS solar cell chip has vast applications, ranging from traditional alkaline battery recharging to battery charging for laptops and cell phones to RFID tagging, wireless sensors, test equipment and smoke detectors. One chip deriving power from solar energy can generate 12 volts of electricity – enough to charge batteries of mission critical applications. **IXYS is truly a pioneer in this industry, as no other company has a similar product on the market.**

A more comprehensive list of IXYS’ solar products include: diodes for solar energy applications, high efficiency solar cell arrays/cards for charging batteries in portable electronics, solar bit evaluation boards, Schottky rectifiers suitable for solar cell generation systems and portable solar battery chargers.

**COMPANY BACKGROUND**

Dr. Nathan Zommer, IXYS Chairman and CEO, founded IXYS Corporation (Nasdaq: IXYS) in 1983. The company quickly differentiated itself from other power semiconductor companies by establishing a product portfolio of higher voltage, high efficiency, discrete power MOSFETs and IGBTs.

In 1989, IXYS acquired ABB's German semiconductor division, adding bipolar and power module products and technologies. This acquisition gave IXYS a strong manufacturing and sales foothold in the burgeoning European power electronics marketplace.

IXYS went public in 1998. In May 2000, IXYS acquired Directed Energy, Inc. (DEI), a supplier of high-speed, pulsed-power instruments and components for OEM, laboratory and manufacturing applications. DEI (under the IXYS Colorado division) supplies customers with solid-state pulsed voltage and current instruments that rely on patented techniques and circuit designs for performance and reliability.

In January 2002, IXYS acquired Westcode Semiconductors Limited, a UK-based power semiconductor company that manufactures and sells a portfolio of very high power semiconductors products, which supplement the existing IXYS product line. Later that same year, IXYS acquired Clare, Inc., a firm specializing in mixed system integrated circuits and optical isolation products used in communications products like VoIP, as well as display drivers and security systems.

In September 2003, IXYS acquired MicroWave Technology, Inc., a leading manufacturer of RF & microwave discrete semiconductor products, wireless amplifier products, microwave amplifiers, MMIC amplifiers, and hybrid modules.
In August 2009, IXYS CH GmbH acquired two business lines (LED driver/controller business and certain legacy display driver products) from Leadis Technology, Inc.

In February 2010, IXYS closed the acquisition of Zilog, Inc. a trusted supplier of application specific, embedded microcontroller units (MCUs) that are system-on-chip (SoC) solutions for industrial and consumer markets. By introducing MCUs that enable digital power management and embedded control, IXYS is able to create more cost-effective system integration solutions for its diversified customer base.

Headquartered in Milpitas, CA, IXYS has grown to become a premier power semiconductor manufacturer in the U.S., with a market cap of approximately $450 million. Its diversified product base of specialized power semiconductors and integrated circuits is utilized by customers worldwide, ranging cross industrial, transportation, telecommunications, computer, medical and consumer markets. 6/2011