

# O.S.D

OPTOELECTRONICS • SENSORS • DISCRETES

# REPORT

# 2009

A Market Analysis and Forecast for  
Optoelectronics, Sensors/Actuators, and Discretives

- ▶ One-of-a-kind report on the "non-IC" semiconductor markets
- ▶ Market, unit, and pricing forecasts through 2013
- ▶ Review of applications and technologies, including MEMS
- ▶ Impact analysis of industry recession and recovery on market segments
- ▶ Free call-in privileges on information presented

## MAJOR FINDINGS INCLUDE:

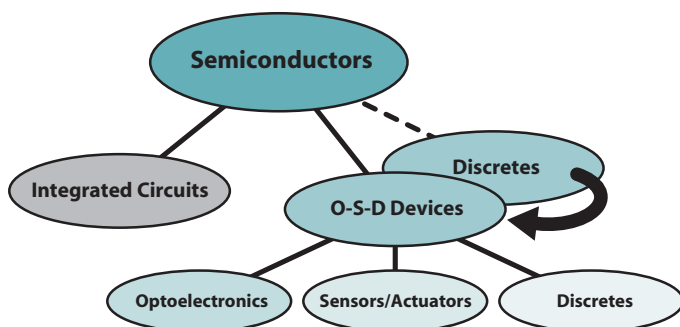
- 1 Solid-state sensors/actuators—driven by MEMS technology—will be the fastest-growing semiconductor market coming out of the 2008-2009 industry recession (18% annually).
- 2 For the first time in history, optoelectronics surpassed sales of discretives in 2008 to become the second-largest semiconductor market segment behind ICs.
- 3 CMOS image sensors have overtaken CCDs in total revenue and will represent 85% of units in the image sensor market by 2013.
- 4 Power transistors now account for over half the revenues generated by discretives, with over 40% coming from MOSFET and IGBT products in 2008.
- 5 Fiber-optic transmission devices have staged a dramatic recovery since the last telecom recession and have become the fastest-growing product category in optoelectronics.

Great complement to the IC market data provided in *The McClean Report*

# Discover New Business Opportunities in Optoelectronics, Sensors, and Discretes

The semiconductor universe consists of integrated circuits (ICs) and optoelectronic, sensor/actuator, and discrete (O•S•D) components. Although smaller and oftentimes overlooked, the O•S•D market plays a vital role in the overall health and advancement of the semiconductor and electronic systems industries. IC Insights' 2009 *O•S•D Report* uncovers little-known, but revealing trends in this marketplace and sheds light on the rapidly increasing importance of these devices. O•S•D products accounted for 16% of total semiconductor revenues in 2008 compared to about 13% 10 years ago.

## Generic "Discretes" Label No Longer Relevant



Until recently, products falling outside of mainstream integrated circuit categories have often been lumped into a market melting pot called "discretes." However, high growth in optoelectronics, sensors, and actuator device markets has created a need to further segment the category previously labeled as discretes in order to perform more in-depth analyses. In addition, a growing number of optoelectronic, sensor, and actuator products are actually integrated circuits, making the general "discrete" label obsolete.

## CONTENTS

**270 PAGES**

**210 CHARTS, GRAPHS, ILLUSTRATIONS**

- Global Semiconductor Market Outlook and Cycles
- Extensive Tables of Market, Unit, and Pricing Data to 2013
- End-Use Application and Regional Market Analysis
- Leading Supplier Rankings for 2008
- Device History and Technology Trends
- Diagrams and Illustrations of Devices and Packages

**And More!**

## About The Author

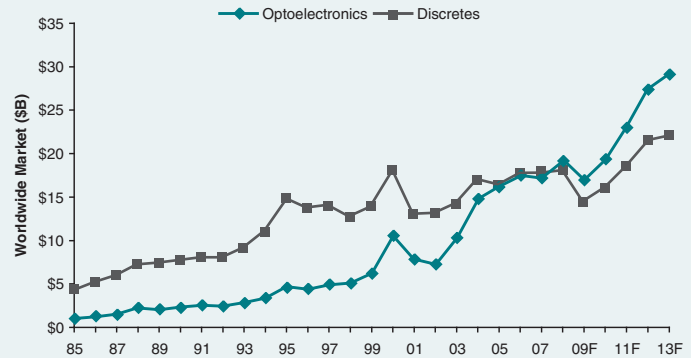
Rob Lineback is Senior Market Research Analyst at IC Insights. He has over 29 years experience as an industry analyst and editor covering semiconductor business, technology, and global suppliers. Prior to joining IC Insights in 2005, Rob was senior technical editor for Solid State Technology and WaferNews. He co-founded Internet-based The Semiconductor Reporter and was the founding editor for SiliconStrategies.com (also known as Semiconductor Business News). He also held chief editor positions at Electronic Business Today, Electronic World News, Electronic Buyers' News, and Electronics, and was the European editor of Electronic News.

# OPTOELECTRONICS

- CCD AND CMOS IMAGE SENSORS
- LASER TRANSMITTERS AND PICK-UPS
- SOLID-STATE LAMPS AND LEDs
- INFRARED DEVICES
- COUPLERS, ISOLATORS, AND OPTICAL SWITCHES
- DIGITAL CHARACTER DISPLAYS
- OTHER OPTO DEVICES

For nearly 25 years, solid-state optoelectronic devices have lived in the shadows of discrete semiconductor products. Historically, optoelectronics was considered a small but fast-growing branch of the “greater” discrete marketplace, but that is no longer the case. Consistently higher growth rates enabled optoelectronics sales to exceed discretives revenues by \$1 billion in 2008—marking the first year in history that optoelectronics topped the market for discretives! This is an amazing milestone, considering that optoelectronics sales were only one-fourth to one-half the dollar volume of discretives in the 1980s and 1990s. By 2013, optoelectronics sales are expected to exceed discrete revenues by nearly 31%. Strong growth in optoelectronics is being driven by image sensors, solid-state lamp devices, and laser transmitters.

Optoelectronics Pull Ahead of Discretives



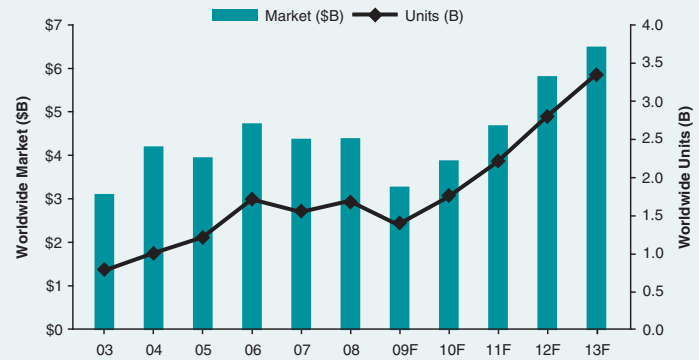
# SENSORS/ACTUATORS

- PRESSURE SENSORS (INCLUDING MEMS-BASED)
- ACCELERATION/YAW SENSORS (INCLUDING MEMS-BASED)
- MAGNETIC-FIELD SENSORS
- ACTUATORS (INCLUDING MEMS-BASED)
- OTHER SENSORS (E.G., TEMPERATURE SENSORS AND FINGERPRINT ID CHIPS)

Solid-state sensors have been around for decades, often performing real-time measurements in embedded-control applications. But, it was not until 2001 that sensors were fully recognized as a fast-growing product segment within the semiconductor industry. Prior to 2001, sensors were mostly seen as an adjunct to the larger discrete semiconductor segment.

MEMS-based products account for 80% of the revenues in the sensor/actuator segment. MEMS-based unit shipments in this category are forecast to grow at a CAGR of 16% per year in the 2010-2013 timeframe.

MEMS-based Sensors & Actuators Growth



# DISCRETES

- POWER TRANSISTORS/MODULES
- SMALL-SIGNAL TRANSISTORS
- SWITCHING TRANSISTORS
- DIODES, RECTIFIERS, AND THYRISTORS
- RF/MICROWAVE TRANSISTORS/MODULES

A half-century ago, transistors began as small-signal devices, aimed primarily at replacing bulky vacuum tubes in switching and amplification applications. Ten years later, transistors developed into integrated circuits, which then began to eliminate the need for many small-signal discrete devices. However, with 334 billion discretives shipped in 2008, the advent of ICs certainly has not stopped the growth of transistor products and other commodity solid-state discretives. In fact, discretives are seeing increased use in portable electronics applications such as laptop PCs, PDAs, and cell phones, which need more power transistors and other discretives in power management, switching power supplies, and battery-charging systems.

Top 10 Discrete Suppliers

2008 Rank	Company	Headquarters	2007 (\$M)	2008 (\$M)	08/07 % Change
1	Toshiba	Japan	1,410	1,489	6%
2	Infineon	Europe	1,395	1,461	5%
3	ST	Europe	1,285	1,238	-4%
4	Fairchild	U.S.	980	976	0%
5	Vishay	U.S.	995	968	-3%
6	Rohm	Japan	890	857	-4%
7	NXP	Europe	830	789	-5%
8	ON Semi	U.S.	706	744	5%
9	NEC	Japan	725	718	-1%
10	Renesas	Japan	650	616	-5%
<b>Top 10 Total</b>			9,866	9,856	0%
<b>Others</b>			8,207	8,349	2%
<b>Discrete Total</b>			18,073	18,205	1%

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