The semiconductor industry has fundamentally transformed the world's industrial structure. By providing the "building blocks" of the microelectronic revolution, semiconductor technology fuels development and productivity in crucial industrial sectors, including consumer electronics, telecommunications, factory automation, and defense electronics. Advancements made possible by the semiconductor industry and related "downstream" electronics industries have visibly impacted the economic, social, and political structures of the United States and other countries throughout the world.

The importance of the semiconductor industry has generated widespread interest on the part of business, government, and the academic and financial communities in statistics that offer insight into the industry's performance. This report provides a series of critical indicators of the U.S. semiconductor industry's financial and operating performance since 2001.

The 2023 Semiconductor Industry Association Databook (hereafter, The Databook) comprises more than 50 historical data series that document key trends in the U.S.-based semiconductor industry. Included in this report are measures of operating performance, employment, cost structure, productivity, and profitability. The Databook is intended to provide industry observers with insights into its historical evolution. The impact of the "Silicon Cycle" is examined, as well as long-term industry trends.

**DESCRIPTION OF DATA SOURCES**


The Databook accounts for over 95 percent of total U.S.-based semiconductor sales revenues. Because of this high rate, total U.S. industry performance trends may be readily inferred from WSTS and 10K/10Q data except where noted (such as in the discussion of capital expenditures).
ORGANIZATION OF REPORT
The following is a brief outline of the trends covered in the SIA Databook.

Section 1: Global Industry Overview
Section 2: U.S. Industry Overview
Section 3: Global Market
Section 4: U.S. Industry Business Profile
Section 5: Capital and R&D Investment
Section 6: Jobs
Section 7: Productivity & Profitability

DESCRIPTION OF RESULTS
The majority of charts and tables present historical trends in a ratio format, and include "mean" and "median" data. Mean values are determined by first totaling both the ratio numerator and denominator for firms and dividing these totals to determine the "average" industry result. Computed in this manner, the result is weighted by the relative size of each firm: large firms impact the ratio in greater proportion than small firms. However, the median value is not weighted by firm size, because one half of the respondents report a higher ratio, and one half report a lower ratio.

In some cases, total sales, market shares, or investments levels are presented. Sales and market share data are derived from the WSTS. Total industry outlays for investment and research and development (R&D) are inferred from the expenditure rates of survey respondents, the respondents' share of the U.S.-based industry, and the 10K/10Q filings of U.S. semiconductor companies to the SEC.
(1) SECTION 1: GLOBAL INDUSTRY OVERVIEW
(2) The Global Semiconductor Industry has been One of the Fastest Growing Industrial Sectors in the Global Economy
(3) Annual Growth Rates of Worldwide Semiconductor Industry Sales have been Cyclical and Volatile
(4) The Semiconductor Industry has been Characterized by Short-Term Sales Volatility
(5) Annual Growth Rates for Worldwide Sales of Memory Semiconductors have Historically been more Volatile than Non-Memory Semiconductors

(6) SECTION 2: U.S. INDUSTRY OVERVIEW
(7) The U.S. Semiconductor Industry has Nearly Half of the Global Market Share
(8) U.S.-Based Industry Semiconductor Sales have Displayed Similar Steady Annual Growth as the Overall Global Industry
(9) Annual Percentage Changes in U.S.-Based Semiconductor Industry Revenues have been Cyclical
(10) U.S.-Based Semiconductor Companies Maintain Market Share Leadership in Most Major Regional Semiconductor Markets
(11) U.S.-Based Semiconductor Companies Maintain Nearly 50 percent of Global Semiconductor Market Share and Lead in Most Major Regional Markets
(12) Semiconductors are one of America’s Top Exports

(13) SECTION 3: GLOBAL MARKET
(14) Global Semiconductor Sales are Diversified by Type of Product Sold
(15) While the Type of Semiconductor Products Sold has not Changed Much Over Time, the Share of Each Product of Total Semiconductor Sales has Shifted
(16) Logic Semiconductors Represent the Largest Share of Global Semiconductor Sales by Major Product Sector
(17) Historically, Memory Semiconductors have Displayed the Most Volatile Growth Rate of Any Major Semiconductor Product Sector
(18) Today, the Asia Pacific is by Far the Largest Regional Semiconductor Market
(19) Leading Regional Semiconductor Markets have Shifted Over Time, with the Asia Pacific Currently the Largest Market
(20) Annual Growth Rates in Regional Markets Exhibit Similar Cyclical Patterns
SECTION 4: U.S. INDUSTRY BUSINESS PROFILE

(22) Annual Operating Expenses Remain Relatively Stable Even when the Industry Experiences Volatility
(23) Operating Expenses Differ for Fabless Firms and IDMs, Mainly Because IDMs have Higher Capex Costs and Fabless Firms have Higher R&D Costs
(24) Major Cost Components have Exhibited Similar Cyclical Patterns as the Industry as a Whole
(25) The Cost Structure of U.S.-Based Semiconductor Producers has Changed Slightly since 2001
(26) Annual Industry Cost per Chip Sold in 2022 Totaed $0.77
(27) Annual Industry Cost per Chip Sold has Mostly Decreased since 2001
(28) Annual Industry Cost per Chip Sold by Share since 2001 Roughly Reflects Total Cost Trends
(29) Manufacturing Cost of Goods Sold (Less Depreciation and Amortization) as a Percent of Sales Revenues has Followed Predictable Cyclical Patterns
(30) Manufacturing Cost of Goods Sold (Less Depreciation and Amortization) as a Percent of Sales Revenues Differ for Fabless Firms vs. IDMs
(31) Depreciation and Amortization Expenses as a Percent of Sales Revenues have Ranged from 9 to 19 percent since 2001
(32) Depreciation and Amortization Expenses as a Percent of Sales Revenues Differ for Fabless Firms vs. IDMs
(33) SG&A Costs as a Percent of Sales Revenues have Ranged from 8 to 17 Percent since 2001
(34) Annual R&D Expenditures as a Percent of Sales Revenues have Generally Exceeded 10 Percent Over the Past 20 Years, an Unprecedented Rate Among U.S. Industries in the United States

SECTION 5: CAPITAL AND R&D INVESTMENT

(36) Capital and R&D Investment are Critical to Maintaining a Competitive Semiconductor Industry
(37) The U.S. Semiconductor Industry R&D Spending Rate is Among the Highest of any U.S. Industry
(38) Asset Turnover Rates Differ for Fabless Firms vs. IDMs
(39) Total Annual Levels of Investment in Capital and R&D are High for the Industry
(40) The Total Rate of Investment in Capital and R&D Tends to Remain High During Market Upturns and Downturns
(41) Investment in Capital Expenditures and R&D per Employee is Very High – It has Increased at a Rate of about 5 Percent per Year Over the Past 20 Years
List of Figures
(Page Numbers in Parentheses)

(42) U.S. Semiconductor Industry Capital Expenditures Reached Record High in 2021
(43) Capital Expenditures as a Percent of Sales Revenues have Historically been Very High
(44) Semiconductor Industry R&D Expenditures Trends are Highly Countercyclical
(45) The U.S. Semiconductor Industry is a Leader in R&D Spending as a Percent of Sales Among U.S. Industries
(46) The U.S. Semiconductor Industry Spends More on R&D as a Percent of Sales than any Other Country’s Semiconductor Industry
(47) Net Fixed Assets in the Industry have Risen Faster than Revenues
(48) Each Semiconductor Industry Employee is Supported by Over $306,700 in Net Fixed Assets

(49) SECTION 6: JOBS
(50) Employment by U.S.-Based Semiconductor Firms has Grown over the Long Term
(51) U.S.-Based Semiconductor Industry Annual Employment Levels have been Cyclical
(52) The U.S. Semiconductor Industry Accounts for Over a Quarter of a Million Direct Jobs in the United States
(53) The U.S. Semiconductor Industry Accounts for Over 1.7 Million Additional Indirect and Induced Jobs in the United States
(54) The Average Annual Pay Rate for Employees in the U.S. Semiconductor Industry is Higher than Average Pay Rates for All Jobs and All Manufacturing Jobs in the United States
(55) U.S. Semiconductor Industry Average Annual Pay Rates have Steadily Increased
(56) U.S. Semiconductor Industry Average Annual Pay Rates have been Consistently Higher than Rates for All U.S. Jobs and All U.S. Manufacturing Jobs

(57) SECTION 7: PRODUCTIVITY & PROFITABILITY
(58) U.S. Semiconductor Firms have Experienced Rapid Improvements in Productivity over the Past 20 Years
(59) Since 2001, Annual Industry Costs per Semiconductor have Consistently Run below Annual Sales per Semiconductor
(60) Semiconductor Industry Financial Performance is Highly Cyclical
(61) Semiconductor Industry Labor Productivity has Doubled since 2001
(62) The U.S. Semiconductor Industry Maintains a High Gross Margin Indicating the High Value Added Created by U.S. Semiconductor Companies
(63) As Measured by Pre-tax Income as a Percent of Sales Revenues, the Semiconductor Industry has been Profitable in 18 of the Last 21 Years
(64) Net Profit in the U.S. Semiconductor Industry has Improved Consistently Due to M&A and Rollout of More Advanced Products