An Roinn Fiontar,
Trádála agus Fostaíochta
Department of Enterprise,
Trade and Employment

Mapping of Ireland's Semiconductor & Microelectronics Industry

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Department of Enterprise, Trade & Employment

March 2025

Introduction

- Semiconductor Market Dynamics
- Global Semiconductor Industry: Dynamics
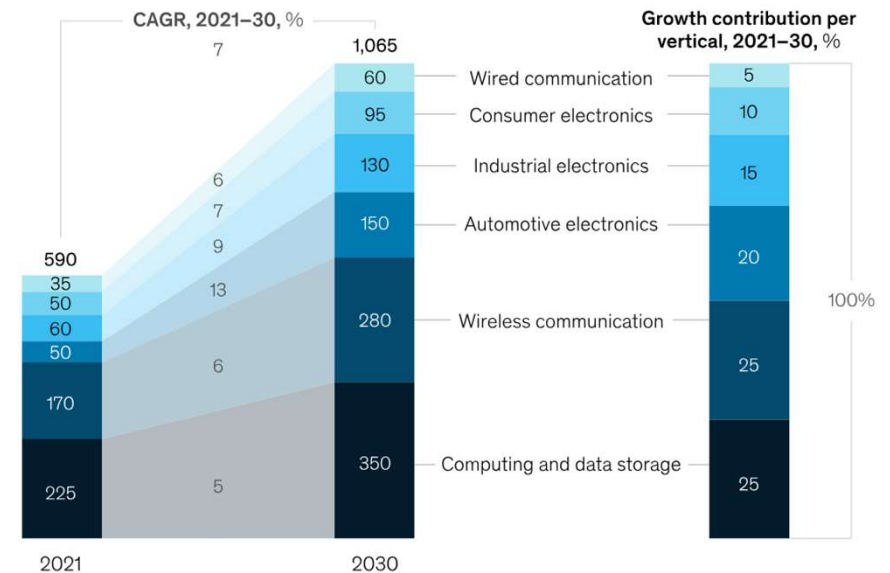- Global Semiconductor Industry: Structure

Global Semiconductor Value Chain Mapping Exercise

- Global Semiconductor Value Chain
- International Semiconductor Industry Key Market Actors
- Ireland's Semiconductor & Microelectronics Industry

Introduction

- Semiconductors are underpinning and ubiquitous electronic components across all modern technologies.

- The global market for semiconductors was $527 billion in 2023 and is projected over reach over $1 trillion by 2030.

- The growth of the global market for semiconductors is directly linked with the driving forces of population growth, urbanisation , and mobility.

- Key megatrends for market growth include AI, Industrial technologies, mobility, space and defence and consumer electronics.

Global semiconductor market value by vertical, indicative, $ billion

Introduction

- Semiconductor chips are pieces of silicon or other semiconducting material with miniature circuits that perform specific electronic tasks.

- Chips have four main categories of functionality: Logic Chips, application-specific integrated chips (ASICs) and system-on-a-chip devices (SoCs).

  - Logic chips process information such Central Processing Units (CPUs), graphics processing units (GPUs) optimized for visual display, neural processing units (NPUs) designed for deep and machine learning applications, Tensor Processing Units (TPUs) designed to accelerate machine learning workloads.

  - Memory chips store information. There are two types of memory: volatile and non-volatile. Examples are Dynamic Random Access Memory (DRAM) and NAND Flash.

  - ASICs are simple, single-purpose chips used for performing repetitive processing routines.

  - SoCs are essentially integrator chips. They are a relatively new type of chip that combines many chips and circuits in a single chip and may integrate things such as graphics, audio, camera, video and Wi-Fi.

https://www.semiconductors.org/2024-state-of-the-u-s-semiconductor-industry/

https://medium.com/@mshojaei77/understanding-the-differences-between-cpu-gpu-tpu-and-lpu-49fe98956473

https://www.asml.com/en/technology/all-about-microchips/microchip-basics

https://www.mckinsey.com/industries/semiconductors/our-insights/exploring-new-regions-the-greenfield-opportunity-in-semiconductors

Semiconductor Industry from 2015 to 2025 | SEMI

Semiconductor Market Dynamics

- The semiconductor value chain is highly complex, characterised by globally distributed production processes and interlinked stages.

- In recent decades economies of scale, logistics and materials costs an increasing factor which has shaped the location of research, design, manufacturing and test functions.

- Across the thousands of key market actors, the industry remains highly polarized with small sets of industry players commanding market dominance and therefore market vulnerability is inherent.

- Semiconductor value chain susceptible to vulnerability and bottlenecks should unexpected events shock or impact the efficient functioning of global trade and logistics.

- There is a growing need for establishing granular level value chain mapping to assess the functioning of the industry and to ensure mitigating policies are in place to alleviate potential disruption.
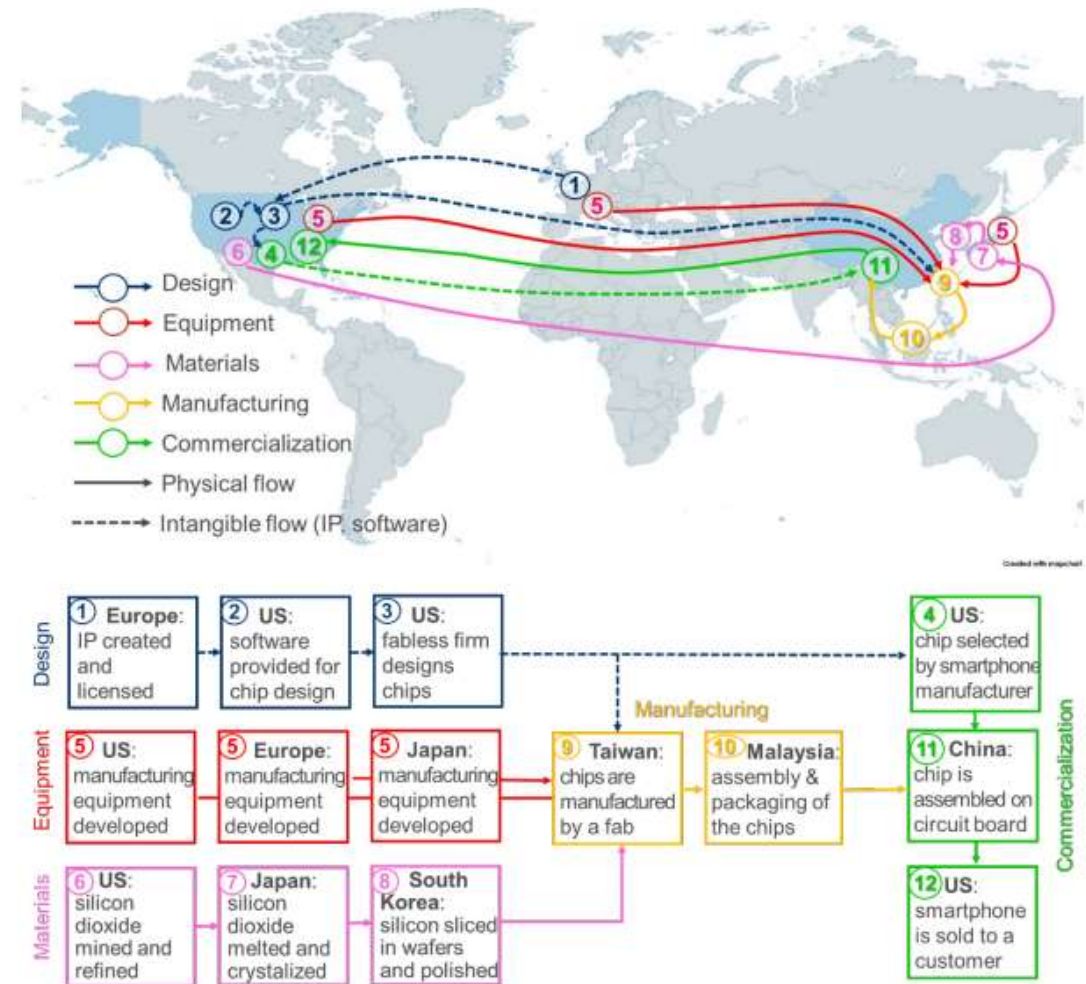
Source: JRC rearrangement from BCG (2021).

Mapping of Ireland's Semiconductor & Microelectronics Industry – Department of Enterprise, Tourism and Employment
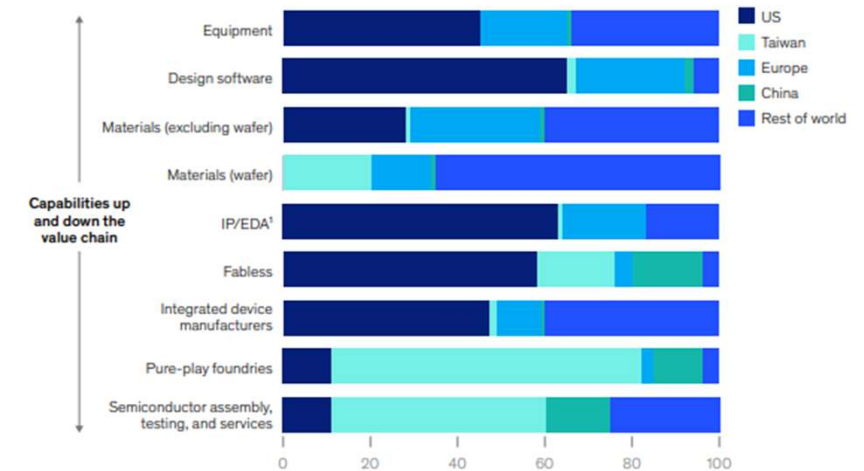
Semiconductor Market Dynamics
European Perspective

- European market $53.809 billion in 2022, a 12.3% increase on 2021, 8.6% of the global market.

- Leading role in research through entities such as IMEC, Leti and Fraunhofer, and equipment manufacturers such as ASML, Zeiss, and Trumpf.

- Key drivers: automotive (37%), industrial consumption (25%).

- High dependency on US and Asian inputs and

- In the EU value chain, nearly 80% of input suppliers and 63% of customers to the companies in the chain are outside of the EU.

No. Companies in the Semiconductor Supply Chain by MS
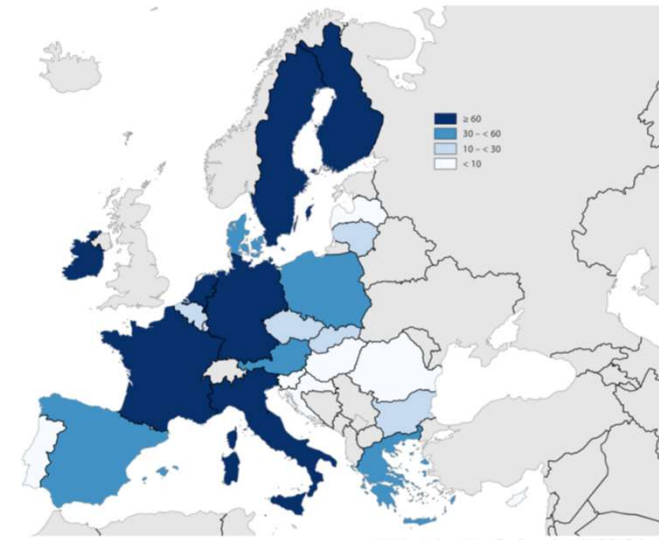
Sales based on company headquarters location, % share

Global Semiconductor Industry: Dynamics

- Recent years has seen policy level developments across global jurisdictions to mitigate against supply chain disruptions and strengthen economic security.

- Chips Act Packages have been developed to support technology trends and to mitigate against vulnerabilities of the semiconductor supply chain: US Chips & Science Act (Aug. 2022), EU Chips Act (Sept. 23), Japan (Nov. 23), India (Feb 24), South Korea (March 24), China (May 24).

- Industrial investment in semiconductor manufacturing has been forecast to be approximately $2.3 Trillion in capex between 2024-2032. https://www.semiconductors.org/america-projected-to-triple-semiconductor-manufacturing-capacity-by-2032-the-largest-rate-of-growth-in-the-world/

- Innovation activity continues to surge on the back of global investments. Key organisations in this sector are based in Europe (e.g. IMEC (BE), CEA-Leti (FR), Fraunhofer (DE), and the US (e.g. SEMETECH, Albany, Semiconductor Research Corporation).

- Key themes which drive innovation: continued miniaturisation (advanced leading edge <5nm), alternative materials (Ge, GaN, SiC, InP, GaAs, Graphene), energy consumption.

- Joint ventures and industrial partnerships have emerged as a growing trend. Investments by TSMC in Europe to form a new JV named ESMC involving Bosch, Infineon, NXP.
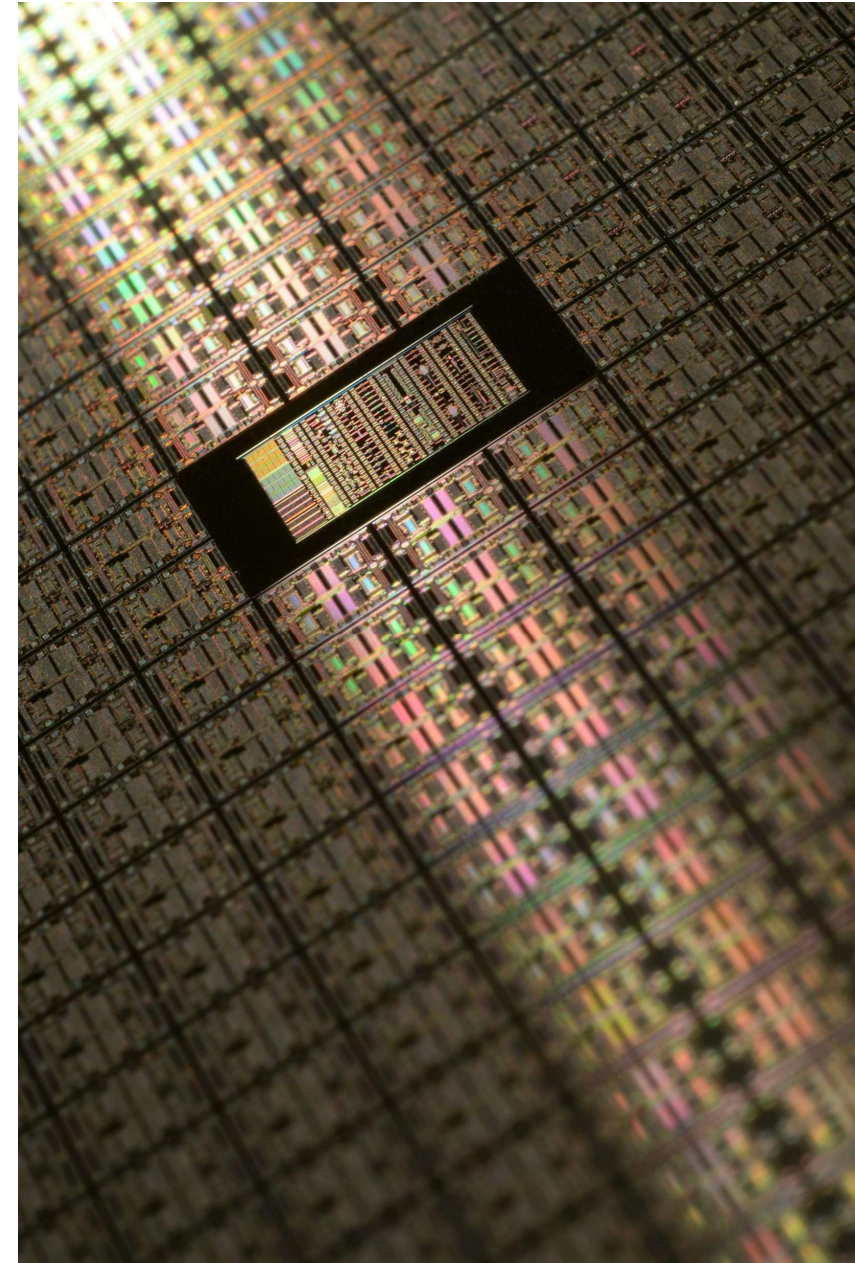
Global Semiconductor Industry: Structure

- There are three main phases associated with the production of semiconductor chips:
  - Design
  - Manufacture
  - Assembly, testing and packaging (ATP)

- These phases are preceded by a number of preliminary activities such as pre-competitive and competitive research, development of specific IP and design tools.

- Both manufacturing and ATP phases are underpinned by materials and equipment.

- There are two conventional business models for semiconductor manufacturing, fabless-foundry and Integrated Device Manufacturing (IDM).
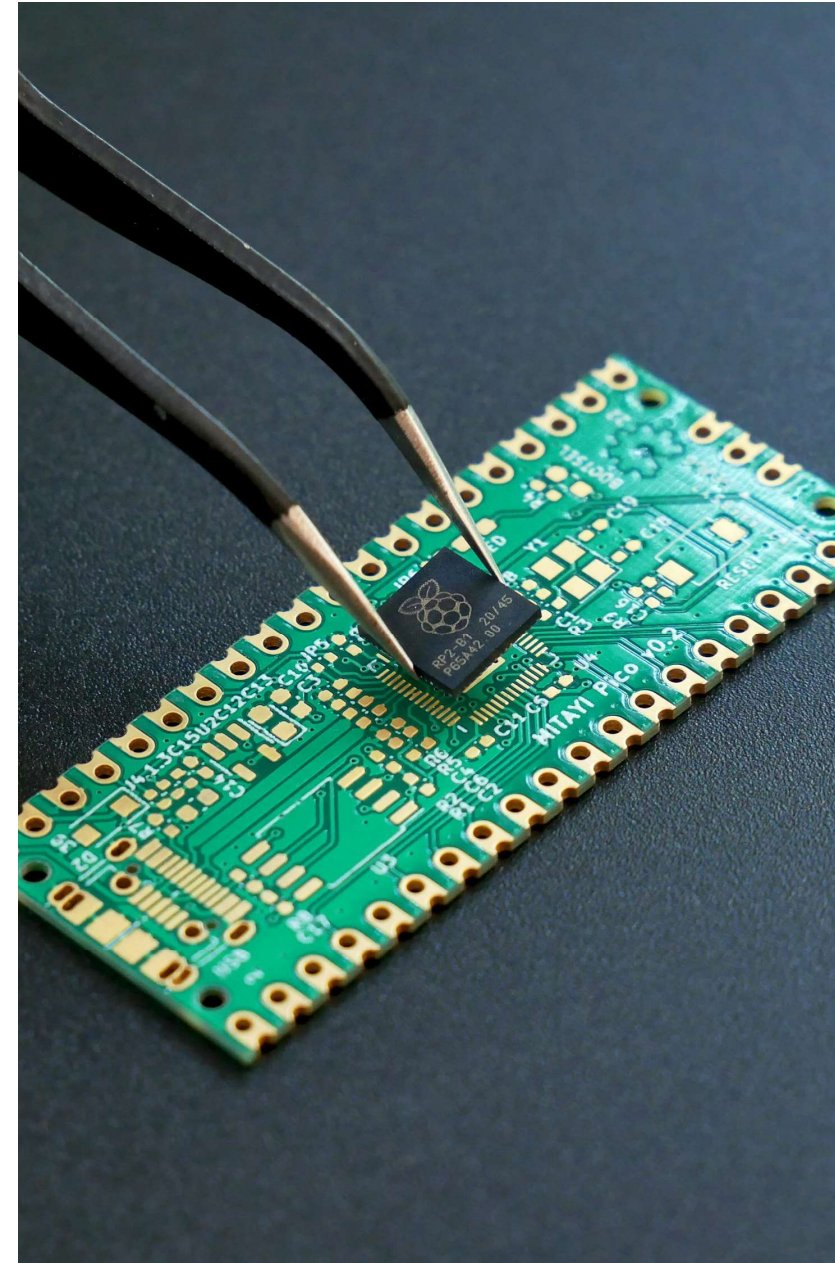
Global Semiconductor Industry: Structure

- Based on the semiconductor supply chain structure published by European Commission JRC, 2023, and cross-referenced to the OECD- Directorate for Science, Technology and Innovation, Digital Policy Committee publication: Mapping the semiconductor value chain, 2024, the following sub-sets are proposed to build a detailed mapping of key market actors.

Subsets:
- **Design Tools, Electronic Design Automation, and IP Cores companies**
- **Manufacturing and Test Equipment companies**
- **Materials and Chemical supplier companies**
- **Fabless Design companies**
- **Foundry companies**
- **Assembly, Testing and Packaging companies**
- **Integrated Device Manufacturers**
- **Research and Development institutions and commercial entities**

https://publications.jrc.ec.europa.eu/repository/handle/JRC133850

Global Semiconductor Industry: Structure

Subset Definitions:

- **Design Tools, Electronic Design Automation, and IP Cores**

  EDA companies are trusted intermediaries between design companies and foundries providing design tools, reference flows and some services. Third party IP providers design and license IP building blocks (processors, libraries, memories, interfaces, sensors, and security).

- **Manufacturing and Test Equipment companies**

  Specialized companies that design, produce, and sell machinery and tools essential for semiconductor production.

- **Materials and Chemical suppliers**

  Raw and manufactured materials, such as silicon wafers, photomasks, and photoresists, along with certain chemicals, are necessary inputs across the semiconductor manufacturing process.

- **Fabless Design companies**

  Fabless semiconductor companies designs and sell semiconductors but do not own or operate its own fabrication facilities. These companies focus on the research, design, and development of semiconductor products, such as integrated circuits (ICs), and then outsource the manufacturing process to third-party foundries.

- **Foundry companies**

  Foundries manufacture chips for design firms. Instead of designing their own semiconductors, these design firms hand over their designs to foundries, which then turn these designs into physical chips.

- **Outsourced Assembly, Testing and Packaging companies**

  Outsourced semiconductor assembly and test (OSAT) vendors are the companies that offer integrated circuit (IC) packaging and test services, including wafer level services after fabrication.

- **Integrated Device Manufacturers**

  IDMs conventionally operate a vertically integrated business model where they design and conduct front and back-end manufacturing internally.

https://publications.jrc.ec.europa.eu/repository/handle/JRC133850

Global Semiconductor Value Chain Structure

R&D

Input

Fabless-Foundry model

IDM model

Design Tools, EDA & IP Cores

Research and Development (R&D)

Manufacturing & Test Equipment

Materials & Chemicals

Design (Fabless)

Manufacturing (Foundries)

Outsourced Semiconductor Assembly & Testing (OSAT)

Integrated Device Manufacturer (IDM)

Design

Manufacturing

Assembly, Test, & Package
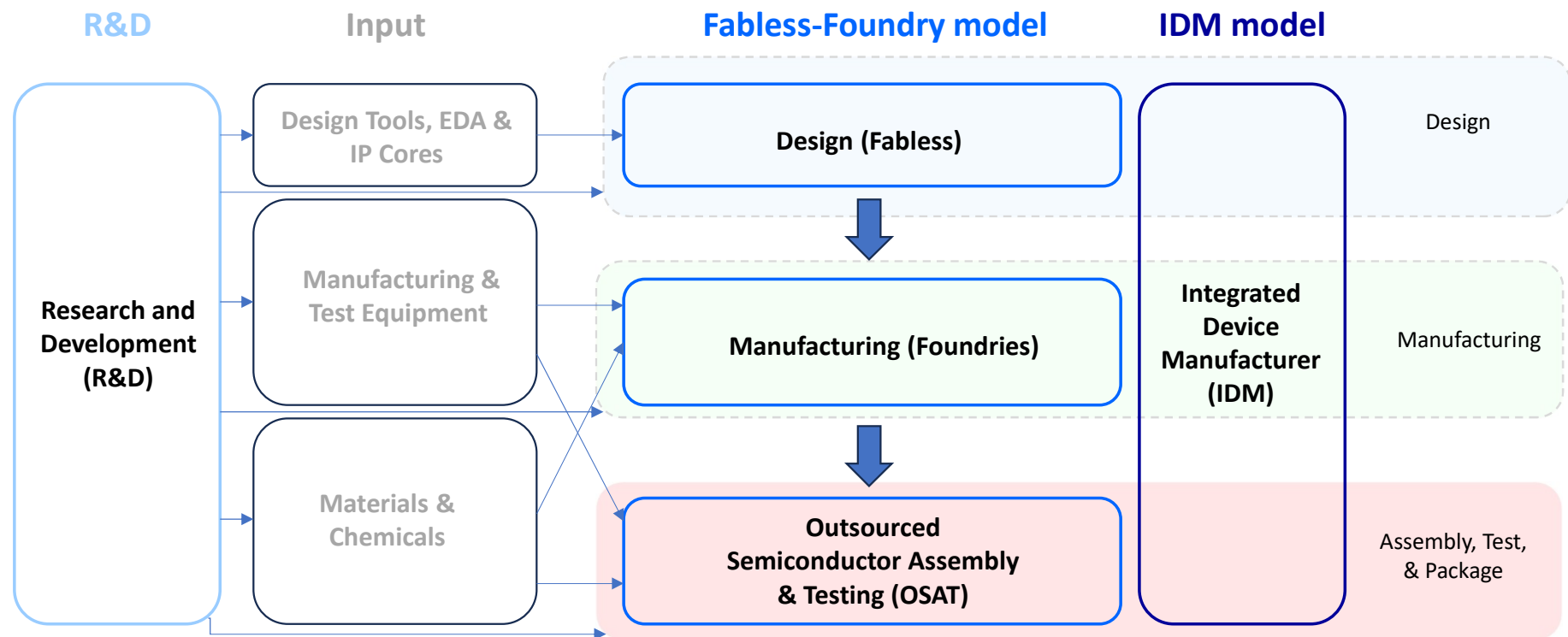
Global Semiconductor Value Chain Mapping Exercise

Semiconductor Value Chain Mapping

- The semiconductor value chain is highly complex and distributed across multiple global jurisdictions. To gain a deeper understanding of which countries host key market players and to understand the distribution of industry sub-sector activity a mapping exercise according to head-quartered entities has been undertaken.

- While this methodology may initially indicates the origin of management control over the industry it will not indicate the commercial proportion associated with these key market actors in terms of revenue. Additional studies which may identify revenue associated with companies as well as networks of subsidiaries may give additional insights into the proportionality of company activity as well as the describing the highly complex geographical spread of subsidiary companies involved in the semiconductor value chain.

- duplicates in this mapping exercise is deliberate at this point which is indicative of multiple companies being integral players across multiple industry subsets.

International Mapping

- This mapping exercise identifies key international companies head-quarter location as a function of industry sub-set.

National Mapping

- Identification of key market actors which have a presence in Ireland across industry sub-sets.

- Mapping of industry sub-sectors which enable the functioning of the industry. This includes suppliers of process control technology, energy and infrastructure management services.

- Mapping of ancillary sub-sectors encompassing construction, engineering and facilities services.

Semiconductor Value Chain Mapping

Key results:

International Mapping

International semiconductor industry key market actors ca. 745

- Design Tools, Electronic Design Automation, IP Cores: 181
- Semiconductor manufacturing equipment   178
- Chemical and materials: 123
- Fabless design companies: 94
- Foundry companies: 46
- Assembly, Test and Packaging companies: 32
- Integrated Device Manufacturers: 90
- Research and Development: 90

National Mapping: Ireland

Semiconductor industry: 41 companies (excluding chemicals)(multiple sites)(excluding R&D)

- Design Tools, Electronic Design Automation, IP Cores: 5
- Semiconductor manufacturing equipment   17
- Fabless design companies: 9
- Integrated Device Manufacturers: 10
- Research and Development: 4

Microelectronics Industry: ca. 40 companies

Manufacturing process equipment and services, electrification ad automation: ca. 16 companies

Engineering + Construction Services, materials, FM, PM: ca. 175 companies

Global Semiconductor Value Chain
International Industry Structure
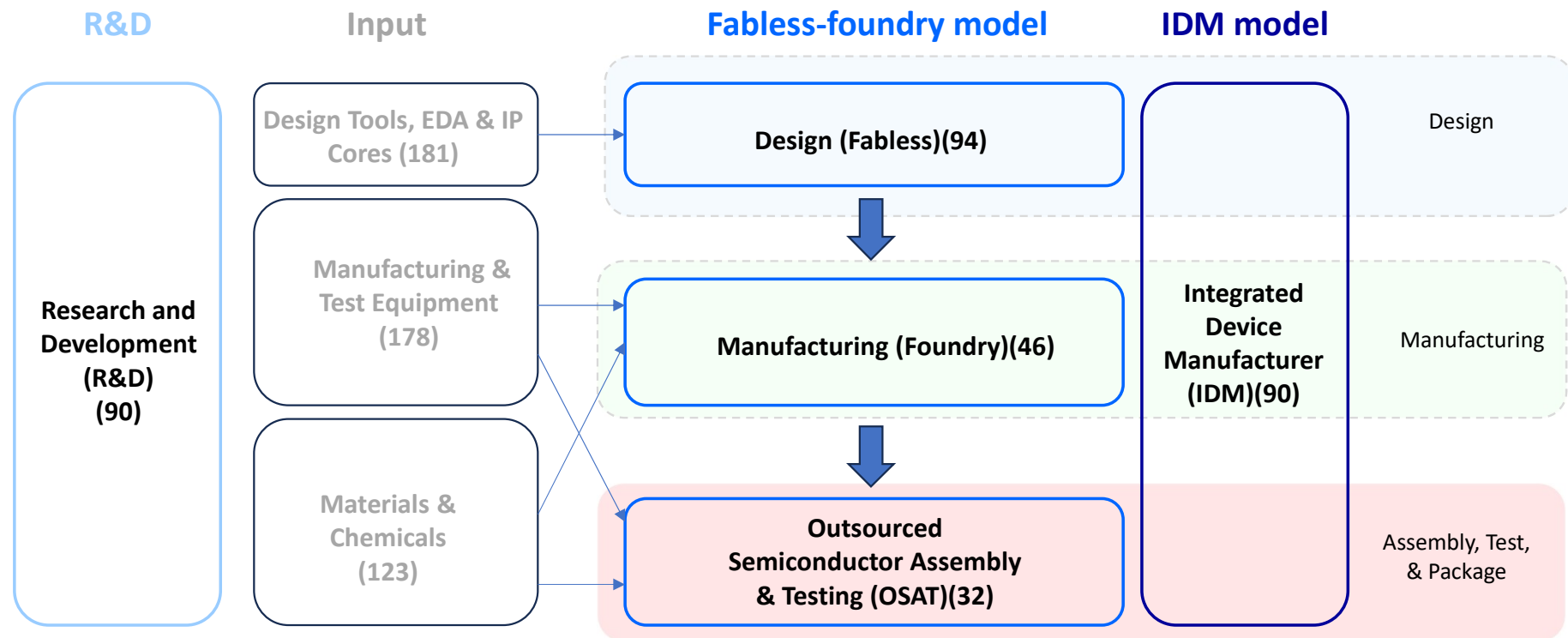
R&D

Input

Fabless-foundry model

IDM model

Research and Development (R&D) (90)

Design Tools, EDA & IP Cores (181)

Manufacturing & Test Equipment (178)

Materials & Chemicals (123)

Design (Fabless)(94)

Manufacturing (Foundry)(46)

Outsourced Semiconductor Assembly & Testing (OSAT)(32)

Integrated Device Manufacturer (IDM)(90)

Design

Manufacturing

Assembly, Test, & Package

Key market actors: ca. 745

Global Semiconductor Value Chain

Mapping exercise data yields an approximate total of 745 companies which are key market actors across the semiconductor industry. This may be further broken down to indicate the relative proportion across global jurisdictions: Americas, Europe and Asia-Pacific

Global Semiconductor Industry

Total Companies (746)	239	137	370

0   100   200   300   400   500   600   700   800

■ Americas (32.7%)   ■ Europe (18.2%)   ■ Asia Pacific (49.1%)
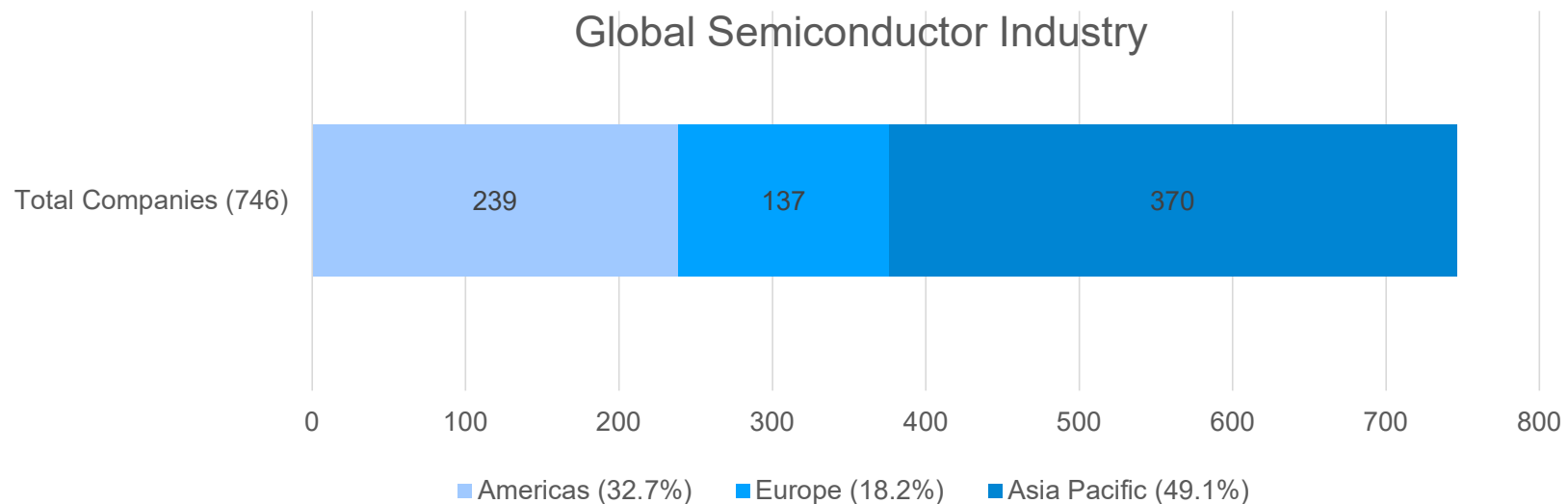
Global Semiconductor Value Chain

Mapping exercise data indicates the proportion of sub-sector distribution across global jurisdictions; Americas, Europe and Asia-Pacific.

Caveat. The number of head-quartered companies is indicated across global regions however mapping the proportion of revenue within the key market actors would indicate a more accurate relative market share and indicate market dominances.
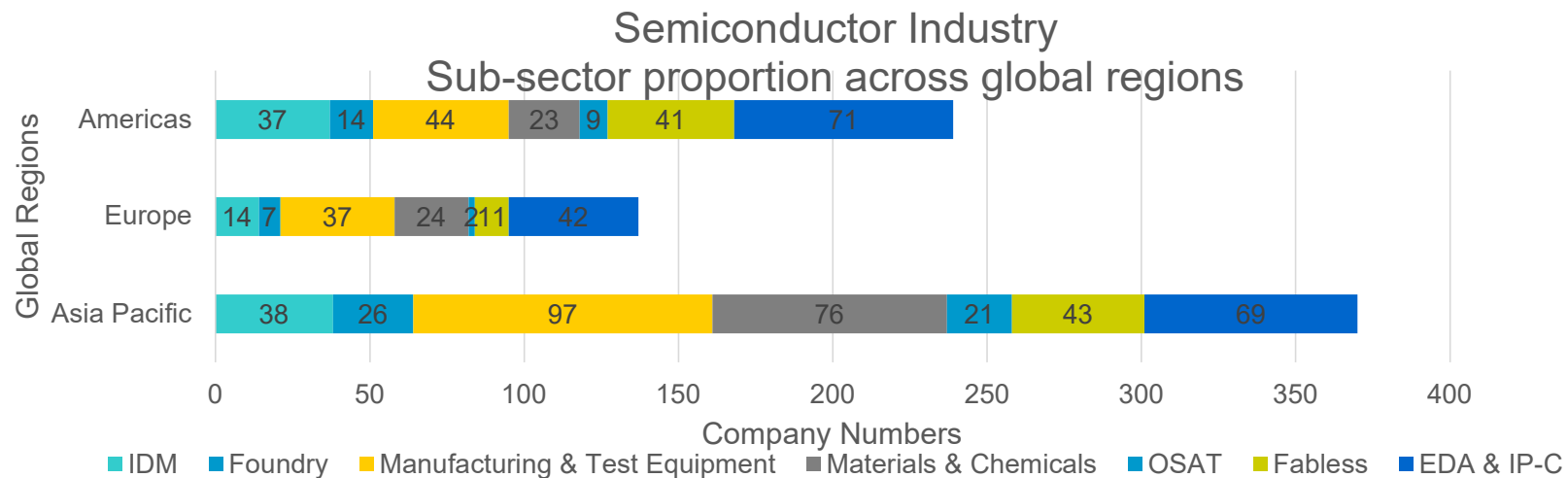
Semiconductor Industry
Sub-sector proportion across global regions

Global Regions	IDM	Foundry	Manufacturing & Test Equipment	Materials & Chemicals	OSAT	Fabless	EDA & IP-C
Americas	37	14	44	23	9	41	71
Europe	14	7	37	24	2/11		42
Asia Pacific	38	26	97	76	21	43	69

Company Numbers

Legend: ■IDM ■Foundry ■Manufacturing & Test Equipment ■Materials & Chemicals ■OSAT ■Fabless ■EDA & IP-C

Global Semiconductor Value Chain

Semiconductor Industry Global Region proportion across Sub-Sectors
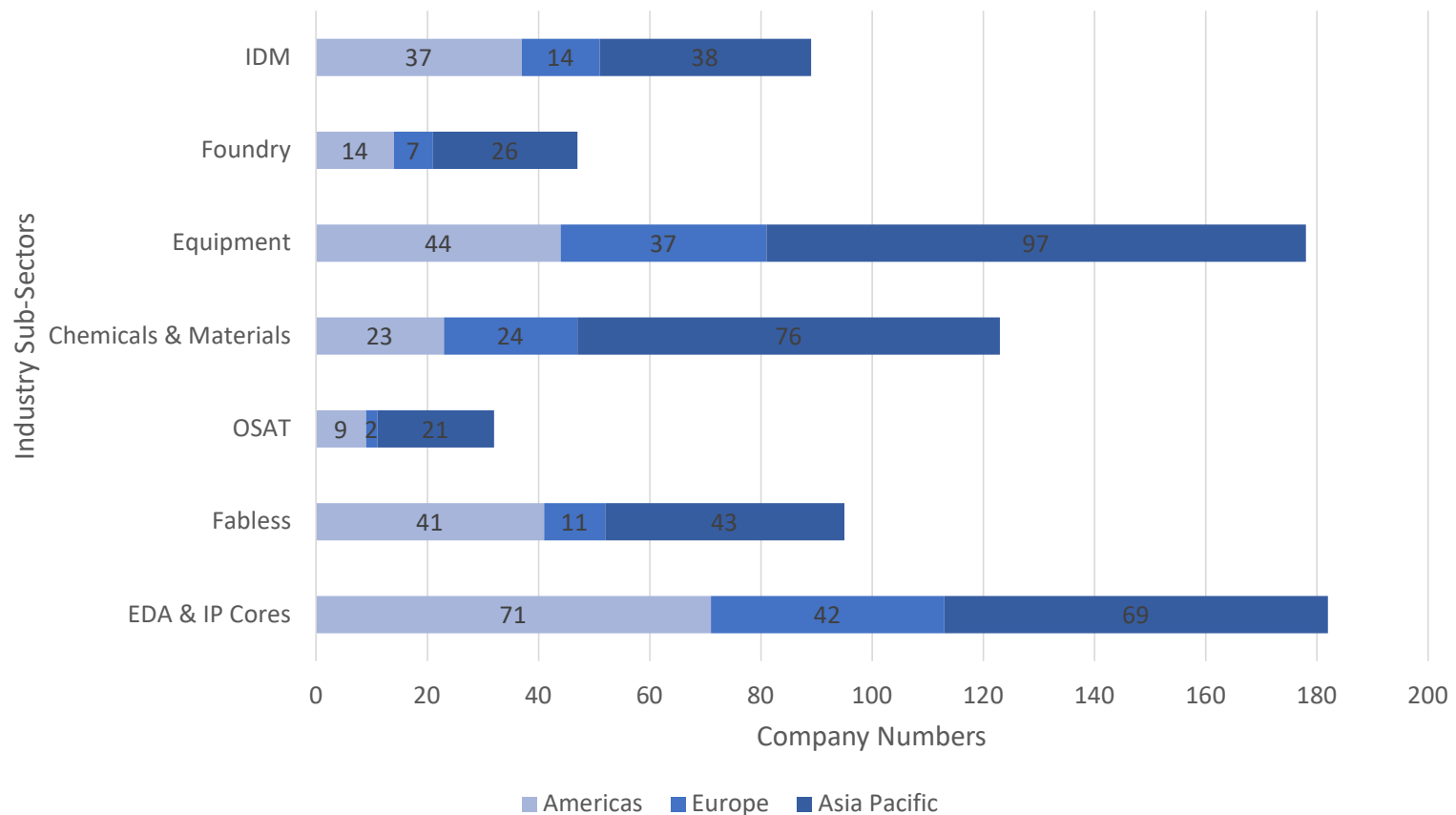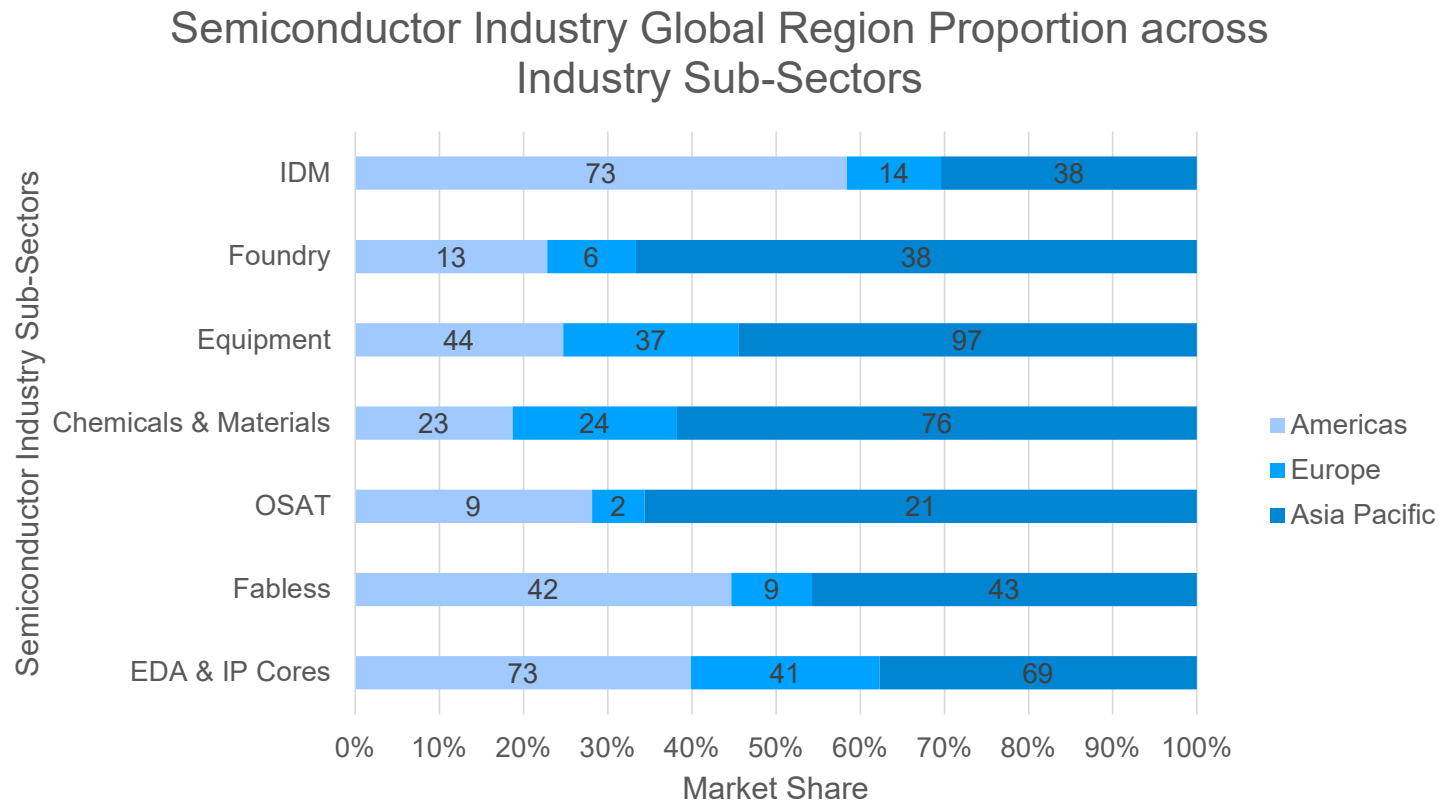
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Global Semiconductor Value Chain

Semiconductor Industry Global Region Proportion across Industry Sub-Sectors

Semiconductor Industry Sub-Sectors	Americas	Europe	Asia Pacific
IDM	73	14	38
Foundry	13	6	38
Equipment	44	37	97
Chemicals & Materials	23	24	76
OSAT	9	2	21
Fabless	42	9	43
EDA & IP Cores	73	41	69

Market Share

International Semiconductor Industry Key Market Actors

Global Semiconductor Value Chain

Integrated Device Manufacturers (IDMs)

IDMs conventionally operate a vertically integrated business model where they design and conduct front and back-end manufacturing internally.

Many IDMs have begun to shift towards a fab-lite business model, where as opposed to conducting all of the manufacturing steps in-house some elements of both front-end and back end manufacturing may be outsourced to foundries and OSATs (outsourced assembly and test facilities).

IDMs have also begin to change their model in the regard on now offering foundry services themselves and opening up their production capacity to offer contract manufacturing to external customers for both front-end and back-end manufacturing.

The top ten IDMs by revenue 2024:

Samsung, Intel, SK Hynix, Micron, Infineon, TI, STMicroelectronics, NXP, Sony, Murata.

CXMT	Japan Semiconductor Corporation	NXP Semiconductors	Sharp Corporation	Texas Instruments Incorporated	YMTC
Denso	Macom	onsemi	SK hynix Inc.	Toshiba	Windbond Electronics Corp.
Diodes Incorporated	Microchip Technology Inc.	Qorvo	Skyworks Solutions	Tower Semiconductor Ltd.	Wolfspeed, Inc.
Elmos	muRata	Rapidus	Sony	Tsinghua Unigroup	Nuvoton Technology Corp.
Infineon	Nanya	Rohm	STMicroelectronics MV	Vishay	Polar Semiconductor LLC
Kioxia	Nexperia	Seagate Technology Holdings PLC	TDK Corporation	Western Digital	Magnachip Semiconductor

Global Semiconductor Value Chain

Integrated Device Manufacturers (IDMs)

Americas

Name	website	Global Region	nationality	Flag
D-Wave Systems	www.dwavesys.com	Americas	Canada	🇨🇦
Akoustis	www.akoustis.com	Americas	United States of America	🇺🇸
Alpha & Omega Semiconductor	www.aosmd.com	Americas	United States of America	🇺🇸
Ambiq Micro	https://ambiq.com	Americas	United States of America	🇺🇸
Analog Devices	www.analog.com	Americas	United States of America	🇺🇸
Diodes Incorporated	www.diodes.com	Americas	United States of America	🇺🇸
Everspin Technologies	www.everspin.com	Americas	United States of America	🇺🇸
Greenliant Systems	http://www.greenliant.com/	Americas	United States of America	🇺🇸
GSI Technology	https://gsitechnology.com/	Americas	United States of America	🇺🇸
Infinera	www.infinera.com	Americas	United States of America	🇺🇸
Intel Corporation	www.intel.com	Americas	United States of America	🇺🇸
Littlefuse	www.littelfuse.com	Americas	United States of America	🇺🇸
Luminar	www.luminartech.com	Americas	United States of America	🇺🇸
MACOM Technology Solutions	www.macom.com	Americas	United States of America	🇺🇸
Microchip Technology	www.microchip.com	Americas	United States of America	🇺🇸
Micron Technology, Inc	www.micron.com	Americas	United States of America	🇺🇸
Northrop Grumman	www.northropgrumman.com	Americas	United States of America	🇺🇸
ON Semiconductor Corporation	www.onsemi.com	Americas	United States of America	🇺🇸
Optek Technology, Inc	www.ttelectronics.com	Americas	United States of America	🇺🇸
Opto Diode	www.optodiode.com	Americas	United States of America	🇺🇸
Orbit Semiconductor, Inc.	www.orbit-semi.com	Americas	United States of America	🇺🇸
Pallidus	www.pallidus.com	Americas	United States of America	🇺🇸
Polar Semiconductor	www.polarsemi.com	Americas	United States of America	🇺🇸
pSemi	www.psemi.com	Americas	United States of America	🇺🇸
Qorvo	www.qorvo.com	Americas	United States of America	🇺🇸
Rigetti Computing, Inc.	www.rigetti.com/	Americas	United States of America	🇺🇸
Saras Micro Devices	www.sarasmicro.com	Americas	United States of America	🇺🇸
Seagate	www.seagate.com	Americas	United States of America	🇺🇸
Semtech	www.semtech.com	Americas	United States of America	🇺🇸
Skorpios Technologies Inc.	www.skorpiosinc.com	Americas	United States of America	🇺🇸
Skyworks Solutions	www.skyworksinc.com	Americas	United States of America	🇺🇸
SMART Modular Technologies	www.smartm.com	Americas	United States of America	🇺🇸
Texas Instruments	www.ti.com	Americas	United States of America	🇺🇸
Transphorm, Inc. (renesas)	http://transphormusa.com/	Americas	United States of America	🇺🇸
Trusted Semiconductor Solution	www.trustedsemi.com	Americas	United States of America	🇺🇸
Vishay Intertechnology	www.vishay.com	Americas	United States of America	🇺🇸
Western Digital	www.westerndigital.com	Americas	United States of America	🇺🇸
Wolfspeed	www.wolfspeed.com	Americas	United States of America	🇺🇸

Global Semiconductor Value Chain

Integrated Device Manufacturers (IDMs)

Asia Pacific

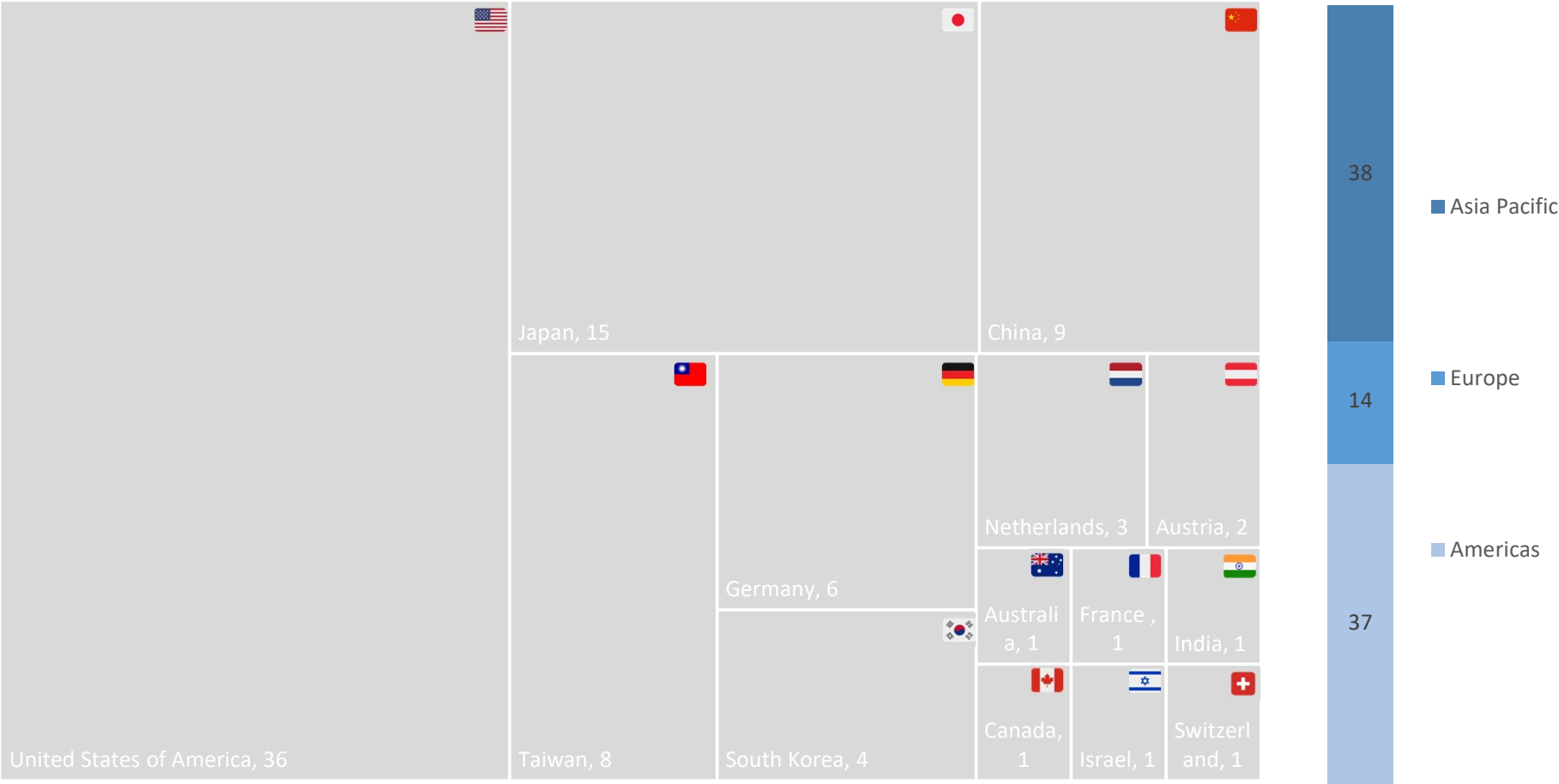| Name	website	Global Region	nationality	Flag
Silana Group	www.silanna.com	Asia-Pacific	Australia	
ChangXin Memory Technologies, Inc.	www.cxmt.com	Asia-Pacific	China	
China Resources Microelectronics Limited	www.crmicro.com	Asia-Pacific	China	
Sanan Optoelectronics	www.sanan-e.com	Asia-Pacific	China	
SHENZHEN SI SEMICONDUCTORS CO., LTD.	www.sisemi.en.ec21.com	Asia-Pacific	China	
Silergy Corp	www.silergy.com	Asia-Pacific	China	
Suzhou Good-Ark Electronics Co. Ltd.	www.goodarksemi.com	Asia-Pacific	China	
Tsinghua Unigroup	http://www.unigroup.com.cn/	Asia-Pacific	China	
Yangtze Memory Technologies Co., Ltd.	https://www.ymtc.com/	Asia-Pacific	China	
Yangzhou Yangjie Electronic Technology Co., Ltd.	www.21yangjie.com	Asia-Pacific	China	
Tessolve	https://www.tessolve.com/	Asia-Pacific	India	
Denso Global	www.denso.com	Asia-Pacific	Japan	
Fuji Electric	www.fujielectric.com	Asia-Pacific	Japan	
Fujitsu Semiconductor Memory Solution Limited	www.fujitsu.com	Asia-Pacific	Japan	
Japan Semiconductor Corporation	www.jsemicon.co.jp	Asia-Pacific	Japan	
Kioxia	www.kioxia.com	Asia-Pacific	Japan	
MinebeaMitsumi	www.minebeamitsumi.com	Asia-Pacific	Japan	
Mitsubishi Electric	www.mitsubishielectric.com	Asia-Pacific	Japan	
Murata Manufacturing Co., Ltd.	www.murata.com	Asia-Pacific	Japan	
Rapidus Corporation	www.rapidus.inc	Asia-Pacific	Japan	
Renesas	www.renesas.com	Asia-Pacific	Japan	
Rohm Semiconductor	www.rohm.com	Asia-Pacific	Japan	
Sharp Corporation	www.global.sharp	Asia-Pacific	Japan	
Sony	www.sony.com	Asia-Pacific	Japan	
TDK Corporation	www.tdk.com	Asia-Pacific	Japan	
Toshiba Electronic Devices & Storage Corporation	www.toshiba.com	Asia-Pacific	Japan	
Magnachip	www.magnachip.com	Asia-Pacific	South Korea	
Radio Frequency Hybrid Integrated Circuit	RFHIC- Innovators of GaN SSPA & Micr	Asia-Pacific	South Korea	
Samsung Electronics	www.semiconductor.samsung.com	Asia-Pacific	South Korea	
SK Hynix	www.skhynix.com	Asia-Pacific	South Korea	
Arima Optoelectronics	http://www.arima.com.tw/	Asia-Pacific	Taiwan	
Epistar Corp.	www.epistar.com	Asia-Pacific	Taiwan	
Everlight	www.en.everlight.com	Asia-Pacific	Taiwan	
Lextar Electronics Corp.	www.lextar.com	Asia-Pacific	Taiwan	
Macronix International Co., Ltd.	www.mxic.com.tw	Asia-Pacific	Taiwan	
Nanya Technology Corporation	www.nanya.com	Asia-Pacific	Taiwan	
Nuvoton Semiconductor manufacturing corporation	www.nuvoton.com	Asia-Pacific	Taiwan	
Winbond Electronics Corporation	www.winbond.com	Asia-Pacific	Taiwan	

Global Semiconductor Value Chain

Integrated Device Manufacturers (IDMs)

Europe

Name	website	Global Region	nationality	Flag
ams OSRAM AG	https://ams-osram.com/	Europe	Austria	
AT & S Austria Technologie & Systemtechnik Aktiengesel	https://ats.net/	Europe	Austria	
Aledia	www.aledia.com	Europe	France	
Bosch	www.bosch-semiconductors.com	Europe	Germany	
Elmos Semiconductor SE	www.elmos.com	Europe	Germany	
iC-Haus GmbH	www.ichaus.de/	Europe	Germany	
Infineon	www.infineon.com	Europe	Germany	
PREMA Semiconductor	www.prema.com	Europe	Germany	
SAW COMPONENTS	www.sawcomponents.de/	Europe	Germany	
Tower Semiconductor	www.towersemi.com	Europe	Israel	
LioniX International	www.lionix-international.com	Europe	Netherlands	
Nexperia	www.nexperia.com	Europe	Netherlands	
NXP	www.nxp.com	Europe	Netherlands	
STMicroelectronics	www.st.com	Europe	Switzerland	

Integrated Device Manufacturer (IDM) - Proportional Global Distribution

United States of America, 36

Japan, 15

China, 9

Taiwan, 8

Germany, 6

South Korea, 4

Netherlands, 3

Austria, 2

Australia, 1

France, 1

India, 1

Canada, 1

Israel, 1

Switzerland, 1

38	■ Asia Pacific
14	■ Europe
37	■ Americas

Mapping of Ireland's Semiconductor & Microelectronics Industry –
Department of Enterprise, Tourism and Employment

Global Semiconductor Value Chain

Foundry companies

Foundries manufacture chips for design firms. Instead of designing their own semiconductors, these design firms hand over their designs to foundries, which then turn these designs into physical chips. Essentially, foundries serve as the "factories" of the semiconductor world. Foundries collaborate closely with IP vendors and Electronic Design Automation (EDA) suppliers to offer a compete value chain to their customers.

The leading semiconductor foundry companies are key players in the global semiconductor manufacturing industry. These foundries specialize in producing integrated circuits (ICs) based on designs provided by fabless semiconductor companies. Some of the most prominent semiconductor foundry companies are:

1. **Taiwan Semiconductor Manufacturing Company (TSMC)** (Hsinchu, Taiwan) TSMC is the world's largest and most advanced semiconductor foundry, holding a dominant market share. It manufactures chips for major companies like Apple, AMD, Nvidia, and Qualcomm. TSMC is known for its cutting-edge technology, including 5nm and 3nm process nodes.

2. **Samsung Foundry** (Suwon, South Korea) Samsung Foundry is a close competitor to TSMC and is one of the leading players in semiconductor fabrication. Samsung produces chips for companies like Qualcomm, Nvidia, and its own internal products (e.g., Exynos processors).

3. **GlobalFoundries** (Santa Clara, California, USA) GlobalFoundries is a key player in the semiconductor foundry market, focusing on mature process nodes (e.g., 14nm, 12nm) and providing services for a wide range of industries, including automotive, IoT, and communications.

4. **United Microelectronics Corporation (UMC)** (Hsinchu, Taiwan) UMC is one of the major semiconductor foundries, competing mainly in the mid-range process nodes (e.g., 28nm, 40nm). It serves a wide range of industries, including automotive, consumer electronics, and communications.

5. **SMIC (Semiconductor Manufacturing International Corporation)** (Shanghai, China) SMIC is China's largest semiconductor foundry, with a growing presence in the global market. While it lags behind TSMC and Samsung in terms of advanced process technologies, it has made significant strides in producing chips for applications like smartphones, IoT, and automotive systems.

These companies are critical to the production of semiconductors for a wide array of industries, from consumer electronics to automotive to industrial applications. TSMC and Samsung, in particular, lead the charge in terms of technological advancements and market share.

Global Semiconductor Value Chain -Foundry companies
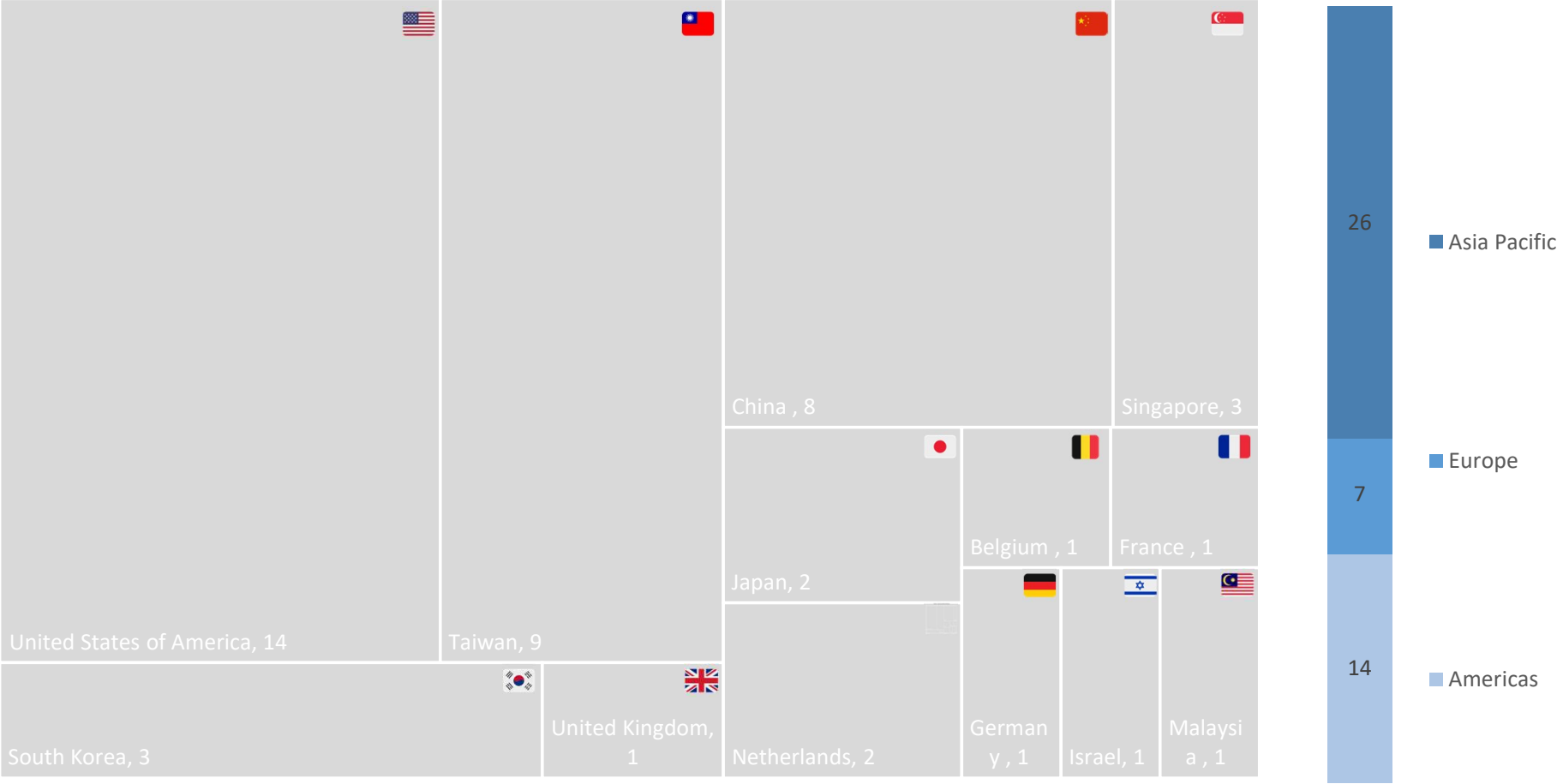Americas : Asia Pacific : Europe

Name	website	Global Region	nationality	Flag
Atomica Corp.	www.atomica.com	Americas	United States of America	🇺🇸
BAE Systems	www.baesystems.com	Americas	United States of America	🇺🇸
Global Communication Semiconductors, LLC (GCS)	www.gcsincorp.com	Americas	United States of America	🇺🇸
Global Foundries	www.gf.com	Americas	United States of America	🇺🇸
Honeywell Aerospace	www.aerospace.honeywell.com	Americas	United States of America	🇺🇸
Intel	www.intel.com	Americas	United States of America	🇺🇸
LA Semiconductor	www.lasemiconductor.com	Americas	United States of America	🇺🇸
Lansdale	www.lansdale.com	Americas	United States of America	🇺🇸
Odyssey Semiconductor	www.odysseysemi.com	Americas	United States of America	🇺🇸
Polar Semiconductor	www.polarsemi.com	Americas	United States of America	🇺🇸
Rogue Valley Microdevices	www.roguevalleymicrodevices.com	Americas	United States of America	🇺🇸
SiCamore Semi	www.sicamoresemi.com	Americas	United States of America	🇺🇸
SkyWater Technology	www.skywatertechnology.com	Americas	United States of America	🇺🇸

Name	website	Global Region	nationality	Flag
Hanking Electronics (Liaoning) Co., Ltd	http://www.hkmems.com	Asia-Pacific	China	
HuaHong Group	www.huahonggrace.com	Asia-Pacific	China	
Nexchip	www.nexchip.com	Asia-Pacific	China	
Shanghai Huali Microelectronics (HMLC)	www.hlmc.cn	Asia-Pacific	China	
Silex Microsystems AB	silexmicrosystems.com	Asia-Pacific	China	
SMIC	www.smics.com	Asia-Pacific	China	
United Nova Technology	http://www.unt-c.com/	Asia-Pacific	China	
Wingtech	http://www.wingtech.com/	Asia-Pacific	China	
JS Foundry KK.	www.jpnsf.com	Asia-Pacific	Japan	
Seiko Epson - Tohoku Epson Corporation	www.corporate.epson	Asia-Pacific	Japan	
Silterra Malaysia	www.silterra.com	Asia-Pacific	Malaysia	
AMF	www.advmf.com	Asia-Pacific	Singapore	
Silicon Box	www.silicon-box.com	Asia-Pacific	Singapore	
Systems on Silicon Manufacturing	www.ssmc.com	Asia-Pacific	Singapore	
DB HiTEk	www.dbhitek.com	Asia-Pacific	South Korea	
MagnaChip Semiconductor	www.magnachip.com	Asia-Pacific	South Korea	
Samsung	www.semiconductor.samsung.com	Asia-Pacific	South Korea	
Advanced Wireless Semiconductor Company (AWSC)	www.awsc.com.tw	Asia-Pacific	Taiwan	
Episil Technology Inc.	www.episil.com/	Asia-Pacific	Taiwan	
Hon Young Semiconductor Corporation	www.hys.com.tw	Asia-Pacific	Taiwan	
Powerchip Semiconductor Manufacturing Corporation	www.powerchip.com	Asia-Pacific	Taiwan	
TSMC	www.tsmc.com	Asia-Pacific	Taiwan	
UMC	www.umc.com	Asia-Pacific	Taiwan	
Vanguard International Semiconductor	www.vis.com.tw	Asia-Pacific	Taiwan	
VisEra Technologies Co Ltd	www.viseratech.com	Asia-Pacific	Taiwan	
WIN Semiconductors	www.winfoundry.com	Asia-Pacific	Taiwan	

Name	website	Global Region	nationality	Flag
United Monolithic Semiconductors (UMS)	www.ums-rf.com	Europe	France	🇫🇷
X-Fab	www.xfab.com	Europe	Germany	🇩🇪
Tower Semiconductor	www.towersemi.com	Europe	Israel	🇮🇱
nanoPHAB	www.nanophab.com	Europe	Netherlands	🇳🇱
SMART Photonics	https://smartphotonics.nl/	Europe	Netherlands	🇳🇱
IQE	http://iqep.com/	Europe	United Kingdom	🇬🇧
ESMC	www.esmc.eu	Europe	Germany	🇩🇪

Foundry - Proportional Global Distribution

United States of America, 14

Taiwan, 9

South Korea, 3

United Kingdom, 1

China , 8

Japan, 2

Netherlands, 2

Germany , 1

Israel, 1

Belgium , 1

France , 1

Malaysia , 1

Singapore, 3

26 — ■ Asia Pacific

7 — ■ Europe

14 — ■ Americas

Global Semiconductor Value Chain

Manufacturing and Test Equipment

Specialized companies that design, produce, and sell machinery and tools essential for semiconductor production. This equipment is crucial for the fabrication and testing of semiconductor devices, such as transistors, capacitors, and integrated circuits.

Semiconductor manufacturing equipment (SME) that facilitates the precision, scale, speed, purity, and dependability required to sustainably produce semiconductors is expensive and extremely difficult to make. As such, its supply is highly concentrated in key companies and regions. SME includes wafer fabrication on the front end as well as semiconductor assembly, test, and packaging equipment for back-end fabrication.

Subsets
- Wafer fabrication equipment
- Microlithography and masking equipment
- Etching and cleaning tools
- Deposition tools
- Photolithography scanner equipment (EUV and non-EUV)

- Gas and liquid handling equipment
- Process monitoring and control equipment
- Inspection and metrology equipment
- Characterization equipment
- Chip test equipment
- Assembly/packaging equipment

Global Semiconductor Value Chain

Manufacturing and Test Equipment

Americas

Name	website	Global Region	nationality	Flag
ACM Research	www.acmr.com	Americas	United States of America	🇺🇸
Applied Materials, Inc.	www.appliedmaterials.com	Americas	United States of America	🇺🇸
Axcelis	www.axcelis.com	Americas	United States of America	🇺🇸
B & Z Manufacturing Co. Inc.	www.bzmfg.com	Americas	United States of America	🇺🇸
Brewer Science	www.brewerscience.com	Americas	United States of America	🇺🇸
Brooks Automation	www.brooks.com	Americas	United States of America	🇺🇸
Bruker	www.bruker.com	Americas	United States of America	🇺🇸
Coherent	www.coherent.com	Americas	United States of America	🇺🇸
COHU	www.cohu.com	Americas	United States of America	🇺🇸
Electro Scientific Industries: ESI	www.esi.com	Americas	United States of America	🇺🇸
Entegris	www.entegris.com	Americas	United States of America	🇺🇸
Entrepix	www.entrepix.com	Americas	United States of America	🇺🇸
EUV Tech	www.euvtech.com	Americas	United States of America	🇺🇸
FM Industries	www.fmindustries.com	Americas	United States of America	🇺🇸
Form Factor	www.formfactor.com	Americas	United States of America	🇺🇸
Ichor Systems	www.ichorsystems.com	Americas	United States of America	🇺🇸
inTEST Corporation	https://intest.com/	Americas	United States of America	🇺🇸
J.A. Woollam Co Inc	www.jawoollam.com	Americas	United States of America	🇺🇸
K&B Industries	www.kb-industries.com	Americas	United States of America	🇺🇸
Keithley Instruments	www.tek.com/keithley	Americas	United States of America	🇺🇸
Kennebec Technologies	www.kennebec.com	Americas	United States of America	🇺🇸
Keysight Technologies	www.keysight.com	Americas	United States of America	🇺🇸
KLA	www.kla.com	Americas	United States of America	🇺🇸
Lam Research	www.lamresearch.com	Americas	United States of America	🇺🇸
Mattson Tech	www.mattson.com	Americas	United States of America	🇺🇸
Micro Control	www.microcontrol.com	Americas	United States of America	🇺🇸
Multibeam Corporation	www.multibeamcorp.com	Americas	United States of America	🇺🇸
Murata Machinery USA, Inc.	www.muratec-usa.com	Americas	United States of America	🇺🇸
Nanonex	www.nanonex.com	Americas	United States of America	🇺🇸
Natioanl Instruments (Emerson)	www.ni.com	Americas	United States of America	🇺🇸
Neutronix Quintel (NXQ)	www.neutronixinc.com	Americas	United States of America	🇺🇸
nLIGHT Inc	https://www.nlight.net/	Americas	United States of America	🇺🇸
Onto Innovation	www.ontoinnovation.com	Americas	United States of America	🇺🇸
Park Systems, Inc.	www.parksystems.com	Americas	United States of America	🇺🇸
Photronics	http://photronics.com/	Americas	United States of America	🇺🇸
PI (Physik Instrumente) L.P.	www.pi-usa.us	Americas	United States of America	🇺🇸
Plasma Therm	www.plasmatherm.com	Americas	United States of America	🇺🇸
Revasum	www.revasum.com	Americas	United States of America	🇺🇸
Semiconductor Equipment Corporation	www.semicorp.com	Americas	United States of America	🇺🇸
Tektronix Inc.	http://www.tek.com/	Americas	United States of America	🇺🇸
Teradyne	www.teradyne.com	Americas	United States of America	🇺🇸
Thermo Fisher	www.thermofisher.com	Americas	United States of America	🇺🇸
Veeco Instruments Inc.	www.veeco.com	Americas	United States of America	🇺🇸
Yield Engineering System	www.yieldengineering.com	Americas	United States of America	🇺🇸

Global Semiconductor Value Chain

Manufacturing and Test Equipment

Asia Pacific

Name	website	Global Region	nationality	Flag
AccoTest	www.accotest.com	Asia-Pacific	China	
Advanced Micro-Fabrication Equipment (AMEC)	www.amec-inc.com	Asia-Pacific	China	
China Electronics Technology Group Corporation (CETC	www.cetc.com.cn	Asia-Pacific	China	
China Resources Microelectronics Limited (CR Micro)	www.crmicro.com	Asia-Pacific	China	
Dongfang Jingyuan Electron	http://www.dfjy-jx.com/	Asia-Pacific	China	
Hwatsing	www.hwatsing.com	Asia-Pacific	China	
Jafeng Automation	JAFENG AUTOMATION-Semiconductor	Asia-Pacific	China	
JHT Design Co., Ltd	www.jht-design.com	Asia-Pacific	China	
JUNO Electronics Co., Ltd.	https://juno-intl.com/	Asia-Pacific	China	
Kingsemi Co. Ltd.	https://en.kingsemi.com/	Asia-Pacific	China	
Nanjing Advanced Semiconductor Technology (NAST), (	Nanjing Advanced Semiconductor Tec	Asia-Pacific	China	
NAURA Technology Group	www.naura.com	Asia-Pacific	China	
Piotech	www.piotech.cn/	Asia-Pacific	China	
Shanghai Micro Electronics Equipment (SMEE)	www.smee.com.cn	Asia-Pacific	China	
Shenzhen Xinyichang Technology Co., Ltd.	http://www.szhech.com/	Asia-Pacific	China	
Tec Semiconductor Equipment (Shenzhen) Co., Ltd.	www.tec-pho.com	Asia-Pacific	China	
Zhejiang Jingsheng Mechanical & Electrical Co., Ltd. (JS	www.jsjd.cc/	Asia-Pacific	China	
A&D Company, Limited	www.aandd.jp	Asia-Pacific	Japan	
Accretech	www.accretech.com	Asia-Pacific	Japan	
Advantest	www.advantest.com	Asia-Pacific	Japan	
Canon Semiconductor Equipment Inc.	www.global.canon	Asia-Pacific	Japan	
Canon Tokki	http://tokki.canon/	Asia-Pacific	Japan	
Dai Nippon Printing Co., Ltd.	www.global.dnp	Asia-Pacific	Japan	
Daifuku	www.daifuku.com	Asia-Pacific	Japan	
Dainippon Screen	www.screen.co.jp	Asia-Pacific	Japan	
DISCO	www.disco.co.jp	Asia-Pacific	Japan	
Ebara Corporation	www.ebara.co.jp	Asia-Pacific	Japan	
Fasford Tech	www.fasford-tech.com	Asia-Pacific	Japan	
Gigaphoton Inc.	www.gigaphoton.com	Asia-Pacific	Japan	
Hitachi High-Tech	www.hitachi-hightech.com	Asia-Pacific	Japan	
HORIBA, Ltd.	www.horiba.com	Asia-Pacific	Japan	
HOYA Corporation	www.hoya.com	Asia-Pacific	Japan	
Jeol	www.jeol.com	Asia-Pacific	Japan	
JFE Shoji Electronics Corporation	www.jfe-shoji-ele.co.jp	Asia-Pacific	Japan	
Keyence Corporation	www.keyence.com	Asia-Pacific	Japan	
KOKUSAI ELECTRIC Group	www.kokusai-electric.com	Asia-Pacific	Japan	
Lasertec Corporation	www.lasertec.co.jp	Asia-Pacific	Japan	
Mitutoyo Corporation	https://www2.mitutoyo.co.jp/	Asia-Pacific	Japan	
Nikon	www.nikon.com	Asia-Pacific	Japan	
Nissin Electric Co., Ltd.	www.nissin.jp	Asia-Pacific	Japan	
Nissin Ion	www.nissin-ion.co.jp	Asia-Pacific	Japan	
NuFlare	www.nuflare.co.jp	Asia-Pacific	Japan	
Ohkura Electric Co., Ltd.	www.ohkura.co.jp	Asia-Pacific	Japan	
Okamoto Corporation	www.okamotocorp.com	Asia-Pacific	Japan	
Pentagon Technologies (Kurita Group)	www.pen-tec.com	Asia-Pacific	Japan	
Rigaku Corporation	www.rigaku.com	Asia-Pacific	Japan	
Rorze Corporation	www.rorze.com	Asia-Pacific	Japan	
SAMCO	www.samcointl.com	Asia-Pacific	Japan	
Sanken Electric Co Ltd	http://www.sanken-ele.co.jp/	Asia-Pacific	Japan	

Global Semiconductor Value Chain

Manufacturing and Test Equipment

Asia Pacific

Company	Website	Region	Country	
SCREEN Semiconductor Solutions	www.screen.co.jp	Asia-Pacific	Japan	
Seiko Instruments	www.sii.co.jp	Asia-Pacific	Japan	
Shibaura Mechatronics	www.shibaura.co.jp	Asia-Pacific	Japan	
Sumitomo Heavy Industry	www.shi.co.jp	Asia-Pacific	Japan	
Sumitomo Precision Products Co. Ltd.,	www.spp.co.jp	Asia-Pacific	Japan	
TESEC Corporation	www.tesec.co.jp	Asia-Pacific	Japan	
Tokyo Electron Ltd.	www.tel.com	Asia-Pacific	Japan	
Toray Engineering Co., Ltd.	www.toray-eng.com	Asia-Pacific	Japan	
TOWA	www.towajapan.co.jp	Asia-Pacific	Japan	
Toyo Tanso	www.toyotanso.com	Asia-Pacific	Japan	
ULVAC, Inc	www.ulvac.co.jp	Asia-Pacific	Japan	
Ushio Inc.	www.ushio.com	Asia-Pacific	Japan	
Yokogawa Electric Corporation	www.yokogawa.com	Asia-Pacific	Japan	
ViTrox	www.vitrox.com/	Asia-Pacific	Malaysia	
AEM Holdings	www.aem.com.sg	Asia-Pacific	Singapore	
ASM Pacific Technology	www.asmpt.com	Asia-Pacific	Singapore	
ASTI	www.astigp.com	Asia-Pacific	Singapore	
kulicke and soffa	www.kns.com	Asia-Pacific	Singapore	
Micromechanics	www.micro-mechanics.com	Asia-Pacific	Singapore	
Toyo Adtec Pte Ltd	www.toyo-adtec.com.tw	Asia-Pacific	Singapore	
Ums holdings	www.umsgroup.com.sg	Asia-Pacific	Singapore	
AP Systems	apsystems.co.kr	Asia-Pacific	South Korea	
DI Corporation	www.di.co.kr	Asia-Pacific	South Korea	
EO Technics Co.,Ltd.	http://www.eotechnics.com/	Asia-Pacific	South Korea	
Gigalane	www.gigalane.co.kr	Asia-Pacific	South Korea	
Hanmi Semiconductor Co., Ltd.	https://hanmisemi.com/	Asia-Pacific	South Korea	
HPSP Co., Ltd.	https://thehpsp.com/	Asia-Pacific	South Korea	
Jusung Engineering Co Ltd	https://jusung.intermediary.co.kr/	Asia-Pacific	South Korea	
KCTech	www.kctech.com	Asia-Pacific	South Korea	
Koh Young	https://kohyoung.com/	Asia-Pacific	South Korea	
KOSES	http://www.koses.co.kr	Asia-Pacific	South Korea	
Mirtec	www.mirtec.com/	Asia-Pacific	South Korea	
NEOSEM INC.	https://neosem.com/	Asia-Pacific	South Korea	
PSK Group	www.pskinc.com	Asia-Pacific	South Korea	
SEMES	www.semes.com	Asia-Pacific	South Korea	
SSP Inc	https://ssp.inc/	Asia-Pacific	South Korea	
TES Co., Ltd.	http://www.hites.co.kr/	Asia-Pacific	South Korea	
Uni Test Inc.	www.uni-test.com	Asia-Pacific	South Korea	
YEST Corporation	www.yest.co.kr	Asia-Pacific	South Korea	
ZEUS Co., Ltd.	www.globalzeus.com	Asia-Pacific	South Korea	
C Sun Mfg Ltd.	www.csun.com.tw/	Asia-Pacific	Taiwan	
Gallant Precision Machining Co., Ltd	www.gpmcorp.com.tw/	Asia-Pacific	Taiwan	
Grand Process Technology Corporation	www.gptc.com.tw	Asia-Pacific	Taiwan	
Gudeng Equipment Co., LTD.	www.gudeng.com	Asia-Pacific	Taiwan	
Hermes Epitek	www.hermes.com.tw	Asia-Pacific	Taiwan	
OptoTech	www.optotech.net	Asia-Pacific	Taiwan	
Skytech	www.skytech.com.tw	Asia-Pacific	Taiwan	
Taiwan Mask Corporation	www.tmcnet.com	Asia-Pacific	Taiwan	

Global Semiconductor Value Chain

Manufacturing and Test Equipment

Europe

Name	website	Global Region	nationality	Flag
EV Group (EVG)	www.evgroup.com	Europe	Austria	
IMS Nanofabrication	www.ims.co.at	Europe	Austria	
Siconnex	www.siconnex.com	Europe	Austria	
Tescan	www.tescan.com	Europe	Czech Republic	
CAMECA	www.cameca.com	Europe	France	
Recif Technologies	www.reciftech.com	Europe	France	
UnitySC	www.unity-sc.com	Europe	France	
Aixtron	www.aixtron.com	Europe	Germany	
Carl Zeiss SMT	www.zeiss.com	Europe	Germany	
Heidelberg Instruments	www.heidelberg-instruments.com	Europe	Germany	
Hesse	www.hesse-mechatronics.com	Europe	Germany	
Jenoptik	www.jenoptik.com	Europe	Germany	
Pfeiffer Vacuum Inc. (Busch Group)	www.pfeiffer-vacuum.com	Europe	Germany	
ProTec Carrier Systems GmbH	Semiconductors, machines & more • F	Europe	Germany	
PVA TePla AG	www.pvatepla.com/	Europe	Germany	
Raith	https://raith.com/	Europe	Germany	
SUSS MicroTec	www.suss.com	Europe	Germany	
Tesla Automation GmbH	www.teslaautomation.de	Europe	Germany	
Trumpf	www.trumpf.com	Europe	Germany	
Vistec Electron Beam GmbH	www.vistec-semi.com	Europe	Germany	
Camtek	www.camtek.com	Europe	Israel	
Nova Ltd.	www.novami.com	Europe	Israel	
Technoprobe	www.technoprobe.com	Europe	Italy	
Eurofins EAG Laboratories	www.eag.com	Europe	Luxembourg	
ASM	www.asm.com	Europe	Netherlands	
ASML	www.asml.com	Europe	Netherlands	
Besi	www.besi.com	Europe	Netherlands	
Atlas Copco	www.atlascopco.com	Europe	Sweden	
Mycronic	www.mycronic.com	Europe	Sweden	
Obducat	www.obducat.com	Europe	Sweden	
Evatech	www.evatecnet.com	Europe	Switzerland	
Hitachi Energy Ltd	www.hitachienergy.com	Europe	Switzerland	
Mettler Toledo	www.mt.com	Europe	Switzerland	
Meyer Burger Technology AG	www.meyerburger.com	Europe	Switzerland	
OC Oerlikon	https://www.oerlikon.com/en/	Europe	Switzerland	
Edwards Vacuum (Atlas Copco)	www.edwardsvacuum.com	Europe	United Kingdom	
Oxford Instruments	www.oxinst.com	Europe	United Kingdom	

Manufacturing & Test Equipment – Proportional Global Distribution

Japan, 45

United States of America, 44

South Korea, 19

China, 17

Germany, 13

Taiwan, 8

Singapore, 7

Switzerland, 5

Austria, 3

Netherlands, 3

Sweden, 3

France, 3

Israel, 2

United Kingdom, 2

Czech

Italy

Luxe

Mala

97

37

44

■ Asia Pacific

■ Europe

■ Americas
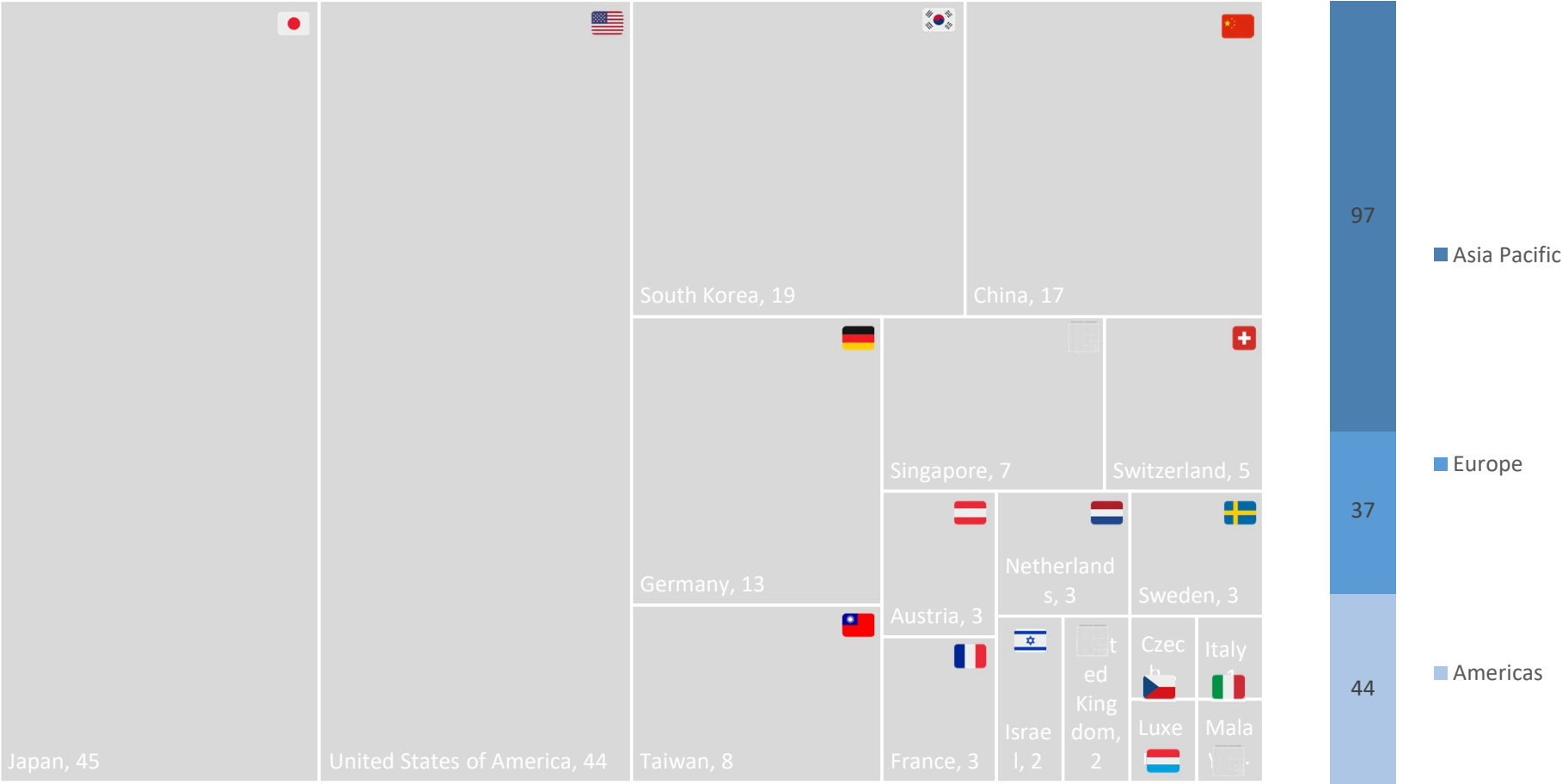
Global Semiconductor Value Chain

Materials and Chemicals

Raw and manufactured materials, such as silicon wafers, photomasks, and photoresists, along with certain chemicals, are necessary inputs across the semiconductor manufacturing process.

The market for fabrication materials exceeded $40 billion in 2021 and is concentrated in the United States, Germany, Japan, Taiwan, South Korea, and China.

In 2021, Taiwan captured the largest slice of the market, with a quarter of global materials market share by sales. On the other end of the spectrum, Europe (9 percent) and China (15 percent) enjoy the smallest shares of the market. Although small by measure of total sales volume, Europe occupies a critical space in the materials supply chain, particularly in the supply of chemicals.

China holds a much stronger position in the supply of raw materials, particularly in low-grade gallium, tungsten, and magnesium, than in manufactured materials.

Subsets
- Photoresist
- Bulk crystal source materials
- Wafer substrates
- Photomasks
- Photoresist ancillaries
- Electronic gases
- Wet chemicals

- Sputtering targets
- CMP (Slurries and Pads)
- Other wafer fab materials
- Deposition materials
- Assembly and packaging materials
- Facility consumables

Global Semiconductor Value Chain

Materials and Chemicals

Americas

Name	website	Global Region	nationality	Flag
3M	www.3m.com	Americas	United States of America	🇺🇸
Air Products and Chemicals	www.airproducts.com	Americas	United States of America	🇺🇸
Avantor	www.avantorsciences.com	Americas	United States of America	🇺🇸
AXT, Inc.	http://www.axt.com/	Americas	United States of America	🇺🇸
Brewer Science	www.brewerscience.com	Americas	United States of America	🇺🇸
Cabot Microelectronics Corp	www.cabotcorp.com	Americas	United States of America	🇺🇸
Chemours	www.chemours.com	Americas	United States of America	🇺🇸
Chemtrade	www.chemtradelogistics.com	Americas	Canada	🇨🇦
Corning	www.corning.com	Americas	United States of America	🇺🇸
Desert Silicon Inc	https://desertsilicon.com/	Americas	United States of America	🇺🇸
Dow	www.dow.com	Americas	United States of America	🇺🇸
DuPont	www.dupont.com	Americas	United States of America	🇺🇸
EFC Gases & Advanced Materials	www.efcgases.com	Americas	United States of America	🇺🇸
Element Solutions	www.elementsolutionsinc.com	Americas	United States of America	🇺🇸
Entegris Inc.	www.entegris.com	Americas	United States of America	🇺🇸
Ferrotec	www.ferrotec.com	Americas	United States of America	🇺🇸
Hemlock Semiconductor	https://www.hscpoly.com/	Americas	United States of America	🇺🇸
Honeywell	https://advancedmaterials.honeywell.(	Americas	United States of America	🇺🇸
Inpria (JSR)	www.inpria.com	Americas	United States of America	🇺🇸
QP Technologies	www.qptechnologies.com	Americas	United States of America	🇺🇸
SunEdison	www.sunedison.com	Americas	United States of America	🇺🇸
TWI (Thomas West)	www.twimaterials.com	Americas	United States of America	🇺🇸
Versum Materials, Inc. (Merck)	https://www.versummaterials.com/	Americas	United States of America	🇺🇸
WaferPro	https://waferpro.com/	Americas	United States of America	🇺🇸

Global Semiconductor Value Chain

Materials and Chemicals

Asia Pacific

Name	website	Global Region	nationality	Flag
Chang Chun Group	www.ccp.com.tw	Asia-Pacific	Taiwan	
Episil-Precision	www.epi.episil.com	Asia-Pacific	Taiwan	
GlobalWafers	www.gw-semi.com	Asia-Pacific	Taiwan	
LCY Chemical	www.lcycic.com/	Asia-Pacific	Taiwan	
Nan Ya PCB Corporation	www.nanyapcb.com.tw	Asia-Pacific	Taiwan	
SAS (Sino-American Silicon Products Inc.)	www.saswafer.com	Asia-Pacific	Taiwan	
Sunlit Chemical	www.sunlit-chemical.com	Asia-Pacific	Taiwan	
Wafer Works Corporation	www.waferworks.com	Asia-Pacific	Taiwan	
WaferChem	www.waferchem.com.tw	Asia-Pacific	Taiwan	
Absolics (SKC)	www.absolicsinc.com	Asia-Pacific	South Korea	
BGFecomaterials Co., Ltd.	www.bgfecomaterials.com/	Asia-Pacific	South Korea	
HAESUNG DS CO., Ltd	https://haesungds.co.kr/	Asia-Pacific	South Korea	
Hana Materials, Inc.	HANA MATERIALS - (hanamts.com)	Asia-Pacific	South Korea	
LG Chem Ltd.	www.lgchem.com	Asia-Pacific	South Korea	
Samsung Electro-Mechanics	https://m.samsungsem.com	Asia-Pacific	South Korea	
SIMMTECH	https://eng.simmtech.com/	Asia-Pacific	South Korea	
SK Materials	www.sk-materials.com	Asia-Pacific	South Korea	
SK Siltron	www.sksiltron.com	Asia-Pacific	South Korea	
Soulbrain	www.soulbrain.co.kr	Asia-Pacific	South Korea	
TOKAI CARBON KOREA Co., Ltd.	www.tck.co.kr	Asia-Pacific	South Korea	
Wonik	www.wonik.com	Asia-Pacific	South Korea	
YCCHEM	www.ycchem.co.kr	Asia-Pacific	South Korea	
Anji Microelectronics	www.anjimicro.com/	Asia-Pacific	China	
Beijing Dabo Nonferrous Metals Solder Co., Ltd	www.doublink.com	Asia-Pacific	China	
CSSC (Handan) Perry Special Gases Co., Ltd	www.pericsg.com	Asia-Pacific	China	
GRIKIN Advanced Materials Co., Ltd,	http://en.grikin.com/	Asia-Pacific	China	
Hangzhou Semiconductor Wafer Co.,Ltd.	http://www.ftwafer.com/	Asia-Pacific	China	
Hubei Dinglong Holding Co., Ltd.	https://en.dl-kg.com/	Asia-Pacific	China	
Jiangsu Nata Opto	Nata Opto-electronic Material (natache	Asia-Pacific	China	
Kangqiang Electronics	Ningbo Kangqiang Electronics Co., LTD	Asia-Pacific	China	
longi	www.longi.com	Asia-Pacific	China	
MCL Electronic Materials Co.	http://www.mclwafer.com/	Asia-Pacific	China	
National Silicon Industry Group Co Ltd	http://www.nsig.com/	Asia-Pacific	China	
Shanghai Xinsheng Semiconductor Technology Co., Ltd	www.zingsemi.com/	Asia-Pacific	China	
Shennan Circuit Company Limited	www.scc.com.cn	Asia-Pacific	China	
Wenyi Trinity Technology	www.chinatrinity.com	Asia-Pacific	China	
AGC Inc.	www.agcchem.com	Asia-Pacific	Japan	
Central Glass Co. Ltd	www.cgc-jp.com	Asia-Pacific	Japan	
Daikin Industries Ltd	www.daikinchemicals.com	Asia-Pacific	Japan	
Fujifilm Electronic Materials	www.fujifilm.com	Asia-Pacific	Japan	
Fujimi Corporation	www.fujimiinc.co.jp	Asia-Pacific	Japan	
IBIDEN CO., LTD.	www.ibiden.com	Asia-Pacific	Japan	
JSR corporation	www.jsr.co.jp	Asia-Pacific	Japan	
JX Nippon Mining & Metal	www.jx-nmm.com	Asia-Pacific	Japan	
Kanto Chemical Co., Inc.	www.kanto.co.jp	Asia-Pacific	Japan	
Kyocera	https://global.kyocera.com/	Asia-Pacific	Japan	
Maruwa Co., Ltd.	https://www.maruwa-g.com/	Asia-Pacific	Japan	
MEC Company Ltd.	www.mec-co.com	Asia-Pacific	Japan	
Mitsubishi Gas Chemicals	www.mgc.co.jp	Asia-Pacific	Japan	

Global Semiconductor Value Chain

Materials and Chemicals

Asia Pacific

Mitsubishi Materials Corporation	www.mmc.co.jp	Asia-Pacific	Japan	●
Mitsui Chemicals, Inc.	https://jp.mitsuichemicals.com/	Asia-Pacific	Japan	●
Mitsui High-Tech	www.mitsui-high-tec.com	Asia-Pacific	Japan	●
NAMICS Corporation	www.namics.co.jp	Asia-Pacific	Japan	●
NGK Insulators	www.ngk-insulators.com	Asia-Pacific	Japan	●
Nichia Corporation	https://www.nichia.co.jp/en/	Asia-Pacific	Japan	●
Nichias	www.nichias.co.jp	Asia-Pacific	Japan	●
NIPPON CHEMICAL INDUSTRIAL CO.,LTD.	www.nippon-chem.co.jp	Asia-Pacific	Japan	●
Nippon Micrometal	www.nmc-net.co.jp	Asia-Pacific	Japan	●
Osaka Organic Chemical Industry	https://www.ooc.co.jp/	Asia-Pacific	Japan	●
Panasonic	www.panasonic.com	Asia-Pacific	Japan	●
Resonac (formerly Showa Denko)	www.resonac.com	Asia-Pacific	Japan	●
SCREEN Semiconductor Solutions Co. Ldt.	www.screen.co.jp	Asia-Pacific	Japan	●
Shin-Etsu Chemical Co., Ltd.	www.shinetsu.co.jp	Asia-Pacific	Japan	●
Shinko	www.shinko.co.jp	Asia-Pacific	Japan	●
Sumco Corp	www.sumcosi.com/	Asia-Pacific	Japan	●
Sumitomo Chemical	www.sumitomo-chem.co.jp/	Asia-Pacific	Japan	●
Taiyo Nippon Sanso Corporation (TNSC)	www.tnsc-innovation.com	Asia-Pacific	Japan	●
Tama Chemicals Co. Ltd. (Moses Lake Ind.)	www.tama-chem.co.jp	Asia-Pacific	Japan	●
TANAKA Denshi Kogyo K.K.	www.tanaka.co.jp	Asia-Pacific	Japan	●
TOAGOSEI CO., LTD	www.toagosei.co.jp	Asia-Pacific	Japan	●
Tokuyama Corporation	www.tokuyama.co.jp/	Asia-Pacific	Japan	●
Tokyo Ohka Kogyo Co., Ltd.	www.tok.co.jp	Asia-Pacific	Japan	●
TOPPAN Inc.	www.toppan.com	Asia-Pacific	Japan	●
Toray	www.toray.com	Asia-Pacific	Japan	●
Tosoh SMD	www.tosohsmd.com	Asia-Pacific	Japan	●
Toyo Gosei Co., Ltd	www.toyogosei.co.jp	Asia-Pacific	Japan	●

Global Semiconductor Value Chain

Materials and Chemicals

Europe

Name	website	Global Region	nationality	Flag
IQE	http://iqep.com/	Europe	United Kingdom	
Linde	www.linde-gas.com	Europe	UK/Ireland	
Topsil	www.topsil.com	Europe	Denmark	
Georg Fischer	www.gfps.com	Europe	Switzerland	
Schunk	www.schunk-group.com	Europe	Netherlands	
Borealis	www.borealisgroup.com	Europe	Austria	
Air Liquide	www.airliquide.com	Europe	France	
Arkema	www.arkema.com	Europe	France	
Mersen USA	www.mersen.com	Europe	France	
Saint Gobain	www.ceramicsrefractories.saint-gobai	Europe	France	
Soitec	www.soitec.com	Europe	France	
Okmetic	www.okmetic.com	Europe	Finland	
Allresist GmbH	www.allresist.com	Europe	Germany	
Arubis	www.aurubis.com	Europe	Germany	
BASF	www.basf.com	Europe	Germany	
Evonik	corporate.evonik.com	Europe	Germany	
Grillo	www.grillo.de	Europe	Germany	
Henkel	www.henkel.com	Europe	Germany	
Heraeus	www.heraeus.com	Europe	Germany	
LanXess	https://lanxess.com/	Europe	Germany	
Merck Group	www.merckgroup.com	Europe	Germany	
Siltronic	www.siltronic.com	Europe	Germany	
Wacker Chemie AG	www.wacker.com	Europe	Germany	
Freiberger Compound Materials	https://freiberger.com/	Europe	Germany	
Solvay	www.solvay.com	Europe	Belgium	

Chemicals & Materials – Proportional Global Distribution
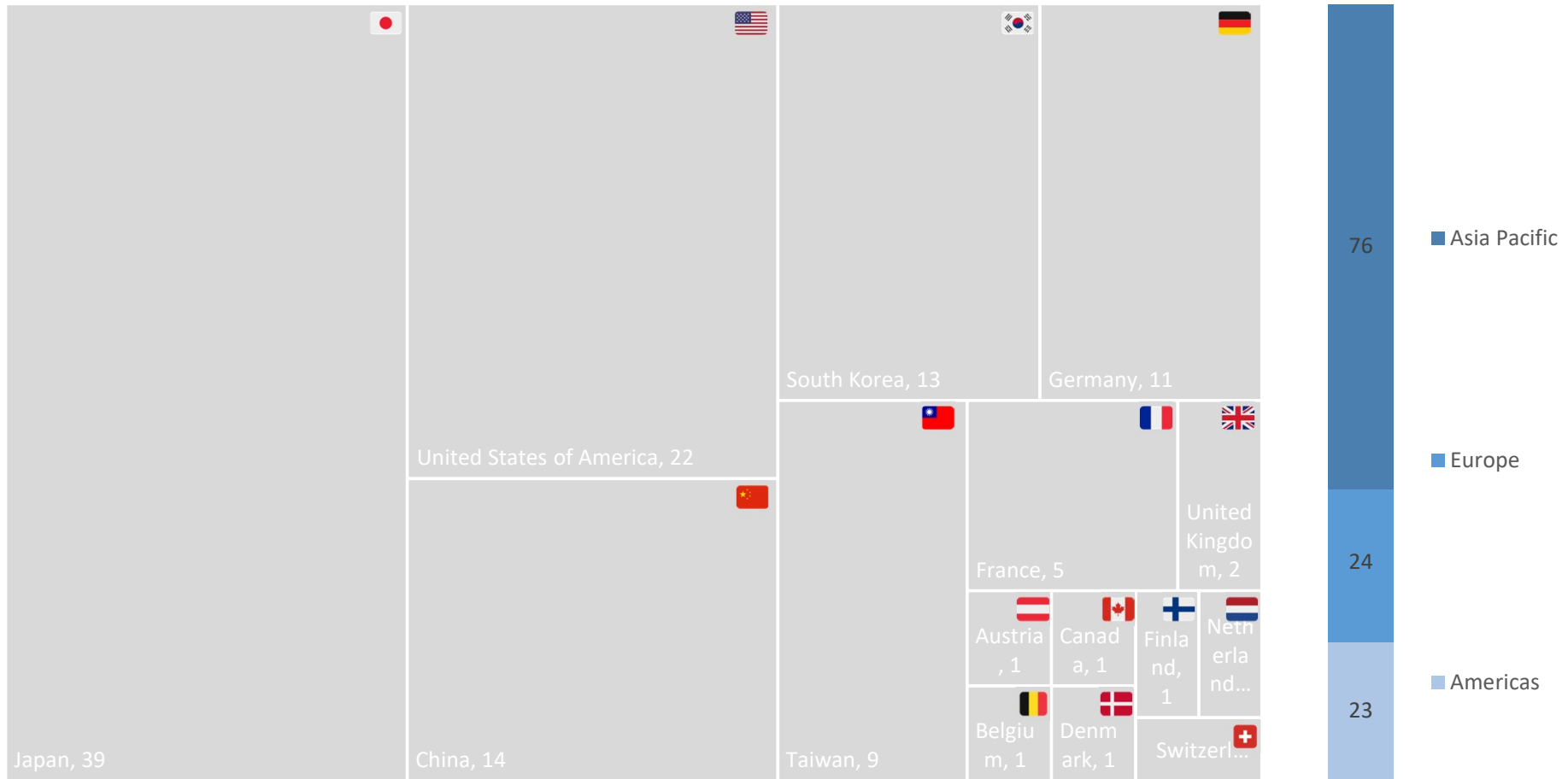
Japan, 39

United States of America, 22

China, 14

South Korea, 13

Germany, 11

Taiwan, 9

France, 5

United Kingdom, 2

Austria, 1

Canada, 1

Finland, 1

Netherland...

Belgium, 1

Denmark, 1

Switzerl...

76	■ Asia Pacific
24	■ Europe
23	■ Americas

Global Semiconductor Value Chain

Outsourced Assembly, Test, and Packaging (OSAT)

Outsourced semiconductor assembly and test (OSAT) vendors are the companies that offer integrated circuit (IC) packaging and test services, including wafer level services after fabrication and prior to separation of die, the separation of die and subsequent packaging and testing of separated die.

OSATs provide package design support to fabless and non-fabless companies, packaging to silicon devices that are made by foundries, and test services prior to shipping to the customer.

OSATs mainly focus on offering innovative packaging and test solutions for semiconductor companies in well-established markets such as communications, consumer & computing, automotive, aerospace, defence, and space in addition to emerging markets in industrial, medical, the Internet of Things (IoT), artificial intelligence (AI), and wearable devices. OSATs offer cost-effective and innovative packaging solutions that enable higher performance, processing speeds and functionality of ICs with a reduction in space in an electronic device.

OSAT companies come into major play at the end stage of the semiconductor manufacturing process after the wafer fabrication and wafer probe stages. OSATs offer packaging and assembly solutions that involve the processing of bare semiconductors into finished semiconductors, which helps in protecting the die as well as facilitating electrical connections and heat dissipation. After packaging the customer's die, OSATs conduct final testing to ensure that the packaged semiconductor meets performance specifications. OSATs offer a wide range of semiconductor test services that includes various types of final, system-level, wafer, and strip testing along with the complete end of line services up to and including final shipping.

Key players in the OSAT market:

- ASE Technology Holding Group
- Amkor Technology Inc.
- Powertech Technology Inc.
- Chipmos Technologies Inc.
- King Yuan Electronics Co. Ltd
- Jiangsu Changjiang Electronics Technology Co. Ltd
- UTAC Holdings Ltd
- Tongfu Microelectronics Co.
- Chipbond Technology Corporation
- Hana Micron Inc.
- Tianshui Huatian Technology Co. Ltd

Comments of the Semiconductor Industry Association (SIA) To the Internal Revenue Service On the Advanced Manufacturing Investment Credit, Notice of Proposed Rulemaking REG-120653-22 88 Fed. Reg. 17451 (March 23, 2023)

Global Semiconductor Value Chain

Outsourced Assembly, Test, and Packaging (OSAT)

Americas : Asia Pacific : Europe

Name	website	Global Region	nationality	Flag	HQ
Aehr Test Systems (Aehr Test)	www.aehr.com	Americas	United States of America		Fremont, CA, US
Amkor Technology	http://amkor.com/	Americas	United States of America		Tempe, AZ, US
Azimuth Industrial Co	https://azimuthsemi.com/	Americas	United States of America		Union City, CA, US
IBM	www.ibm.com	Americas	United States of America		Armonk, NY, US
Integra Technologies	https://www.integra-tech.com/	Americas	United States of America		Wichita, KS, US
Interconnect Systems Inc. (ISI) (Molex)	www.isipkg.com	Americas	United States of America		Camarillo, CA, US
Modelithics	www.modelithics.com	Americas	United States of America		Oakland, CA, US
NHanced Semiconductors	www.nhanced-semi.com	Americas	United States of America		Batavia, IL, US
Promex	promex-ind.com	Americas	United States of America		Santa Clara, CA, US
Huatian Technology	http://www.tshtkj.com/	Asia-Pacific	China		Tianshui, China
JCET (Jiangsu Changjiang Electronics Technology)	https://www.jcetglobal.com/en	Asia-Pacific	China		Jiangyin, China
SJ Semi	http://en.sjsemi.com/	Asia-Pacific	China		Jiangyin, China
TongFu Microelectronics Co. Ltd.	Tongfu Microelectronics Co., Ltd._FCBG	Asia-Pacific	China		Nantong, China
Carsem	https://carsem.com/	Asia-Pacific	Malaysia		Ipoh, Malaysia
Unisem (M) Berhad	www.unisemgroup.com	Asia-Pacific	Malaysia		Kuala Lumpur, Malaysia
United Test and Assembly Center Ltd (UTAC)	www.utacgroup.com	Asia-Pacific	Singapore		Singapore. Singapore.
Hana Micron Inc.	www.hanamicron.com	Asia-Pacific	South Korea		Asan City, South Korea
Nepes Corporation	www.nepes.co.kr	Asia-Pacific	South Korea		Seoul, South Korea
SFA Semicon Co. Ltd. (SSK)	www.sfasemicon.com	Asia-Pacific	South Korea		Cheonan-si, South Korea
Signetics Corporation	www.signetics.com	Asia-Pacific	South Korea		Paju, South Korea
ASE Group	http://ase.aseglobal.com	Asia-Pacific	Taiwan		Kaohsiung, Taiwan
Chipbond Technology Corporation	www.chipbond.com.tw	Asia-Pacific	Taiwan		Hsinchu, Taiwan
ChipMOS Technologies	www.chipmos.com	Asia-Pacific	Taiwan		Hsinchu, Taiwan
Giga Solution Tech. Co., Ltd. (Ardentec group)	www.giga-solution.com	Asia-Pacific	Taiwan		Hsinchu, Taiwan
Global Unichip Corp (GUC)?	www.guc-asic.com	Asia-Pacific	Taiwan		Hsinchu, Taiwan
King Yuan Electronics Co. Ltd. (KYEC)	www.kyec.com.tw	Asia-Pacific	Taiwan		Hsinchu, Taiwan
Powertech Technology Inc. (PTI)	www.pti.com.tw	Asia-Pacific	Taiwan		Hsinchu, Taiwan
Sigurd Microelectronics Corporation	www.sigurd.com.tw	Asia-Pacific	Taiwan		Hsinchu, Taiwan
Siliconware Precision Industries Co. Ltd (SPIL)	www.spil.com.tw	Asia-Pacific	Taiwan		Taichung, Taiwan
Xintec	www.xintec.com.tw	Asia-Pacific	Taiwan		Taoyuan City, Taiwan
Incize	www.incize.com	Europe	Belgium		Louvain-la-Neuve, Belgium
Filtronic	https://filtronic.com/	Europe	United Kingdom		Durham, UK

OSAT – Proportional Global Distribution

Taiwan, 10

United States of America, 9

China, 4

South Korea, 4

Malaysia, 2

Belgium, 1

Singapore, 1

UK, 1

21 — Asia Pacific

2 — Europe

9 — Americas

Mapping of Ireland's Semiconductor & Microelectronics Industry – Department of Enterprise, Tourism and Employment
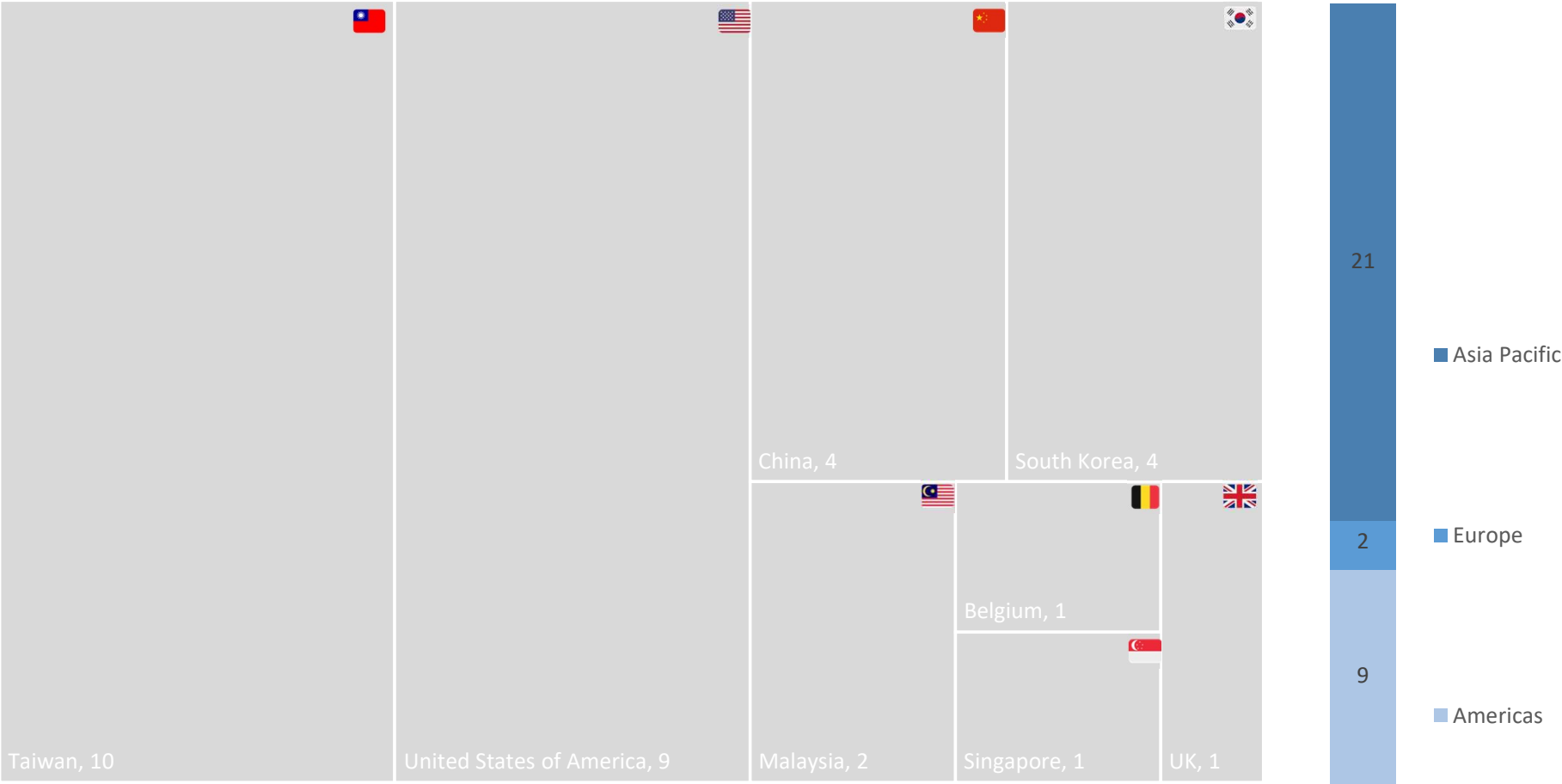
Global Semiconductor Value Chain

Fabless Companies

Fabless semiconductor companies designs and sell semiconductors but do not own or operate its own fabrication facilities. These companies focus on the research, design, and development of semiconductor products, such as integrated circuits (ICs), and then outsource the manufacturing process to third-party foundries, such as TSMC (Taiwan Semiconductor Manufacturing Company) or GlobalFoundries.

The business model of a fabless semiconductor company involves:

Designing Semiconductor Products: The company invests in research and development (R&D) to create innovative chips or circuits for various applications, like processors, memory, or communication devices.

Outsourcing Manufacturing: Rather than building and maintaining expensive fabrication plants, fabless companies contract out the manufacturing of their designs to foundries, which specialize in high-volume semiconductor production.

Focusing on Innovation and Marketing: By outsourcing manufacturing, fabless companies can focus more on innovation, product differentiation, and go-to-market strategies rather than capital-intensive manufacturing and operational complexities.

Supply Chain and Partnerships: These companies often develop close relationships with foundries, equipment providers, and other partners to ensure efficient production and timely delivery of their products. This business model allows companies to avoid the significant capital costs associated with running a semiconductor fab, while still benefiting from the growing demand for semiconductor technology. Prominent examples of fabless semiconductor companies include Qualcomm, Nvidia, AMD, and Broadcom.

Key Fabless companies:

- Nvidia
- Qualcomm
- Broadcom
- Advanced Micro Devices (AMD)
- MediaTek

- Marvell Technology
- Novotek Microelectronics
- Realtek Semiconductor
- Will Semiconductor
- Monolithic Power Systems (MPS)
- Cirrus Logic

Global Semiconductor Value Chain

Fabless Companies

Americas

Name	website	Global Region	nationality	Flag
Achronix Semiconductor Corporation	http://www.achronix.com/	Americas	United States of America	🇺🇸
Advanced Micro Devices Inc. (AMD)	www.amd.com	Americas	United States of America	🇺🇸
Alereon, Inc	http://www.alereon.com/	Americas	United States of America	🇺🇸
Allegro Microsystems	www.allegromicro.com	Americas	United States of America	🇺🇸
Alpha & Omega Semiconductor	www.aosmd.com	Americas	United States of America	🇺🇸
Altera Corporation	www.altera.com	Americas	United States of America	🇺🇸
Amazon - AWS (Annapurna Labs)	www.aboutamazon.com	Americas	United States of America	🇺🇸
Ambarella	www.ambarella.com	Americas	United States of America	🇺🇸
Ampere Computing LLC	Ampere Computing Home	Americas	United States of America	🇺🇸
Analogix	www.analogix.com	Americas	United States of America	🇺🇸
Apple	www.apple.com	Americas	United States of America	🇺🇸
Broadcom Inc.	www.broadcom.com	Americas	United States of America	🇺🇸
Cerebras Systems Inc.	http://cerebras.net/	Americas	United States of America	🇺🇸
Cirrus Logic	www.cirrus.com	Americas	United States of America	🇺🇸
Cisco Systems	www.cisco.com	Americas	United States of America	🇺🇸
Endura Technologies	http://www.enduratechnologies.com/	Americas	United States of America	🇺🇸
GCT Semiconductor	www.gctsemi.com	Americas	United States of America	🇺🇸
Groq, Inc.	https://groq.com/	Americas	United States of America	🇺🇸
IBM	www.ibm.com	Americas	United States of America	🇺🇸
Indie Semiconductor, Inc.	www.indiesemi.com	Americas	United States of America	🇺🇸
Integrated Silicon Solution Inc. (ISSI)	www.issi.com	Americas	United States of America	🇺🇸
Lattice Semiconductor	www.latticesemi.com	Americas	United States of America	🇺🇸
Marvell Technology Inc.	www.marvell.com	Americas	United States of America	🇺🇸
MaxLinear	www.maxlinear.com	Americas	United States of America	🇺🇸
Microchip Technology	www.microchip.com	Americas	United States of America	🇺🇸
Monolithic Power Systems (MPS)	www.monolithicpower.com	Americas	United States of America	🇺🇸
Navitas Semiconductor	https://navitassemi.com/	Americas	United States of America	🇺🇸
NEO Semiconductor	https://neosemic.com/	Americas	United States of America	🇺🇸
Nvidia Corporation	www.nvidia.com	Americas	United States of America	🇺🇸
ON Semiconductor	www.onsemi.com	Americas	United States of America	🇺🇸
Parade Technologies	www.paradetech.com	Americas	United States of America	🇺🇸
Pixelworks	www.pixelworks.com	Americas	United States of America	🇺🇸
Power Integrations	www.power.com	Americas	United States of America	🇺🇸
Qorvo	www.qorvo.com	Americas	United States of America	🇺🇸
Qualcomm Inc.	www.qualcomm.com	Americas	United States of America	🇺🇸
QuickLogic Corporation	www.quicklogic.com	Americas	United States of America	🇺🇸
Rambus	www.rambus.com	Americas	United States of America	🇺🇸
Silicon Laboratories	www.silabs.com	Americas	United States of America	🇺🇸
SiTime Corporation	https://sitime.com/	Americas	United States of America	🇺🇸
Skyworks Solutions	www.skyworksinc.com	Americas	United States of America	🇺🇸
Synaptics	www.synaptics.com	Americas	United States of America	🇺🇸
Tesla	https://www.tesla.com/	Americas	United States of America	🇺🇸

Global Semiconductor Value Chain

Fabless Companies

Asia Pacific

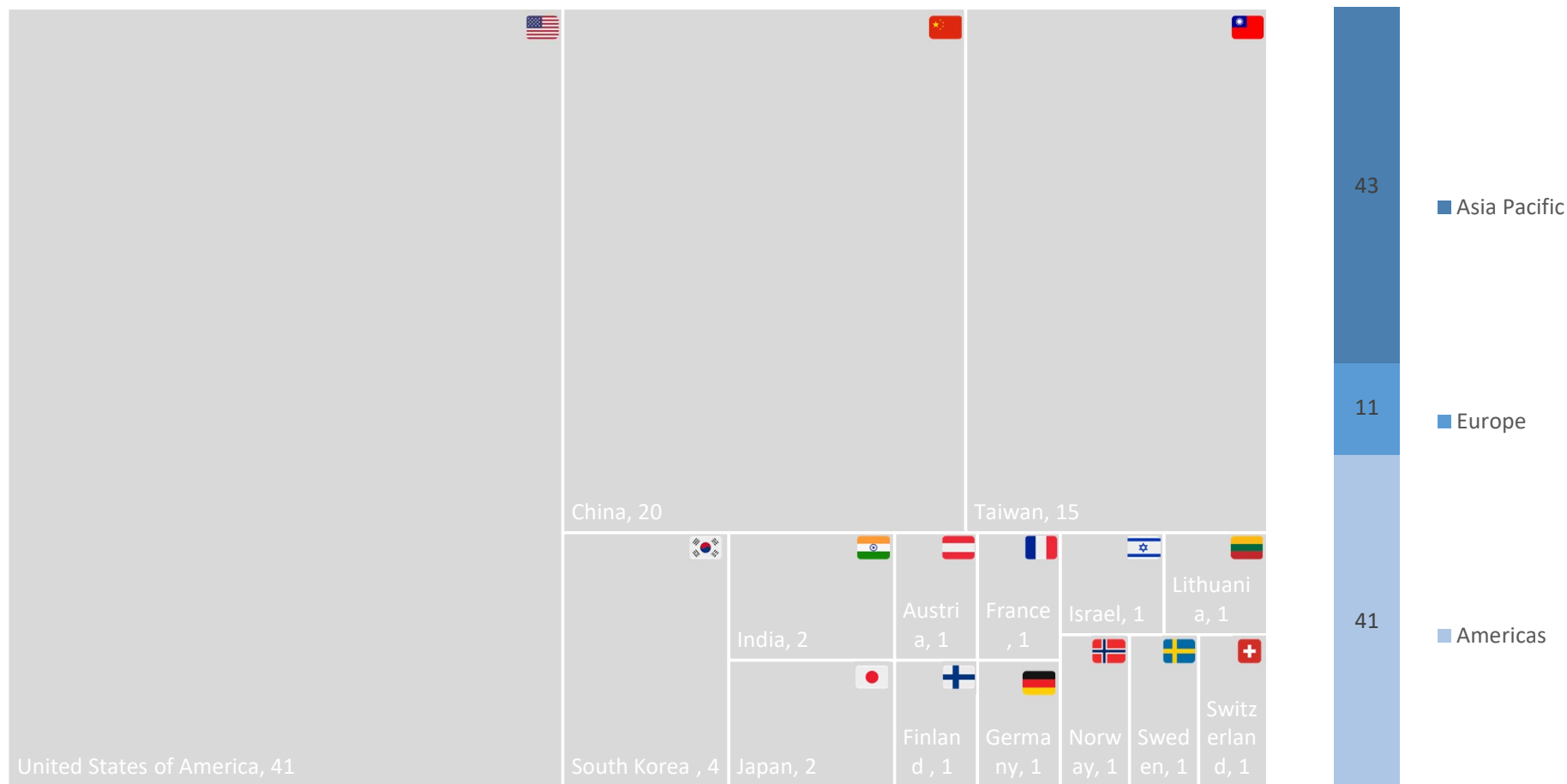| Name	website	Global Region	nationality	Flag
Actions Semiconductor	www.actionstech.com	Asia-Pacific	China	
Alibaba Group (Yitian)	www.alibabagroup.com	Asia-Pacific	China	
Allwinner Technology	www.allwinnertech.com	Asia-Pacific	China	
Cambricon technologies	www.cambricon.com	Asia-Pacific	China	
GigaDevice	www.gigadevice.com	Asia-Pacific	China	
GOWIN Semiconductor	www.gowinsemi.com	Asia-Pacific	China	
HiSilicon (Huawei)	www.hisilicon.com	Asia-Pacific	China	
Huawei	www.huawei.com	Asia-Pacific	China	
Hygon Information Technology	www.hygon.cn	Asia-Pacific	China	
Ingenic Semiconductor	http://www.ingenic.com.cn/en	Asia-Pacific	China	
Loongson Technology	www.loongson.cn	Asia-Pacific	China	
Maxscend Microelectronics	http://www.maxscend.com/	Asia-Pacific	China	
Montage Technology	http://www.montage-tech.com/	Asia-Pacific	China	
Moore Threads	https://www.mthreads.com/	Asia-Pacific	China	
Phytium Technology	http://www.phytium.com.cn/	Asia-Pacific	China	
Rockchip	www.rock-chips.com	Asia-Pacific	China	
Unisoc	www.unisoc.com	Asia-Pacific	China	
VeriSilicon	www.verisilicon.com	Asia-Pacific	China	
Will Semiconductor	www.ovt.com	Asia-Pacific	China	
Zhaoxin	www.zhaoxin.com	Asia-Pacific	China	
L&T Semiconductor Technologies	www.ltsct.com	Asia-Pacific	India	
Vervesemi (VS)	Home - Vervesemi	Asia-Pacific	India	
Socionext	www.socionext.com/en/	Asia-Pacific	Japan	
Sony Semiconductor Solutions Corporation	www.sony-semicon.com	Asia-Pacific	Japan	
ABOV Semiconductor	www.abov.co.kr	Asia-Pacific	South Korea	
FADU	www.fadu.io	Asia-Pacific	South Korea	
LX Semicon Co., Ltd.	www.lxsemicon.com	Asia-Pacific	South Korea	
Telechips	http://telechips.com/	Asia-Pacific	South Korea	
Alchip Technologies	www.alchip.com/en	Asia-Pacific	Taiwan	
ASPEED Technology Inc.	www.aspeedtech.com/	Asia-Pacific	Taiwan	
Elan Microelectronics	www.emc.com.tw	Asia-Pacific	Taiwan	
Elite Semiconductor Memory Technology Inc	www.esmt.com.tw	Asia-Pacific	Taiwan	
eMemory Technology	www.ememory.com.tw	Asia-Pacific	Taiwan	
Etron Technology, Inc.	https://etron.com	Asia-Pacific	Taiwan	
Global Unichip Corp (GUC)	www.guc-asic.com	Asia-Pacific	Taiwan	
Himax Technologies	www.himax.com.tw	Asia-Pacific	Taiwan	
MediaTek Inc.	www.mediatek.com	Asia-Pacific	Taiwan	
Novatek Microelectronics	www.novatek.com.tw	Asia-Pacific	Taiwan	
Nuvoton Technology	www.nuvoton.com	Asia-Pacific	Taiwan	
Realtek Semicondutor Corporation	www.realtek.com	Asia-Pacific	Taiwan	
Silicon Motion	www.siliconmotion.com	Asia-Pacific	Taiwan	
Sitronix Technology Corporation	www.sitronix.com.tw	Asia-Pacific	Taiwan	
VIA Technologies	www.viatech.com	Asia-Pacific	Taiwan	

Global Semiconductor Value Chain

Fabless Companies

Europe

Name	website	Global Region	nationality	Flag
Photeon Technologies	www.photeon.com	Europe	Austria	
Nokia	www.nokia.com	Europe	Finland	
Sequans Communications	www.sequans.com	Europe	France	
INOVA Semiconductors GmbH	https://inova-semiconductors.de	Europe	Germany	
Valens Semiconductor (Valens)	www.valens.com	Europe	Israel	
NTLab	Fabless Semiconductor Development C	Europe	Lithuania	
Nordic Semiconductor	www.nordicsemi.com	Europe	Norway	
Ericsson	www.ericsson.com	Europe	Sweden	
u-blox	www.u-blox.com	Europe	Switzerland	

Fabless – Proportional Global Distribution

Region	Value
Asia Pacific	43
Europe	11
Americas	41

Countries shown:
- United States of America, 41
- China, 20
- Taiwan, 15
- South Korea, 4
- India, 2
- Japan, 2
- Austria, 1
- France, 1
- Israel, 1
- Lithuania, 1
- Finland, 1
- Germany, 1
- Norway, 1
- Sweden, 1
- Switzerland, 1

Global Semiconductor Value Chain

EDA Design Tools and IP Cores

EDA (Electronic Design Automation) design tools and **IP (Intellectual Property) cores** are crucial components that support the development and manufacturing of semiconductors, particularly integrated circuits (ICs).

1. **EDA Design Tools**: These are specialized software tools that aid engineers and designers in creating, simulating, testing, and verifying the design of integrated circuits. EDA tools are used throughout the entire semiconductor design process, including:

   - **Schematic capture**: Creating diagrams of the circuit's layout.

   - **Simulation**: Testing the circuit design under various conditions to predict performance.

   - **Layout design**: Placing the circuit's components on the silicon chip and routing the connections.

   - **Verification**: Ensuring that the design functions as intended and meets all specifications.

   EDA tools help reduce design errors, shorten time-to-market, and improve the overall efficiency of semiconductor development. Key players in this market include companies like **Cadence Design Systems, Synopsys**, and **Siemens EDA**.

2. **IP Cores**: These are pre-designed, reusable blocks of logic or functionality that can be integrated into a custom chip design. IP cores can range from basic elements like adders and multipliers to more complex components like processors, memory controllers, and communication interfaces. Using IP cores allows semiconductor designers to avoid reinventing the wheel for common functions and focus on differentiating aspects of their designs, saving time and reducing risk. Some IP cores are available for licensing, while others are open-source or developed in-house.

Examples of IP core providers include companies like ARM, which provides processor cores, and Imagination Technologies, which offers GPU IP cores.

Global Semiconductor Value Chain

EDA Design Tools and IP Cores

Americas

Name	website	Global Region	nationality	Flag
Chipus	www.chipus.com.br	Americas	Brazil	🇧🇷
Alphawave Semi	http://www.awavesemi.com/	Americas	Canada	🇨🇦
crosslight software	www.crosslight.com	Americas	Canada	🇨🇦
Low Power Futures	lowpowerfutures.com	Americas	Canada	🇨🇦
BigBang Semi	https://bigbangsemi.com/	Americas	Mexico	🇲🇽
Accenture	www.accenture.com	Americas	United States of America	🇺🇸
Achronix	www.achronix.com	Americas	United States of America	🇺🇸
Agnisys Inc.	www.agnisys.com	Americas	United States of America	🇺🇸
Aldec	www.aldec.com	Americas	United States of America	🇺🇸
Alphacore	www.alphacoreinc.com	Americas	United States of America	🇺🇸
Altair Engineering Inc.	https://altair.com/	Americas	United States of America	🇺🇸
Altera (Intel)	http://altera.com/	Americas	United States of America	🇺🇸
Altium	www.altium.com	Americas	United States of America	🇺🇸
Analog Bits	www.analogbits.com	Americas	United States of America	🇺🇸
Ansys, Inc.	www.ansys.com	Americas	United States of America	🇺🇸
Aragio	www.aragio.com	Americas	United States of America	🇺🇸
Arasan Chip Systems	www.arasan.com	Americas	United States of America	🇺🇸
Arteris IP	http://www.arteris.com/	Americas	United States of America	🇺🇸
asicNorth	www.asicnorth.com	Americas	United States of America	🇺🇸
Autodesk	https://www.autodesk.com/	Americas	United States of America	🇺🇸
Blue Cheetah	www.bcanalog.com/	Americas	United States of America	🇺🇸
Blue Pearl Software	Blue Pearl Software Inc.	Americas	United States of America	🇺🇸
Bluespec	https://bluespec.com/	Americas	United States of America	🇺🇸
Cadence Design Systems	www.cadence.com	Americas	United States of America	🇺🇸
CAST	www.cast-inc.com	Americas	United States of America	🇺🇸
Certus Semiconductor	Home - Certus Semiconductor (certus-s	Americas	United States of America	🇺🇸
Ceva, Inc.	www.ceva-ip.com	Americas	United States of America	🇺🇸
Credo	Credo Semiconductor, Inc. | We Conne	Americas	United States of America	🇺🇸
Digital Blocks	www.digitalblocks.com	Americas	United States of America	🇺🇸
Dolphin Technology	http://www.dolphin-ic.com/	Americas	United States of America	🇺🇸
Dover Microsystems	http://www.dovermicrosystems.com/	Americas	United States of America	🇺🇸
DXCorr Design Inc.	http://www.dxcorr.com/	Americas	United States of America	🇺🇸
Efinix	www.efinixinc.com/	Americas	United States of America	🇺🇸
eInfochips	https://www.einfochips.com/	Americas	United States of America	🇺🇸
Encore Semi, Inc	Encore Semi Homepage	Americas	United States of America	🇺🇸
Eureka Technology Inc.	www.eurekatech.com	Americas	United States of America	🇺🇸
Excellicon	Home - Excellicon	Americas	United States of America	🇺🇸
Expedera, Inc.	https://www.expedera.com/	Americas	United States of America	🇺🇸
Flexlogix	Home | Flex Logix — Reconfigurable Co	Americas	United States of America	🇺🇸
Google	https://about.google/	Americas	United States of America	🇺🇸
ICManage	www.icmanage.com	Americas	United States of America	🇺🇸
Intelliprop Inc.	www.intelliprop.com	Americas	United States of America	🇺🇸
Keysight Technologies EDA division	www.keysight.com	Americas	United States of America	🇺🇸
Lorentz Solution	www.lorentzsolution.com	Americas	United States of America	🇺🇸
MathWorks, Inc.	https://mathworks.com/	Americas	United States of America	🇺🇸
MIPS Technologies	http://mips.com/	Americas	United States of America	🇺🇸
miribilis design inc	www.mirabilisdesign.com	Americas	United States of America	🇺🇸
Mixel	https://mixel.com/	Americas	United States of America	🇺🇸
Mobiveil	https://mobiveil.com/	Americas	United States of America	🇺🇸

Global Semiconductor Value Chain

EDA Design Tools and IP Cores

Americas

Omni Design Technologies	www.omnidesigntech.com/	Americas	United States of America	🇺🇸
PDF Solutions, Inc.	www.pdf.com	Americas	United States of America	🇺🇸
polar instruments	www.polarinstruments.com	Americas	United States of America	🇺🇸
PrimisAI	https://primis.ai	Americas	United States of America	🇺🇸
Quadric.io Inc.	https://quadric.io/	Americas	United States of America	🇺🇸
Quest Global	www.quest-global.com	Americas	United States of America	🇺🇸
QuickLogic	www.quicklogic.com	Americas	United States of America	🇺🇸
Rambus, Inc.	https://www.rambus.com/	Americas	United States of America	🇺🇸
Real Intent	www.realintent.com	Americas	United States of America	🇺🇸
S2C Inc.	www.s2cinc.com	Americas	United States of America	🇺🇸
Schrodinger	www.schrodinger.com	Americas	United States of America	🇺🇸
SiFive	www.sifive.com	Americas	United States of America	🇺🇸
Silicon Creations	www.siliconcr.com	Americas	United States of America	🇺🇸
Silicon Motion	www.siliconmotion.com	Americas	United States of America	🇺🇸
Silicon Storage Technology, Inc. (SST) (Microchip)	www.sst.com	Americas	United States of America	🇺🇸
Silvaco Inc.	http://silvaco.com/	Americas	United States of America	🇺🇸
SkillCAD	www.SkillCAD.com	Americas	United States of America	🇺🇸
Spectral Design and Test Inc	Home (spectral-dt.com)	Americas	United States of America	🇺🇸
Synopsys	https://www.synopsys.com/	Americas	United States of America	🇺🇸
ULKASEMI Inc.	https://www.ulkasemi.com/	Americas	United States of America	🇺🇸
Uniquify Inc.	https://www.uniquify.com/	Americas	United States of America	🇺🇸
Verific Design Automation	www.verific.com	Americas	United States of America	🇺🇸
Western Design Centre	www.westerndesigncenter.com	Americas	United States of America	🇺🇸
Xpeedic	www.xpeedic.com	Americas	United States of America	🇺🇸

Global Semiconductor Value Chain

EDA Design Tools and IP Cores

Asia Pacific

Name	website	Global Region	nationality	Flag
NanoSilicon	www.nanosi.com	Asia-Pacific	Australia	
Perceptia	https://perceptia.com/	Asia-Pacific	Australia	
AkroStar	www.akrostar-tech.com	Asia-Pacific	China	
Chengdu Analog Circuit Technology Inc.	http://www.analogcircuit.cn/	Asia-Pacific	China	
CoAsia SEMI	www.coasiasemi.com	Asia-Pacific	China	
Corigine	www.corigine.com	Asia-Pacific	China	
DeePoly Technology	www.deepoly.com	Asia-Pacific	China	
EasyEDA	https://easyeda.com/	Asia-Pacific	China	
Empyrean Technology	www.empyrean-tech.com	Asia-Pacific	China	
GOWIN Semiconductor	www.gowinsemi.com	Asia-Pacific	China	
Hongxin micro-nano	Shenzhen Hongxin Micro-Nano Techno	Asia-Pacific	China	
Horizon Robotics	https://horizon.cc/	Asia-Pacific	China	
Innosilicon	https://innosilicon.shop/	Asia-Pacific	China	
IPGoal	IPGoal Microelectronics (Sichuan) Co.,	Asia-Pacific	China	
IPSoar Microelectronics. ...	http://www.ipsoar-tech.com/	Asia-Pacific	China	
Naneng Micro	www.nanengmicro.com	Asia-Pacific	China	
Primarius Technologies	www.primarius-tech.com	Asia-Pacific	China	
Robei LLC	http://robei.com/	Asia-Pacific	China	
Semitronix	www.semitronix.com	Asia-Pacific	China	
Shanghai Arcas Microelectronics Technology Co. Ltd.	www.arcas-da.com	Asia-Pacific	China	
Shenzhen Pango Microsystems Co., Ltd	www.pangomicro.com	Asia-Pacific	China	
VeriSilicon	https://verisilicon.com/	Asia-Pacific	China	
X-Epic	www.x-epic.com	Asia-Pacific	China	
Xingxin (Hangzhou Xingxin Technology Co., Ltd.)	www.phlexing.com	Asia-Pacific	China	
Cyient	http://www.cyient.com/	Asia-Pacific	India	
HCLTech	www.hcltech.com	Asia-Pacific	India	
iWave Systems	www.iwavesystems.com	Asia-Pacific	India	
L&T Technology Services	www.ltts.com	Asia-Pacific	India	
MosChip Technologies	https://moschip.com/	Asia-Pacific	India	
Sevya Multimedia	www.sevyamultimedia.com	Asia-Pacific	India	
SmartDV	www.smart-dv.com/	Asia-Pacific	India	
SmartSoC	www.smartsocs.com	Asia-Pacific	India	
Wipro Engineering	https://www.wipro.com/	Asia-Pacific	India	
ACL Digital (An ALTEN Group Company)	https://www.acldigital.com/	Asia-Pacific	Japan	
Digital Media Professionals Inc.	http://www.dmprof.com/	Asia-Pacific	Japan	
DNP LSI Design Co., Ltd (Dai Nippon Printing Co., Ltd.)	https://www.dnp.co.jp	Asia-Pacific	Japan	
Floadia Corporation	http://www.floadia.com/	Asia-Pacific	Japan	
Jedat	www.jedat.co.jp	Asia-Pacific	Japan	
NSCore, Inc.	http://www.nscore.com/	Asia-Pacific	Japan	
NSW, Inc.	https://www.nsw.co.jp/	Asia-Pacific	Japan	
Silicon Library Inc.	https://siliconlib.com/	Asia-Pacific	Japan	
Socionext Inc.	www.socionext.com	Asia-Pacific	Japan	
Toppan Inc. (TOPPAN TECHNICAL DESIGN CENTER CO.,	http://www.toptdc.com/	Asia-Pacific	Japan	
Zuken	www.zuken.com	Asia-Pacific	Japan	
Skyechip	https://skyechip.com/	Asia-Pacific	Malaysia	
MEDs Technologies Pte Ltd	Home - MEDs TECHNOLOGIES PTE LTD (	Asia-Pacific	Singapore	
ADTechnology	www.adtek.co.kr	Asia-Pacific	South Korea	
alpha solutions	Alpha Solutions, Inc.	Asia-Pacific	South Korea	
ASICLAND	http://www.asicland.com/	Asia-Pacific	South Korea	

Global Semiconductor Value Chain

EDA Design Tools and IP Cores

Asia Pacific

Chips&Media	http://www.chipsnmedia.com/	Asia-Pacific	South Korea	
GAONCHIPS	GAONCHIPS	Asia-Pacific	South Korea	
Leo LSI	www.leolsi.com	Asia-Pacific	South Korea	
OPENEDGES Technology, Inc.	www.openedges.com	Asia-Pacific	South Korea	
Parts Inc.	www.parts-inc.co.kr	Asia-Pacific	South Korea	
Qualitas Semiconductor	www.q-semi.com	Asia-Pacific	South Korea	
SEMIFIVE	https://semifive.com/	Asia-Pacific	South Korea	
Alchip Technologies	http://www.alchip.com/	Asia-Pacific	Taiwan	
Anaglobe	AnaGlobe	Asia-Pacific	Taiwan	
Andes Technology Corporation	www.andestech.com	Asia-Pacific	Taiwan	
Attopsemi Technology Co., LTD	http://www.attopsemi.com/	Asia-Pacific	Taiwan	
CMSC, Inc.	www.cmsc.com.tw	Asia-Pacific	Taiwan	
eMemory Technology Inc.	http://www.ememory.com.tw	Asia-Pacific	Taiwan	
Faraday Technology Corporation	http://www.faraday-tech.com/	Asia-Pacific	Taiwan	
GUC (Global Unichip Corporation)	www.guc-asic.com	Asia-Pacific	Taiwan	
M31	www.m31tech.com	Asia-Pacific	Taiwan	
Progate Group Corporation	www.pgc.com.tw	Asia-Pacific	Taiwan	
Rafael Microelectronics	www.rafaelmicro.com	Asia-Pacific	Taiwan	
Silicon Topology Co., Ltd	https://www.stlayout.com/	Asia-Pacific	Taiwan	
Yield Microelectronics Corporation (YMC)	www.ymc.com.tw	Asia-Pacific	Taiwan	

Global Semiconductor Value Chain

EDA Design Tools and IP Cores

Europe

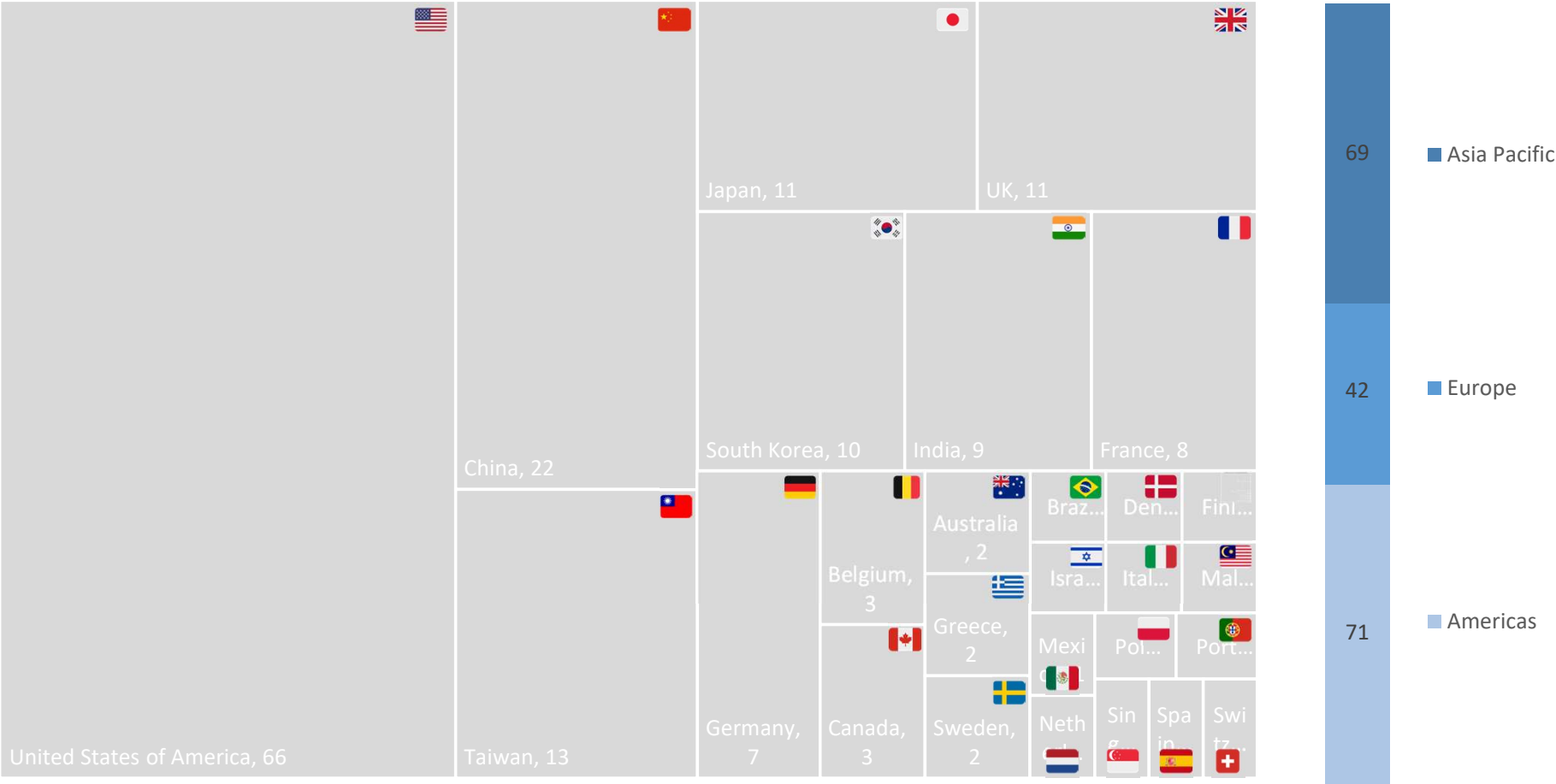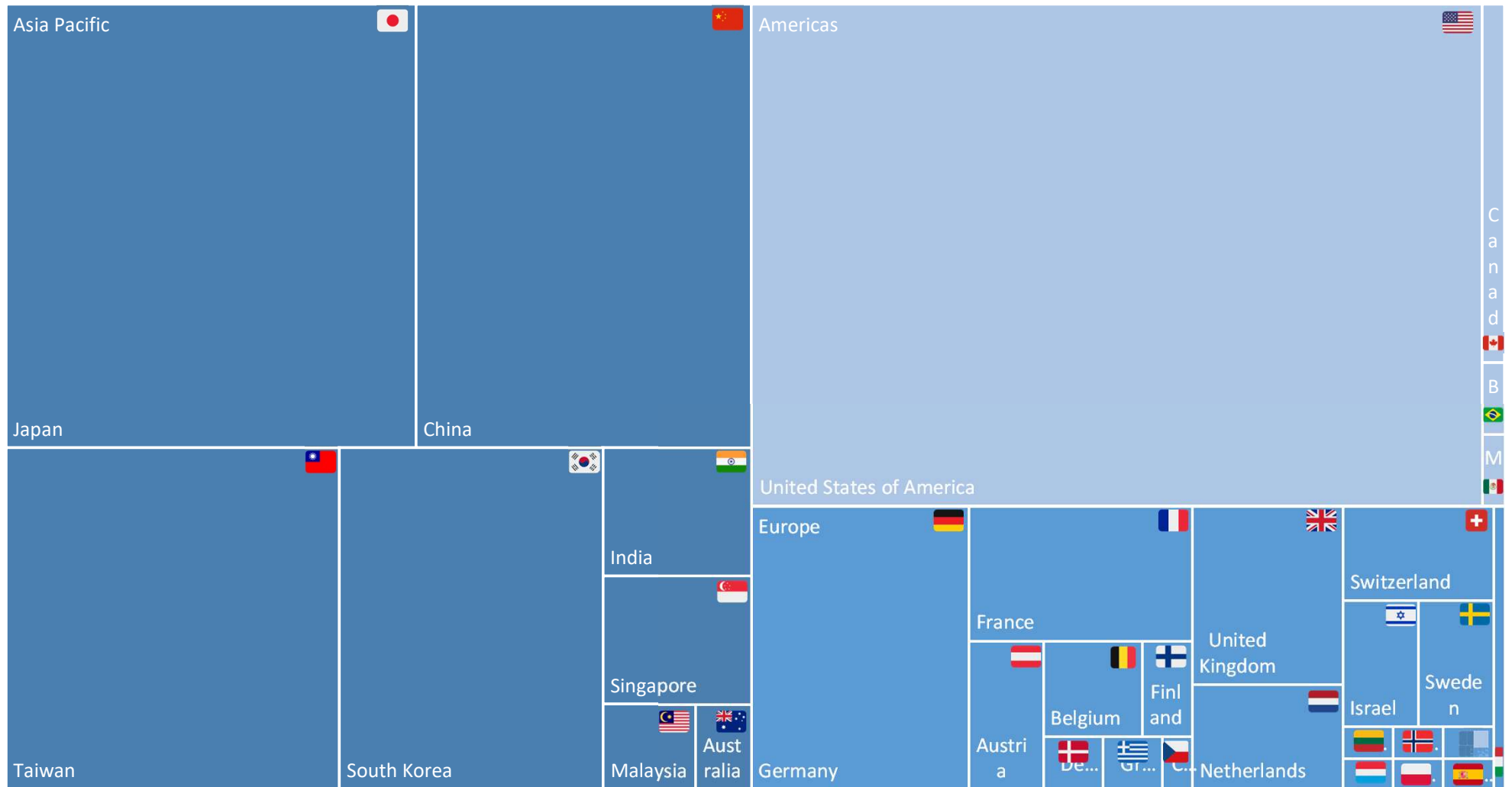| Name	website	Global Region	nationality	Flag
ICsense	www.icsense.com	Europe	Belgium	
IMEC	http://www.imec.be/	Europe	Belgium	
Sofics	http://www.sofics.com/	Europe	Belgium	
Comcores	www.comcores.com	Europe	Denmark	
Core HW	www.corehw.com	Europe	Finland	
Cortus	https://cortus.com/	Europe	France	
Dassalut Systemes	http://3ds.com/	Europe	France	
Dolphin Design	https://www.dolphin-design.fr/	Europe	France	
ICALPS	www.icalps.com	Europe	France	
IROC Technologies	www.iroctech.com	Europe	France	
Menta S.A.S.	http://www.menta-efpga.com/	Europe	France	
Presto Engineering	www.presto-eng.com	Europe	France	
Codasip	Architect your ambition with RISC-V Cu	Europe	Germany	
COSEDA Technologies GmbH	http://coseda-tech.com/	Europe	Germany	
EasyLogix - Schindler & Schill GmbH	http://www.easylogix.de/	Europe	Germany	
Extoll GmbH	www.extoll.com	Europe	Germany	
Lauterbach	http://lauterbach.com/	Europe	Germany	
Racyics	Racyics GmbH – Enabling Advanced No	Europe	Germany	
Siemens EDA	www.sw.siemens.com	Europe	Germany	
Think Silicon (Applied Materials)	http://www.think-silicon.com/	Europe	Greece	
WeASic	https://weasic.com/	Europe	Greece	
Avnet ASIC Israel Ltd. (AAI)	https://www.avnet-asic.com/	Europe	Israel	
Canova Tech	www.canovatech.com	Europe	Italy	
Bruco Integrated Circuits	https://bruco-ic.com/	Europe	Netherlands	
Digital Core Design	www.dcd.pl	Europe	Poland	
Silicon Gate	www.silicongate.com	Europe	Portugal	
Bitec	https://bitec-dsp.com/	Europe	Spain	
Frontgrade Gaisler (Sweden)	www.gaisler.com/	Europe	Sweden	
Xenergic	www.xenergic.com	Europe	Sweden	
CSEM	http://www.csem.ch/	Europe	Switzerland	
Agile Analog	www.agileanalog.com	Europe	United Kingdom	
Arm Holdings	https://www.arm.com/	Europe	United Kingdom	
EnSilica	www.ensilica.com	Europe	United Kingdom	
e-Si-RISC	www.esi-risc.com	Europe	United Kingdom	
GF Micro	www.gfmicro.com	Europe	United Kingdom	
Graphcore Limited	https://www.graphcore.ai/	Europe	United Kingdom	
Helion	www.heliontech.com	Europe	United Kingdom	
Imagination Technologies	https://www.imaginationtech.com/	Europe	United Kingdom	
IN2FAB Technology Ltd	www.in2fab.com	Europe	United Kingdom	
Sondrel	www.sondrel.com	Europe	United Kingdom	
Surecore	www.sure-core.com	Europe	United Kingdom	

EDA Design Tools & IP Cores – Proportional Global Distribution

69	■ Asia Pacific
42	■ Europe
71	■ Americas

United States of America, 66

China, 22

Taiwan, 13

Japan, 11

UK, 11

South Korea, 10

India, 9

France, 8

Germany, 7

Belgium, 3

Canada, 3

Australia, 2

Greece, 2

Sweden, 2

Braz...

Den...

Fini...

Isra...

Ital...

Mal...

Mexi...

Pol...

Port...

Neth...

Sing...

Spain

Switz...

Global Semiconductor Industry Proportional Company HQ Distribution

■ Americas ■ Europe ■ Asia Pacific

Asia Pacific 🇯🇵		China 🇨🇳		Americas 🇺🇸	Canada 🇨🇦

Japan

China

Americas

United States of America

Taiwan 🇹🇼	South Korea 🇰🇷	India 🇮🇳		

India

Singapore 🇸🇬

| Malaysia 🇲🇾 | Australia 🇦🇺 |

Europe 🇩🇪

Germany

France 🇫🇷

Austria

Belgium 🇧🇪

Finland 🇫🇮

United Kingdom 🇬🇧

Netherlands 🇳🇱

Switzerland 🇨🇭

Israel 🇮🇱

Sweden 🇸🇪

B 🇧🇷

M 🇲🇽

Global Semiconductor Industry Proportional Company HQ Distribution

Country (vertical axis label)

Industry Sub-Sector (horizontal axis label)

Sub-sectors: IDM, Foundry, Man.Test.Equip., Mat.Chem., OSAT, Fabless, EDA. IP.

Countries:
- United States
- United Kingdom
- Taiwan
- South Korea
- Singapore
- Malaysia
- Japan
- Israel
- India
- Europe (6)
- China

Global Semiconductor Industry Proportional Company HQ Distribution

Numbers shown on map markers: 2, 3, 15, 36, 18, 56, 137, 4, 68, 38, 115, 71, 2, 8, 3, 2

Global Semiconductor Value Chain

R&D **Input** **Fabless-foundry model** **IDM model**

Research and Development (R&D)

Design Tools, EDA & IP Cores (183) → Design (Fabless)(96)

Manufacturing & Test Equipment (179)

Materials & Chemicals (124)

Manufacturing (Foundries)(48)

Outsourced Semiconductor Assembly & Testing (OSAT)(33)

Integrated Device Manufacturer (IDM)(90)

Design

Manufacturing

Assembly, Test, & Package

Mapping of Ireland's Semiconductor & Microelectronics Industry – Department of Enterprise, Tourism and Employment

Ireland's Semiconductor & Microelectronics Industry

Ireland's Semiconductor & Microelectronics Industry

- Ireland has had an established base of over 80 companies which employ 27,000+ people in the semiconductor and microelectronics sector.

- Ireland hosts 15 of the world's largest 30 semiconductor companies across EDA & IP, design, and manufacturing operations. Examples are Analog Devices, Intel, AMD, Infineon, Qualcomm.

- Ireland is also home to a growing number of equipment and materials vendors servicing the domestic semiconductor manufacturing sector as well as wider markets across the EU. Examples are TEL, Lam Research, KLA, ASML, Applied Materials.

- Ireland has seen a stream of high-profile investments into the industry through acquisition, through expansion of existing operations as well as new market entrants who are establishing European operations from Ireland.

- Ireland is also home to a stream of high potential start-up companies in photonic packaging, heterogenous integration, quantum hardware technology, as well as on-chip cooling solutions and advanced materials for manufacturing.

- Ireland also has a vibrant innovation ecosystem which supports the semiconductor industry. Tyndall National Institute is a flagship facility which actively collaborates with industry, a range of European collaborative research programmes and has direct collaborative links with top-tier organisations such as IMEC, Leti and Fraunhofer.

Employment
- 100
- 600
- 2,000
- 6,000

Mapping of Ireland's Semiconductor & Microelectronics Industry – Department of Enterprise, Tourism and Employment
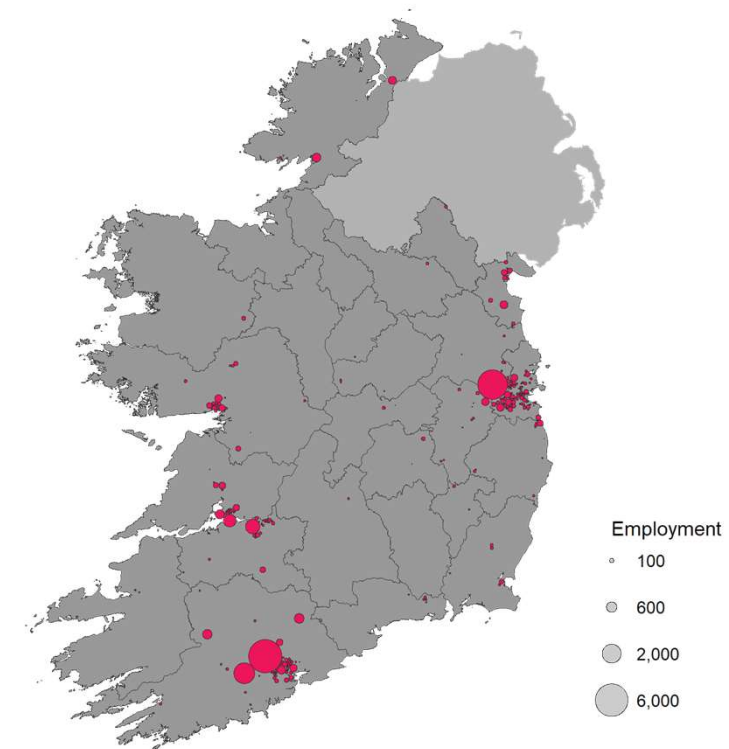
Ireland's Semiconductor & Microelectronics Industry
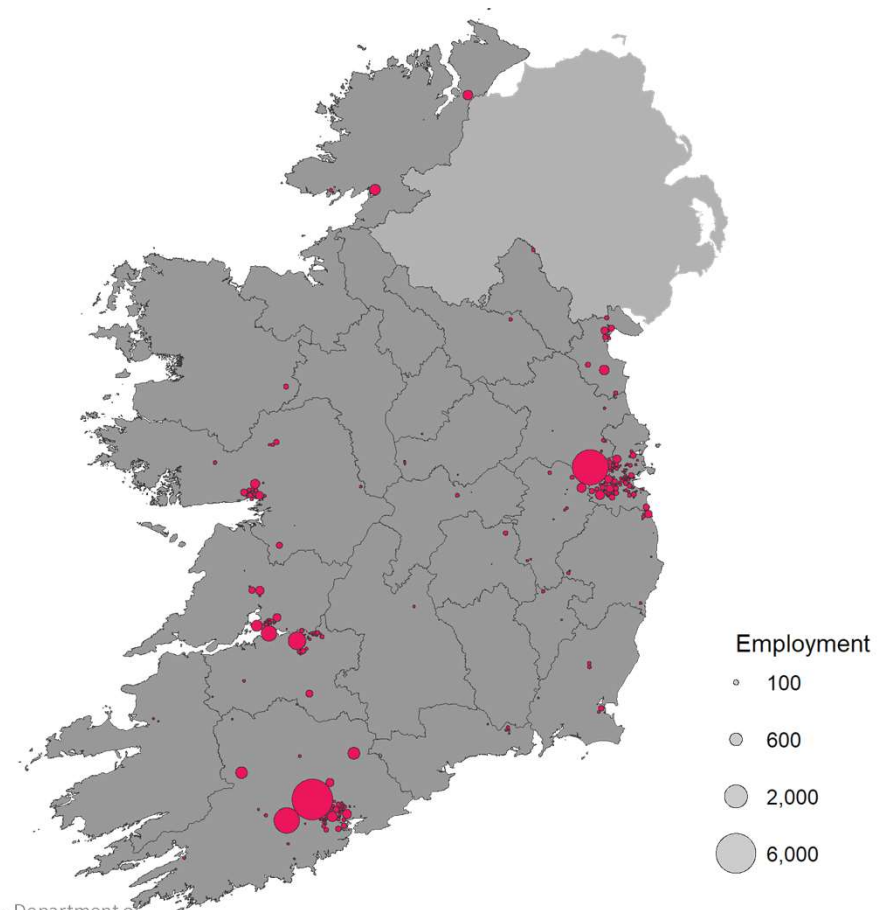
Key industry statistics:

Companies: 80+

Employment: 27,000+

Exports: €15.5 Bn

Payroll: €2 Bn

In-house R&D: €5.6 Bn

Capital Expenditure €11 Bn

Expenditure into Irish Economy: €3.3 Bn

Employment
○ 100
○ 600
○ 2,000
○ 6,000

Mapping of Ireland's Semiconductor & Microelectronics Industry – Department of Enterprise, Tourism and Employment

Ireland's Semiconductor & Microelectronics Industry

Integrated Device Manufacturers:
- Analog Devices
- Bosch
- Infineon
- Intel
- MACOM
- Microchip
- Onsemi
- Qorvo
- Skyworks
- Vishay

Fabless:
- A-DAPT
- AMD
- Apple
- Broadcom
- Equal 1
- IBM
- Parade
- Qualcomm
- uBlox

Design Tools, EDA & IP Cores:
- Arm
- Autodesk
- Cadence
- Siemens
- Synopsys

Manufacturing & Test Equipment:
- Applied Materials
- ASML
- ASM
- Daifuku
- Ebara
- Edwards Vacuum
- KLA Corporation
- Kokusai Electric
- LAM Research
- Lasertec
- Materion
- Nikon
- Onto
- PSK
- SCREEN
- Tokyo Electron
- Trumpf

Materials & Chemicals:
- Air Products
- Boc
- Brenntag
- Schlötter
- Chemco
- Merck Group

Irish Semiconductor Industry

Integrated Device Manufacturers (IDMs)

Americas : Europe

Name	website	Global Region	HQ	Flag	Presence in Ireland
ANALOG DEVICES	www.analog.com	Americas	Wilmington, MA, US	🇺🇸	Limerick
ANALOG DEVICES	www.analog.com	Americas	Wilmington, MA, US	🇺🇸	Cork
ANALOG DEVICES - MAXIM INTEGRATED	www.analog.com	Americas	Wilmington, MA, US	🇺🇸	Dublin
ANALOG DEVICES INTL FINANCIAL SERVICES	www.analog.com	Americas	Wilmington, MA, US	🇺🇸	Limerick
Intel Ireland Ltd.	www.intel.com	Americas	Santa Clara, CA, US	🇺🇸	Kildare
Intel Ireland Ltd.	www.intel.com	Americas	Santa Clara, CA, US	🇺🇸	Cork
Intel Research & Development Ireland Ltd.	www.intel.com	Americas	Santa Clara, CA, US	🇺🇸	Clare
Intel Research & Development Ltd.	www.intel.com	Americas	Santa Clara, CA, US	🇺🇸	Kildare
MACOM Technology Solutions	www.macom.com	Americas	Lowell, MS, US	🇺🇸	Cork
Microchip (Microsemi)	www.microchip.com	Americas	Chandler, Arizona, US	🇺🇸	Dublin
Microchip Ireland	www.microchip.com	Americas	Chandler, Arizona, US	🇺🇸	Cork
Microchip Ireland	www.microchip.com	Americas	Chandler, Arizona, US	🇺🇸	Clare
Skyworks Solutions	www.skyworksinc.com	Americas	Irvine, CA, US	🇺🇸	Cork
Vishay Intertechnology	www.vishay.com	Americas	Malvern, PA, US	🇺🇸	Cork
Vishay Intertechnology	www.vishay.com	Americas	Malvern, PA, US	🇺🇸	Limerick
On Semiconductor Ireland Research and Design Limite	www.onsemi.com	Americas	Phoenix, AZ, US	🇺🇸	Limerick
On Semiconductor Ireland Research and Design Limite	www.onsemi.com	Americas	Phoenix, AZ, US	🇺🇸	Cork
Qorvo	www.qorvo.com	Americas	Greensboro, NC, US	🇺🇸	Dublin
Qorvo	www.qorvo.com	Americas	Greensboro, NC, US	🇺🇸	Cork
Infineon Technologies	www.infineon.com	Europe	Neubiberg, Germany	🇩🇪	Dublin
Infineon Technologies	www.infineon.com	Europe	Neubiberg, Germany	🇩🇪	Dublin
Infineon Technologies	www.infineon.com	Europe	Neubiberg, Germany	🇩🇪	Cork
Robert Bosch IE Ltd.	www.bosch-semiconductors.com	Europe	Gerlingen, Germany	🇩🇪	Limerick

Irish Semiconductor Industry

Fabless Companies

Americas : Europe

Name	website	Global Region	HQ	Flag	Presence in Ireland
Advanced Micro Devices Inc. (AMD)	www.amd.com	Americas	Santa Clara, CA, US	🇺🇸	Dublin
Advanced Micro Devices Inc. (AMD)	www.amd.com	Americas	Santa Clara, CA, US	🇺🇸	Cork
Broadcom Inc.	www.broadcom.com	Americas	San Jose, CA, US	🇺🇸	Dublin, Ireland
Parade Technologies	www.paradetech.com	Americas	SanJose, CA, US	🇺🇸	Cork
Qualcomm - QT Technologies Ireland Ltd.	www.qualcomm.com	Americas	San Diego, CA, US	🇺🇸	Cork
u-blox	www.u-blox.com	Europe	Thalwil, Switzerland	🇨🇭	Cork
Apple	www.apple.com	Americas	Cupertino, CA, US	🇺🇸	Cork
Meta Reality Labs Cork (Oculus)	https://about.meta.com/	Americas	Menlo Park, CA, US	🇺🇸	Cork
IBM	www.ibm.com	Americas	Armonk, NY, US	🇺🇸	Dublin
Johnson Controls	www.johnsoncontrols.com	Americas	Milwaukee, WI, US	🇺🇸	Cork

EDA Design Tools and IP Cores

Americas : Europe

Name	website	Global Region	HQ	Flag	Presence in Ireland
CADENCE DESIGN SYSTEMS (IRELAND) LIMITED	www.cadence.com	Americas	San Jose, CA, US	🇺🇸	Dublin
CADENCE DESIGN SYSTEMS (IRELAND) LIMITED	www.cadence.com	Americas	San Jose, CA, US	🇺🇸	Cork
Synopsys	www.synopsys.com	Americas	Sunnyvale, CA, US	🇺🇸	Dublin
Arm Holdings	https://www.arm.com/	Europe	Cambridge, UK	🇬🇧	Galway
AUTODESK IRELAND LIMITED	www.autodesk.com	Europe	San Francisco, CA, US	🇺🇸	Dublin
Siemens EDA - Mentor Graphics (Ireland) Ltd.	www.sw.siemens.com	Europe	Wilsonville, OR, US (DE)	🇺🇸	Clare

Irish Semiconductor Industry

Manufacturing and Test Equipment

Americas : Asia Pacific : Europe

| Name	website	Global Region	HQ	Flag	Presence in Ireland
Applied Materials, Inc.	www.appliedmaterials.com	Americas	Santa Clara, CA, US	🇺🇸	Kildare
KLA Ireland Limited	www.kla.com	Americas	Milpitas, CA, US	🇺🇸	Dublin
Lam Research (Ireland) Ltd.	www.lamresearch.com	Americas	Fremont, CA, US	🇺🇸	Kildare
Onto Innovation	www.ontoinnovation.com	Americas	Wilmington, MA, US	🇺🇸	Dublin
Materion Corp.	www.materion.com	Americas	Mayfield Heights, OH, US	🇺🇸	Limerick
Daifuku	DAIFUKU	Asia-Pacific	Osaka, Japan	🇯🇵	Kildare
PSK	www.pskinc.com	Asia-Pacific	Gyeonggi-do, Korea.	🇰🇷	Dublin
Ebara Corporation	www.ebara.co.jp	Asia-Pacific	Tokyo, Japan	🇯🇵	Kildare
Kokusai Semiconductor	www.kokusai-electric.com	Asia-Pacific	Tokyo, Japan	🇯🇵	Kildare
Lasertec Corporation (Lasertec U.S.A., Inc.)	www.lasertec.co.jp	Asia-Pacific	Yokohama, Japan	🇯🇵	Kildare
Nikon Precision Europe GmbH.	www.nikon.com	Asia-Pacific	Tokyo, Japan	🇯🇵	Kildare
SCREEN SPE IRELAND LTD.	www.screen.co.jp	Asia-Pacific	Kyoto, Japan	🇯🇵	Kildare
TEL Magnetic Solutions Ltd.	www.tel.com	Asia-Pacific	Tokyo, Japan	🇯🇵	Dublin
Tokyo Electron Ltd.	www.tel.com	Asia-Pacific	Tokyo, Japan	🇯🇵	Kildare
ASM	www.asm.com	Europe	Almere, Netherlands	🇳🇱	Dublin
ASML	www.asml.com	Europe	Veldhoven, Netherlands	🇳🇱	Kildare
Edwards Vacuum (Atlas Copco)	www.edwardsvacuum.com	Europe	Burgess Hill, UK	🇬🇧	Dublin
Trumpf	www.trumpf.com	Europe	Ditzingen, Germany	🇩🇪	Dublin

Ireland's Semiconductor & Microelectronics Industry

Mapping of Ireland's Semiconductor & Microelectronics Industry – Department of Enterprise, Tourism and Employment
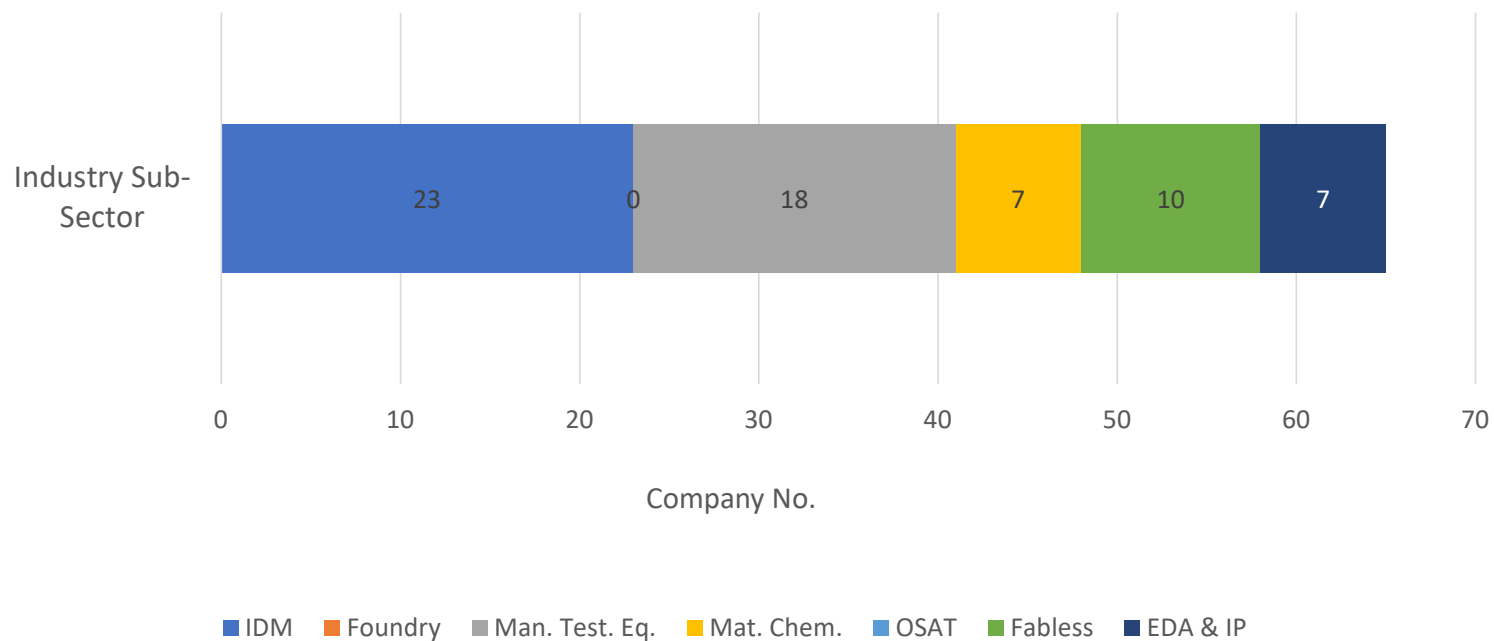
Ireland's Semiconductor & Microelectronics Industry

Component and Systems Developers

PixQuanta	Mbryonics	Farran	InnaLabs
Eblana Photonics	Firecomms	Pilot Photonics	Taoglas

Design, Prototyping & Manufacture

Celeprint	Aragorn Services		Litho Circuits
Mint-Tek	Realtime Technologies	mSemicon	Jade

Assembly, Test & Package Services

Abrel	Accutron	Ashling	RTR Electronics
IC Mask Design	FiconTEC	Icergi	YieldHub

Mapping of Ireland's Semiconductor & Microelectronics Industry – Department of Enterprise, Tourism and Employment

Indigenous Microelectronics Industry

Component and Systems Developers
Design, Prototyping & Manufacture
Assembly, Test & Package Services

Name	website	Global Region	HQ	Flag	Presence in Ireland
PixQuanta	http://pixquanta.com/	Europe	Cork, Ireland		Cork
Equal1 Laboratories Ireland Ltd	www.equal1.com	Europe	Dublin, Ireland		Dublin
Abrel Products Ltd	www.abrel.com	Europe	Limerick, Ireland		Limerick
Accutron Ltd	www.accutron.ie	Europe	Limerick, Ireland		Limerick
X-Celeprint Ltd	https://x-celeprint.com	Europe	Cork, Ireland		Cork
Aragorn Services	www.aragorn.ie	Europe	Clare, Ireland		Clare
Ashling Microsystems Ltd	www.ashling.com	Europe	Limerick, IE		Limerick
IC Mask Design Ltd	https://icmaskdesign.com/	Europe	Limerick, IE		Limerick
AnDAPT	www.andapt.com	Europe	Dublin, Ireland		Dublin
Mbryonics	https://mbryonics.com	Europe	Galway, Ireland		Galway
FiconTEC	www.ficontec.com	Europe	Cork, Ireland		Cork
Farran	https://farran.com	Europe	Cork, Ireland		Cork
InnaLabs	www.innalabs.com	Europe	Dublin, Ireland		Dublin
Eblana Photonics	https://eblanaphotonics.com	Europe	Dublin, Ireland		Dublin
Firecomms	www.firecomms.com	Europe	Cork, Ireland		Cork
Litho Circuits Limited	https://litho-circuits.com	Europe	Limerick, IE		Limerick
Mint Tek	https://mint-tek.com	Europe	Galway, Ireland		Galway
Pilot Photonics	www.pilotphotonics.com	Europe	Dublin, Ireland		Dublin
Taoglas	www.taoglas.com	Europe	Dublin, Ireland		Dublin
Realtime Technologies Ltd	www.realtime.ie	Europe	Dublin, Ireland		Dublin
RTR Electronics Limited	www.rtrelec.com/	Europe	Limerick, IE		Limerick
ICERGi	www.icergi.com	Europe	Dublin, Ireland		Dublin
mSemicon	www.msemicon.com	Europe	Dublin, Ireland		Dublin
Jade Design Automation	https://jade-da.com	Europe	Galway, Ireland		Galway

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