# TEL TOKYO ELECTRON CORPORATE PROFILE



### **TOKYO ELECTRON LIMITED**

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# Toward Building a Strong and Resilient Society

Tokyo Electron is using its world-leading expertise in semiconductor production equipment to drive innovation in semiconductor technology, with the goal of creating a prosperous and sustainable future.

# CEO's Message



I would like to express my sincere gratitude to all stakeholders for your continued support and patronage. In recent years, industry, society and the lives of the public have been significantly affected by a series of challenges. These include natural disasters caused by climate change; geopolitical risks; trade frictions and the human rights issues they engender. On the other hand, in order to build a strong and resilient society in which economic activities do not stop under such circumstances, various efforts are underway, including the implementation of ICT (information and communication technology) and decarbonization to preserve the global environment. All of these efforts require semiconductor evolution.

Meanwhile, the transition to a data-driven society is progressing at an unprecedented speed, and digital technologies are now used furthermore: IoT, AI and 5G are becoming more widespread, industries are growing smarter, autonomous driving is evolving, and the much-hyped generative AI and VR (Virtual Reality) is seeing real-world applications. For semiconductors, which are supporting the core of this shift, expectations for technological innovations such as larger capacity, higher speed, superior reliability and lower power consumption are limitless. The size of the semiconductor market is expected to reach US\$1 trillion by 2030, followed by continued growth over the next decade or two. And we expect the semiconductor production equipment market in which we operate to grow even further.

We celebrated the 60th anniversary of our founding last year, Based on our vision "A company filled with dreams and vitality that contributes to technological innovation in semiconductors.", we aim for medium- to long-term profit expansion and continuous corporate value enhancement by utilizing our expertise to continuously create high value-added leading-edge equipment and technical services. Our corporate growth is enabled by people, and our employees both create and fulfill company values. We work to realize this vision through engagement with our stakeholders. Our corporate growth is enabled by people, and our employees both create and fulfill company values. We work to realize this vision through engagement with our stakeholders.

We deeply appreciate your support for Tokyo Electron and look forward to your continued support and patronage.

**Toshiki Kawai** Representative Director, President & CEO

Mony Gawas



Tokyo Electron's Corporate Principles are comprised of four elements that together detail our mission as a company and identify the values and behaviors necessary to fulfill our goals.



### **Corporate Philosophy**

The purpose of TEL's existence and its mission in society

We strive to contribute to the development of a dream-inspiring society through our leading-edge technologies and reliable service and support.



### **Management Policies**

The logic that underscores general rules of management

### **■ Profit is Essential**

The TEL Group aims to contribute to the development of society and industry and to the enhancement of corporate value while continually pursuing profit.

### **■** Growth Philosophy

We will tirelessly take on the challenges of technological innovation to achieve continuous growth through business expansion and market creation.

### **■** Employees

The TEL Group's employees both create and fulfill company values, performing their work with creativity, a sense of responsibility, and a commitment to teamwork.

### ■ Safety, Health, and the Environment

The TEL Group gives the highest consideration to the safety and health of every person connected with our business activities as well as to the global environment.

### **■** Scope of Business

The TEL Group leads markets by providing high-quality products in leading-edge technology fields with a focus on electronics.

### ■ Quality and Service

The TEL Group strives to understand the true needs to achieve customer satisfaction and secure customer trust while continuously improving quality and service.

### **■** Organizations

The TEL Group builds optimal organizations that maximize corporate value in which all employees can realize their full notential

### ■ Social Responsibility

Feeling a strong sense of corporate social responsibility, we strive to gain the esteem of society and to be a company where our employees are proud to work.

# **Technology Enabling Life**

Our corporate message that expresses the Corporate Principles which consist of our Corporate Philosophy, Management Policies, Vision and TEL Values.





### Vision

Medium- to long-term business aspirations based on our Corporate Philosophy and Management Policies

A company filled with dreams and vitality that contributes to technological innovation in semiconductors

This vision is based on the idea of CSV\* (Creating Shared Value).

\* CSV: CSV is to use the expertise of a company to solve social issues, create social and economic value, improve corporate value, and achieve sustainable growth.

### **TEL Values**

Attitudes, codes of conduct, and values to be observed by each employee

Pride

We take pride in providing high-value products and services.

Challenge

We accept the challenge of going beyond what others are doing in pursuing our goal of becoming number one globally.

Ownership

We will keep ownership in mind as we think things through, and engage in thorough implementation in order to achieve our goals.

Teamwork

We respect each other's individuality and we place a high priority on teamwork.

**Awareness** 

We must have awareness and accept responsibility for our behavior as respectful members of society.



# The History of TEL

The growth of TEL has always been in sync with the history of the semiconductor industry. Ever since its inception, TEL has tirelessly pursued the leading-edge technologies and innovations. Here are the milestones of the company's development.

# 1963

### Founded as a technology trading company

■ Tokyo Electron Laboratories, Inc. is established in Akasaka, Minato-ku with capital of five million yen as an affiliate of Tokyo Broadcasting System, Inc. Young entrepreneurs including Tokuo Kubo, Toshio Kodaka and

others established Tokyo Electron Laboratories, Inc., driven by a conviction that semiconductors were about to transform the

■ TEL begins import and sales of leak detectors, and IC production systems

### 1965

Concludes an agency agreement with Fairchild Semiconductor Corp. (U.S.) to sell Fairchild's IC testers in Japan

### 1968

A joint venture with the Thermco Products Corp. (U.S.), named TEL-Thermco Engineering Co., Ltd. begins domestic production of diffusion furnaces



1976

TEL-Thermco Engineering Co., Ltd. develops the world's first nigh-pressure oxidation furnace

### 1980

Listed on the Second Section of the Tokyo Stock Exchange

### and support in Europe and the U.S.

From the 1990s onwards, TEL reinforced its group company structure in Japan by establishing a number of several subsidiaries responsible for service and manufacturing. The company's overseas operations that began in 1980 also expanded vigorously in the 1990s, resulting in a broad network of overseas TEL subsidiaries that offered direct sales and support in the fast-growing global market. It was around this time that TEL began to grow into a company

### 1991

Top sales among semiconductor production equipment manufacturers attained for three consecutive years from 1989

TEL began exporting its semiconductor production equipment in 1986, and already in 1989, it was ranked No. 1 in sales among all semiconductor equipment manufacturers

### 1990

TEL marks a major move into development and marketing of

**FPD** production equipment

### 1986

semiconductor production equipment begins

### 2002

Participation in Albany NanoTech Program for industry-academia joint research promotion and support



2016

**TEL receives Prime** Minister's Award for the second time since 2003

### 2022

- TEL announces new Vision and new Medium-term Management Plan, and introduces Corporate Message
- TEL's listing transferred to Prime Market in **Tokyo Stock Exchange** ■ TEL wins Grand Prize for

of the Year® 2021

Corporate Governance

2024

- TEL is cited as "Most Honored Company" in the Institutional Investor's All-Japan Executive Team Rankings for nine years in succession
- TEL is chosen for SX Brand 2024

### 2018 TEL is cited as one of

"Top 100 Global Tech Leaders"

by Thomson Reuters (now Refinitiv)

TEL receives Tokyo Stock Exchange's **Tenth Annual Award for Excellence in Disclosure for** the second time since 1999

### 2007

2005

Establishment of "TEL UNIVERSITY" to strengthen employee development

2023

■ TEL participates in the U.S.-Japan University Partnership for Workforce Advancement and Research & Development in Semiconductors (UPWARDS) for the Future

■ TEL celebrated its 60th anniversary on November 11,2023

### The meaning expressed by the 60th anniversary logo

The special logo created to celebrate TEL's 60th anniversary contains many symbolic features. The five colored bands symbolize diversity, and the upward arrow points to a future of breakthroughs. They symbolize TEL's desire to move the world forward with its unique innovation and ongoing transformation as it combines the strengths of diverse individuals.



### 1964

TEL acquires importing and selling rights for diffusion furnace manufactured by Thermco Products Corp. (U.S.) and begins sales

### 1970

Complete domestic production of diffusion furnaces becomes possible at TEL-Thermco Engineering Co., Ltd.

### 1984

Listed on the First Section of the Tokyo Stock Exchange

### 1978

Tokyo Electron Laboratories, Inc. renamed Tokyo Electron Ltd.

Export of

2021

2020

Tetsuro Higashi

(Former Chairman,

President & CEO)

receives the Order

of the Rising Sun, Gold and Silver Sta

> **TEL Tops Domestic List** in the Second ROESG Rankings (2020 Edition)

Mainframe Computer



Single Chip Microprocessor



Personal Computer



Mobile Phone

2013

1999

Category of industry on

"Wholesale Trade" to

"Electric Appliances"

the Tokyo Stock Exchange

First Section changed from

**TEL concludes** 

a merger agreement with Applied Materials, Inc.

(to be dissolved in 2015)



2015

TEL

Re-emergence as New TEL

(Vision, Medium-term Management Plan

formulated and new Corporate Logo created)

Digital Consumer Electronics

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Consolidated

2.400

1,600

1,200

Sales (Billion yen)

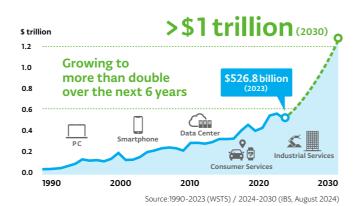




### Market size of semiconductors

Today, semiconductors are not only pervasive in electronic equipment, but are also indispensable to Data centers and 5G/6G network infrastructure that support a wide range of applications. Also, applications that require large-scale calculations, such as VR, autonomous driving, and generative Al represented by ChatGPT, will continue to expand and their importance will continue to grow. Reflecting its soaring importance, the semiconductor market is forecast to top US\$1 trillion by 2030, more than double its current size. As the evolution of semiconductors is set to continue, TEL is expected to play an even greater role than before.

### **Outlook for the Semiconductor Market**



### Toward sustainable growth of society

To achieve the digital transformation and decarbonization of society, we are implementing an environmentally-focused supply chain initiative called E-COMPASS. By working to reduce the environmental impact of our business operations and the use of our equipment, we promote the preservation of the global environment throughout our supply chain.



Environmental Co-Creation by Material, Process and Subcomponent Solutions

### **Semiconductors**

Pursuing higher device performance and lower power

### **Production equipment**

Achieving both high process performance and environmental performance of the equipment

### Business activities

Reduction of CO<sub>2</sub> emissions in all business activities

### TEL's environmental goals

To enhance the environmental performance of our products, plants, and offices, we have set a long-term environmental goal of achieving "net zero"—which means offsetting our greenhouse gas emissions with reductions. We plan to effectively eliminate scope 1, 2\* and 3\*\* emissions by 2040.

Net Zero Target Scope 1,2 & 3 by 2040

\* Scope 1 and 2: Emissions from the use of energy such as electricity in business activities

\*\* Scope 3: Emissions from the use and disposal of sold equipment, purchase of materials, distribution, etc.

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# BUSINESS

# To Provide the Best Products and Best Technical Service

As the transition to a data-driven society accelerates and the scope of semiconductor applications expand, customers' requirements for production equipment are becoming even more diverse and advanced. This is why we at TEL are not only committed to developing innovative technologies, but also to providing "reliable service and support." By contributing to the customers' value creation processes, we aim to remain their sole strategic partner.

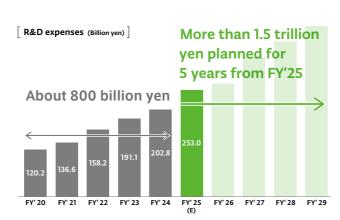


### **TEL's Business Operations**



### R&D

Since semiconductors are critical building blocks of social infrastructure, the technologies that drive them are set to evolve further. As future semiconductors will need even larger capacity, higher speed, higher reliability, and lower power consumption than ever before, it is critical for us to come up with advanced next-generation R&D capabilities so we can provide production equipment with higher added-value and competitiveness in a timely manner.



### **R&D Facilities** TEL Manufacturing and Engineering of America (U.S.) – TEL Technology Center, America (U.S.) - TEL Magnetic Solutions (Ireland) - TEL Technology Center Korea (Korea) - CEA-Leti (France) SUNY Poly/NY CREATES (U.S.) Tokyo Electron Technology Solutions - BRIDG (U.S.) Tokyo Flectron Kyushi Tokyo Electron America (U.S.) Tokyo Electron Miyagi National Institute of Advanced Industrial Science and Technology (Japan) TEL Technology Center, Taiwan (Taiwan) - IME (Singapore) TEL R&D base Consortium

### **Active Capital Investment for Future Growth**

We plan to complete several new buildings at our major domestic development and manufacturing sites. This will further strengthen our technology development capabilities and enable timely delivery of products with features that meet the needs of the market and our customers.



New Development Building Yamanashi (Completed in July 2023)



New Development Building
Kumamoto (To be completed in summer 2025)



New Development Building
Miyagi (To be completed in spring 2025)

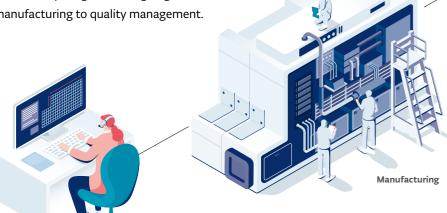


Tohoku Production and Logistics Center Iwate (To be completed in fall 2025)



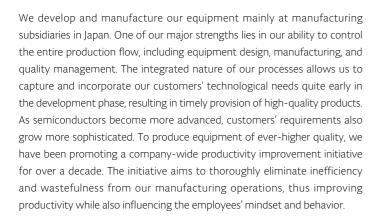
# Manufacturing

Our manufacturing operations start with early phases of product development and covers everything from designing and manufacturing to quality management.





Quality Management





### Designing to order

Customizing the equipment's design specifications to meet the customer's precise technological needs

### Designing manufacturing processes

Designing processes that assure efficient and high-quality

### High-volume manufacturing



### Sales

Making sales starts with gathering information on customers' needs and business trends to quickly and accurately discern what kind of equipment and technologies are in demand. We then take full advantage of our core competence and expertise to propose the optimum solution that helps create the best value for our customers. We have formed strong partnerships with our customers and are daily engaged in intense sales activities on a global field.



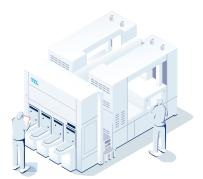


production of equipment

Producing high-quality equipment in large volume and on schedule







### **Technical Service and Support**

Committed to pursuing the best technical service possible in a constantly changing business environment, we are ensuring that our technical service and support will bring satisfaction to all customers around the world. Anticipating the shifting trends and diversifying customer needs, we are also continuously upgrading our global support capabilities.

### **Assorted Services to Address Diverse Needs**

- Sales of new small-diameter wafer processing equipment (including 200 mm)
- Sales/procurement/warranty/total support of refurbished equipment
- Genuine spare parts supply and repair service
- Engineering service/support
- Equipment upgrade service



At TEL, we refer to technical service and support before-andafter equipment delivery as "field solutions." We assure high equipment availability through total technical service and support, including everything from delivery and installment of equipment to after-sales maintenance service. Our field solutions business takes advantage of the largest installed base in the industry (about 92,000 units), while also employing the latest AI, digital technologies, and knowledge management\* tools to boost the efficiency of our service.

\*Knowledge management: a method for stimulating innovation and enhancing an organization's productivity by capturing and sharing tacit knowledge held by individual

### **Use of Digital Technology**

We employ the latest wearable devices to capture real-time images and sounds from our customers' production sites. Shared availability of such data is vital to the efficacy of our remote support system. Our advanced and user-friendly smart glasses\*\* feature original functions including enhanced data security, restriction on image transmission, and speech translation, all of which contribute to accurate and speedy support. Our TELeMetrics™ service connects the equipment installed at customers' sites with TEL's servers via a highly secure communication lines, allowing remote analysis of the equipment data to enhance operational stability and productivity. By implementing these technologies in close cooperation with field engineers and manufacturing sites, we provide high value-added



\*\* Smart glasses: an eyewear-type device capable of projecting images and digital information in the user's field of vision.

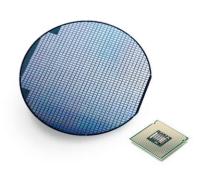
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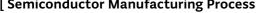
# **World-Leading Capabilities for Technological Innovation Enable** the Evolution of Semiconductors

### **Semiconductor Production Equipment**

Semiconductors are critical components of digital products such as TVs, PCs and smartphones, and they are also essential to industrial digitalization including smart factories, smart agriculture, smart healthcare, and smart cities. Accordingly, semiconductor engineers are responding to unending requests for larger capacity, higher speed, higher reliability and lower power consumption.



### [ Semiconductor Manufacturing Process ]





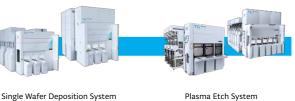








Cleaning System



Interconnect formation

■ Wafer process (Front-end) ■ Assembly and Test process (Back-end)

Plasma Etch System



Metal film

Metal film dielectric film

Oxide/Nitride film deposition

Thin films such as silicon dioxide, silicon nitride and others are deposited by thermal oxidation, CVD \* and/or ALD\*\*

on the wafer surface.

### Photoresist\* coating

While the wafer is rotated at a high speed, a thin layer of photoresist is coated uniformly on its surface. \*Photoresist: a light-sensitive material that changes

**Redistribution Layer** 

### Exposure

To transfer the integrated circuit pattern onto a wafer, equipment called stepper irradiates UV light on the photoresist layer through a patterned photomask aligned over

### Development

Developing exposed photoresist leaves a particular pattern on a wafer according to the reticle (photomask) being used.

### Etching

A plasma etch system removes the exposed dielectric silicon dioxide, silicon nitride, silicon and others from the wafer surface according to the remaining photoresist

### Ashing/Cleaning

In a post-etch process, the residual photoresist is removed, and the wafer is soaked into chemical impurities on the wafer.

# **Before Wiring**

Gate Electrode

transistors, first a dielectric (oxide) layer is deposited over the gate layer so another layer of circuit can be laid on top. Contact holes (vias) are then opened in the dielectric layer, and are filled with metal by CVD.

**Contact Formation** 

To form wiring that connects individual

and the surface is planarized. These processes are repeated to make a multi-level interconnect.

form another wiring pattern.

Interconnect Formation

Another dielectric layer is deposited on

The trenches are filled with a metal film,

and then the excess metals are polished

top, in which trenches are etched to



### Isolation Formation/Gate Formation

### Packaging/Inspection





Wafer/Dicing Frame Probei



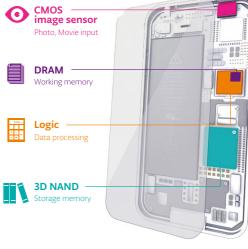
package substrates or lead

frames, and are sealed with ceramic or plastic. Completed

**Semiconductor Packaging** 

Packaging/Assembly

### Examples of semiconductor product applications







Testing





To form redistribution layer and Bond pads (BUMP) as well as to provide protection, a high-viscosity material such as polyimide is coated followed by lithography and developing treatment. Then, a heat-curing process is performed.

Wafer Probe Testing Photo Imageable Dielectric Film Coating/Developing

Coater/Developer

CLEAN TRACK™LITHIUS Pro™AP









**Completed Integrated Circuit** 

### layers and bonding pads(bumps), a support substrate may be temporarily bonded to the device wafer to thin the back surface, and

After fabricating redistribution

Wafer Bonder/Debonder

Wafer Bonding/Debonding

is then removed by a de-bonder.

Inspection

determine whether it can be

assembled into the package.

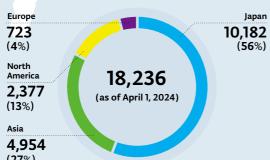
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We operate our business in countries and regions across the world. We are supporting the growth of the electronics industry and the global society with our expansive business presence in Japan, the U.S., Asia, and Europe.



### Number of Employees by Region (Consolidated)



### Major products and market position\*

Tokyo Electron Singapore



# **Equipment Lineup Covering Four Sequential Processes**

TEL is the only manufacturer in the world that offers a lineup of equipment covering the four sequential processes that are critical to ultra-fine semiconductor manufacturing: deposition, coater/developer, etching, and cleaning. Our solutions identify technical needs and issues concerning our products as early as at the development stage and co-optimize relevant processes.

# #1 #2 #2 #1 #1 #1 #2 #2 Coater/ Cleaning Developer Cleaning Plasma etching Developer Gleaning Developer Cleaning Developer Cleaning Developer Cleaning Plasma etching Cas chemical furnace deposition deposition deposition deposition deposition rectangle of the control of the c

# Products Holding No. 1 or No. 2 Shares in the Global Market

TEL's semiconductor production equipment holds a strong position in each segment, and the products are typically ranked first or second in their markets. That means virtually all semiconductor chips in the world are processed by TEL's equipment at some point in their manufacture. Regarding coater/developer that can be integrated inline with EUV\* exposure systems, TEL has a 100% share of the market.

\* EUV: Extreme Ultraviolet



# Largest Installed Base in the World (As of the end of March 2024)

The global installed base of TEL's equipment is the largest in the industry at about 92,000 units. In addition, about 4,000-6,000 new equipment are being shipped to customer fabs every year. These products also bring significant after-market opportunities for servicing, parts sales, and equipment upgrades, which constitute a growing business segment.

### **Company Information**

: Branch, Office (including Field Service), Sales Office
\*Group companies in the process of being wound up are not shown on the map.

: Head Office

Established November 11, 1963

Representative Toshiki Kawai Representative Director, President & CEO

Capital 54.9 billion ven

Number of 2,114 (non-consolidated) Employees\* 18,236 (consolidated)

Head Office Akasaka Biz Tower, 3-1 Akasaka 5-chome, Minato-ku, Tokyo 107-6325, Japan

\*as of April 1, 2024



By pursuing sustainability activities through our business and TEL FOR GOOD social contribution activities, we are aiming to contribute to the resolution of industrial and social issues, the development of industry and society, and the achievement of the SDGs.

"We strive to contribute to the development of a dream-inspiring society through our leading-edge technologies and reliable service and support." By practicing the Corporate Philosophy, we strive to achieve medium- to long-term profit expansion and continuous corporate value enhancement.



### **Participation in Global Initiatives**

We participate in a variety of global initiatives and promote sustainability in our business operations.













### **Third-Party Recognition**

Our sustainability initiatives have been receiving high acclaim from global rating organizations.





EURONEXT

V.E













FTSE4Good

### **TEL FOR GOOD (Social Contribution Activities)**

TEL FOR GOOD is the brand name for our social contribution activities. Considering the activities' importance to society and relevance to our business, we have defined the three focus areas below. Activities of TEL FOR GOOD are being implemented throughout the world, while promoting initiatives through our business operations.





Fostering innovation through cutting-edge technologies is essential to the evolution of semiconductors. Through TEL FOR GOOD, we create learning opportunities that foster creativity and support highly original research and development on a









### Conserving the Global Environment

As climate change becomes more serious, we strive to build a decarbonized society through TEL FOR GOOD and our business activities. We also make efforts to conserve water resources and maintain biodiversity. In addition, we contribute to the conservation of the global environment by promoting a circular economy.











### **Co-creation with Communities**

In addition to contributing to the development and revitalization of the communities where we conduct business through employment opportunities and fostering local industries, we strive for co-creation with communities through TEL FOR GOOD, which is rooted in our communities. We also fulfill our role as a corporate citizen by participating in international humanitarian aid and disaster recovery initiatives.









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