GLOSSARY OF TECHNICAL TERMS

"2.5D packaging/2.5D stacking IC packaging"	an advanced packaging technology that integrates multiple chips side-by-side, typically through an interposer, to achieve high-density interconnection and improved performance
"3D packaging/3D stacking IC packaging"	an advanced packaging technology that vertically stacks multiple chips or components to increase integration density and improve performance
"5G/6G"	fifth-generation and sixth-generation mobile communication technologies
"400G/800G/1.6T"	high-speed data transmission interface rates, referring to 400 gigabits per second, 800 gigabits per second and 1.6 terabits per second, respectively
"ABF"	Ajinomoto Build-up Film, a key build-up dielectric material used in advanced IC substrates
"ADAS"	advanced driver assistance system, a system that assists drivers through functions such as perception, decision-making and control in intelligent driving applications
"AEO"	authorized economic operator, a customs certification granted to enterprises that meet relevant customs compliance and security standards
"AI"	artificial intelligence, a branch of computer science focused on creating systems capable of performing tasks that typically require human intelligence, such as learning, reasoning and perception
"AIoT"	artificial intelligence of things, referring to the integration of artificial intelligence technologies with Internet of Things devices and applications
"ASIC"	application-specific integrated circuit, a customized integrated circuit designed for a specific application
"AiP"	antenna-in-package, a packaging technology that integrates antennas into a semiconductor package or module
"AMHS"	automatic material handling system, a logistical backbone of a cleanroom fab, designed to prevent human contact or particle contamination
"AOI"	automated optical inspection, an inspection process using optical imaging to detect defects in circuits or IC substrates

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"APS"	advanced planning and scheduling, the specialized software and digital infrastructure used to manage and optimize production workflows. It dynamically manages production schedules, material constraints, equipment maintenance down-times, and fluctuating market demands to prevent bottlenecks and maximize yield
"ASP"	average selling price
"AVI"	automatic visual inspection, a quality control process that uses high-resolution cameras, specialized sensors, and AI-powered software to capture images of chips and circuit boards, automatically detecting microscopic defects and verifying dimensions without human intervention
"BGA"	ball grid array, a type of integrated circuit package using an array of solder balls for electrical connection
"blind via"	a via that is exposed on only one side of an IC substrate or printed circuit board and connects an outer layer to one or more inner layers
"BOM"	bill of materials, a structured list of all the raw materials, chemicals, components, and sub-assemblies needed to manufacture an integrated circuit (IC) or electronic product
"BT"	bismaleimide triazine, a high-performance resin commonly used as a base substrate material in semiconductor and chip packaging.
"BT-CCL"	bismaleimide triazine resin glass-fiber copper-clad laminates
"CAGR"	compound annual growth rate
"CCL"	copper-clad laminate, a composite sheet material made by bonding thin layers of copper foil to a non-conductive substrate, such as fiberglass, resin, paper or specialty polymers.
"chiplet"	a small integrated circuit (IC) that contains a well-defined subset of functions and is designed to be combined with other chiplets, typically on an interposer and within a single package, to form a more complex component such as a computer processor.
"CPO"	co-packaged optics, a packaging technology that integrates optical engines or optical components close to switching or computing chips to support high-speed data transmission
"CPU"	central processing unit, a complex set of electronic circuitry that runs the machine's operating system and apps
"CSP"	chip scale package, a compact integrated circuit package in which the package size is close to that of the die itself

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"CTE"	coefficient of thermal expansion, a measure of the extent to which a material expands or contracts with changes in temperature
"CXL"	compute express link, an open standard, high-speed interconnect technology that enables efficient data transfer and memory sharing between CPUs, memory devices, and hardware accelerators
"data warehouse"	a centralized data repository used to store, integrate and support analysis of production, quality and operational data
"DDR5"	double data rate 5, a fifth-generation DRAM memory standard that provides high-speed, high-bandwidth, and large-capacity memory for data center, server, computing, and other high-performance semiconductor applications
"desmear"	a post-drilling or post-laser-processing cleaning and surface-preparation process that removes resin smear or drilling residues from via or hole walls and prepares the surface for copper deposition
"DMS"	defect management system, a system used to collect, classify, analyze and trace production defects to support root-cause analysis and process improvement
"DPU"	data processing unit, a programmable processor designed to accelerate data-centric computing, networking, storage or security workloads
"DRAM"	dynamic random access memory, a type of random-access semiconductor memory that stores each bit of data in a memory cell
"EAP"	equipment automation program, a software interface used to transmit recipes and work order instructions from manufacturing execution system (MES) to production equipment and collect equipment status, alarms and process data through communication protocols
"EDA"	electronic design automation, software tools and systems used to design, simulate, verify, and analyze semiconductor chips, IC substrates, and electronic circuits before manufacturing
"electroless copper plating" or "chemical copper deposition"	a chemical copper deposition process that deposits copper on substrate or via surfaces without using an external electric current, often used before subsequent electroplating
"electroplating"	an electrochemical process that deposits a conductive metal layer, typically copper, onto a substrate or via wall to enable electrical conduction

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"EMS"	equipment management system, a system used in manufacturing operations to maintain an equipment ledger and manage equipment inspection, preventive maintenance, repair records, operating status, and lifecycle tracking
"ERP"	enterprise resource planning, an integrated system used to manage procurement, inventory, production planning, finance, and supply chain operations across the business
"ETS"	embedded trace substrate, a substrate process or structure in which circuit traces are embedded in a prepreg or resin dielectric layer to protect fine-line circuitry and support high-density interconnection
"FCCSP"	flip-chip chip-scale package, a semiconductor packaging technology where a silicon die is flipped upside down (active face facing the substrate) and directly connected to it via tiny solder bumps, creating an ultra-compact, thin package with significantly shortened electrical signal paths
"FCCSP substrate"	IC substrate for FCCSP packaging
"FCBGA"	flip-chip ball grid array, a type of ball grid array that uses flip-chip bonding for electrical connection between the die and the substrate
"FCBGA substrate"	IC substrate for FCBGA packaging
"FDC"	fault detection and classification, a system or methodology used to monitor equipment and process data in real time to detect abnormal conditions, classify faults and trigger alerts
"GHG"	greenhouse gas
"GPU"	graphics processing unit, a specialized electronic circuit designed for digital image processing and to accelerate computer graphics
"HBM"	high bandwidth memory, a stacked dynamic random-access memory (DRAM) technology that provides high data bandwidth for AI, graphics and other high-performance applications
"HDI"	high-density interconnect, referring to structures or technologies that enable dense electrical interconnections within substrates or packages
"HMI"	human-machine interface, a user-facing electronic interface enabled by semiconductor components, such as processors, display driver ICs, sensors, memory, and IC substrates, that allows users to interact with machines, vehicles, or electronic systems through displays, touch controls, voice input, buttons, or other control functions

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"HPC"	high-performance computing, the use of high-speed parallel computing systems to perform complex, computation-intensive tasks
"IC"	integrated circuit, a semiconductor device that integrates a number of transistors and other electronic components onto a piece of silicon
"IC Substrate"	a specialised, multi-layer platform, typically composed of composite materials, that connects the silicon die to the printed circuit board, providing electrical connectivity, mechanical support and thermal dissipation for the chip
"IDM"	integrated device manufacturer, a company that performs multiple stages of the semiconductor value chain in-house, typically including chip design, wafer fabrication, packaging, testing, and sales of semiconductor products
"Inplan"	a production engineering and manufacturing preparation software used to convert customer design files into standardized work orders, process parameters and bills of materials for IC substrate manufacturing
"IoT"	Internet of things, referring to connected devices, sensors and systems that collect and exchange data
"I/O density"	input/output density, referring to the number of input and output connections within a given area
"kg"	kilogram
"laser direct imaging" or "LDI"	laser direct imaging, a maskless lithography or image-transfer process that directly writes circuit patterns onto a photoresist-coated substrate, used for fine-line circuit formation
"laser drilling"	equipment or a process that uses focused laser energy to form small holes, vias or microvia openings in IC substrates, including CO2 laser drilling machines used for blind vias and microvia openings
"laser via"	a via formed by laser drilling to enable interlayer electrical connection in high-density substrates
"LiDAR"	light detection and ranging, a sensing module that uses laser emitters, photodetectors, and signal-processing ICs to measure distance and generate precise 3D information about a vehicle's surroundings
"LPDDR"	low power double data rate, a dynamic random-access memory (DRAM) standard optimized for low power consumption in mobile, embedded and other compact electronic devices

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"LPU"	language processing unit, a type of specialized processor designed to accelerate the inference of large language models
"MCS"	material control system, a manufacturing control system that manages the dispatching, routing, and tracking of materials through semiconductor production processes to support efficient and traceable manufacturing flow
"MCU"	microcontroller unit, an integrated circuit used for control functions in electronic systems, including automotive applications
"MES"	manufacturing execution system, a system used to manage, monitor and control manufacturing operations in real time
"microvia"	a small via used in high-density substrates or printed circuit boards to provide interlayer electrical connection, typically formed by laser drilling
"mm"	millimeter
"MMC"	MultiMediaCard, a type of flash memory card standard
"module"	a functional assembly that integrates multiple heterogeneous bare chips and passive components into a single package to perform a specific function
"mSAP"	modified semi-additive process, a circuit fabrication process used in advanced PCBs and IC substrates that selectively adds copper to patterned areas in a controlled manner, enabling the formation of very fine circuit lines and small spacing required for high-density modern electronic devices
"NAND flash memory"	a type of non-volatile flash memory used for data storage
"nm"	nanometer
"NPU"	neural processing unit, a processor or accelerator designed for artificial intelligence and neural network workloads
"OA"	a system for office automation that digitizes and streamlines routine administrative tasks, workflows, and internal communications within an organization
"OCR"	optical character recognition, a technology that identifies and extracts text or parameters from images or documents and converts them into digital data
"OSAT"	outsourced semiconductor assembly and test, referring to companies that provide semiconductor packaging and testing services

"PHM"	prognostics and health management, a predictive maintenance system or methodology used to assess equipment health, forecast potential failures and support maintenance decisions
"plasma treatment"	a surface treatment process using plasma to clean, activate or modify substrate surfaces to improve adhesion, coating or subsequent metallization
"prepreg"	short for "pre-impregnated," prepreg is a composite material typically made of woven fiberglass cloth impregnated with partially cured resin, such as epoxy. In advanced packaging substrates and printed circuit boards, it serves as a dielectric insulating layer and bonding material that helps hold conductive layers together
"PMIC"	power management integrated circuit, an integrated circuit used to regulate, convert and distribute power in electronic systems
"printed circuit board"	a board used to mechanically support and electrically connect electronic components
"ProjectLink"	the digital software supporting online collaboration and project management
"QMS"	quality management system, a system used to manage quality inspection, quality improvement, quality traceability and nonconformance handling across manufacturing processes
"RFFE"	radio frequency front-end, a set of semiconductor components or modules that transmit, receive, filter, amplify, and route radio-frequency signals in wireless devices, commonly used in smartphones, Wi-Fi, Bluetooth, wearables, and other connected electronics
"RMS"	recipe management system, a manufacturing software system used to manage, version-control and distribute production recipes, formula parameters and process settings to support consistent equipment operation
"SAP"	system applications and products, the software for systems, applications, and products in data processing, which is an enterprise resource planning platform and functions as a centralized business management system
"sawing" or "dicing" or "singulation"	a cutting process by which processed panels, substrates or wafers are separated into shipment units or individual units
"SECS"	the semiconductor equipment communications standard/protocol used for communication between manufacturing systems and production equipment

"semi-additive process"	a circuit fabrication process, related to mSAP, that selectively builds copper on patterned areas to form fine circuit traces for high-density IC substrates or printed circuit boards
"silicon die"	an individual semiconductor chip cut from a processed wafer, containing integrated circuits and serving as the core active component in a package
"SoC"	System-on-Chip, an integrated circuit that integrates multiple system components into a single chip
"SPC"	statistical process control, a data-driven quality control method used to monitor process data, apply control rules and identify process variations during manufacturing
"sq. m."	square meter
"through-hole electroplating"	an electroplating process that deposits conductive metal on the walls of through holes to provide electrical connection between layers of an IC substrate or printed circuit board
"TPU"	tensor processing unit, a type of processor or accelerator designed for artificial intelligence and machine learning workloads
"μm"	micrometer
"WBCSP"	wire bonding chip scale package, a type of chip scale package that uses wire bonding to connect the die to the substrate
"WBCSP substrate"	IC substrate for WBCSP packaging
"warpage"	warpage is calculated as the maximum warpage height divided by the substrate diagonal length, multiplied by 100%
"WMS"	warehouse management system, a software system used to manage and control warehouse operations, including inventory receiving, storage, location tracking, picking, packing, dispatching, and shipment management
"VCP"	vertical continuous plating, an electroplating process used in IC substrate manufacturing
"via"	a plated or conductive hole used to provide electrical connection between different layers of an IC substrate or printed circuit board
"xPU"	an umbrella term for domain-specific processors, where the "x" denotes a variable representing a specific application or domain, such as vision, graphics, neural networks or other specialized workloads. It generally describes chips tailored to specific workloads rather than general-purpose computing
"YMS"	yield management system, a system used to collect and analyze yield data across production and testing processes to identify yield loss, support quality traceability and improve manufacturing performance