

# Technical Glossary

**5G** The fifth generation of cellular networks up to 100× faster than 4G that will enable connected vehicles, smart power grids and industrial automation.

**AI (artificial intelligence)** The simulation of human intelligence in machines that are programmed to think like humans and mimic their actions.

**ALD (atomic layer deposition)** An advanced deposition technique that allows for ultra-thin films of a few nanometers to be deposited in a precisely controlled way.

**Control Valve** A valve that controls pressures or gas flows in different steps of semiconductor manufacturing.

**Deposition** The transfer of material onto a semiconductor wafer, including physical vapor deposition (PVD), chemical vapor deposition (CVD), and molecular beam epitaxy (MBE).

**Etching** A process for removing material in a specified area through a chemical reaction or physical bombardment.

**EUV (extreme ultraviolet) lithography** Uses light with a wavelength of 13.5-nm to manufacture transistors and interconnect wiring of a semiconductor chip.

**Fab** Common name for a semiconductor fabrication plant, a factory used to manufacture integrated circuits.

**Gate Valve** A valve that regulates the flow of gases, fluids or materials by opening, closing or obstructing a port or passageway.

**Integrated Circuit (IC)** A semiconductor product of electrically connected components (such as transistors and capacitors) fabricated on the same substrate.

**Internet of Things (IoT)** The interconnection via the Internet of computing devices embedded in everyday objects, enabling them to send and receive data.

**Isolation Valve** Used to seal high-vacuum process chambers from neighboring processes that are at different pressure levels.

**Liquid-Crystal Display (LCD)** A type of flat-panel display that uses an array of backlit thin-film transistors to control each pixel.

**Load Lock** A chamber used to transfer a wafer from an environment at atmospheric pressure into and out of the vacuum environment used for processing.

**Mechatronics** Multidisciplinary branch of engineering that focuses on electrical and mechanical systems, and includes robotics, electronics, telecommunications, control and product engineering.

**Nanometer (nm)** A unit of length; one billionth of a meter, commonly used in the semiconductor industry to describe device dimensions.

**Packaging** The protective container or housing for an electronic component or die, with external terminals to provide electrical access to the components inside.

**Organic Light-Emitting Diode (OLED)** A flat light-emitting technology made by placing a series of organic thin-films between two conductors. OLEDs can be used to make displays and lighting.

**Process Chamber** An enclosed area in which a single process is performed in the manufacture of an integrated circuit or other device.

**Photovoltaic (PV)** The generation of electricity from solar radiation.

**Semiconductor** A material whose electrical conductivity is between that of metals (conductors) and insulators (non-conductors) and can be modified physically or chemically to increase or decrease its conductivity.

**Subfab** The area underneath a semiconductor fabrication plant that contains support equipment (pumps, etc.) for processing tools.

**Substrate** The starting material for the semiconductor manufacturing process, typically silicon; also referred to as a wafer.

**Thin-Film** A layer of material ranging from fractions of a nanometer to several micrometers thick.

**Transfer Valve** Used to move substrates such as wafers, glass panels and other materials into and out of manufacturing process chambers.

**Vacuum** A pressure below the ambient atmosphere

- Typical atmospheric pressure at sea level: 1,000 millibars (mbar)
- Pressure at typical cruising altitude for commercial aircraft: 100 mbar
- High vacuum used in coating processes:  $10^{-8}$  mbar (1 one-hundred-millionth of a millibar)
- Ultra-high vacuum used in deposition processes:  $10^{-10}$  mbar (1 ten-billionth of a millibar)

**Wafer** The thin, circular or nearly square slices of mono- or multicrystalline silicon on which semiconductors and PV cells are built.