ST process technologies

At ST, we innovate to create unique technologies and products that provide the best solutions to address challenges and provide opportunities for our customers.

The manufacturing of an integrated circuit can be divided into two steps.

- Wafer fabrication, known as front-end, entails extremely sophisticated process technologies to manufacture silicon or composite material chips.
- Assembly and test, known as back-end, involves highly precise and automated packaging and die testing processes.

Our products are built using various fundamental semiconductor process technologies. Many of these are unique to ST and represent the culmination of significant investment and development efforts over decades. Each process is designed and refined to meet the needs of our customers' target applications.

Orio Bellezza
President, Technology, Manufacturing, Quality and Supply Chain

To provide our customers with the best solutions, we need to be constantly creative and innovative when developing products and technologies. Energy management is a key challenge, not only for us, but for our entire industry. Thanks to our dedicated teams of experts pushing forward the boundaries of energy-efficient and responsible technologies, ST helps to drive positive change in people's lives, prioritizing people and the planet and creating long-term value for all stakeholders."

Smart power technology for greener solutions

Combining power technologies with embedded intelligence is a technical challenge and will be key to enable our customers across the globe to develop more efficient and compact power and energy management solutions. ST has deep expertise in this field, with over 25 years of R&D and multiple generations of products on the market. Below are some of our technologies that are widely used in automotive, industrial, consumer, and communications applications.

- BIPOLAR-CMOS-DMOS (BCD) is a key technology for power integrated circuits (ICs). We invented this revolutionary technology in the mid-1980s and have continually developed it ever since.
- VIPower technologies integrate diverse functionality in single devices. They help applications control high power and sense, and communicate operating status while providing device protection.
- Our STi^{2}GaN product family leverages the special characteristics of wide bandgap Gallium Nitride (GaN) technology. It promises to deliver significant size, performance, and cost benefits across a wide variety of applications.

High-power innovation

Power transistors are a key component of every power system. We are constantly innovating to deliver greater efficiency and reliability in silicon and wide-bandgap materials in advanced packages.

- Silicon Carbide (SiC) exhibits intrinsic advantages over mainstream silicon, enabling higher energy efficiency in many sustainable applications.
- GaN-based transistors offer unrivaled energy efficiency and power density in power conversion applications.
- Our trench gate field-stop (TGFS) architecture ensures more balanced conduction and switching losses and greater robustness in insulated gate bipolar transistors (IGBTs).
- Our world-leading super-junction (SJ) technology is the driving factor behind our highly successful range of MDmesh Power MOSFETs.

Micro-Electro-Mechanical Systems (MEMS)

MEMS devices are increasingly pervasive as they transform the way that digital and analog worlds interact. We are developing new generations of MEMS sensors and actuators through leading-edge process technologies, packaging, and manufacturing capabilities.

We are serving all market needs with industry-leading MEMS process technology, innovative product design, and in-depth application expertise.

- Our Thick Epitaxial Layer for Micro-gyroscopes and Accelerometers (ThELMA) process enables the integration of accelerometer and gyroscope mechanical elements in a single chip.
- Other specialized processes allow the creation of MEMS microphones and pressure sensors.
- MEMS actuator technologies including thermal, electrostatic, electromagnetic, and piezoelectric enable applications such as thermal printheads, laser-based scanning micromirrors, and miniature sound systems.

Digital and mixed-signal technologies for tomorrow's applications

Advances in digital and mixed-signal technologies enable smaller systems without compromising performance. Constant innovation in our radio frequency (RF), analog, and digital technologies are helping our customers meet the power and integration requirements of today and the future.

- Embedded Non-Volatile Memory (eNVM) CMOS: our advanced eNVM processes allow the creation of microcontrollers with embedded memory within a single chip.
- Our embedded phase change memory (ePCM) offers substantially better density and robustness over flash memory and other embedded memories.
- Fully depleted silicon-on-insulator (FD-SOI) delivers outstanding low-power performance and high reliability for cost-effective RF/mmW and mixed-signal applications.
- Radio frequency silicon-on-insulator (RF-SOI): our solutions enable the design of a full range of advanced RF front-end modules (FEMs).
- Our imaging technology portfolio of proprietary technologies enables specialized and differentiated imaging solutions.

Learn more about our unique set of innovative and differentiated technologies on **www.st.com/technology** .