Soitec Products and Services
Semiconductor Materials & Equipment - Solar Energy - Lighting
The Company

Soitec is a world leader in designing and manufacturing high-performance semiconductor materials, using its unique expertise to serve the electronics, solar energy and lighting markets.

Since its creation in 1992, Soitec has continued to grow by cultivating innovation and focusing on developing differentiating technologies that add maximum value to end products.

As an industrial company, Soitec has built its reputation on developing and manufacturing its flagship material, SOI (silicon-on-insulator), which is based on the revolutionary Smart Cut™ “atomic scalpel” technology.

Green Electronics
In the electronics market, Soitec’s engineered substrates and technologies toolbox enable the performance, energy efficiency and cost effectiveness to address the Internet of Everything challenges. Our substrates are used in growing markets such as mobile and consumer electronics, networking, data communications and automotive electronics.

Solar - Clean Energy
In the solar market, Soitec is an industrial manufacturer of concentrator photovoltaic (CPV) systems with installations in more than 20 countries worldwide. Our innovative CPV systems are designed for utility-scale power plants as well as off-grid electrification in sunny regions. By exploiting the synergies between our proprietary semiconductor technologies and solar energy, we are committed to bringing solar cells with record efficiency into production.

LED - Efficient Lighting
In the lighting market, Soitec is focused on delivering high-quality, high-performance, economically sensible light emitting diode (LED) lighting solutions for the commercial and industrial lighting markets. Leveraging our semiconductor expertise, we strive to offer high-efficiency LEDs based on breakthrough materials innovations.
Technology Innovation Rooted in our DNA

Market-changing innovation has always been the pathway to success at Soitec, beginning with our initial breakthrough – Smart Cut™ technology – and extending through Smart Stacking™, Soitec CPV technology and our full product portfolio.

Soitec has nearly 3,000 active patents and files 350 additional patent applications each year. In addition to patents for which we hold sole ownership, we also license technologies from our research and development partners.

Our research and development program focuses on four major goals: continuing to reduce the size of transistors and integrated circuits (More Moore), adding new functions to circuits (More than Moore), engineering III-V composite materials for the next generation of LED substrates, and developing high-efficiency solar cells and CPV systems for competitive electricity production.

Technology Roadmap

**More Moore**
Continuing transistor miniaturization

**More than Moore**
Integrating more RF functions into circuits

**III-V materials engineering for lighting applications**
Enable energy efficiency at competitive cost

**High-efficiency solar cells for concentrator photovoltaic systems**
Improve energy conversion rates
Soitec’s Five Core Technologies and the Expertise

Smart Cut™ Technology
Silicon-On-Insulator Substrates

Soitec’s silicon-on-insulator (SOI) wafers cover the full range of applications for microelectronics markets. Our Smart Cut™ wafer-manufacturing technology gives us the flexibility to tailor SOI substrates to meet the most demanding specifications.

Epitaxy Expertise
III-V Materials

- GaAs epi
- GaN epi

For epitaxial GaAs structures, Soitec materials are tailored with atomic-layer precision to meet customer-specific design requirements. Soitec combines its expertise in III-V materials epitaxy with proven Smart Cut™ technology to prepare the next generation of engineered substrates that enables advanced device structures for lighting applications.

Altatech Technology
Equipment Expertise

- Mature and advanced materials deposition
- Holistic defect inspection
Soitec CPV Technology
Solar Energy

- Concentrator Photovoltaic

Soitec is a leading manufacturer and supplier of concentrator photovoltaic systems using highly efficient Soitec CPV technology. The company has a successful track record with CPV installations in more than 20 countries. We offer innovative CPV systems and outstanding services related to project development as well as operation and maintenance.

Smart Stacking™ Technology
Layer-Transfer Solutions

- Processed wafer stacking
- Engineered and bonded substrates

Soitec leverages a unique portfolio of technologies — including our Smart Cut™ and Smart Stacking™ technologies — and expertise in low-temperature direct wafer bonding and mechanical-chemical thinning to offer a wide range of layer-transfer solutions that address each customer’s specific needs.

Altatech develops highly efficient, cost-effective inspection and CVD technologies used for R&D and manufacturing of semiconductors, LEDs, MEMS and photovoltaic devices.

Altatech offers a unique portfolio of equipment for mature and advanced materials deposition and holistic defect inspection.
Soitec Product and Service Offerings

Soitec’s products and technologies dramatically improve energy efficiency, performance, miniaturization, reliability and the quality of daily life.

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<th>Typical Applications</th>
<th>Typical Markets</th>
<th>Soitec Products Lines</th>
<th>Specifications</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>Digital CMOS: Planar Fully Depleted</td>
<td></td>
<td>Soitec FD-2D</td>
<td>Ultra-thin silicon-on-insulator with:</td>
<td>• Very low power with remarkable performance</td>
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<tr>
<td>(FD-SOI)</td>
<td></td>
<td></td>
<td>• Top silicon: 10nm to 30nm</td>
<td>• Extremely cost-competitive to continue Moore’s Law at 28 nm and beyond</td>
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<td></td>
<td></td>
<td></td>
<td>• Buried oxide layer: 10nm to 145nm</td>
<td>for SOC</td>
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<td></td>
<td></td>
<td></td>
<td>• Uniformity: ±5 Å min. – max. range</td>
<td>• Evolutionary path to fully depleted CMOS technology</td>
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<tr>
<td></td>
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<td></td>
<td>(all points, all wafers)</td>
<td></td>
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<tr>
<td>Digital CMOS: FinFET</td>
<td></td>
<td>Soitec FD-3D</td>
<td>Silicon-on-insulator with:</td>
<td>Fin height and isolation built into substrate:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Top silicon: 20nm to 100nm</td>
<td>• Faster and easier process development and manufacturing</td>
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<td></td>
<td></td>
<td></td>
<td>• Buried oxide layer: 50nm standard</td>
<td>• Optimized cost of ownership</td>
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<tr>
<td>Digital CMOS: Partially Depleted</td>
<td></td>
<td>Soitec Premium SOI™</td>
<td>Silicon-on-insulator with:</td>
<td>• Excellent electrical behavior</td>
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<tr>
<td>SOI</td>
<td></td>
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<td>• Top silicon: 50nm to 90nm</td>
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<td></td>
<td></td>
<td></td>
<td>• Buried oxide layer: 50nm to 145nm</td>
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<tr>
<td>RF on SOI</td>
<td></td>
<td>Soitec Wave SOI™</td>
<td>Silicon-on-insulator with:</td>
<td>Substrate of choice for RF front-end module:</td>
</tr>
<tr>
<td>(eSi™ or HR-SOI)</td>
<td></td>
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<td>high-resistivity base wafer:</td>
<td>• Best cost and performance trade-off</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Top silicon: 70nm to 1μm</td>
<td>• Low RF loss, high RF isolation, linearity, power signal and digital</td>
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<td></td>
<td></td>
<td></td>
<td>• Buried oxide layer: 145nm to 2μm</td>
<td>integration</td>
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<td>• Base wafer resistivity &gt; 1 kohm.cm</td>
<td>• Simpler design and process</td>
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<td>and a Trap Rich layer in Soitec eSi™</td>
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<td>product</td>
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<tr>
<td>RF on GaAs</td>
<td></td>
<td>Soitec GaAs Wafers</td>
<td>• pHEMT, high-mobility pHEMT,</td>
<td>Pioneer in custom GaAs pHEMT epitaxy service:</td>
</tr>
<tr>
<td>(Epitaxial Wafers)</td>
<td>Epicenters</td>
<td></td>
<td>MESFET, HFET, mHEMT</td>
<td>• Customer support from prototypes to high-volume manufacturing</td>
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<td>Expertise in GaAs on MBE technology</td>
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<td></td>
<td>75, 100 and 150 mm wafer diameters</td>
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<tr>
<td>RF on Sapphire</td>
<td></td>
<td>Soitec Bonded SOS</td>
<td>Combining our core technologies to</td>
<td>Ideal substrate for RF:</td>
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<tr>
<td></td>
<td></td>
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<td>provide the best silicon layer quality</td>
<td>• State-of-the-art RF performance</td>
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<td></td>
<td>on top of a sapphire substrate</td>
<td>• High integration</td>
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<tr>
<td>RF on Sapphire</td>
<td></td>
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<td>Silicone-on-insulator with:</td>
<td>Significant chip size reduction</td>
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<tr>
<td>(Bonded SOS)</td>
<td></td>
<td></td>
<td>• Top silicon: 0.2µm to 1.5µm</td>
<td>• Much lower overall system costs</td>
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<td></td>
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<td></td>
<td>• Buried oxide layer: 145nm to 3µm</td>
<td>• Reduced standby current</td>
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<td></td>
<td>• Ultra-thick buried oxide option</td>
<td>• Very-high-temperature operation (up to 200°C)</td>
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<td>for high-voltage applications (&gt;1000V)</td>
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<td></td>
<td>• Buried oxide up to 10µm</td>
<td></td>
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<tr>
<td>Power Analog on SOI</td>
<td></td>
<td>Soitec Smart Power SOI</td>
<td>Silicone-on-insulator with:</td>
<td>Faster learning and ramp-up:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Top silicon: 1.5µm min.</td>
<td>• Higher yields in volume production</td>
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<td></td>
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<td></td>
<td>• Buried oxide layer: 145nm to 500nm</td>
<td>• Lower total cost of ownership</td>
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<td>Product also available: Stacking for Power Analog on SOI</td>
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<tr>
<td>Image Sensor on SOI</td>
<td></td>
<td>Soitec Imager SOI™</td>
<td>Silicon-on-insulator with:</td>
<td>Excellent uniformity</td>
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<td></td>
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<td></td>
<td>• Top silicon and buried oxide layer</td>
<td>Intrinsic etch stop</td>
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<td></td>
<td>thickness adaptable to any customer</td>
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<td></td>
<td>application</td>
<td>Product also available: Stacking for MEMS</td>
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<tr>
<td>MEMS on SOI</td>
<td></td>
<td>Soitec MEMS SOI</td>
<td>Silicone-on-insulator with:</td>
<td></td>
</tr>
<tr>
<td>MEMS on SOI</td>
<td></td>
<td></td>
<td>• Top silicon and buried oxide layer</td>
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<td>thickness adaptable to any customer</td>
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<tr>
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<td>application</td>
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</tbody>
</table>

Image Sensor on SOI

MEMS on SOI

Semantic Materials

Soitec CPV technology

Smart Cut™ technology

Smart Stacking™ technology

Epitaxy expertise

Altatech technology

Soitec CPV technology

Smart Stack™ technology
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</table>
| 3D Integration       |                 | Soitec Stacking for 3D | • Direct bonding based on dielectric or metallic layers  
|                      |                 |                      |   • Multiple stacking of processed layers  
|                      |                 |                      |   Products also available: Stacking for Imager and Stacking for MEMS  
|                      |                 |                      |                | • Innovative solutions to improve performance, form factor and cost  
|                      |                 |                      |                | • Customized solutions  
| Photonics on SOI     |                 | Soitec Photonics SOI | Silicon-on-insulator with:  
|                      |                 |                      |   • Top silicon: 200 nm to 2000 nm  
|                      |                 |                      |   • Buried oxide layer: 1 µm to 3 µm  
|                      |                 |                      |   200mm and 300mm wafer diameters  
|                      |                 |                      |                | • Thick buried oxide for optical confinement  
|                      |                 |                      |                | • Excellent top-silicon crystal quality enabling low-loss waveguide  
|                      |                 |                      |                | • Good thickness uniformity for high-yield manufacturing process  
| LED                  | LED Materials & Systems | Soitec GaN Engineered Substrate | • High-quality GaN substrates tailored to LED requirements  
|                      |                 |                      |   • Substrate diameter: 100 mm  
|                      |                 |                      |                | • High device efficiency at high current injection  
|                      |                 |                      |                | • Easily removable handle substrate for vertical devices  
| Indoor and outdoor lighting | LED Materials & Systems | Soitec Lamps & Luminaires | • High efficacy LED lighting system  
|                      |                 |                      |   • Long life  
|                      |                 |                      |   • Compatible with commonly available control systems  
|                      |                 |                      |                | • Power savings > 50%  
|                      |                 |                      |                | • Enhanced lighting experience by end user  
|                      |                 |                      |                | • Low maintenance cost  
|                      |                 |                      |                | • Overall short return on investment  
| Mature and Advanced Materials Deposition | Semiconductor Equipment | Altatech NanoDeposition | • Wafer sizes: 100 mm to 300 mm  
|                      |                 |                      |   • Wide spectrum of deposited materials through a broad range of vaporization and deposition temperatures  
|                      |                 |                      |                | • Excellent uniformity  
|                      |                 |                      |                | • Low cost of ownership  
|                      |                 |                      |                | • Adapted to customer requirements  
| Defect Inspection and Metrology | Semiconductor Equipment | Altatech NanoVision | • Front-end defect inspection:  
|                      |                 |                      |   • Unpatterned and patterned wafer inspection  
|                      |                 |                      |   • Macro and edge inspection  
|                      |                 |                      |   • Back-end defect inspection  
|                      |                 |                      |                | • High-sensitivity inspection  
|                      |                 |                      |                | • Modular system  
|                      |                 |                      |                | • Low cost of ownership  
|                      |                 |                      |                | • Adapted to customer requirements  
| Utility-Scale or Off-Grid Electrification in Sunny Regions | Solar Energy | Soitec CX-S530-II CPV System | • Highly efficient conversion of solar energy to electricity with >32% module efficiency  
|                      |                 |                      |   • Precise dual-axis tracker for optimal positioning toward the sun  
|                      |                 |                      |   • Large module area to reduce the number of CPV systems per power plant  
|                      |                 |                      |   • Only 12 Soitec CPV modules to be mounted per system  
|                      |                 | Soitec CX-S540 CPV System |                | • High power output in peak times when electricity is most valuable  
|                      |                 |                      |                | • Low cost of installation  
|                      |                 |                      |                | • Low cost of operation and maintenance  
| Utility-Scale or Off-Grid Electrification in Sunny Regions | Solar Energy | Soitec CX-M500 CPV Modules | • Fifth generation of Soitec CPV Modules  
|                      |                 |                      |   • Highly efficient conversion of solar energy to electricity with >32% module efficiency  
|                      |                 |                      |   • Precise dual-axis tracker for optimal positioning toward the sun  
|                      |                 |                      |   • Low height (max. 6.5 m / 21 ft.) dual-axis tracker with 8 sub-units carrying 3 CPV Modules each  
|                      |                 | Soitec Plug&Sun™ and Plug&Sun+ |                | • High reliability and predictability of the power output  
|                      |                 |                      |                | • Partnerships with local tracker manufacturers possible  
| Small and Medium-Scale Off-grid Electrification | Concentrator Photovoltaic Systems | Soitec Plug&Sun™ and Plug&Sun+ | • Complete energy solution  
|                      |                 |                      |   • High-efficiency CPV modules  
|                      |                 |                      |   • Dual-axis-tracking  
|                      |                 |                      |                | • Autonomous / hybrid solution  
|                      |                 |                      |                | • Low ground coverage  
|                      |                 |                      |                | • Easy to deploy  

**Concentrator Photovoltaic Systems**

**Semiconductor Equipment**

**LED**

**Indoor and outdoor lighting**

**Solar Energy**

**Utility-Scale or Off-Grid Electrification in Sunny Regions**

**Mature and Advanced Materials Deposition**

**Defect Inspection and Metrology**

**Soitec**

**Photonics**

**Typical Applications**

**Typical Markets**

**Soitec Products Lines**

**Specifications**

**Benefits**