



## Soitec Electronics Products



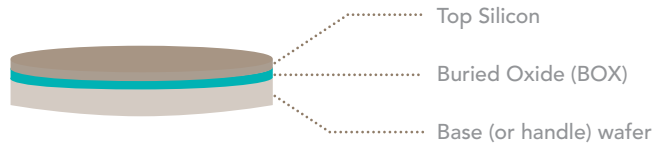
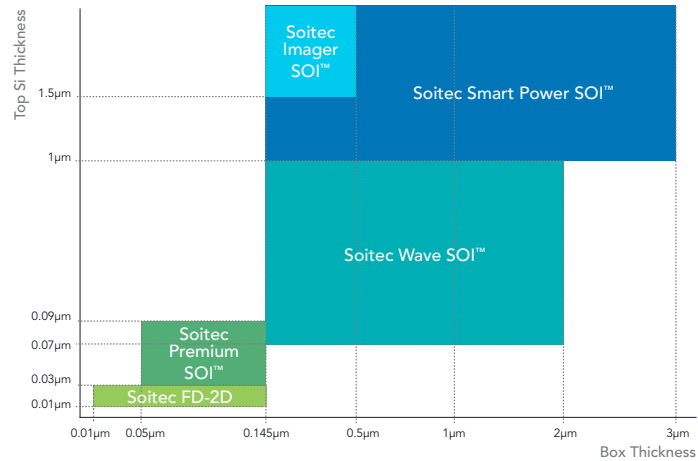
# Microelectronics

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 your most demanding design specifications.

- 20 years of expertise in developing SOI and other engineered substrate solutions for high-volume manufacturing
- A full selection of SOI wafer diameters and parameters for each layer
- The precision and accuracy of our thin-film uniformity meets or beats the industry's most rigorous requirements

*We can also give you expert support to help tailor SOI wafer specifications to your device and manufacturing requirements.*

**Soitec offers several product lines to address specific applications:**



Products Lines	Specifications	Benefits	Typical Applications	Markets
<b>Soitec FD-2D</b>	<ul style="list-style-type: none"> <li>• Top silicon: 10nm to 30nm</li> <li>• Buried oxide layer (BOX): 10nm to 145nm</li> <li>• Uniformity: ±5Å min-max range (all points, all wafers)</li> </ul>	<ul style="list-style-type: none"> <li>• Improved variability and reduced short channel effects</li> <li>• Remarkable performance at low power consumption</li> <li>• Cost competitive solution to continue Moore's law at 20nm and beyond for SOC</li> </ul>	<b>Digital FD-SOI</b>	
<b>Soitec Premium SOI™</b>	<ul style="list-style-type: none"> <li>• Top silicon: 30nm to 90nm</li> <li>• Buried oxide layer (BOX): 50nm to 145nm</li> </ul>	<p><b>PD-SOI</b></p> <ul style="list-style-type: none"> <li>• Super-high performance capable</li> <li>• Improved switching speed to power consumption ratio</li> </ul> <p><b>FinFET on SOI</b></p> <ul style="list-style-type: none"> <li>• Continuation of Moore's law at 20nm and beyond</li> <li>• Integration on SOI relaxes challenges associated with finFET transistors</li> </ul>	<b>Digital PD-SOI</b>  <b>FinFET on SOI</b>	
<b>Soitec Wave SOI™</b>	<ul style="list-style-type: none"> <li>• Top silicon: 70nm to 1µm</li> <li>• Buried oxide layer (BOX): 145nm to 2µm</li> <li>• Resistivity: &gt;1kohm.cm</li> <li>• Uniformity: ±125Å</li> </ul>	<ul style="list-style-type: none"> <li>• Low RF loss</li> <li>• High RF isolation, linearity and power signal</li> <li>• Integrates digital processing and power management</li> </ul>	<b>RF</b>	
<b>Soitec Smart Power SOI™</b>	<ul style="list-style-type: none"> <li>• Top silicon: 1µm to 1.5µm</li> <li>• Buried oxide layer (BOX): 145nm to 3µm</li> </ul>	<ul style="list-style-type: none"> <li>• Significant chip size reduction</li> <li>• Much lower overall system costs</li> <li>• Reduced standby current</li> <li>• Very high temperature operation (up to 200°C)</li> </ul>	<b>Power Analog</b>	
<b>Soitec Imager SOI™</b>	<ul style="list-style-type: none"> <li>• Top silicon: 1.5µm min</li> <li>• Buried oxide layer (BOX): 145nm to 500nm</li> </ul>	<ul style="list-style-type: none"> <li>• Faster learning and ramp-up</li> <li>• Higher yields in volume production</li> <li>• Lower total cost of ownership</li> </ul>	<b>Image Sensor</b>	

# Specialty Electronics



For epitaxial GaAs structures, Soitec materials are tailored with atomic-layer precision to meet customer-specific design requirements. We combine our compound epitaxy expertise with proven Smart Cut™ technology to prepare the next generation of engineered material solutions that enable advanced device structures for power and lighting applications.

- 25 years of expertise in developing GaAs and related epitaxial materials for high-volume manufacturing
- The leader in GaAs HEMT technology
- Epitaxy experts capable of generating innovative epitaxial layers on different base substrates
- **GaAs epitaxial wafers**


- **GaN epitaxial wafers** on various substrates
- Successful partnerships in the commercial telecommunications, military and aerospace industries
- Experts, processes, technologies and high-quality production environments

## GaAs epi wafer solutions

- Pseudomorphic high-electron mobility transistors (PHEMTs)
- Metamorphic high-electron mobility transistors (MHEMTs)
- Metal-semiconductor field effect transistors (MESFETs)
- Heterojunction field effect transistors (HFETs)
- Hall sensors

## GaN epi wafer solutions on various substrates

Soitec can develop a full range of GaN Schottky barrier diodes and HEMT structures on various substrates such as silicon and engineered substrates for high-power, discrete DC or IC applications.

Products Lines	Specifications	Benefits	Typical Applications	Markets
<b>GaAs Epi MESFET</b>	<ul style="list-style-type: none"> <li>• Historical HEMT structure</li> </ul>	<ul style="list-style-type: none"> <li>• High breakdown voltage</li> <li>• High Ft and Fmax</li> </ul>	<b>RF front-end module</b> <b>Automotive</b> <b>Satellite communication</b> <b>Radar</b> <b>Point-to-point link</b>	
<b>GaAs Epi PHEMT</b>	<ul style="list-style-type: none"> <li>• Includes a GaInAs channel</li> <li>• Indium percentage up to 25%</li> </ul>	<ul style="list-style-type: none"> <li>• Improved performances</li> <li>• Higher Ft and Fmax</li> </ul>		
<b>GaAs Epi AlAs ES-PHEMT</b>	<ul style="list-style-type: none"> <li>• Includes a GaInAs channel</li> <li>• Indium percentage up to 25%</li> <li>• Includes an AlAs etch-stop layer</li> </ul>	<ul style="list-style-type: none"> <li>• Better etching precision</li> <li>• Easier process</li> <li>• Improved process yield</li> </ul>		
<b>GaAs Epi GaInP ES-PHEMT</b>	<ul style="list-style-type: none"> <li>• Includes a GaInAs channel</li> <li>• Indium percentage up to 25%</li> <li>• Includes GaInP etch-stop layer</li> </ul>	<ul style="list-style-type: none"> <li>• Improved process opportunities</li> <li>• Higher etching selectivity</li> <li>• Better process reproducibility</li> <li>• Reduced Vp dispersion</li> </ul>		
<b>GaAs Epi MHEMT</b>	<ul style="list-style-type: none"> <li>• Very high Indium percentage in channel up to 70%</li> </ul>	<ul style="list-style-type: none"> <li>• Very high Ft and Fmax</li> </ul>		

*“Soitec has all the expertise and capability to provide wafers for your next-generation specialty electronics devices.”*

# Layer Transfer Solutions

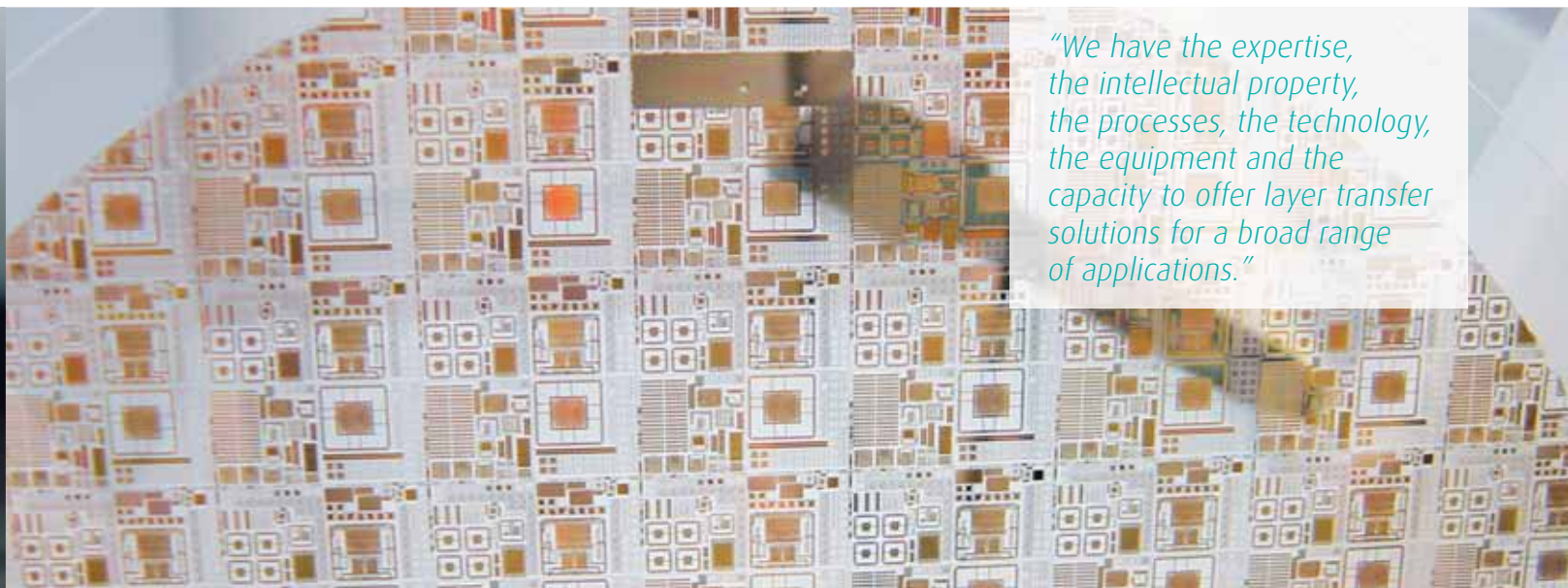
Soitec leverages a unique portfolio of technologies — including our Smart Cut™ and Smart Stacking™ technologies — and expertise in low-temperature direct wafer bonding and mechanical-chemical thinning to offer a wide range of layer transfer solutions that address each customer's specific needs.

- Long history of successful partnerships with key customers across a wide range of industries
- From product development to delivery of prototyping up to high-volume manufacturing, Soitec has the capabilities to deliver flexible layer-stacking solutions
- Layer transfer techniques apply to processed wafer stacking and engineered substrates

## Processed wafer stacking and engineered substrates

- Soitec can provide various engineered, bonded structures on different types of wafers (including engineered BSOI, bonded SOS and stacking for various applications)
- Partially or fully processed incoming wafers (e.g., wafers with pre-etched cavities, CMOS)
- High- and low-temperature bonding process capabilities
- Dedicated manufacturing lines

Products Lines	Specifications	Benefits	Typical Applications	Markets
<b>Stacking for Imager</b>	<ul style="list-style-type: none"> <li>• Direct-bonding and thinning techniques on processed SOI and bulk wafers</li> <li>• CMOS Image Sensor transferred onto silicon</li> </ul>	<ul style="list-style-type: none"> <li>• Low-stress bonding compatible with color filter arrays for any pixel sizes</li> <li>• High-quality transferred layers</li> <li>• Proven reliability in extreme environments</li> </ul>	<b>Image Sensor</b>	
<b>Stacking for MEMS</b>	<ul style="list-style-type: none"> <li>• Monocrystalline silicon layers ranging from 4µm to over 100µm transferred onto silicon handle with cavities</li> </ul>	<ul style="list-style-type: none"> <li>• Defect-free bonding</li> <li>• High interface and surface quality</li> <li>• Improved thickness uniformity to enhance performance</li> </ul>	<b>MEMS</b>	
<b>Stacking for 3D</b>	<ul style="list-style-type: none"> <li>• Direct bonding based on dielectric or metallic layers</li> <li>• Multiple stacking of processed layers</li> </ul>	<ul style="list-style-type: none"> <li>• Innovative solutions to improve performance, form factor and cost</li> <li>• Customized solutions</li> </ul>	<b>3D</b>	
<b>Bonded SOS</b>	<ul style="list-style-type: none"> <li>• Thin monocrystalline layer on sapphire</li> </ul>	<ul style="list-style-type: none"> <li>• High linearity</li> <li>• High integration</li> </ul>	<b>RF</b>	



*“We have the expertise, the intellectual property, the processes, the technology, the equipment and the capacity to offer layer transfer solutions for a broad range of applications.”*

# The Company

## Soitec is an international company, a world leader in generating and manufacturing revolutionary semiconductor materials at the frontier of the most exciting challenges for energy and electronics

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 developing and manufacturing its flagship material, SOI (Silicon-on-Insulator) that is based on the revolutionary Smart Cut™ “atomic scalpel” technology.

Today Soitec is leading technological advances that will shape the performance of tomorrow’s products in markets such as computing, communications, automotive electronics, and lighting as it strives to continue Moore’s law and the More than Moore’s law.

Similarly, in the solar market, Soitec is one of the leading technology providers of Concentrator Photovoltaic (CPV) modules and systems based on its Concentrix™ technology.

Headquartered in Bernin, France, Soitec has offices and fabs in the United States, Germany, Japan, China, Taiwan and Singapore. Today, Soitec has high-volume manufacturing capacity reaching over two million wafers per year dedicated to electronics markets.

## A wide spectrum of semiconductor materials for a broad range of applications

Soitec’s products and technologies dramatically improve energy efficiency, performance, miniaturization and reliability to address the increasing demand for rich and diverse online content and enhanced mobility, pervading all industries segments.

### Soitec offers a variety of materials dedicated to electronic applications:

- Microelectronics (Soitec FD-2D, Soitec Premium SOI™, Soitec Wave SOI™, Soitec Smart Power SOI™ and Soitec Imager SOI™)

- Specialty Electronics (GaAs, GaN and engineered substrates)
- Layer-Transfer Solutions (Stacking for Imager, Stacking for RF and Stacking for MEMS)

### Power and Performance

Soitec’s SOI products enable much faster devices for the same power budget as bulk equivalents.



### Miniaturization

Soitec’s latest generation of products enables continuation of Moore’s Law.



### Mobility

Soitec’s products enable longer battery life and components that integrate several functions – all at a competitive price.



### Energy Efficiency

Soitec’s SOI wafers enable 50% energy saving compared to traditional driver components.





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