International Rectifier

THE POWER MANAGEMENT LEADER

FABRICATION

International Rectifier Epi Services

Benefits

- Large installed base of advanced epitaxial reactor technologies (ASM and EpiPro 5000)
- Experts in Buried Layer, Blanket, and Hetero Si Epitaxial growth.
- Real-time computer based SPC control
- Fully automated cleaning system for both pre and post cleans
- Full metrology suite
- Rapid cycle time
- Experienced & professional staff
- Hands-on engineering support for qualifications
- ISO 14001 & TS 16949 Certified
- Operating 24 hours per day, 7 days a week
- Daily shipments

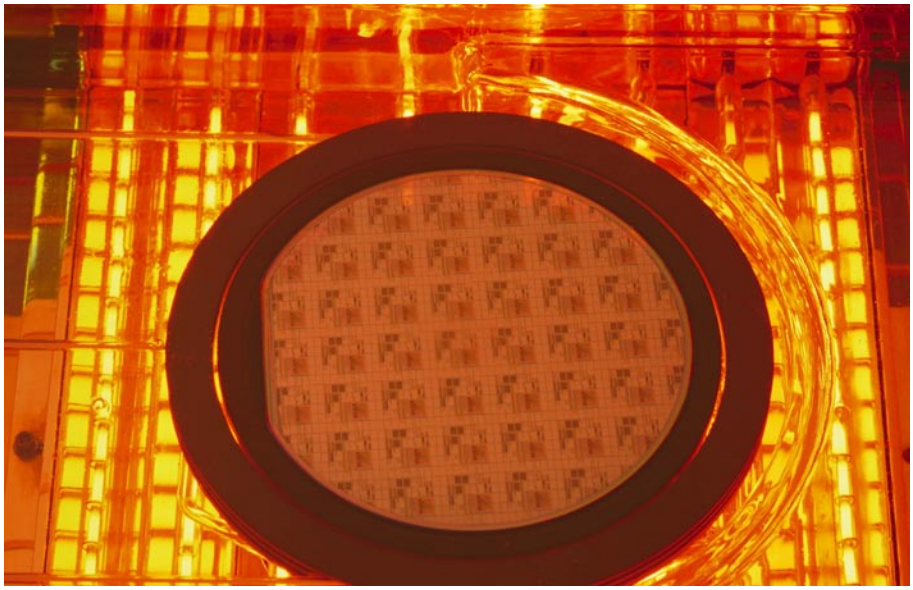
ASM Processing Capability

- Substrate diameters: 100mm, 125mm, 150mm, and 200mm
- Epi layer dopants: B_2H_6, PH_3 & AsH_3
- Silicon sources: $HSiCl_3$, SiH_2C1_2 and SiH_4
- Atmospheric & Reduced pressure processing
- Processing available on polished substrates and processed buried layer wafers

Epi Pro 5000 Processing Capability

- Substrate diameters*: 125mm & 150mm
- Epi layer dopants: B_2H_6, PH_3 & AsH_3
- Silicon Sources: $HSiCl_3$
- Pressure: Atmospheric
- Largest "thick epi" reactor available:
  - 125mm = 24 wafers per run
  - 150mm = 18 wafers per run
  - 200mm = 8 wafers per run

* Can support 100mm and 200mm processing



International Rectifier Epi Services (IR Epi Services) provides outsourced silicon epitaxial services for semiconductor manufacturing. The company specializes in the growth of epitaxial silicon on buried layer, polished silicon, SOI, and sapphire wafers.

IR Epi Services wafer diameters from 100mm through 200mm and can provide a range of epi thicknesses from >0.50Å to 150µm and epi resistivities of 0.001Ω-cm to 1000Ω-cm.

With over 40 advanced technology reactors installed, IR Epi Services offers 'blanket' epi on polished, SOI and sapphire substrates for IGBTs, power MOSFETs, CCDs, bipolar power discrete and CMOS devices. In addition, as the world's largest outsource provider of epi on substrates with buried layers, IR Epi Services provides this specialty epitaxy for bipolar and BiCMOS integrated circuits. Product specific epi processes for substrates with buried layers containing arsenic (As), boron (B), phosphorus (P) or antimony (Sb), & combinations of these buried layers, are developed and available using atmospheric pressure or reduced pressure processing.

Processing epitaxy is a capital intensive activity and the availability of experienced epitaxy professionals is limited. Outsourcing epitaxial process requirements to IR Epi Services relieves a fab operation of the capital, floor space, and human resource requirements to support these processes. IR Epi Services integrates manufacturing resources, technical expertise & customer focus in a single source for epitaxial products.

Typical Process Performance & Capability

Application	Thickness (µm)	Resistivity (W-cm)	Thickness Uniformity	Resitivity Uniformity
BiCMOS/Bipolar Digital	0.5 - 10.0	0.2 - 10.0	+/- 1%	+/- 5%
BiCMOS/Bipolar Linear	5.0 - 30.0	0.5 - 10.0	+/- 2%	+/- 3%
Discrete	3.0 - 40.0	1.0 - 50.0	+/- 2%	+/- 3%
Power MOSFET	5.0 - 25.0	0.1 - 10.0	+/- 2%	+/- 2%
SOI	0.7 - 10.0	Various	+/- 1%	r_ dependent
CMOS	1.0 - 10.0	1.0 - 10.0	+/- 2%	+/- 3%
			(wafer to wafer <2%)	(wafer to wafer <2%)