



## HISTORY

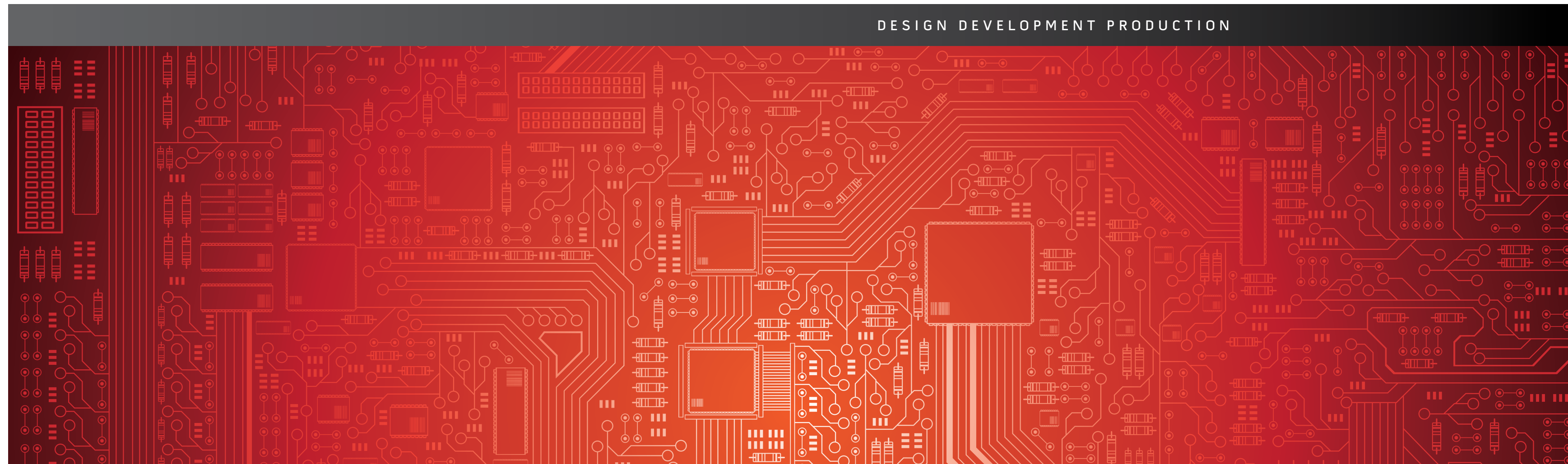
Masimo Semiconductor, a wholly owned subsidiary of Masimo Corporation, has been researching III-V opto-electronic devices since 1982. Masimo Semiconductor's scientists and engineers cumulatively have over 100 years of experience and account for over 140 publications, 34 patents, and 3 world record discrete semiconductor devices.

## FACILITIES

In 2003, Masimo Semiconductor brought on-line and moved into the current 40,000 sq. ft. state-of-the-art production facility. Masimo Semiconductor's large modern office and laboratories are located in Hudson, NH. The facility boasts a 13,500 sq. ft. of class 100/1000 cleanroom space that houses an MOCVD and processing laboratory as well as an extensive materials characterization and device testing area. Office area is available for customer use and an additional 50,000 sq. ft. is available for capacity expansion.

# Compound Semiconductor Foundry Services

DESIGN DEVELOPMENT PRODUCTION



**Masimo Semiconductor** • A Wholly Owned Subsidiary of Masimo Corporation

25 Sagamore Park Road • Hudson, NH 03051 • Tel 603.595.8900 • Fax 603.595.0975

sales@masimosemi.com • www.masimosemiconductor.com



6392-7285A-0812





## APPLICATIONS

### CPV Cells

Masimo Semiconductor makes next generation efficiency solar cells (over 42% at 500suns, (25C), as independently-verified by the National Renewable Energy Laboratory. The patent pending Bi-facial Growth (BFG) cells are exclusively a Masimo Semiconductor-owned and developed product.

### Night Vision

Masimo Semiconductor has extensive experience in high quality, low particle, metal-organic chemical vapor deposition (MOCVD). We sell large quantities of AlGaAs/GaAs and InGaAs-based photocathode epiwafers to leading night vision equipment makers.

### LEDs

Masimo Semiconductor works with many "fabless" companies on customer-proprietary LED products. Masimo Semiconductor-made LED products range from single emitter red LEDs for medical manufacturers for use in blood oximeters to infrared LED emitter arrays for instrument manufacturers to resonant cavity LEDs (RCLEDs) for telecommunications.

### Avalanche and PIN Photodiodes

Masimo Semiconductor can design or implement customers' photodiode epi-designs and can design or use customer-designed photomasks to microfabricate various photodetectors, including sensitive photon-counting avalanche photodiodes (APDs) for specialty instruments as well as standard PINs for optical communications.

### Thermophotovoltaics

Masimo Semiconductor is a leading supplier of specialty low-bandgap InGaAs power converter cells for thermophotovoltaic power systems that are being examined to replace thermoelectrics for power in deep space planetary exploration missions by utilizing thermal photons generated from radioisotope heat sources.

### Laser Power Converters

Masimo Semiconductor has world-class expertise in the design of various photovoltaic power conversion products. We design and make highly efficient (up to 60%) laser power converters that can supply power to remote locations or sensors via a laser beam in free space or a laser beam guided by an optical fiber.

## Masimo Semiconductor Capabilities

KEY		Relative atomic masses are based on <sup>12</sup> C = 12.00000															
Atomic Mass	→ 12.0111	← Oxidation Numbers	4, 0, 0, 0, 0, 0														
Symbol	→ C		He														
Atomic Number	→ 6		2														
Electron Configuration	→ 1s <sup>2</sup> 2s <sup>2</sup> 1p <sup>1</sup>		1s <sup>2</sup>														
<b>III-V</b>																	
<b>p-block GROUP</b>																	
New Designation      Former Designation (prior to 1984 IUPAC decision)																	
1	2	13	14	15	16	17	18										
IA	IIA	IIIA	IVA	VA	VIA	VIIA	0										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Li	Be	B	C	N	O	F	Ne										
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Na	Mg	Al	Si	P	S	Cl	Ar										
		<b>d-block</b>															
		<b>Transition Elements GROUP</b>															
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Cs	Ba	La-Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Fr	Ra	Ac-Lr	Rf	Db	Sg	Bh	Hs	Mt	Uun*	Uuu	Uud						
* The systematic names and symbols for elements of atomic numbers greater than 109 will be used until the approval of trivial names by IUPAC.																	
Mass numbers in parentheses are mass numbers of the most stable or common isotope.																	
		<b>Lanthanide Series</b>															
		<b>Actinide Series</b>															

## SERVICES

### Design

Masimo Semiconductor maintains a flexible custom/production wafer growth and processing laboratory. We offer epitaxial structure design, device performance modeling and process flow layout services for all your III-V compound semiconductor devices. Our capabilities include CAD design of photolithographic mask sets, development of custom device process as well as routine fabrication processes. Capabilities range from prototype development to full production.

### Epitaxial Growth

Masimo Semiconductor offers large library of epitaxial growth experience on multiple high production Veeco MOCVD reactors as well as small volume reactors. The reactors are outfitted to grow InP and GaAs based material systems and growth can be performed on 2", 3", 4", or 6" substrates. Masimo Semiconductor has developed significant know-how growing devices with challenging delivery specifications such as high-strain materials, bi-facial growth and ultra low-particle counts.

### Device Fabrication

Starting with Masimo Semiconductor MOCVD growth or customers supplied epitaxial wafers and device concept; we can take GaAs, InP, Si Lithium Niobate, Lithium Tantalate or SiC wafers (up to 4") through the full device fabrication process. We can provide engineering expertise to develop a process flow, run parallel "test" lots, recommend alternative approaches, and provide alternative steps and materials to optimize a device for both performance and manufacturing costs.

### Testing

Masimo Semiconductor provides non-destructive epitaxial characterization and device performance measurements as well as destructive testing for in-depth performance analysis and long-term reliability requirements. All materials characterization is performed in a class 1000 cleanroom located adjacent to the MOCVD laboratory and a pass-through allows wafer transfer from MOCVD to characterization. We provide the following materials characterization: Surface Inspection and Defect Count, Spectral Reflectance, Photoluminescence, XRD, Hall and Polarization. We also provide the following device testing: Solar Cell – Simulated IV Measurements (1-sun & concentration), IQE, EQE, Reflectance, LED – Intensity Mapping.