Industry Leading Millisecond Anneal Technology Offers Lowest Thermal Budget Solution

LSA 101
Laser Spike Anneal System

Utilized by leading IDMs and foundries around the globe

> Ultratech's 300mm LSA101 system is utilized as the preferred technology for high-volume manufacturing of advanced logic devices from the 40nm to 10nm nodes with development at 7nm.

> Built on the customizable Unity Platform™, the LSA's scanning system has fundamental advantages in uniformity and low-stress processing, which make it readily applicable for current and future device nodes.

> The LSA101 enables critical millisecond annealing applications that allow customers to maintain high processing temperatures, and thus achieve improved device performance, lower leakage, and improved yield.

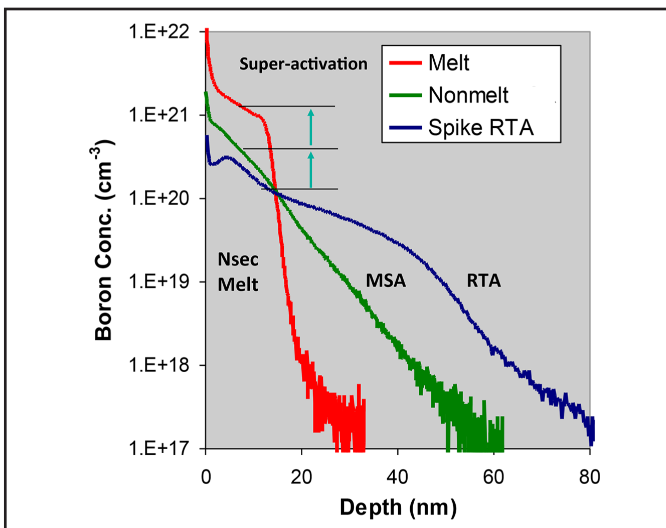
Laser Spike Annealing Technology Advantages

> Ultratech's laser processing system provides solutions to meet the difficult challenge of fabricating ultra-shallow junction transistors with highly activated source/drain contacts

> LSA provides a sub-millisecond thermal anneal process at temperatures up to 1350° C, resulting in high activation with minimal dopant diffusion

> Ultratech's proprietary optical design reduces pattern related within-die temperature variations by >10x as compared to other millisecond annealing systems

Junction Profile Comparison



Melt annealing results in ultra-shallow, abrupt junction, with above solid solubility activation→better Rs-Xj than MSA

Laser Spike Anneal

- Long λ
- Brewsters Angle
- No shadowing or light trapping by Fins

Fins

Silicon

Measured reflectance map

ΔT ~ 10°C

Flash Anneal/Diode

- Short λ
- Near normal incidence
- Can have light trapping by Fins

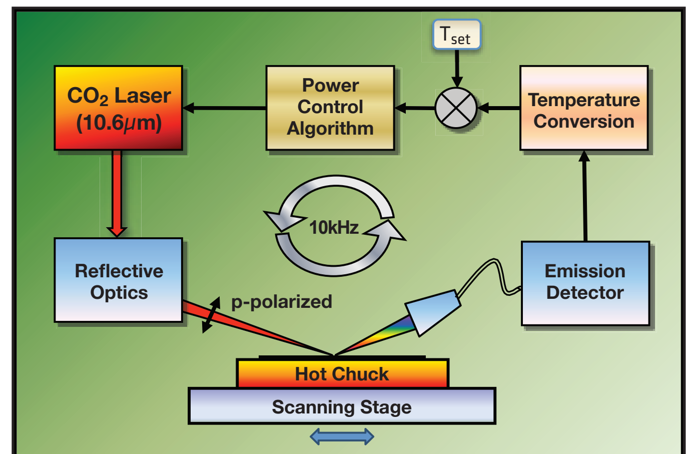
Fins

Silicon

Measured reflectance map

ΔT > 100°C

LSA Control System



> Long wavelength p-polarized light at Brewster's angle incidence for optimum within-die uniformity

> Closed-loop temperature feedback control to maintain tight real-time temperature control

> Best-in-class pattern insensitivity reduces layout constraints, ideal for the foundry market and for both planer and FinFET devices

> Localized stress field with flexible dwell time enables low stress processing and reduced wafer breakage

LSA Logic Applications

Planar: Poly & HKMG

40/28nm

> S/D anneal
> S/D ext anneal
> SMT

Planar: HKMG

22/20nm

> S/D anneal
> S/D ext anneal
> SMT
> High k anneal
> NiSi formation

FinFET

Gate
Drains
Sources
14/10nm

> S/D anneal
> S/D ext anneal
> SMT
> High k anneal
> Re-activation
> Ti Silicide formation

LSA is used for an increasing number of applications as devices scale to smaller dimensions with different materials and architectures

Find out more at
www.ultratech.com
or call 408.321.8835

Veeco–Ultratech
3050 Zanker Road,
San Jose, CA 95134

Ultratech | A division of Veeco