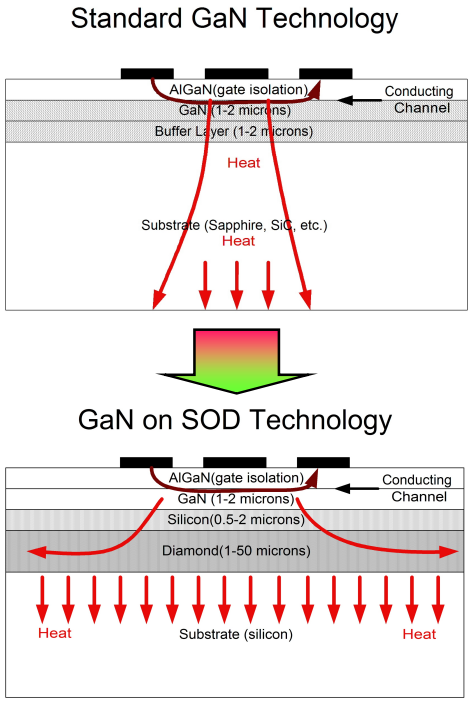
GaN on SOD (Silicon On Diamond)

The Solution to High Power Density Thermal Management

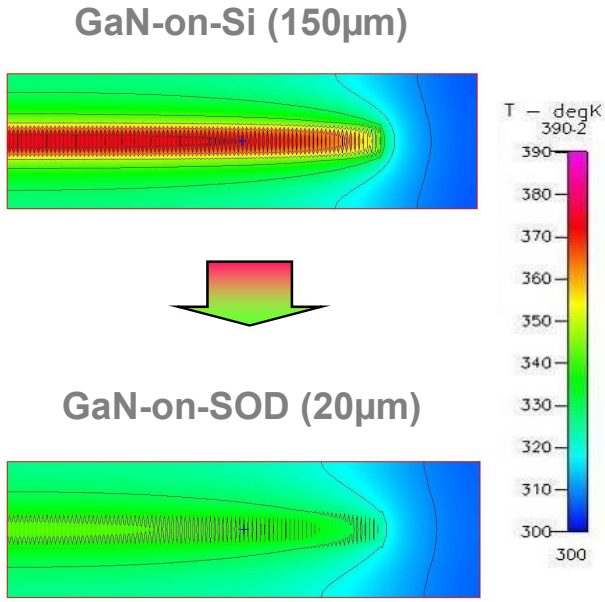
Benefits

- Diamond Heat spreading directly under the junction
- W/mm increase at fixed T_j
  - >100% vs. silicon
  - 50-80% vs. SiC
- T_j reduction at fixed power
  - >50 degrees vs. GaN on silicon or SiC.
- GaN growth on SOD yields films equivalent to GaN on silicon.
- Wafer size can be scaled to 300 mm.

Structure

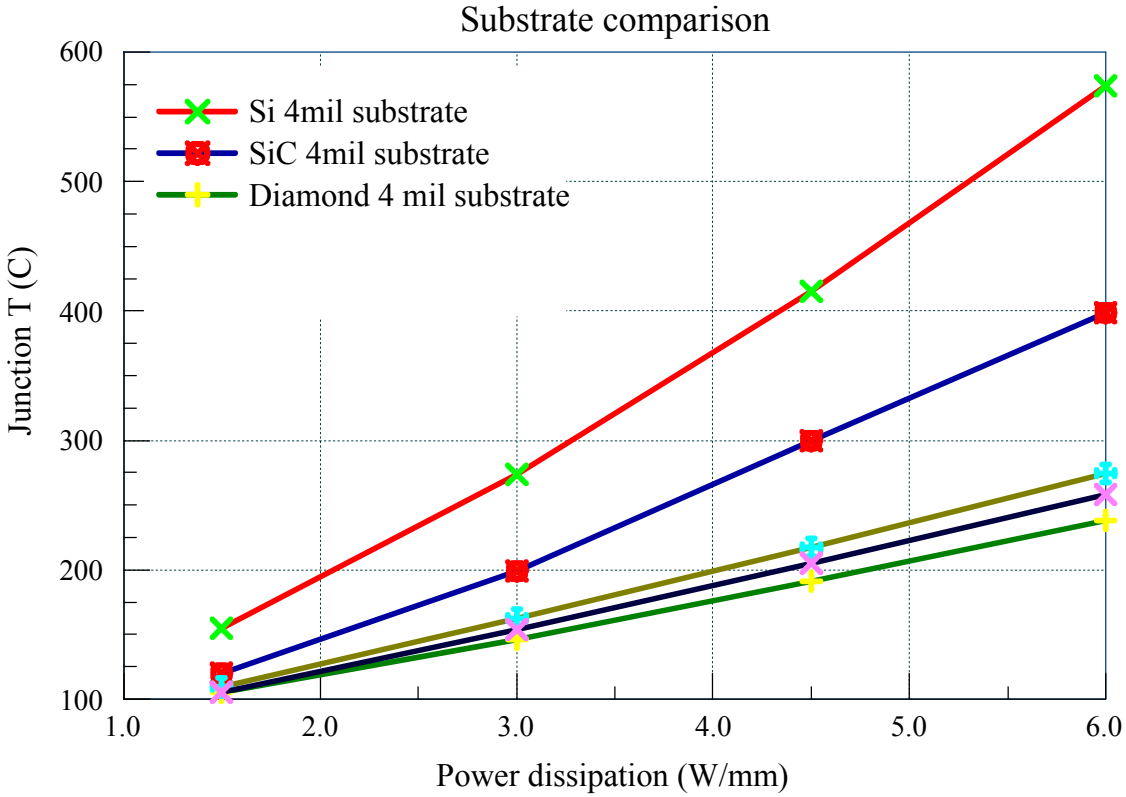


Thermal Improvement



Source: Nitronex

Substrate Comparisons
Junction Temp vs.
Power Dissipation



2 cells 4 mil sub with package

	SiC sub	Si sub	Diamond sub
Pd (W/mm)	Tj (C)	Tj (C)	Tj (C)
1.5	120.09	154.86	105.33
3	199.02	273.94	145.75
4.5	299.58	415.02	191.12
6	398.87	574.26	237.98

base T=60C K= 600W/m-K (conservative) Source: TriQuint