

# Empyrean ALPS<sup>®</sup>

DATASHEET

## The Fastest GPU-Accelerated SPICE Simulator for Analog, RF and Mixed-Signal Design

### Benefits

#### Simulation

- >100M-element capacity
- High-performance mixed-signal simulation and co-simulation with all leading Verilog simulators
- Supports save/recover and snapshot
- MTS and S-parameter with hundreds of ports
- High-performance distributed simulation for PVT corners and Monte Carlo analysis
- 3nm support

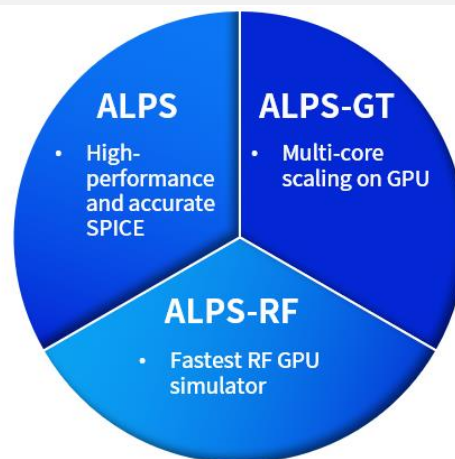
#### GPU

- Industry-leading multi-core on GPU
- Up to 10x speedup
- First commercial GPU-based simulator
- Fastest GPU simulator

#### RF

- Supports Period Steady State (PSS) analysis and Harmonic Balance (HB) analysis
- Unique simulator supporting RF on GPU
- Up to 100x speedup

Empyrean offers a comprehensive suite of high-performance, high-accuracy simulations. The product lineup includes the next-generation Empyrean ALPS<sup>®</sup>, which delivers 100% SPICE accuracy on circuits with over 100M elements. Empyrean ALPS<sup>®</sup> GT leverages the GPU to provide accelerated processing power and up to 10x performance improvement. Empyrean ALPS<sup>®</sup> RF addresses the complex simulation needs of RF circuit design while offering over 10x speedup for Harmonic Balance RF simulations through GPU acceleration.



Empyrean ALPS<sup>®</sup> (Accurate Large-capacity Parallel Simulator) delivers 100% SPICE accuracy on circuits with over 100M elements. ALPS proprietary Smart Matrix Solving technology provides efficient matrix solving and helps to deliver significant speedup, especially in post-layout simulation.

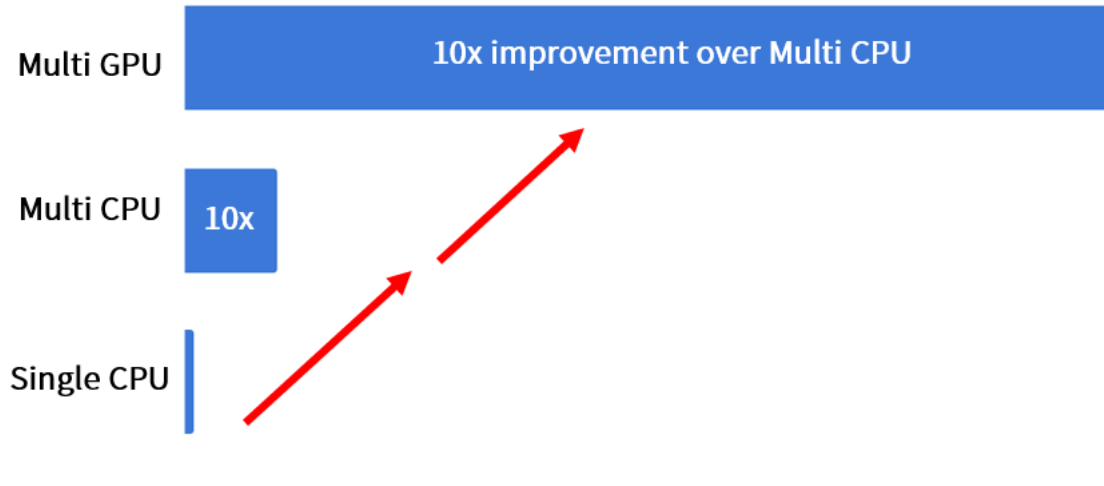
Empyrean ALPS<sup>®</sup> GT is based on the CPU-GPU platform architecture. ALPS-GT utilizes the ALPS engine to provide SPICE accuracy and offers accelerated processing power with GPU Turbo Smart Matrix Solving (SMS-GT) technology delivering 10x performance improvement.

Empyrean ALPS<sup>®</sup> RF supports comprehensive RF simulation functionalities like large signal analysis, small signal analysis, and noise analysis. Updated RF engines include Harmonic Balance and Shooting Newton. The ALPS-RF Harmonic Balance RF simulation has been accelerated by GPU which provides over 10X speedup over CPU-based solution.

- Industry-leading multi-core scaling and compute acceleration on GPU/CPU
- RF simulation supporting Harmonic Balance and Shooting Newton algorithms
- Capacity to handle large designs with hundreds of S-parameter ports

## Unmatched Performance and Scalability

The next-generation GPU-accelerated architecture of Empyrean ALPS® GT delivers the highest performance CPU-GPU computing to achieve massive scaling through industry-leading multi-core and multi-machine parallelization. The cutting-edge Smart Matrix Solving technology of Empyrean ALPS® and the GPU Turbo Smart Matrix Solving (SMS-GT) of ALPS-GT ensures unparalleled performance and scalability.



Empyrean ALPS-GT performance improvement with GPU-based simulation

### ❖ Circuit Simulation Analysis

- Supports OP, DC, Tran, AC, PZ, STB, Noise, Dcmatch, Transient Noise analysis, etc.
- Supports PSS, HB, PAC/HBAC, Pnoise/HBnoise, PXF/HBXF, PSP/HBSP, PSTB/HBSTB analysis
- Supports multi-corner, alter, sweep analysis
- Supports Monte Carlo and fast Monte Carlo analysis

### ❖ Format Support

Supports mainstream models and languages:

- BSIM3, BSIM4, BSIM6, BSIMSOI, BSIMCMG, PSP, MOSVAR
- MOS1, MOS3, TFT, HiSim HV, MOS20
- BJT, JFET, DIODE
- S-element/Nport
- Verilog-A, Verilog

### ❖ Platform Support Hardware

- Nvidia Grace ARM CPU
- Nvidia V100/A100/H100 GPU
- CUDA Toolkit 10/11/12
- X86 64-bit:  
Red Hat Enterprise V6, and V7