NEWS RELEASE

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Silicon Genesis continues its focus on Customer Specific 3DIC Applications using its SiGen NanoTec suite of technology offerings and SiGen Nanocleave Layer Transfer Process Technology

January 27, 2023 – Fremont, CA - Silicon Genesis Corporation (SiGen), a leader in process technology and equipment for engineered substrates continues to provide ongoing support to its licensees. Since SiGen's announcement over five years ago, the company has developed and applied its layer transfer process and equipment technology to 3DIC applications. For over two decades, SiGen has developed processes and tools for commercial fabrication of SOI, GOI and SOQ wafers, licensed process technology, and produced specialized bonding and layer transfer tools for high-volume SOI production and now for 3DIC applications.

3DIC is a rapidly emerging market opportunity for using SiGen layer transfer techniques to dramatically improve device performance, for example by increasing system internal bandwidths in the 3rd dimension. The NanoTec family of products has been advertised on SiGen's website for over 20 years and includes Nanocleave, a room temperature layer transfer process that SiGen is known for worldwide and is often cited in the Semiconductor Industry. The Nanocleave process remains a SiGen offering with unique characteristics that are beneficial for enabling both materials layer transfer, such as SOI wafer fabrication, and 3DIC device layer transfer for specific application needs.

SiGen is uniquely positioned to support 3DIC by extending its NanoTec process technology and tools to the special requirements for wafer-scale layer transfer of CMOS device layers onto atomically bonded device layer stacks. The SiGen layer transfer process provides unique technical and commercial benefits over other 3DIC stacking approaches. SiGen has been long known for pioneering methods and tools for room temperature cleaving of semiconductor materials and developing and selling tools such as the SiGen Room Temperature Controlled Cleaving Process (rT-CCP) system for high volume manufacture of SOI wafers. SiGen has also developed methods for efficient bonding on semiconductor layers through the use of Plasma Activation of bond surfaces and continued sales of the SiGen Stand-alone Plasma Activation (SPA) system.

SiGen's 3DIC process and tool portfolio is supported by an applications lab for developing customer specific processes. The applications are supported by continued development of bonding and layer transfer methods and tools for the specialized requirements for CMOS device stacking. 3DIC applications are also supported by an extended layer transfer patent portfolio covering 3DIC stacking technologies, such as

formation of cooling fluid channels, preparation of surfaces for sequential bonding of wafer and die-scale IC devices, and fabrication of integrated lateral and vertical Interconnect Networks for high-bandwidth 3DIC systems.

Over the past five years and as recently as 2022 SiGen has been granted numerous apparatus and methods patents in the U.S. and worldwide that extend the Nanocleave technology from substrate layer transfer to 3DIC device layer transfer. The SiGen 3DIC patent portfolio and suite of proprietary methods also covers process methods for mitigating deleterious materials effects from issues such as in-process stress, non-planar device surfaces, proton ion implantation, and multi-layer bonding of dissimilar materials. The SiGen patent portfolio also extends to unconventional cleave plane formation methods such as the deposition of specially tailored buried strain layers and the use of novel methods including mechanical, thermal and/or electromagnetic energy sources for cleave plane initiation and propagation.

SiGen's business model continues to be one of offering a suite of products, tools and services under the SiGen NanoTec umbrella and licensing our patented process technology to protect customers' competitive advantage for their specifically developed applications. Application Engineering Services for developing what are known as Customer Specific Substrates (CSS) continues to be a key avenue for developing 3DIC applications. SiGen has actively used CSS over the past five years with its customers to develop specialized 3DIC applications. This approach involves very close customer interaction and collaboration that shortens development time, streamlines customer adoption, and aides in high volume ramp up.

About SiGen

SiGen is a leading provider of engineered substrate process technology and equipment for the semiconductor, display, and optoelectronics markets. SiGen's technology is used for production of Silicon-on-Insulator (SOI) semiconductor wafers and 3DIC stacks of CMOS device layers for high performance applications. SiGen develops innovative substrates through thin-film and thick-film engineering, enabling new applications and markets for its customers. SiGen's customers and partners include top players from substrate and equipment suppliers throughout the world. Founded in 1997, SiGen is headquartered in Fremont, California. For more information, visit http://www.sigen.com for the complete SiGen NanoTec offerings of layer transfer process, equipment technology and services.