PulseForge makes major breakthrough which allows flux-less soldering in an ambient environment

AUSTIN, TX, UNITED STATES, February 26, 2026 /EINPresswire.com/ -- PulseForge, Inc. (PFI), the inventors of Photonic Soldering technology, today announced a major breakthrough enabling high-temperature solder alloy reflow in ambient atmosphere without the use of active flux. This advancement constitutes a critical milestone for next-generation electronics manufacturing, providing a cleaner, faster, and more cost-effective alternative to traditional soldering methods.

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>
> *Jonathan Gibson, CEO of PulseForge*

The breakthrough, first demonstrated in pre-bumping of ball grid array (BGA) components, is applicable across a broad range of device structures. Solder balls are stabilized mechanically with a flux-less tacky agent and attached using the photonic reflow process. This approach enables manufacturers to achieve a significantly cleaner final joint, with easier and more reliable removal of remaining residues compared to reflow with conventional fluxed solder pastes. Because the process operates in ambient atmosphere, it also eliminates the expense and environmental impact of inert gas purging.

“Flux-less soldering has long been considered the ‘holy grail’ of electronics assembly,” said Jonathan Gibson, CEO of PulseForge, Inc. “Our team has achieved what the industry has pursued for decades: a clean, repeatable, production-ready process that dramatically lowers total manufacturing cost by eliminating the need for process nitrogen. This technology changes what is possible in high-performance electronics.”

A gamechanger for high-reliability applications

Flux has historically played an essential—but imperfect—role in soldering by removing oxides and improving wetting. However, its use introduces a variety of trade-offs, including corrosion risk, ionic contamination, post-cleaning steps, and long-term reliability concerns. As electronic devices continue to shrink and I/O density increases, flux residue poses an even greater reliability challenge.

PulseForge’s flux-less approach overcomes these limitations by leveraging the unique physics of Photonic Soldering, where rapid heating significantly limits oxygen penetration during reflow. The result is solder joints with performance identical to flux-assisted processes, with reduced contamination risks and cleaning overhead.

This innovation sets a new standard for high-reliability applications including semiconductor packaging, die attachment, advanced interconnects, flex-to-rigid assemblies, and next-generation underfill processes.

Cleaner and greener at a lower cost
PulseForge Photonic Soldering delivers profile times between 1 and 5 seconds, dramatically increasing throughput compared to conventional soldering approaches. By eliminating the need for inert or reducing gases, the environmental impact of the process is reduced by more than 95%, while also cutting operational costs.

Combined with a faster process and reduced consumables, the technology delivers a significant cost-per-unit advantage to manufacturers.

Available for immediate implementation
The full suite of PulseForge industrial tools supports immediate qualification and integration of the new flux-less process into existing production environments. The technology is available across all PulseForge soldering tool platforms, allowing customers to deploy it quickly in both development and high-volume manufacturing.

About PulseForge
PulseForge, Inc. develops and manufactures state-of-the-art flashlamp-based tools that deliver energy in a precise and targeted manner to enable innovation in industrial manufacturing. PulseForge’s expertise and tools empower customers to explore novel materials and manufacturing methodologies, driving dynamic and efficient production at an industrial scale.

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