A composite image showing the interior of a particle accelerator with its complex, circular, metallic structure. Overlaid on the right side is a detailed view of an RF amplifier module, which is a yellow circuit board with various electronic components, including capacitors and a small heat sink, and a silver-colored metal flange at one end.

From kW to MW: powering the future of particle acceleration with solid-state technology

Offering a rugged, high-efficiency RF power transistor portfolio of GaN and LDMOS RF power transistors for CW and pulsed particle accelerator applications

The transition to solid-state power amplifiers (SSPAs) is reshaping RF power systems in large scientific facilities. Where feasible, replacing tube-based systems with modern solid-state solutions from 50 MHz to 6 GHz enhances efficiency, reliability, and longevity.

Achieving the power levels of vacuum tube technology with SSPAs requires the precise combination of multiple solid-state devices. At Ampleon, we develop the industry's most efficient and rugged RF power transistors, working closely with national laboratories, research institutions, medical pioneers, and industrial leaders to help design and build cutting-edge RF amplifier systems.

Our expertise in extremely ruggedized solutions ensures that our continuous-wave (CW) solid-state devices can withstand harsh mismatch conditions and RF on/off cycling, which is often critical for long-term system reliability.

Whether your project requires 1 kW or several megawatts, Ampleon is your trusted design and technology partner for high-performance RF amplification.

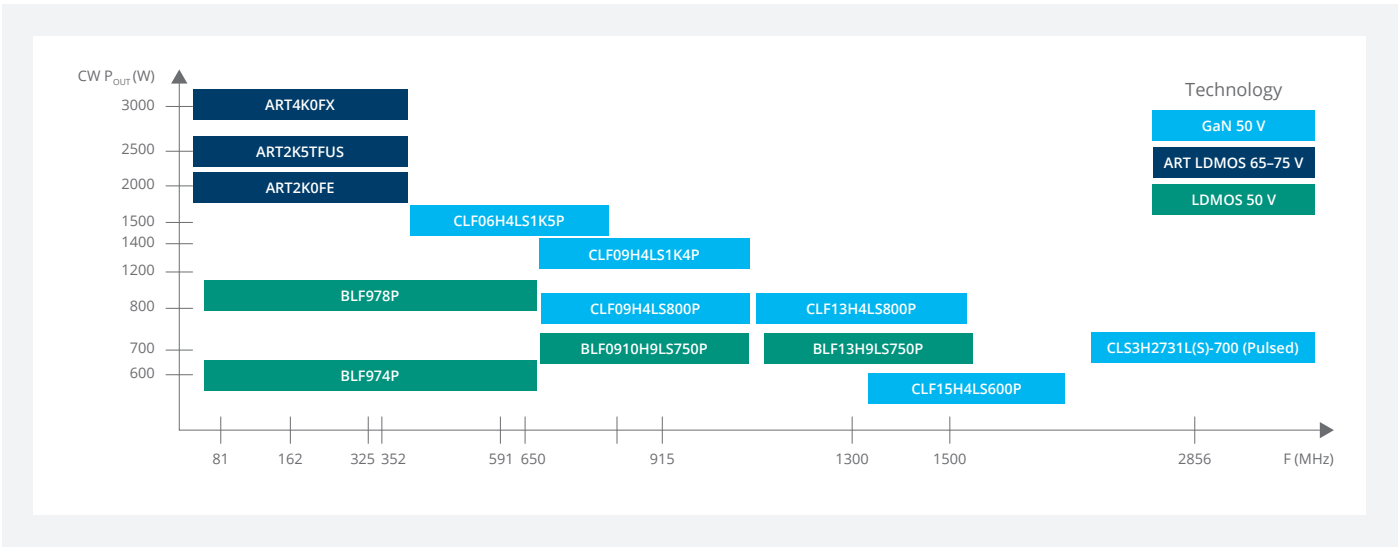
KEY FEATURES

- Optimized SSPA portfolio for each frequency range
- High output power with state-of-the-art efficiency
- High reliability, > 20-year transistor lifespan
- Withstands extremely high cycles of RF on/off, ensuring long-term durability
- Low thermal resistance (R_{th}) for superior heat dissipation

KEY BENEFITS

- Availability and longevity of supply
- High modularity and redundancy
- No single point of failure for enhanced system reliability
- Low maintenance costs and cost-efficient operation
- Designed for continuous 24/7, 365-day operation
- Easily scalable SSPA architecture for high output power
- Compact footprint for space-efficient integration
- Simplified electrical and thermal system design for ease of implementation
- > 1 million hours operating lifetime
- No need for periodic replacements

Preferred SSPA transistor portfolio for particle accelerator applications



F _{range} (MHz)	Type number	Technology	Package outline	CW P _{1dB} (W)	V _{DS} (V)	η _D (%)	G _{dB} (dB)	Demoboard
1–400	ART4K0FX	ART LDMOS 65–75 V	SOT539A	3000	75	74	24	Available
1–400	ART2K5TFUS	ART LDMOS 65–75 V	SOT539A	2500	75	76	29.5	Available
1–400	ART2K0FE(S)	ART LDMOS 65–75 V	SOT539A(B)	2000	65	78	27	Available
1–700	BLF978P	LDMOS 50 V	SOT539A	1200	50	80	25.5	Available
1–700	BLF974P	LDMOS 50 V	SOT539A	500	50	77	25	Available
600–800	CLF06H4LS1K5P*	GaN 50 V	SOT539B	1500	50	77	17	Available
902–828	BLF0910H9LS750P	LDMOS 50 V	SOT539B	750	50	69	20	Available
900–1000	CLF09H4LS1K4P*	GaN 50 V	SOT539B	1400	50	77	20	Available
900–1000	CLF09H4LS800P*	GaN 50 V	SOT1214B	800	50	81	18	Available
1300	BLF13H9LS750P	LDMOS 50 V	SOT539B	750	50	63	19	Available
1300	CLF13H4LS800P*	GaN 50 V	SOT1214B	800	50	75	17	Available
1500	CLF15H4LS600P*	GaN 50 V	SOT1214B	600	50	75	17	Available
2856	CLS3H2731L(S)-700	GaN 50 V	SOT502A(B)	700**	50	59	13.5	Available

* Samples and demoboards are available. Product release is coming soon.
** Pulsed

Contact information



www.ampleon.com/particle-acceleration#contact