



The Architecture of the Invisible

Redefining High Fidelity through the Mastery of Gallium Nitride (GaN)

Introduction

Audio fidelity is a battle against time and energy. Where traditional amplification reaches its structural limits, IXYCORE opens a new era by taming Gallium Nitride (GaN). Our approach is based on a vertical integration of disruptive technologies, where every nanosecond is mastered to fade away before the truth of timbres and pure dynamics.

IXYCORE represents the ultimate culmination of a holistic and energetic approach: converting a power circuit into an instrument of absolute high fidelity.

1. The GaN Revolution: Beyond the Limits of Silicon

The integration of GaN marks a major technological breakthrough, resolving the physical limitations inherent in traditional silicon (MOSFET).

- **Drastic reduction of dead times (Dead Time) < 5 ns:** GaN transistors can switch up to 100 times faster than silicon. Dead time, the main generator of harmonic distortion in Class D, is virtually reduced to zero.
- **Exceptional Linearity:** This velocity allows for a reproduction of micro-details rivaling the best Class A amplifiers, without their thermal constraints, size, and weight.
- **Thermal Efficiency and Power:** With an extremely low on-state resistance ($R_{DS(on)}$) energy losses are minimal. We deliver massive power while maintaining perfect stability on low-impedance loudspeakers.

2. The Proprietary Modulator: The Conductor

To break free from the limits of generic off-the-shelf chips, IXYCORE has developed a self-oscillating variable-frequency modulator (500 kHz to 1.2 MHz).

- **Post-Filter Feedback Loop:** Our proprietary control loop encompasses the output filter and the load. The modulator integrates the speaker's reaction in real time to maintain a perfect output voltage, regardless of the complexity of the load.

3. High-Precision Driver: Mastery of the Nanosecond

Driving a GaN transistor requires surgical precision. IXYCORE has selected cutting-edge drivers specifically optimized for very high-speed power electronics.

- **Noise Immunity (dv/dt):** The driver is capable of handling abrupt voltage variations (several hundred volts in less than 5 ns) without spurious triggering, ensuring absolute reliability.
- **Stable Voltage Regulation:** To protect transistors and stabilize linearity, the system integrates an ultra-precise local regulation of the gate drive voltage (V_{GS}).
- **Layout Optimization:** The multi-layer PCB design allows for an ultra-tight coupling, minimizing parasitic gate loop inductances to eliminate any destructive oscillation.

4. The GaN Power Supply: The Foundation of Dynamics

The IXYCORE switch-mode power supply (SMPS) also uses GaN technology to guarantee an inexhaustible and silent source of energy.

- **Maximum Efficiency:** Clocked at 100 kHz, the power supply minimizes GaN switching losses, remaining cool even under heavy load.
- **Instantaneous Energy Reservoir:** The system recharges the filter capacitors 2000 times more often than a conventional linear power supply (50 Hz), allowing for note attacks of lightning-fast violence and sharpness.

5. Precision Engineering and Protection

- **Solid-State Switch Protection:** Replacing resistive mechanical relays, IXYCORE uses a high-capacity solid-state switch (300A). With a reaction time of only 3 μ s, it protects your loudspeakers regardless of the origin of the detected anomaly.

6. Switchable AC/DC Coupling

In DC mode, the signal path is freed from any coupling capacitor, ensuring perfect phase and full extension into the infra-bass.

Power	IXYCORE Architecture
8 ohm	200 W
4 ohm	400 W
2 ohm	800 W
Damping factor (at terminals)	20 000
Switching frequency	1,2 MHz
Harmonic distortion	< 0,00005 % @ 1KHz 100W
Rendement (étage de puissance)	98 %