Perspectives d’application des GaN pour la transition énergétique

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3 to 5% Global energy saving estimated through deployment of WBG in current power electronics

- 117 TWh/Y with 100% Variable Frequency Drives (today ~ 10% Si)
- 48 TWh/Y with better efficient Power Architecture in Datacenters

- 70% of the world electricity managed by power electronics
- World - 23000 TWh/Y (2019)
GaN technology adoption trends & opportunity

**Penetration of existing markets**
- Consumer
- Dataserver

**Expansion into « new markets »**
- Automotive
- Industrial

**Substitution by alternatives**
- Defence
- Energy
- Aerospace

**Improving Value Proposition**
- Better figures of merits
- Lower system cost
- More system functionalities

- From 15 to 240 W adapters
  - Tiny USB Power Delivery
  - LED lighting

**Providing Performances**
- High reliability
- Robust (Short Circuit, Overload, ...)
- Advanced packaging
- Die integration (PM, IPM)

- Auto On/Off board charger
  - Higher efficiency
  - Lower BOM cost

- PSU data Server
  - Hard switching applications
  - Bridgeless Totem Pole
  - DC-DC LLC

**Challenging Others**
- High Voltage (900 - 1200 V)
- Vertical GaN
- Multicellular approach

**2020**
- From 15 to 240 W adapters

**2025**
- Auto On/Off board charger
- PSU data Server

**2030...**
- Motor Control (Inverter)
  - Less losses
  - Less ripple torque
  - Smaller filter

PowerGaN
Market segmentation by product family

**Applications**

**PowerGaN* family**

- **Personal Electronics**
  - Chargers
  - Adapters
  - USB PD
  - Consumer Electronics Power Supply

- **Smart Industry**
  - PSU for Telecom
  - PSU for Datacenter and Servers
  - Solar
  - PSU for Industrial Drives

- **Car Electrification**
  - On-board Chargers
  - 400V-12V DC-DC converter
  - 48V-12V DC-DC converter
  - LiDAR
  - Traction Inverter

- **G-FET / G-DRIVE, G-HEMT**
  - Low to mid frequency
  - Low to mid Power
  - SiP solutions
  - Legacy package

- **G-FET / G-DRIVE, G-HEMT**
  - Mid to very high frequency
  - Mid to high Power
  - 100V GaN availability
  - Legacy and new package

- **G-FET / G-HEMT**
  - Very high frequency
  - High Power
  - 100V GaN availability
  - Assembly requirements (CSP and KGD)
  - PCB embedding trends

* The enhanced product portfolio includes devices from Exagan, a subsidiary of ST

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