Airfast RF Power GaN for Cellular

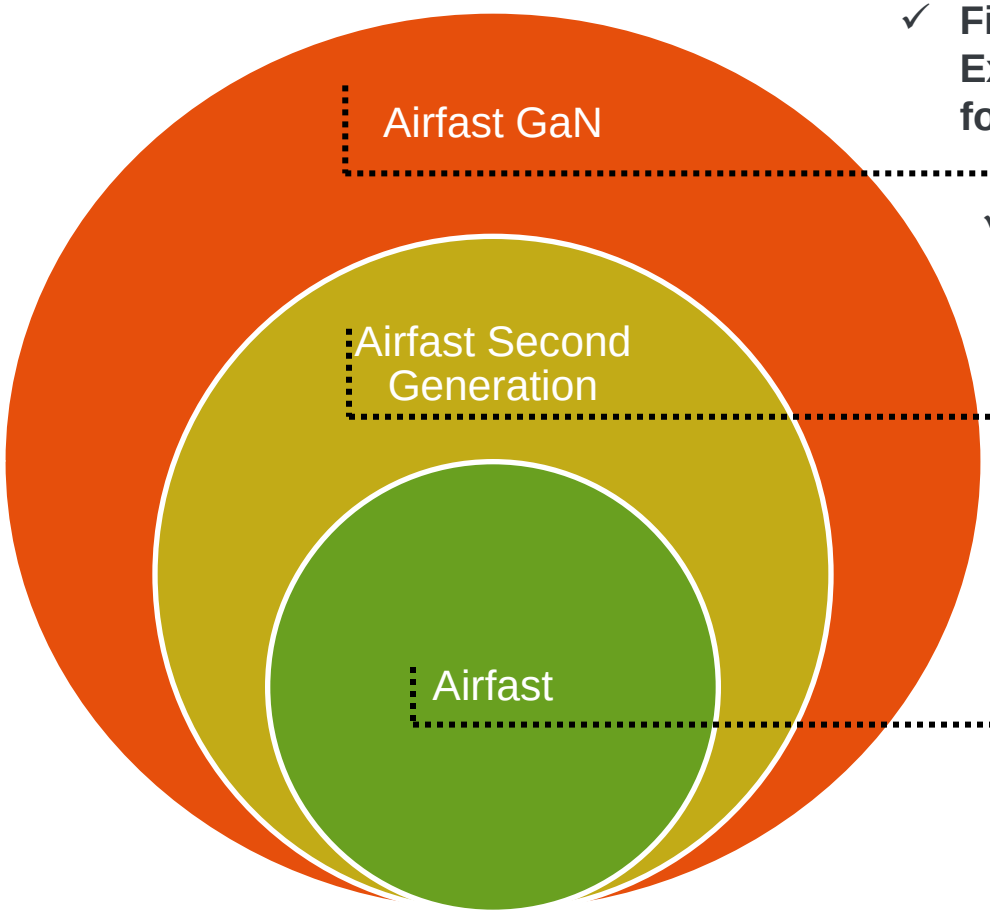
Freescale Introduces Its First Gallium Nitride RF Power Transistor for Cellular Base Station Applications

***Announcing:* A2G22S160-01S**

freescale™
Airfast RF

May 2015

Expanding Second-generation Airfast RF Power Solutions with GaN

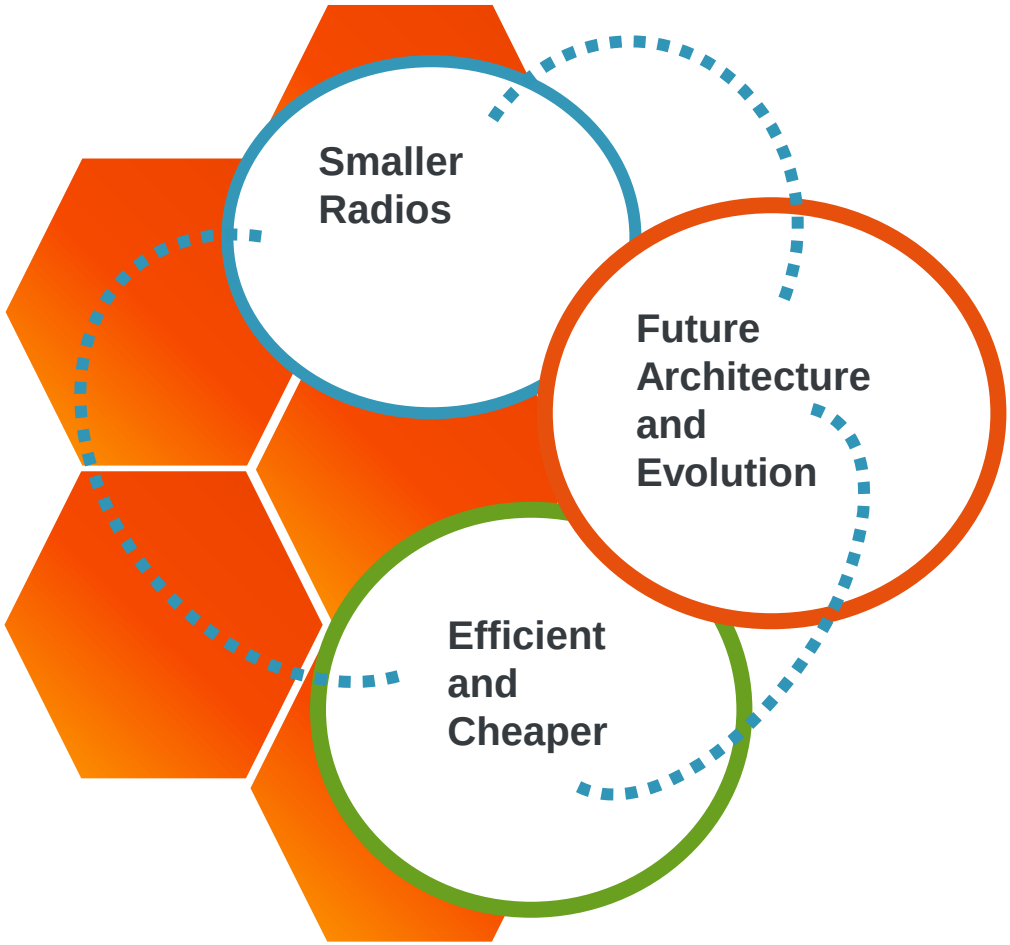


- ✓ **2015**
  - ✓ **First Cellular GaN A2G22S160-01S – Excellent performance, high volume ready for commercial base station deployment**
- ✓ **2014**
  - ✓ **Second-generation Airfast ICs- high gain as drivers and finals**
  - ✓ **Includes 50 V LDMOS**
- ✓ **2012**
  - ✓ **Airfast Discretes – Best-in-class performance at all cellular bands**
  - ✓ **Airfast 50 V LDMOS**
  - ✓ **Airfast ICs**

freescale Airfast RF

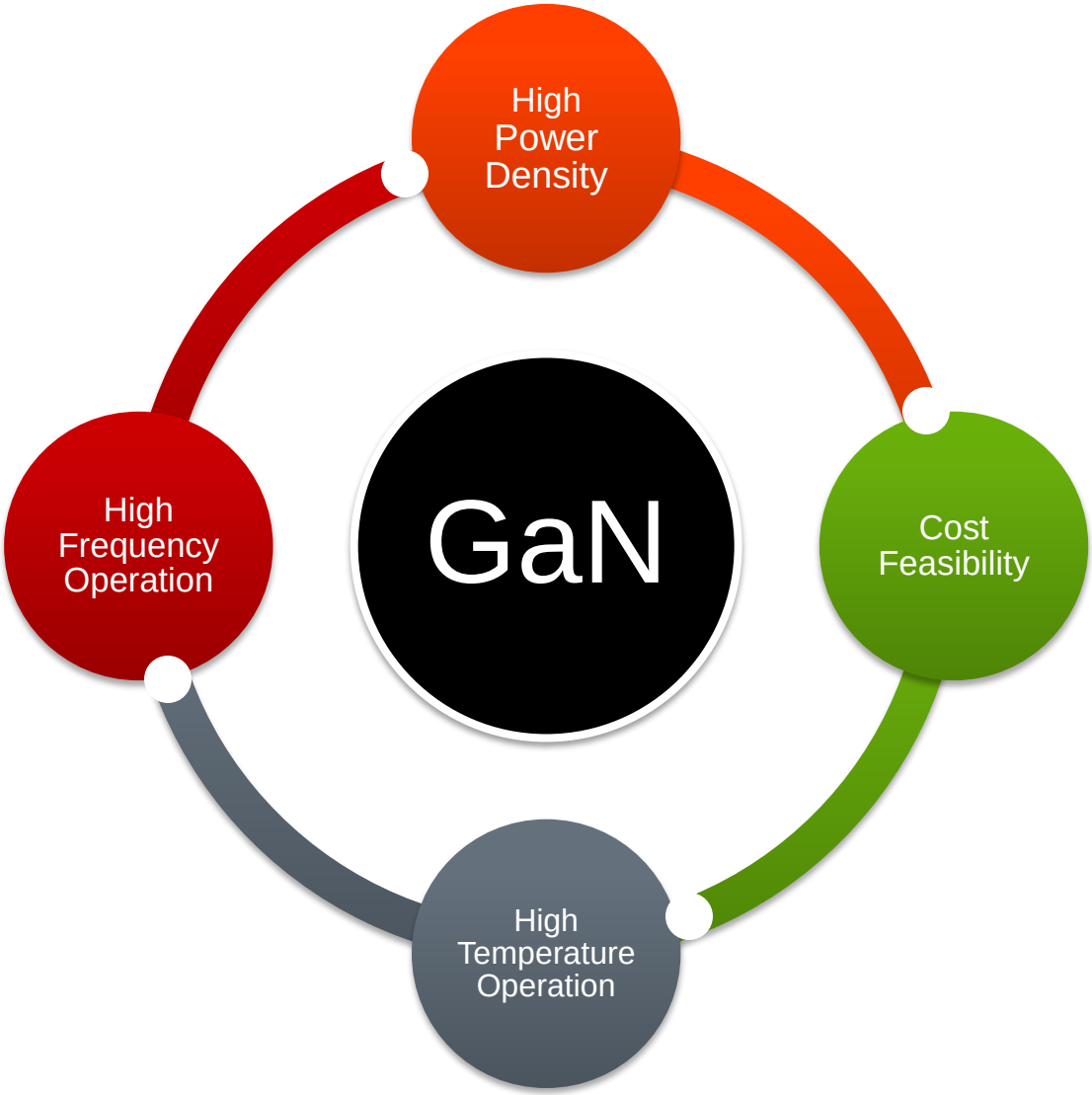
Network Operators Trends and Hurdles

- **Network operators in data-driven market space**
  - Facing challenges of densification, rapid deployment, evolving standards (4G to 5G) and optimization are required to compete better
- **Future-proofing networks**
  - Today's architectural choices will have a long lasting impact on the network performance in the future
  - There is a need for innovative technologies and processes which can ease network rollouts in the coming days
- **Embracing trends:**
  - Higher power and efficiency requirements are pushing the network operators to adopt the next big technology



GaN?

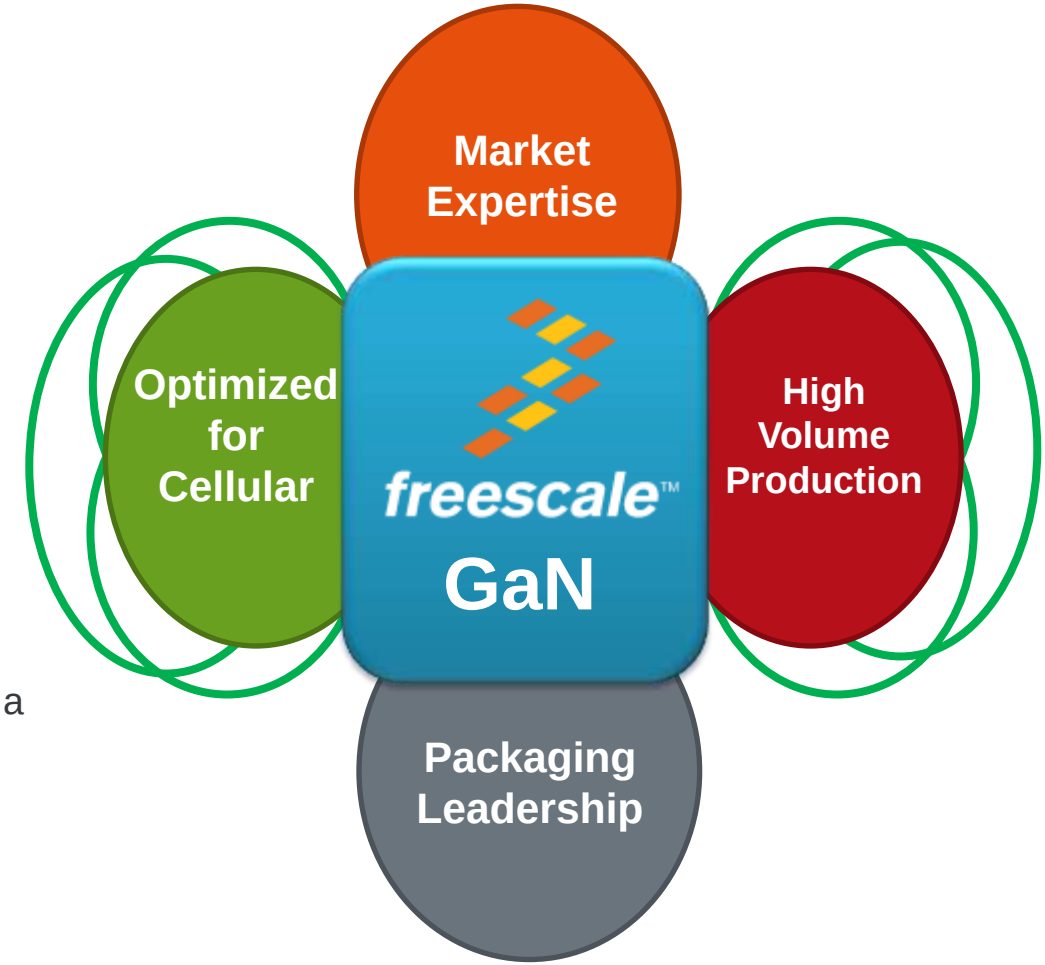
- **High power density**
  - GaN devices are capable more than 2x the power output of other semiconductor devices. High electron density and high breakdown voltages results in GaN materials capable of operating at high voltage which leads to high RF power
- **High frequency operation**
  - GaN devices having cut-off frequencies 6x more than other semiconductor devices makes them uniquely suitable for high frequency operation
- **Cost feasibility**
  - Market adoption and scale of economies have made GaN highly desirable and cost effective
- **Higher temperature**
  - The inherent high thermal conductivity and wide band gap of GaN allows it to operate under high temperatures leading to smaller products



scale GaN Advantages

- Freescale has developed and perfected GaN for commercial base station applications
- This latest product expands Freescale's high volume manufacturing expertise and complete application solution support to GaN

- **Optimized for cellular**
  - Die optimizations specifically for cellular base station needs
  - High power matching expertise
  - Leadership in Doherty architecture design
- **Packaging leadership**
  - Years of research and development for reducing package footprint and enabling performance leaps
- **High volume production**
  - Capable of high volume manufacturing for a large scale rollout
  - Efficient and secure supply chain
- **Market expertise**
  - Deep knowledge of cellular market and requirements leading to end-to-end application and solution support



22S160-01S Key Product Features

A2G22S160-01S

Available Now

Airfast RF Power GaN Solutions

- Freescale's first cellular GaN designed for cellular operation from 1800 to 2200 MHz
- 32 W compact footprint single-ended device
- Available in air cavity ceramic NI-400S-2S package

A2G22S160-01S Doherty Performance

Measured in a two transistor Doherty configuration

- 2110-2170 MHz performance in Doherty test fixture:
  - Peak power: 316 W (55 dBm)
  - VBW resonance: 100 MHz
  - At an average power of 63 W
    - Gain: 17 dB
    - Drain Efficiency: 55%

Measured in a three-transistor Doherty configuration

- 2110-2170 MHz performance in Doherty test fixture:
  - Peak power: 468 W (56.7 dBm)
  - VBW resonance: 100 MHz
  - At an average power of 56.2 W
    - Gain: 15.6 dB
    - Drain Efficiency: 56.4%

freescale Airfast RF

More Information

From the Product Summary Pages

- Data sheets
- Simulation models – ADS and AWR
- MTTF calculators
- S-parameters

A2G22S160-01S:

From www.freescale.com/RFpower

- Product Selector Guide
- Parametric search
- App notes – > 30 available
- White papers & webinars
- Freescale Product Longevity Program

On the web

- Blogs & Twitter – @RFLeonard
- YouTube.com/Freescale
- RF Engineering Tools App for Android & iOS
- On eTailers & Freescale Approved Distributors

freescale Airfast RF

www.Freescale.com