



Navitas

*Let's go **GaNFast**™*

CES 2021 Company & Technology Update





- Navitas:
 - Latin for “Energy”
 - Founded January 2014
 - Proven management, 75+ employees
 - Strong financial investors (\$1B+ managed capital)
- Global Expansion
 - HQ : Ireland
 - China : Shenzhen, Shanghai and Hangzhou
 - Regional : Los Angeles, Taipei, Hsinchu, Manila, Seoul, Tokyo
- World’s first & only GaN power IC company



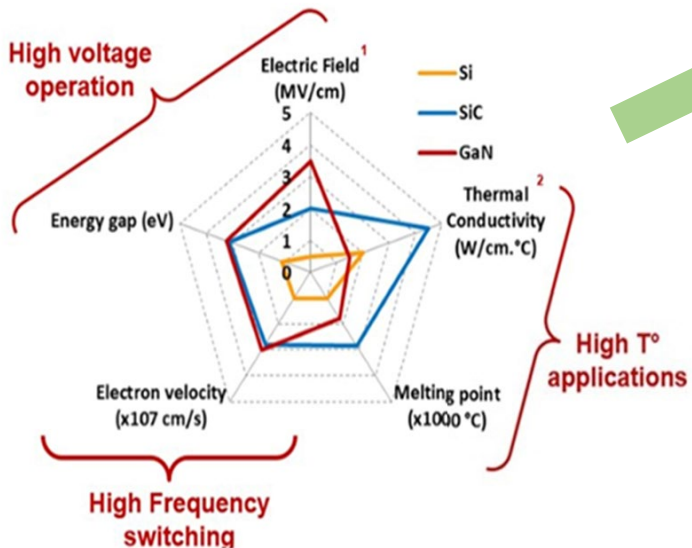


Power GaN Technologies



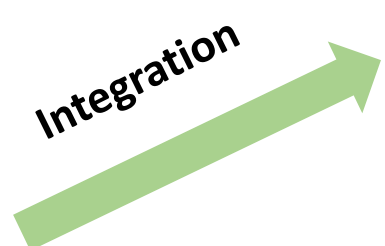
GaN replaces silicon, electrifies applications around the world

GaN Speed
GaN Efficiency
GaN Density

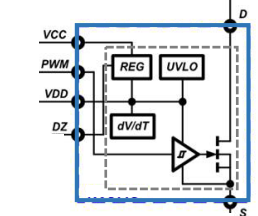


eMode FET
(normally off)

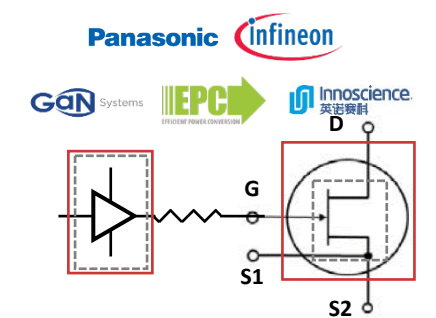
dMode FET
(normally on)



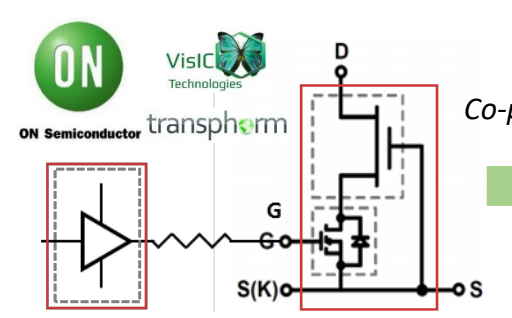
Navitas



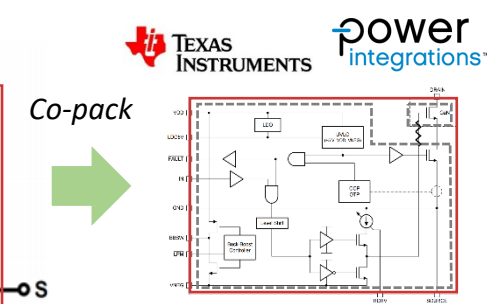
GaN Power IC
GaN Power (FET),
Drive, Control, Protection



GaN Discrete
Need special gate driver to drive sensitive GaN input



Need extra Si FET in 'cascode' configuration



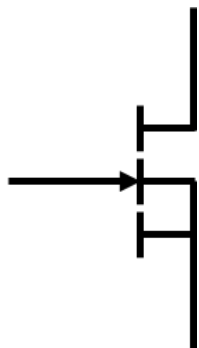
Si controller/driver + Si FET cascode + GaN dMode FET



World's First GaNFast™ Power ICs



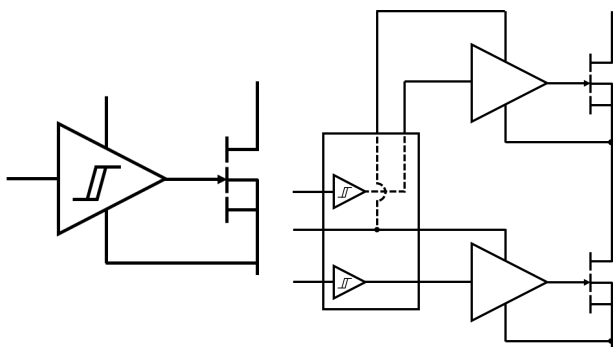
**Fastest, most efficient
GaN Power FETs**



**>20x faster than silicon
>5x faster than cascoded GaN
Proprietary design**



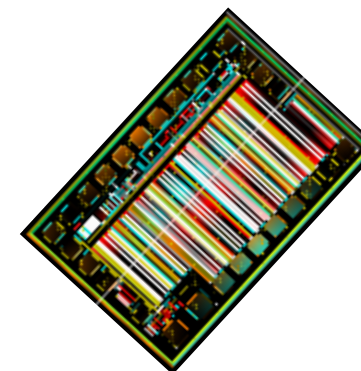
**First & Fastest Integrated
GaN Gate Driver
with Control & Protection**



**>3x faster than any other gate driver
Proprietary design
120+ patents granted/applied**



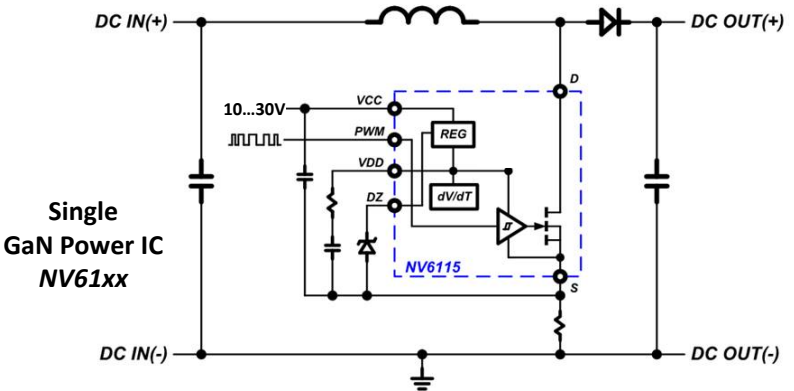
**World's First
GaNFast™
Power ICs**



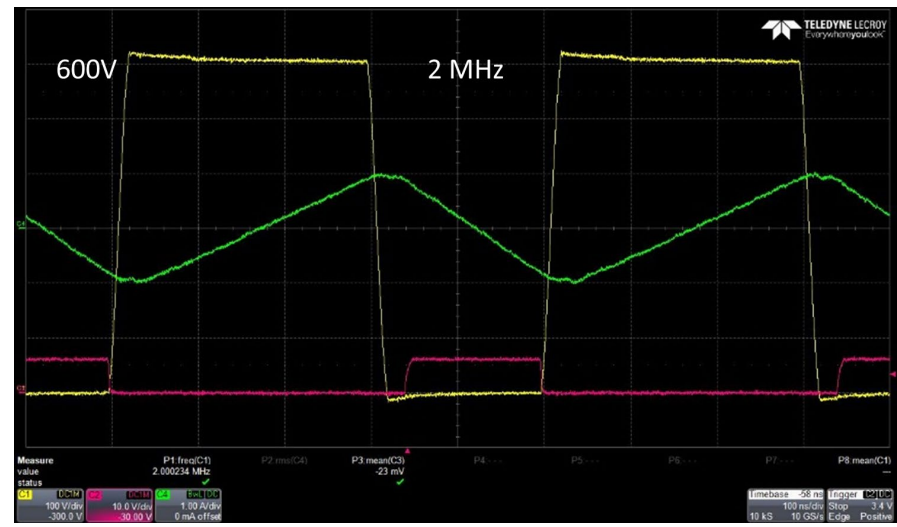
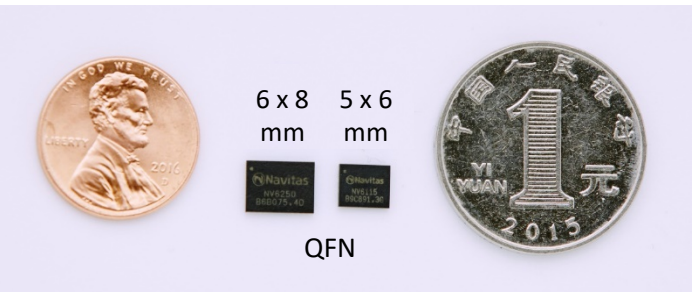
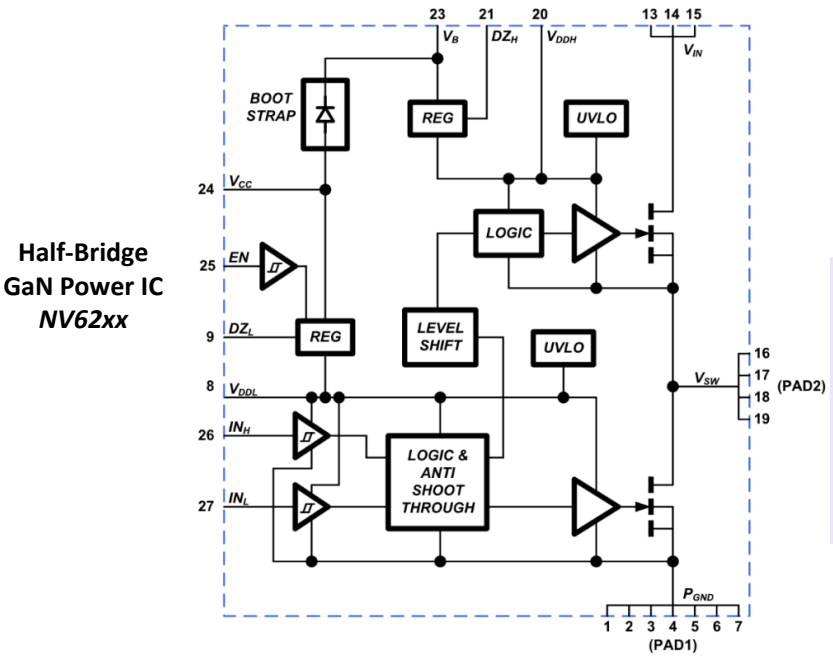
Up to 40 MHz switching, 5x higher density & 20% lower system cost



GaNFast Power ICs: Single, Half-Bridge



- Monolithic integration, 650V/800V, 2MHz
 - GaN Power FET(s) + Driver + Control + Protection
 - Features: on-board regulators, hysteretic input, level-shift, bootstrap, dV/dt control, UVLO, shoot-through & ESD protection
- “Digital In, Power Out”



2MHz, 0-600V Half-Bridge

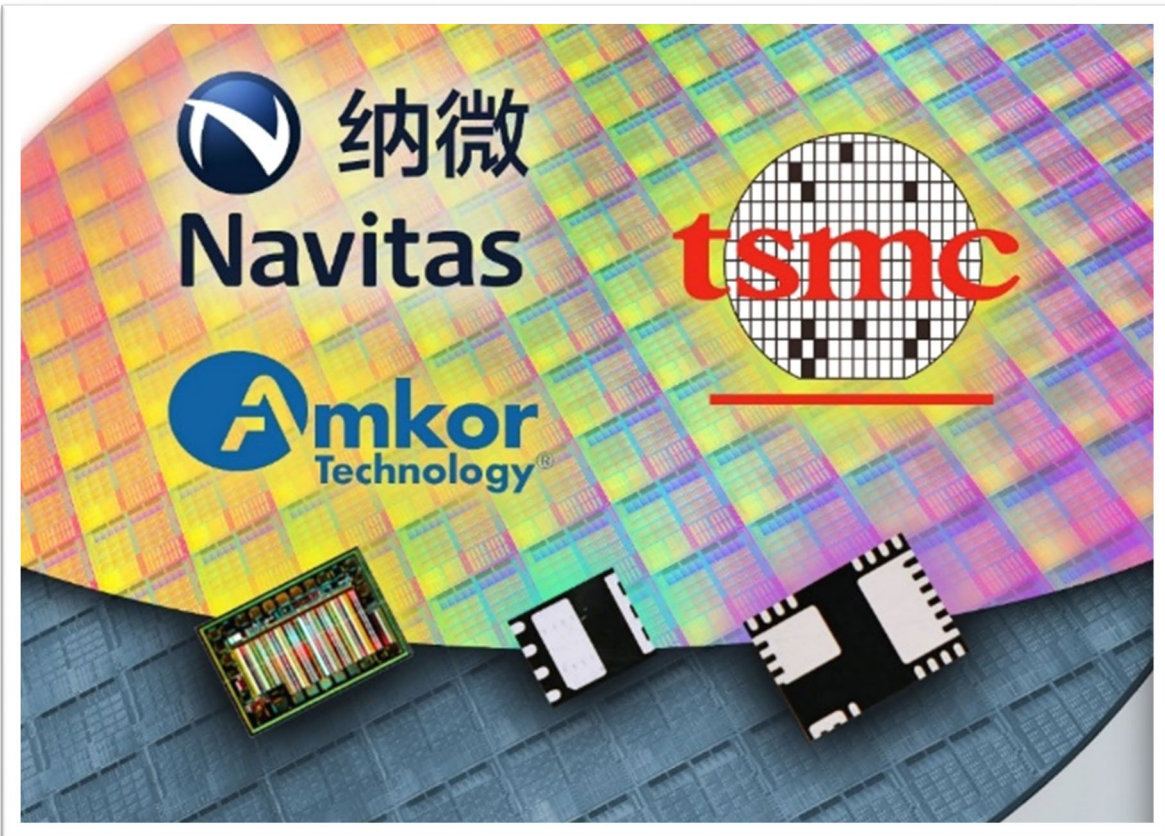


- 120+ patents
- AllGaN™ PDK
 - Integrated gate drive
 - Half-bridge
 - Level-shifting
 - Autonomous protection
 - ...and more
- Low-inductance packaging
- High-frequency systems
- Application use cases





High Volume, High Quality



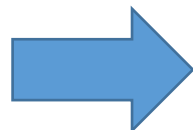
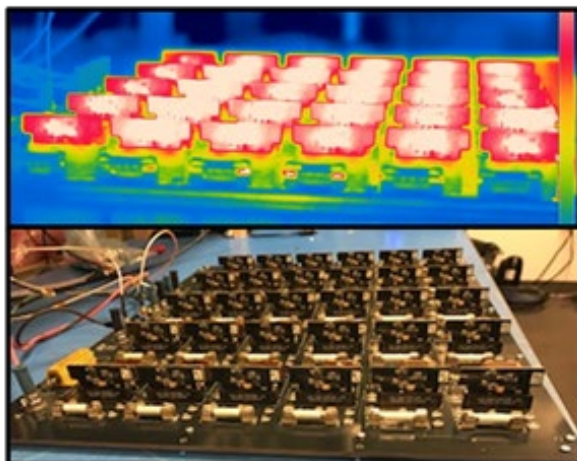


Proprietary Reliability Methods

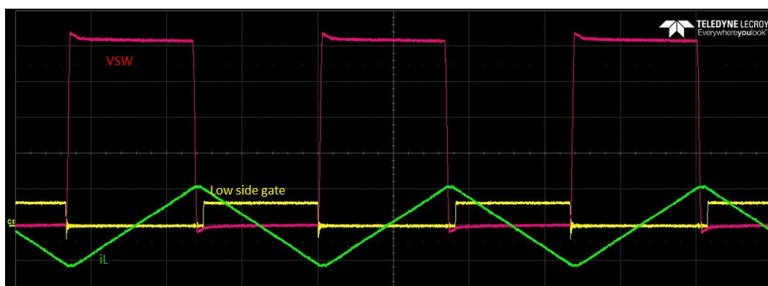
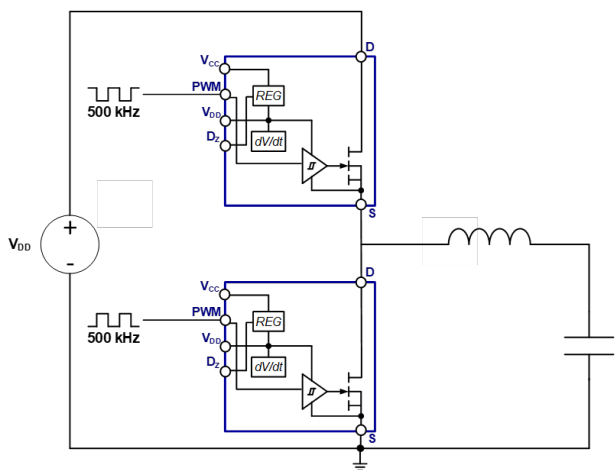
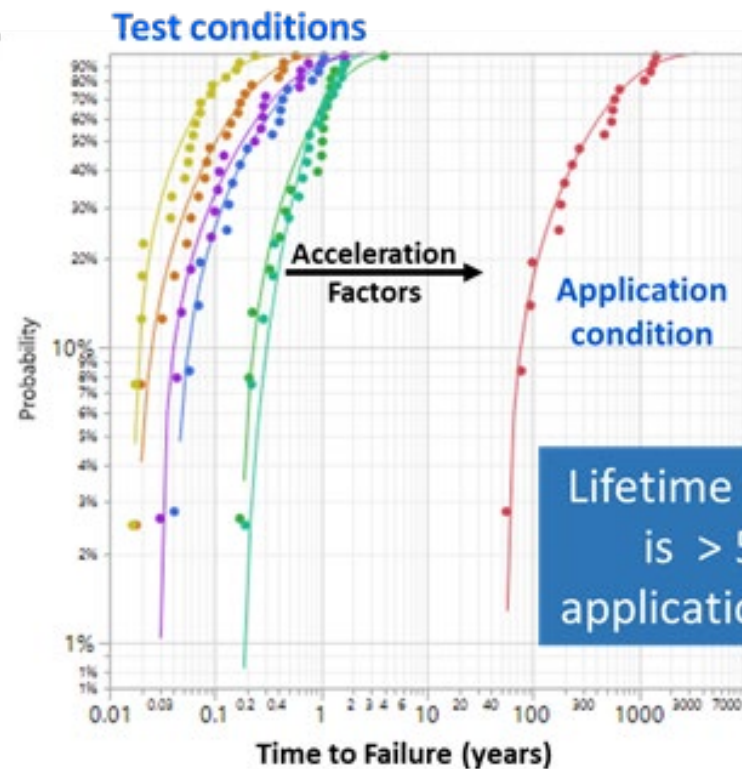
Application Specific Testing

- ✓ Matches all elements of application profile
 - ✓ FET & IC
- ✓ Many cells in parallel
 - ✓ Statistical sample sizes
- ✓ Low total power consumption
- ✓ Conditions changeable to develop lifetime and acceleration models

HTOL Mother Board



Test to Failure & Lifetime Prediction



500kHz, 0-500V

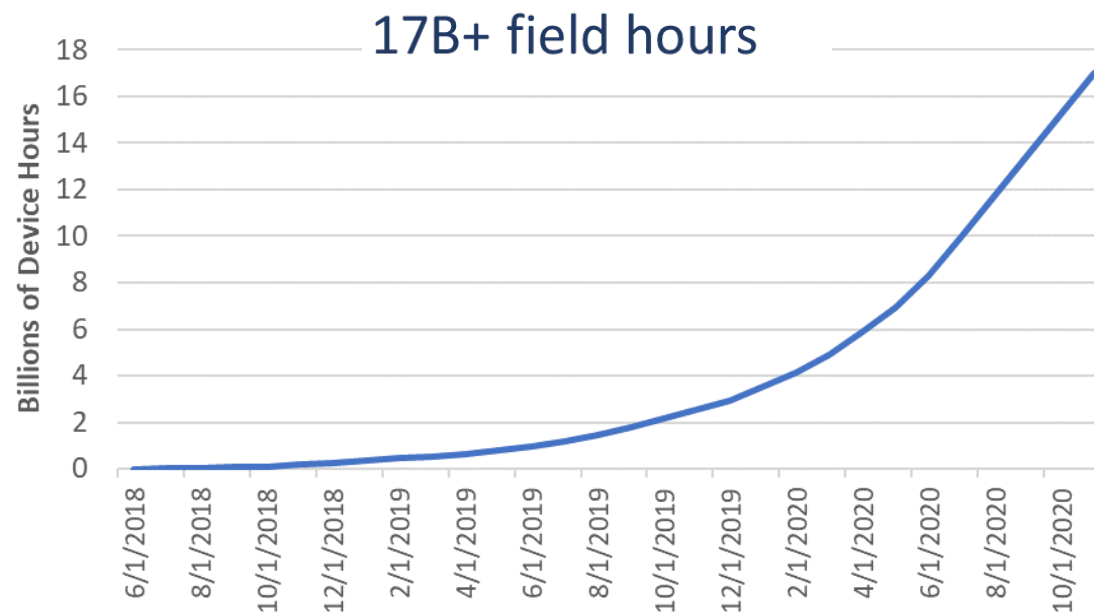
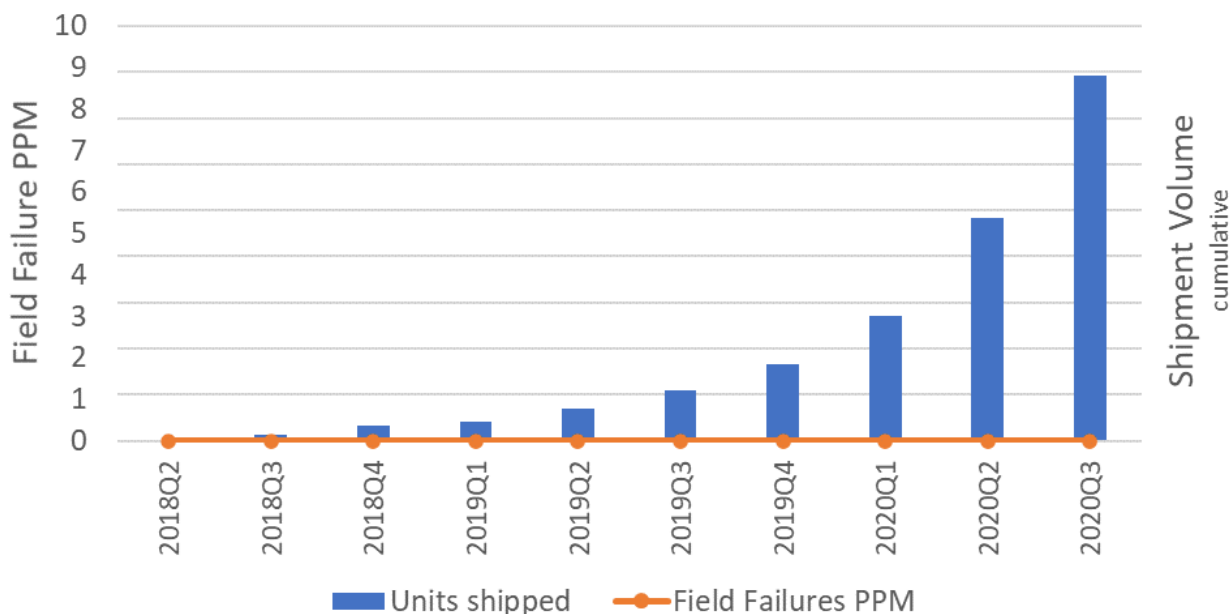


Proven Quality and Reliability



Ongoing Reliability Monitoring	Results
Equivalent device hours tested	3.4 billion hours
FIT (Failures in Time) Failures in 1 billion device hours in the field	0.27

>9M Shipped
0 (zero) Field Failures





Second Revolution in Power

Linear Regulators



Switching Regulators



Switching Regulators



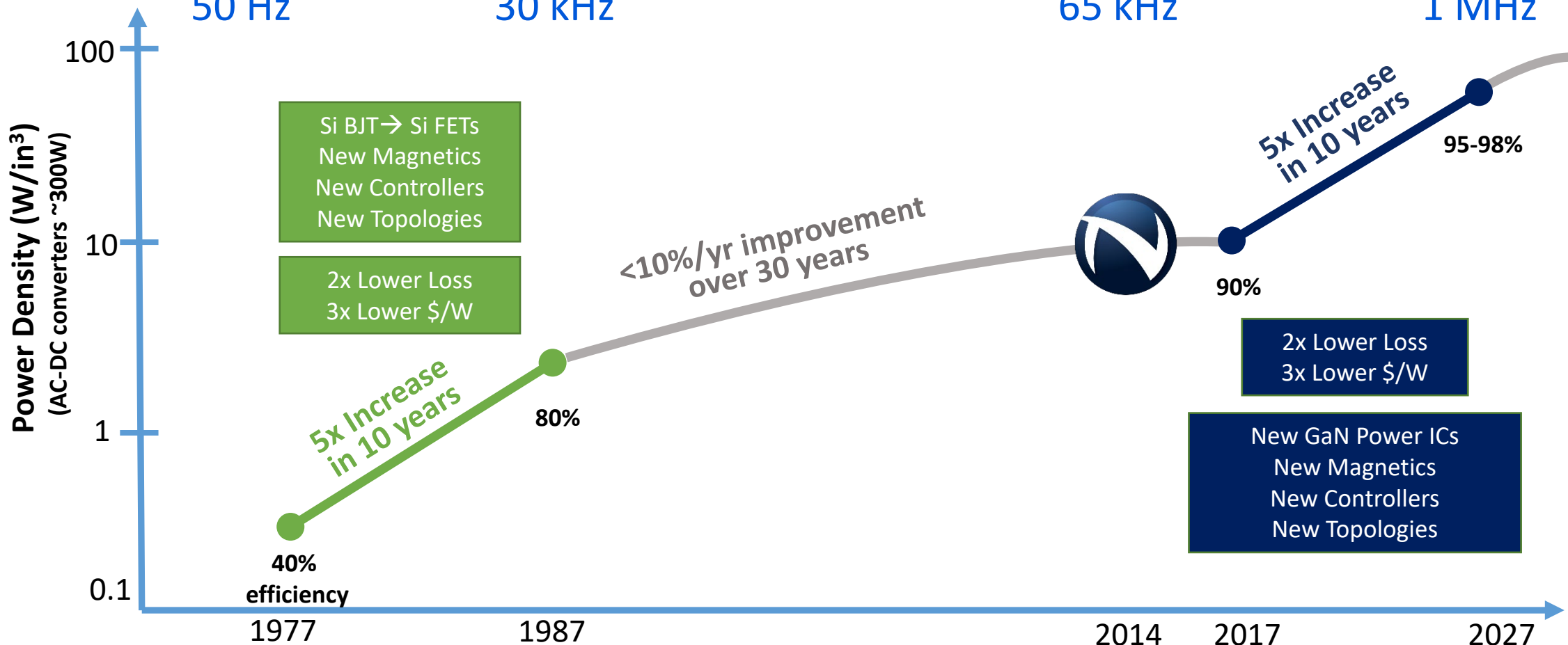
HF Switching Regulators

50 Hz

30 kHz

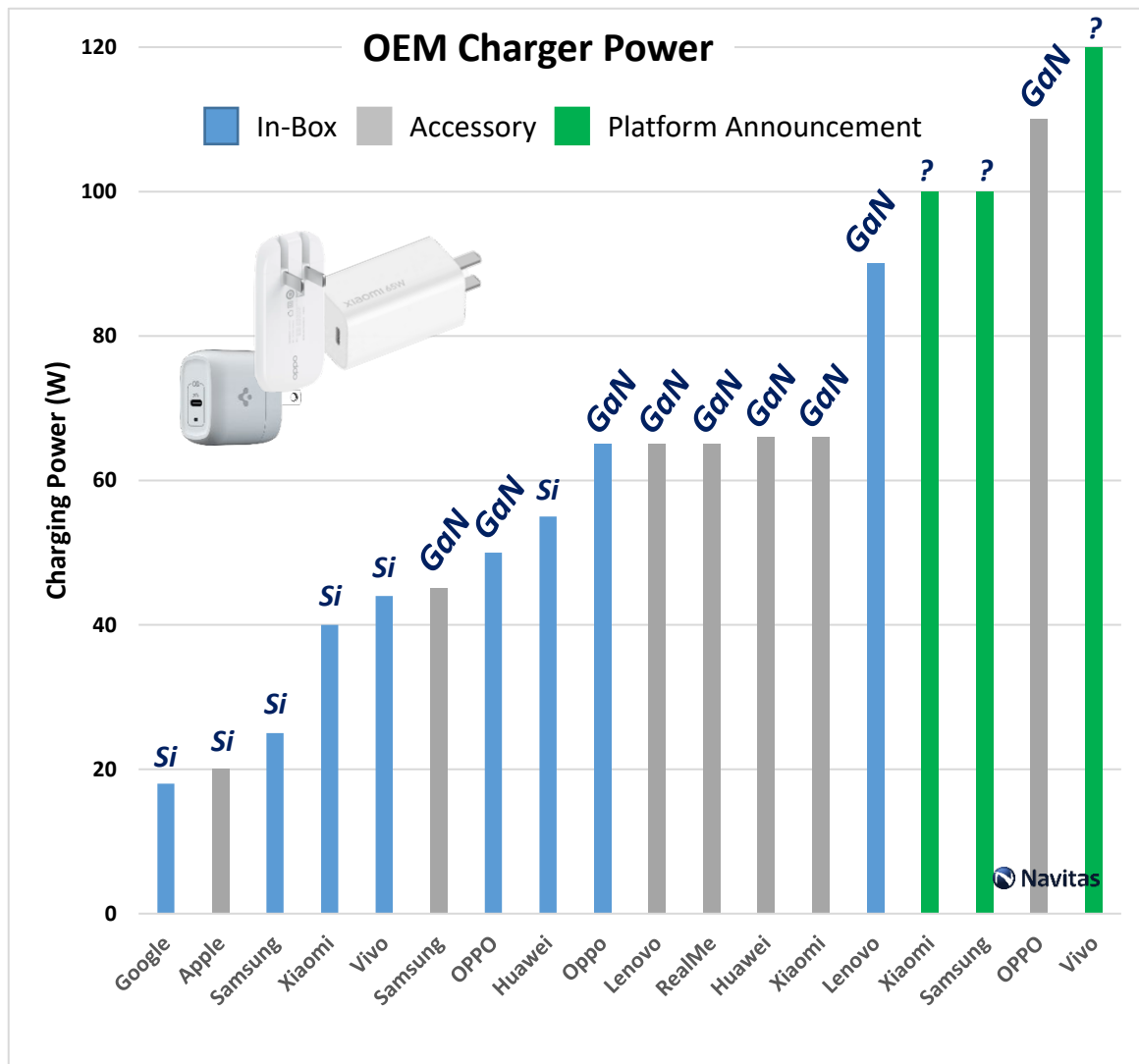
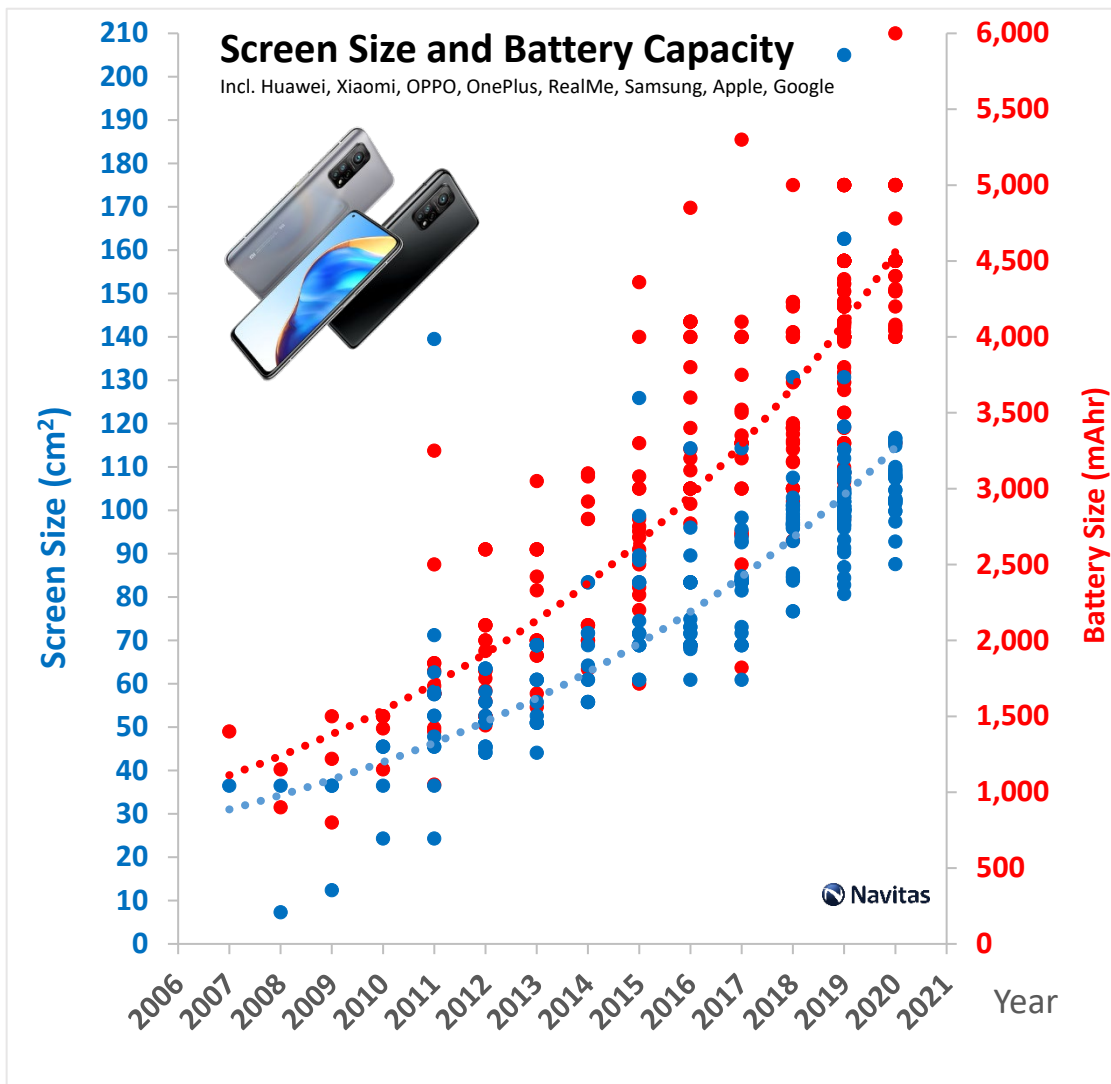
65 kHz

1 MHz





Smartphones Win With GaN





Notebook Fast Charging



Lenovo 联想

thinkplus

Lipstick 65W C
63 cc, 93 g, 1 W/cc

thinkplus

Lipstick Pro 65W C+A
76 cc, 106 g, 0.85 W/cc



全世界最小的65瓦充电器



Lenovo
联想口红电源
65瓦氮化镓充电器

纳微 Navitas Let's go GaNFast™

双口 双动力

- 支持USB-C和USB-A同时充电，可同时对电脑和手机进行充电，智能功率分配。





Notebook Fast Charging



Let's go GaNFast™

Power Adapter Plus (PA901)
90W captive USB-C + 10W A
188 cc, 375 g, 0.53 W/cc



ProArt StudioBook One
300W 48V
237 cc, 600 g, 1.27 W/cc



Mobile Fast Charging

GaNFast™

oppo

“Using gallium nitride devices to drive transformers to very high frequencies has been the dream of all technical workers for many years”



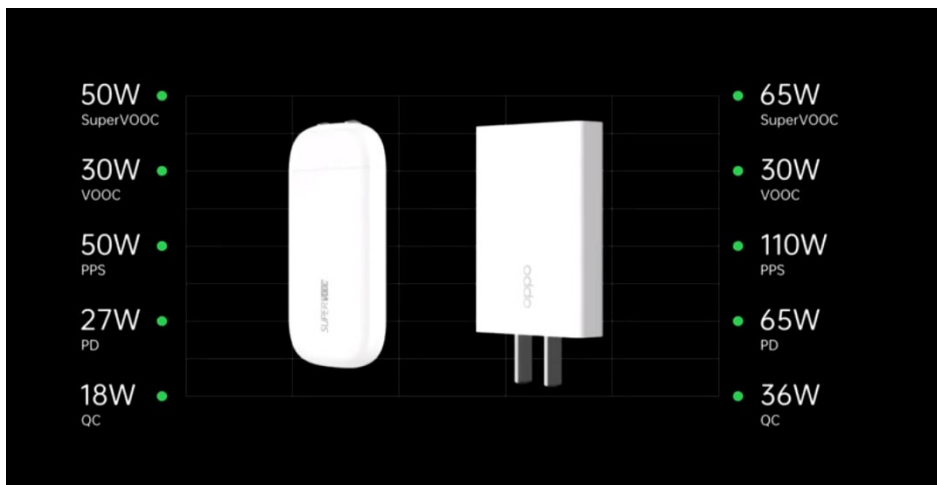
50W Mini SuperVOOC “Cookie” Charger



110W Platform



65W SuperDart





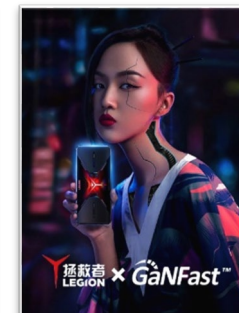
Mobile Fast Charging



Legion Gaming Phone
90W 2C



Xiaomi CEO: "How tiny is this GaN charger?"





Aftermarket GaNFast



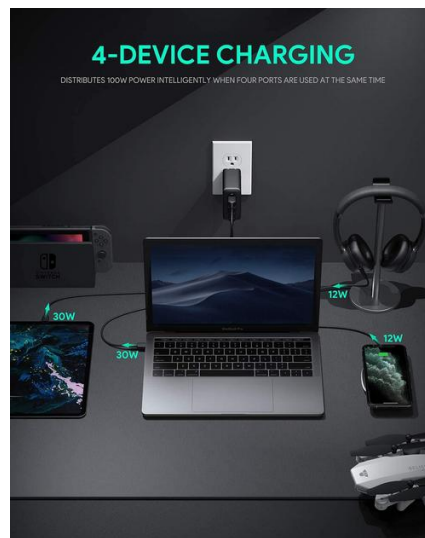
- 8 chargers from 27W to 100W 2C+2A
- Proprietary Omnia GaNFast power IC



Omnia 61W C
61 cc, 92 g, 1 W/cc



Omnia 100W 2C+2A
160 cc, 223 g, 0.62 W/cc





Aftermarket GaNFast

GaNFast™

 spigen



20W C



65W C+A



61W C



 spigen

World's first 20W GaN Fast Charger for iPhone 12

 Navitas *Let's go GaNFast™*

Intelligent Power Allocation
Cleverly distributes power between 2 devices when charging simultaneously



USB-A 5-18W USB-C 45-60W





World's Smallest Multi-Port 30W-200W



3x smaller, lighter and lower cost than individual chargers

High-frequency ACF / QR
Toroidal or planar transformers



200W 2C+2A
203 cc, 220 g



120W 2C+A
154 cc, 216 g

SHARGE



100W 3C+A
149 cc, 220 g

AUKEY



Omnia 90W 2C+A
131 cc, 190 g

Lenovo 联想
thinkplus



Pro 65W C+A
76 cc, 106 g

UIBI 袖比



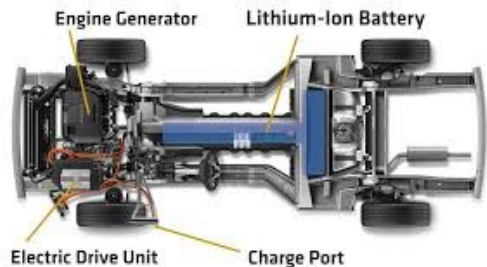
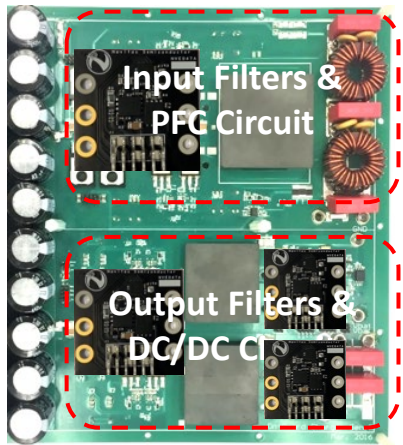
30W C+A
67 cc, 82 g

High-frequency CrCM boost PFC + ACF / QR
Toroidal or planar transformers

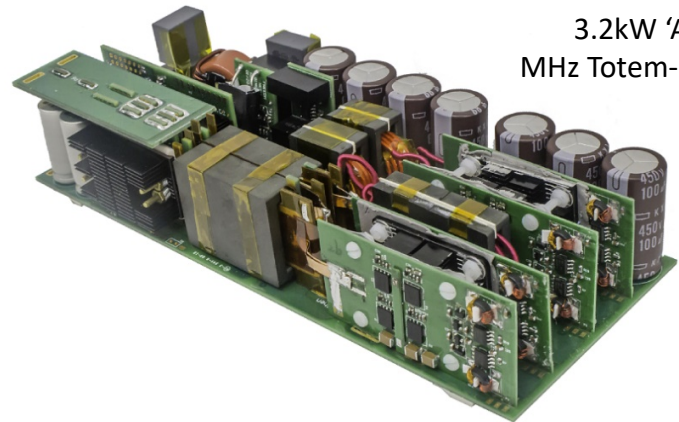


High-Power Roadmap

GaNFast™



On-Board Charger and DC-DC
For eScooter, eBike, eCar
75W to 6.6kW



3.2kW 'All GaN' AC-54V
MHz Totem-Pole PFC + MHz LLC

300W AC-48V Laptop Adapter

Navitas
GaN Navitas
Power GaNFast™
Power IC

纳微 Navitas NVIDIA

300W HVDC ¼ Brick

DENSITY POWER

400V,
300W
¼ Brick

纳微 Navitas





Let's go **GaNFast™**

Follow us!

