纳微 Navitas

Dec 8th - 10th,
Shenzhen, China

纳微氮化镓市场分享及展望

A New Era in Fast Charging: Let's Go GaNFast!



Semiexpo
Shenzhen 2020



Navitas Semiconductor Inc.

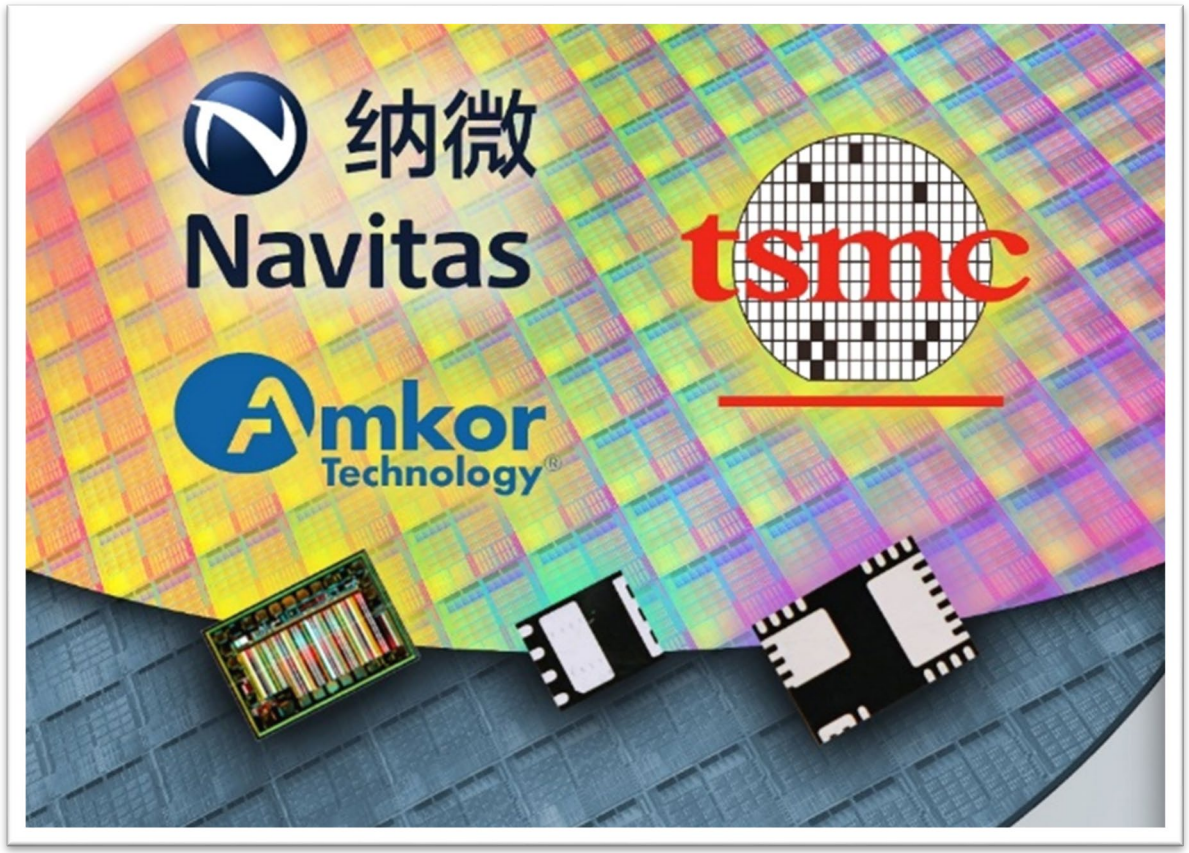


- Navitas:
  - Latin for “Energy”
  - Founded January 2014
  - Proven management, 100 employees
  - Strong financial investors ($1B+ managed capital)
- Global Expansion
  - HQ : Ireland
  - China : Shenzhen, Shanghai and Hangzhou
  - Regional : Los Angeles, Taipei, Hsinchu, Manila, Seoul
- World’s first & only GaN power IC company



High Volume, High Quality Production

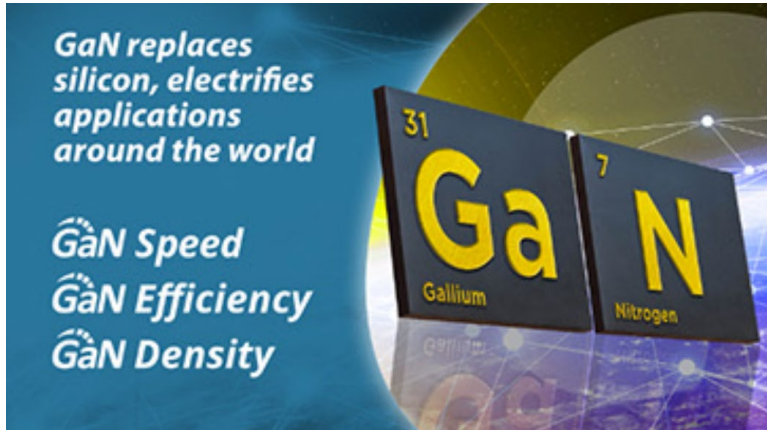
- World-class manufacturing partners
- 8M+ shipped, ***zero*** failures

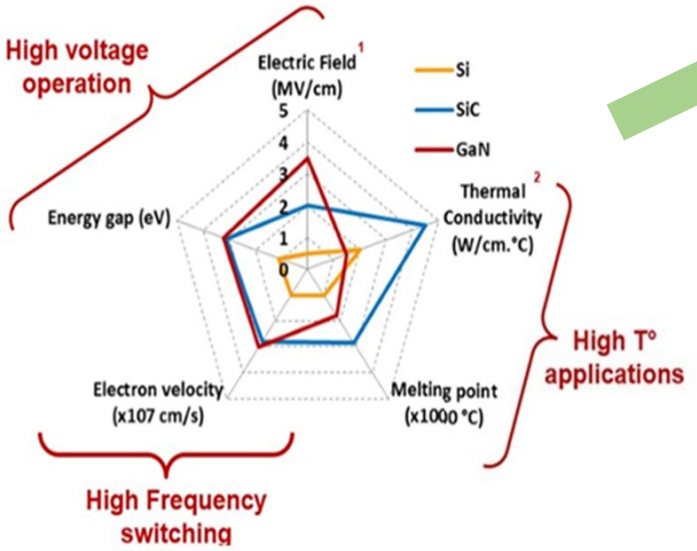




Power GaN Technologies

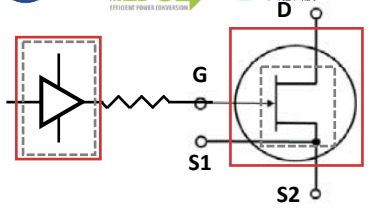
GaNFast™





eMode FET
(normally off)

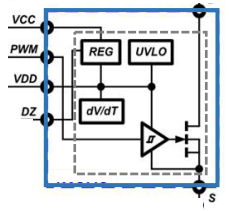
Panasonic Infineon GaN Systems EPC Innoscience



Need special gate driver to drive sensitive GaN input

Integration

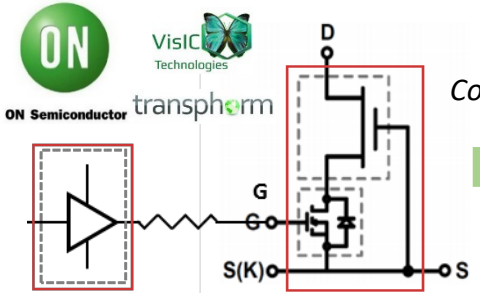
纳微 Navitas



GaN Power (FET), Drive, Control, Protection

dMode FET
(normally on)

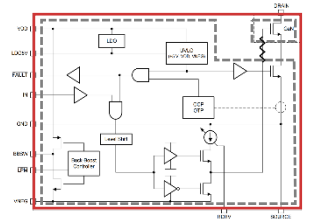
ON Semiconductor VisIC Technologies transphorm



Need extra Si FET in 'cascode' configuration

Co-pack

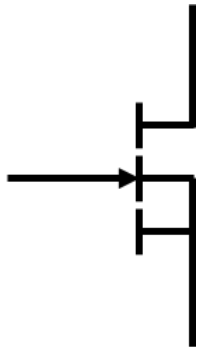
Texas Instruments power integrations



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

World's First GaNFast™ Power ICs

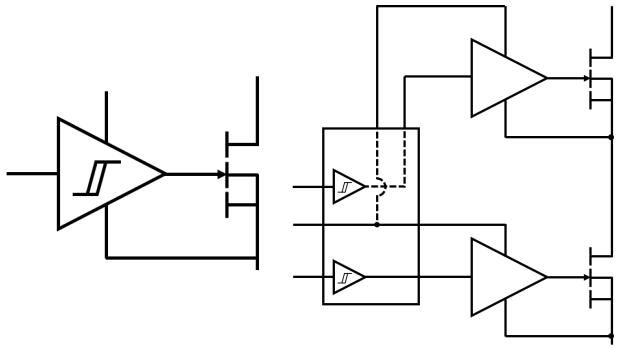
Fastest, most efficient GaN Power FETs



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

+

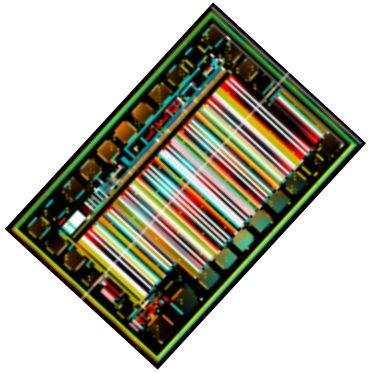
First & Fastest Integrated GaN Gate Drivers



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

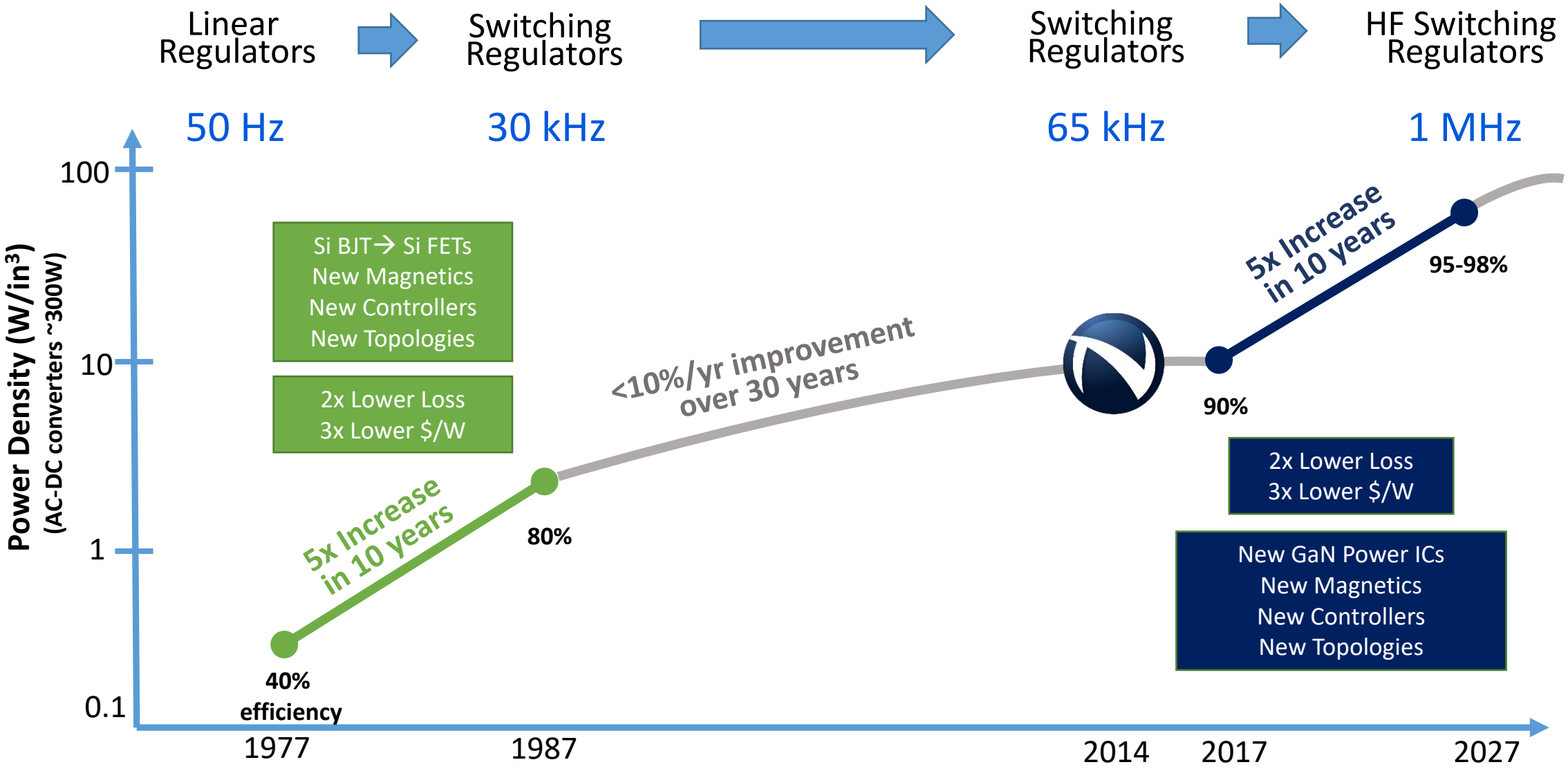
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World's First GaNFast™ Power ICs



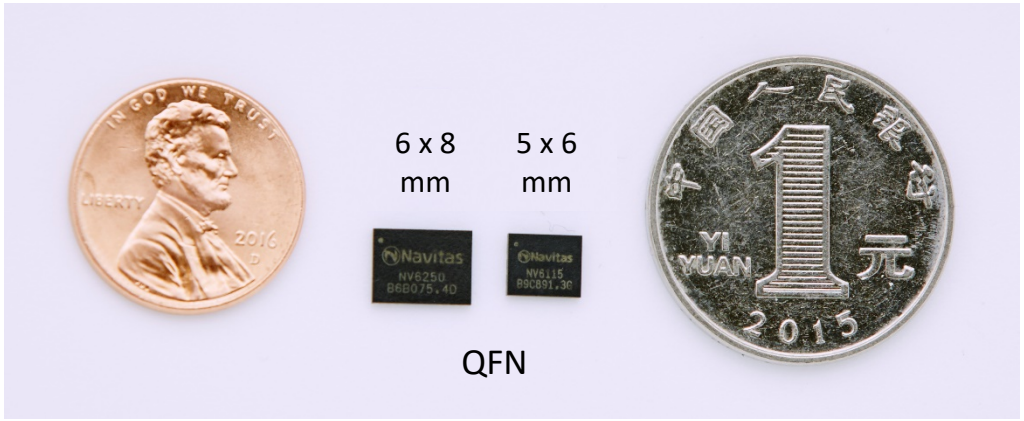
Up to 40 MHz switching, 5x higher density & 20% lower system cost

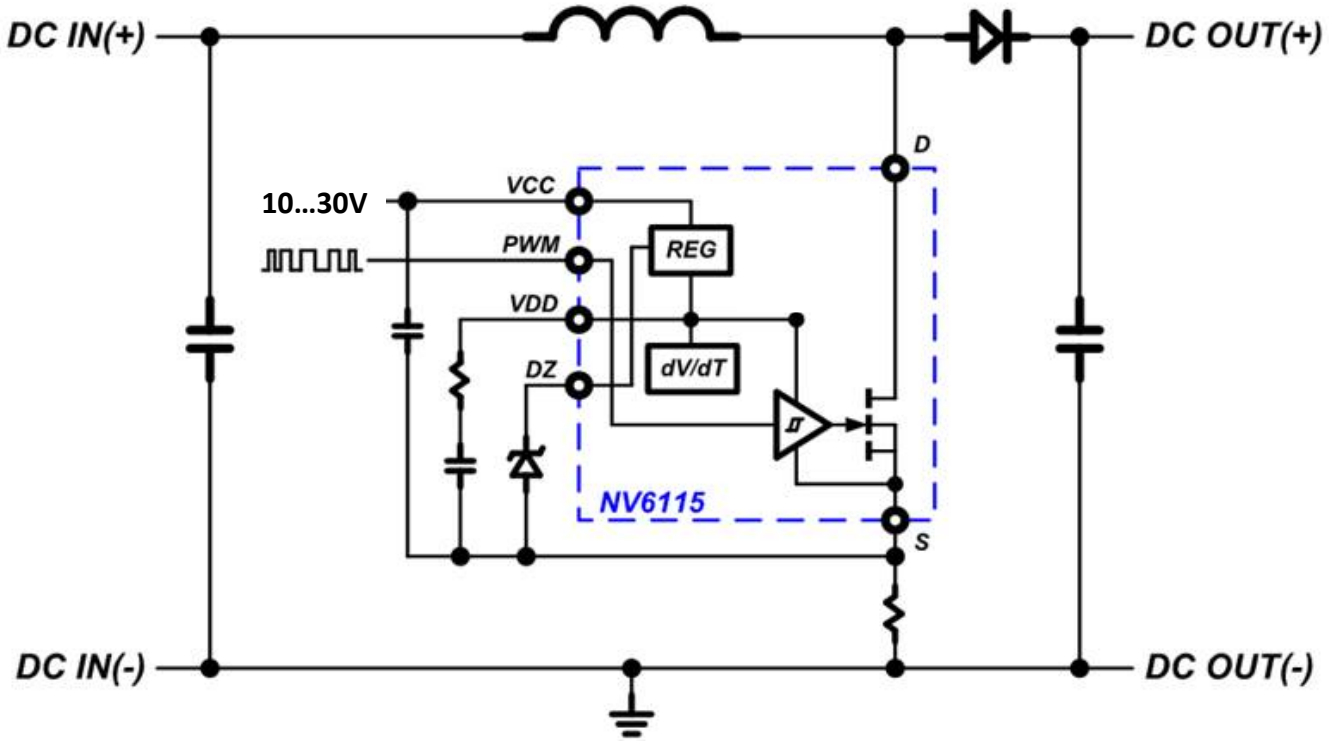
Second Revolution in Power



Single GaNFast Power IC

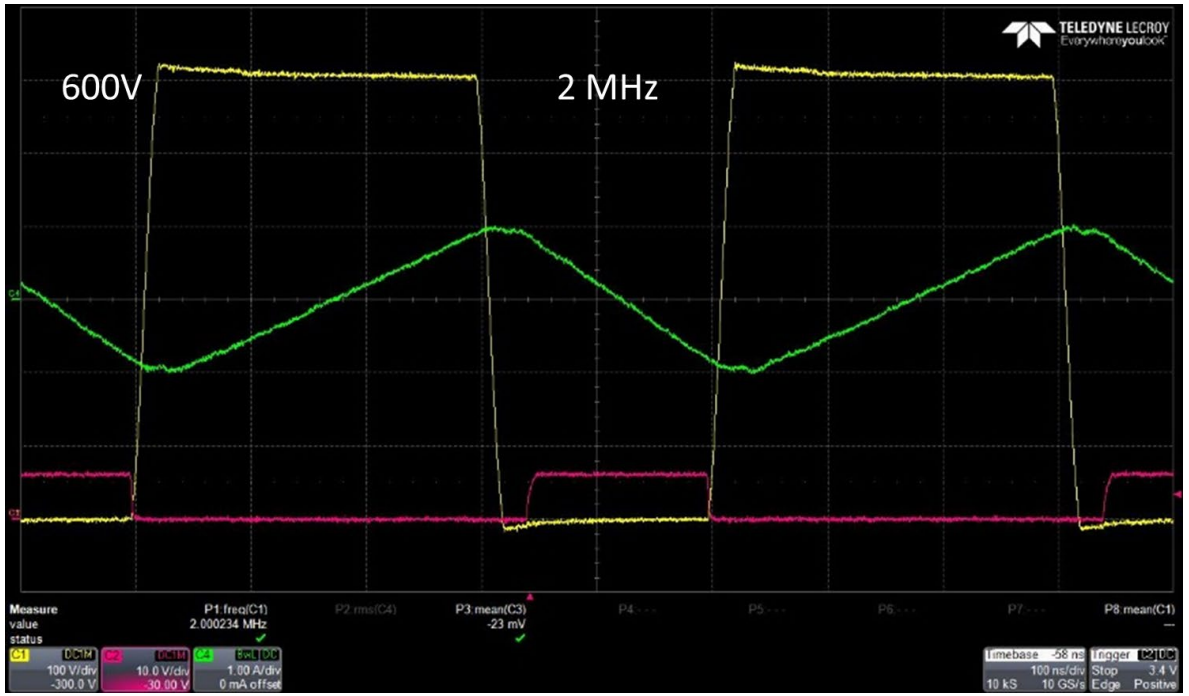
- Monolithic integration, 650V
  - GaN FET
  - GaN Driver
  - GaN Logic
- “Digital In, Power Out”

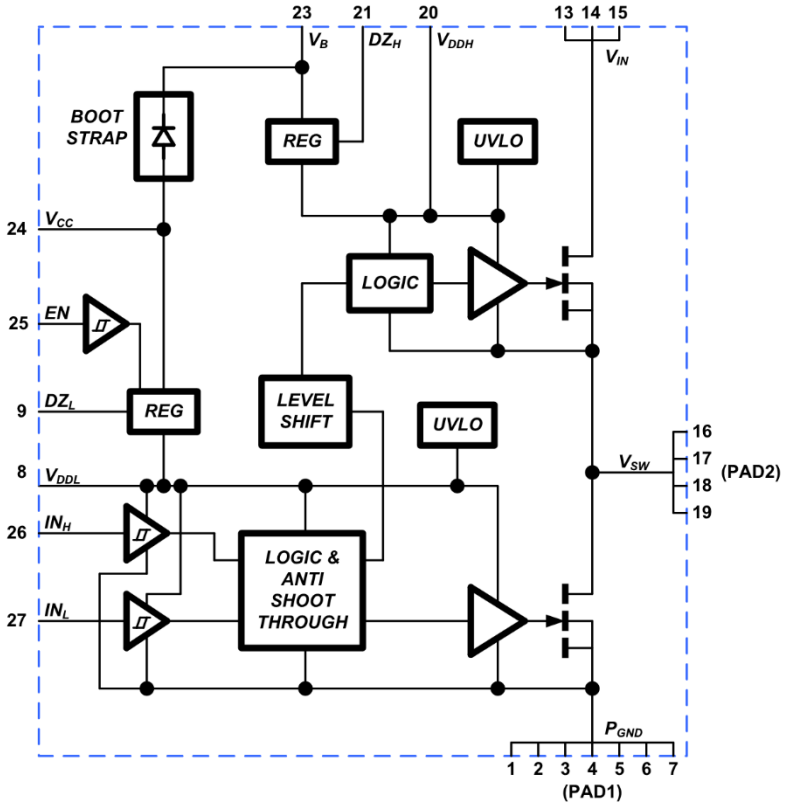


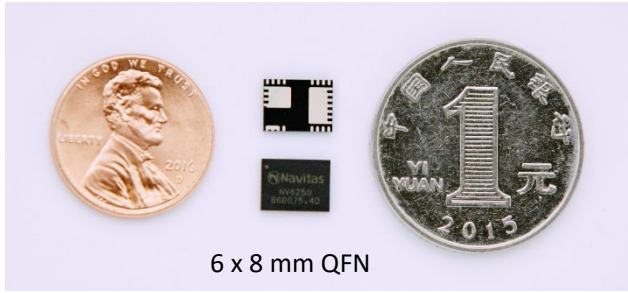


Half-Bridge GaNFast Power IC

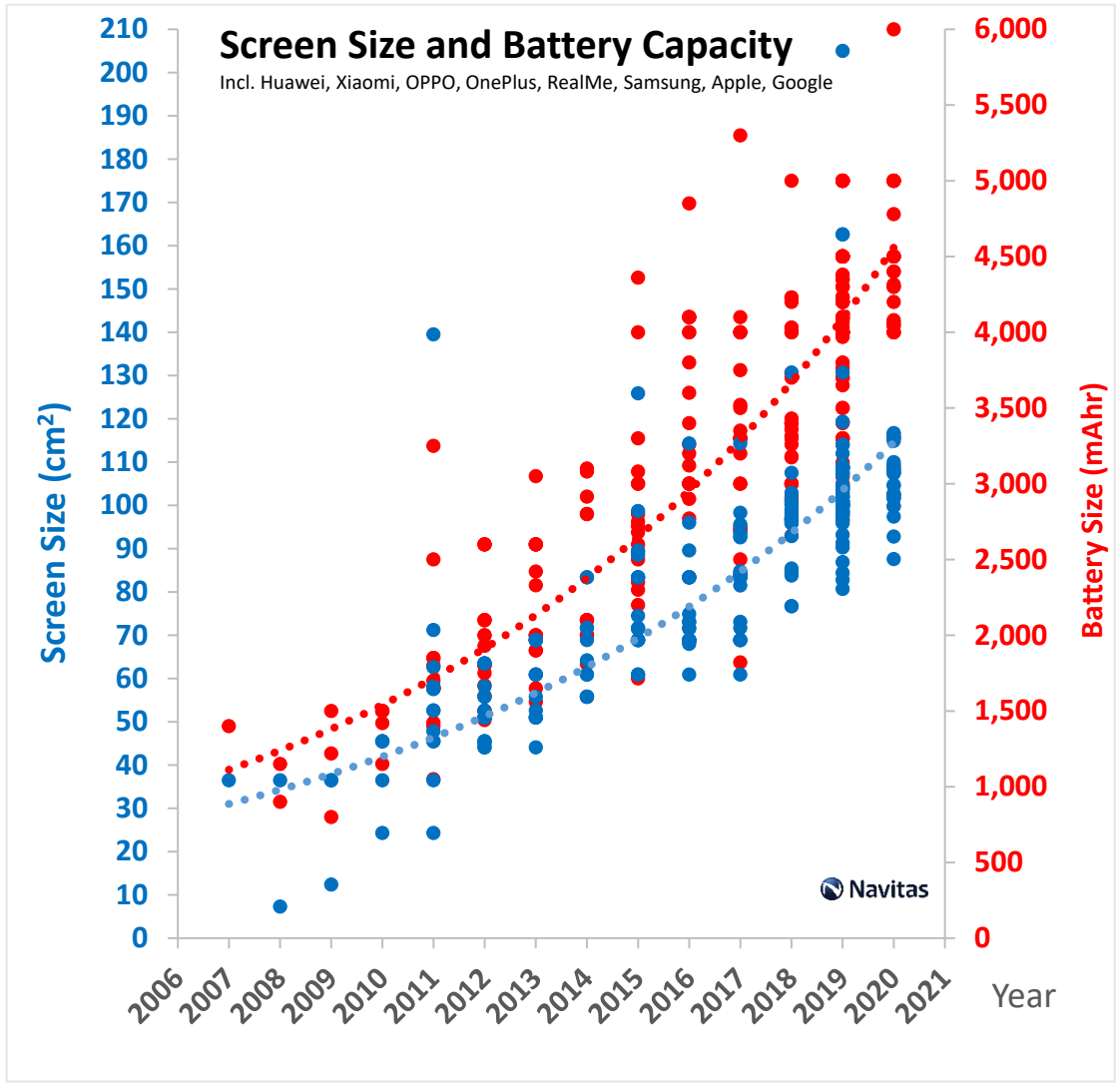
- Monolithic integration, 650V
  - 2x GaN FETs
  - 2x GaN drivers
  - GaN Logic (level-shift, bootstrap, UVLO, shoot-through, ESD)
- “Digital In, Power Out”

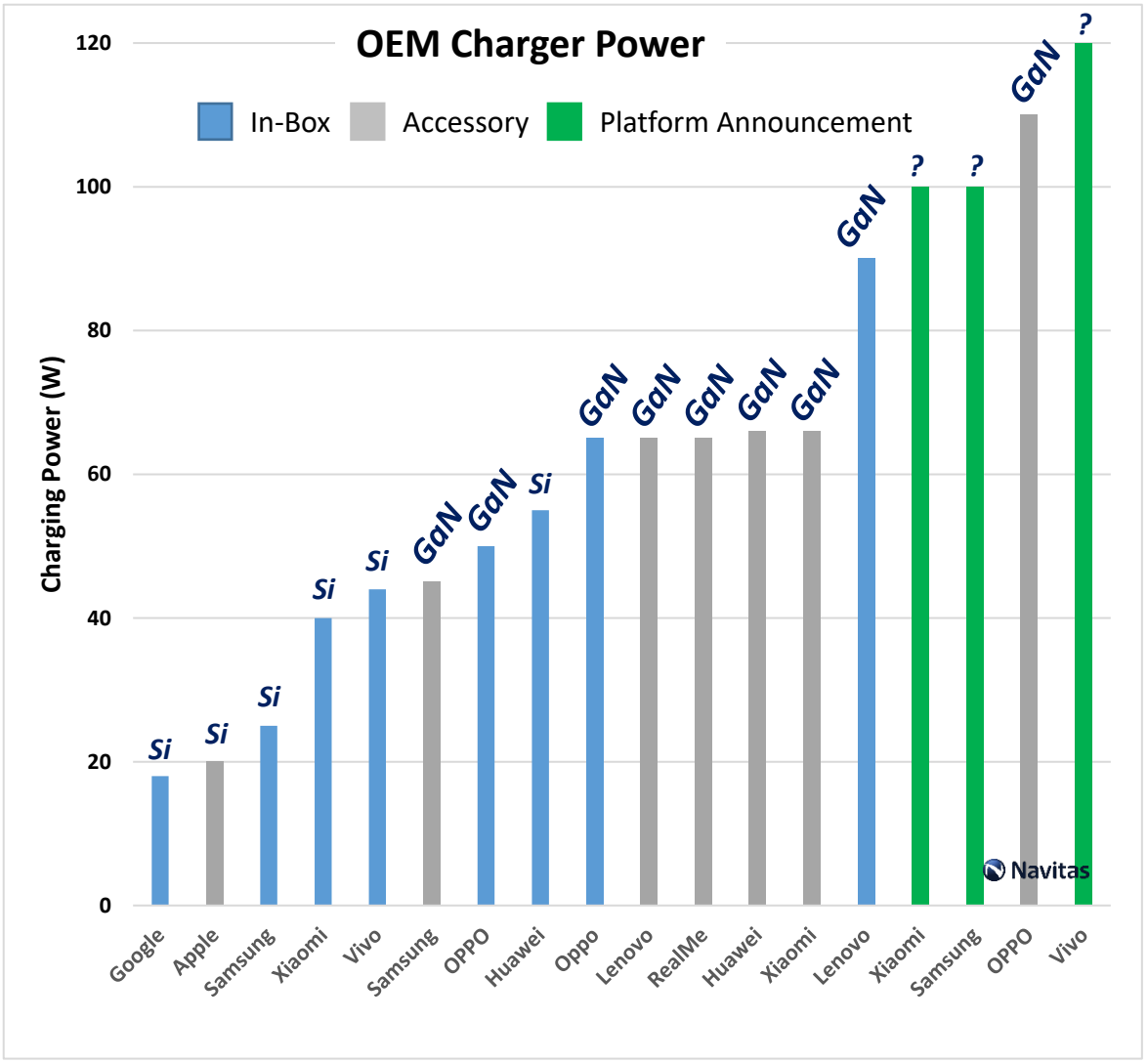






More Power, Faster Charge: GaN





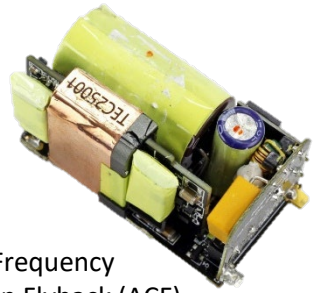
Source: Navitas, to November 2020

Single-Output: Q1 2020

小米 xiaomi.com



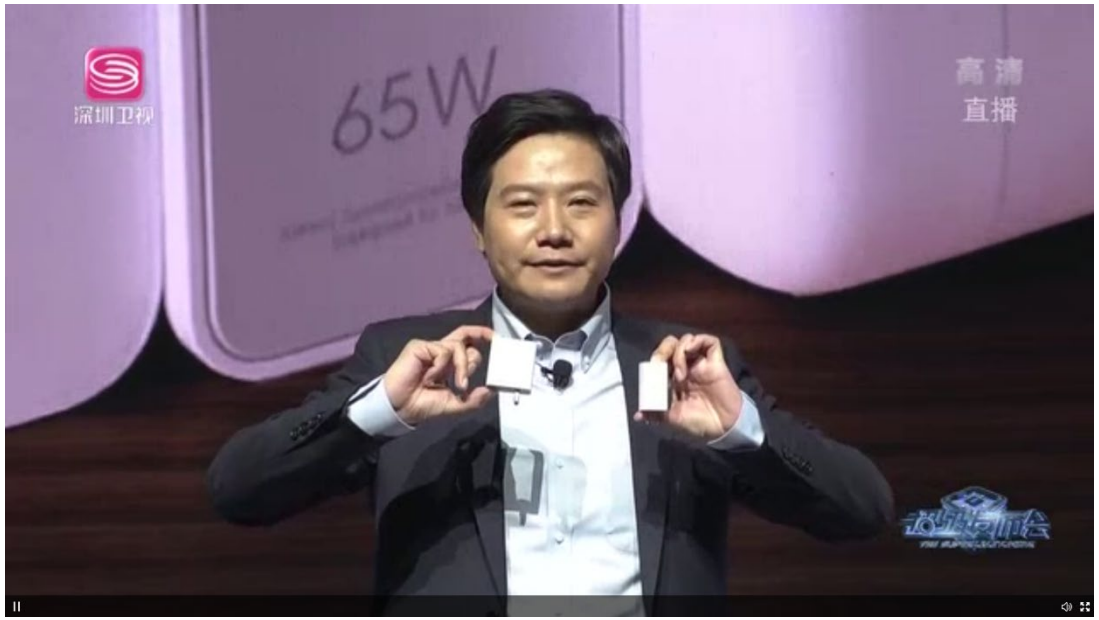
65W C
53 cc



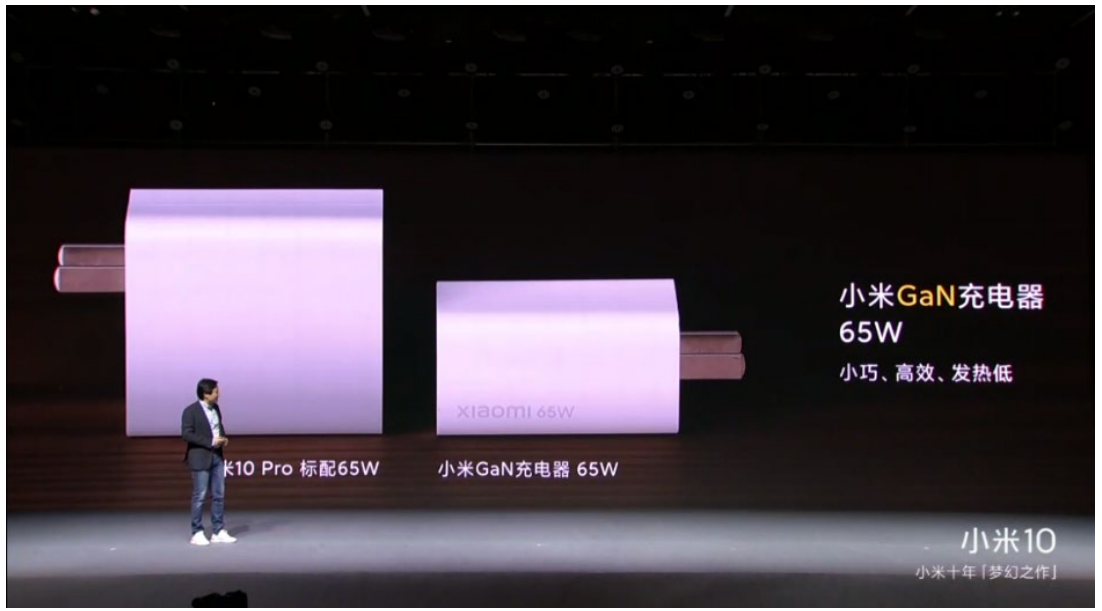
High-Frequency
Active Clamp Flyback (ACF)
with Planar Transformer



Mi 10, 10 Pro



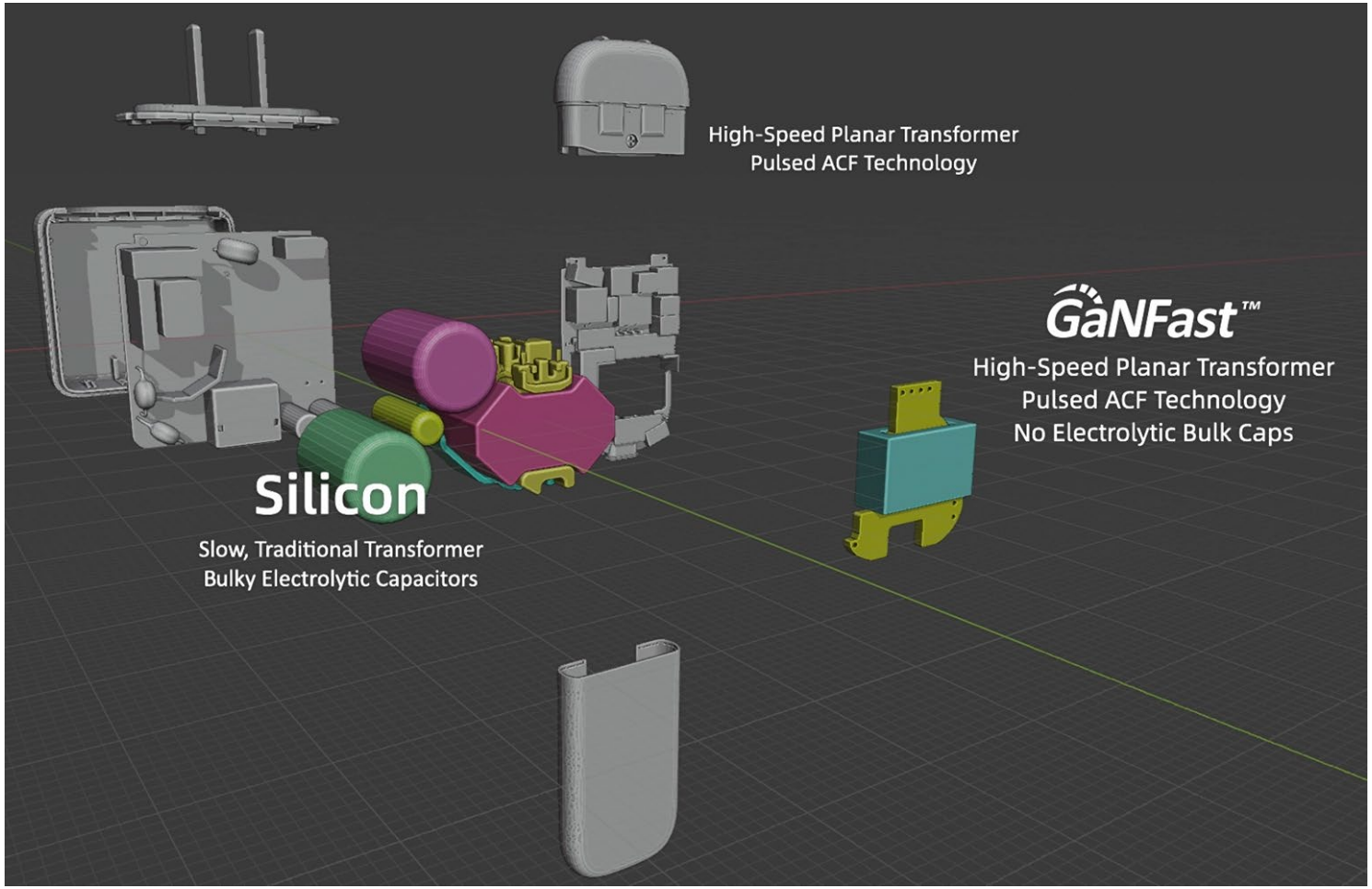
Xiaomi CEO: "How tiny is this GaN charger?"



Xiaomi CEO: "This GaN charger is extremely small & efficient?"

Single-Output: Q4 2020

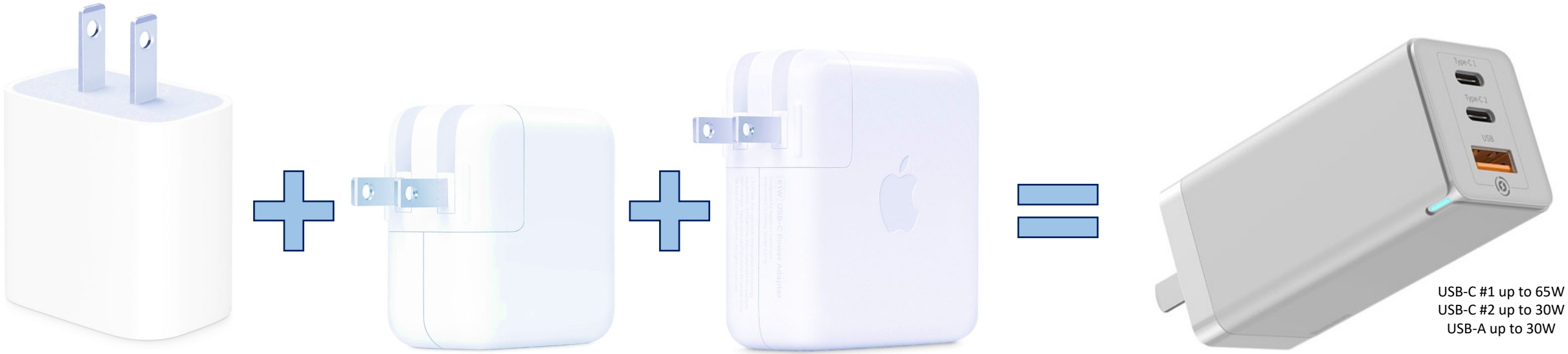
oppo 50W Mini “Cookie” Charger, 10.5 mm







Multi-Output: Q4 2019



USB-C #1 up to 65W
USB-C #2 up to 30W
USB-A up to 30W

Apple Si 18W
42 x 41 x 27 mm
= 47 cc, 60 g
(fixed AC pins)

Apple Si 30W
55.9 x 55.9 x 32 mm
= 87 cc, 158 g

Apple Si 61W
73 x 73 x 28 mm
= 149 cc, 193 g

Baseus GaN 65W
75 x 35 x 32 mm
= 84 cc, 125 g

Retail $29 **$49** **$69**

283 cc, 411 g, $147 → **84 cc, 125 g, $35**

Images to scale

Multi-Output: Q4 2020

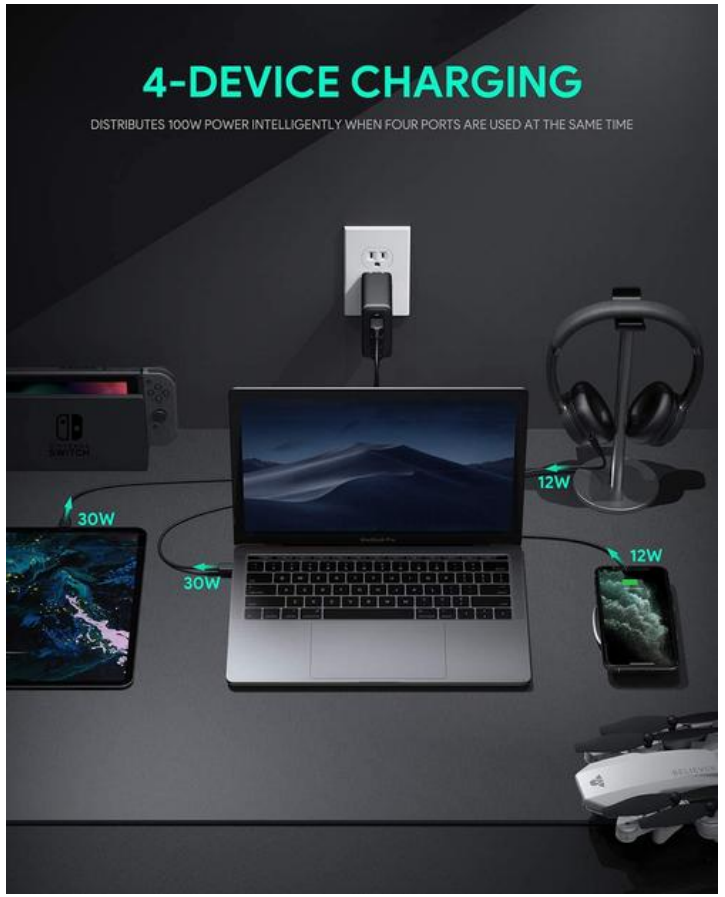
Lenovo 联想 thinkplus

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





AUKEY





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

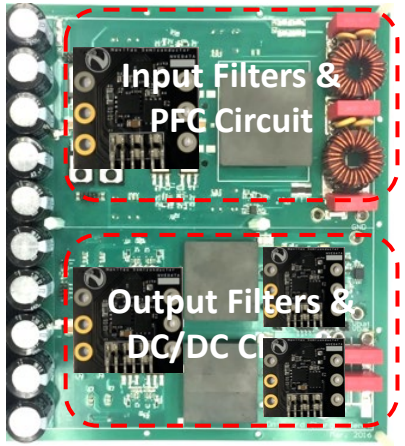
Multi-Output: Q1 2021

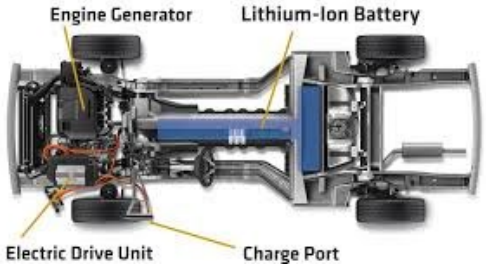
200W 2C+2A
88 x 55 x 42 mm = 203 cc
220g, 1 W/cc



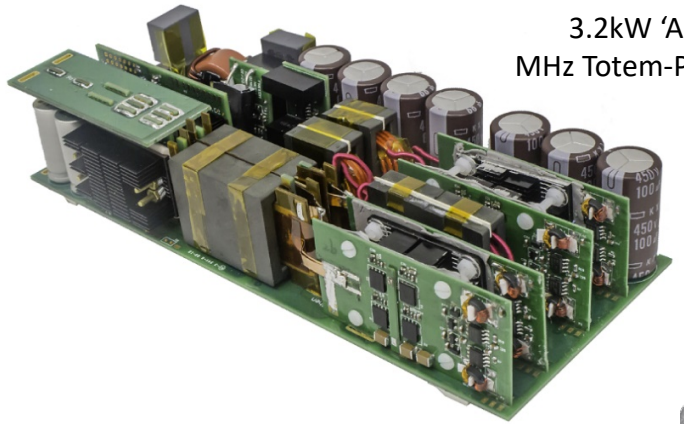


High-Power Roadmap





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

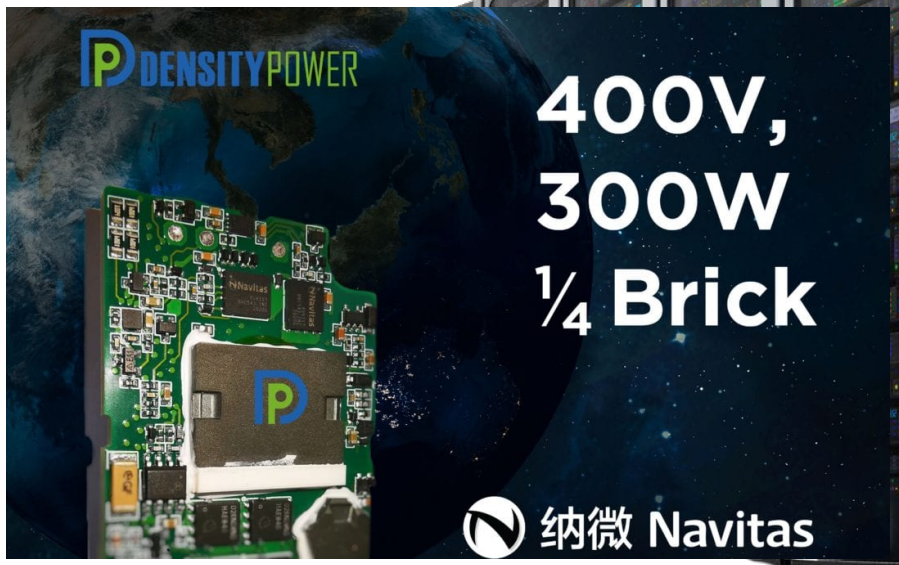


3.2kW 'All GaN' AC-54V
MHz Totem-Pole PFC + MHz LLC

300W AC-48V Laptop Adapter



300W HVDC ¼ Brick




GaNFast™
氮
镓
Let's go GaNFast™
超级芯片，超速充电