



The Digital GaN Company

Activating GaN's Full Potential with Digital  
Control for Enhanced Performance Across  
All Electronics Sectors

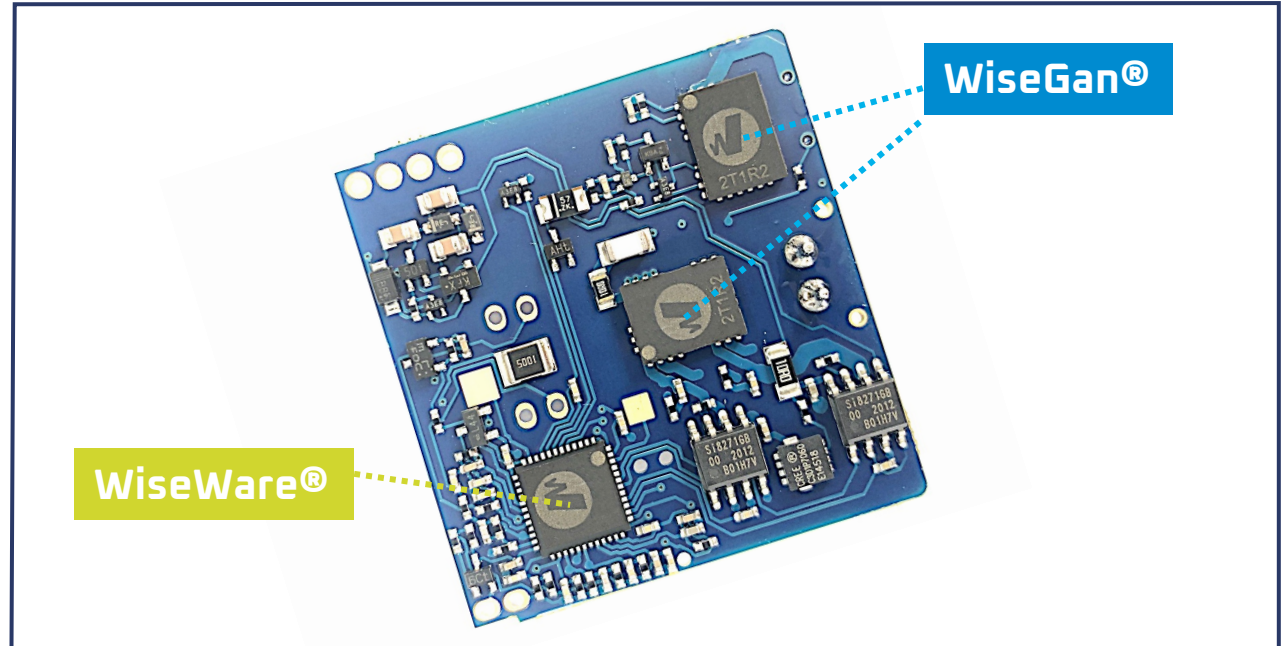
Thierry Bouchet, CEO

PE International 2024

# WE PROVIDE ADVANCED GaN POWER IC AND DIGITAL CONTROLLERS FOR THE POWER CONVERSION MARKET



AC/DC converter



POWER BOARD with our GaN IC

- **WiseGan®** = our GaN Power Integrated Circuit (7 patents)
- **WiseWare®** = our Digital Controller, MCU 32bits with our own firmware (3 patents)



## POWERFUL SYNERGY: TOP KEY FEATURES OF WISEGAN AND WISEWARE

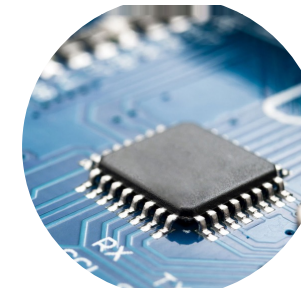
From discrete to monolithically integrated functionalities, revolutionizing power conversion.



### WiseGan® GaN IC

- High-Efficiency GaN Power IC
- Integrated functions
- Integration with WiseWare
- Versatile Applications

MCU digital control enabling high-frequency operation in GaN converters, thus increasing power density

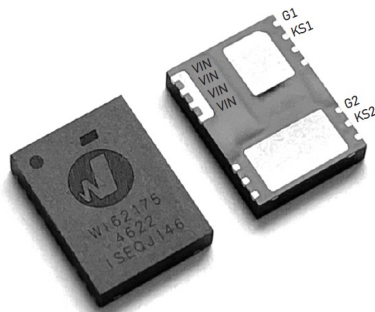
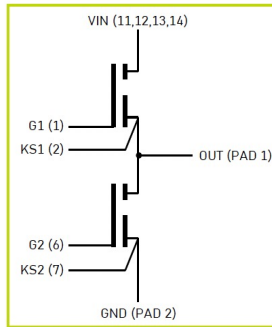


### WiseWare® MCU 32 bits

- Fully Digital and GaN-Dedicated Design
- Proprietary Enhanced Topologies
- Predictive and Real-Time Control
- Integration and Cost Efficiency
- Enhanced Reliability and Faster Production Time

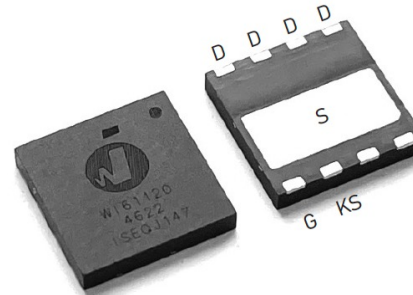
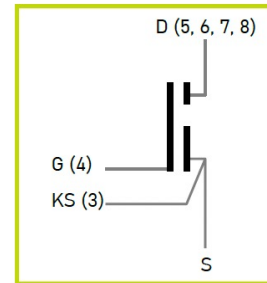


## WiseGan® half-bridge WI62xxx



195 mΩ

## WiseGan® discrete WI61xxx



60 mΩ  
120 mΩ  
195 mΩ

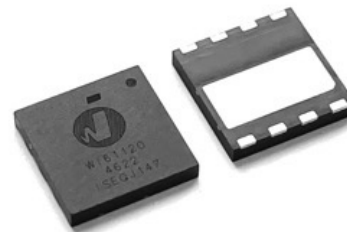
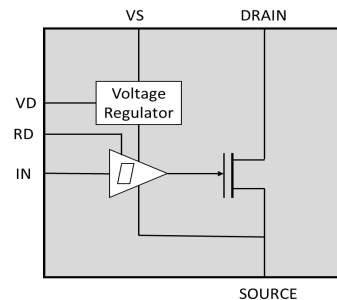
WiseGan® Gen #1  
**WI61xxx**  
discrete power device :

1 or 2 transistors  
in a package

## GEN #2 : GaN IC PRODUCT PORTFOLIO (650V E-MODE)

WiseGan® Gen #2  
**WI63xxx**  
implements GaN IC  
features to make a  
complete SOC including  
protection and driver.

### WiseGan® WI63120



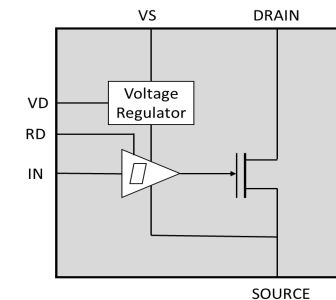
**Rdson (typ) : 120 mΩ**

**VIN : 5 to 15 V**

**VS : 12 to 30 V**

**DFN88**

### WiseGan® WI63050



**Rdson (typ) : 50 mΩ**

**VIN : 5 to 15 V**

**VS : 12 to 30 V**

**DFN88**





# WISE INTEGRATION'S TARGET MARKETS

## Consumer

- Fast chargers
- TV
- Power tools



**HIGH POWER DENSITY (SMALL & POWERFULL)**  
30W to 15kW

## E-mobility

- E-bike & E-scooter
  - E-motorcycle
- EV Onboard charger ( $\geq 10$  kW)



## Industry

- Robotics
- Led driver
- Home Appliances
- Motor Control,
- Solar Inverter



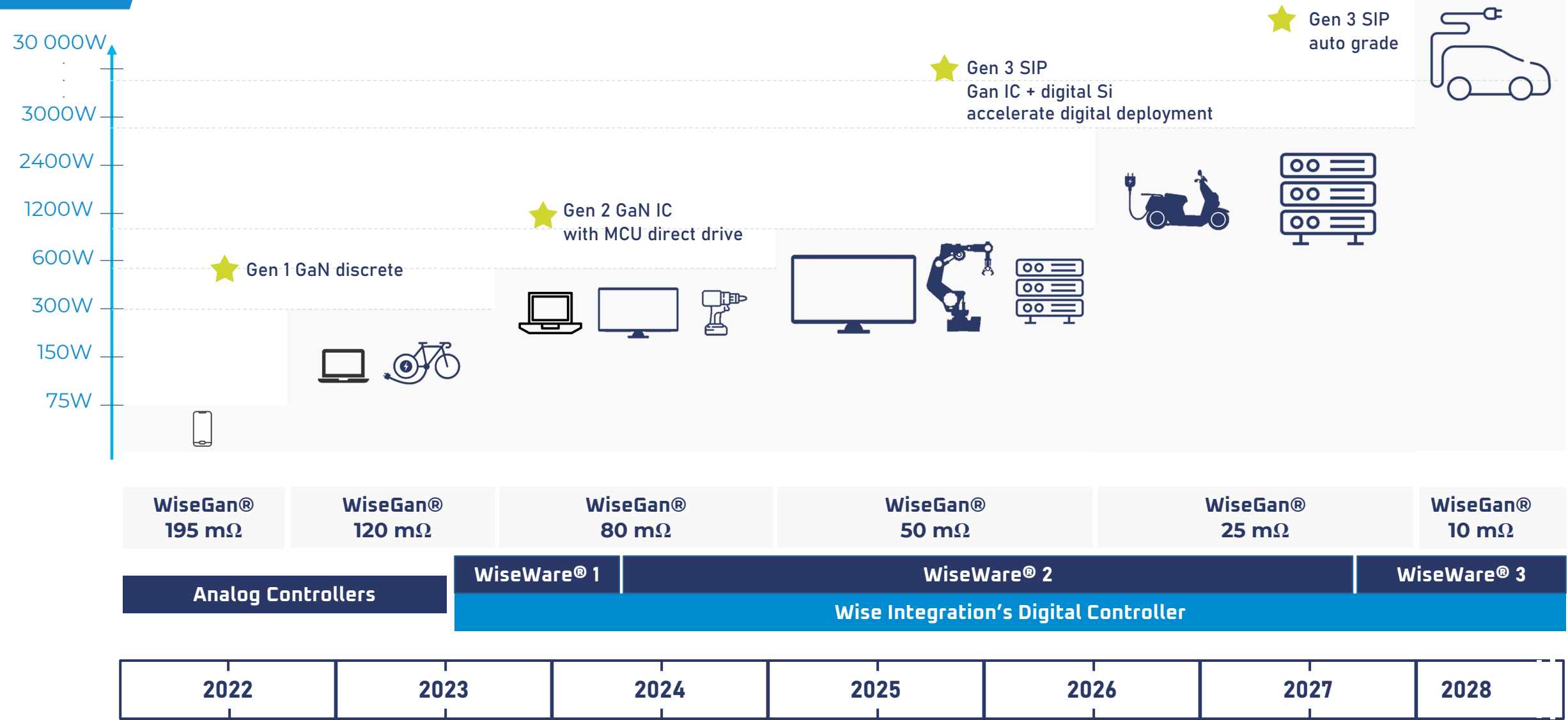
**HIGH POWER EFFICIENCY**  
300W to 30kW

## Data center

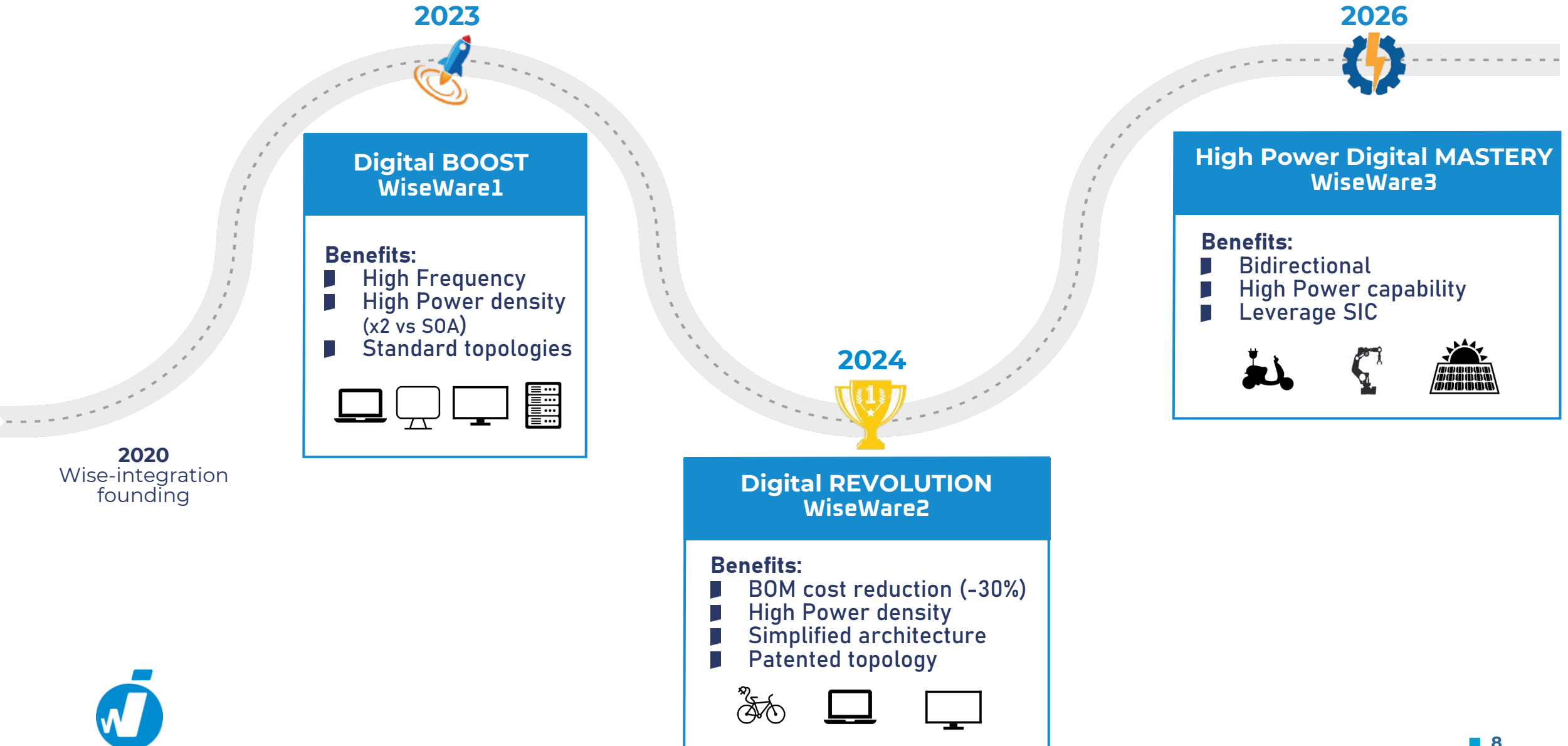
- Data Com
- Telecom
- Enterprise



# PRODUCT ROADMAP AND MARKET APPLICATIONS

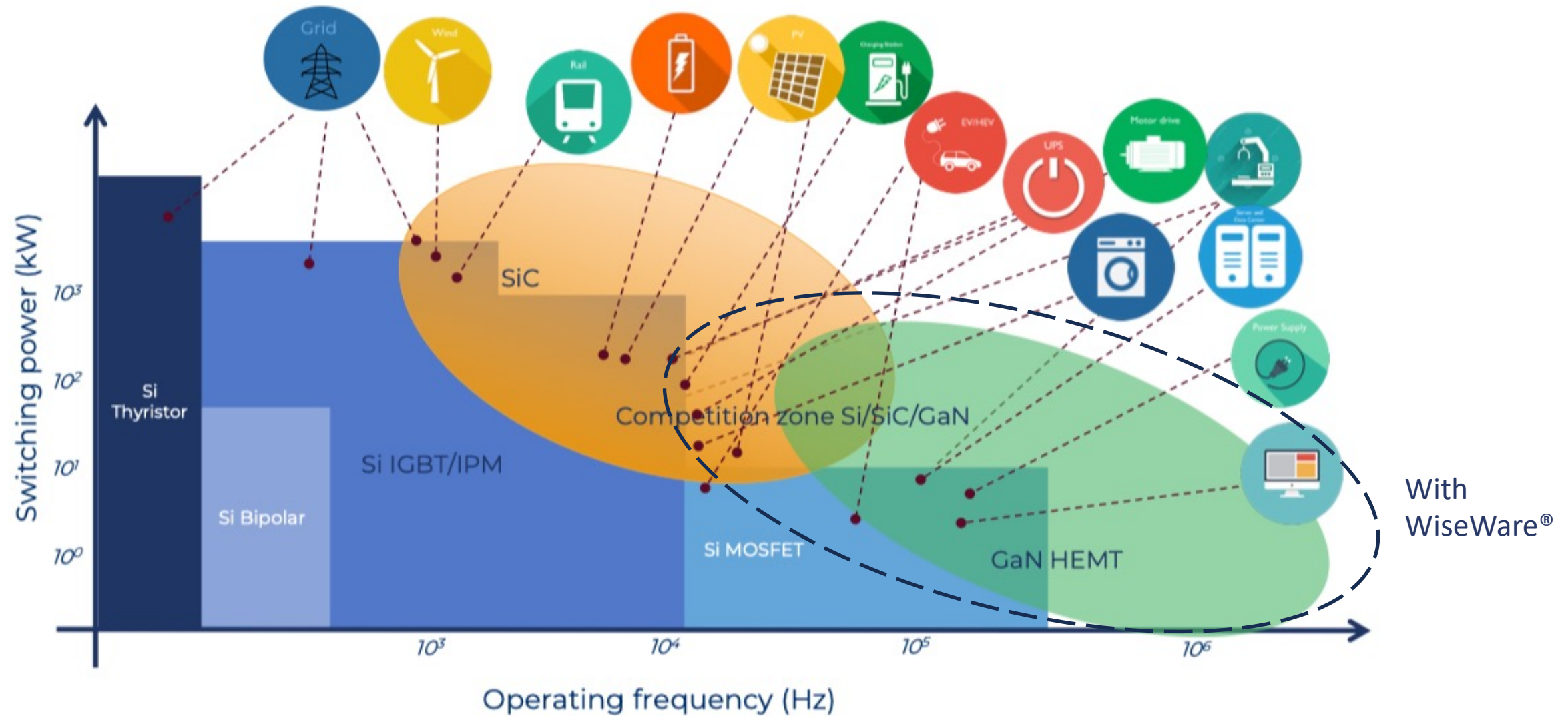


# THE REAL GAME CHANGER : FROM DIGITAL BOOST TO DIGITAL MASTERY










# LIMITATION FOR GaN AND HOW TO OVERPASS



# LIMITATION FOR GaN IN POWER CONVERTERS AND HOW TO OVERPASS

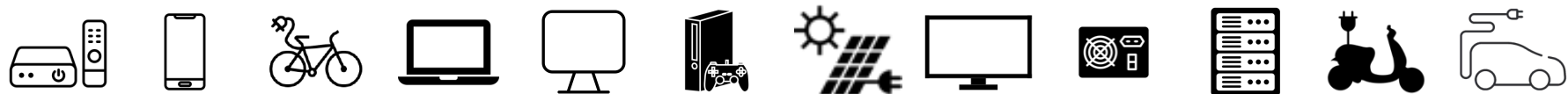
Wise Integration address all challenges that GaN-based solutions are still facing

| Challenge          | Actual Performances                             | Related      | Issues                                                  | Perspective / Solution                                                   | Addressed By                                                                                                                                                                |
|--------------------|-------------------------------------------------|--------------|---------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| System Fine tuning | 2 time longer than with silicon + gate weakness | System level | Restricts market penetration                            | Digital control + GaN IC                                                 |                                                                                          |
| Power density      | 40% better than Si, but still perfectible       |              | Compacity, form factor                                  | Digital control                                                          |                                                                                          |
| RDSon              | > 10mohms for 650V                              | GaN level    | Yield improvement (large die size) and cost competitive | New technology generation & New interleaved topologies + Digital control |                                                                                          |
| Voltage range      | 200-650 V                                       |              | Epitaxy thickness                                       | GaN on QST 1200V                                                         |   |



# DIGITAL CONTROL EXTENDED MARKET FIT

-- 65W -- 100W ----- 300W --- 500W --- 1kW -- 3kW --- 15kW -->



Analog control

WiseWare 2.0

WiseWare 1.0 & 1.1

WiseWare 3.0

70W OBC for e-bike "Cocotte"



300W power supply TV



8K



65W USB PD charger



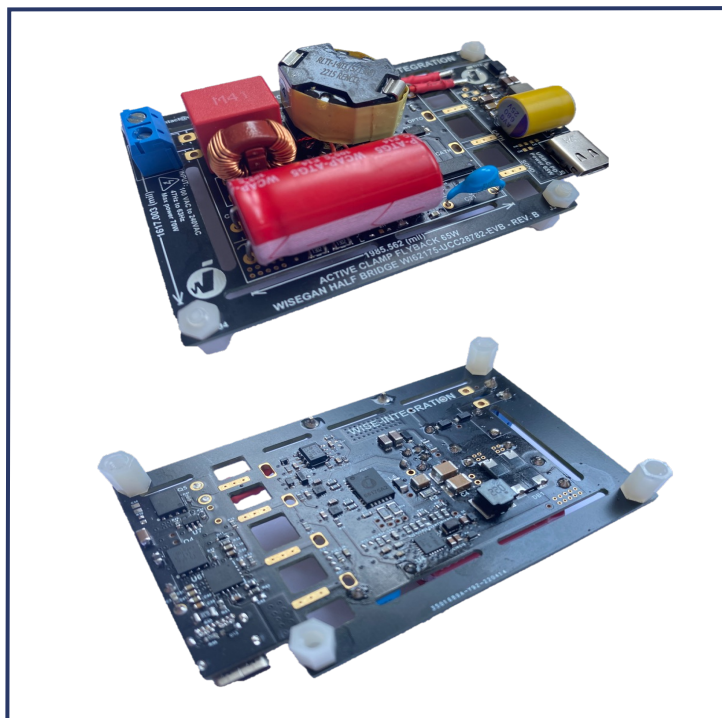
500W IA power supply rack



3kW OBC for "la bagnole"



## CONSUMER : USB PD CHARGER



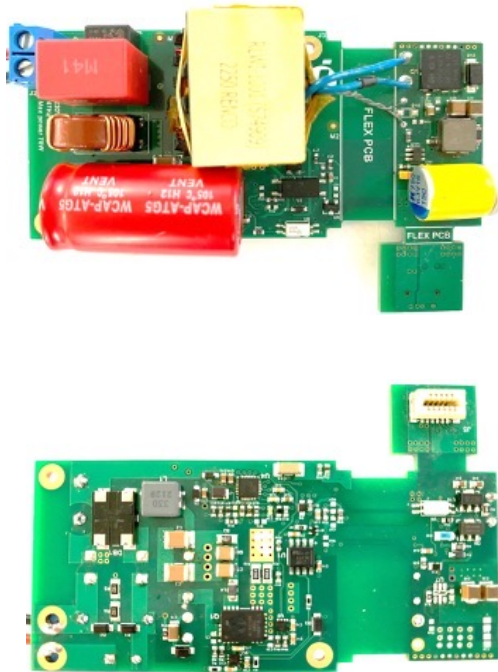
### 65W USB PD

- Active Clamp Flyback
- Analog control
- Output : 20V-3,25A  
15V-3A  
9V-3A  
5V-3A (USB 3,0 compliant)

### 65W USB PD charger

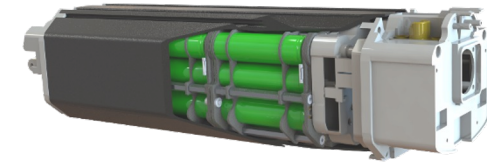


## CONSUMER : E-BIKE ON BOARD CHARGER



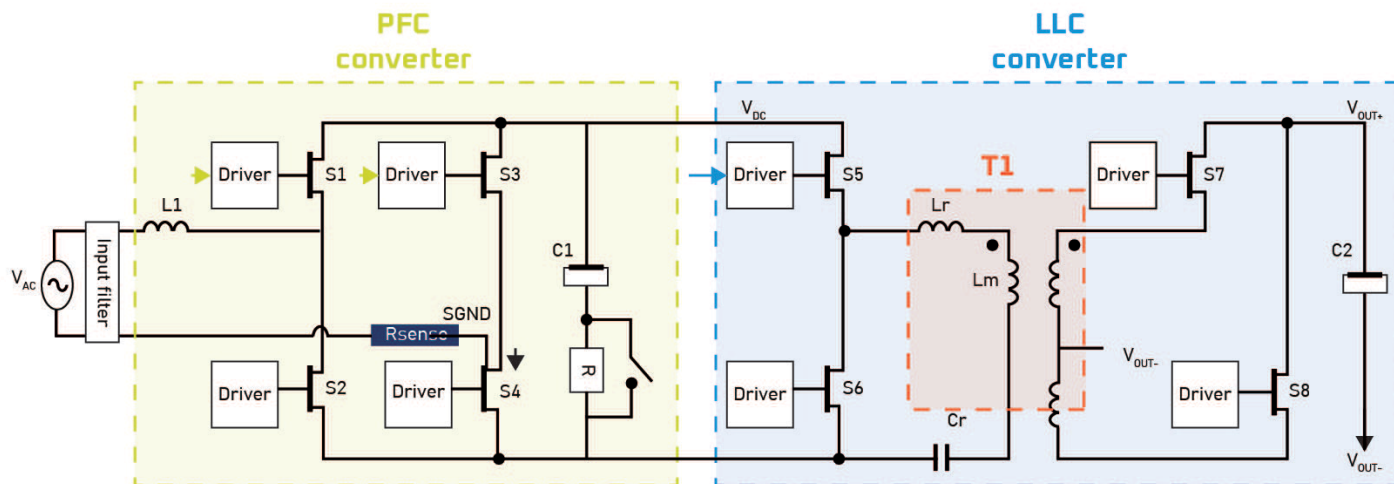
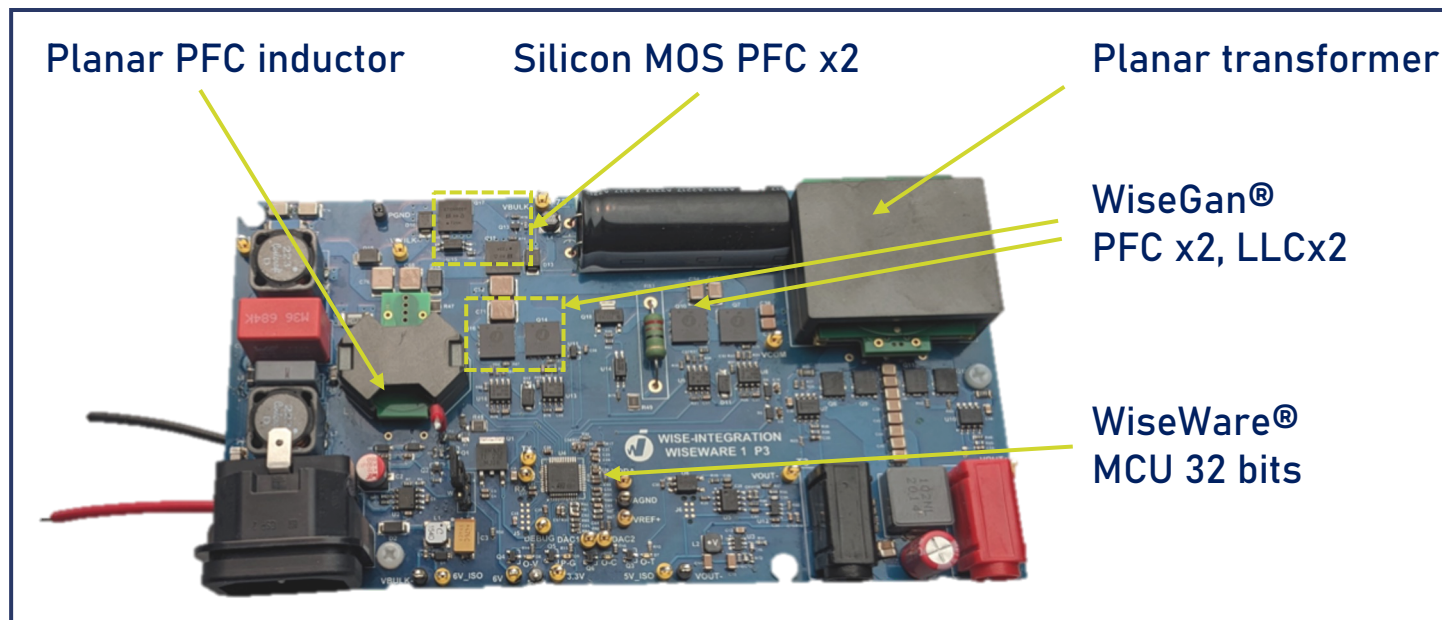
70W, ebike OBC

- Active Clamp Flyback
- Analog control
- Output : 20-55 V
- 93% efficiency @70W





# WISEWARE® 1 DEMONSTRATION BOARD

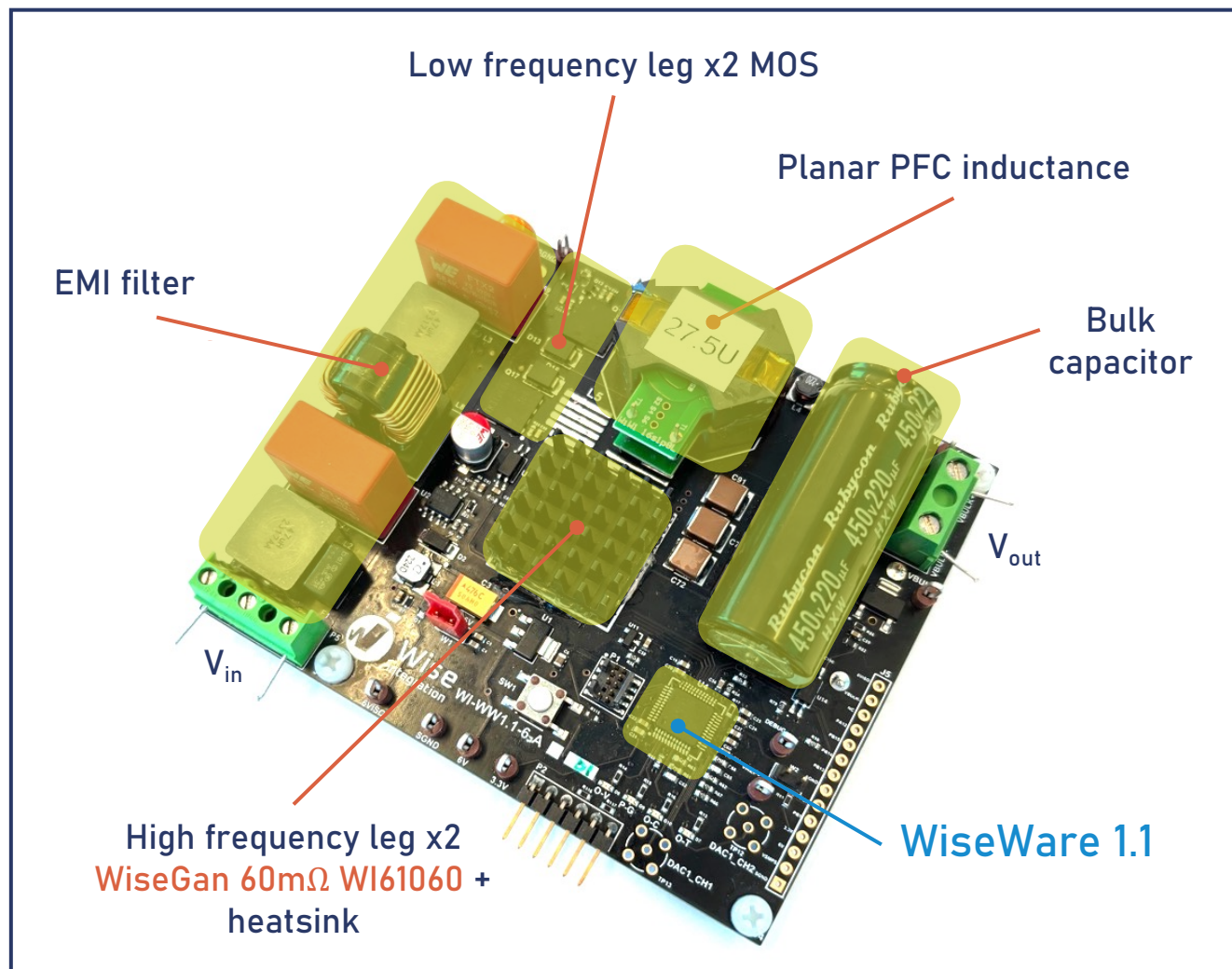


## 300 W Demoboard PFC-LLC

- Totem pole PFC
- Digital control = 1 MCU
- Fix Output: 20V
- 95% efficiency @ 300W

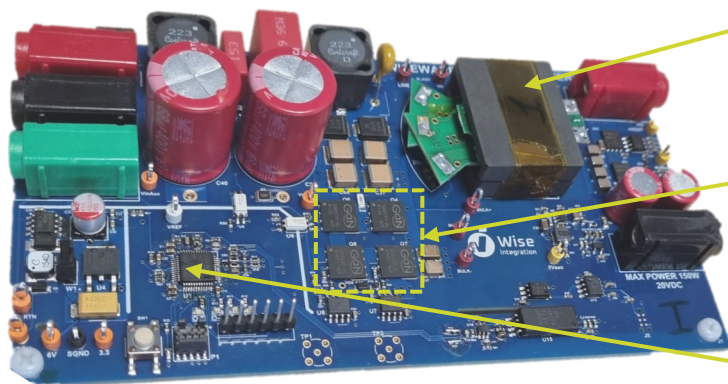


## WISEWARE® 1.1 (TOTEM POLE PFC SOLUTION)



| Parameter                    | Value            |
|------------------------------|------------------|
| Input Voltage ( $V_{in}$ )   | 90-265Vrms       |
| Output Voltage ( $V_{out}$ ) | 400V             |
| Maximum Output Power         | 300W             |
| Switching Frequency          | 300kHz to 700kHz |
| Output voltage ripple        | 25V @ 300W       |
| Power Factor                 | > 0.99           |

# WISEWARE® 2 DEMONSTRATION BOARD



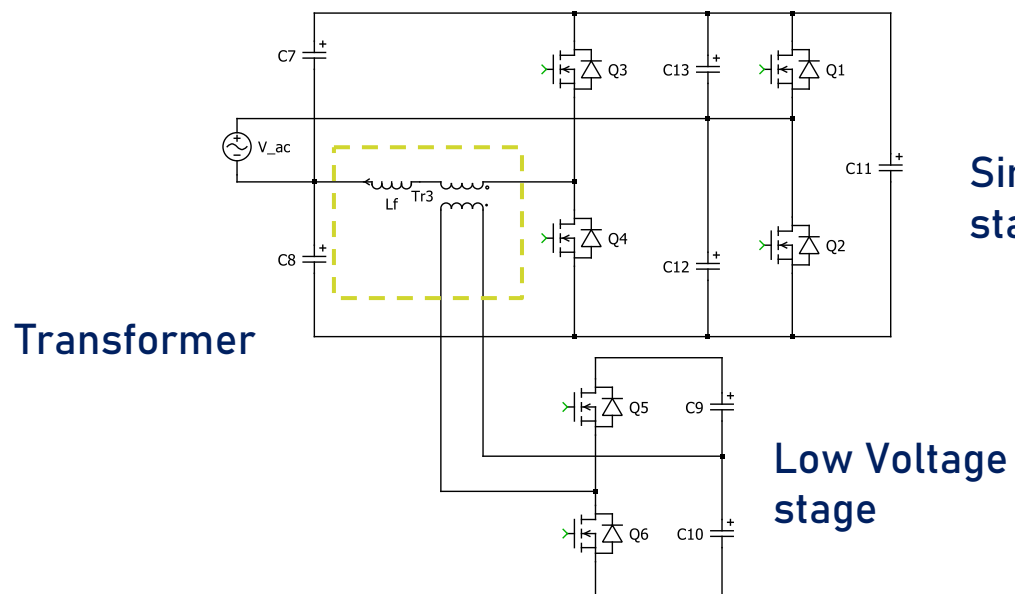
Planar transformer

WiseGan® single power stage x 4

WiseWare MCU 32 bits



8K



## 150 W Demoboard WiseWare 2

- Patented single power stage
- Digital control = 1 MCU 32bits
- Fix Output: 20V
- 96% efficiency @ 150W
- BOM reduced

# REVOLUTIONIZING ELECTROMOBILITY WITH WISEWARE 3 AND WISEGAN GEN 3

**1. Unique Innovation :** Introduction of WiseWare® 3 and WiseGan® Gen 3 (SiP), the latest in our advanced GaN technology and digital control. An innovative embedded Dual Active Bridge (eDAB) with a 25mohm GaN transistor and a MCU 32 bit digital control to maximize compacity and efficiency.

## 2. Competitive advantages:

1

Bidirectional

2

Streamlined Charging System Architecture

3

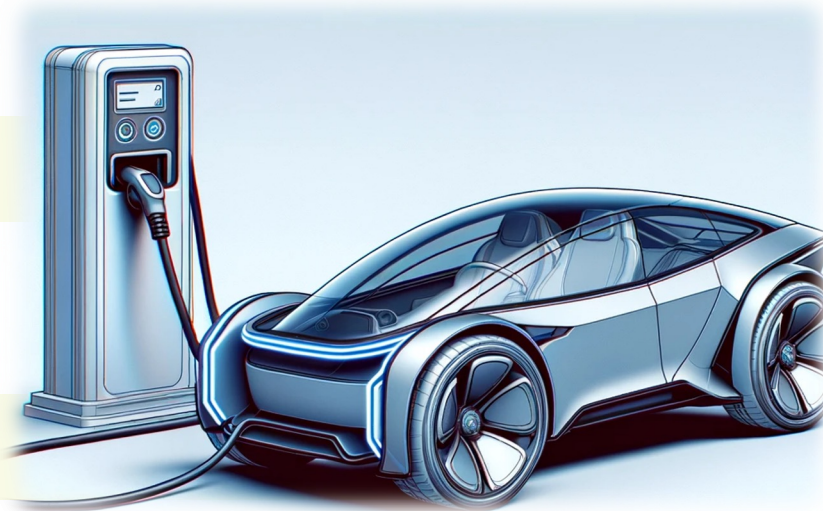
Compact Design,  
Maximizing Space Efficiency

5

Eco-friendly Technology

4

Enhanced Energy Conversion Efficiency







## DIGITAL REVOLUTION IN GaN TECHNOLOGY : LEADING THE CHARGE WITH WISE INTEGRATION

- **Wise Integration is pioneering the GaN revolution with our proprietary WiseGan® and WiseWare® technologies, which offer unmatched power density and efficiency.**
- **Digital control as the keystone: Maximizing GaN's potential.** Our innovative WiseWare® platform is set to replace analog control, unlocking new levels of performance for AC-DC converters.
- **WiseWare® Digital Control is activating GaN's full potential for enhanced performance across all Electronics Sectors.**





# THANK YOU

[wise-integration.com](http://wise-integration.com)

## EUROPE



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