

# eFlash Powers Your EVs (and so much more)

OMEM-201-1

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Presenter: Dave  
Eggleston Microchip/SST



# Where Do 32B MCUs Go Every Year?

Industrial



Data Center & Computing



Automotive



Communications



Aerospace & Defense



Consumer Appliance





# Where Do 32B MCUs Go Every Year?

Industrial



Data Center & Computing



Automotive



# Everything with an On/Off Switch

Communications



Aerospace & Defense



Consumer Appliance





# Megatrends: Wave One uses **MCUs** + Flash



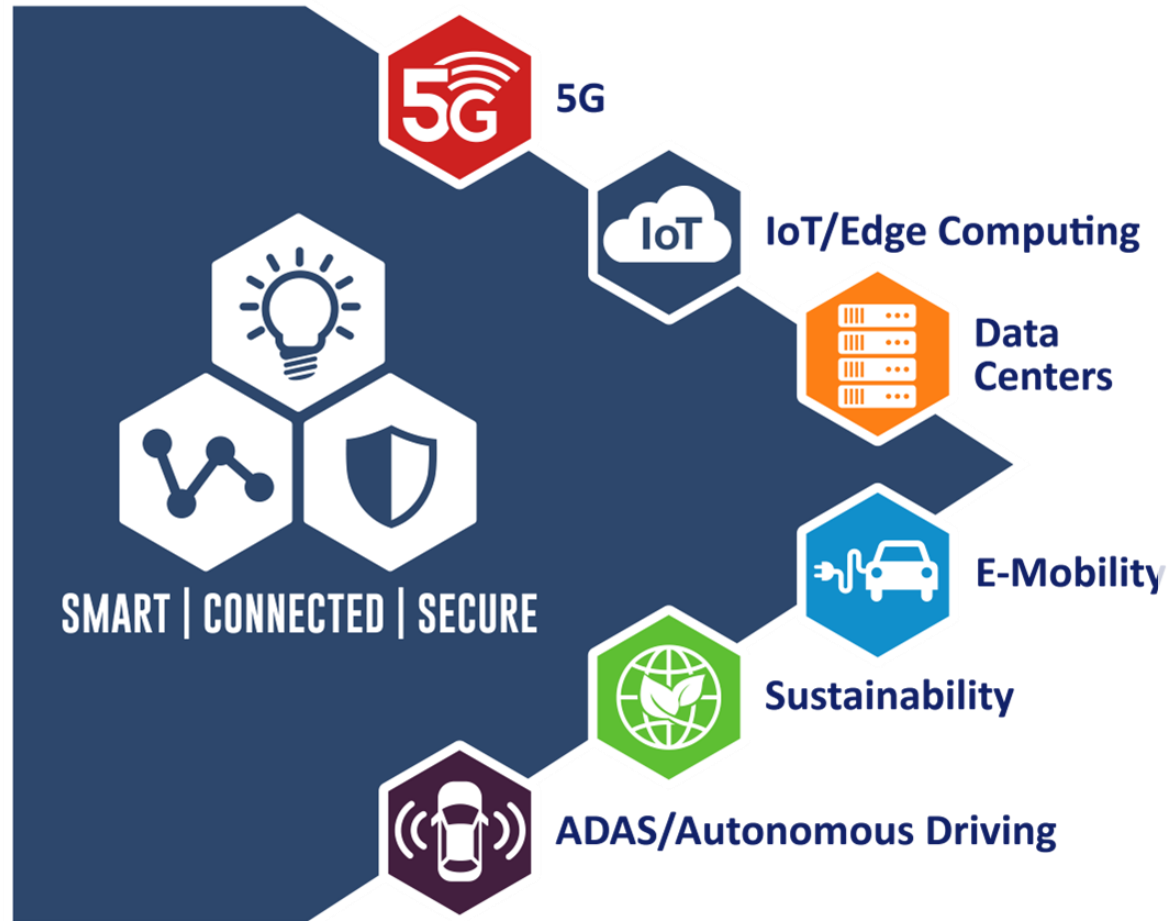
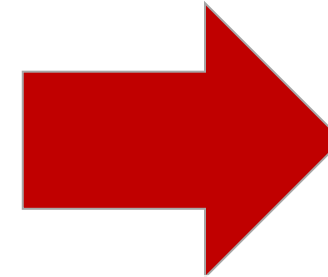
Flash Memory Summit

Flash

Data

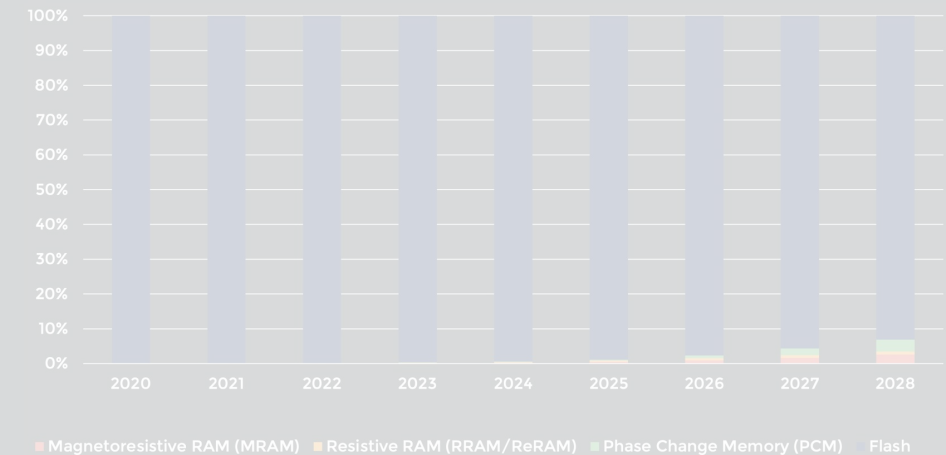
Code

MCU



## EMERGING NON VOLATILE MEMORY - % MCU MARKET REVENUE

Source: Microcontroller Market Monitor, Q2 2023, Yole Intelligence



www.yolegroup.com | ©Yole Intelligence 2023



# Megatrends: Wave One uses **MCUs** + Flash



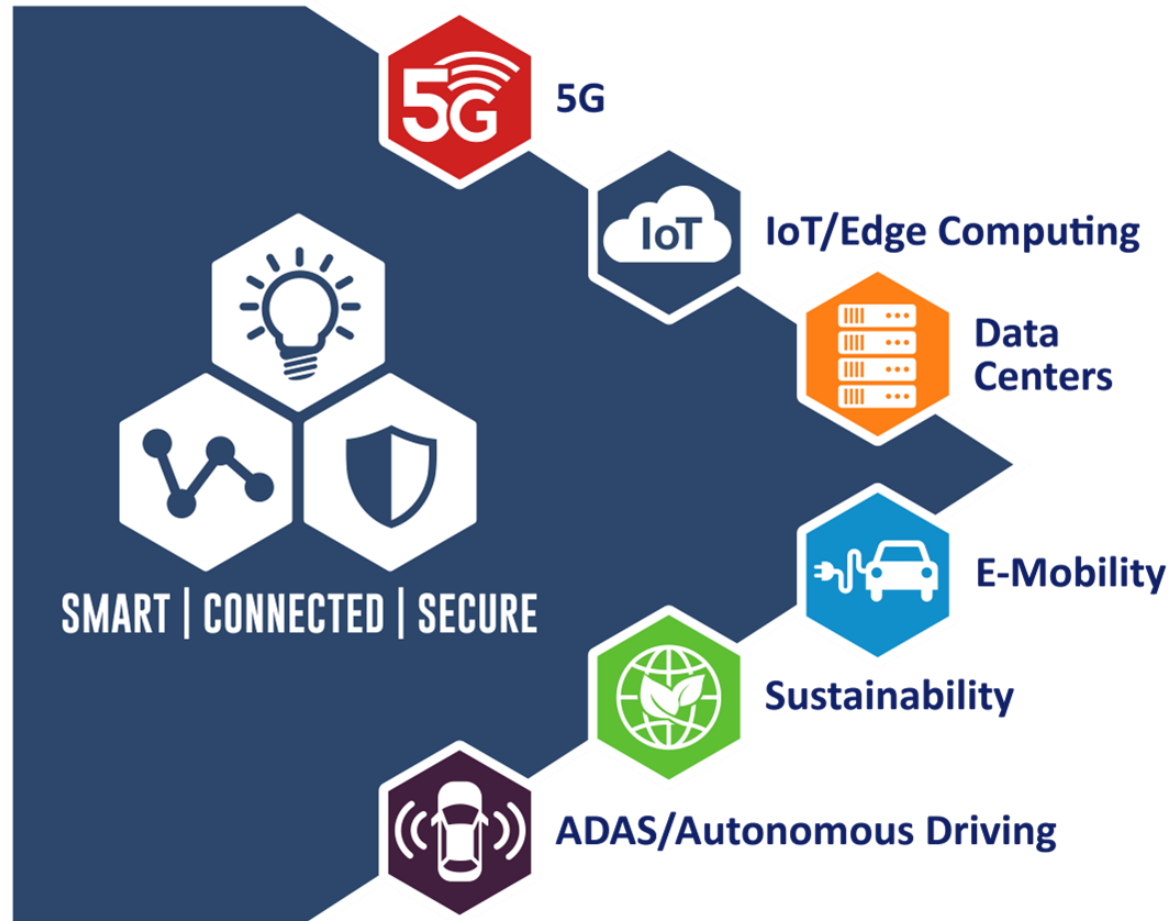
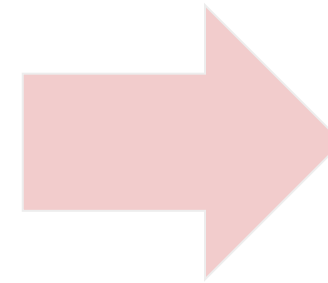
Flash Memory Summit

Flash

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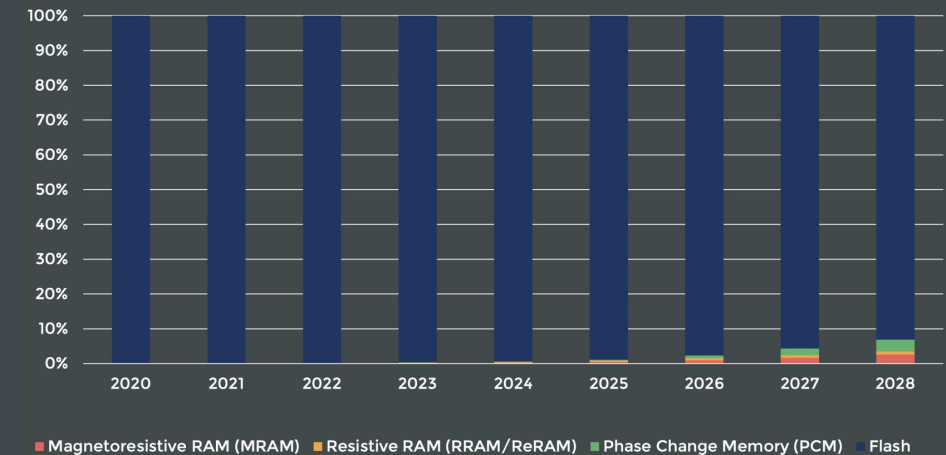
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MCU



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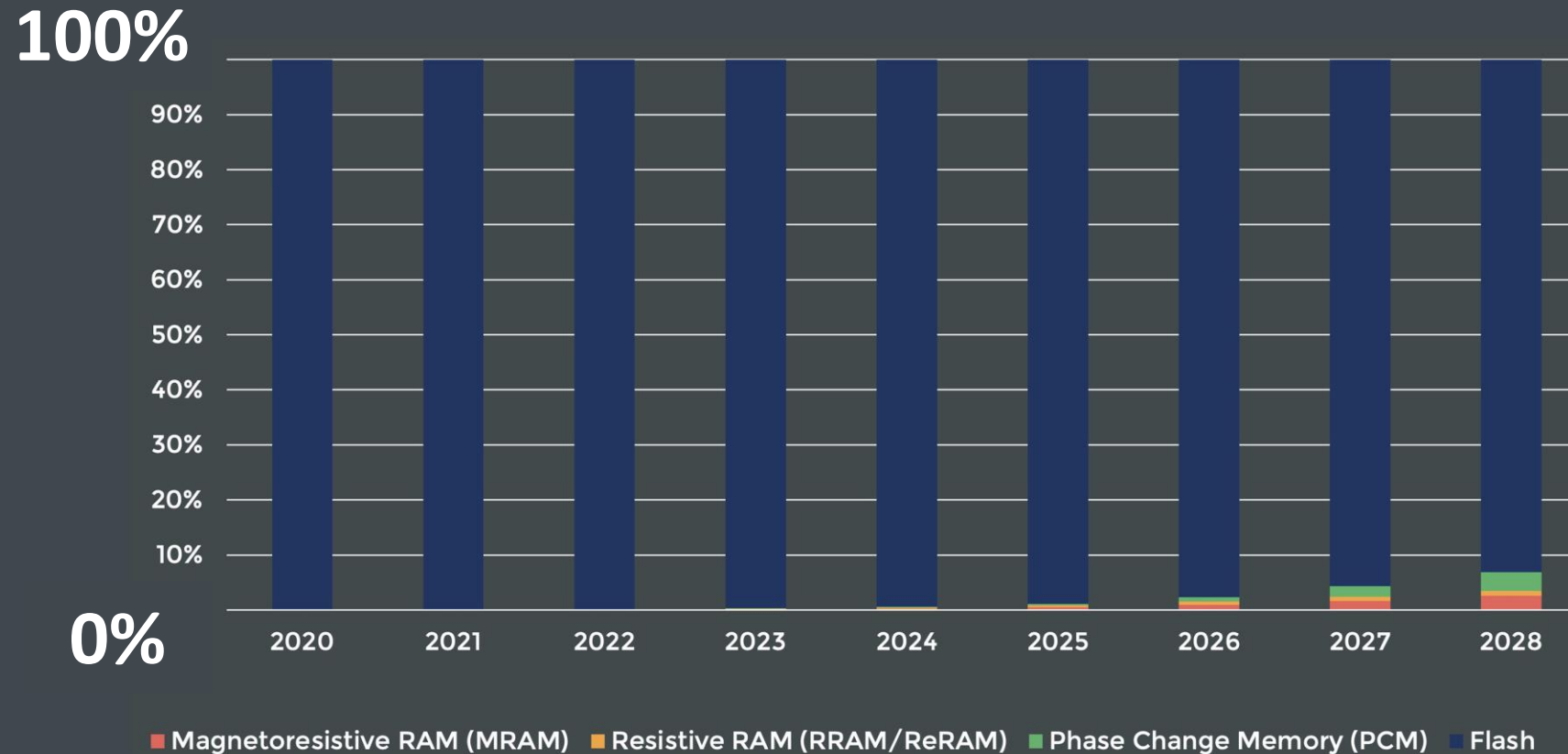
# Megatrends: Wave One uses **MCUs** + **Flash**



Flash Memory Summit

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# Megatrends: Wave One uses **MCUs** + Flash



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## EMERGING NON VOLATILE MEMORY - % MCU MARKET REVENUE

Source: Microcontroller Market Monitor, Q2 2023, Yole Intelligence

100%

>99.5% of MCU Revenue Uses Flash in 2023  
>92% Uses Flash in 2028

0%

2020

2021

2022

2023

2024

2025

2026

2027

2028

■ Magnetoresistive RAM (MRAM) ■ Resistive RAM (RRAM/ReRAM) ■ Phase Change Memory (PCM) ■ Flash



2023

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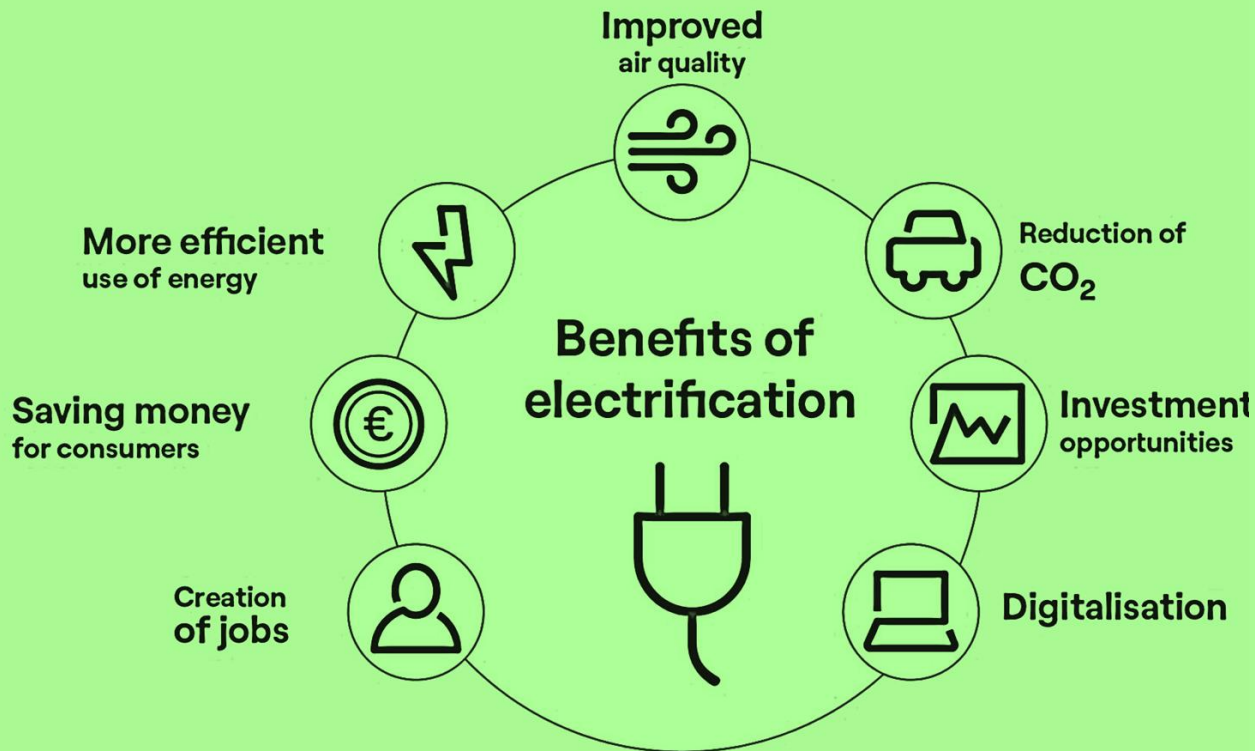


# Massive Trend: Electrification of Everything

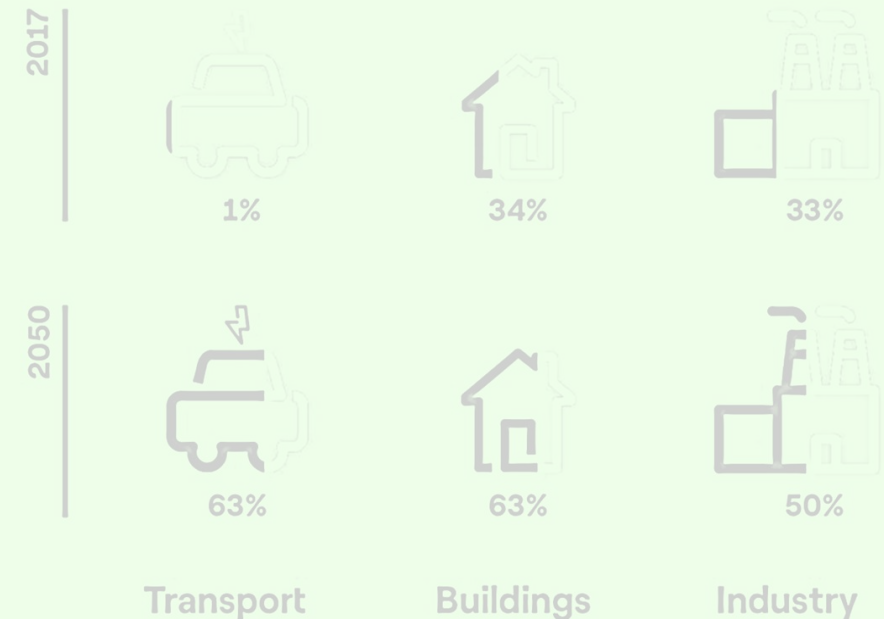


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**“Electrification** is the process of replacing fossil fuels with electricity in all sectors”



% Forecast for electrification in transport, buildings and industry



Source: <https://www.endesa.com/en/the-e-face/energy-sector/what-is-electrification-descarbonisation-keys>

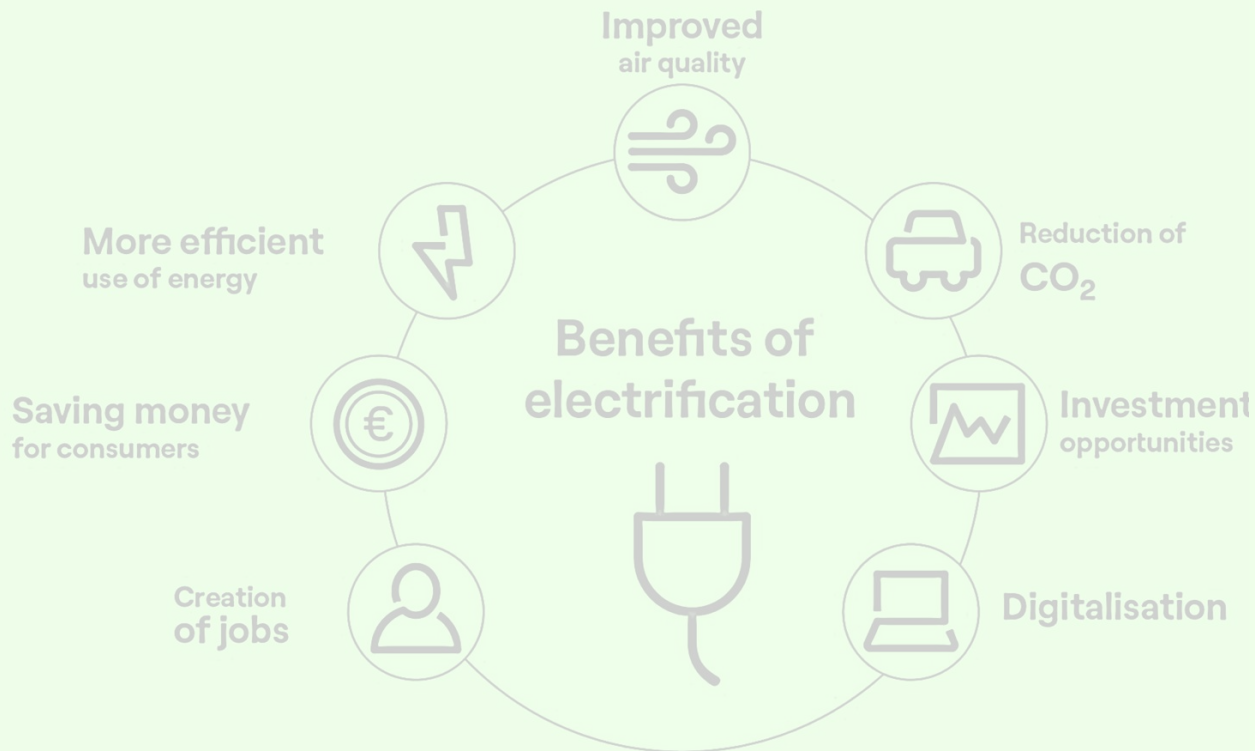


# Massive Trend: Electrification of Everything

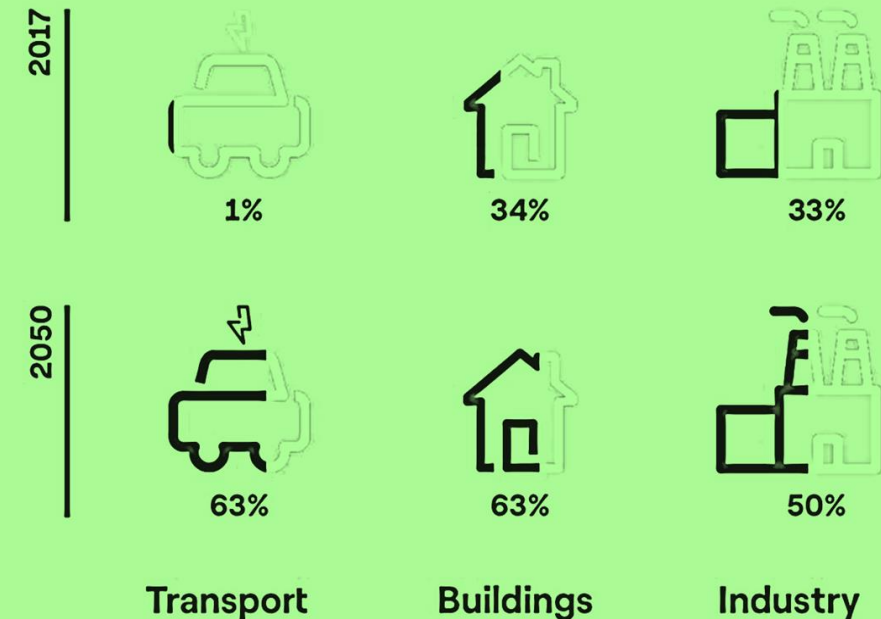


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## % Forecast for electrification in transport, buildings and industry



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# Intersection of Power + MCUs



Flash Memory Summit



- **AC/DC Power**
  - Primary side: Power Factor Correction
  - Secondary side: Regulated DC/DC
  - EV charging
- **DC/DC Power**
  - Automotive DC/DC converters
  - ¼ brick and other small form factors
- **LED Lighting**
  - Automotive headlights
  - Industrial & commercial lighting
- **Wireless Power**
  - In-car smartphone charging
  - Power tools
  - Kitchen appliances



- **Home Appliances**
  - HVAC compressors and fans
  - Refrigerator compressors and fans
  - Dishwashers, clothes washers & dryers
  - Range hoods, garbage disposers
- **Automotive**
  - HVAC compressors and fans
  - Pumps: oil, gas, water & coolant
  - Turbochargers, EGR and CAM valves
- **Consumer**
  - Kitchen countertop appliances
  - Power tools: drills, saws, etc.
  - Lawn tools: lawnmowers, trimmers, blowers, etc.
  - Fans: ceiling, portable
  - E-bikes, E-Scooters
- **Industrial**
  - Factory automation robots
  - Manufacturing machinery, conveyer belts
  - CNC milling machines
  - Textile machines



- **Power Monitoring for IT and Data Centers**
  - AC/DC power supplies
  - Power distribution units
- **Utility Metering and Home Area Network**
  - Utility meters
  - Industrial meters
  - Energy displays
  - Energy-aware appliances
- **Renewable Energy**
  - Microinverters
  - Communications



- **Power Monitoring Home Automation and Industrial Meters**
  - Power distribution units
  - Consumer power strips
  - Smart outlets
  - UPS and inverters
  - E-circuit breakers
  - Industrial meters



# Intersection of Power + MCUs



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## Integration of MCUs with Power SOCs → Massive Product Opportunity

### • AC/DC Power

- Primary side: Power Factor Correction
- Secondary side: Regulated DC/DC
- EV charging

### • DC/DC Power

- Automotive DC/DC converters
- ¼ brick and other small form factors

### • LED Lighting

- Automotive headlights
- Industrial & commercial lighting

### • Wireless Power

- In-car smartphone charging
- Power tools
- Kitchen appliances

### Home Appliances

- HVAC compressors and fans
- Refrigerator compressors and fans
- Dishwashers, clothes washers & dryers
- Range hoods, garbage disposers

### • Automotive

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### • Industrial

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### • Power Monitoring for IT and Data Centers

- AC/DC power supplies
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### • Utility Metering and Home Area Network

- Utility meters
- Industrial meters
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- Energy-aware appliances

### • Renewable Energy

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### • Power Monitoring Home Automation and Industrial Meters

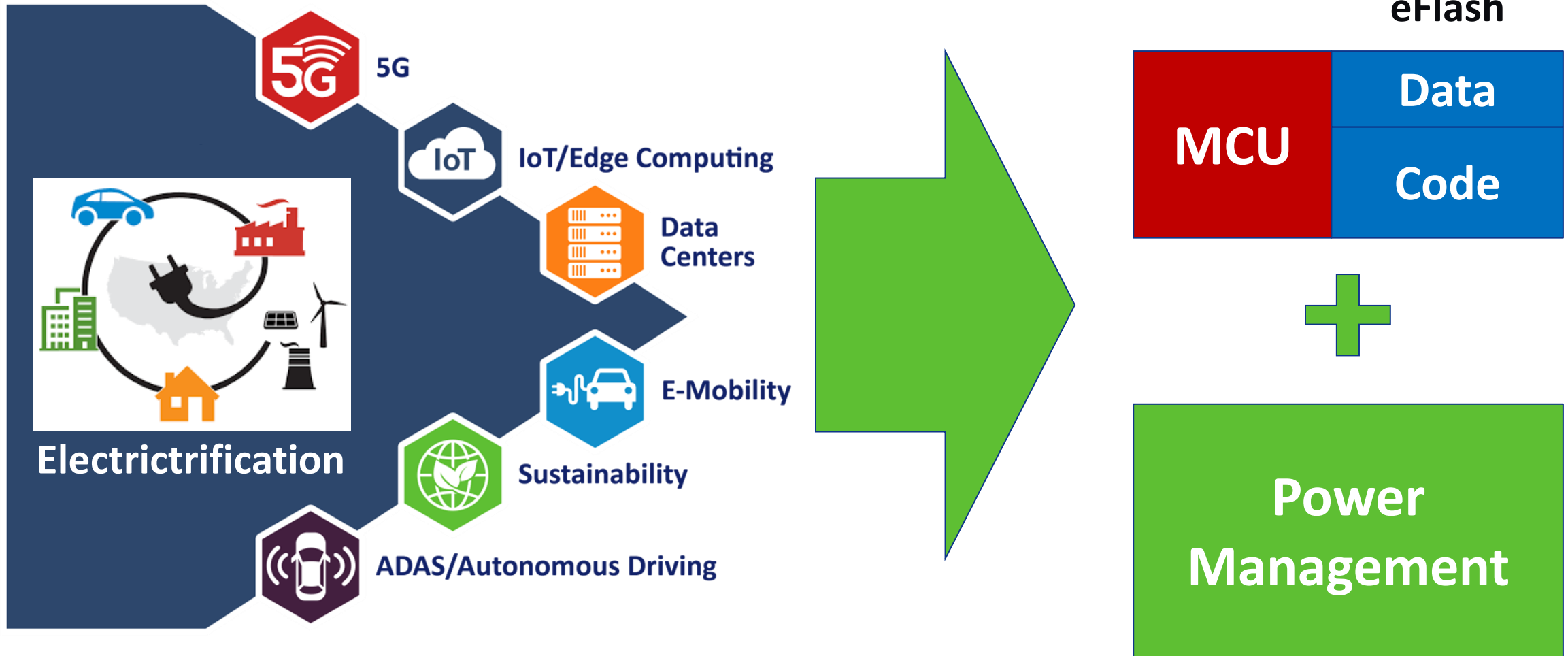
- Power distribution units
- Consumer power strips
- Smart outlets
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- E-circuit breakers
- Industrial meters



# Megatrends: Wave Two combines Power + eFlash



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# Megatrends: Wave Two combines Power + eFlash



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Flash

Add Intelligence Into  
12V/30V/48V/120V/240V Power Devices

MCU  
Data  
Code

Power  
Management



5G



IoT/Edge Computing



Data Centers



E-Mobility



Sustainability



ADAS/Autonomous Driving

Electricification



# eFlash Wave One (MCU)



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**Leading  
Edge MCU**

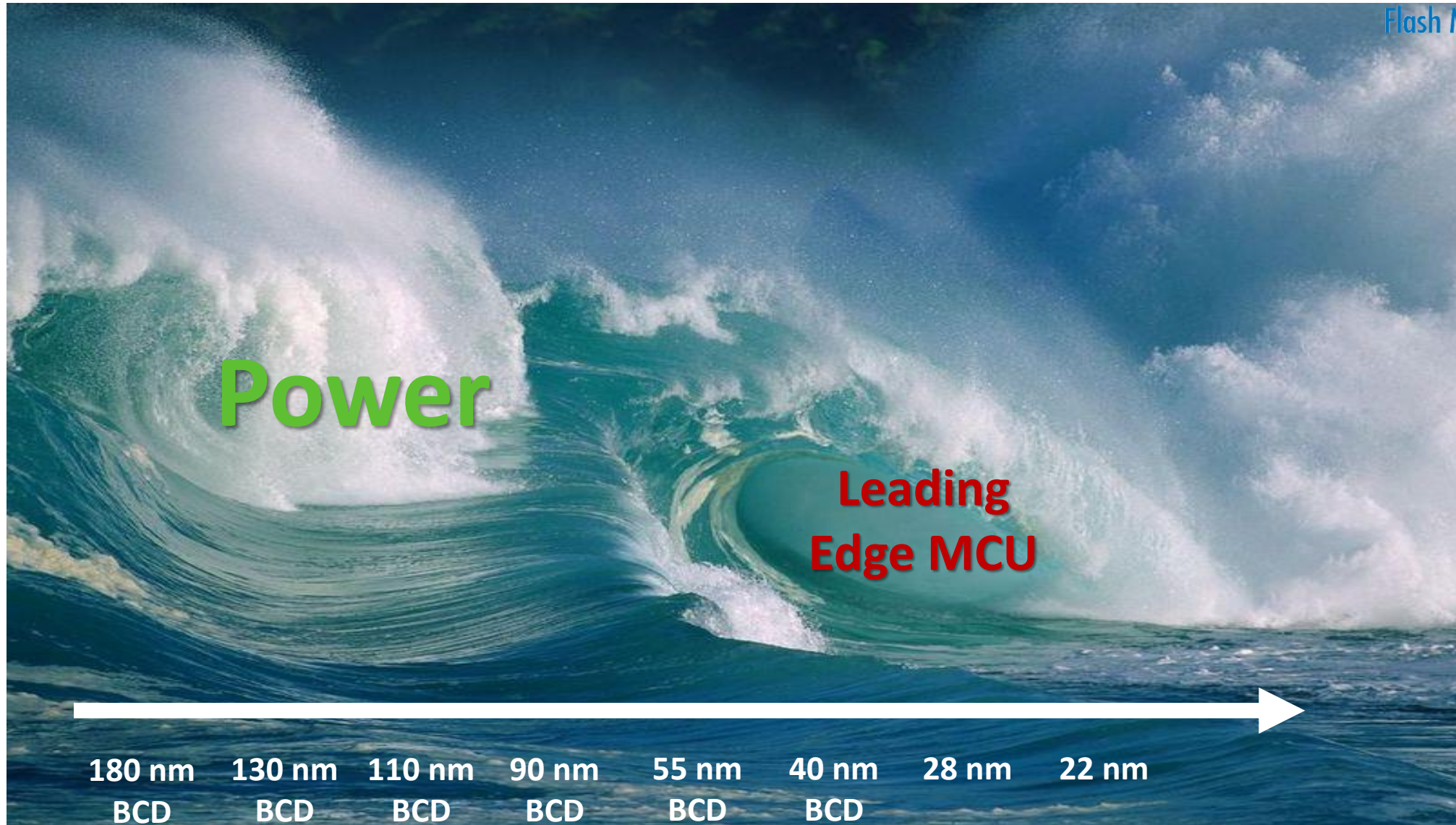
180 nm 130 nm 110 nm 90 nm 55 nm 40 nm 28 nm 22 nm



# eFlash Wave One (MCU) & Wave Two (Power)



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# eFlash Wave One (MCU) & Wave Two (Power)



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BCD = Bipolar + CMOS + DMOS...

Power

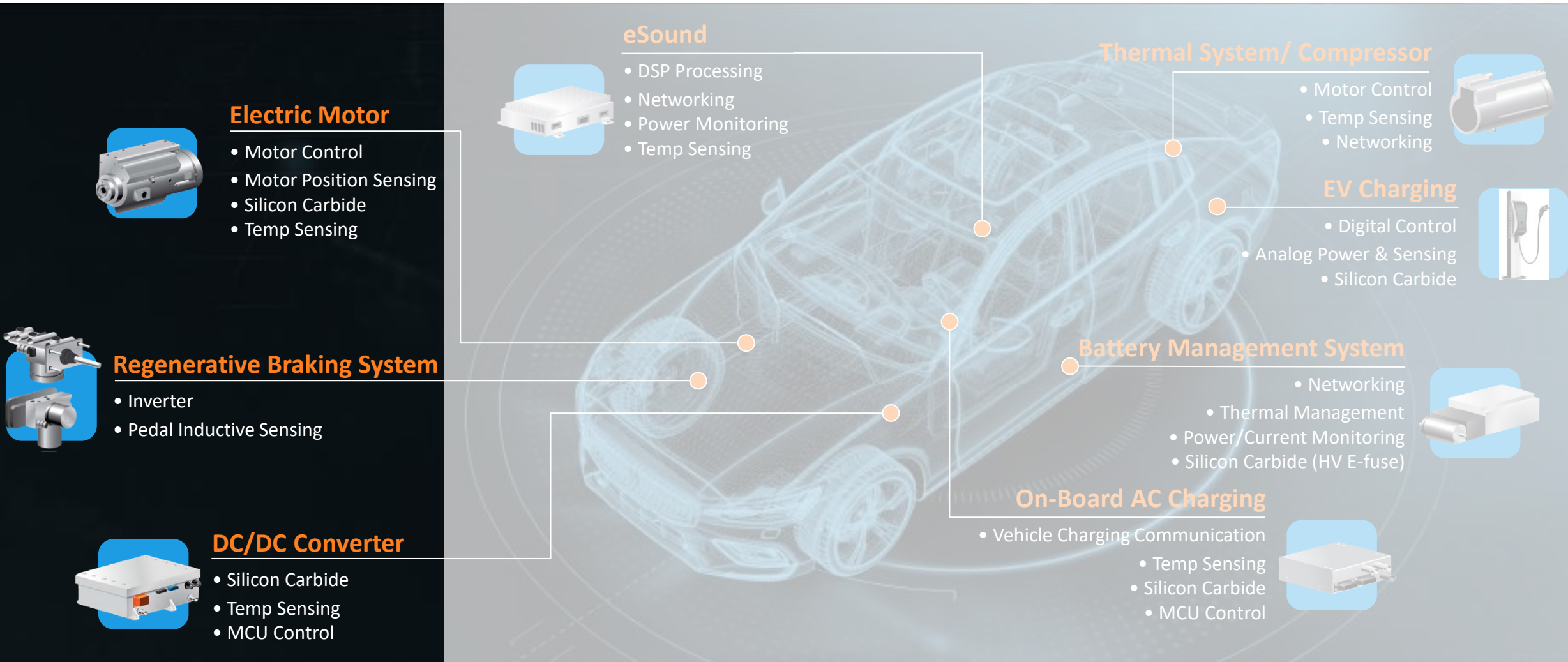
Now + eFlash

Leading  
Edge MCU

180 nm   130 nm   110 nm   90 nm   55 nm   40 nm   28 nm   22 nm  
BCD   BCD   BCD   BCD   BCD   BCD

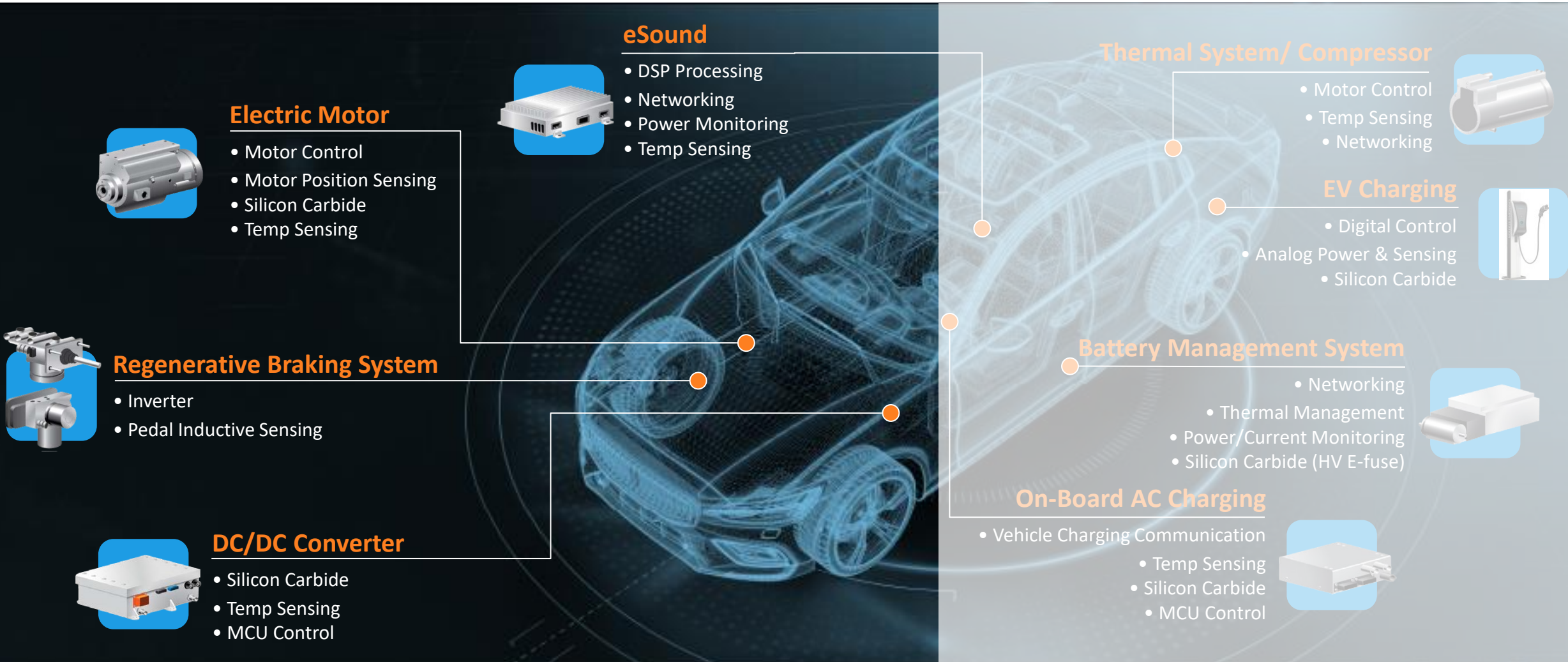


# MCUs + Power in Electric Vehicles



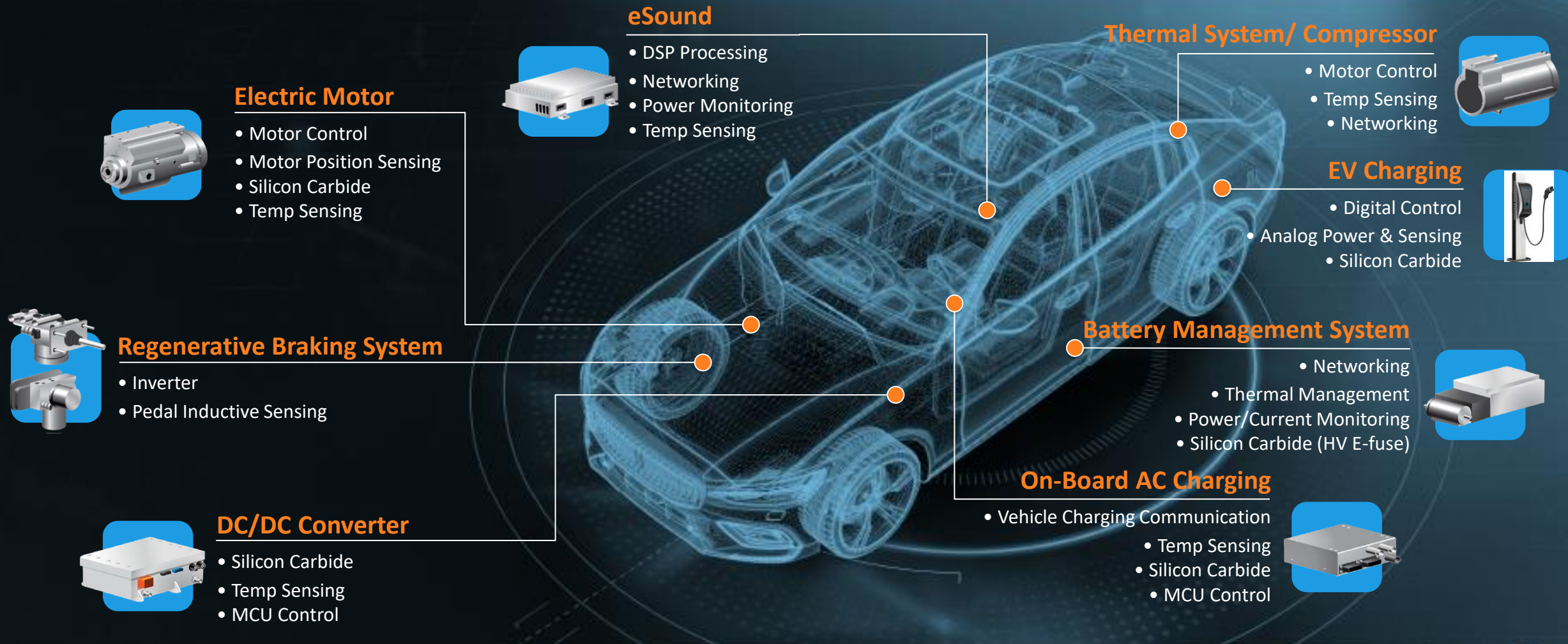


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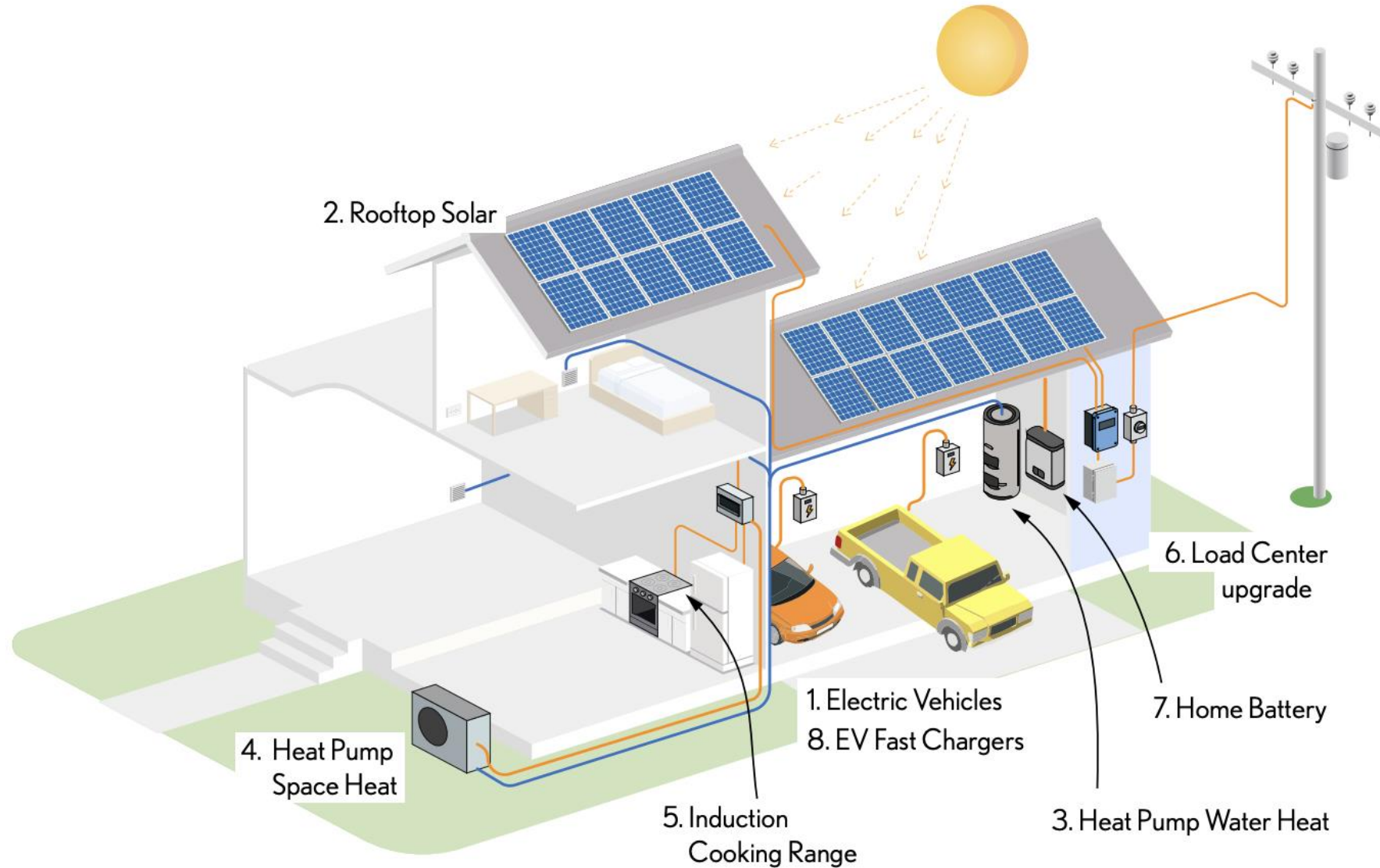


# MCUs + Power in Electric Vehicles





# Within Massive Power Ecosystem



Source: <https://e360.yale.edu/features/from-homes-to-cars-its-now-time-to-electrify-everything>



# SST BCD SuperFlash<sup>®</sup> Specs and Functional Safety



Capacity Range	Kbits – Mbits - Gbits
Endurance	> 100K cycles
Operating Temperature Range	-40°C to 175°C
Read Access Time	≤10 ns
Erase Time	10 ms
Program Time	10 us

Certificate



Functional Safety Management

FS Management (TÜV Rheinland)  
Manufacturer of Semiconductors Devices, related to  
ISO 26262 Road vehicles - Functional safety &  
IEC 61508 E/E/PE System Realisation (Phase 10)  
A-FSM 179

Certificate No.

Certified Company & Location

Scope of Certification

968/A-FSM 179.00/23

Microchip Technology Inc  
2355 W. Chandler Boulevard  
Chandler, AZ 85224  
USA

Manufacturer of Semiconductors Devices, related to

ISO 26262-2:2018 Management of functional safety  
ISO 26262-4:2018 (in extracts) Product development at the system level  
ISO 26262-5:2018 Product development at the hardware level  
ISO 26262-6:2018 Product development at the software level  
ISO 26262-7:2018 Supporting processes  
ISO 26262-8:2018 (in extracts) ASIL-oriented and safety-oriented analyses  
ISO 26262-9:2018 Production, operation, service and decommissioning and  
IEC 61508-1:2010 General requirements  
IEC 61508-2:2010 (in extracts) Requirements for E/E/PE System Realization (Phase 10)  
IEC 61508-3:2010 (in extracts) Software requirements







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# Thank You!



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**190+ Employees**  
**More than 170 Engineers**

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