nexperia

安世半導體 & 品佳集團
【小小零件 ~ 多多用途~ 讓伺服器設計大大滿足 線上研討會】

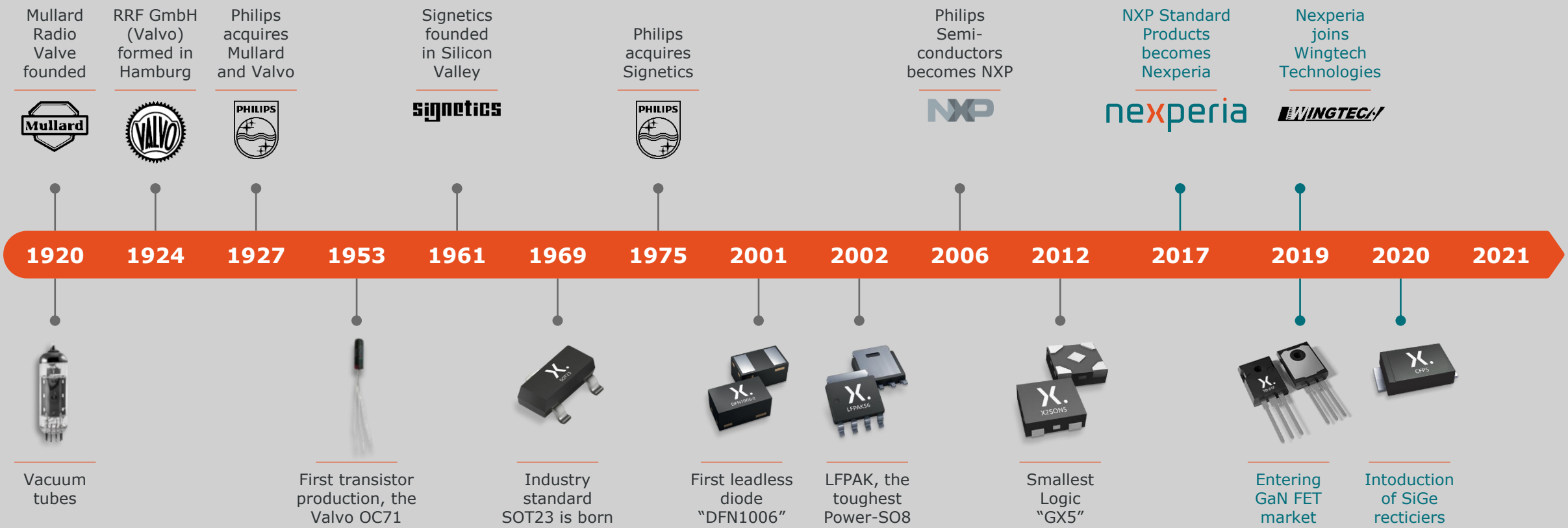
Section 1:
Nexperia半导体公司简介以及服务器市场未来趋势

Presenter: Peter Hsieh
Regional marketing manager

A standalone world-class company
for Discretes, Logic and MOSFET

Sep/15 2021

安世半导体的前世今生


Mullard Radio Valve founded
RRF GmbH (Valvo) formed in Hamburg
Philips acquires Mullard and Valvo
Signetics founded in Silicon Valley
Philips acquires Signetics
Philips Semi-conductors becomes NXP
NXP Standard Products becomes Nexperia
Nexperia joins Wingtech Technologies
1920
1924
1927
1953
1961
1969
1975
2001
2002
2006
2012
2017
2019
2020
2021
Vacuum tubes
First transistor production, the Valvo OC71
Industry standard SOT23 is born
First leadless diode "DFN1006"
LFPAK, the toughest Power-SO8
Smallest Logic "GX5"
Entering GaN FET market
Intoduction of SiGe recticiers

Our portfolio of essential semiconductors

15.000
parts in total

800
new types
added each year

Benchmarks in efficiency

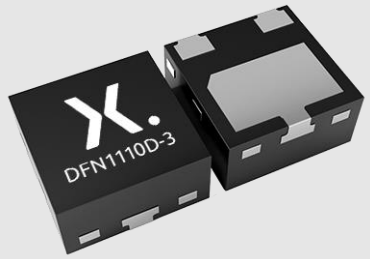
Process

Power

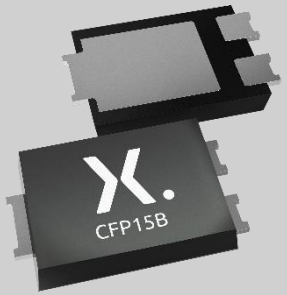
Performance

Industry-leading
small packages

Bipolar transistors



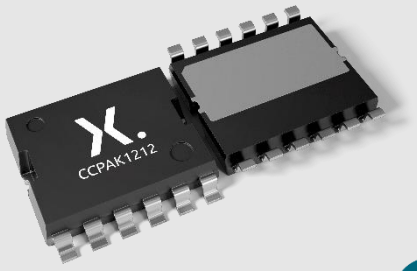
Diodes



ESD protection, TVS, signal conditioning

MOSFETs

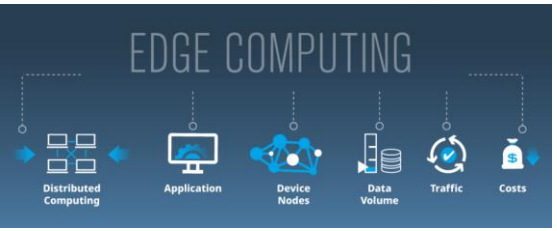
GaN FETs

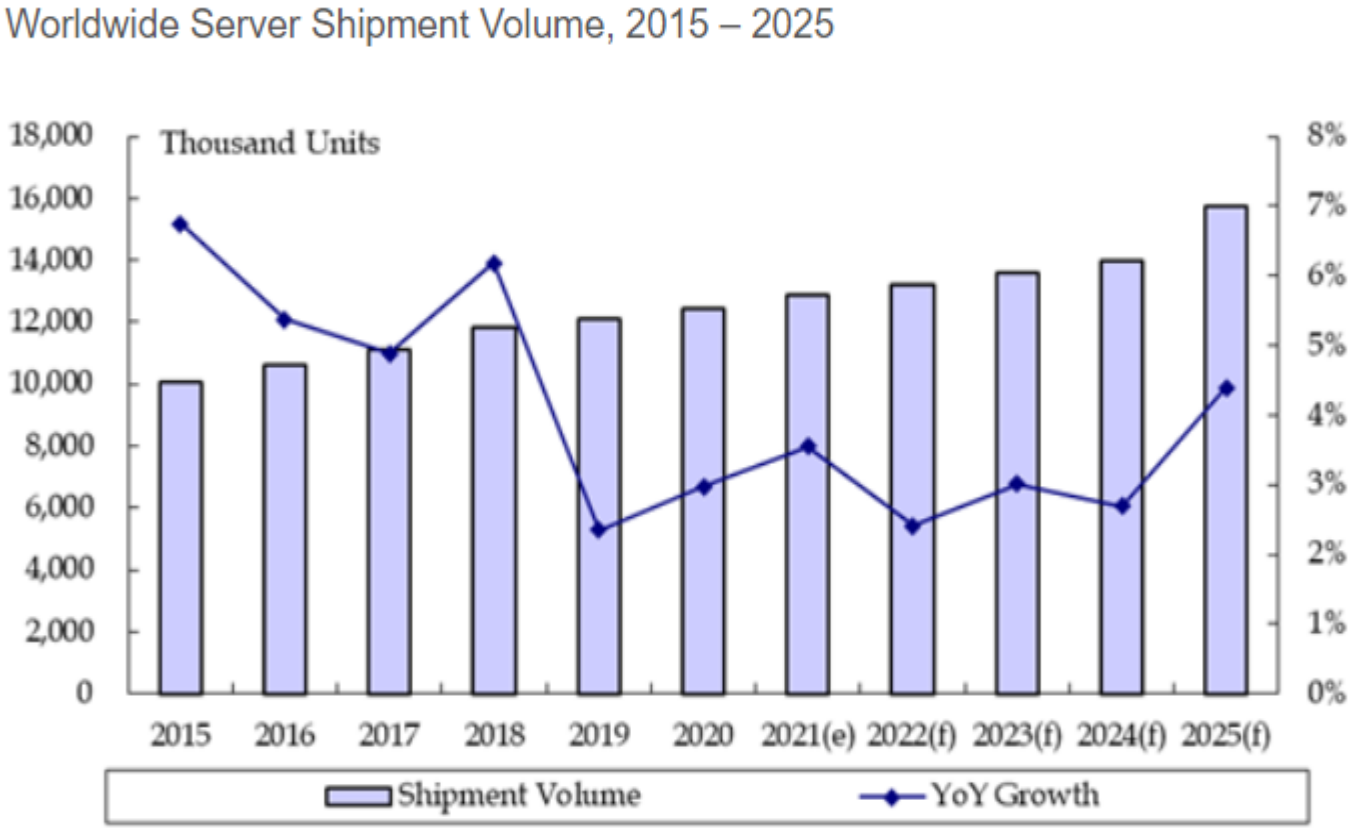


Analog Logic ICs

全球伺服器出貨預測 2015~2025

Global shipments are expected to witness **4.06%** CAGR (Compound Annual Growth Rate) for the forecasted period 2021-2025, reaching 15.7 million units in 2025. source: Mic Apr, 2021.

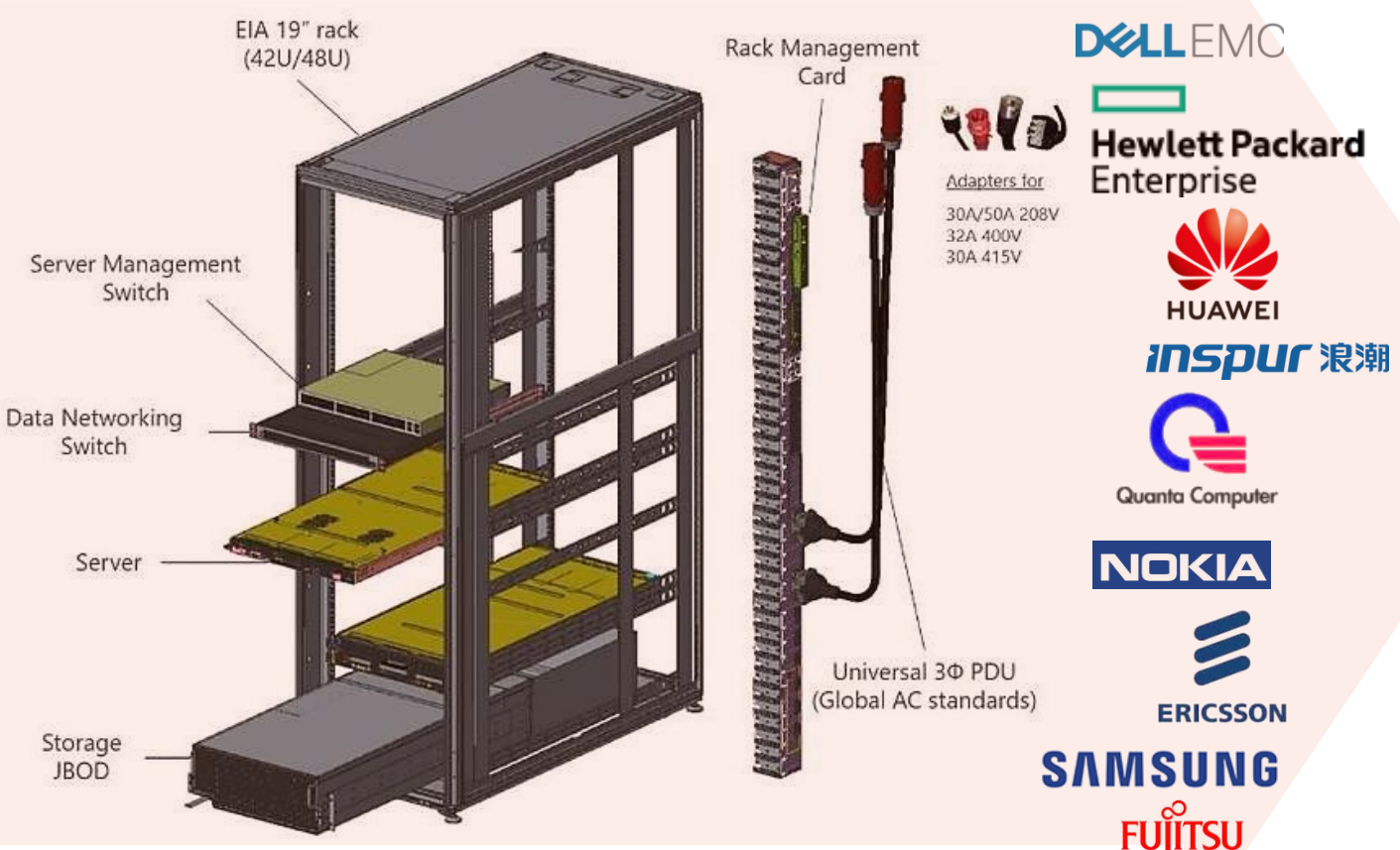




Data source: MIC Apr,2021

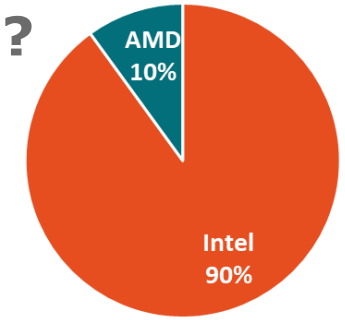
Server Architecture

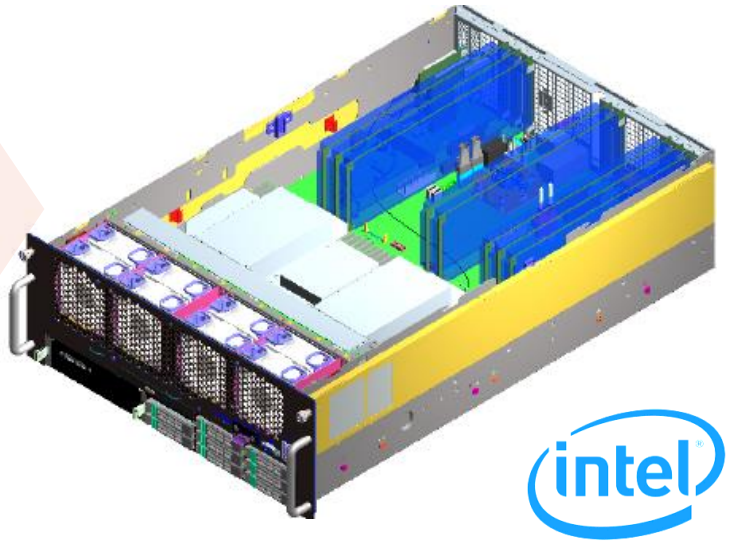
Application Overview



Open Compute Project from Microsoft

Why Intel?





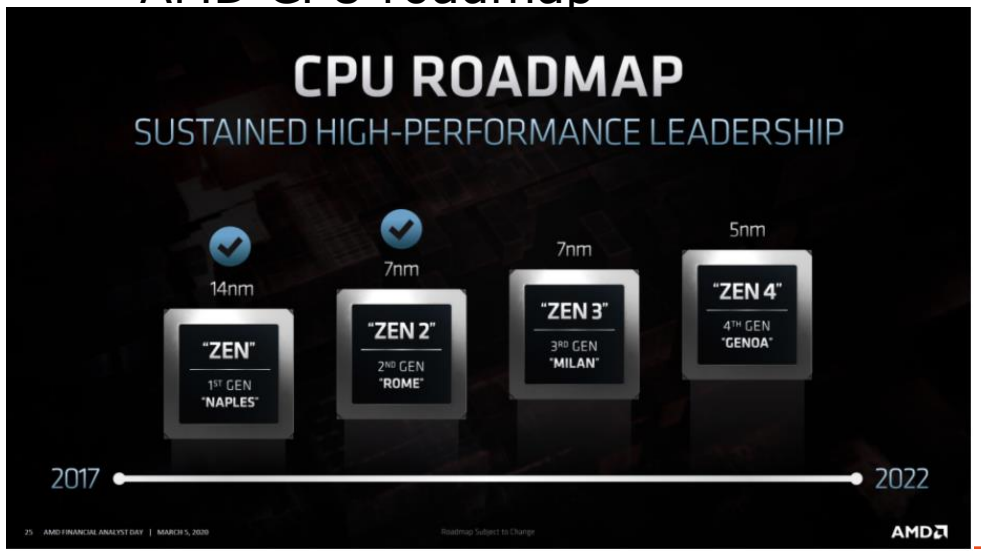
Ref. Platform - 4U Rack Chassis
Reference: Intel Whitley 2020

Server CPU roadmap

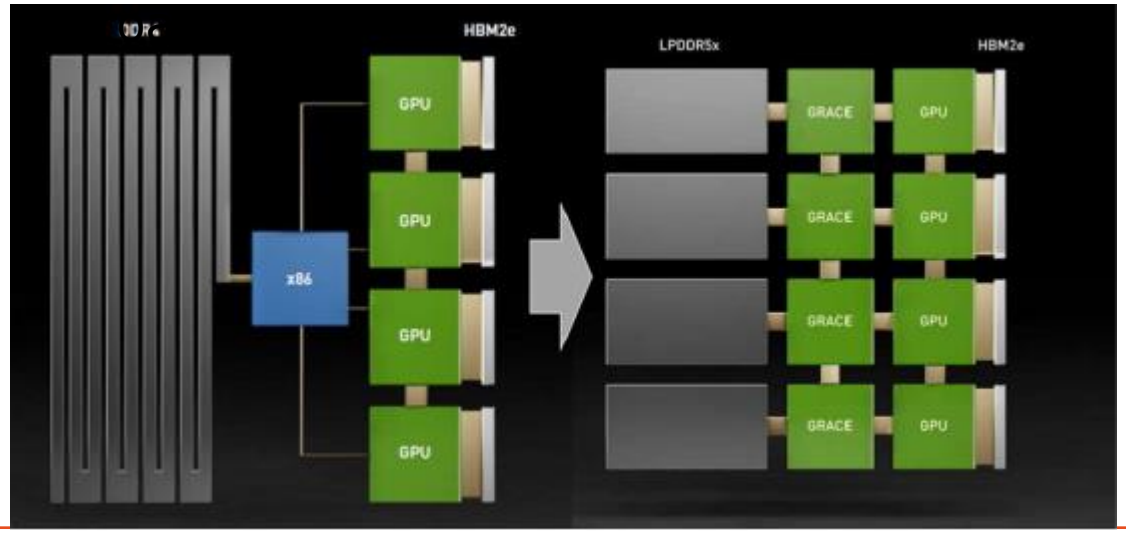
Intel伺服器CPU2019年至2024年產品規畫

2019	2020	2021	2022	2023	2024
Purley	Whitley		Eagle Stream	未公布	
Cascade Lake 14nm, 8通道, DDR4, PCIe3.0	Cooper Lake 14nm, 8通道, DDR4, PCIe3.0	Ice Lake-SP 10nm, 8通道, DDR4, PCIe4.0	Sapphire Rapids-SP 10nm+, 8通道, DDR5, PCIe5.0	Sapphire Rapids HBM 7nm, 8通道, DDR5, PCIe5.0	Granite Rapids 7nm, 8通道, DDR5, PCIe5.0	Diamond Rapids-SP 5 or 7nm

AMD CPU roadmap

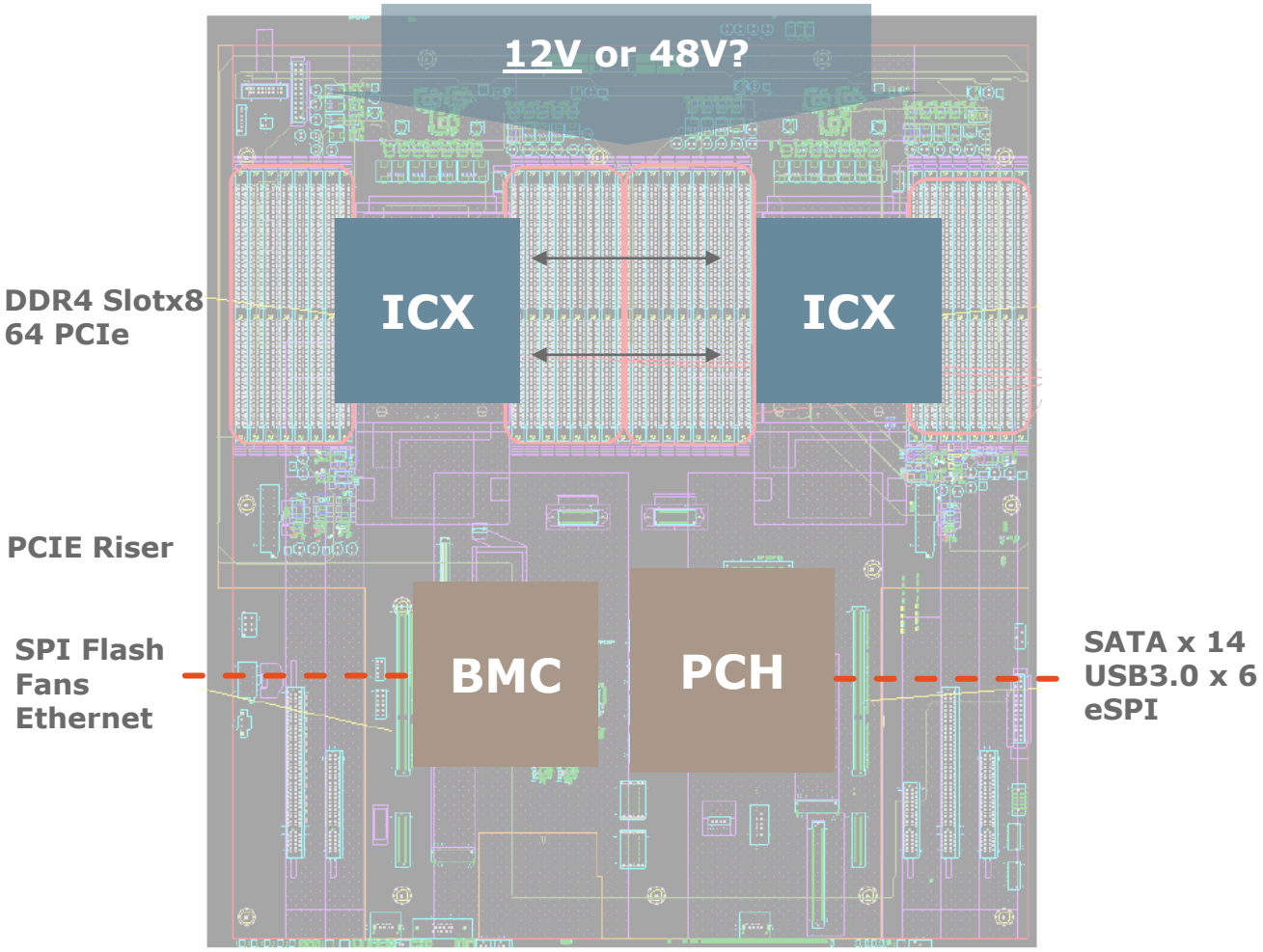


NVIDIA Grace CPU from Arm structure



Design Considerations

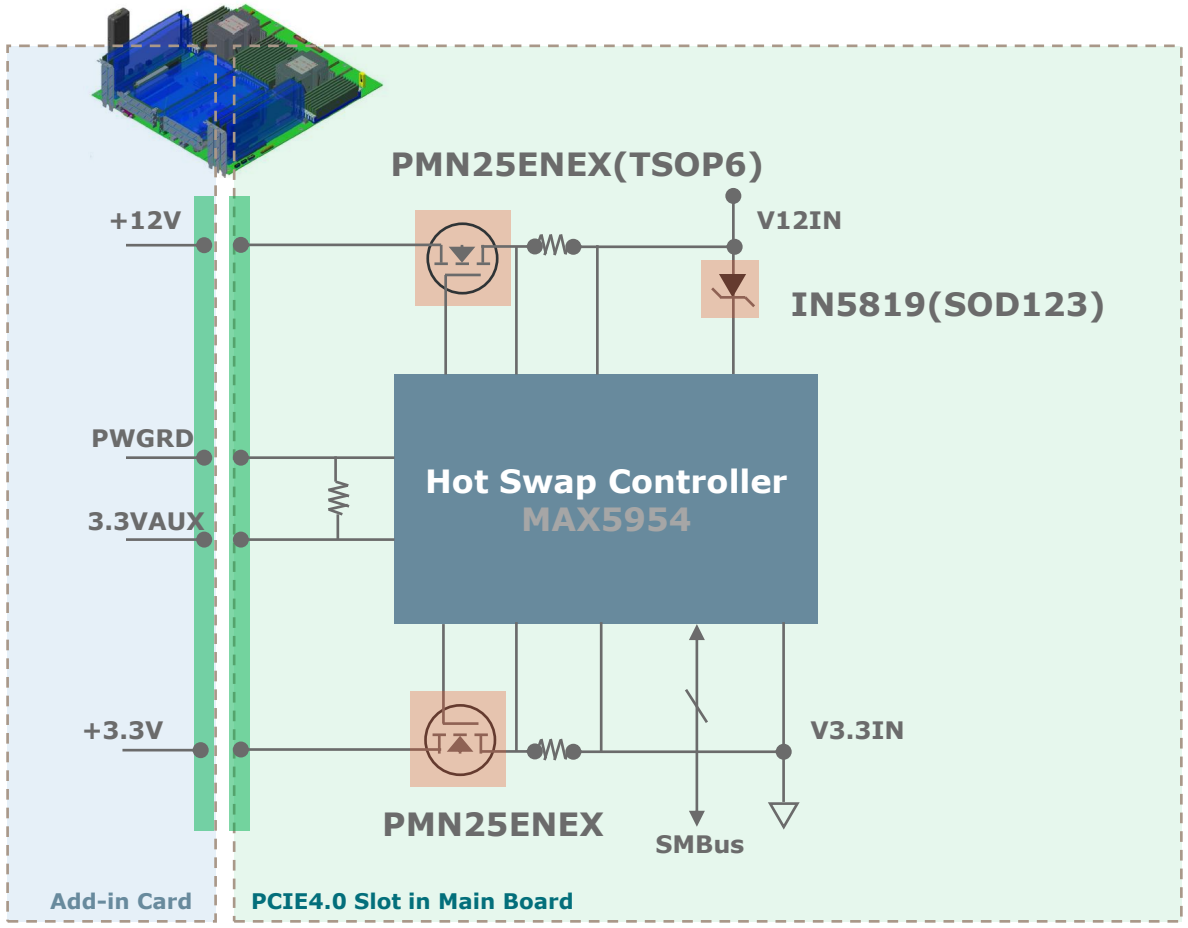
An increase on integration but on complexities



- **2020 Intel ICE Lake(10nm)** to replace 2019 Purley(14nm) to facilitate new capacities of ML and Crypto enhancement.
  - Its performance increases **30%**& Voltage down to **1.2V**
  - CPU Pincount Interface **up 15%**
- **Interface Design Trend**:
  - PCI Express 4.0 up to **64 lanes** from 48 lanes.
  - DDR4 operates at a voltage **1.2 V** vs. DDR3 at 1.5V.
  - Storage moves from SATA HDD to **PCIe SSD**
- **Power Management** is getting critical in performance and thermal issue
  - CPU power up **40% to 230W**; AC/DC **1600W supply**
  - Fan: increases from 21W to **32W**
  - CPU airflow T: keep 38C.
- **Future:**
  - From 12V to **48V** power architecture
  - Battery back by **UPS** via **DC to DC** from traditional AC to AC

Application Schematics

PCIE Hot Swap(or efuse) in Intel reference design



Design Clue

- Hot Swap – Not integrates MOS, allows to operate at higher voltages and currents.
- PCIe card requires 3.3V(9.9W) and 12V(6W) through the PCIe slot.

Application:

- No. interface such as PCIE increases.
- Host system is often different from the module vendors.
- **Either in Server backplane or add-in cards,** ex: 加速卡, 網路卡, 匯流排配接卡 or 固態斷路器

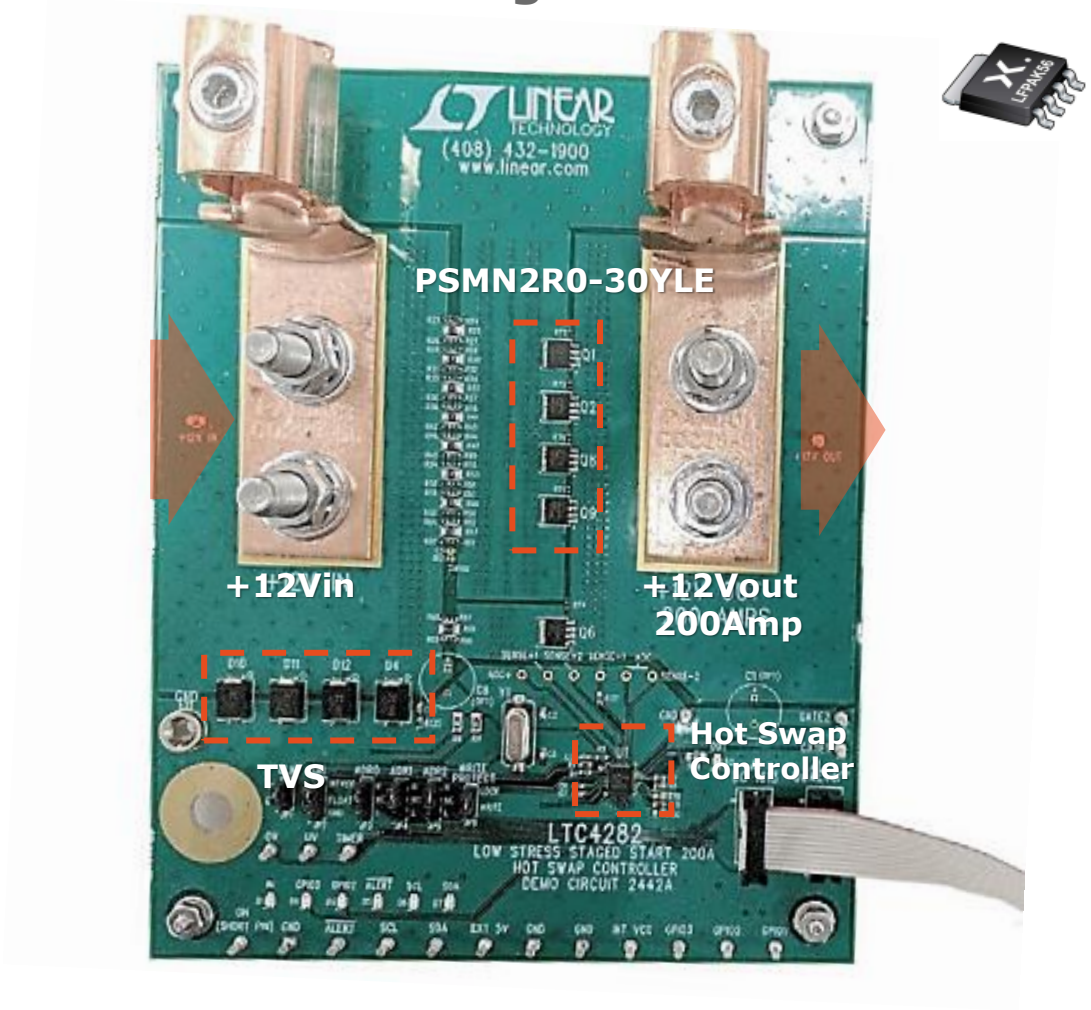
Recommendation:

- **MOSFET: PMN25ENEX x2**
  - 30V, 7A, 25mOhm nMOS
- **Schottky Rectifier** 1A or **TVS Protection**
- **eFuse(integrated MOS)**: Ex: 5V and 12V, 5A; Nexperia also under develop

Ref: Maxim - Single PCI Express, Hot-Plug Controller

Application Schematics

ADI reference design in Intel Server Platform



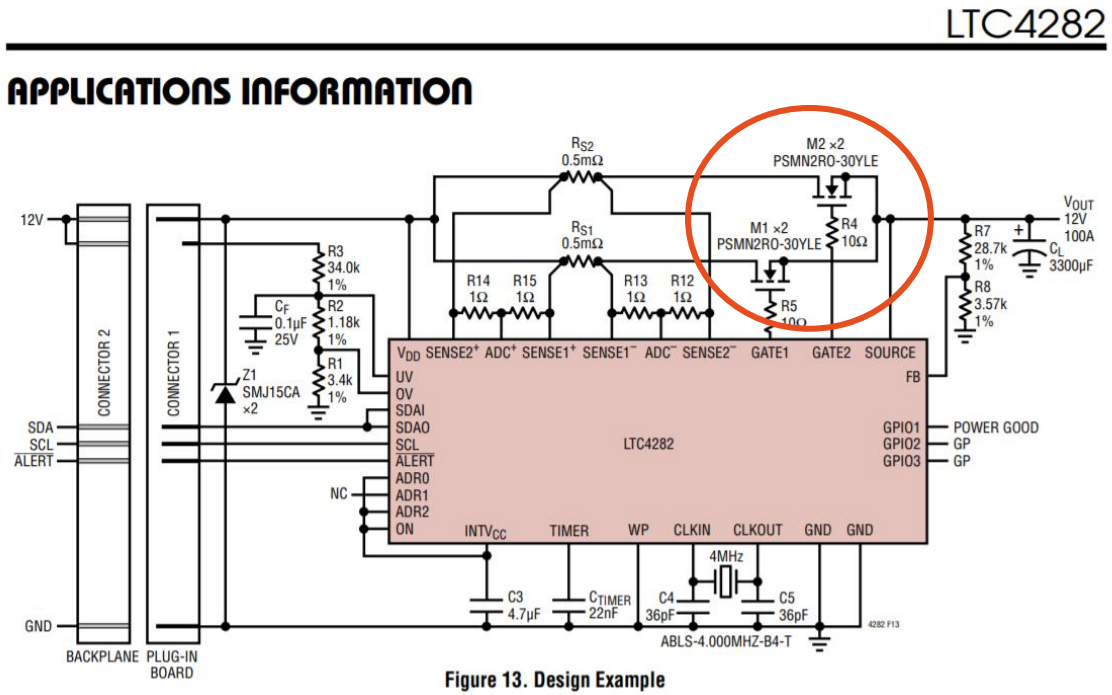


Figure 13. Design Example

Ref: ADI – LTC4282 Hot Swap Controller

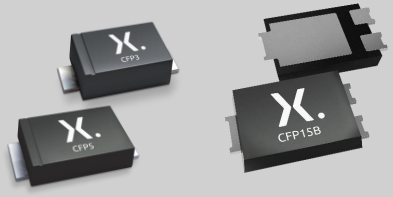
Nexperia solution for Server application

Bipolar transistors

- General Purpose Transistors, ex. PMBT3904/06, PDTC144EU
- BC847, BAT54

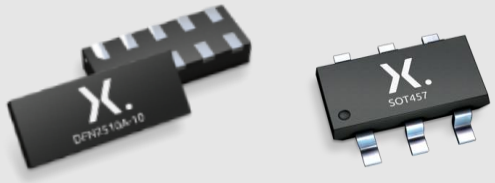
Diodes

- Switching diode, BAS316, BAS516
- Schottky diode <100V, 1~15A



ESD protection

- TrEOS family for high speed interface, IP4220CZ6, PUSB3FR4



15.000
parts in total

800
new types
added each year

Benchmarks in efficiency

Process

Power

Performance

Industry-leading small packages

Power MOSFETs

- High robustness LFPAK package for 25V/30V & 100V, ex. PSMNR51-25YLH, PSMNR58-30YLH, PSMN4R8-100BSE

Small signal MOSFET

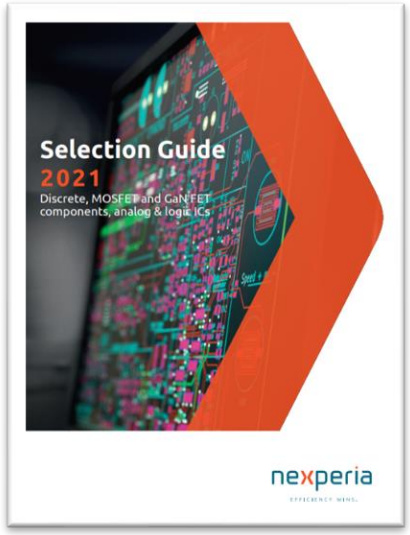
- 7002 series, NX7002BK, NX138BK
- Low RDS_on SOT23, PMV65XP

Analog Logic Ics

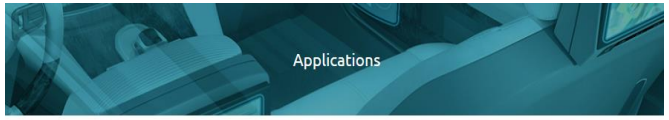
- Control logic, AND, OR….
- Analog switch, 74LVC1G3157, 74CB3Q3257
- Level translator/buffer, 74AVC4T245, NXS0104

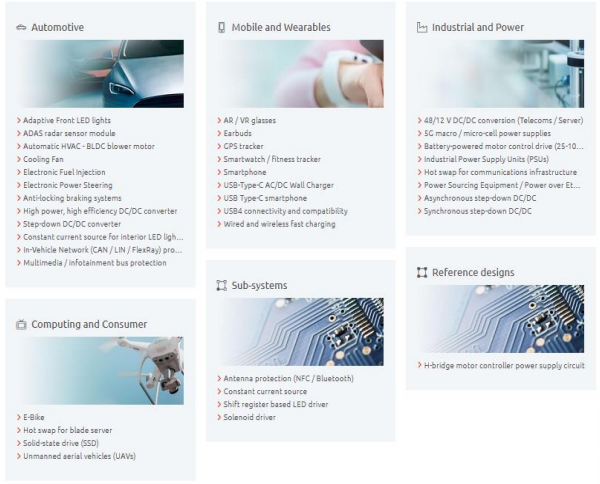
Nexperia can help

2021 Selection Guide



Automotive application Guide





https://www.nexperia.com/applications/

Application handbook