

High-Power GaN ICs & FETs for Next-Gen 800V AI Data Centers

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Navitas Semiconductor
December 2, 2025*

**Bodo's
Wide Bandgap
Event 2025**

Making WBG Designs Happen

GaN

High-Power GaN ICs & FETs for Next-Gen 800V AI Data Centers



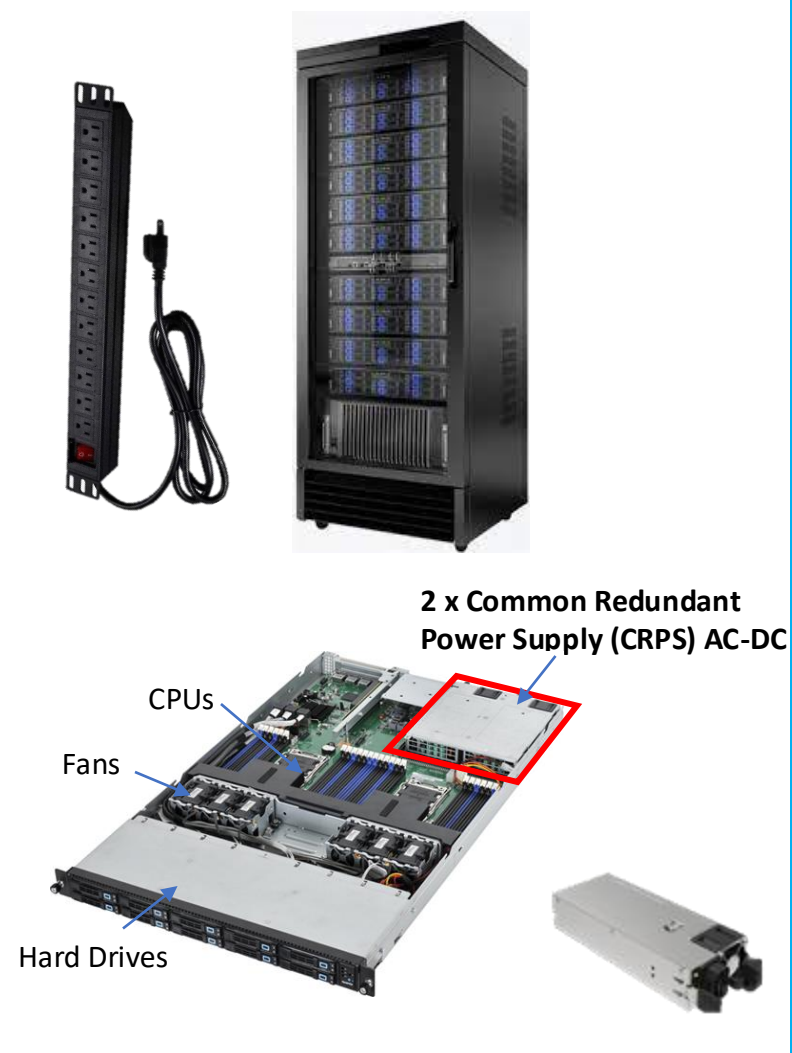
Llew Vaughan-Edmunds
Vice President & GM – GaN
3rd December 2025, 11:45 AM



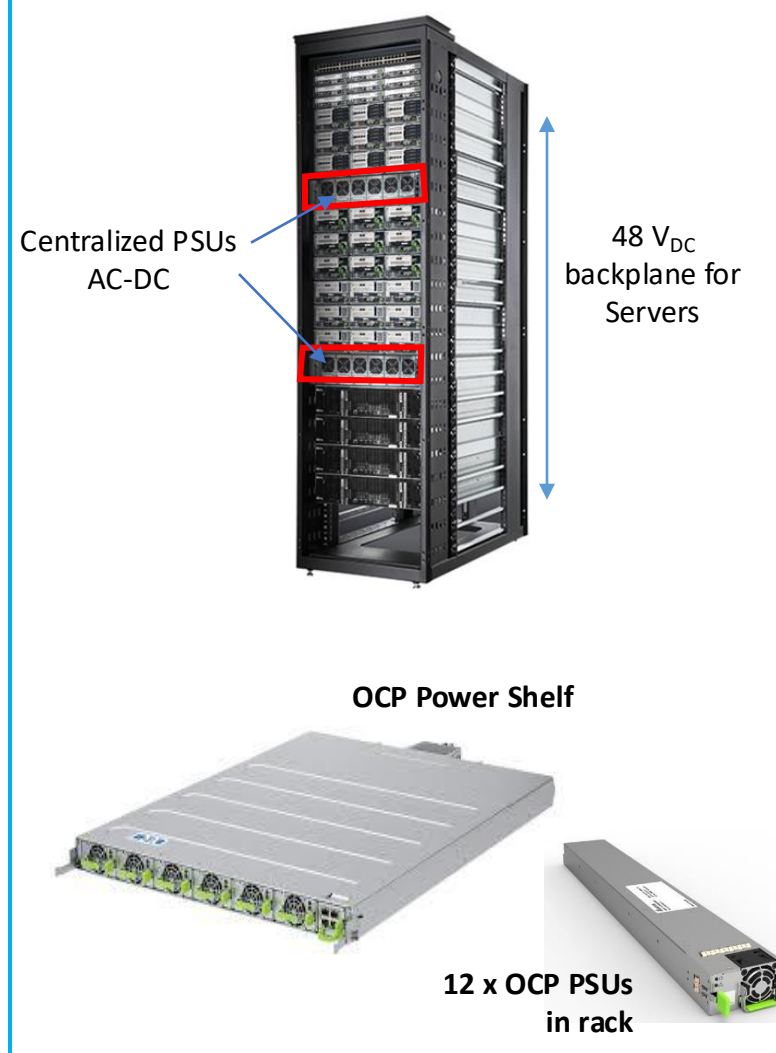
Electrify Our World™

3 Power Architectures in Data Centers

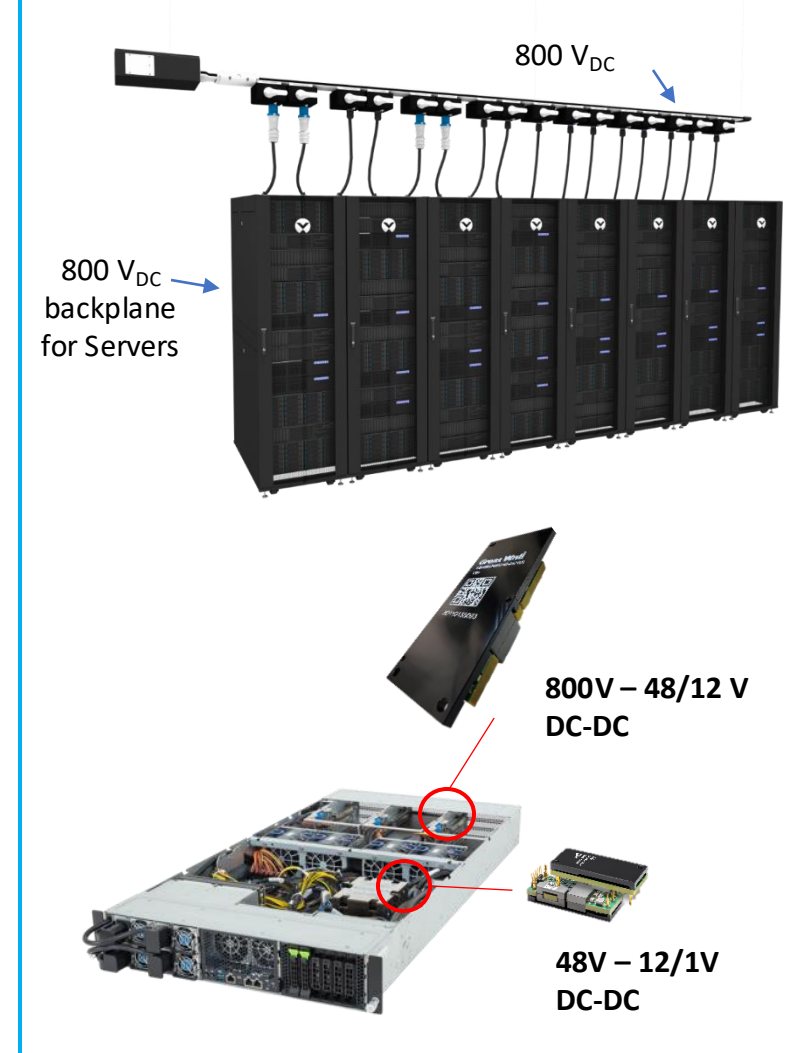
Modular Power (M-CRPS)



Centralized Power (OCP)

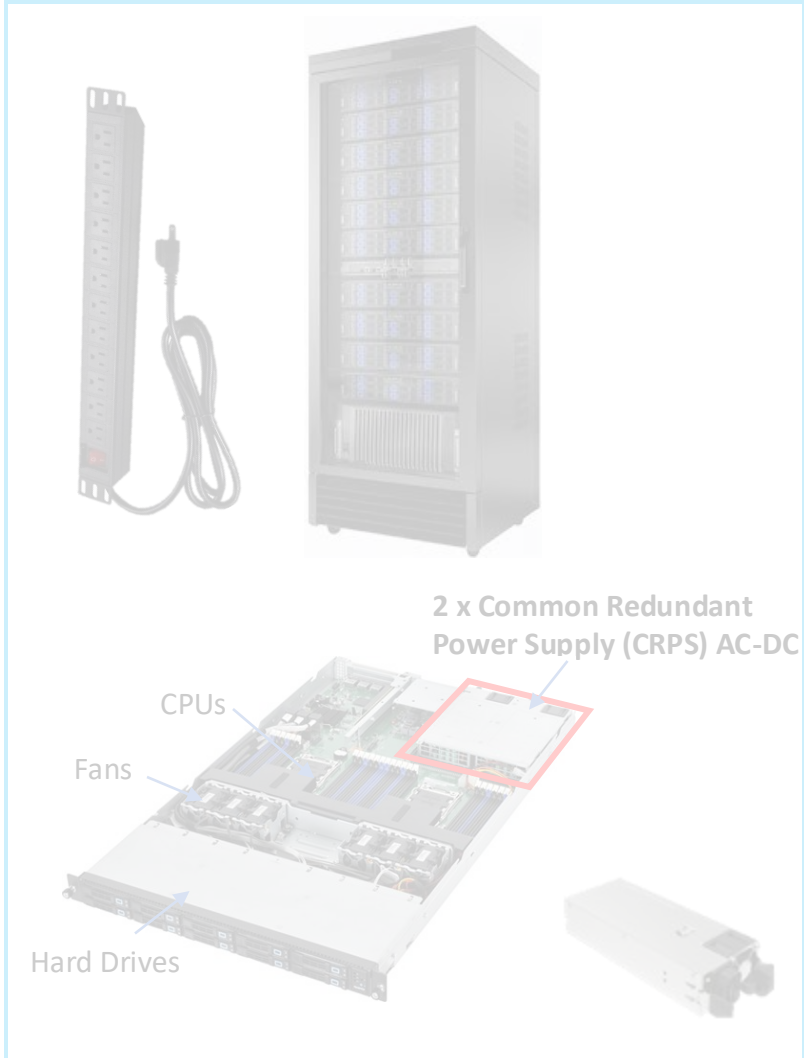


+/- 400 V_{DC} | 800 V_{DC}

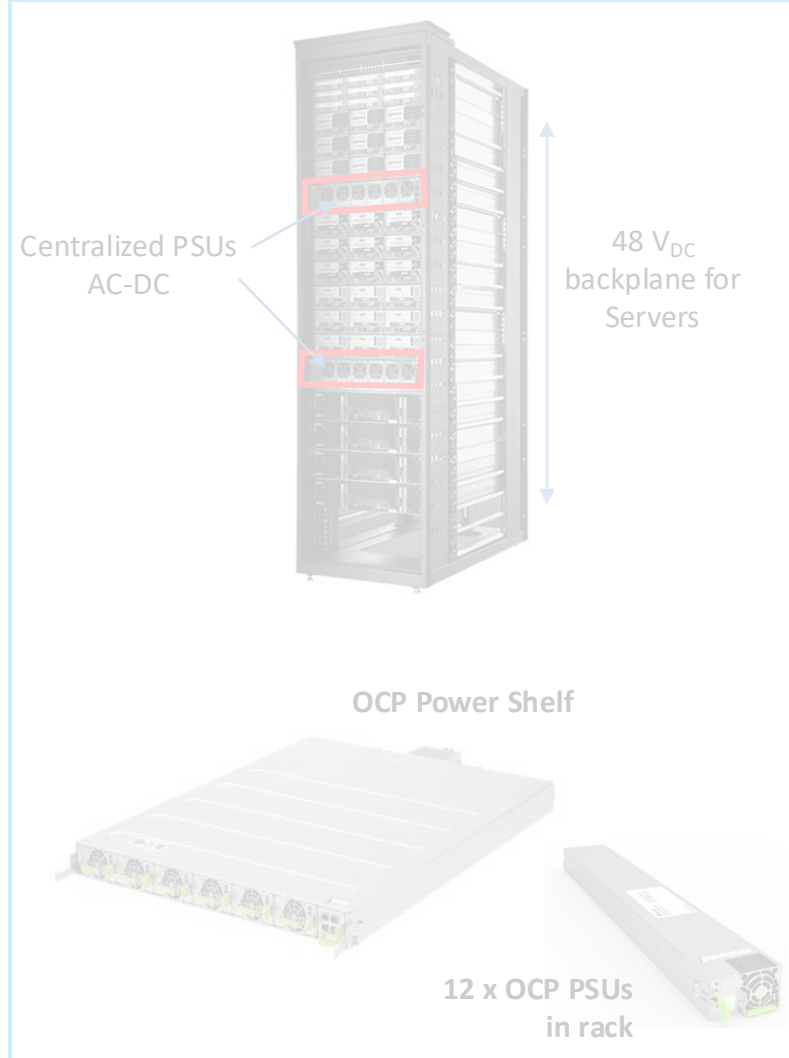


3 Power Architectures in Data Centers

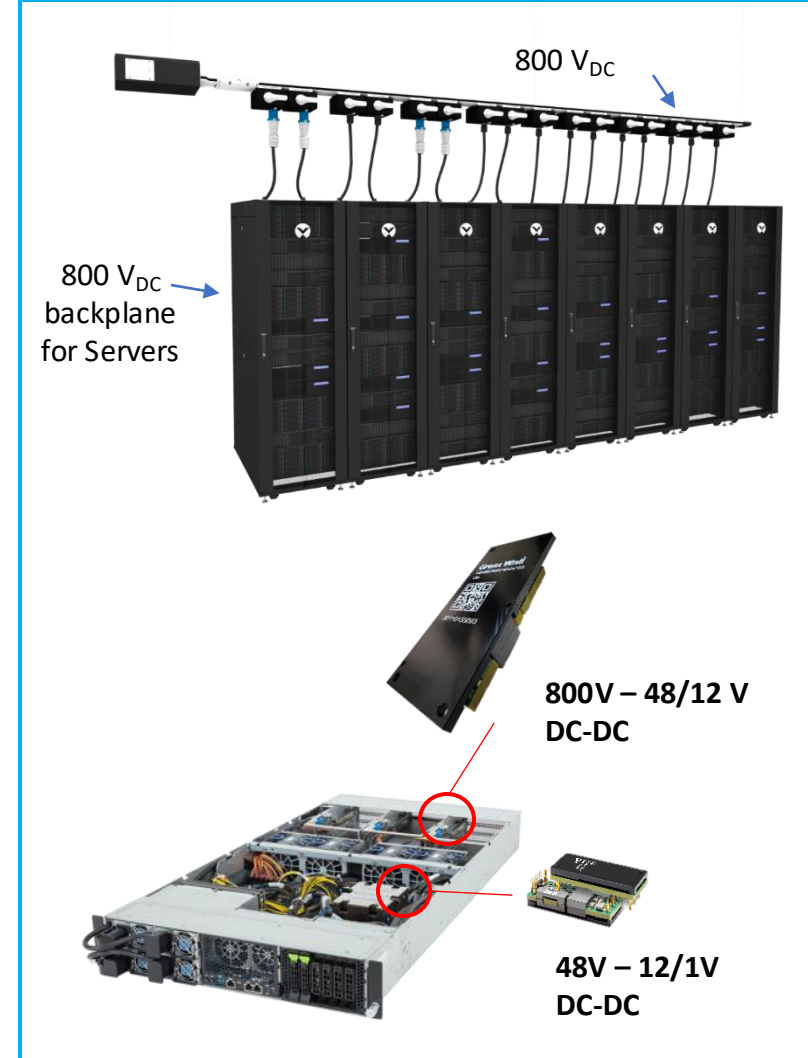
Modular Power (M-CRPS)



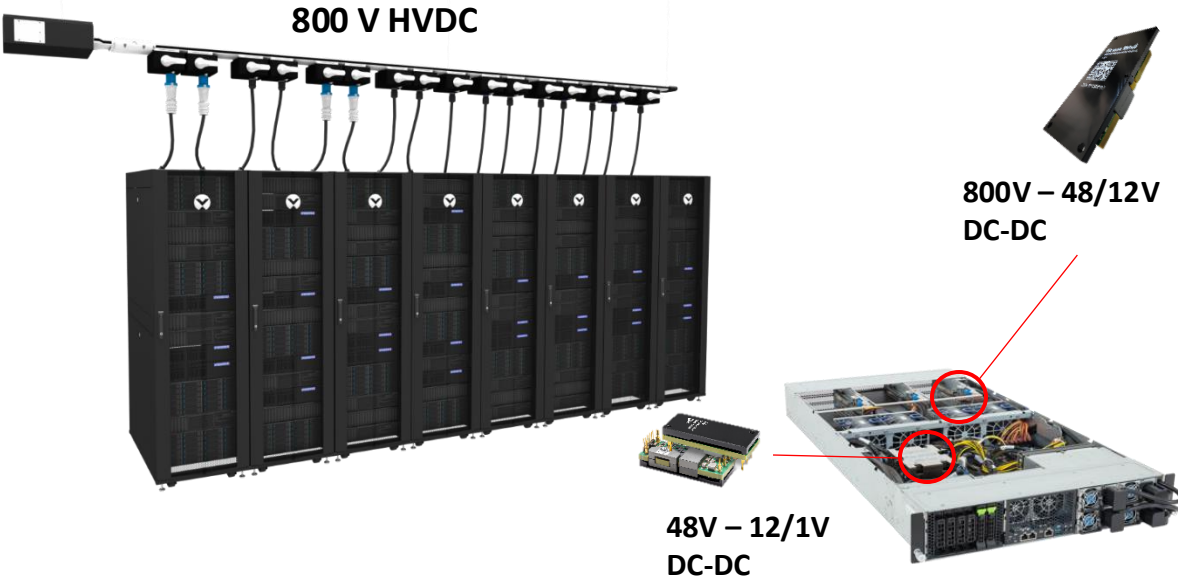
Centralized Power (OCP)



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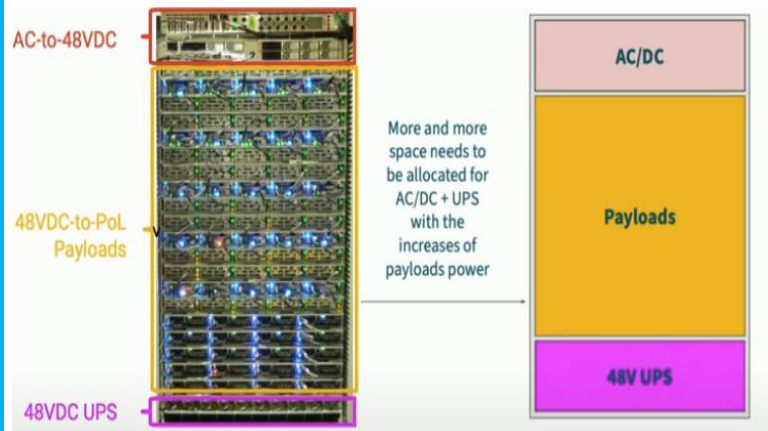


+/- 400V & 800 V DC Architecture



- ✓ 800 V HVDC removes power conversion from the rack
 - Separate 'Sidecar' power rack or upstream
- ✓ Improve efficiency & simplicity
- ✓ Higher computing density
- ✗ Changing existing power distribution is challenging
- ✗ New equipment & racks
- ✗ Safety concerns – DC grounding, arcing/flashings

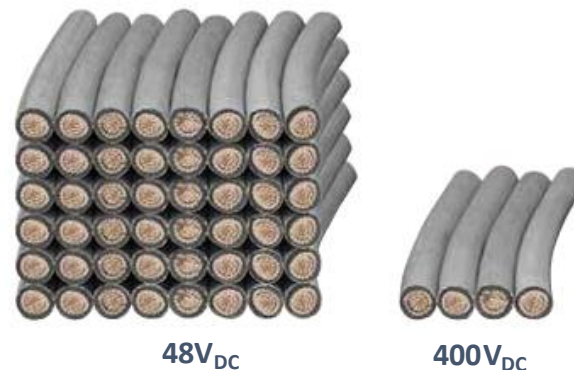
Higher Computing Density



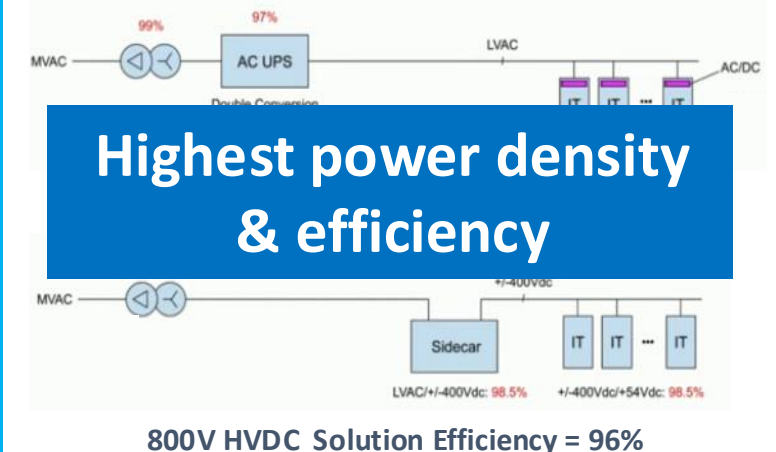
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Lower Cable Costs & I²R Losses

Cable to transport 200 kW of current 245 feet

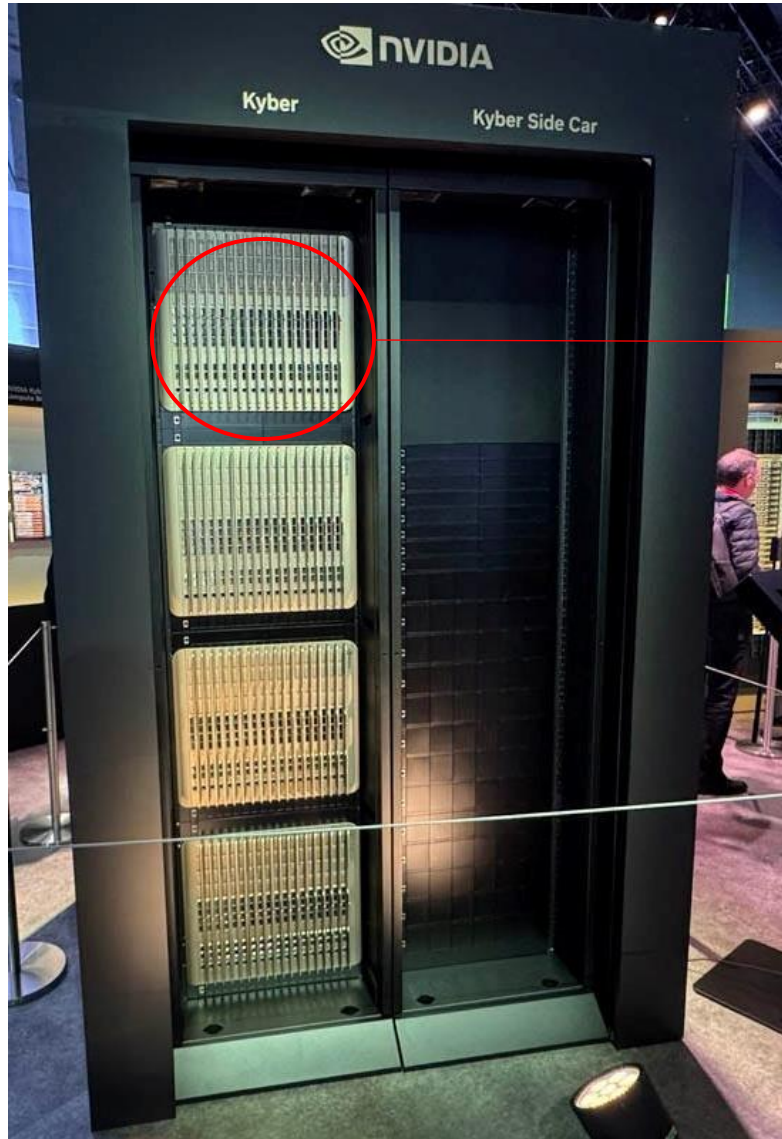


Increase System Efficiency & Simplicity



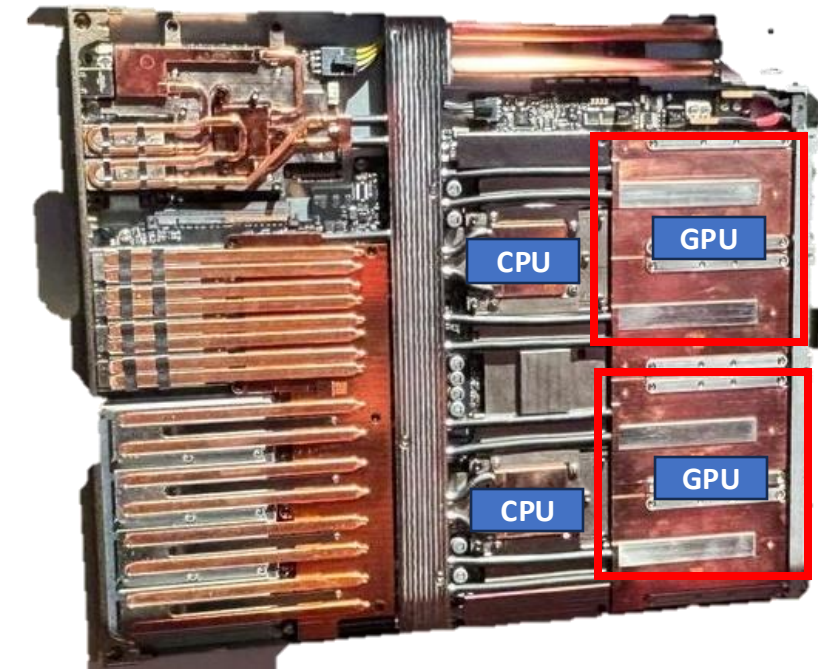
Source: General Technics, Google, Gigabyte, Seeking Alpha, Aivres, Vertiv, Advanced Energy, Vertiv, Great Wall Power

>600kW 'Kyber' Rack Powering Ruben Ultra GPUs

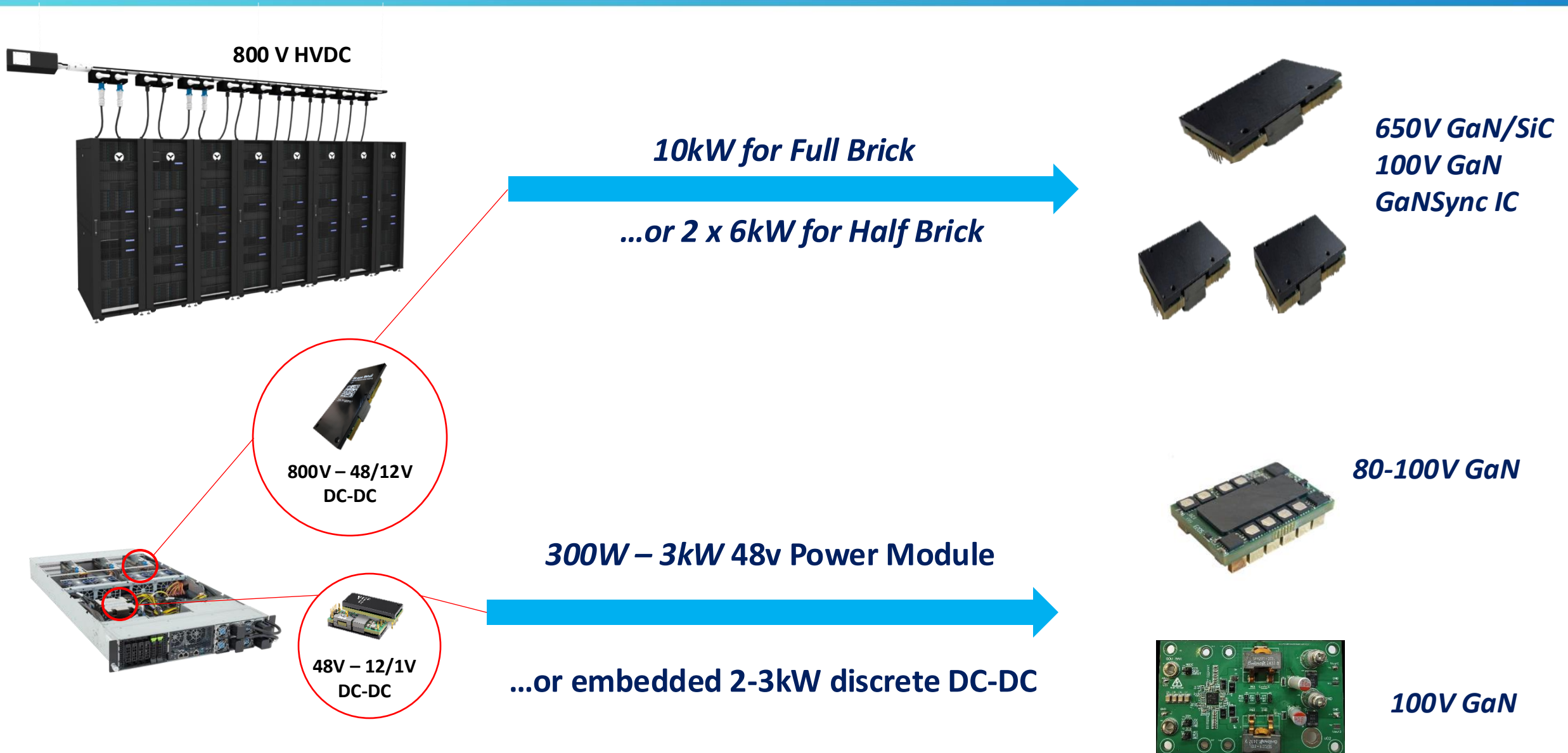


Kyber Rubin NVL576

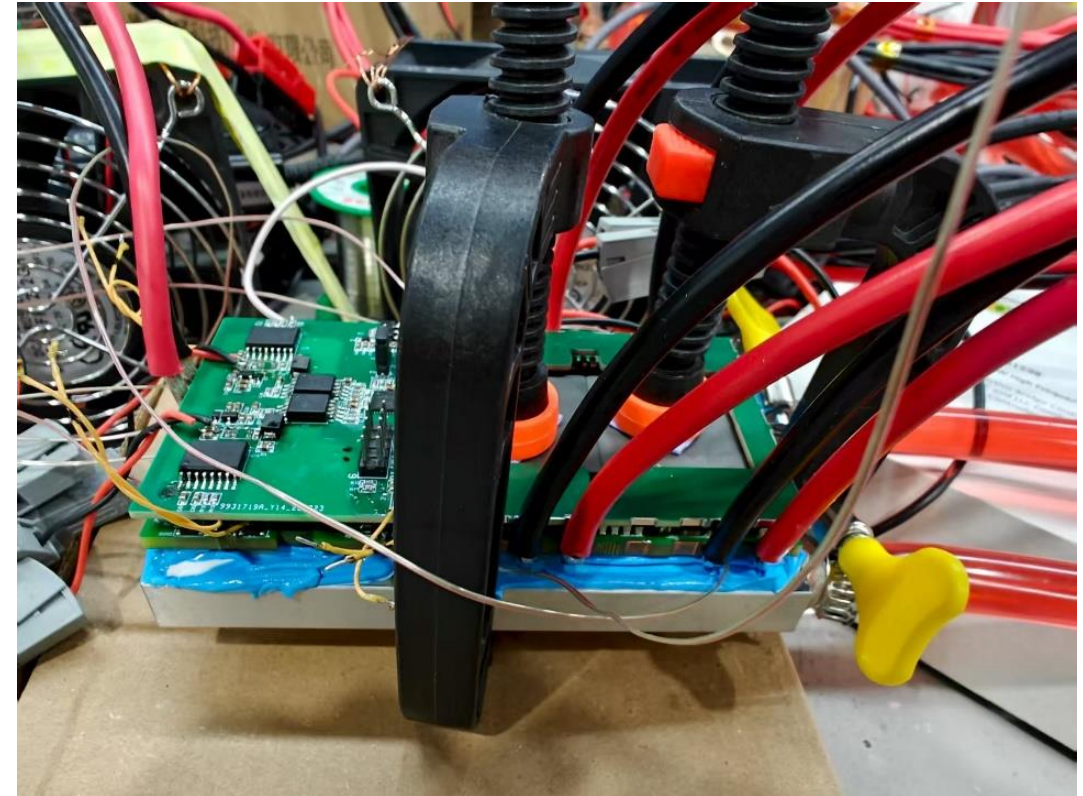
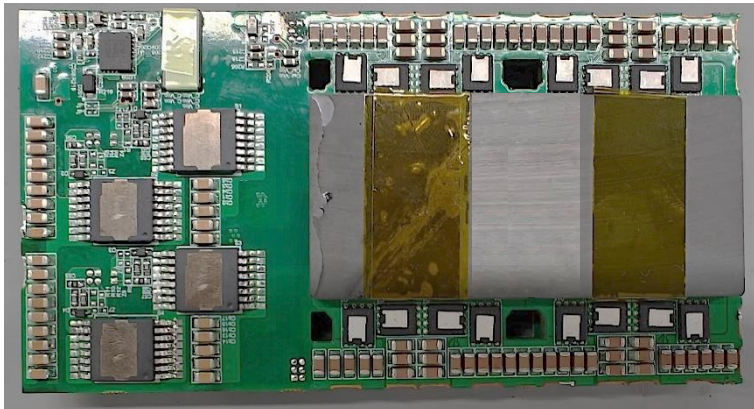
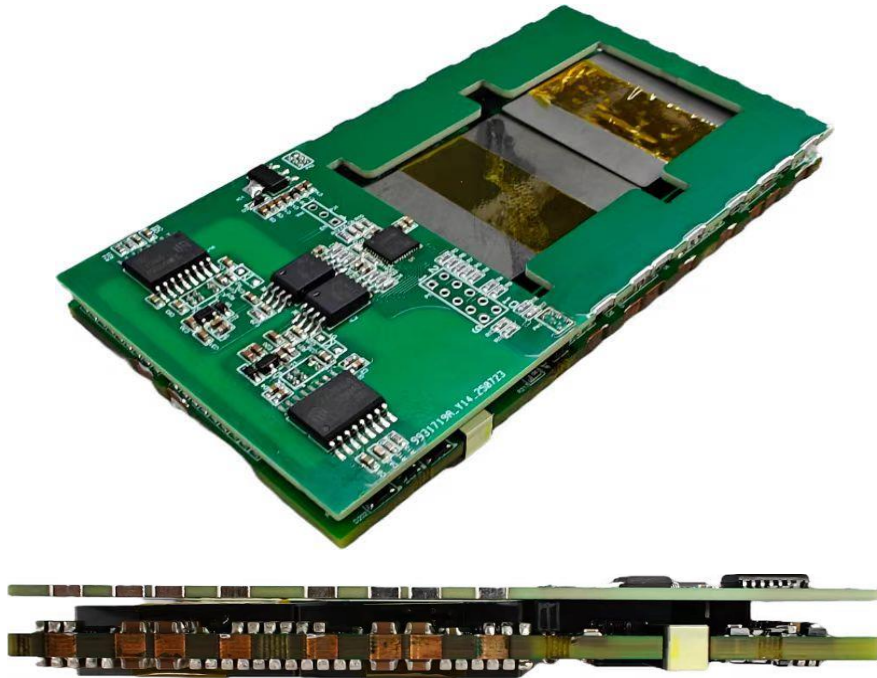
- 27 trays/can
 - 18 trays with 2 x GPU & 2 CPU
 - 9 networking trays on the back
 - 144 GPUs / rack
- **>600 kW...1MW 'Kyber Side Car' for power & cooling**



650V, 100, 80V GaN Opportunities (Today)



Navitas 10kW Full Brick DC-DC (800V – 54V)



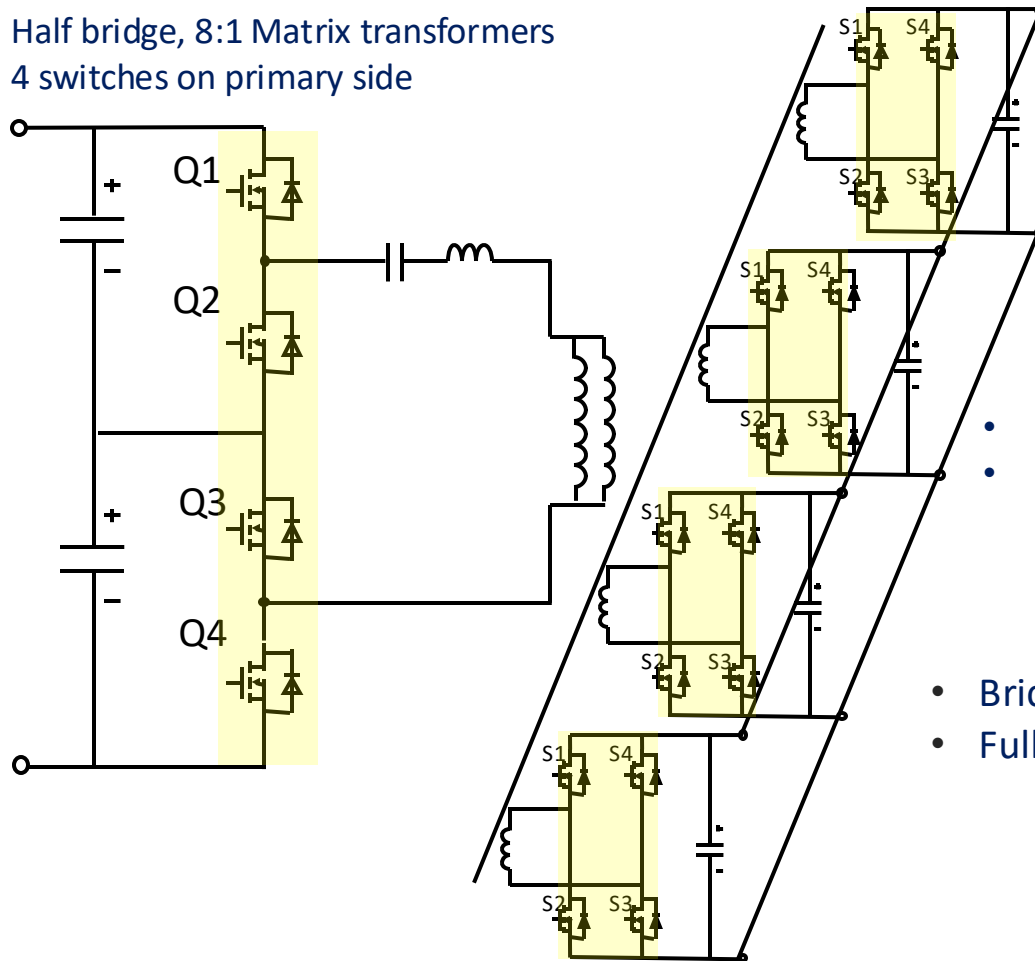
Full Brick: 116mm x 61mm x 12mm

800V HVDC 10kW Full Brick Demo



GaN FET: NV6066 (650V, **11mOhms(typ)**, TOLT)

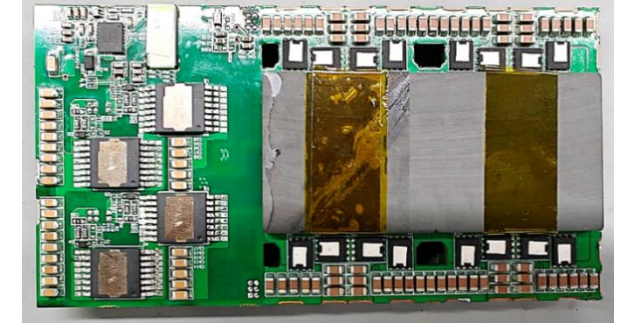
- Half bridge, 8:1 Matrix transformers
- 4 switches on primary side



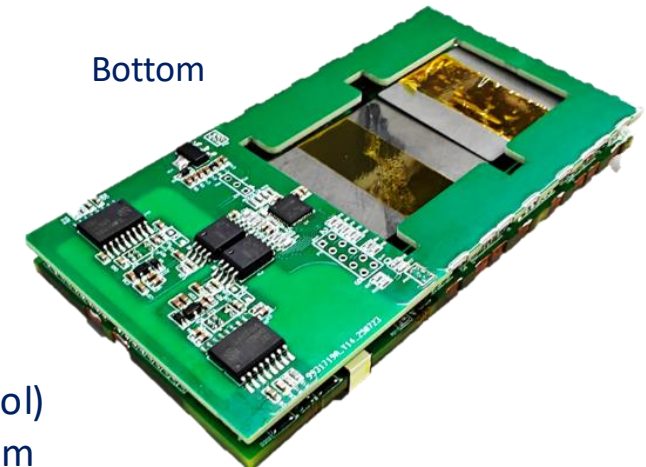
GaN FET: NVG008C10LC
(100V, 0.8mOhms(typ), PQFN56-DC)

- 16 switches on secondary/SR
- Pin-pin replacement with Si FET, IFX GaN
- Brick power module (incl. aux power and control)
- Full brick dimensions: 61 mm x 116 mm x 12 mm

Top

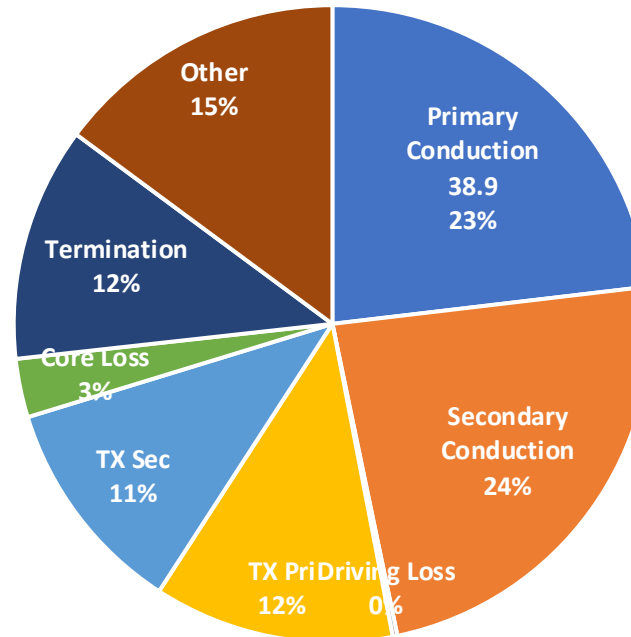


Bottom

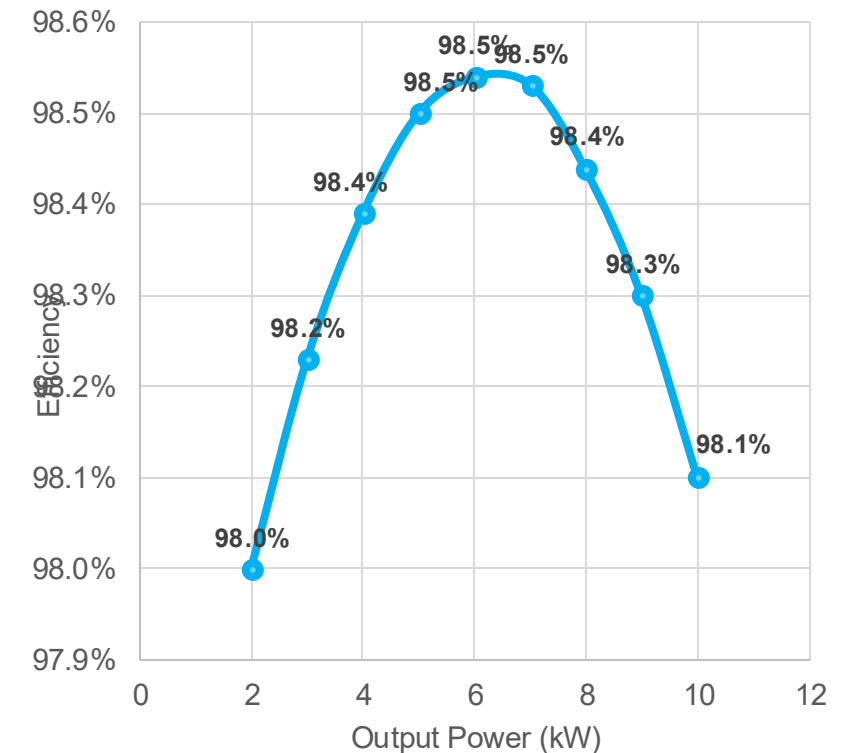


800V HVDC 10kW Full Brick Demo

Losses	Power Loss	Remark
Pri. Conduction	38.9 W	NV6066 GaN FET (650V, 15mOhm)
Sec. Conduction	39.7 W	NV00810 GaN FET (100V, 0.8mOhms)
Driving Loss	0.4 W	GaN
TX Pri	20.5 W	@100C
TX Sec	18.7 W	@100C
Core Loss	5 W	
Termination	20 W	
Other Losses	25 W	
Total	168 W	98.5% eff

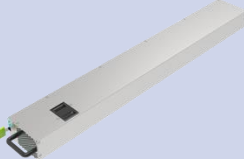


Test Results (calculated)



Using NV6066 + NV00810 achieves >98% efficiency

- Calculation is based on NV6066 (15mOhms) on the primary side and 100V (0.8mOhms) GaN on the secondary side.
- Transformer loss based on 3D FEA simulation

AC-DC (54V) CRPS 185 - 1U (40 mm) x 73.5 mm x 185 mm 2.7 kW – 40% higher power density than Si 3.2 kW – 99.3% PFC efficiency using IntelliWeave™ 4.5 kW – World's Highest Power Density of 137 W/in ³	PFC: 650V SiC LLC: 650V GaN SR: 100V Si MOS	
AC-DC (54V) OCP ORv3.0 - 1U (40 mm) x 73.5 mm x 560 mm 8.5 kW – World's First 8.5kW OCP using GaN/SiC @ 97.5% efficiency	PFC: 650V SiC LLC: 650V GaN SR: 100V Si MOS	
AC-DC (54V) OCP ORv3.0 - 1U (40 mm) x 73.5 mm x 790 mm 12 kW – Designed for Production @ 97.8% efficiency	PFC: 650V SiC LLC: 650V GaN SR: 100V Si MOS	
DC-DC Evaluation Board 600 W - 48VDC – 12VDC, 50A	100V GaN	
DC-DC Full Brick – 116 mm x 61 mm x 12mm 10 kW - 800V - 50VDC	Primary: 650V GaN SR: 100V GaN	
Future • 800V – 12V DC-DC • 800V – 6V DC-DC	Primary: 650V GaN	In development



Thank you!





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