Cyntec Automotive Solution for xEV

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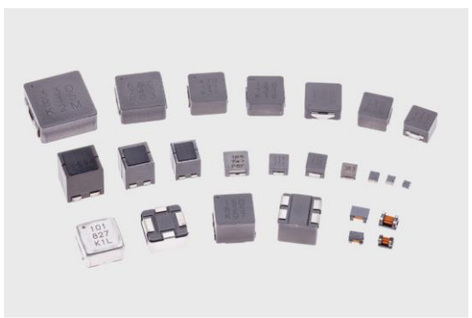
Cyntec‘s Key Highlights @ Automotive World 2023

- ✓ Transformers
- ✓ Power chokes
- ✓ For on-board charger and DC/DC converters

- ✓ High accuracy shunt sensors
- ✓ ASIL-D qualified shunt sensor modules
- ✓ For battery management system



- ✓ Power chokes
- ✓ Common mode chokes
- ✓ LAN transformer
- ✓ For infotainment / ADAS / lighting ECUs

- ✓ Highly integrated, miniaturized automotive-grade DC-DC modules for ECUs

15th AUTOMOTIVE WORLD 2023

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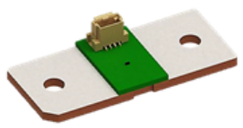
Shunt Sensor & Shunt Sensor Module for BMS

Modularization

Shunt Sensor

- w/ pin or w/o pin
- Patent pin implementation technology
- Robustness, high precision pin pitch

Shunt Sensor with connector



- Precision can reach ≦±0.5% through temperature compensation
- Through QR code to reduce customer test loading

Shunt Module with connector, A/D and MCU

- Optional design for customer selection
- Self-diagnostic capability to achieve ASIL level
- High accuracy level ±0.1% by temperature compensation

Technology Advantages

Modular Design Competence
Modular design and bending busbar replaces most components reducing complexity and system cost. It also resettable after high energy fault.

Thermal management
Professional team for heat distribution and structure design. Combine with high tech heat dissipated material and two phase cooling way.

Accuracy
High accuracy level ≦±0.1% of voltage and current by temperature compensation through our calibration capabilities on shunt module.

Safety
Design compatible of System, progress, product certificate of ISO26262.
Semiconductor of SSR to meet shorter fault current cut-off time from ms to us

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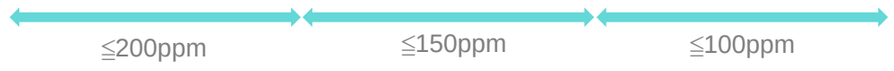
Shunt Sensor Family (Bus-bar type)

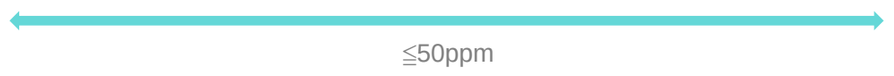
Chip Size (mil)	Chip Size (mm)	Operation Temp (℃)	Watt (W)	Tolerance (%)
272*71	69*18	-65~170	36	5
330*79	84*20	-65~170	36	5
330*142	84*36	-65~170	36	5

Resistance Distribution

TCR Range



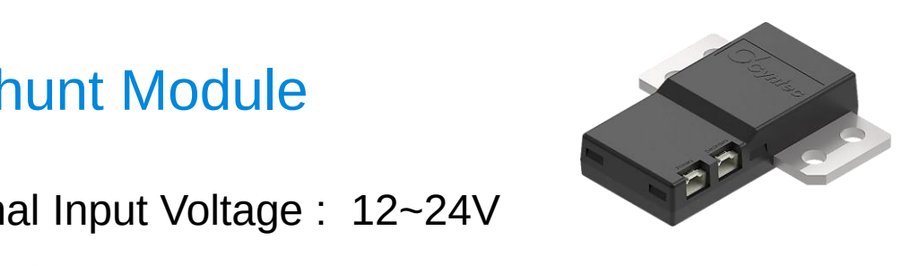
Low TCR Range



Shunt Sensor Family (Connector type)

Chip Size (mil)	Chip Size (mm)	Operation Temp (℃)	Nominal / Peak Current (A)	Tolerance (%)
272*71	69*18*3	-65~125	500 / 1200 (5sec)	5
330*79	84*20*3	-65~125	600 / 1500 (5sec)	5
330*142	84*36*3	-65~125	800 / 2000 (5sec)	5

Resistance Distribution



TCR Range

ASIL C Shunt Module

- Nominal Input Voltage： 12~24V
- Current consumption : < 100mA
- Nominal Current : ±1500A
- Peak Current Measurement Range：±4000A
- Primary Channel Accuracy： ± 0.1%
- Primary Channel Output : CAN
- >3 kV Galvanic Isolation.
- ISO16750 Part 2, Electrical loads for 24V
- Wide Operating temperature range: -40~105℃

ASIL D Shunt Module

- Nominal Input Voltage： 12~24V
- Nominal Current : ±1000A
- Peak Current Measurement Range：±10000A (Period: 10ms)
- Primary Channel Accuracy： ± 0.1%
- Secondary Channel(Analog) Accuracy : 2%
- Primary Channel Output : Digital _ CAN FD
- Secondary Channel Output : Analog _ 0 ~ 5V.
- >3 kV Galvanic Isolation.
- ISO16750 Part 2, Electrical loads for 24V

More Spec Information
Shunt Sensor: Click here
Shunt Sensor Module: Click here

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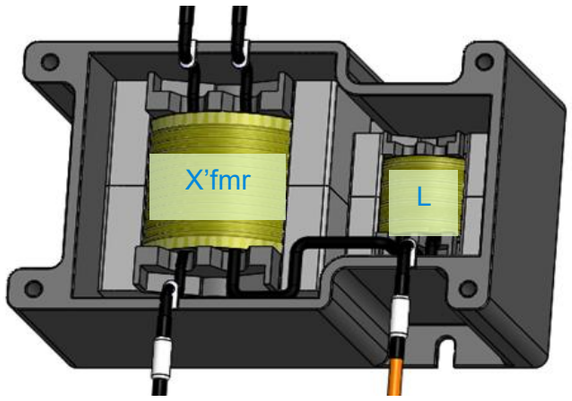
Next Generation High Integration Magnetics Design

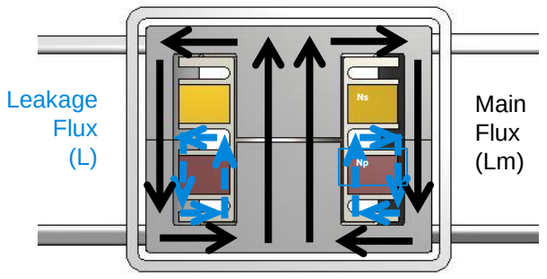
❶ Package level integration
Transformer + Choke

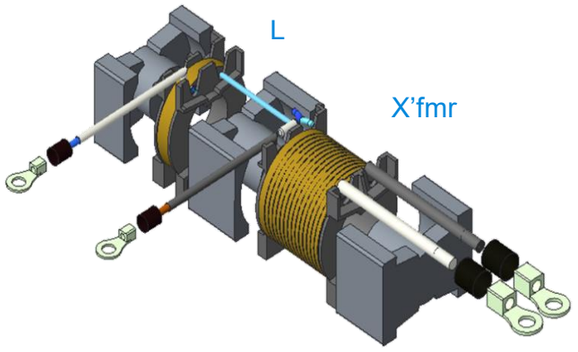
- Flexibility & customized design
- Available wide inductance range
- Better thermal performance
- High quality potting process



❷ Magnetic integration
Size reduction via core sharing

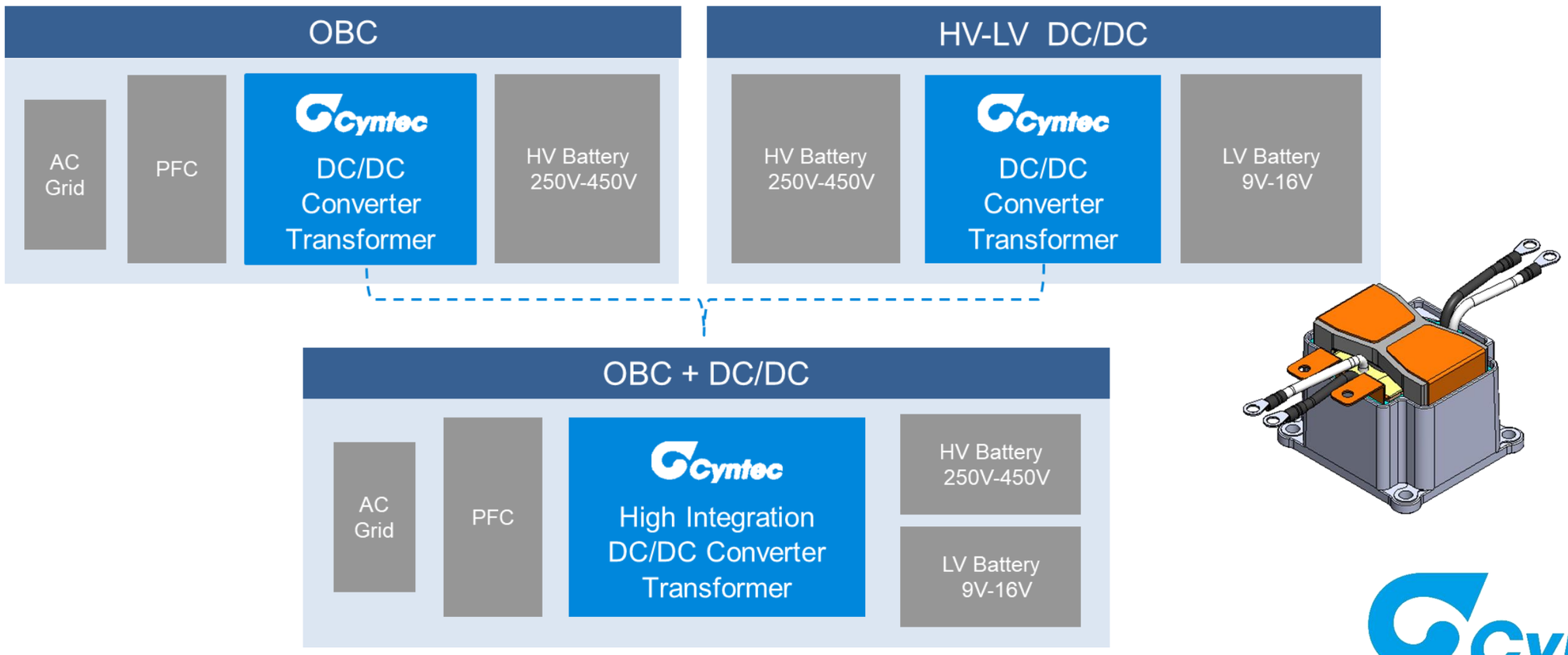
- Size reduction via core sharing
- Leakage as inductor possible
- Compared with discrete design, size(~25% ↓) and weight(~25%↓)





❸ Function integration
Single transformer for HV and LV battery

- Single transformer for HV and LV battery
- Compared with separated OBC and DC/DC structure design, size(~35%↓) and weight(~30%↓)



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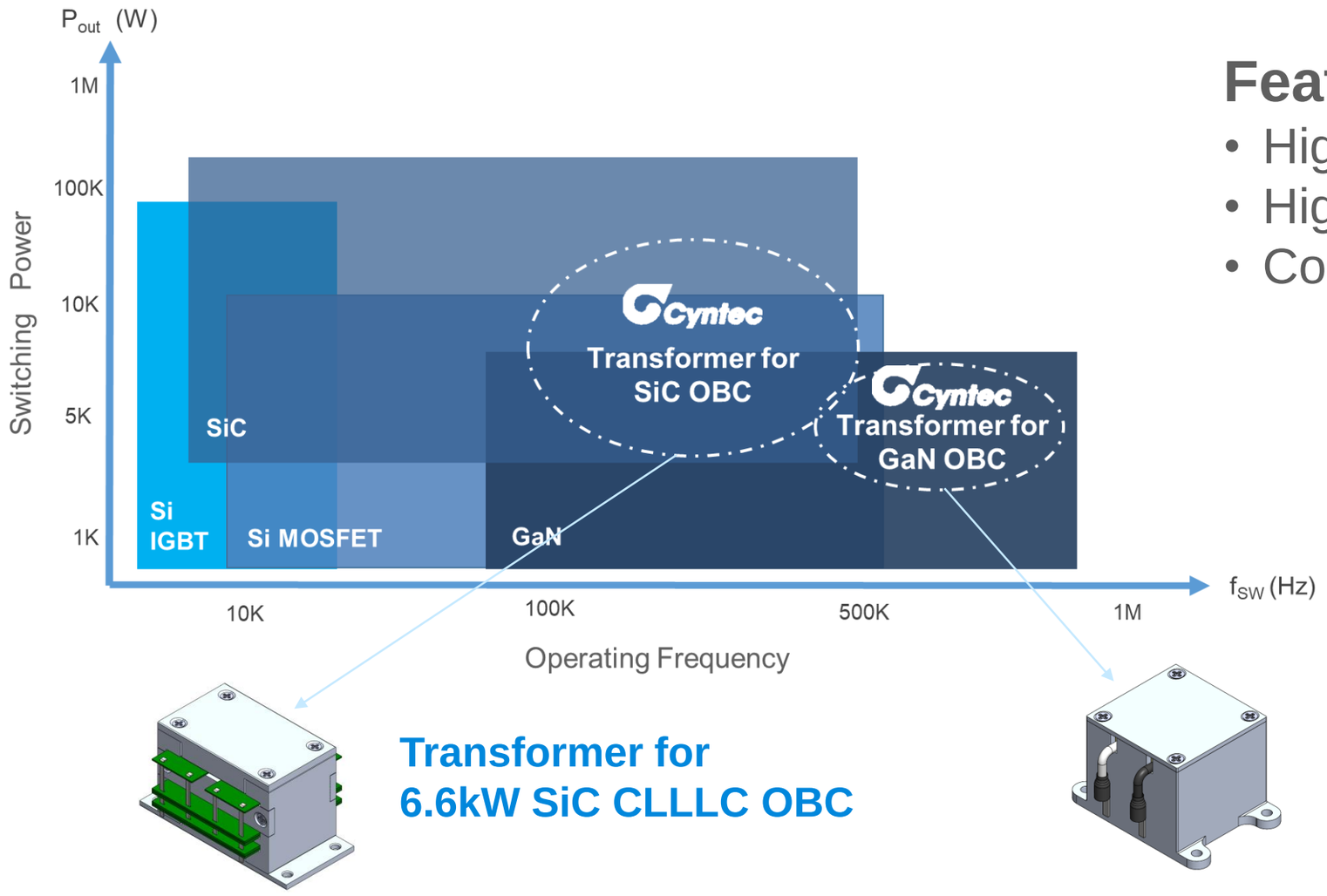
High Power Density Magnetics for SiC / GaN Based OBC



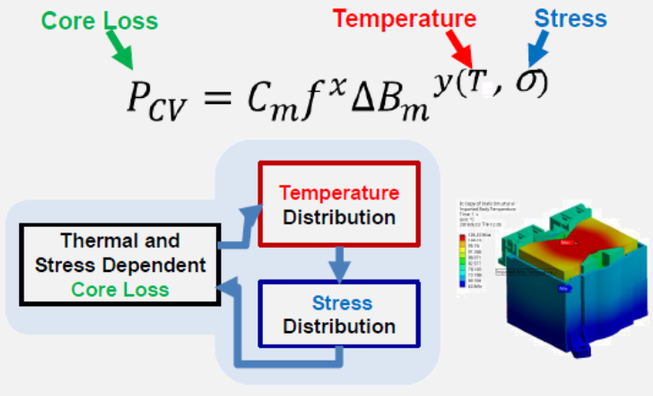
Feature

- High power density
- High conversion efficiency
- Cost / Performance optimized

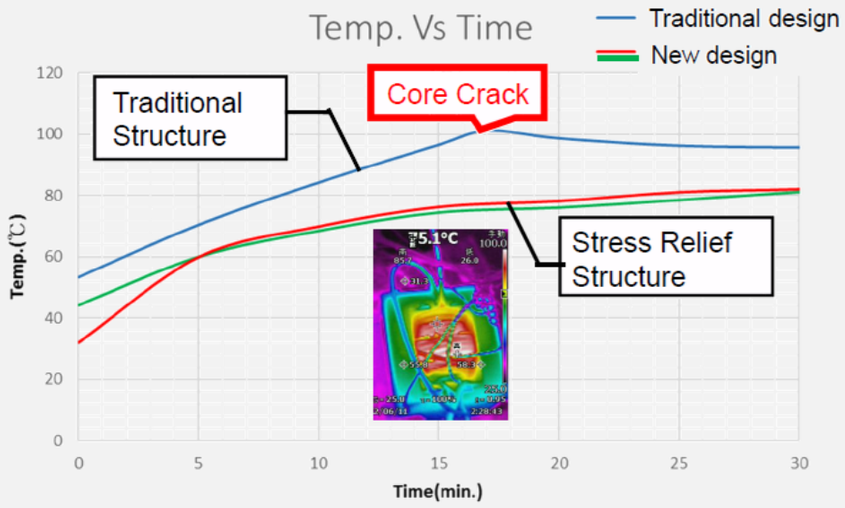
Transformer for 6.6kW SiC CLLLC OBC

Transformer for 6.6kW GaN CLLLC OBC

Multi-physics Stress Relief Design



- Flux density optimization
- Heat dissipation optimization
- Stress-relieving structure



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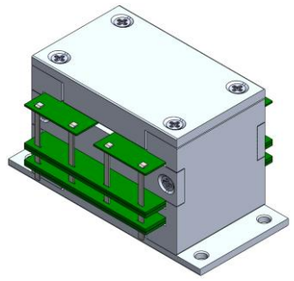
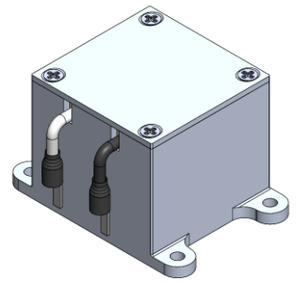


Transformer for 6.6kW SiC CLLLC OBC



Transformer for 6.6kW GaN CLLLC OBC

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❶ Miniaturization

40% size reduction
Magnetic circuit integration
(99.0 x 66.5 x 56.0 mm^3 Max.)

50% size reduction
Leakage as resonant inductors
(74.0 X 52.0 X 47.0 mm^3 Max.)

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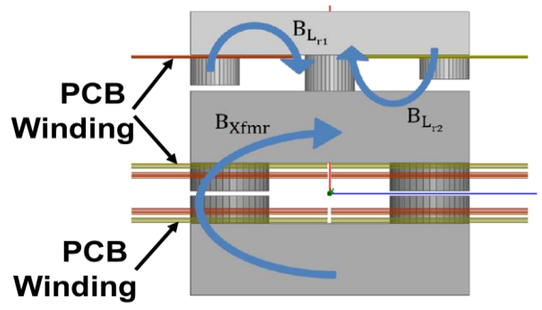
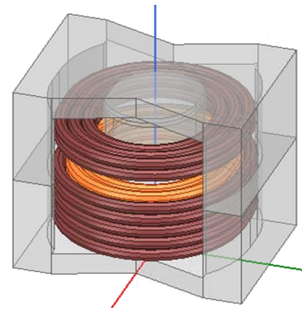
❷ Lower winding loss & core loss

- Avoid air gap fringing to reduce winding loss
- Fluxing cancelling for lower core loss



- Suitable litz wire bundle arrangement & winding away from gap to reduce winding loss
- Optimize flux density to reduce core loss



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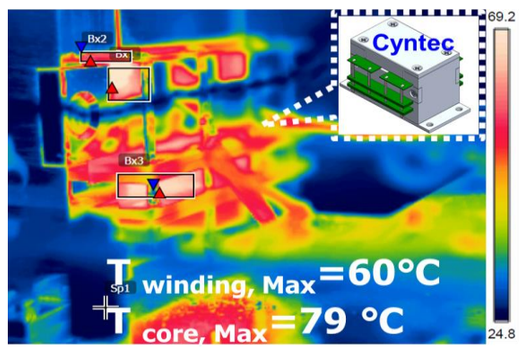
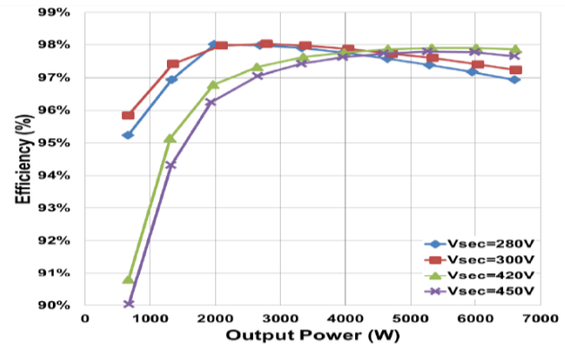
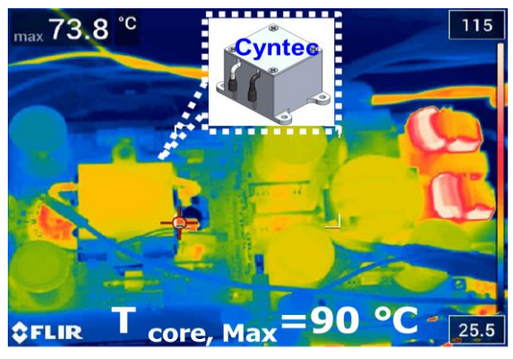
❸ Effective heat dissipation & higher conversion efficiency

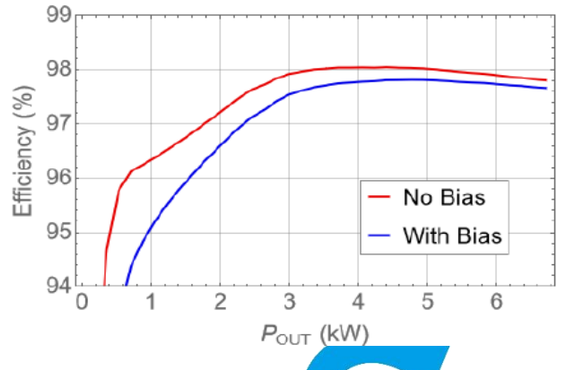
>98% Peak efficiency





>98% Peak efficiency





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