

Cyntec Automotive Solution for xEV



Automotive World Nagoya 2022

26-28 Oct
Hall 1, Booth 11-44



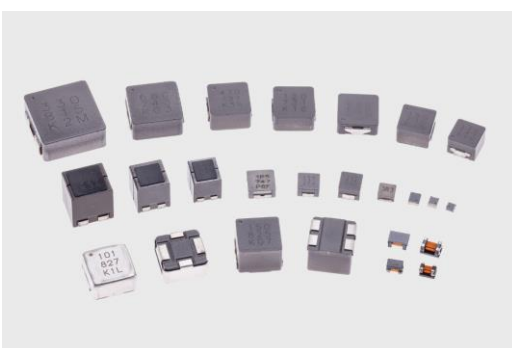
Cyntec's Key Highlights @ AUTOMOTIVE WORLD Nagoya 2022



- ✓ 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

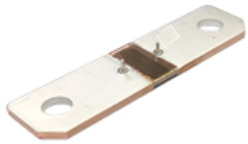


Shunt Sensor & Shunt Sensor Module for BMS

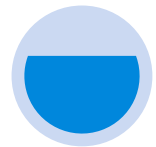
Modularization



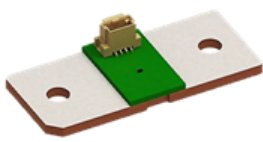
Shunt Sensor



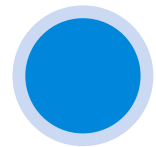
- w/ pin or w/o pin
- Patent pin implementation technology
- Robustness, high precision pin pitch



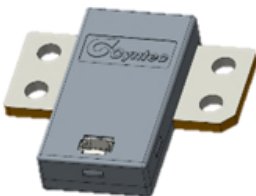
Shunt Sensor with connector



- Precision can reach $\leq \pm 0.5\%$ 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 $\pm 0.1\%$ 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 $\leq \pm 0.1\%$ of voltage and current by temperature compensation through our calibration capabilities on shunt module.



Safety

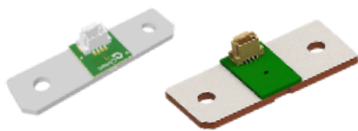
Design compatible of System, progress, product certificate of ISO26262.
Semiconductor of SSR to meet shorter fault current cut-off time from ms to us

Shunt Sensor Family (Bus-bar type)



Chip Size (mil)	Chip Size (mm)	Operation Temp (°C)	Watt (W)	Tolerance (%)	Resistance Distribution		
272*71	69*18	-65~170	36	5	25μΩ	50μΩ	100μΩ
330*79	84*20	-65~170	36	5			150μΩ
330*142	84*36	-65~170	36	5			
TCR Range					≤200ppm	≤150ppm	≤100ppm
Low TCR Range					≤50ppm		

Shunt Sensor Family (Connector type)



Chip Size (mil)	Chip Size (mm)	Operation Temp (°C)	Nominal / Peak Current (A)	Tolerance (%)	Resistance Distribution		
272*71	69*18*3	-65~125	500 / 1200 (5sec)	5	25μΩ	50μΩ	100μΩ
330*79	84*20*3	-65~125	600 / 1500 (5sec)	5			150μΩ
330*142	84*36*3	-65~125	800 / 2000 (5sec)	5			
TCR Range					≤200ppm	≤150ppm	≤100ppm

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°C

ASIL D Shunt Module



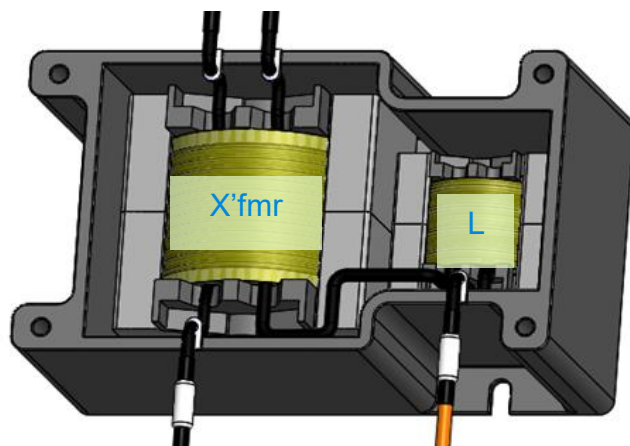
- Nominal Input Voltage : 12~24V
- Nominal Current : ±1000A
- Peak Current Measurement Range : ±10000A (Period: 10ms)
- Primary Channel Accuracy : ± 0.1%
- Secondary Channel(Analog) Accuracy : 2%
- Primary Channel Output : Digital _ CAN FD
- Secondary Channel Output : Analog _ 0 ~ 5V.
- >3 kV Galvanic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

More Spec Information
Shunt Sensor: [Click here](#)
Shunt Sensor Module: [Click here](#)

Next Generation High Integration Magnetics Design

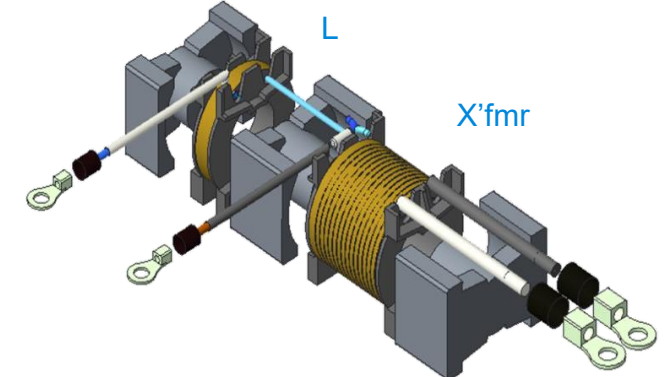
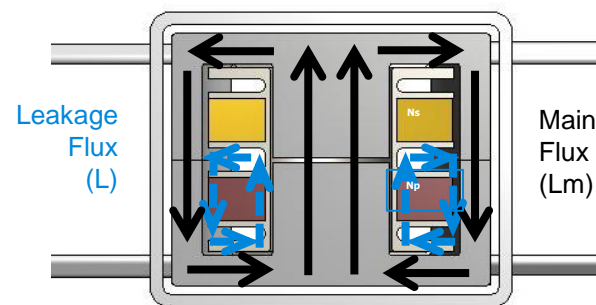
1 Package level integration Transformer + Choke

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



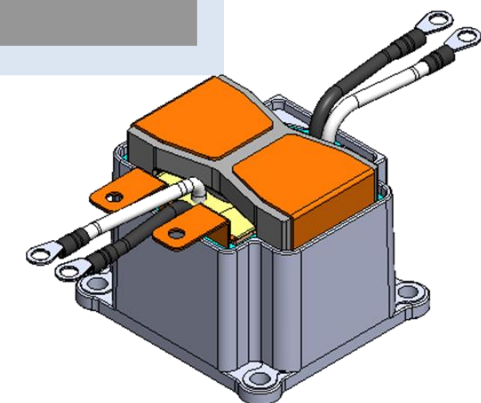
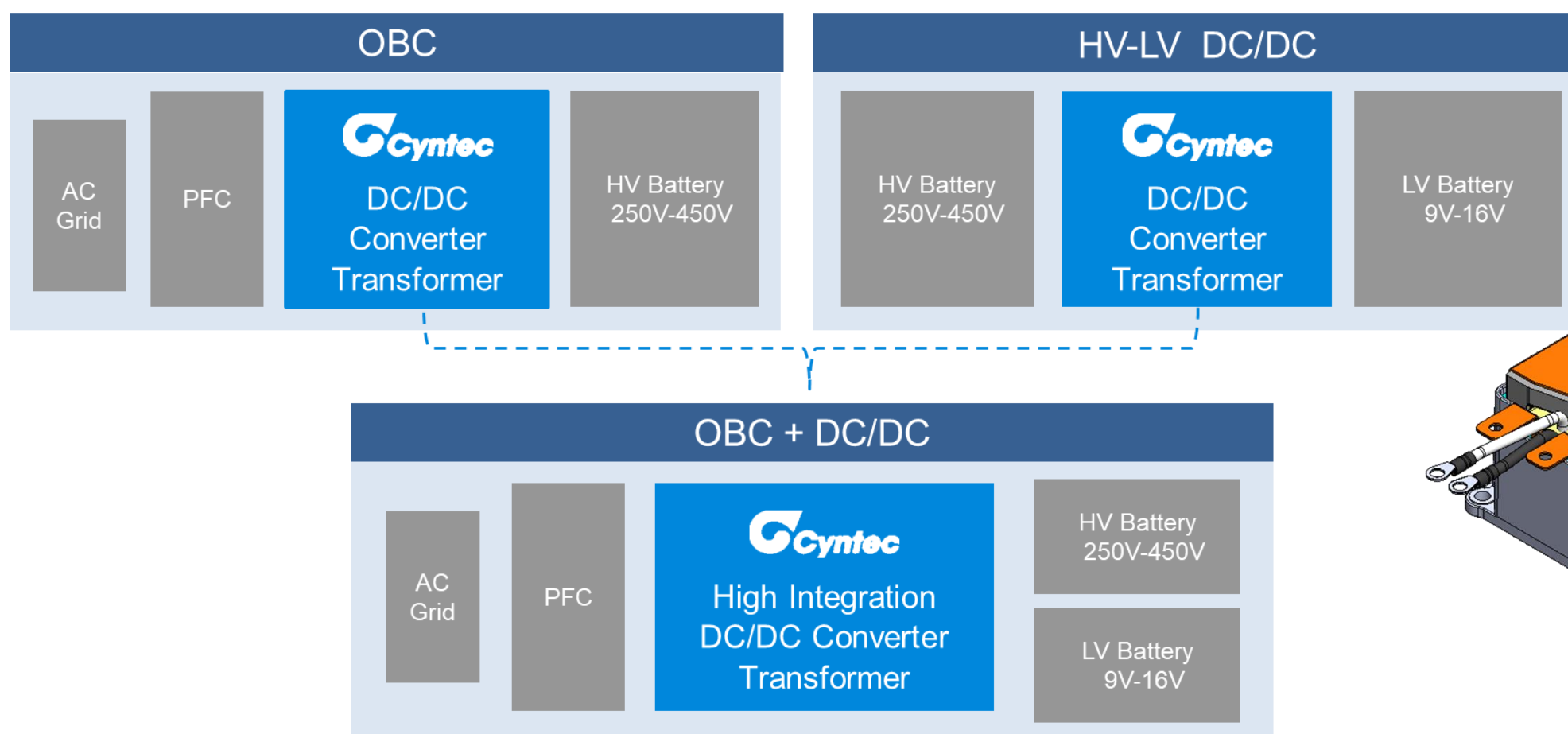
2 Magnetic integration Size reduction via core sharing

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

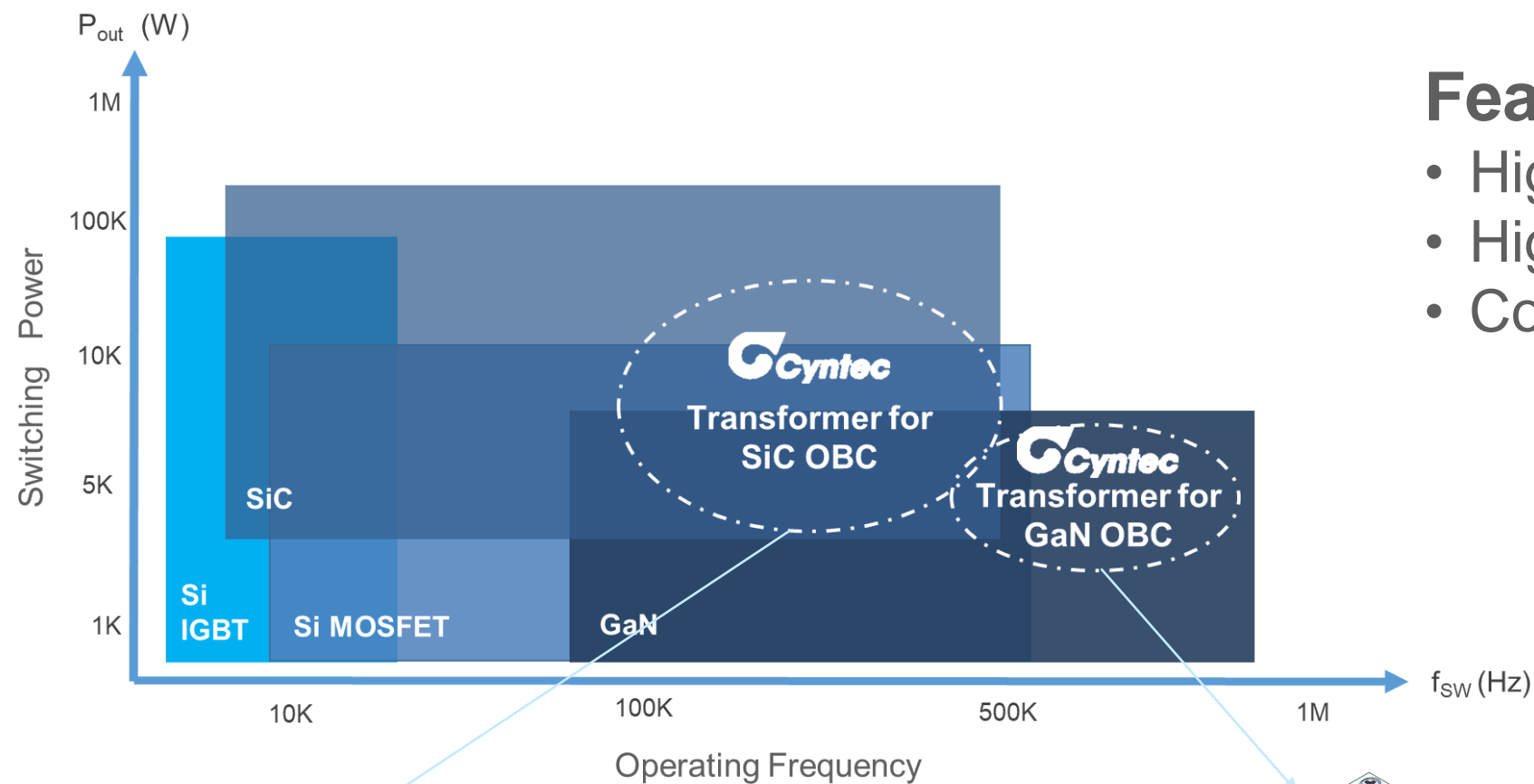


3 Function integration Single transformer for HV and LV battery

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

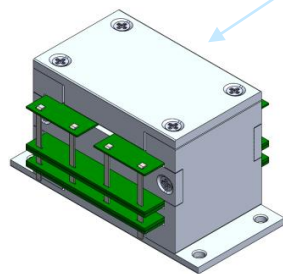


High Power Density Magnetics for SiC / GaN Based OBC

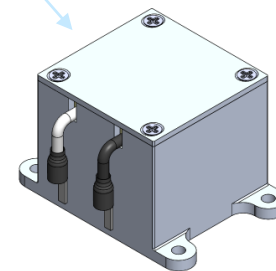


Feature

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

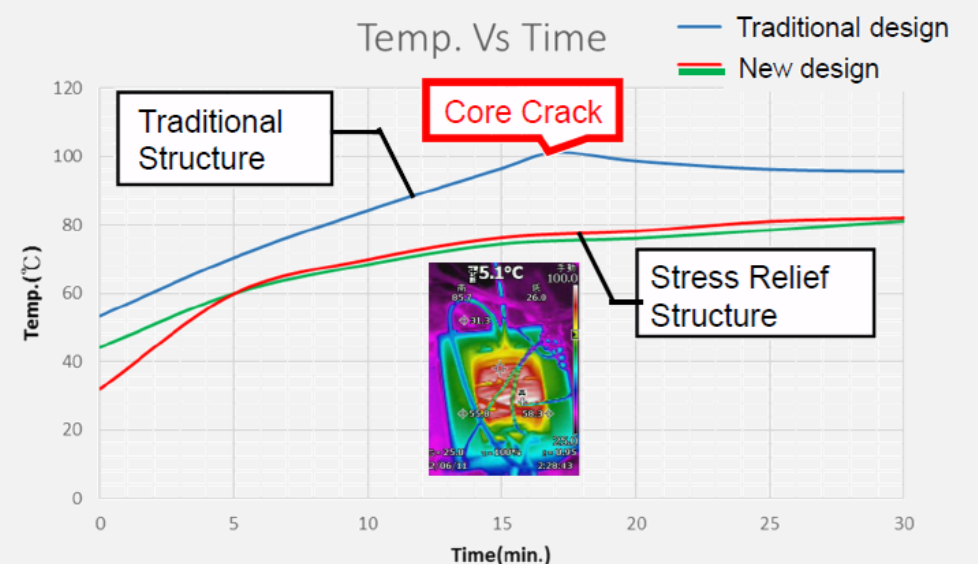
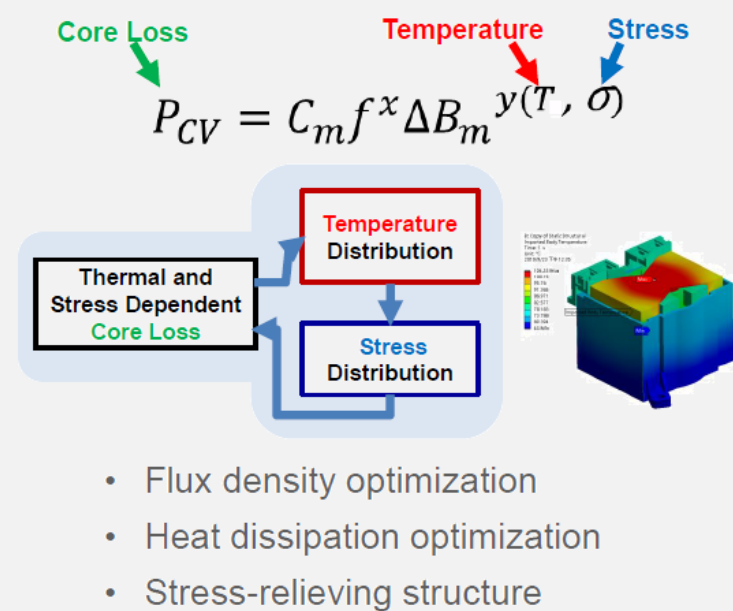


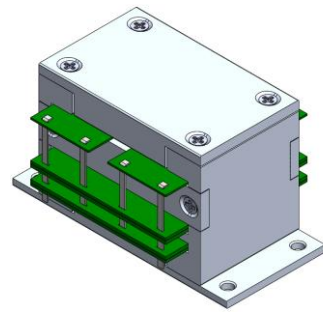
Transformer for
6.6kW SiC CLLC OBC



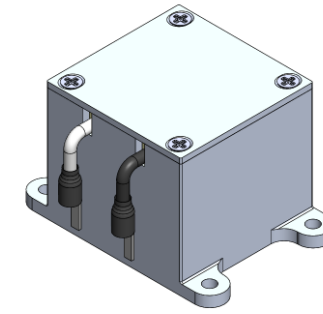
Transformer for
6.6kW GaN CLLC OBC

Multi-physics Stress Relief Design





Transformer for 6.6kW SiC CLLLC OBC



Transformer for 6.6kW GaN CLLLC OBC

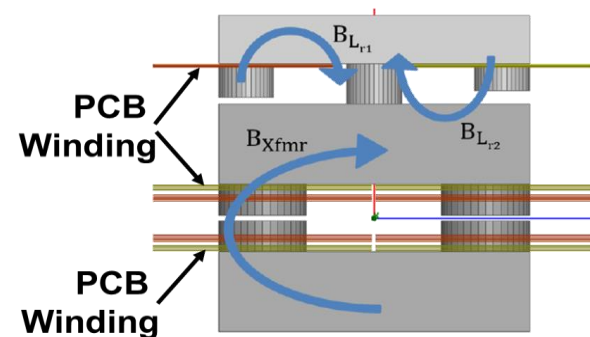
1 Miniaturization

40% size reduction
Magnetic circuit integration
(99.0 x 66.5 x 56.0 mm³ Max.)

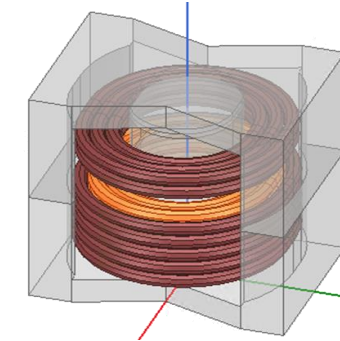
50% size reduction
Leakage as resonant inductors
(74.0 X 52.0 X 47.0 mm³ Max.)

2 Lower winding loss & core loss

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

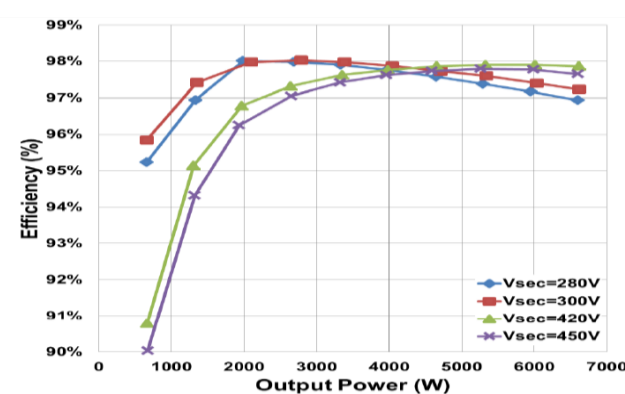
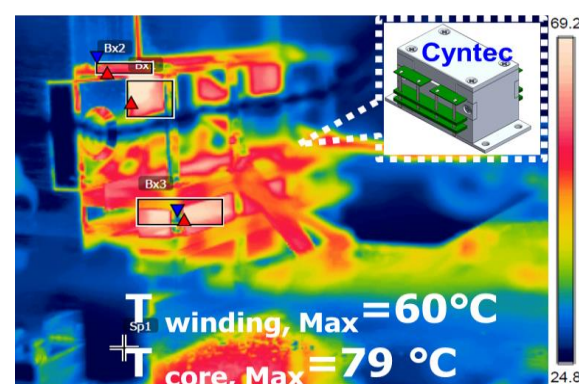


- Suitable litz wire bundle arrangement & winding away from gap to reduce winding loss
- Optimize flux density to reduce core loss

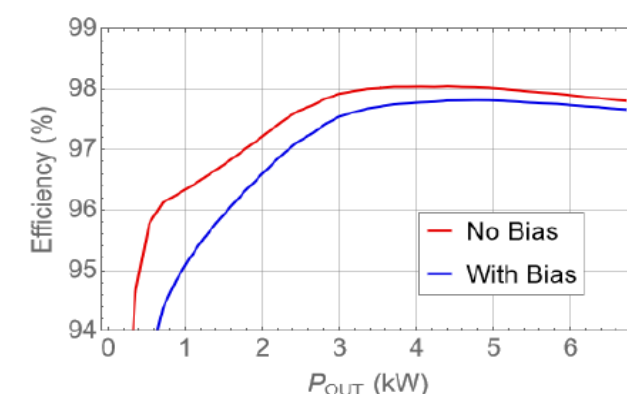
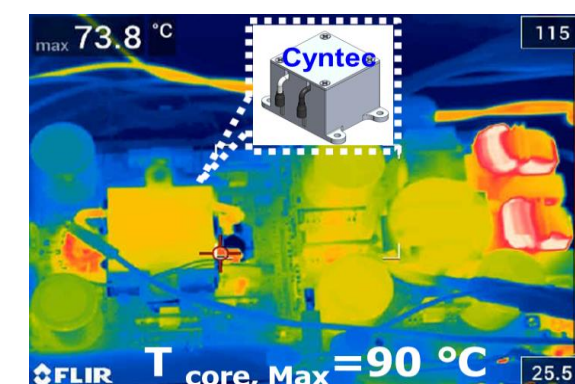


3 Effective heat dissipation & higher conversion efficiency

>98% Peak efficiency



>98% Peak efficiency



Making Things Smaller and Smarter

www.cyntec.com

Contact Window

jpcpbg@deltaww.com

