Inverter

Compliant to All Original LBC Specifications (!)
- No Low-Freq. CM Output Voltage Component
- All Own IP / Patents / No 3rd Party IP Used
- Industr. Design / No Overstressing of Comp.

14.8in³ (243 cm³)
96.3% Efficiency @ 2kW
95.07% Weighted Efficiency
\( T_c = 58^°C @ 2kW \)

\[ \Delta u_{DC} = 1.1\% \]
\[ \Delta i_{DC} = 2.8\% \]
\[ THD+N_u = 2.6\% \]
\[ THD+N_I = 1.9\% \]

88.7mm x 88.4mm x 31mm

New Technologies

- New Cascaded Control for Active Power Pulsation Buffer
- New TCM Modulation → Active ZVS in Whole Operating Range
- New 4D Interleaving of 2 Bridge Legs per Phase
- New 20ns Delay / 500kV/us Gate Drive for 600V IFX Norm.-Off GaN GIT
- New Q=800 / Multi-Micro-Airgap HF Inductor w. Multi-Layer Foil Winding
- New CSPI=34W/(dm³K) Heatsink also Employed as EMI Shield

★ 135 W/in³
**Power Pulsation Buffer**

- Employs Large Voltage Fluctuation Capacitor & DC/DC Buck Converter Stage
- High Energy Density Ceramic Capacitors (CeraLink)
- New Multi-Loop Cascaded Control Structure

\[ V = 48 \text{ cm}^3 \]

\[ V = 166 \text{ cm}^3 \]

- Significantly Lower Volume Compared to Electrolytic Capacitors
**High Frequency Inductors**

- Multi-Airgap Inductor with Patented Multi-Layer Foil Winding Arrangement Minim. Prox. Effect
- Very High Filling Factor / Low High Frequency Losses
- Magnetically Shielded Construction Minimizing EMI

- \( L = 10.5 \mu \text{H} \)
- 2 x 8 Turns
- 24 x 80 \( \mu \text{m} \) Airgaps
- Core Material DMR 51 / Hengdian
- 0.61mm Thick Stacked Plates
- 20 \( \mu \text{m} \) Copper Foil / 4 in Parallel
- 7 \( \mu \text{m} \) Kapton Layer Isolation
- 20m\( \Omega \) Winding Resistance / Q=800
- Terminals in No-Leakage Flux Area

**Dimensions** - 14.5 x 14.5 x 22mm³
**Thermal Management**

- 30mm Blowers with Axial Air Intake / Radial Outlet
- Full Optimization of the Heatsink Parameters
- Outstanding Cooling Syst. Performance Index

- 200um Fin Thickness
- 500um Fin Spacing
- 3mm Fin Height
- 10mm Fin Length
- CSPI = 37 W/(dm^3.K)
- 1.5mm Baseplate

■ Two-Side Cooling → Heatsink Temperature = 52°C @ 80W (8W Natural Convection)
Measurement Results

- System Complies to All Original GLBC Specifications (!)

- Ohmic Load / 2kW

<table>
<thead>
<tr>
<th>Output Current</th>
<th>Inductor Current Bridge Leg 1-1</th>
<th>Inductor Current Bridge Leg 1-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Link Voltage (AC-Coupl.)</td>
<td>Buffer Cap. Voltage</td>
<td>Buffer Cap. Current</td>
</tr>
<tr>
<td>Output Voltage</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- New 4D Interleaving Combined with Active ZVS TCM Modulation

Fraunhofer IZM Fraza d.o.o. LiTTLE BOX CHALLENGE