3.0kW Dual LLC Evaluation Board

EVAL_3KW_2LLC_P7_47
TO247

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1 General Description

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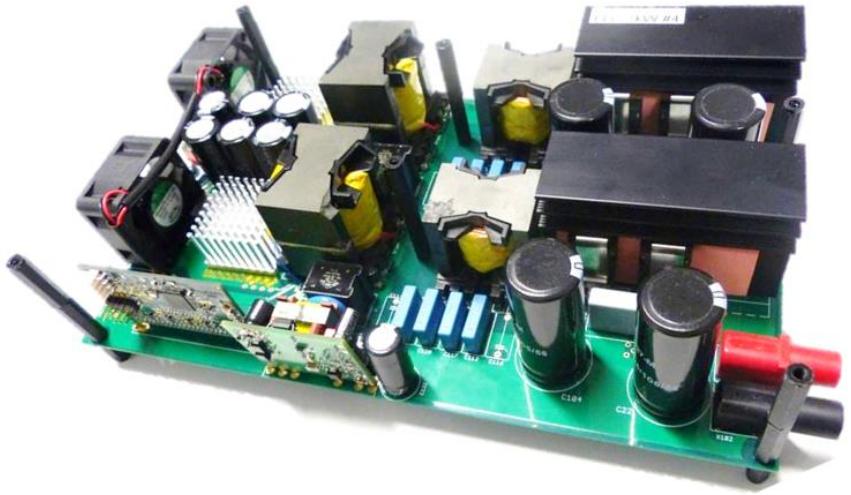
General

Description:

The "EVAL_3KW_2LLC_P7_47" - Evaluation Board shows how to design a dual phase LLC system solution of a Server SMPS with the target to meet **80+ Titanium Standard** efficiency requirements. On this purpose there has been applied latest CoolMOS™ technology IPP60R037P7 600V Power MOSFET on the primary side and OptiMOS™ Low Voltage Power MOSFET in SuperSO8 BSC093N15NS5 in the synchronous rectification secondary stage, in combination with QR CoolSET™ ICE2QR2280Z, 1EDI60N12AF EiceDRIVER™ high voltage, high speed driver ICs for HV MOSFETs, Low Side Gate Driver 2EDN7524R for SR MOSFETs and digital LLC Controller XMC4400.

Summary of Features:

- Output voltage: 44 – 58 VDC
- Output current max: 55A
- Peak efficiency @ 50% load > 98.4%
- Efficiency @ 10% load > 97%



The following variants are available:

- EVAL_3kW_2LLC_P7 version with CoolMOS™ P7 **TO-247**, IPW60R037P7

  Ordercode: EVAL_3KW_2LLC_P7_47

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Example of System Understanding: Infineon Demo Solution for Titanium HV DC/DC stage

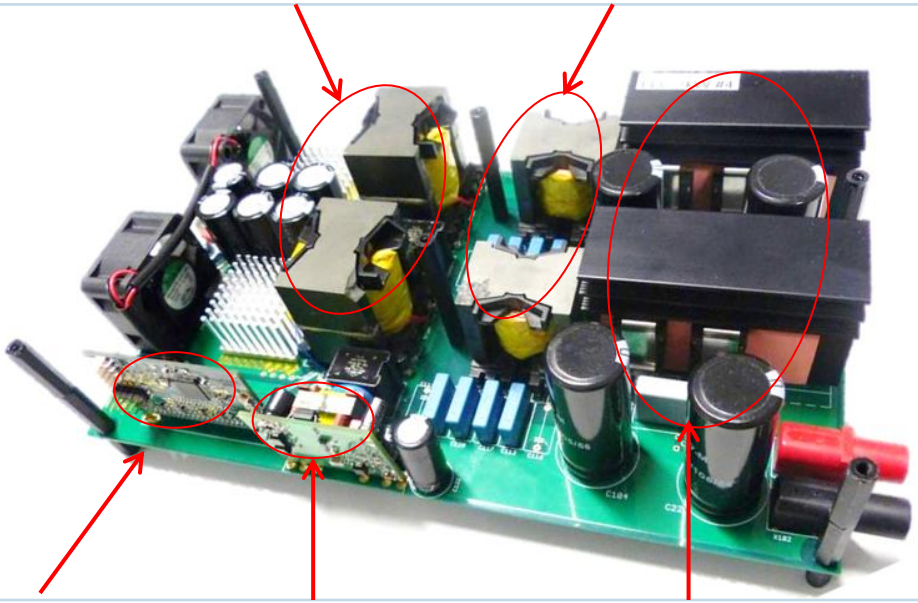
Half Bridge LLC with synchronous rectification in center tap configuration	
V_{in}	350 – 400V_{DC}
V_{in_nom}	380V_{DC}
V_{out}	44 - 58 V_{DC}
I_{out}	55 A
P_o	3 kW
C_r	66 nF
L_r	12 uH
L_m	62 uH

Primary HV MOSFETs
- **CoolMOS™ IPP60R037P7**
  Reduced Gate Charge (Q_g)
- Reduced E_{off}
- High body diode ruggedness

SR MOSFETs
- **OptiMOS™ BSC093N15NS5**
- New generation
- Best FOM $R_{DS(on)}$ x Q_g
- Best FOM $R_{DS(on)}$ x Q_{oss}

Transformer
SP-PQ 40/40 core

Resonant inductor
SP-PQ 35/35 core



LLC controller
Digital XMC4400

Bias QR Flyback controller
ICE2QR2280Z

HV MOSFETs
IPW60R037P7 TO-247

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Control Board Digital

Infineon`s solution to control the 3kW dual phase LLC Evaluation Board

Digital

XMC4400-F64K512 AB

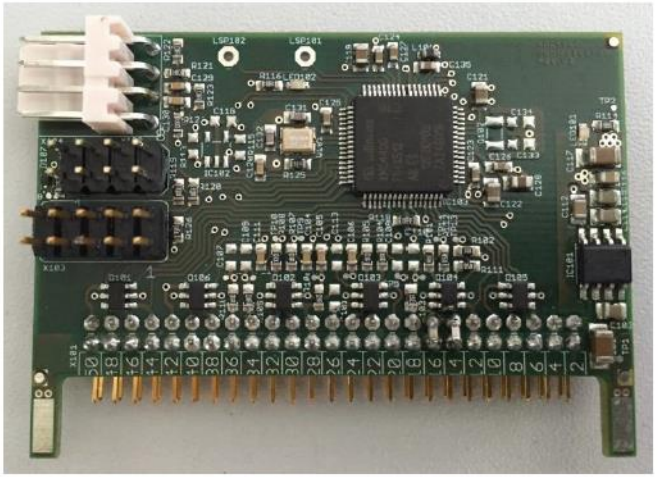
Summary of Features:

- ARM® Cortex™-M4, 120MHz, incl. single cycle DSP MAC and floating point unit (FPU)
- 8-channel DMA + dedicated DMAs for USB and Ethernet
- USB 2.0 full-speed on-the-go
- CPU Frequency: 120MHz
- eFlash: 512kB including hardware ECC
- 80kB SRAM
- Package: PG-LQFP-64

Target Applications:

Motor control

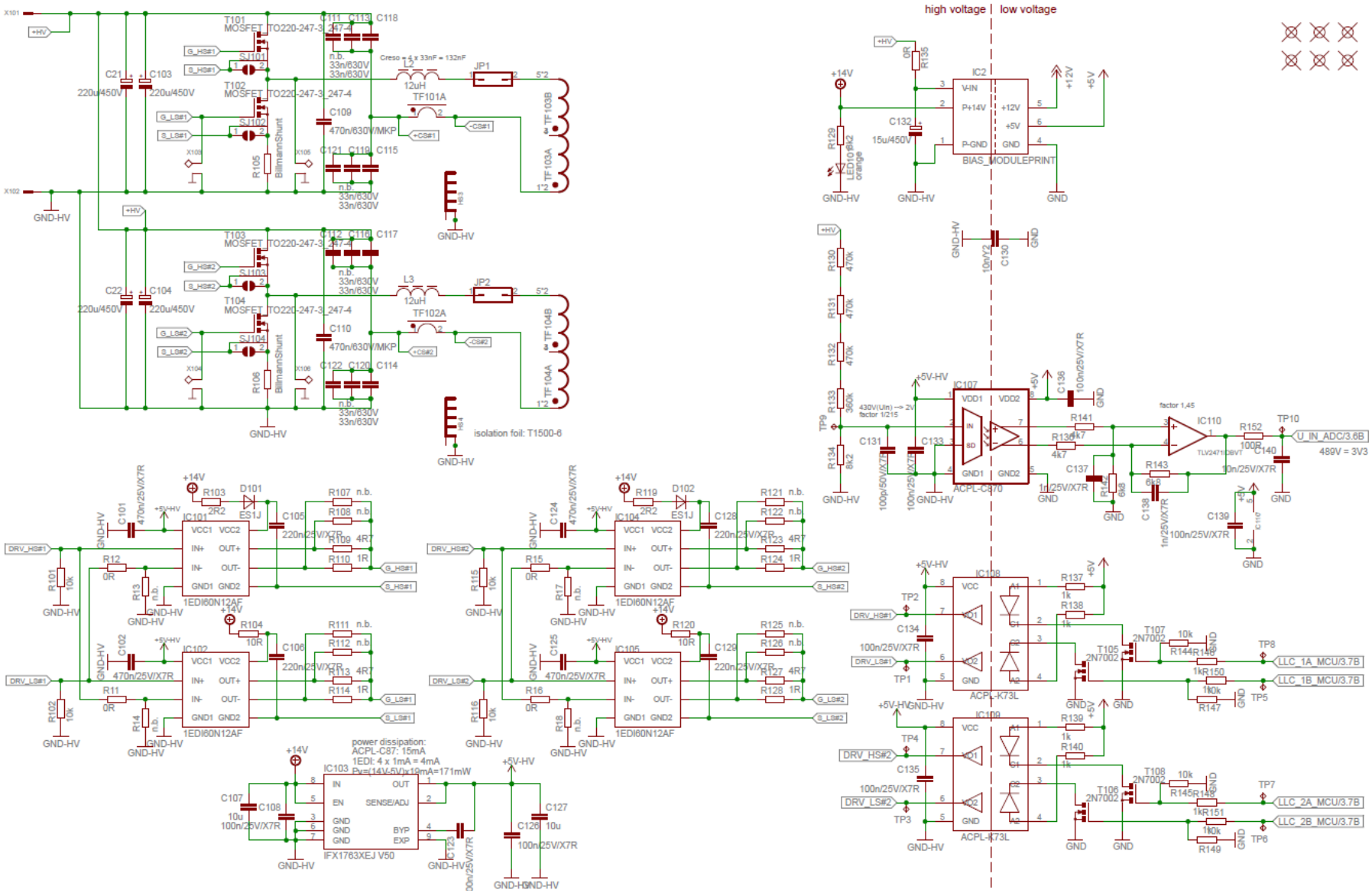
- Position detection
- IO devices
- HMI
- Solar inverters
- SMPS
- Sense & control systems
- PLC
- UPS
- Light networks





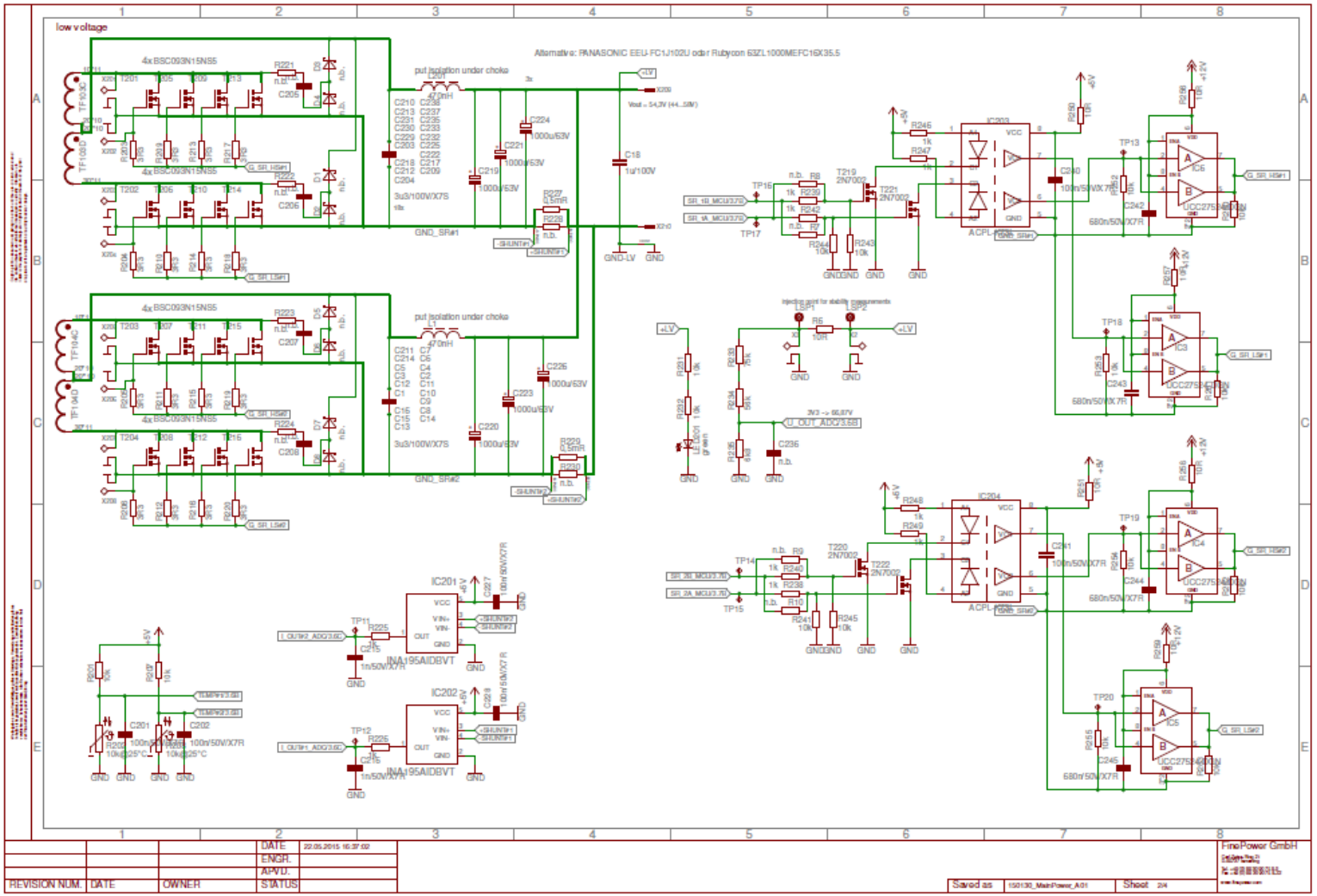
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Main Power Board Schematic_1



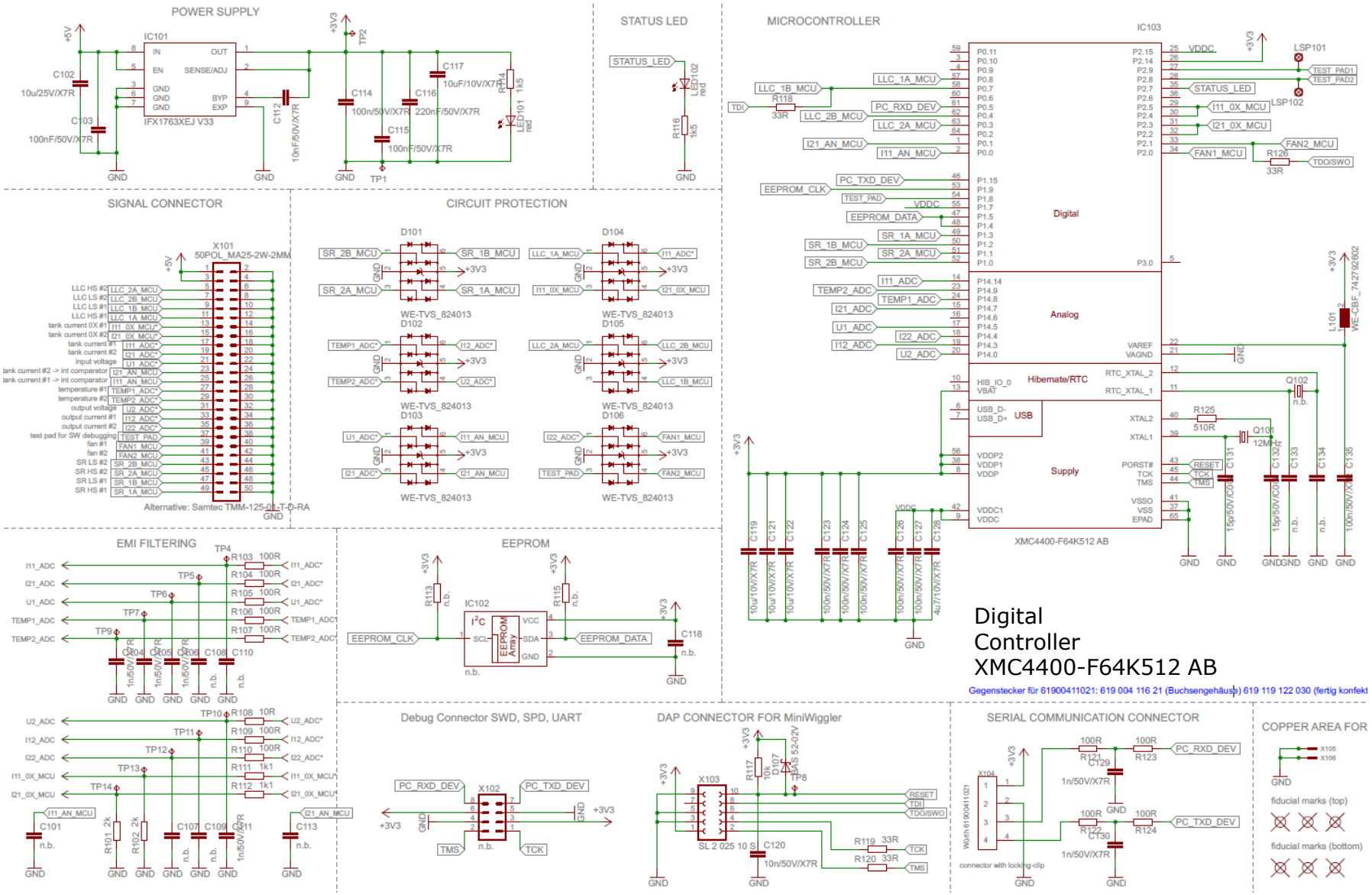
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Main Power Board Schematic_2



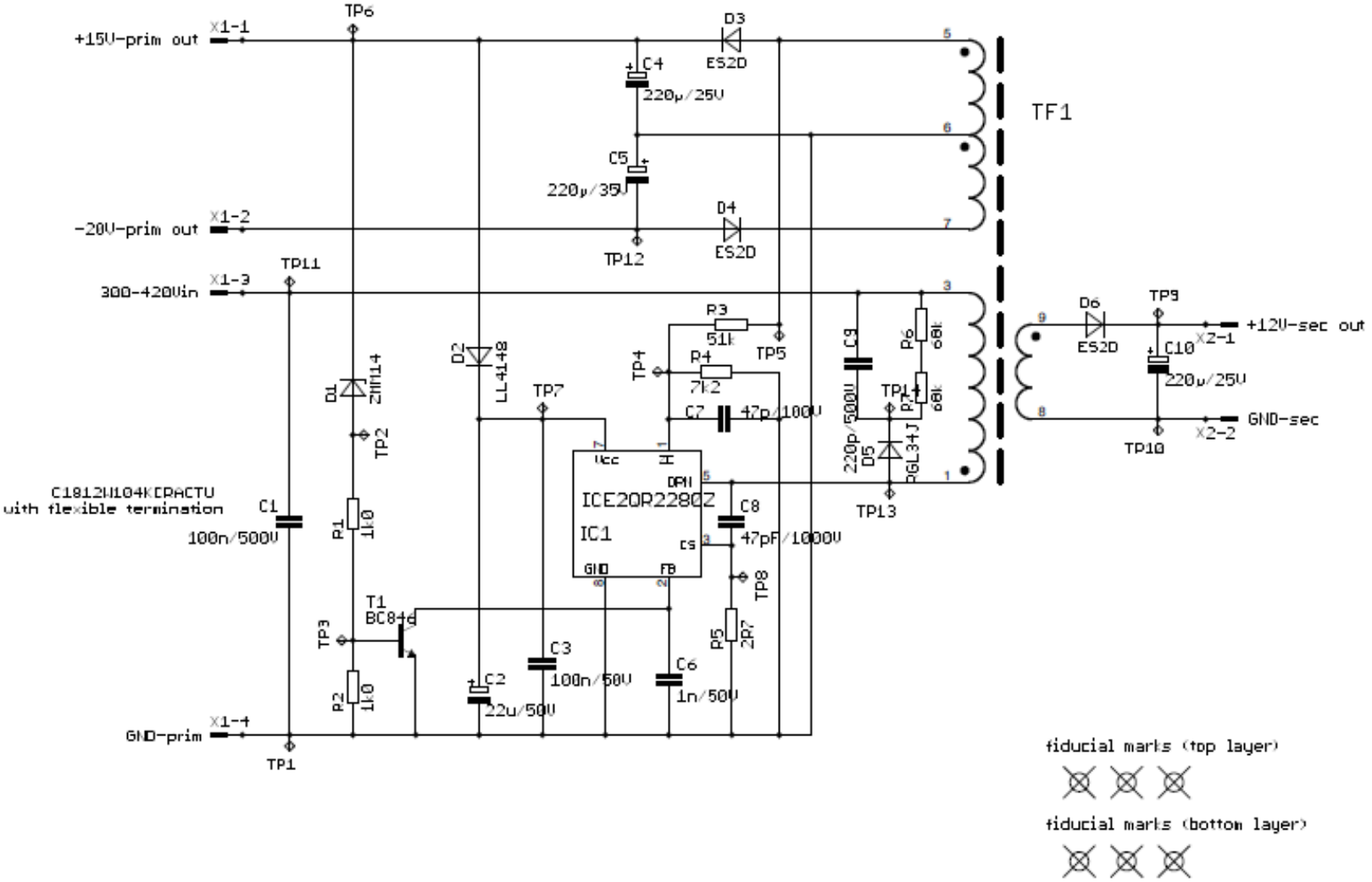
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Digital Control Board Schematic



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Bias Board Schematic



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Connection instruction



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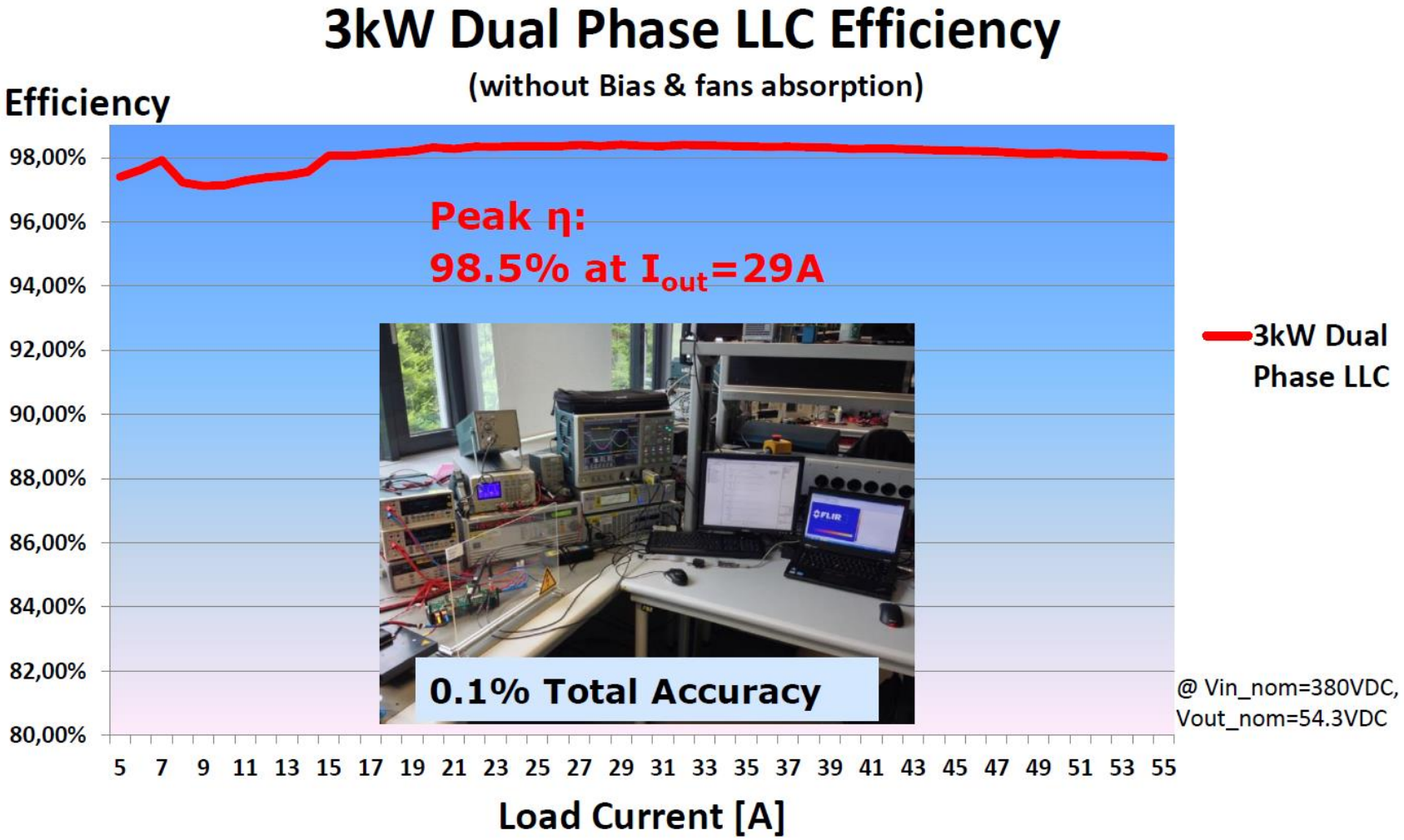
3 Design Concept

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Automated Efficiency Measurement

Combination of converter design (resonant tank, transformer) and proper HV device election

Proper selection of SR LV device and secondary side design



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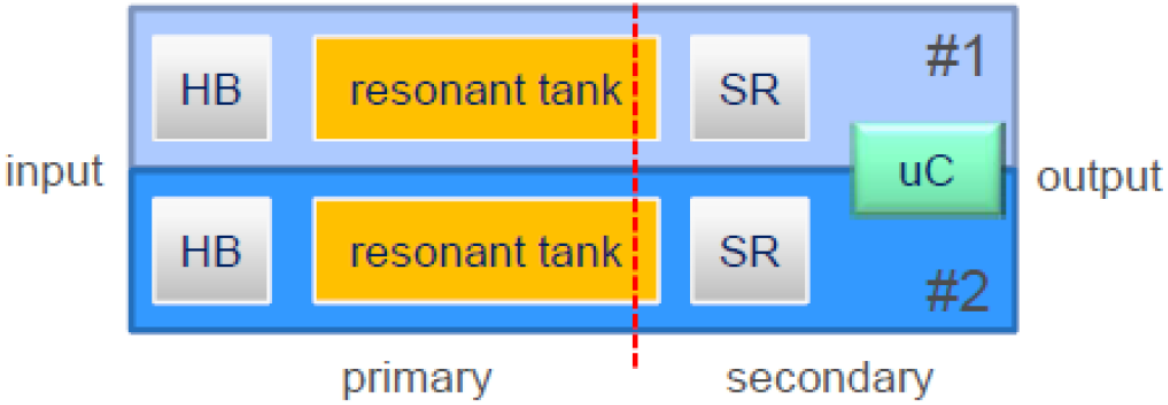
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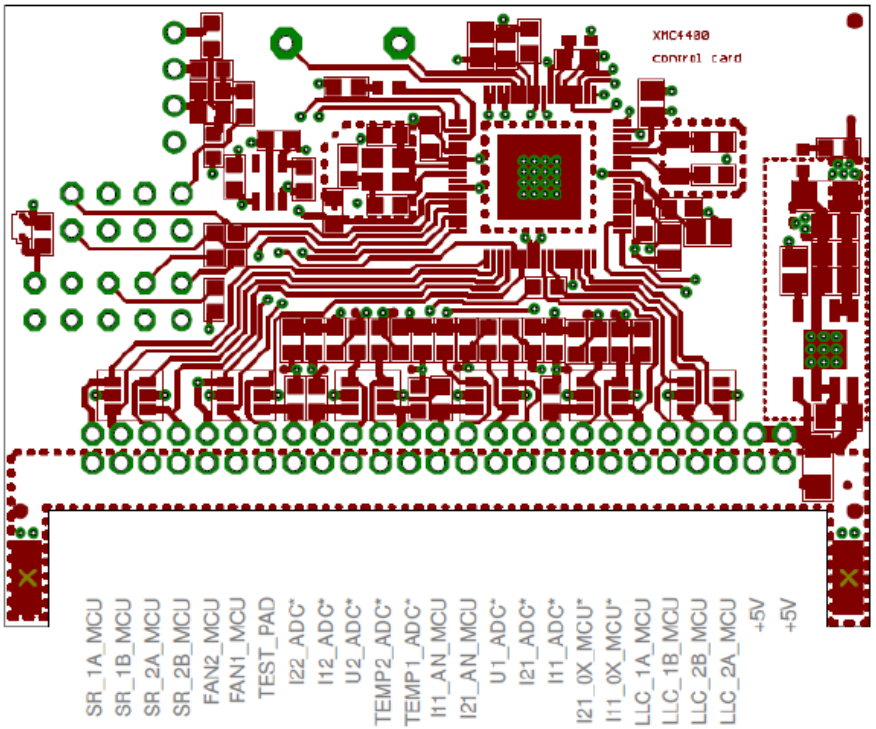
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Design Concept

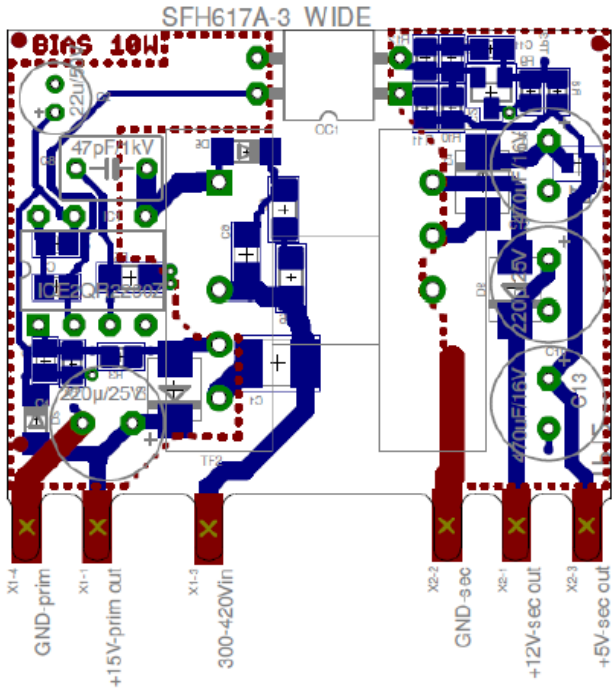


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Two Daughter Boards



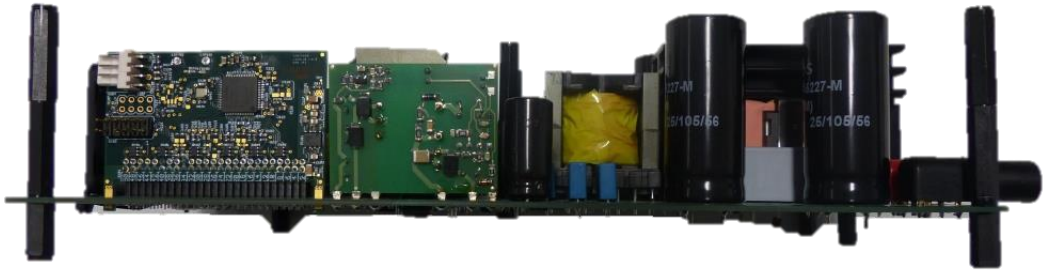
Microcontroller Board

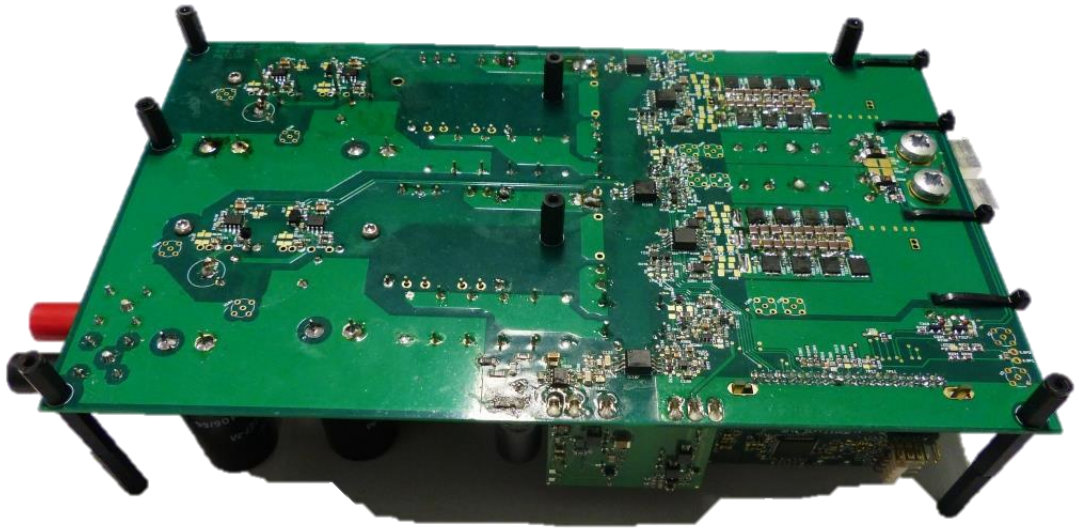


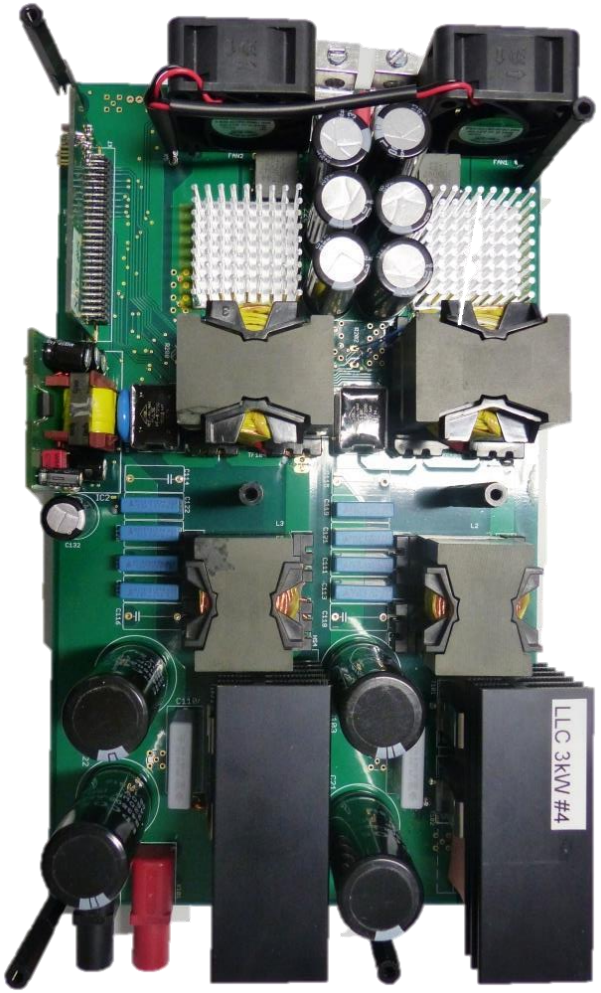
Auxiliary Converter Board

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Evaluation Board
EVAL_3KW_2LLC_P7_47





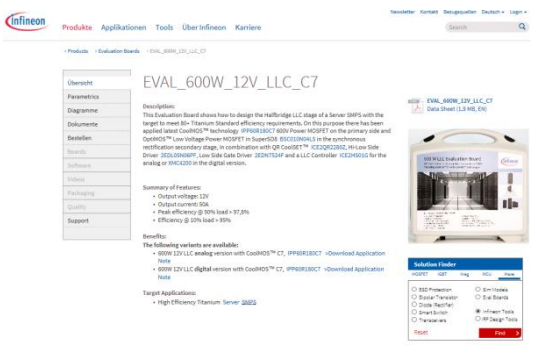


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Support Slides
3KW Dual LLC Evaluation Board

Evaluation Board Page

- Technical Description
- Datasheets
- Parameters
- Related material
- Videos



- EVAL_3KW_2LLC_P7_47

Product Family Pages

- Product Brief
- Application Notes
- Selection Guides
- Datasheets and Portfolio
- Videos
- Simulation Models



- IPP60R037P7
- BSC093N15NS5
- XMC4400-F64K512 AB
- 2EDN7524R
- ICE2QR2280Z
- 1EDI60N12AF
- IFX1763XEJ V50
- IFX1763XEJ V33

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