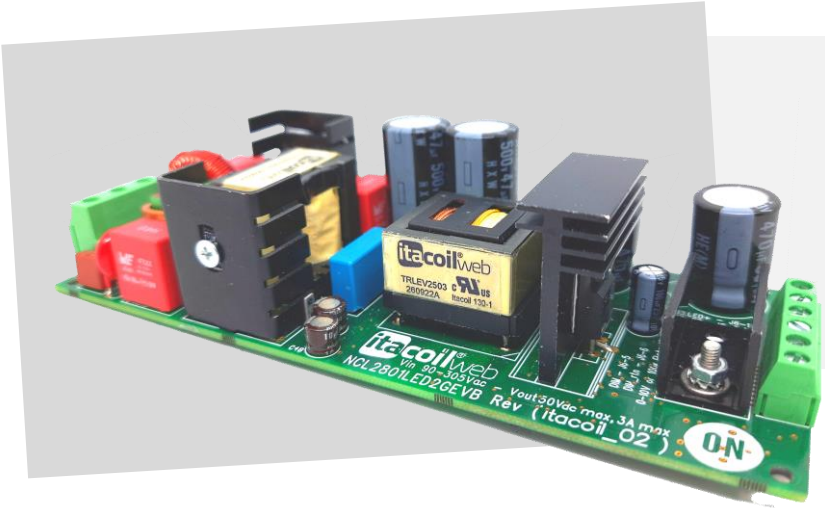


NCL2801LED2GEVB Rev (Itacoil_02)

150W optimized LED Driver

A Onsemi – Itacoil joint activity

Onsemi NCL2801LED2GEVB

ITACOIL carried out the optimization of the demo board NCL2801LED2GEVB, a deep dimming 150W LED driver, resulting in the new demo board NCL2801LED2GEVB Rev (Itacoil_02).

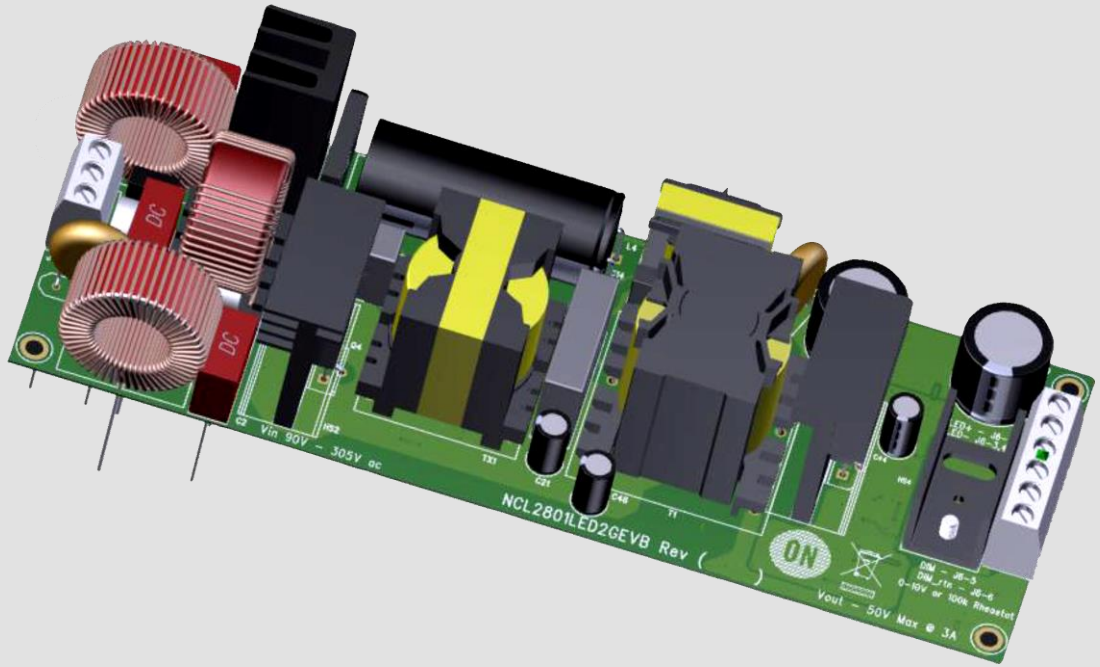
The characteristics of the original Onsemi demo board are the following.

The demo board uses NCL2801 as the front end PFC and NCP13992 LLC for the output converter.

- Input voltage: 90 V_{AC} – 305 V_{AC}
- Output voltage: 50 V_{DC} Max
- Output Current: 1,5 A Max
- Output ripple: ± 5% Max
- Dimming range: down to <1W

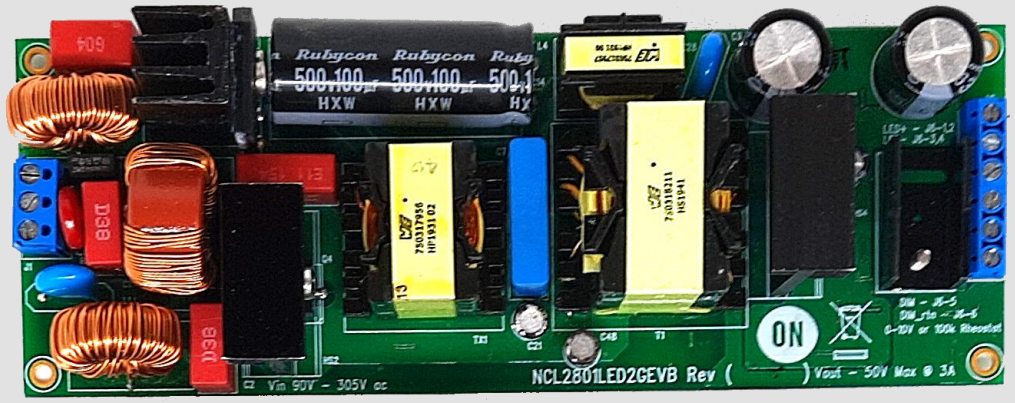
Key features include:

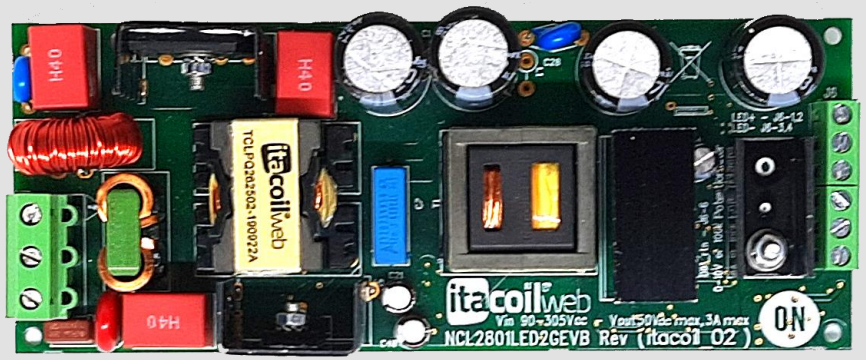
- High Efficiency
- CrM PFC
- LLC Half Bridge
- Dimming Control 0-10V or potentiometer
- Low Standby Power
- Integrated Thermal Shutdown and UVLO



NCL2801LED2GEVB vs. NCL2801LED2GEVB Rev (Itacoil_02)

Optimization results

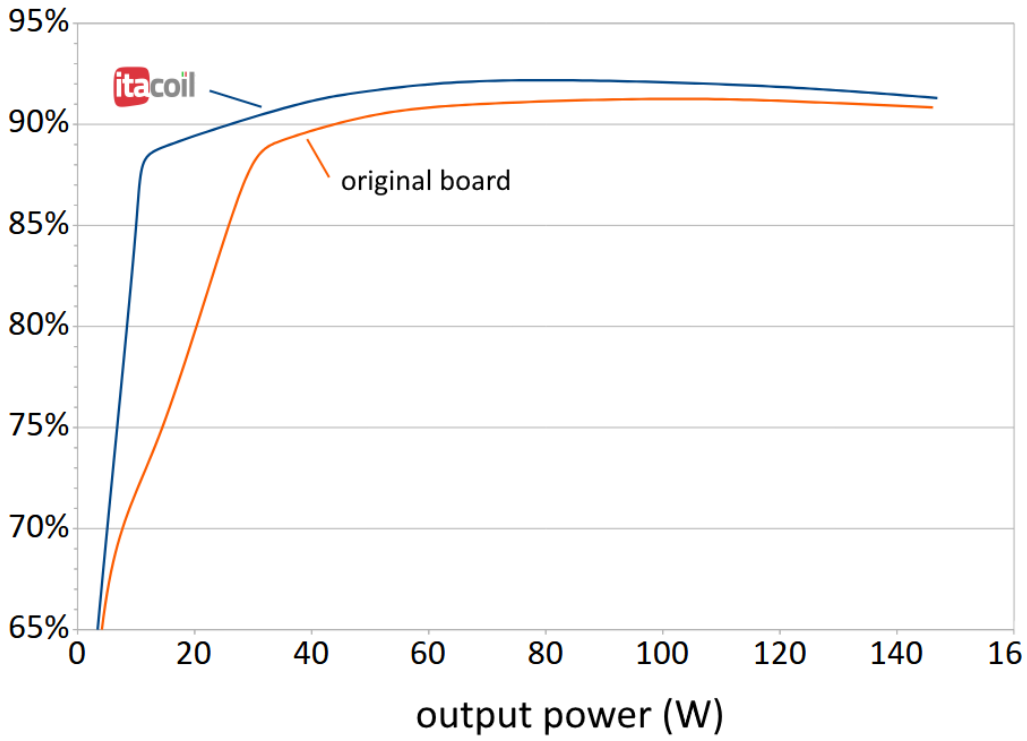




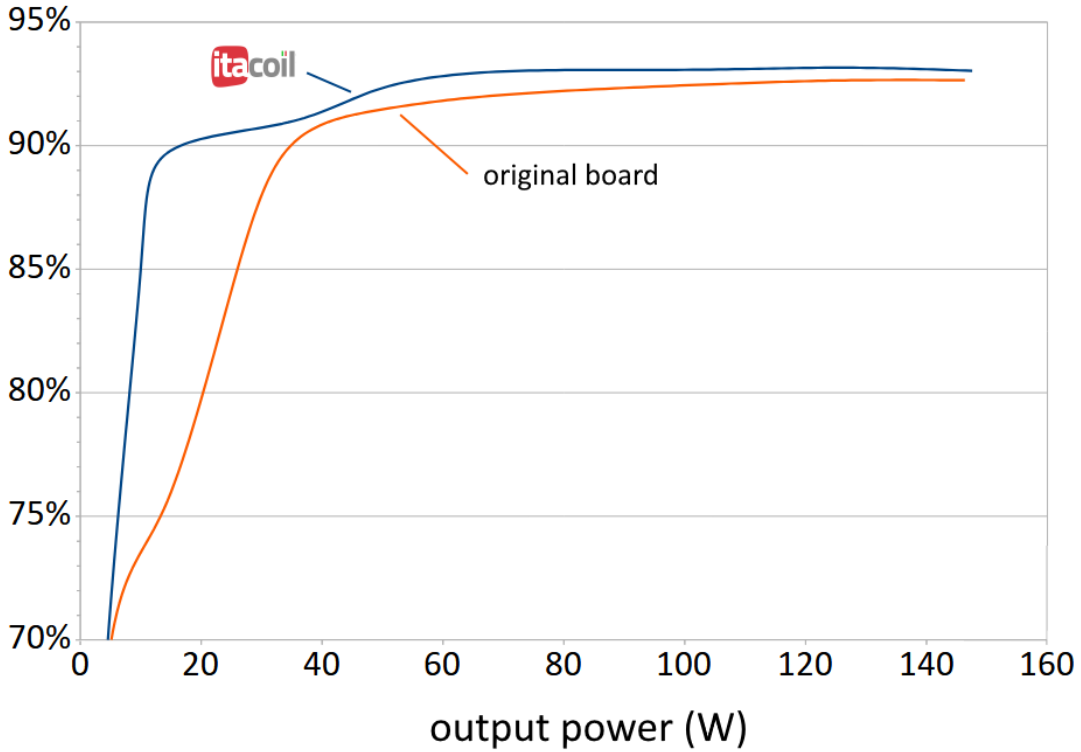
- PCBA size: 15,0x6,08cm (**-25%**); h=3,9cm; volume (**-31%**)
- Footprint of inductive components: **-50%**
  Volume of inductive components: **-64%**
- Efficiency: 91,3% @ Full Load & 110 V_{AC} (**+0,5%**)
  93,0% @ Full Load & 230 V_{AC} (**+0,3%**)
  the improvement is greater at low loads
- THD: ≤ 10% down to 33% load & 110 V_{AC}
- PF: ≥ 0.9 down to 33% load & 230 V_{AC}
- EN 50055 Conducted Noise pre-compliance
- Lower BOM cost

Efficiency comparison

@110 V_{AC}

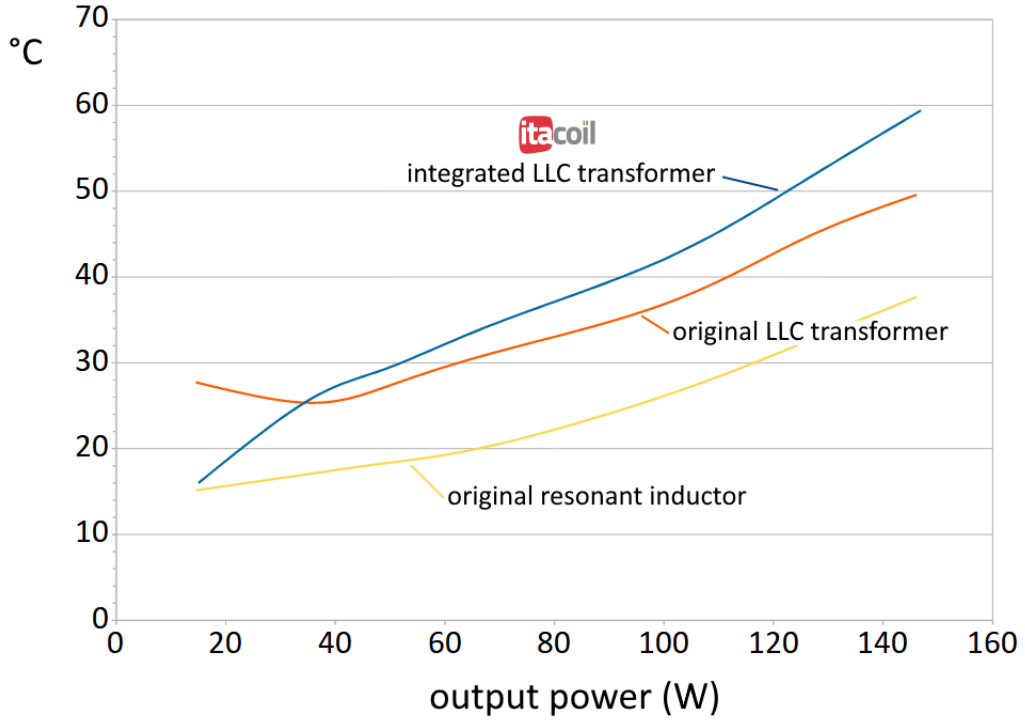


@230 V_{AC}

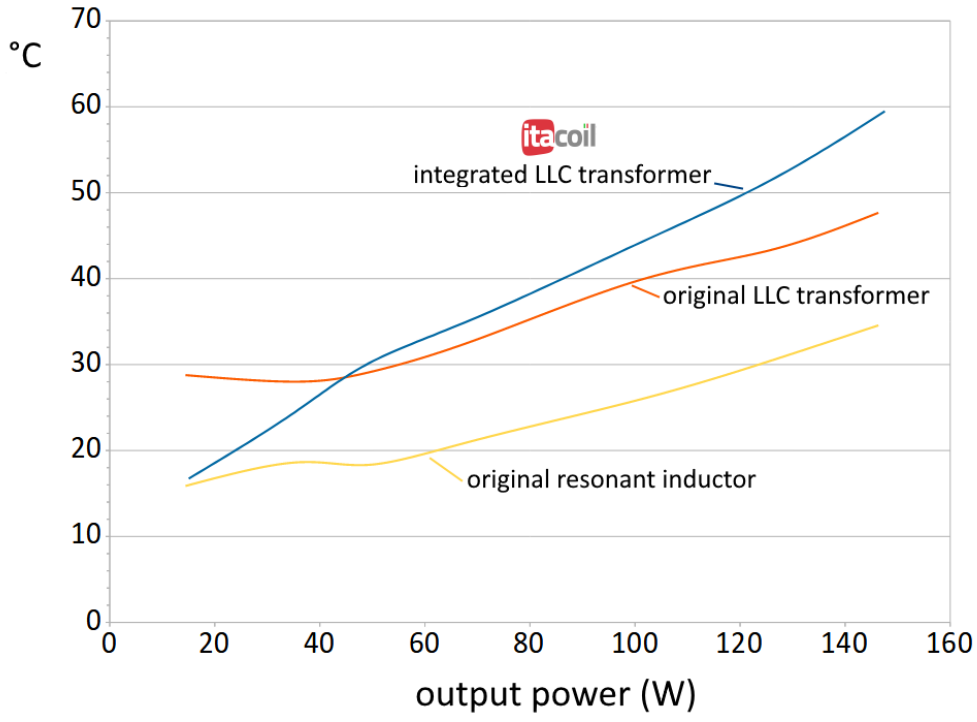


Temperature rise comparison

@110 V_{AC}

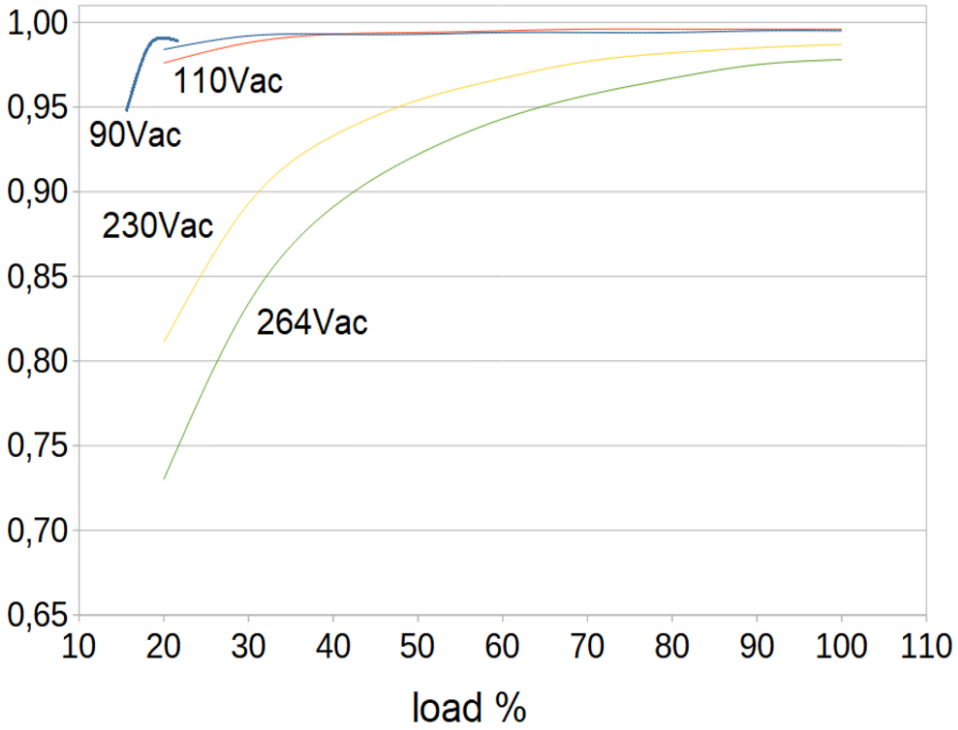


@230 V_{AC}

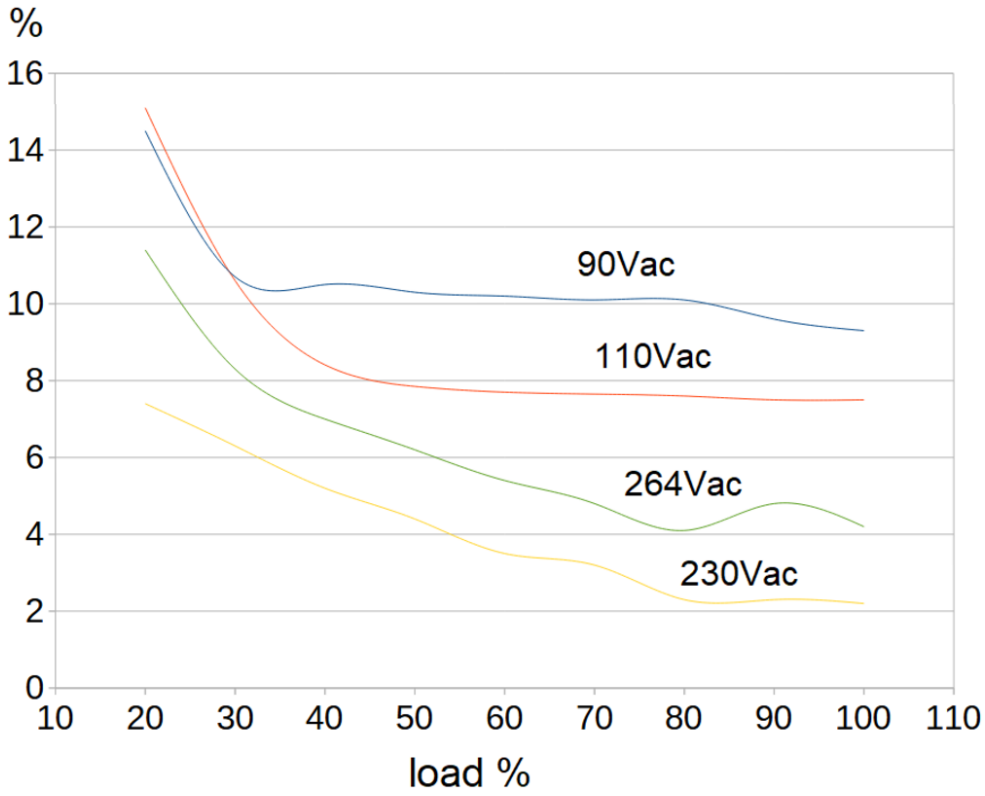


Optimized board **Power Factor and THD**

Power Factor

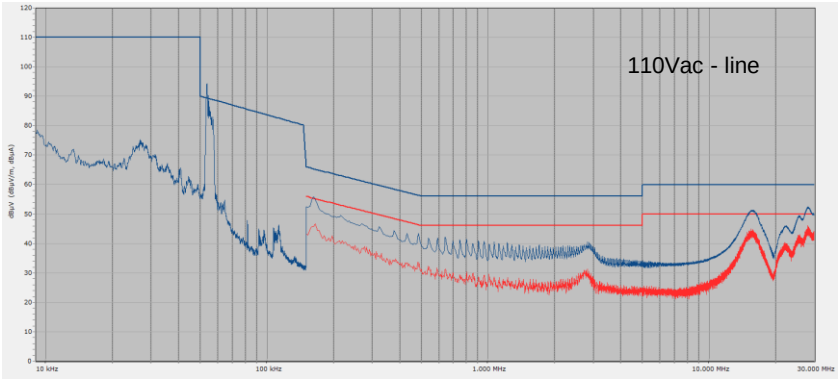


THD



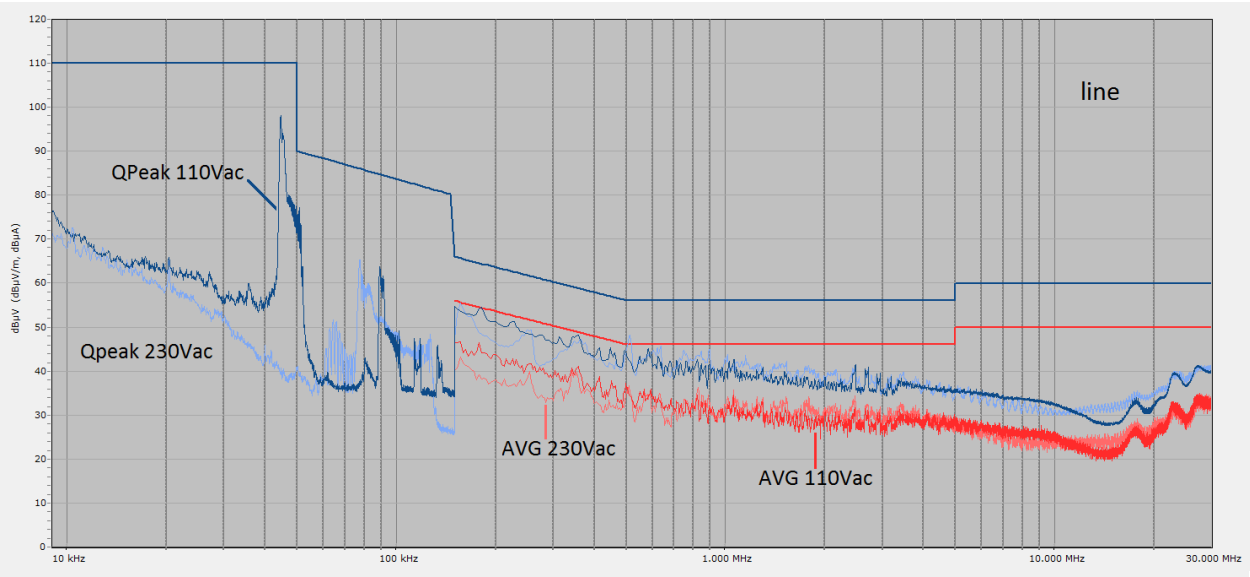
Conducted Noise comparison

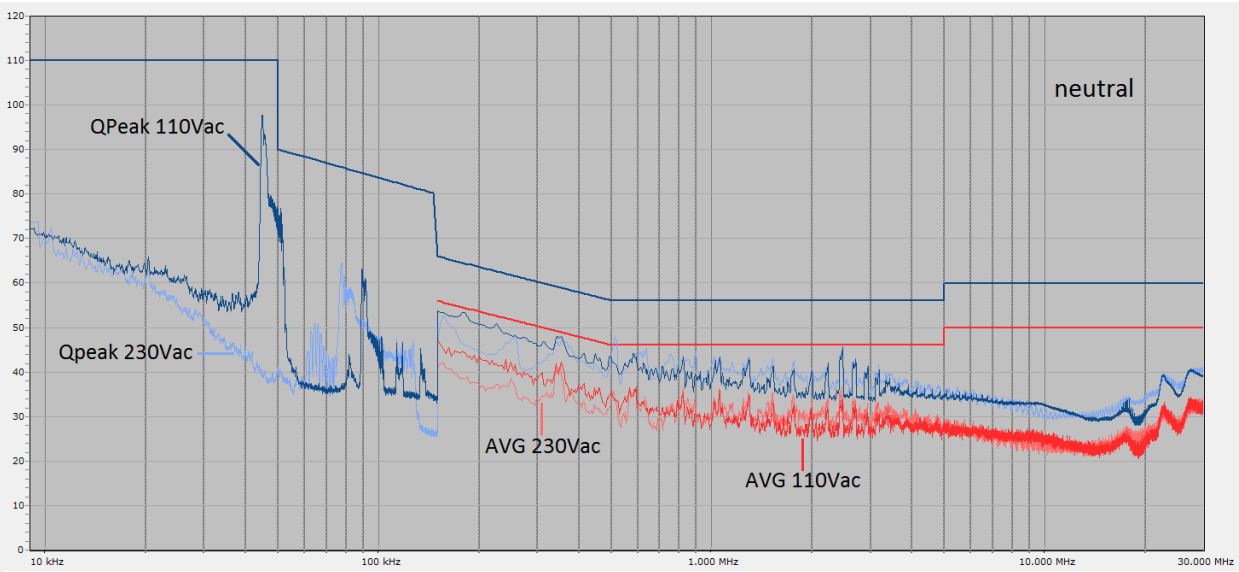
Original board



Optimized board

Compliance to EN 55015 is another improvement of the optimized board compared to the original board





Further improvement

The board could be furtherly simplified, along with a further cost reduction, by **replacing the LLC tank with a LCC tank**.

The LCC resonant topology is particularly suited for dimming LED driver applications.

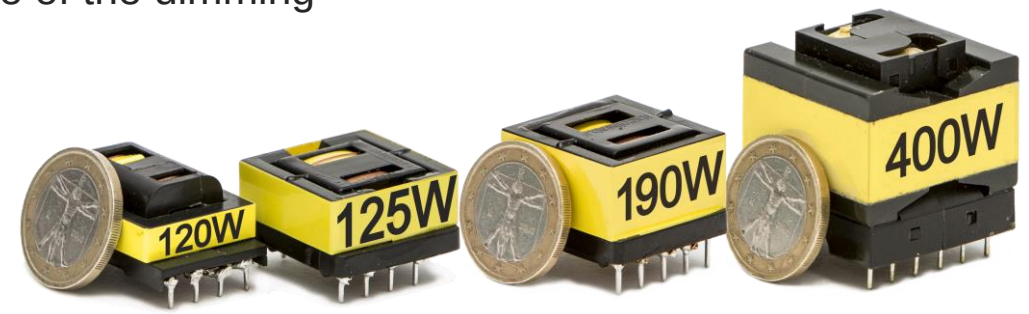
Itacoil's proprietary design tools also support the LCC topology.

This would allow to remove the deep dimming circuitry from the board, which now consists of a series of connected mosfets in linear operation mode.

The efficiency and cost saving obtainable depend on the amplitude of the dimming and the required output voltage range.

Read more about LLC and LCC resonant topologies

CLICK HERE

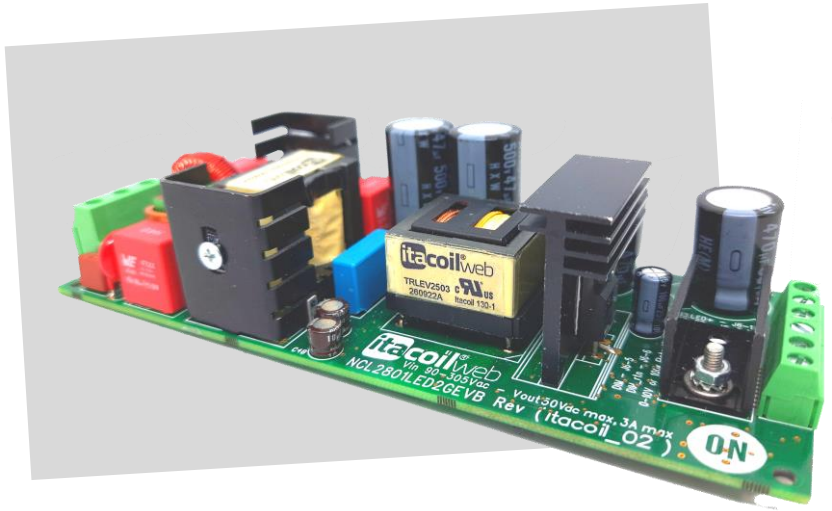


Some examples of the available sizes of Itacoil resonant transformers

Original Onsemi demo board

Other demo board reports

LLC and LCC integrated resonant transformers
PFC inductors
Common Mode inductors
Services



Contact us at contatto@itacoilmail.it or contact module