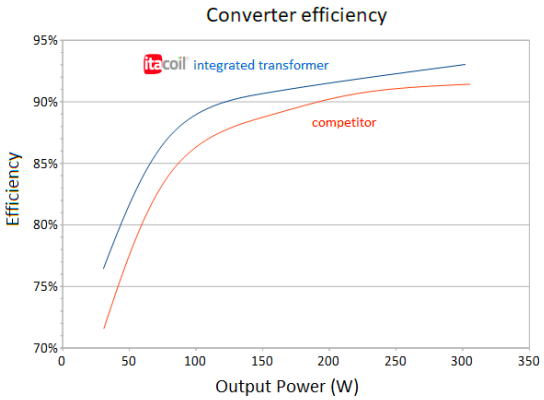
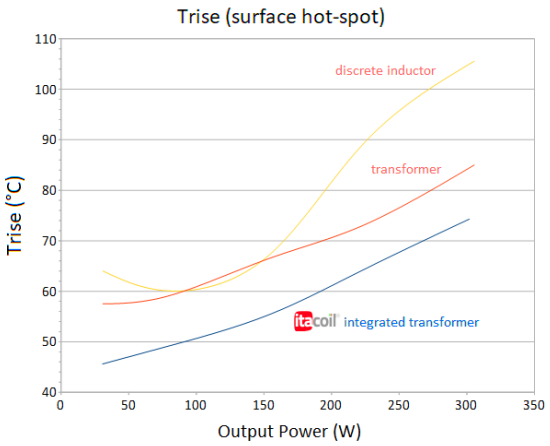
ST Microelectronics® LLL09V1A 36...48V-6,25A LCC CV-CC resonant led driver demo-board based on STM32F334-L6562AT

Transformer comparative test

original Vs Itacoil resonant transformer(1)

	max rated load 48V 6,25A		
	ORIGINAL	itacoil®	
Input voltage	274,9(2)	269,9	Vac
Input current	1,219	1,205	Aac
Input power	334,1	324,4	W
Output voltage	48,90	48,31	Vdc
Ouput current	6,247	6,248	Adc
Ouput power	305,4	301,8	W
Switching frequency	105,3	74,5	KHz
Converter Efficency	91,4%	**93,0%** (+1,6%)	%
Power loss saving		**-6,0** (-21%)	W
Temperatures	Transf. + induct.		
Ambient	27,4	27,4	°C
Worst Trise	105,6	47,9	°C
Dimensions	Transf. + induct.		
Overall footprint	15,8	6,97 (-56%)	cm²
Overall volume	60,8	39,7 (-35%)	cm³





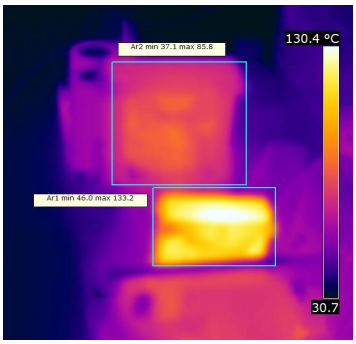
TEST CONDITIONS AND NOTES

- Test performed on ST Microelectronics® LLL09V1A CV-CC digitally controlled resonant converter demo board with PFC stage. (demo-board user guide)
- The original tank has traditional transformer + discrete resonant inductor. Our optimized tank applies a single integrated component.
- The Itacoil tank requires to replace C31(10nF) with 8,2nF capacitor and to set the firmware min frequency to 70,3KHz.
- The comparison has been performed at 48V, CV mode(3).
- A small heatsink has been assembled on D34 to reduce its Trise.

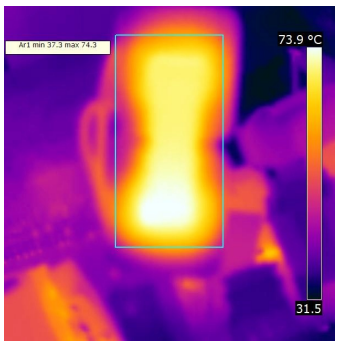
TEST RESULTS

The target was to improve efficiency, cost and Trise only by replacing the resonant tank, with no need for a discrete resonant inductor.
Dimensions, cost, efficiency and Trise have all been dramatically improved. Also note that the efficiency improvement at moderate loads reaches 5%.
Since the PFC stage is unchanged, 21% overall power loss reduction means around 30% on the LLC stage.
Last, the use of integrated transformers enhances the level and reliability of the pri/sec insulation. The structure of the tested transformer allows for over 6KV dielectric strength and 10mm creepage with no extra cost.

ORIGINAL COMPONENTS (@300W, t_a=27,4°C)



ITACOIL TRANSFORMER (@300W, t_a=27,4°C)



BENEFITS OF TRANSFORMER DESIGN BY ITACOIL® PROPRIETARY SOFTWARE

- smaller and lighter components
- optimized power loss
- best efficiency
- cost optimization
- **immediate success of your project**

(1) Lab sample, not available on stock. Similar products can be provided based to on custom design requests.
(2) On the original board we experienced a large Vbulk drop at max load and 270Vac_input. To obtain the normal Vbulk around 720Vdc, such test has been performed with 275Vac mains voltage. Any other test, with lower loads on originary board and with any load with Itacoil components, have been performed at 270V.
(3) The max input voltage have not been tested because it does not affect the LLC stage working conditions. The CC mode is supported within the specified 36-48V range, not tested because of the resources budget but it is assured by design.

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