

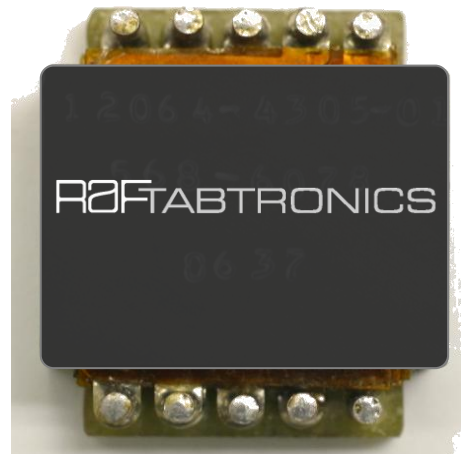


CASE STUDY

HIGH-EFFICIENCY PLANAR FORWARD CONVERTER TRANSFORMER

Abstract

RAF Tabtronics was challenged to increase efficiency of a 168 watt forward converter by reducing winding losses by 40%. By analyzing currents, skin effects, proximity effects, utilization factors and applying Hyper-X Magnetic Technology, the optimal solution was achieved.



Challenge - Increase efficiency of a 168 watt forward converter by reducing winding loss from 5 watts to less than 3 watts.

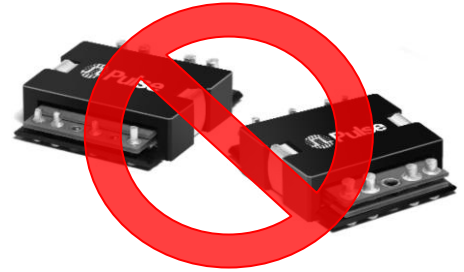
Results – RAF Tabtronics delivered a drop-in replacement part with higher efficiency, specifically optimized to the customers needs.

Challenge:

RAF Tabtronics was challenged to increase efficiency of a 168 watt transformer used in a forward converter power supply for a defense communication application.

Technical Objective:

RAF Tabtronics was presented with a commercial off-the-shelf (COTS) transformer that had dissipated winding losses of 5 watts. The objective was to reduce the winding loss to less than 3 watts, which is a 40% reduction.

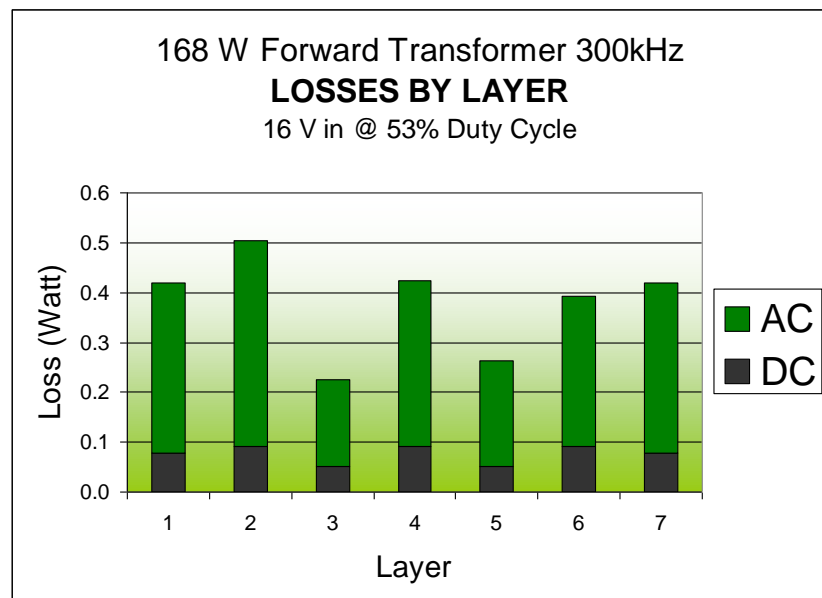


Specific Hurdles:

RAF Tabtronics engineers found that the transformer's conductors were subject to both AC and DC loss components. In addition, skin and proximity effects limited winding conductor utilization.

The Solution:

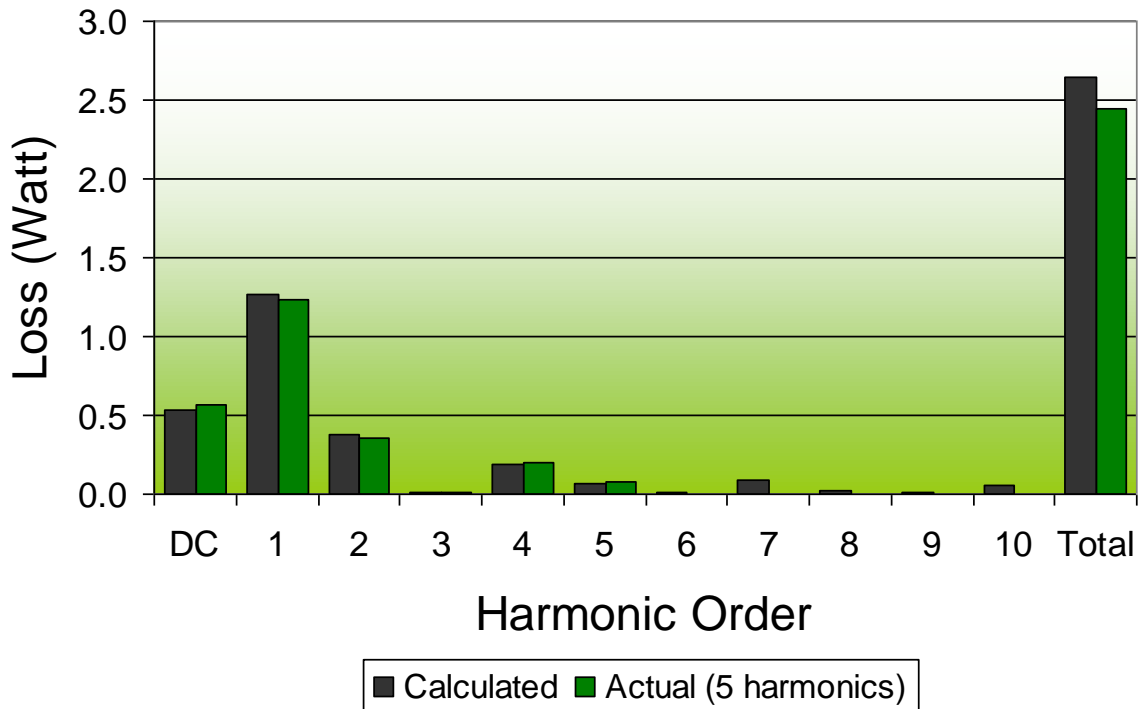
In order to analyze loss effects layer by layer, optimal construction was determined for the specified core by applying Hyper-X Magnetic Technology. Losses were carefully measured using harmonic test methods to correlate results with calculations.



168 W Forward Transformer 300 kHz

3 W MAX WINDING DISSIPATION

Losses By Harmonic: 16 V in



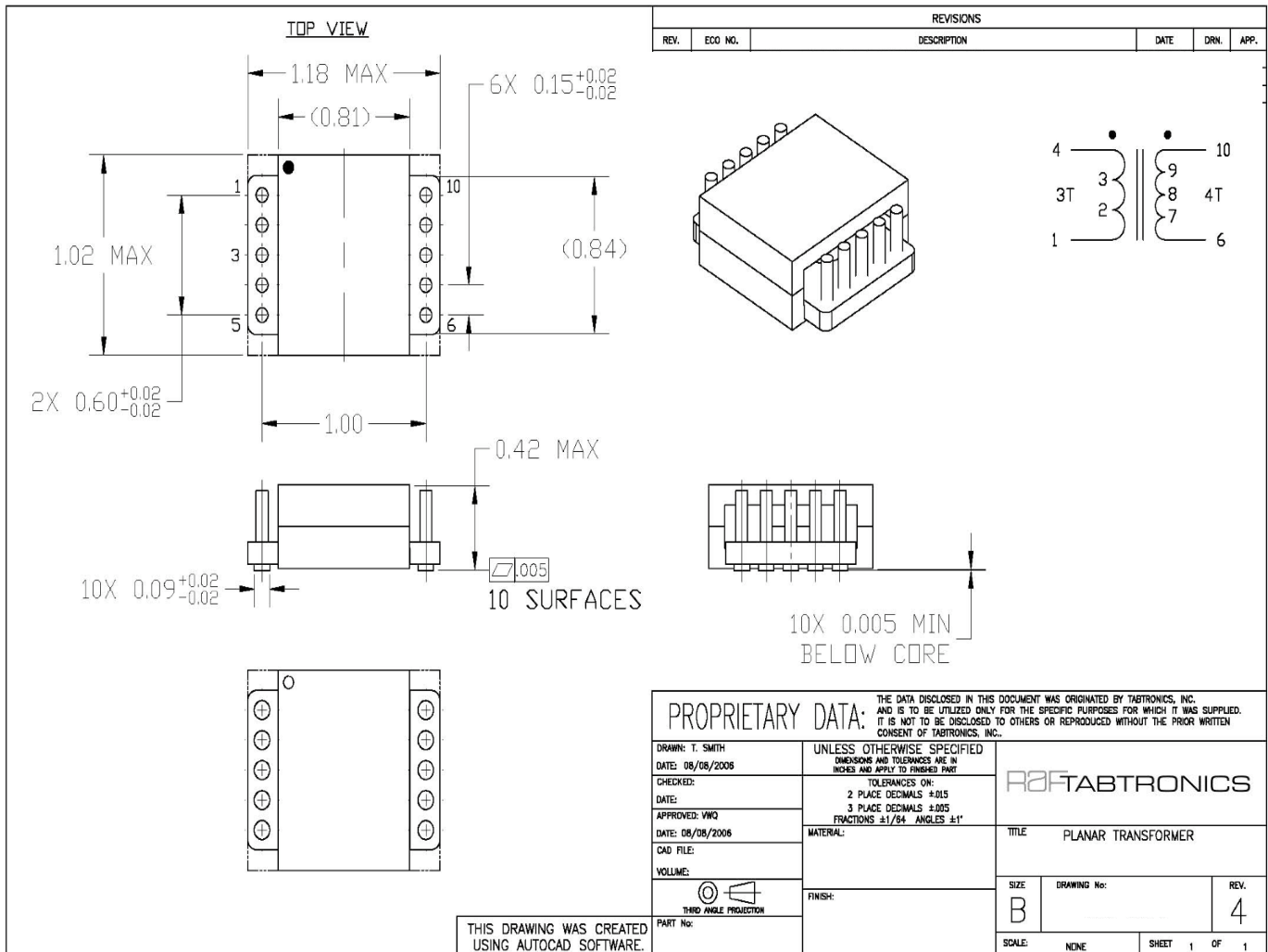
Hyper-X Magnetic Technology was used to determine winding losses layer by layer and to determine the configuration of a redesign using distributed optimization. This optimization process considered both DC and AC current components using harmonic decomposition of the application wave shapes. Harmonic test methods carefully correlated actual loss within 5% of calculations.

Customer Success:

In the end, the newly designed planar forward converter transformer provided the desired efficiency improvement, in the same envelope size and footprint as the original COTS component. The customer was extremely happy with the resulting transformer.

Results:

- Higher Efficiency
- Drop In Replacement
- Optimized to Customer's Unique Need



About RAF Tabtronics LLC:

RAF Tabtronics creates advanced electromagnetic technologies and cost-effective customized solutions for the world's leading power technology companies. We produce innovative ultra-high power density and high-efficiency components which provide significant competitive advantage to our customers in defense electronics, homeland security, medical electronics, aerospace, data management, and several diverse high technology sectors.

RAF Tabtronics facilities are certified to AS9100 and ISO9001 quality management systems.

RAF Tabtronics LLC. *Technology to the global power.*

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