

Confusion on Ferrite Power Transformers

When I worked for a living I designed and tested ferrite transformers (2-30 Mhz) up to 10KW average power. Some of the things I learned may be of interest to Forum members.

1. RF Power transformers DO NOT store energy (except for leakage inductance) , they transfer it.
2. AC current thru transformers do not affect flux density or core loss. AC voltage does.
3. Doubling core crosssectional area does not double inductance. This is because flux density drops as one moves away from the center of the core. This means that larger diameter cores is not the answer in reducing core loss. Use more cores. Loss is proportional to area inside the BH curve so less V/core means a shorter and narrower BH curve.
4. IR scanning of a ferrite power transformer showed that the inner surface heats first and expands (maximum flux density). This is what cracks cores. Even oil cooling had little effect on the power handling ability of the transformer.
5. At 160 meters I would recommend using the Amidon barrel that is 1in diameter, .5in hole, and 1.1in long in type 43 material at 10V/core (carrier). Peak modulation voltage is not much of a problem due to duty cycle and thermal time constant of the ferrite. This same transformer would be coasting at 80 meters (half flux density due to frequency).

I hope my comments help some of the non-engineers out there better understand the in's and out's of ferrite power transformers.