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Accession number:20113114194422

Title:Thermal analysis of a strapped magnetron

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Source title:IEEE Transactions on Electron Devices

Abbreviated source title:IEEE Trans. Electron Devices

Volume:58

Issue:8

Monograph title:SPECIAL ISSUE ON CHARACTERIZATION OF NANO CMOS VARIABILITY BY SIMULATION AND MEASUREMENTS

Issue date:August 2011

Publication year:2011

Pages:2784-2788

Article number:5876310

Language:English

ISSN:00189383

CODEN:IETDAI

Document type:Journal article (JA)

Publisher:Institute of Electrical and Electronics Engineers Inc., 445 Hoes Lane / P.O. Box 1331, Piscataway, NJ 08855-1331, United States

Abstract: Thermal analysis of an L-band 60-kW (continuous-wave) double-ring strapped magnetron for optimizing the design of a cathode support structure and cooling system is presented. This magnetron consists of an oxygen-free copper anode with ten built-in cooling channels and a directly heated tungsten cathode. The operating temperature of the cathode is greater than 2000°C; therefore, proper thermal design of the cathode support structure is essential for reliable operation. The heat convection coefficient for the forced air is estimated by simulations comparing the simulated temperatures for different heat convection coefficients with the measured one. It is observed that the comparison between simulations with measurement is in good agreement for various temperatures from 1000°C to 2000°C when the estimated heat convection coefficient of the forced air is used.