

# NASA TECH BRIEF



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## Prediction of Radiation Damage Effects in Transistors

Experimental measurements supported by a theoretical analysis have established quantitative relationships between the radiation dose (due to high energy particle bombardment in a space environment) to which transistors are exposed and the resultant damage (expressed as a damage factor) to the transistors. The overall damage factor for a particular transistor normally consists of two additive parts: (1) a bulk damage factor and (2) an ionization damage factor. The anticipated bulk-damage radiation dose in DENI's (Damage Equivalent of Normally Incident 1 MeV Electrons) and the anticipated ionization damage radiation dose in rads must be known in order to calculate the corresponding damage factors. Calculation of these dose levels is based on high energy particle population data and analysis of the shielding

effect provided by the enclosures surrounding a given transistor.

**Note:**

Inquiries concerning these relationships may be directed to:

Technology Utilization Officer  
Goddard Space Flight Center  
Greenbelt, Maryland 20771  
Reference: B67-10606

**Patent status:**

No patent action is contemplated by NASA.

Source: Radio Corporation of America  
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