First High-Gain MM-Wave Diode Amplifier

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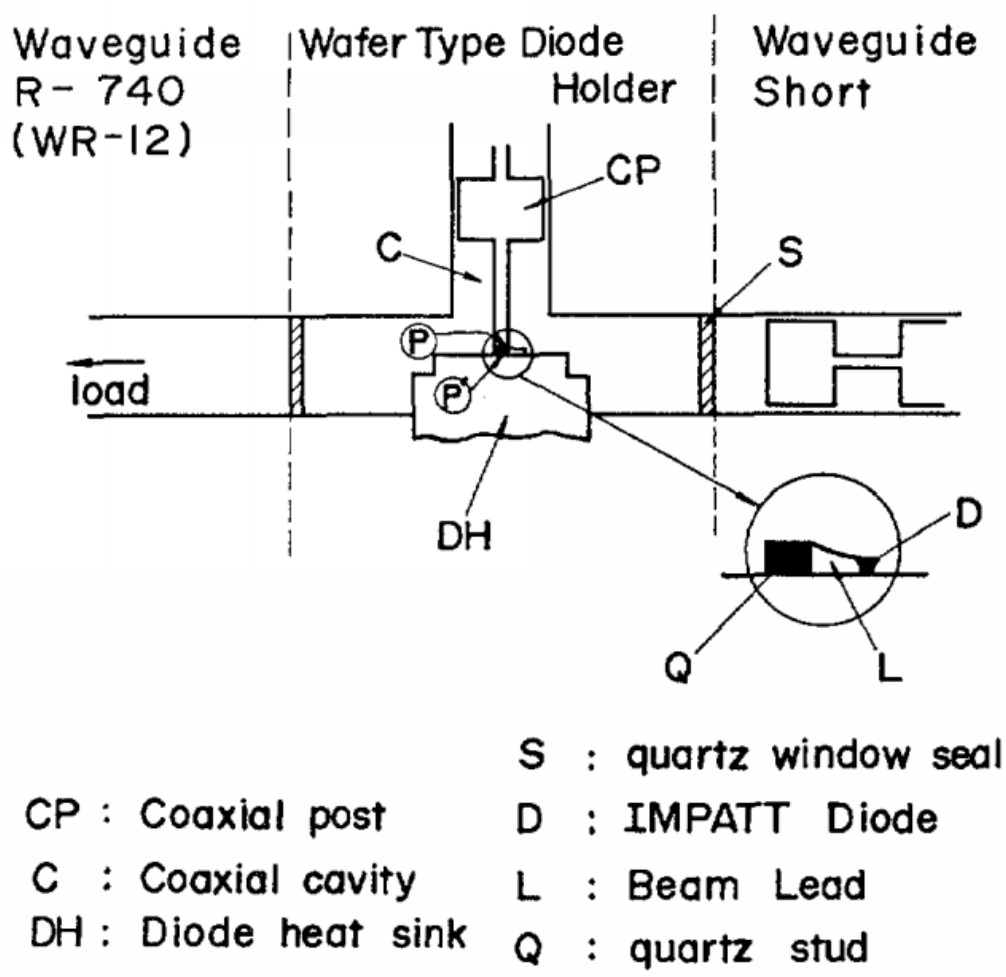

80GHz IMPATT Amplifier

BEFORE THE DEVELOPMENT of optical fibers with suitable characteristics, the lowest-loss method of distributing high-bandwidth signals over significant distances was through the use of circular waveguide. Aside from needing to construct long, hollow pipes with the requisite symmetry and smoothness (to say nothing of contending with bends, kinks and junctions), generating and amplifying millimeter-wave signals presents its own challenges. In 1974, an offspring of the Read diode, known as an IMPATT device, seemed a promising candidate. This paper describes an IMPATT-based amplifier which provides in excess of 10dB gain at 80GHz, a feat well beyond the capabilities of conventional transistor-based circuits of the day (and for years afterward). In another decade, fiber would begin to supplant rigid waveguide systems for wideband transmission.

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