Abstracts

Monolithically Integrated High-Gain and High-Sensitive Photoreceivers with Tunable Filtering Functions for Subcarrier Multiplexed Optical/Microwave Systems

H. Kamitsuna. "Monolithically Integrated High-Gain and High-Sensitive Photoreceivers with Tunable Filtering Functions for Subcarrier Multiplexed Optical/Microwave Systems." 1995 Transactions on Microwave Theory and Techniques 43.9 (Sep. 1995, Part II [T-MTT] (Special Issue on Microwave and Millimeter Wave Photonics)): 2351-2356.

This paper proposes monolithically integrated photoreceivers with tunable filtering functions using HBT-compatible HPT's for band-limited microwave subcarrier multiplexed transmission and optical/microwave signal processing systems. The filter photoreceiver, which consists of the HPT with a positive feedback LC resonance circuit and a Q-damping resistor, realizes the high quality factor (Q-factor) of 37.7 with the photo-response peak frequency of 13.6 GHz. Furthermore, it yields not only 24.1 dB and 16.2 dB higher gain but also over 7.5 dB and 3.5 dB improvement in sensitivity at 13.6 GHz without any spurious oscillation, in comparison with a standard photodiode and a discrete HPT, respectively. The tuner photoreceiver is constructed based on the filter photoreceiver. By adapting the HBT-compatible varactor diode in the resonance circuit, we realize tunable filtering functions, i.e., a very-wide photo-response peak frequency tuning range of 11.0-14.6 GHz with a Q-factor of over 20.2. The chip size is as small as 1.0 mm x 0.75 mm. The developed photoreceivers promise to realize compact, cost-effective hardware for subcarrier multiplexed optical/microwave or /miltimeter-wave systems.

❑ Return to main document.