# Abstracts

## Multi-chip transmitter/receiver module using high dielectric substrates for 5.8 GHz ITS applications

*M. Murase, Y. Sasaki, A. Sasabata, H. Tanaka and Y. Ishikawa. "Multi-chip transmitter/receiver module using high dielectric substrates for 5.8 GHz ITS applications." 1999 MTT-S International Microwave Symposium Digest 99.1 (1999 Vol. I [MWSYM]): 211-214 vol.1.*

We propose novel, small and integrated microwave multi-chip modules (MCMs) using high dielectric substrates. A variety of dielectric substrates can be selected for the specifications of products according to dielectric constants, Q-factors, temperature stability, etc. This paper describes an application of the very high dielectric constant (K=110) substrate for integration of a band pass filter to a 5.8 GHz transmitter/receiver (T/R) module. This module consists of a microstrip filter chip (chip size: 1 mm/spl times/2 mm) and two GaAs IC chips on a low-cost alumina substrate. The package external size is 7.56 mm/spl times/6.50 mm/spl times/1.50 mm, which is the smallest of the T/R modules for the Electronic Toll Collection (ETC) system including a band pass filter and a switch.

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