

Title (en)

Microstrip to waveguide transition for millimetric waves embodied in a multilayer printed circuit board

Title (de)

Mikrostreifenleiter-Hohlleiterübergang für in einer Mehrschichtleiterplatte gebildete Millimeterplatte

Title (fr)

Transition entre ligne microruban et guide d'ondes pour ondes millimétriques réalisée en une carte de circuits imprimés multicouche

Publication

EP 1592081 A1 20051102 (EN)

Application

EP 04425300 A 20040429

Priority

EP 04425300 A 20040429

Abstract (en)

A microwave to waveguide transition is obtained in a multilayer structure comprising a 100 µm thick dielectric substrate (1) adherent to a rigid copper plate (15) 2 mm thick. The dielectric substrate is one of high-losses type suitable for PCB manufacturing techniques, such as Roger™ 4350. A metallic layout on the dielectric substrate includes a microstrip (2) terminating with a patch (3) acting as a probe inside the cavity of a rectangular waveguide WR15 (1.88 × 3.76 mm) operating in the EHF frequency range of 55-60 GHz (millimetric waves). The introduction of the probe inside the cavity (11) of the waveguide filled with air maintaining the continuity of the microstrip is a problem solved by properly working both the multilayer (1, 15) and the waveguide for a reciprocal penetration. More precisely, the multilayer is removed in correspondence of a window (5, 6) for the insertion of the waveguide (10), with the exception of a narrow central stripe (4) bearing the probe. Two opposite grooves (12, 13) are milled in the edge of the waveguide for the insertion of the stripe with the probe inside the cavity of the waveguide as far as the depth of the grooves allows it. A metallic lid (16) is screwed to the edge of the waveguide for reflecting back to the waveguide (10) the power radiated by the patch (3) in the opposite direction. The multilayer is fixed to the same metallic body which had been worked mechanically to obtain the waveguide. In order to prevent possible detachments of the thin dielectric substrate from the thick copper plate, a crown of metallized through holes is obtained around the edge of the waveguides emerging from the multilayer. The transition is part of a millimetric wave transceiver manufactured on a single multilayer according to PCB, surface mount, and chip-on-board technologies (fig.5).

IPC 1-7

H01P 5/107

IPC 8 full level

H01P 5/107 (2006.01)

CPC (source: EP)

H01P 5/107 (2013.01)

Citation (applicant)

- EP 1367668 A1 20031203 - SIEMENS INF & COMM NETWORKS [IT]
- EP 0874415 A2 19981028 - KYOCERA CORP [JP]
- EP 1280392 A1 20030129 - SIEMENS INF & COMM NETWORKS [IT]
- G.L.MATTHAEI, L. YONG; E. M. T. JONES: "Microwave Filters, Impedance-Matching Networks, and Coupling Structures", 1980, ARTECH HOUSE BOOKS
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Citation (search report)

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- [YD] EP 1367668 A1 20031203 - SIEMENS INF & COMM NETWORKS [IT]
- [A] PATENT ABSTRACTS OF JAPAN vol. 2000, no. 23 10 February 2001 (2001-02-10)
- [A] PATENT ABSTRACTS OF JAPAN vol. 008, no. 081 (E - 238) 13 April 1984 (1984-04-13)
- [A] PATENT ABSTRACTS OF JAPAN vol. 1998, no. H10 31 August 1998 (1998-08-31)

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Designated contracting state (EPC)

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR

DOCDB simple family (publication)

EP 1592081 A1 20051102; EP 1592081 B1 20091118; AT E449434 T1 20091215; DE 602004024169 D1 20091231; ES 2334566 T3 20100312

DOCDB simple family (application)

EP 04425300 A 20040429; AT 04425300 T 20040429; DE 602004024169 T 20040429; ES 04425300 T 20040429