APPLICATION NOTE

Construction of the 470 – 860 MHz BLV57 wideband amplifier

NCO8201

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1 INTRODUCTION

In the application report NCO8101 two amplifiers for band 4/5 with BLV57 transistors have been described. Reactions on this report proved the necessity to give more information about the construction of these amplifiers. This construction has been based on a heatsink with a printed-circuit board at the upper side and the bias circuits and a forced air-cooling at the lower side.

2 PRINTED CIRCUIT BOARD

In the printed-circuit board rectangular holes have been made to mount the BLV57 transistors on the heatsink. For fastening of the printed-circuit board on the heatsink by means of screws, 7 holes of 3.1 mm ∅ and for fastening of the hybrid couplers 8 holes of 2.6 mm ∅ have been made on the indicated places (see Figs 1 and 2). Hereby has been taken into account the use of Anaren hybrid couplers, type 10264 – 3, suited for the frequency range of 500 – 1000 MHz. Because the 2 bias units have been situated at the lower side of the heatsink, the connections from these units to the circuit take place through the printed-circuit board and the heatsink. For this purpose 9 holes of 2 mm ∅ are necessary (4 collectors, 4 bases and 1 ground). To make a good ground contact between the upper and the lower side of the printed-circuit board the following measures have been taken:

- On 8 spots rivets have been used and soldered at both sides to the metallization of the printed-circuit board. The holes of 2 mm ∅ , needed for these rivets, have been situated as indicated in Figs1 and 2.
- Copper straps with a thickness of 0.2 mm have been soldered at all edges of the printed-circuit board.
- A good emitter to ground contact has been achieved by soldering 8 copper straps from the upper to the lower side of the printed-circuit board on the spots of each emitter lead.
- The input connector and the output connector have been screwed to the heatsink but the ground also has been soldered to the printed-circuit board.

3 HEATSINK

For the BLV57 amplifiers, described in report NCO8101, a blackened heatsink of Seifert Electronic, type KL-117 with a length of 191 mm has been used (see Fig.3). At the lower side forced air-cooling has been applied with a fan trade mark Etri, type 99 XU 01 - 81 with an air displacement of 16 litres per second). By applying this air-cooling the thermal resistance decreased from 0.5 °C/W to 0.2 °C/W.

4 MECHANICAL MACHINING OF THE HEATSINK

The raised edges at the top side of the heatsink have been removed because the printed circuit board has a width of 113 mm (see Fig.3). To fit the heatsink to the printed-circuit board the following machinings have been carried out:

- Rectangular holes of 2.8 mm deep have been mould in the heatsink because the transistor leads have to be soldered on the printed-circuit board. Also it was necessary to make savings of 4 mm wide and 0.6 mm deep at the positions of the straps on the printed-circuit board. The transistors have been fastened with M 2.5 screws in the heatsink (see Fig.4).
- To achieve that the printed-circuit board lays tight to the heatsink also savings have been made in the heatsink on the spots of the 8 rivets through the printed-circuit board.
- For fastening the printed-circuit board on the heatsink on 7 places, holes with M 3 screwthread have been made in the top side of the heatsink, corresponding with indicated holes in the printed-circuit board.
- The two hybrid couplers also have been fastened in the heatsink with screws through the printed-circuit board. Therefore 8 holes have been made with M 2.5 screwthread, corresponding with the printed-circuit board.
- The input and output connectors have been fastened to the heatsink with M 3 screws. The mid contact of each connector makes contact with the printed-circuit board.

5 CONCLUSIONS

With the construction of the BLV57 amplifiers a good thermal resistance (0.2 °C/W) has been achieved by means of a forced air-cooling. Attention has been payed to a good mechanical contact between heatsink and printed circuit board and a good ground contact on the printed-circuit board by means of rivets and straps at the edges and under the emitter leads.

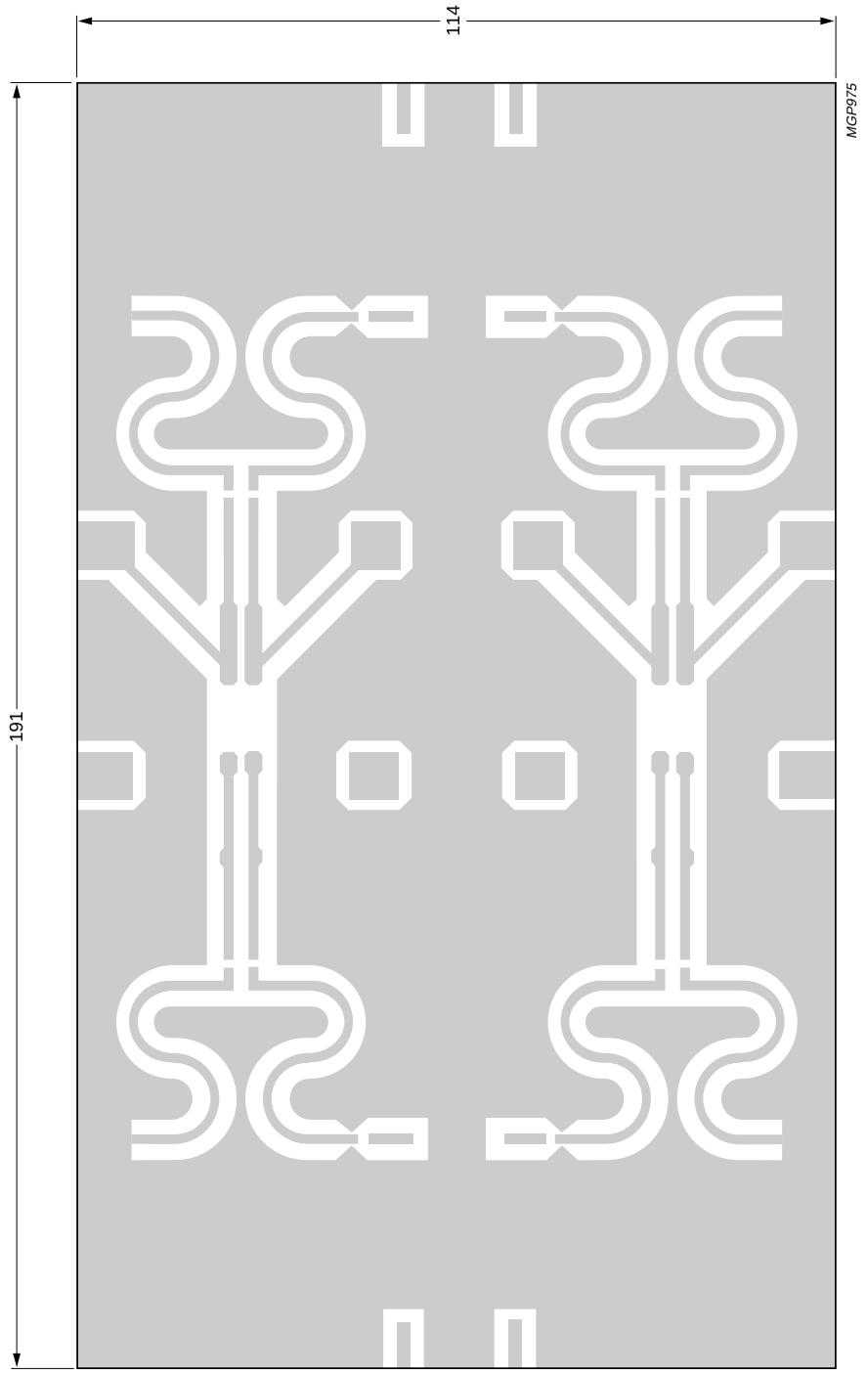

Fig.1 Printed circuit board.

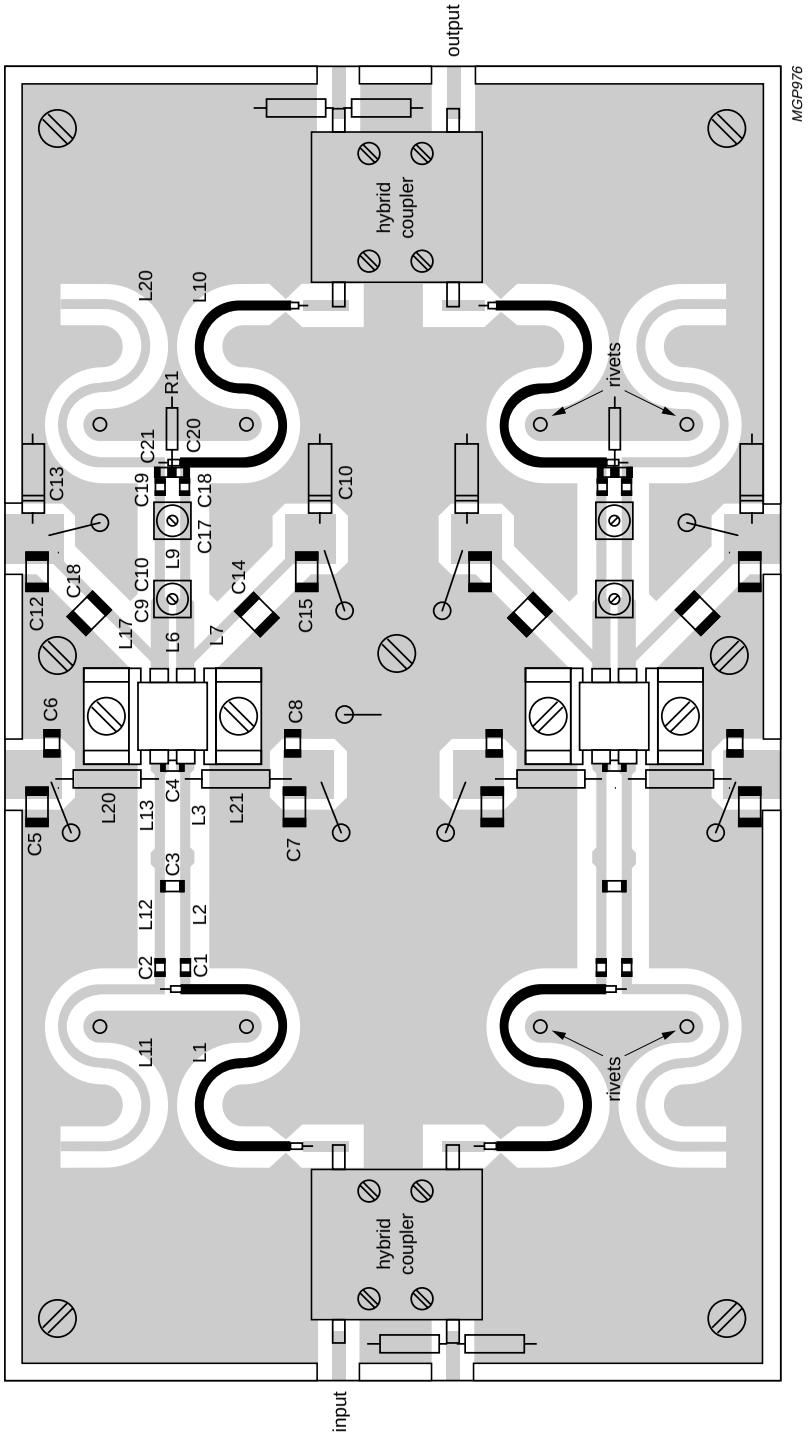

Fig.2 Printed-circuit board.

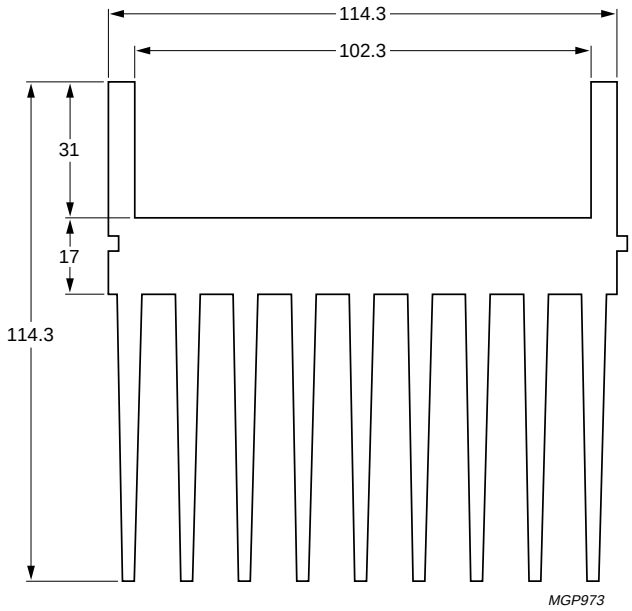

Fig.3 Heatsink.

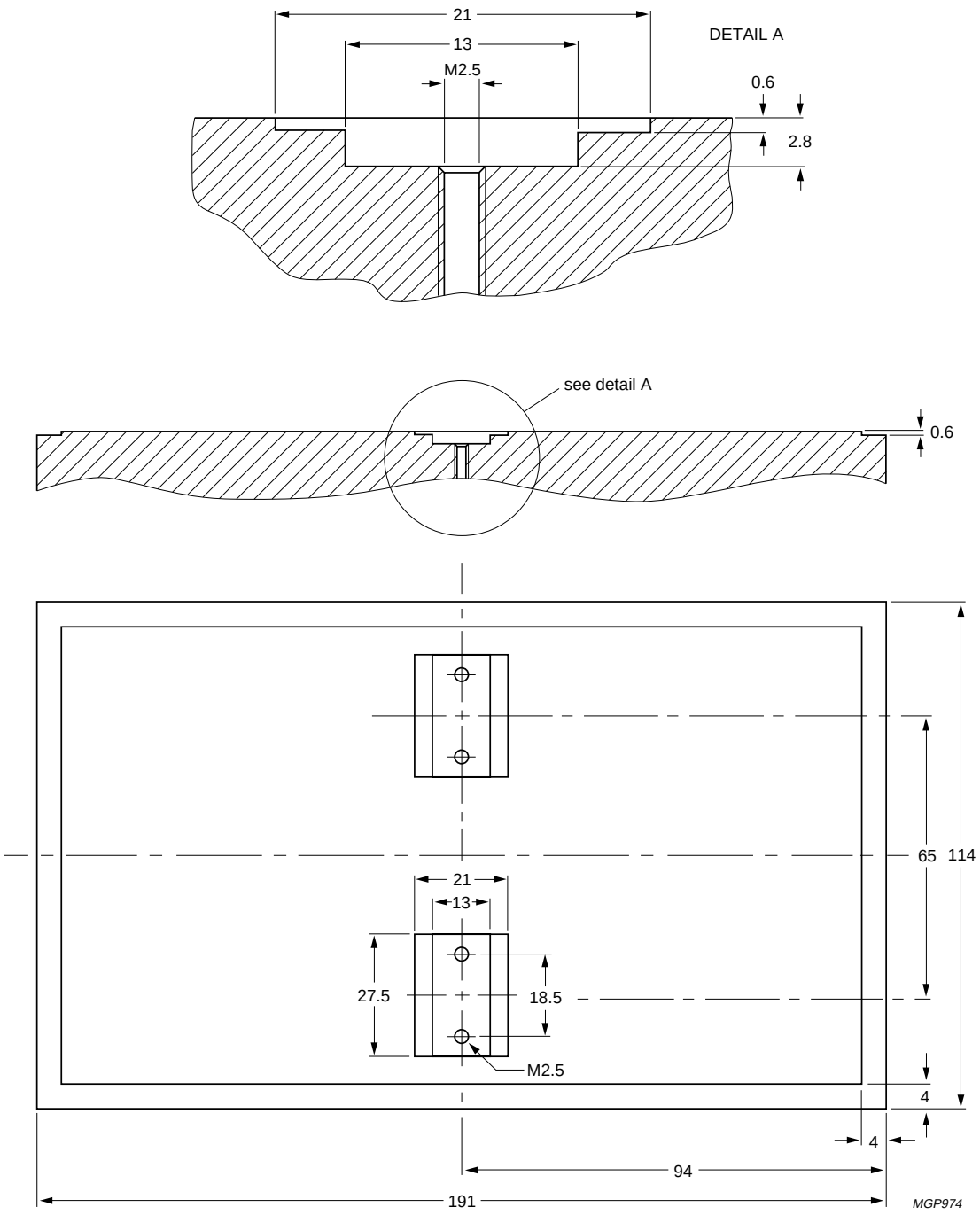

Fig.4 Heatsink savings.

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