

A simple Multipliers and Mixers for 47GHz and 78GHz



Microwave Update 2005
Sheraton Hotel Cerritos, CA

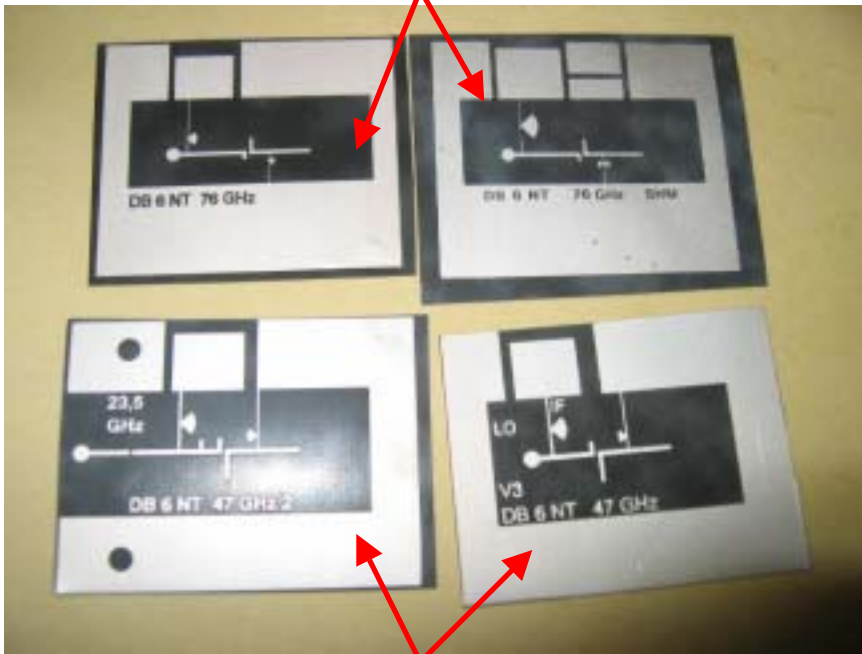
JR3JZM
Ueshi ma

Norio

PCBs, Diodes for Multipliers & Mixers

PCBs (printed circuit board)

for 78GHz

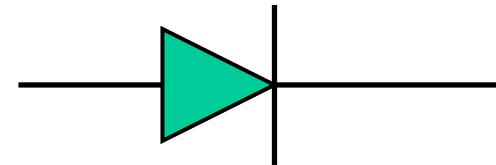


for 47GHz

PCBs made by **DB6NT**

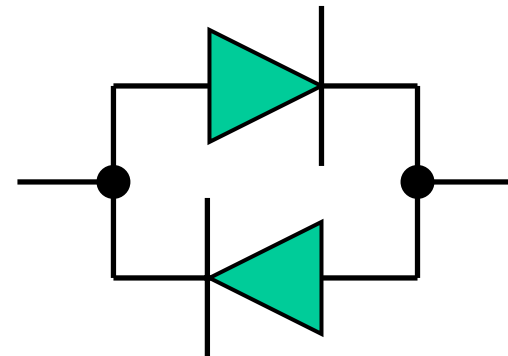
Diodes

Single Diode for Multipliers



Maycom MA4E2037

Anti Paralleled Diode
for Mixers



HP HSCH-9251



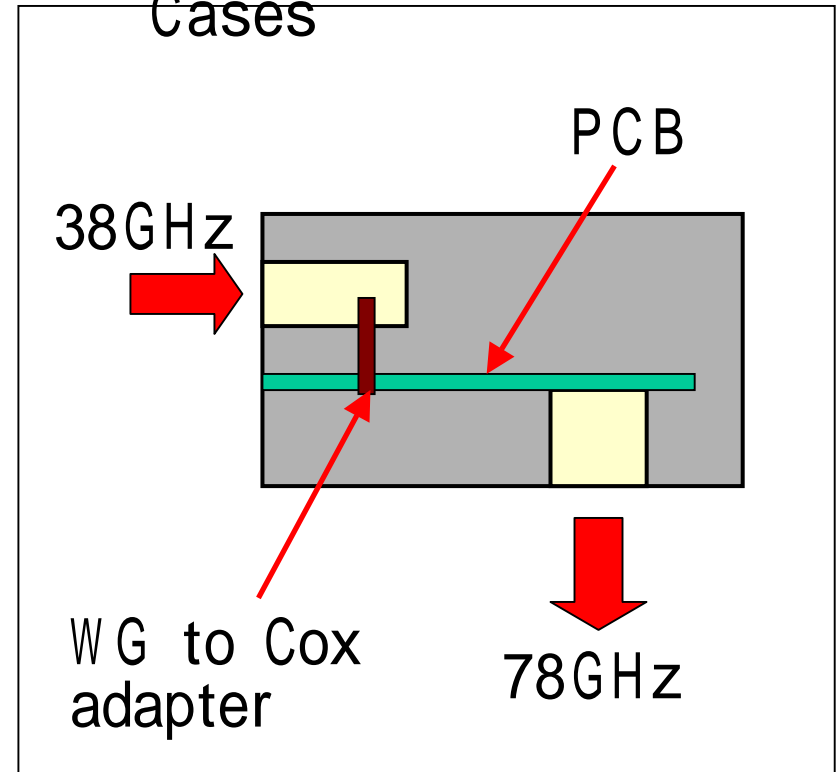
Design and make the aluminum case.

2 prototypes Cases



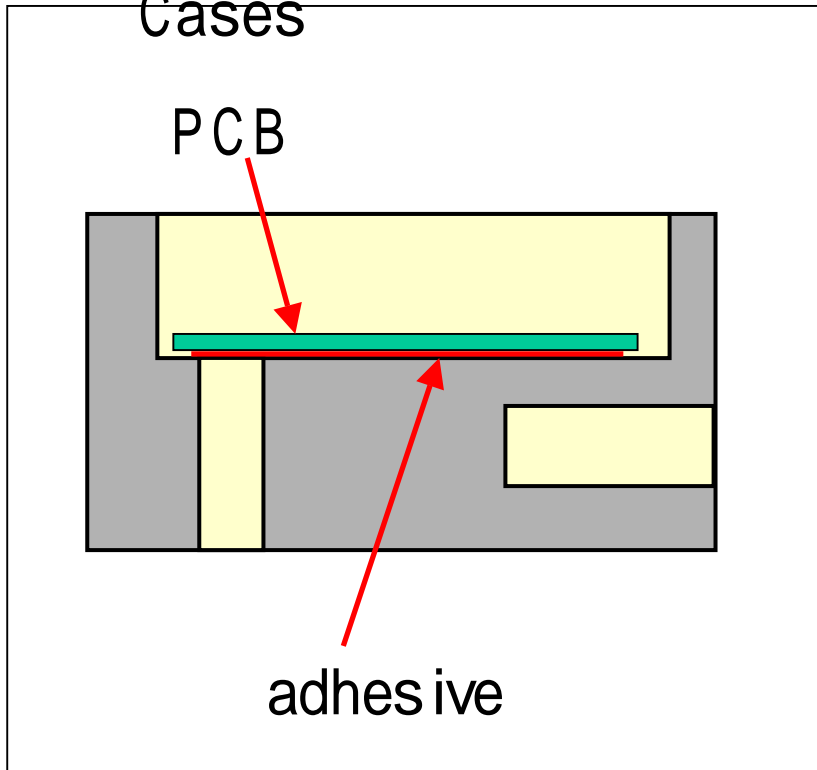
For 47GHz

Makeup of the Cases



Attach the PCB to the case

Makeup of the Cases



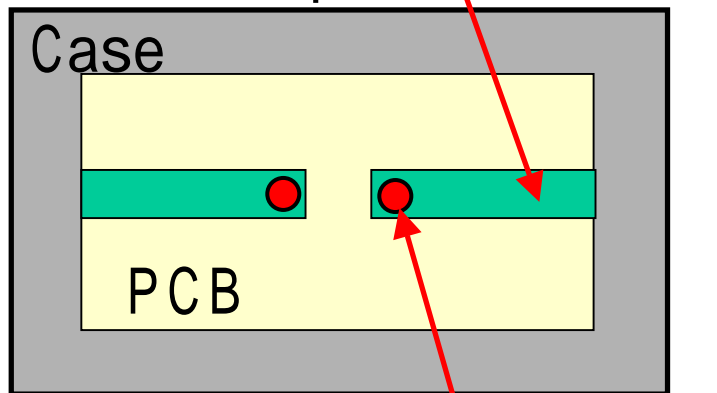
Adhesive with high conductivity



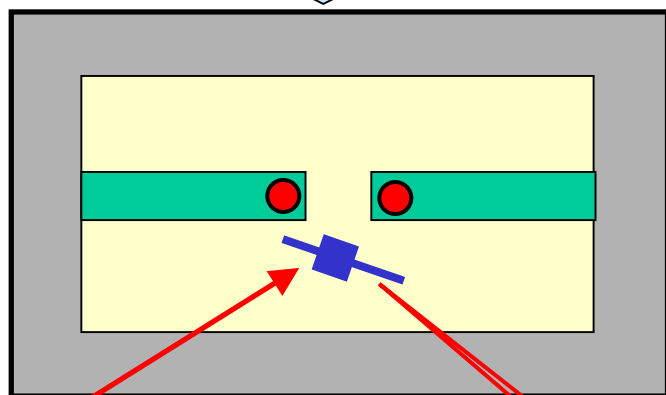
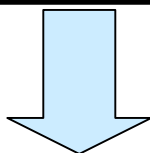
Chemtronics CW2400

Put the Diode on the Strip Line

Makeup of the Cases
Strip Line

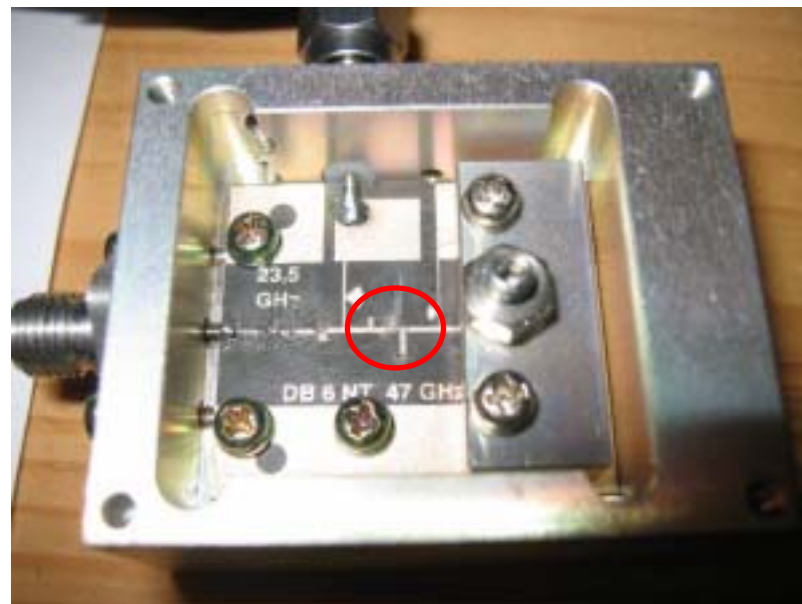
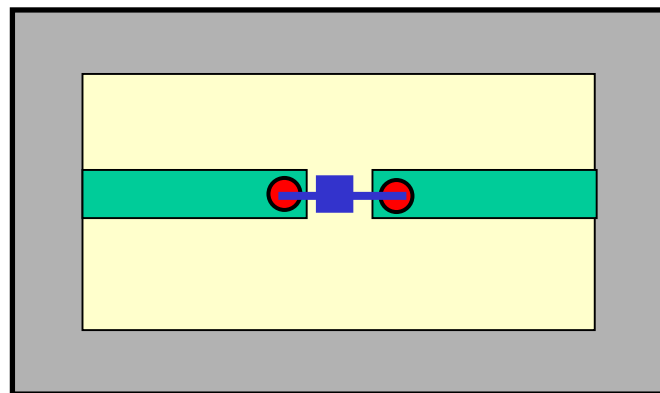
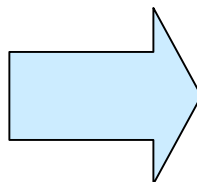


adhesive



diode

Needle



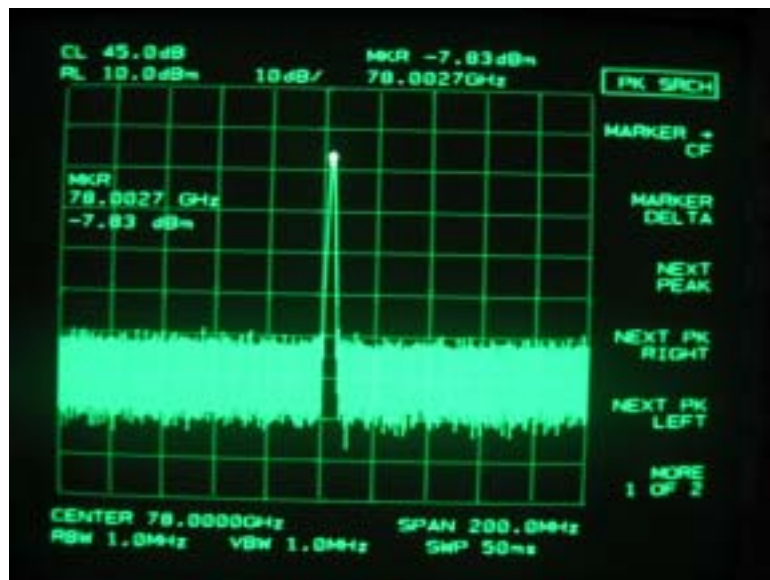
Results of the Measurement

Multiplier

	78GHz	47GHz
Lo power	+20dBm	+20dBm
Lo frequency	39GHz	23.5GHz
Diode bias	1k ohm VR	1k ohm VR
Diode	MA4E2037 Single Beam lead	
Tx power	+5dBm	+10dBm

Mixer

	78GHz	47GHz
Lo power	+20dBm	+20dBm
If frequency	1.2GHz	1.2GHz
Lo frequency	25.7GHz	15.3GHz
Diode bias	10k ohm VR	10k ohm VR
Diode	Hp HSCH-9251 Anti Paralleled Beam lead	
Conversion Gain	-20dB	-12dB



A 120Watts Power Amplifier



Name of FET	Out Put Power	Frequency	Drain	Maker
FLL-15011U-2C	150W	500MHz to 2.4GHz	12V 25A	Fujitsu
FLL-6011Q-2C	60W	500MHz to 2.4GHz	12V 10A	Fujitsu