

Technical Specifications:

Requirements

1. MMIC die fabrication at the foundry specified and supply.
2. Packaging of dies as per specifications.
3. Test PCB board design and population of components including the packaged die.
4. Conduct prescribed Tests to evaluate the die and report.
5. The vendor must take the responsibility to be the interface for all technical clarifications between the IITM, die foundry and packaging vendor.
6. If required tie up with other test centers including DRDO to execute the test as specified.

Detailed specification:

1. MMIC DIE

Fabrication and supply of MACK_3P0, EE, IIT Madras MMIC design provided in the GDS format softcopy to be fabricated in the TSMC, semiconductor foundry.

Foundry	TSMC
Technology (nm)	65
Flavor	MS RF GP
Metal	1p9m_6X1Z1U
Bump	No
Wire bond or Flip chip	Wire bond
Die x (mm)	2.46
Die y (mm)	1.025
Area (mm ²)	2.5215

Core (V)	1.0
I/O (V)	2.5
Wafer quantity	1
Sample quantity	100
Backgrind thickness(mils)	12

Die Details:

1. MOM caps used in the designs. TSMC MOM caps are used which has M1-M7 metal layers.
2. Inductors are used in the design but not in AP layer.
3. 45-degree metal routing lines are not used.
4. AP layer exist in the data base including the pads and its thickness is 14.5KA.
5. Seal ring is included in the GDSII.

2. PACKAGING TASKS

MACK_3P0 MMIC dies to be packaged.

1. Depending upon the place of usage and other processor requirements (inside the package along with die) for feeding the inputs are to be considered for selection of the package size and specifications.
2. The suitable package satisfying the listed criteria must be chosen and finalized based on the review by IITM and vendor.

3. TEST BOARD

MACK_3P0 test PCB board to be developed.

1. Evaluation board design must be done for the chosen package.
2. The board to be designed with minimum 70dB isolation input and output of IC.
3. Evaluation Board fabrication on ROGERS4350B material must be done.
4. Assembly of the test board with the IC must be done.

- Bare test board before assembly of the chip should be tested for isolation and the report must be submitted.

Note: A minimum of 2 number of test boards are required to be fabricated and supplied.

4. TESTING

MACK_3P0 chip to be tested.

Test parameters requirements

The testing of IC must be done, and the following test results are to be confidentially shared in a report format.

S. No	Parameter	Units
1	Frequency band of Operation	GHz
2	Receiver Gain	dB
3	Transmitter Gain	dB
4	Gain Flatness	dB
5	Noise Figure	dB
6	Input and Output Return Loss	dB
7	Attenuator States 64 states	dB
8	Phase Shifter States 64 states	deg
9	Transmitter P1 dB Compression Point	dBm
10	OIP3 for the channel	dBm
11	Maximum Input Power	dBm
12	Power Consumption	W
13	Transmit Saturated Power	dBm

Terms and conditions:

- Any further testing requirements if requested must be done and coordinated accordingly.
- The tested as well as the untested dies and test PCB boards must be submitted.

