

## W-Band X8 MMIC Multiplier

### X8/68-116GHz/14.5dBm Output Power

**Model: TLRDX-2505**

TLRDX-2505 is a W-band broadband octuplexerr chip which operates from 68GHz to 116GHz. When the input power is 0dBm to +4dBm, the typical value of the in-band output power is 14.5dBm, and the typical value of the adjacent sub-harmonic suppression is 12dBc.

#### Features:

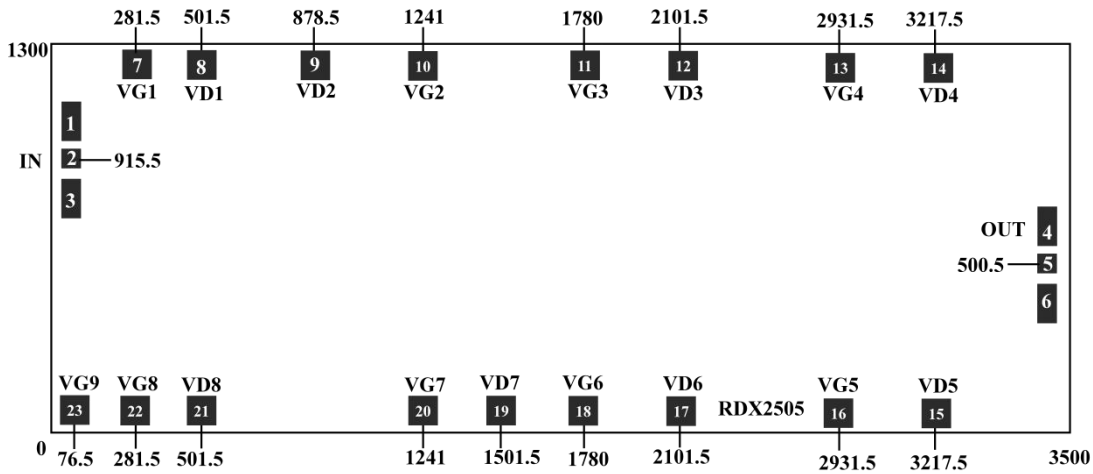
- Output Frequency Range: 68-116GHz
- Input Power: 0~+4dBm
- Output Power: 14.5dBm Typ
- Harmonics: -12dBc
- Chip area: 3.5mmx1.3mm

#### Electrical Characteristics:

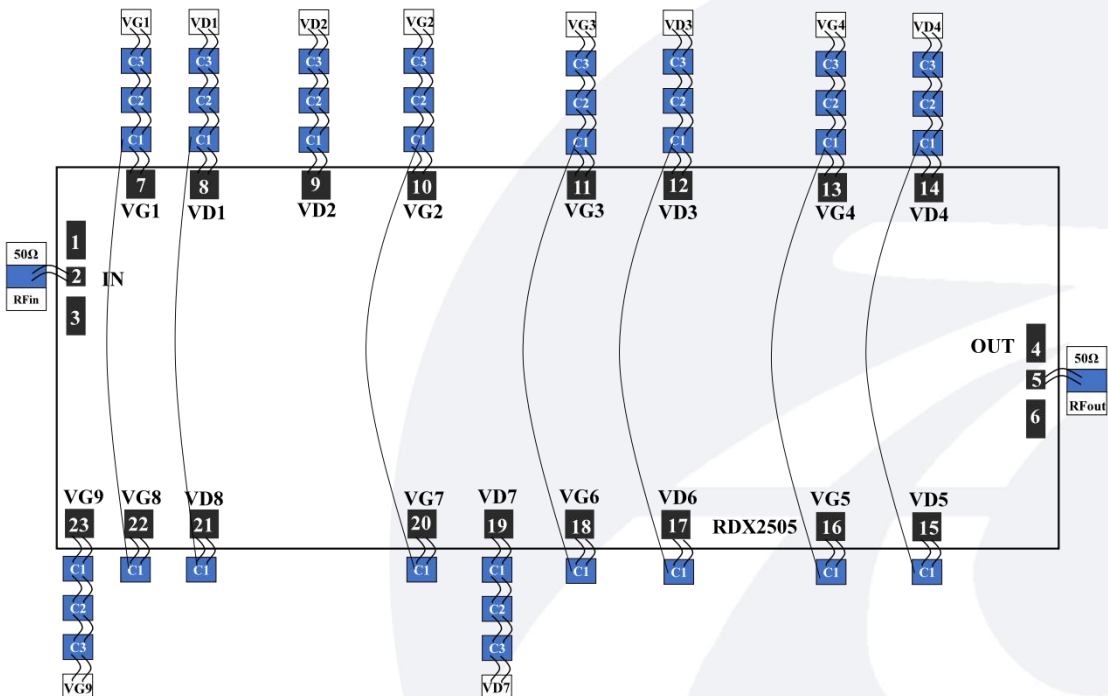
| Parameter               | Min  | Typ  | Max  | Units |
|-------------------------|------|------|------|-------|
| Output Frequency        | 68   |      | 116  | GHz   |
| Output Power            | 13.3 | 14.5 | 15.2 | dBm   |
| Power Flatness@Pin=0dBm |      | 2.1  |      | dB    |
| Input Frequency         | 8.5  |      | 14.5 | GHz   |
| Input Power             | 0    |      | 4    | dBm   |
| Multiply Factor         |      | 8    |      |       |
| Harmonics Suppression   | 12   |      |      | dBc   |
| Input Return Loss       |      |      | -9.5 | dB    |
| Output Return Loss      |      |      | -15  | dB    |
| DC Power Consumption    |      | 1030 |      | mW    |

## Outline and Port size:

Unit:  $\mu\text{m}$



## Suggested Assembly Drawing:



### Notes:

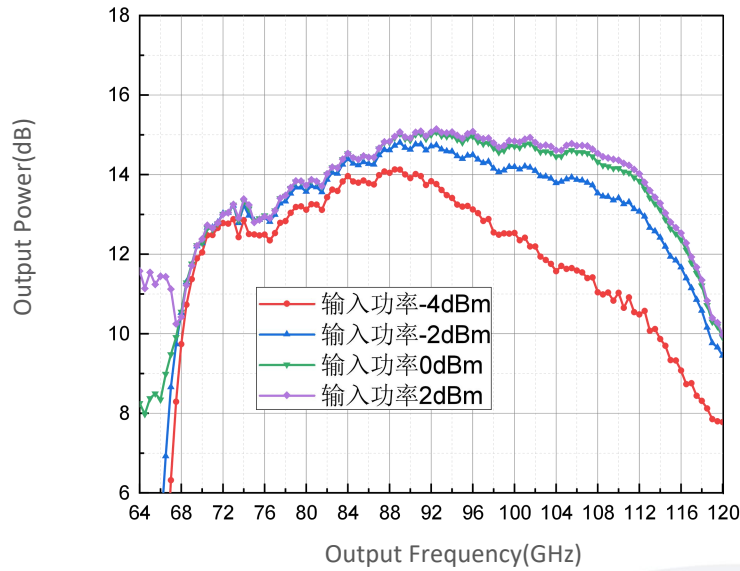
The capacitance value of peripheral capacitance C1 is 100 PF. C2 is 10000pF and C3 is 10uF. C1 it is recommended to use a single-layer capacitor and try to be close to the bonding point of the chip.

## Definition of Bonding Point:

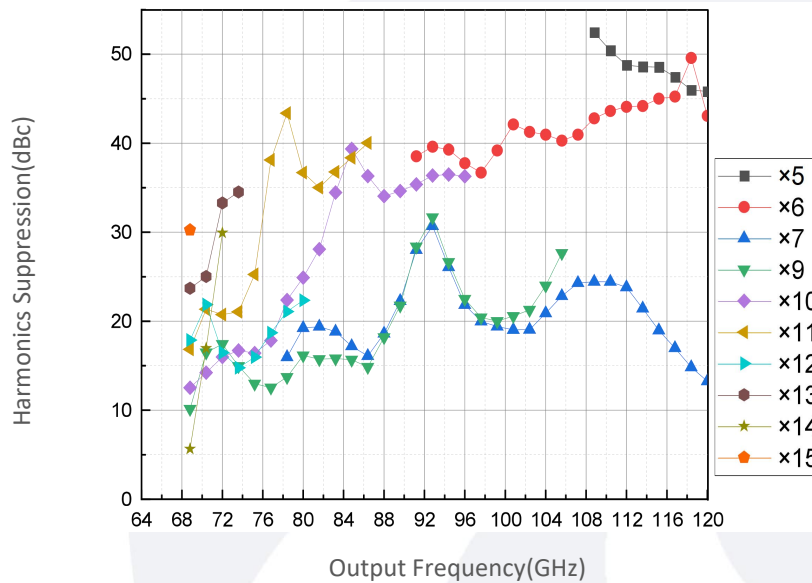
| PAD                   | Symbol | Function                    | Dimension( $\mu\text{m}^2$ ) |
|-----------------------|--------|-----------------------------|------------------------------|
| RFin Bonding Point    |        |                             |                              |
| 1                     | GND    | Ground                      | 100x50                       |
| 2                     | RFin   | 50 Ohm, open circuit for DC | 50x50                        |
| 3                     | GND    | Ground                      | 100x50                       |
| RFout Bonding Point   |        |                             |                              |
| 4                     | GND    | Ground                      | 100x50                       |
| 5                     | RFout  | 50 Ohm, open circuit for DC | 50x50                        |
| 6                     | GND    | Ground                      | 100x50                       |
| DC Bias Bonding Point |        |                             |                              |
| 7                     | VG1    | 0.6V                        | 50x50                        |
| 8                     | VD1    | 3.3V/12.3mA                 | 50x50                        |
| 9                     | VD2    | 3.3V/6.25mA                 | 50x50                        |
| 10                    | VG2    | -0.6V                       | 50x50                        |
| 11                    | VG3    | -0.15V                      | 50x50                        |
| 12                    | VD3    | 3.3V/77mA                   | 50x50                        |
| 13                    | VG4    | -0.15V                      | 50x50                        |
| 14                    | VD4    | 3.3V/62.3mA                 | 50x50                        |
| 15                    | VD5    | 3.3V/62.3mA                 | 50x50                        |
| 16                    | VG5    | -0.15V                      | 50x50                        |
| 17                    | VD6    | 3.3V/77mA                   | 50x50                        |
| 18                    | VG6    | -0.15V                      | 50x50                        |
| 19                    | VD7    | 3.3V/2.84mA                 | 50x50                        |
| 20                    | VG7    | -0.6V                       | 50x50                        |
| 21                    | VD8    | 3.3V/12.3mA                 | 50x50                        |
| 22                    | VG8    | 0.6V                        | 50x50                        |
| 23                    | VG9    | -0.08V                      | 50x50                        |

## Typical Performance Data:

### Pout vs vs Frequency

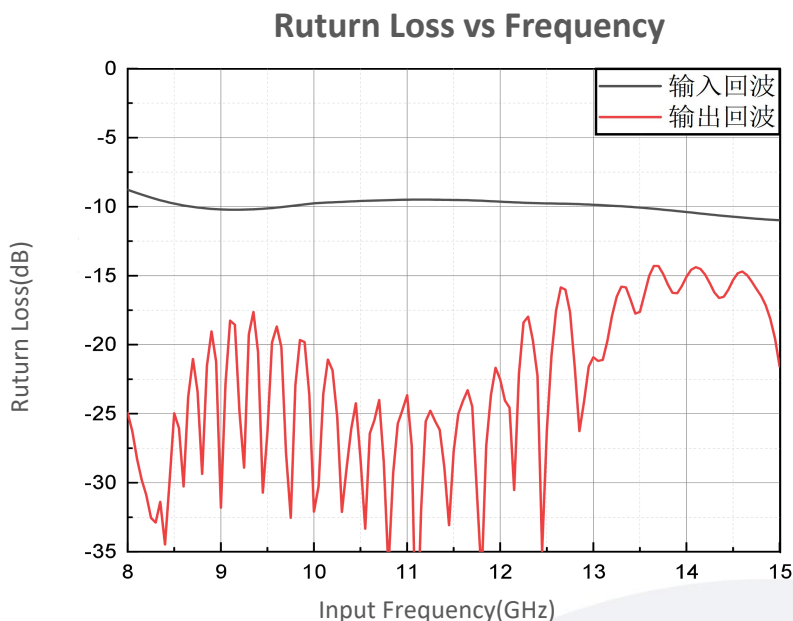


### Harmonics Suppression@Pin=2dBm vs Frequency



Note: Above data is for ref only, actual data may vary from unit to unit depending on operating environment and other factors like material lots etc.

## Simulation Data:



Note: Above data is for ref only, actual data may vary from unit to unit depending on operating environment and other factors like material lots etc.

## Application Information:

- 1、 Storage: The chip must be placed in a container with electrostatic protection function and stored in nitrogen environment.
- 2、 Cleaning: The bare chip must be operated and used in a purified environment. It is forbidden to use liquid detergent to clean the chip.
- 3、 Electrostatic protection: Please strictly comply with ESD protection requirements to avoid electrostatic damage.
- 4、 Routine operation: Please use vacuum chuck or precision pointed tweezers to take the chip. Avoid touching the chip surface with tools or fingers during operation.
- 5、 Power on sequence: when power on, apply gate voltage first and then Drain voltage; When de energizing, remove the Drain voltage first and then the gate voltage.
- 6、 Mounting operation: The chip can be installed by AuSn solder eutectic sintering or conductive adhesive bonding process. The installation surface must be clean and flat, and the gap between the chip and the input / output RF connecting line substrate shall be as small as possible.  
Sintering process: 80 / 20 AuSn shall be used for sintering. The sintering temperature shall not exceed 300 °C, the sintering time shall be as short as possible, not more than 20 seconds, and the friction time shall not exceed 3 seconds.  
Bonding process: The dispensing amount of conductive adhesive shall be minimized during bonding, and the curing conditions shall refer to the data provided by the conductive adhesive manufacturer.
- 7、 Bonding operation:  
Unless otherwise specified, two bonding wires (diameter 25um gold wire) are used for RF input and output, and the bonding wire shall be as short as possible.  
The thermal ultrasonic bonding temperature is 150 °C, and the ultrasonic energy is as small as possible. The pressure of spherical bonding cleaver is 40 ~ 50gf, and the pressure of wedge bonding cleaver is 18 ~ 22gf.
- 8、 If you have any questions, please contact the supplier.