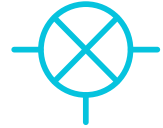
MD608

Double Balanced Mixer 24…37 GHz



- frequency range 24…37 GHz
- frequency range IF от DC до 3 GHz
- conversion loss < 10 dB
- passive double balanced topology
- input power (P1dB) > 10 dBm

Application

- communications
- radars
- test and measurement equipment

The MD608 is a passive double balanced mixer that can be used as an up- or downconverter between 24.0 and 37.0 GHz. The miniature monolithic mixer is fabricated based on GaAs QSBD process, and requires no external components or matching circuitry. The chip is ideally suited for applications where small size, no DC bias, and consistent IC performance are required. This mixer can operate over a wide LO drive input of +10 to +15 dBm. The MMICs use gold bond pads and backside metallization and are fully protected with Silicon Nitride passivation to obtain the highest level of reliability.

Electrical specification (T = 25 °C, F_{IF} = 0.1 GHz, P_{LO} = +13 dBm)*

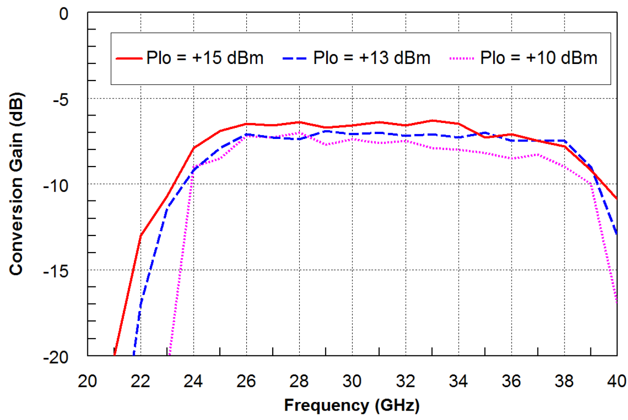
Symbol	Parameter	Min.	Typ.	Max.	Unit
ΔF_{RF}	Frequency range, RF	24	—	37	GHz
ΔF_{LO}	Frequency range, LO	24	—	40	GHz
ΔF_{IF}	Frequency range, IF	DC	—	3	GHz
C_L	Conversion loss	—	9	10	dB
NF	Noise figure	—	9	10	dB
I_{LO-RF}	LO to RF Isolation	32	—	—	dB
I_{LO-IF}	LO to IF Isolation	31	—	—	dB
I_{RF-IF}	RF to IF Isolation	13	—	—	dB
P1dB	1 dB Gain compression (input)	—	10	—	dBm

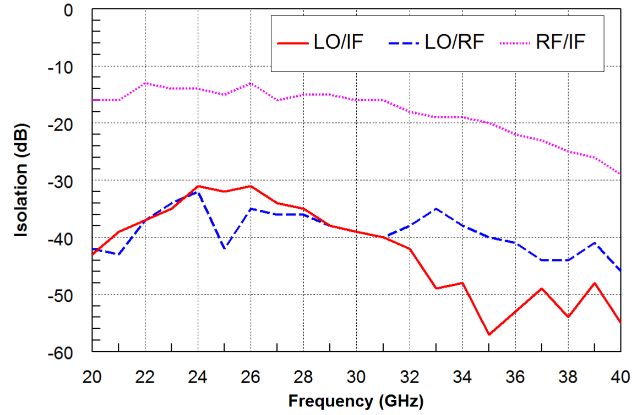
REMARK *Unless otherwise noted, all measurements performed as downconverter, F_{IF} = 0.1 GHz, P_{LO} = +13 dBm.

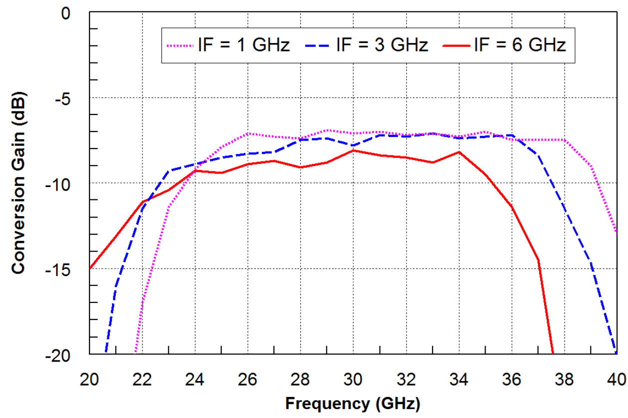
Absolute maximum ratings

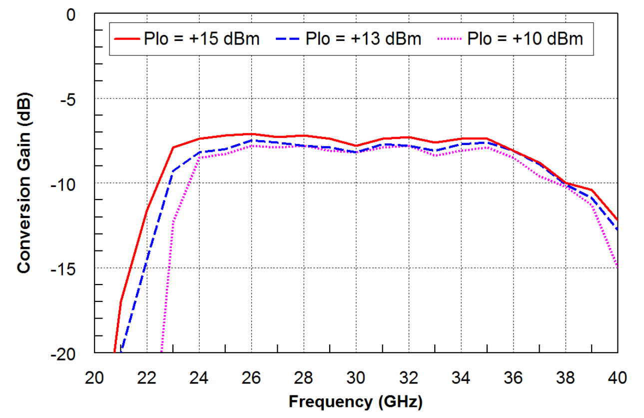
Parameter	Value	Unit
RF input	+20	dBm
LO drive	+20	dBm
Operating temperature	−40…+85	°C
Storage temperature	−55…+125	°C

Typical characteristics (T = 25 °C)

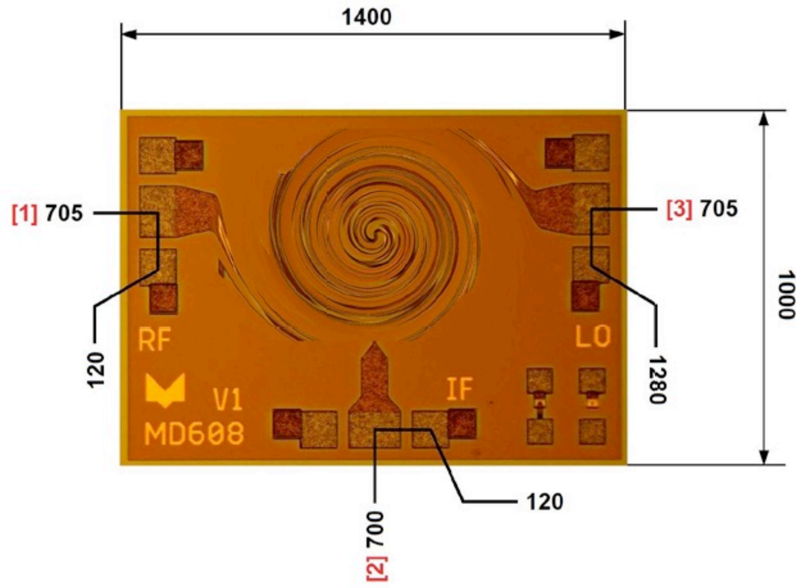








Mechanical data



- Chip size 1400 × 1000 µm (before wafer dicing), thickness 100 µm;
- Bond pad dimensions are shown on the center of the bond pad;
- Bond pad and backside metallization: gold;
- RF pads are 100 × 140 µm.

Pad number	Port	Discription
1	RF	RF input / output
2	IF	IF input / output
3	LO	LO input

Application notes

Mounting
The chip is back-metallized and can be die mounted with AuSn eutectic preforms or with electrically conductive epoxy. The mounting surface should be clean and flat. The 50 Ohm Microstrip transmission lines on 0.127mm thick alumina thin film substrates are recommended for bringing RF to and from the chip (Figure 1). One way to accomplish this is to attach the 0.102 mm thick die to a 0.150 mm thick molybdenum heat spreader (molytab) which is then attached to the ground plane (Figure 2). Microstrip substrates should be located as close to the die as possible in order to minimize bond wire length. Typical die-to-substrate spacing is 0.1mm.

Wire Bonding
Microstrip substrates should be brought as close to the die as possible in order to minimize ribbon bond length. Recommendation for RF pads is one wire: diameter 25 μm, length 450 μm.

DC coupling
All ports are DC coupled. For applications not requiring operation to DC, those ports should be DC blocked externally using a series capacitor whose value has been chosen to pass the necessary frequency range.

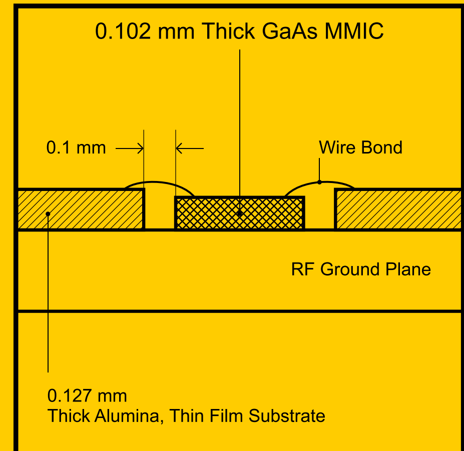


Figure 1.

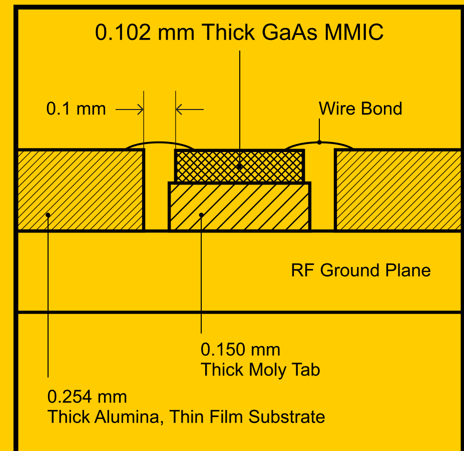


Figure 2.

Recommended ESD Management

This device is susceptible to electrostatic and mechanical damage. Dies are supplied in antistatic containers, which should be opened in cleanroom conditions at an appropriately grounded antistatic workstation. Devices need careful handling using correctly designed collets, vacuum pickups or, with care, sharp tweezers.

Specifications are subject to change without notice.

Micran | Kirova st., 51d, Tomsk, Russia, 634041 | +7 3822 90-00-29 | +7 3822 42-36-15 fax | mic@micran.ru | www.micran.com