

27 - 32 GHz GaAs Mixer MMIC

Preliminary Data Sheet

27 - 32 GHz Mixer

- Monolithic Microwave Integrated Circuit (MMIC)
Single Balanced Mixer (coplanar design)
- Input/Output matched to 50 Ω
- Frequency range: 27 GHz to 32 GHz
- Conversion Loss 9 dB @ $P_{LO} = 11$ dBm
- Chip size: 3.25 mm \times 2.0 mm

ESD: Electrostatic discharge sensitive device, observe handling precautions!

Description

This GaAs MMIC Mixer is intended for use in radio link applications. It provides a conversion loss of 9 dB for a LO-Power of 11 dBm and down conversion to 200 MHz. The device is fabricated with a 0.13 micron Pseudomorphic InGaAs/AlGaAs/GaAs High Electron Mobility Transistor processing technology.

Type	Marking	Ordering Code	Package
27 - 32 GHz Mixer	–	on request	Chip

Electrical Specifications ($V_{G1} = V_{G2} = 0$ V)

Parameter	Limit Values			Unit	Test Conditions
	min.	typ.	max.		
Frequency Range	27	–	32	GHz	–
Conversion loss @ $P_{LO} = 11$ dBm	–	9	–	dB	–
LO input power	–	10	15	dBm	–

Measured Data (on chip measurements)

$V_{GS1} = V_{GS2} = 0$ V, unless otherwise specified;

Down-Converter Mode; I_{F1} and I_{F2} via 0° Combiner

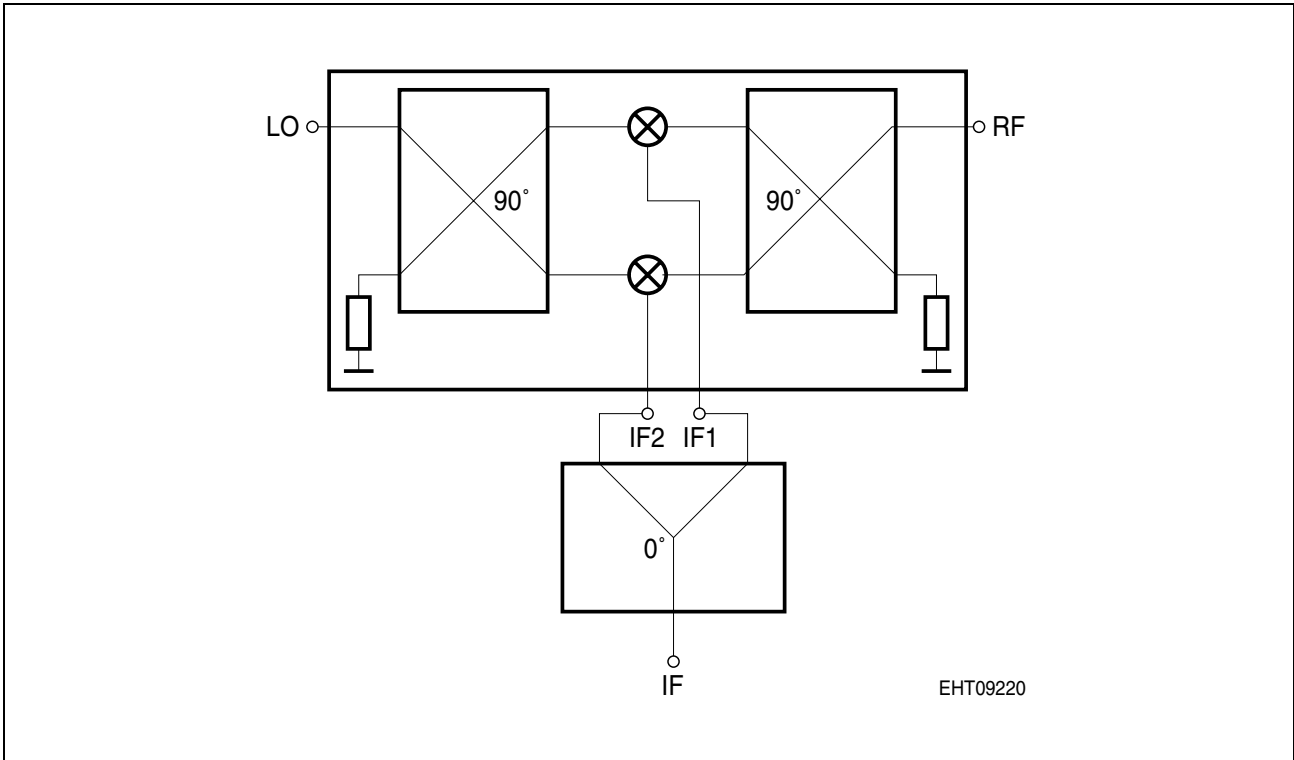
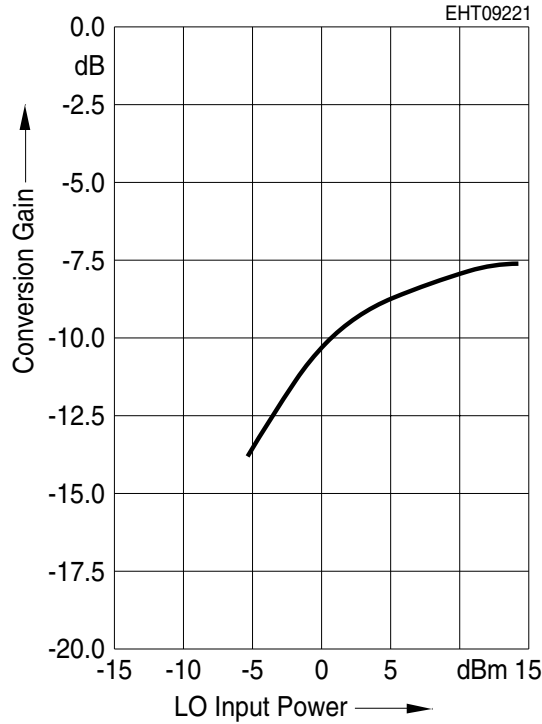


Figure 1

Conversion Gain vs. LO Power

$f_{LO} = 29.5 \text{ GHz}$, $f_{RF} = 29.7 \text{ GHz}$, $f_{IF} = 0.2 \text{ GHz}$, $P_{inRF} = -6.8 \text{ dBm}$

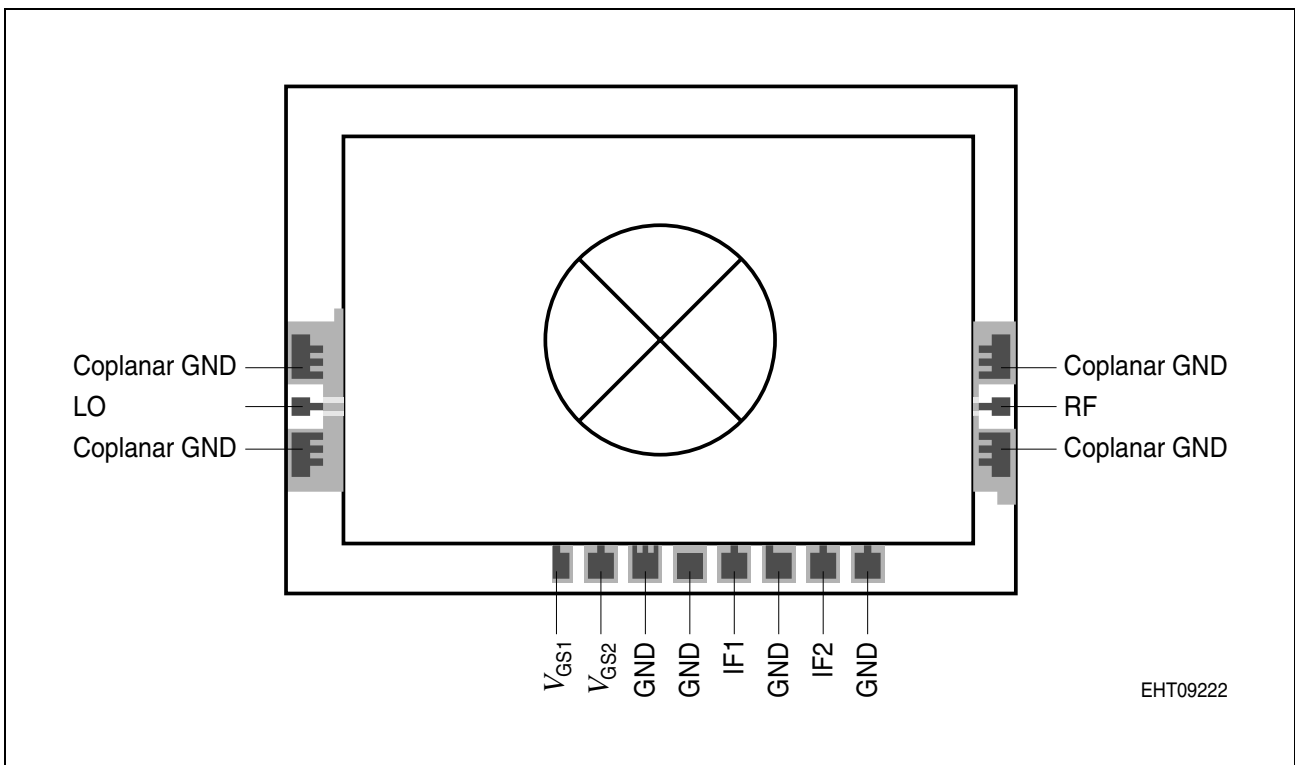


Technology Data

Parameter	Value
Chip thickness	95 μm
Chip size	3.25 mm \times 2.0 mm
DC/RF Bond pads	100 μm \times 100 μm /85 μm \times 65 μm
Bond pad material	Au (plated gold)
Chip passivation	SiN (silicon nitride)

Recommendation of Bonding Conditions

Parameter	Thermocompression Nailhead, without Ultrasonic	Wedge Bonding	Bond Pull Test Mil 883, > 2 g
Table Temp.	250 °C	250 °C	1 : 2.5 g
Tool Temp.	180 °C	150 °C	2 : 3.1 g
Scrub	100 Hz	–	3 : 3.2 g
Bond Force	50 g	25 g	4 : 3.0 g
Wire Diameter	25 µm	17 µm	5 : 2.8 g



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Figure 2 Bond Plan

V_{GS1} and V_{GS2} can directly be bonded to ground. Blocking capacitors in the range of 100 pF should be used if a gate voltage (V_{GS1} , V_{GS2}) is applied to the mixer diodes.