

33–43 GHz GaAs MMIC Double Balanced Down Converter Mixer



AM038D1-00

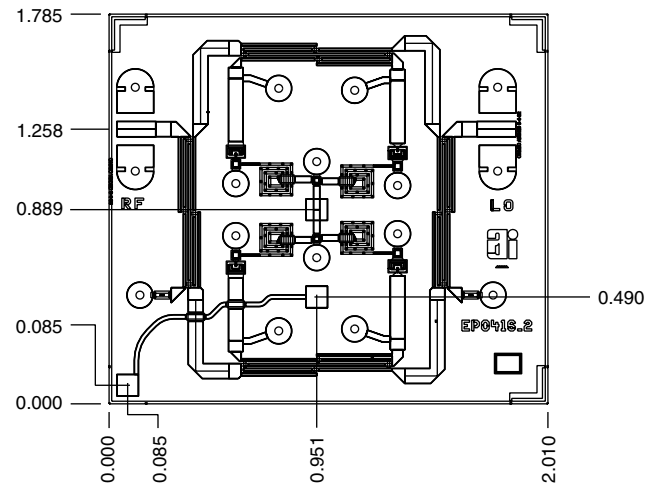
Features

- Low Conversion Loss, 6.5 dB
- Insensitive to LO Power Variations
- Low LO Power Requirement, 9 dBm
- High LO to RF Isolation, 30 dB
- No DC Bias Required

Description

Alpha's double balanced GaAs Schottky diode mixer has a typical conversion loss of 6.5 dB at an LO power level as low as 9 dBm over the band 33–43 GHz. The chip uses Alpha's proven Schottky diode technology, and is based upon MBE layers for the highest uniformity and repeatability. The diodes employ surface passivation to ensure a rugged, reliable part with through-substrate via holes and gold-based backside metallization to facilitate an epoxy die attach process. All chips are screened for DC diode parameters and lot samples are RF measured to guarantee performance.

Chip Outline



Dimensions indicated in mm.
All pads are ≥ 0.07 mm wide.
Chip thickness = 0.1 mm.

Absolute Maximum Ratings

Characteristic	Value
Operating Temperature	-55°C to +125°C
Storage Temperature	-65°C to +150°C
Total Input Power (RF + LO)	23 dBm

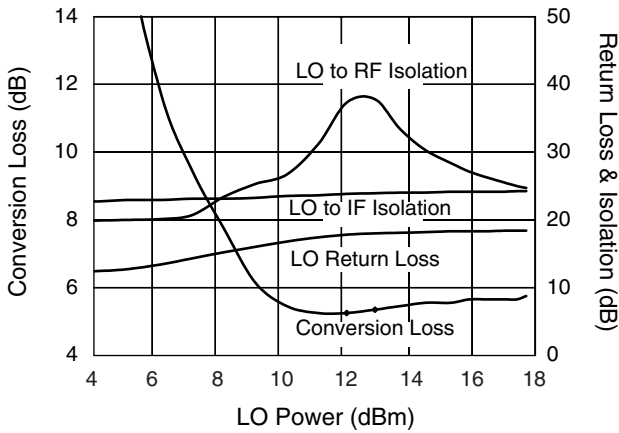
Electrical Specifications at 25°C

Parameter	Symbol	Min.	Typ. ²	Max.	Unit
RF and LO Frequency Range	F_{RF}, F_{LO}		33–43		GHz
IF Frequency Range	F_{IF}		0–5		GHz
LO Power Level	P_{LO}		9–21		dBm
Conversion Loss ¹	L_C		6.5		dB
RF and LO Return Loss ¹	RL_{RF}, RL_{LO}		18		dB
LO to RF Isolation ¹	ISO_{LO-RF}		30		dB
LO to IF Isolation ¹	ISO_{LO-IF}		25		dB
RF Input 1 dB Compression Point ¹	P_1 dB		7		dBm
Two Parallel Diode Series Resistance	R_S			1.5	Ω

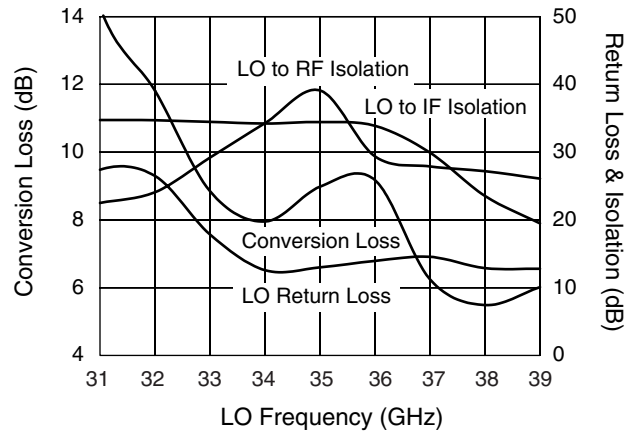
1. Not measured on a 100% basis.

2. Typical represents the median parameter value across the specified frequency range for the median chip.

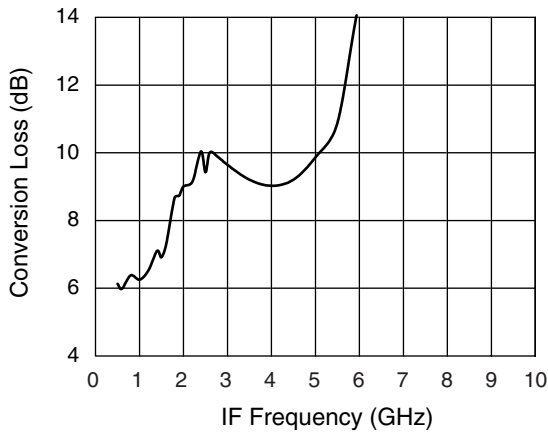
Typical Performance Data



Performance vs. LO Power
 $F_{RF} = 38 \text{ GHz}$, $F_{LO} = 37 \text{ GHz}$, $P_{RF} = -10 \text{ dBm}$

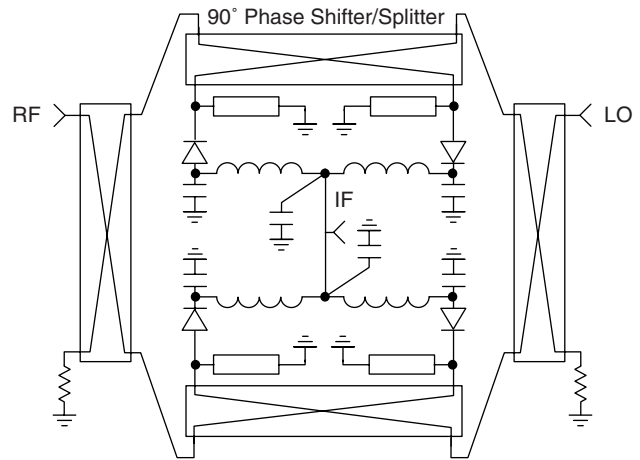


Performance vs. LO Frequency
 $F_{RF} = F_{LO} + 1 \text{ GHz}$, $P_{LO} = 9 \text{ dBm}$

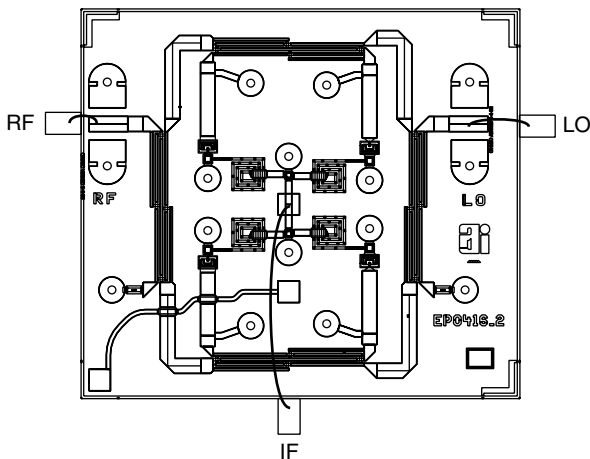


Performance vs. IF Frequency
 $F_{RF} = 38 \text{ GHz}$, $F_{LO} = F_{RF} - F_{IF}$, $P_{LO} = 9 \text{ dBm}$

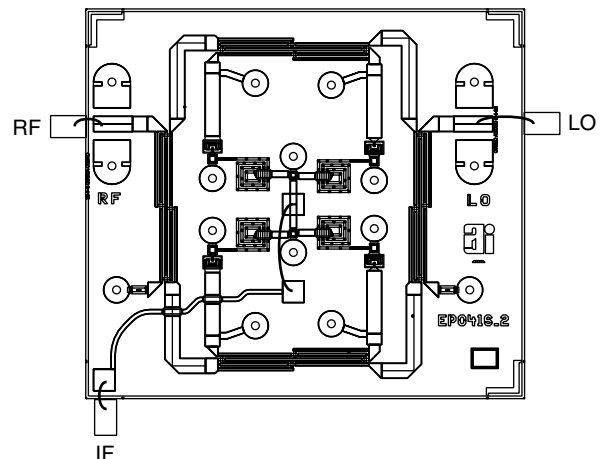
Circuit Schematic



Wire Bonding Configurations



Single IF bond configuration.



Requires two IF bonds.
 LO to IF isolation is degraded by 7 dB for this configuration.