

X=1540 μm Y=1410 μm

Features

- ◆ RF Frequency: 54 to 64 GHz
- ◆ LO Frequency: 27 to 32 GHz
- ◆ Image Rejection: 30 dB
- ◆ Conversion loss: 12.5 dB, (typ.)
- ◆ No External Bias Required
- ◆ Die Size: < 2.2 sq. mm

Performance Characteristics (T<sub>OP</sub> = 25°C)

Specification	Min	Typ	Max	Unit
RF Frequency	54		64	GHz
LO Frequency	27		32	GHz
IF Frequency	dc		3	GHz
LO Power		10		dBm
Input P1 dB		-2		dBm
Input IP3		7		dBm
Downconverter conversion loss		12.5	14	dB
Upconverter conversion loss		12	14	dB
Image Rejection		30		dB
I/Q Phase Balance		1		Deg
I/Q Amp. Balance		0.3		dB
RF Return Loss		12		dB
IF Return Loss		12		dB
Isolation				
LO-RF		30		dB
LO-IF		30		dB

Applications

- ◆ Short Haul / High Capacity Links
- ◆ Wireless LANs

Product Description

The MDB218 is a monolithic HBT schottky diode image-reject mixer designed for use in commercial digital radios and wireless LANs. The mixer requires a 90° off-chip hybrid to achieve signal image rejection, and no external bias is needed. To ensure rugged and reliable operation, HBT devices are fully passivated. Both bond pad and backside metallization are Ti/Au, which is compatible with conventional die attach, thermocompression, and thermosonic wire bonding assembly techniques.

Absolute Maximum Ratings (T<sub>OP</sub> = 25°C)

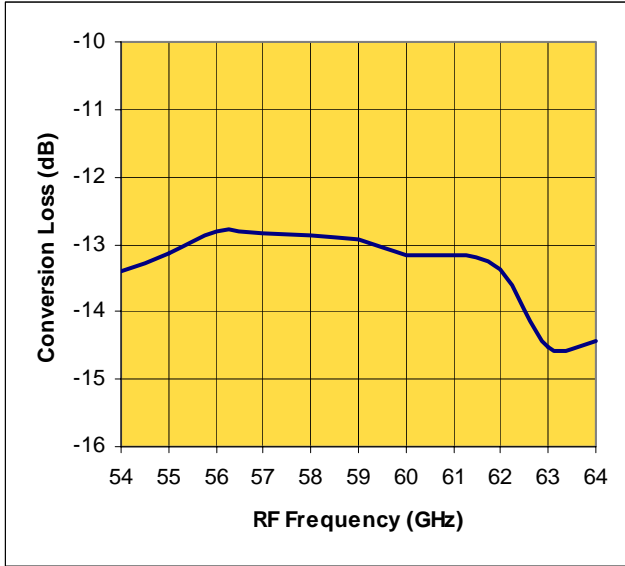
Parameter	Min	Max	Unit
Assy. Temperature (60 seconds)		300	°C

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Measured Performance Characteristics ( $T_{OP} = 25^{\circ}C$ )

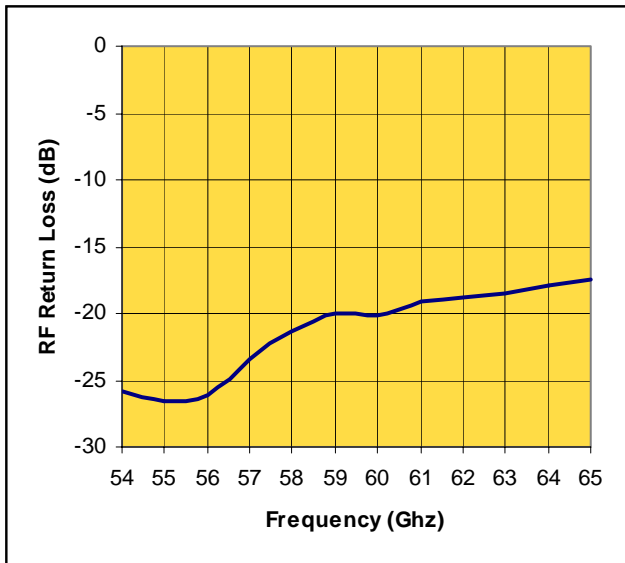
**Downconverter Conversion Loss**



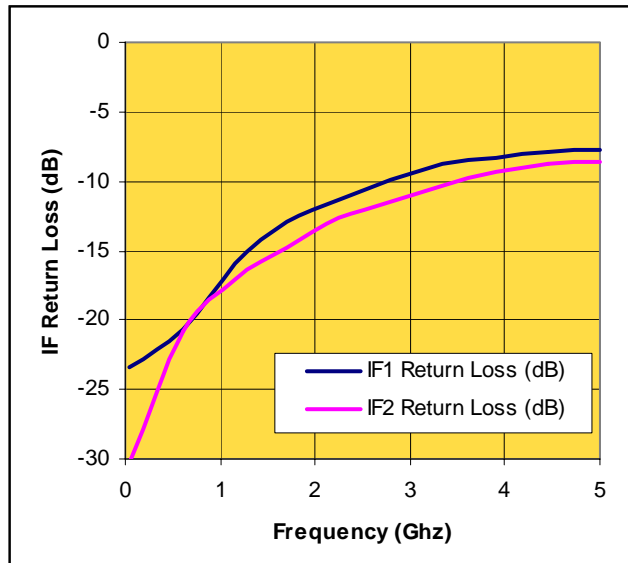
Single side band measurement without 90° hybrid, and second IF port terminated.

IF=1 GHz  
LO=27-30 GHz  
PRF=-20 dBm  
PLO=+10 dBm

**RF Port Return Loss**



**IF Port Return Losses**



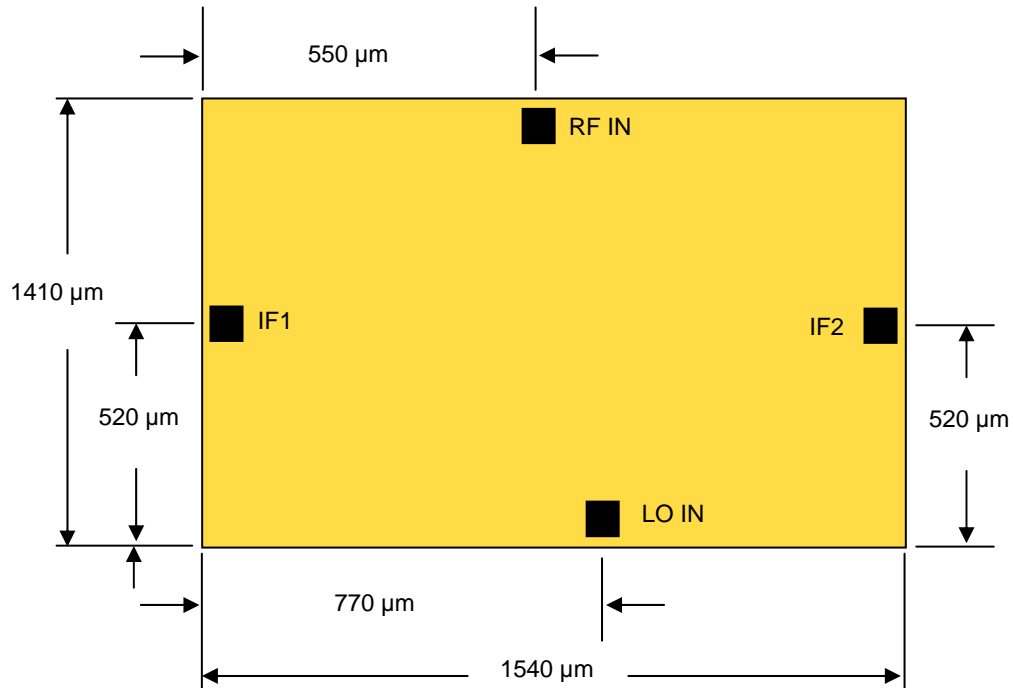
Single side band measurement without 90° hybrid, and second IF port terminated from S-parameters.

LO=29.5 GHz  
PLO=+10 dBm

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Die Size and Bond Pad Locations



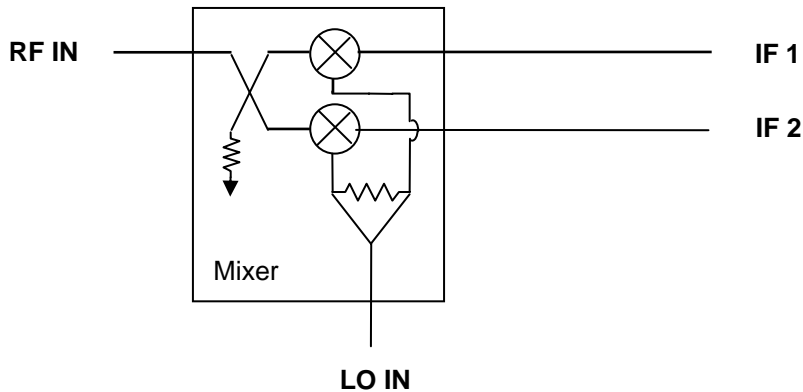
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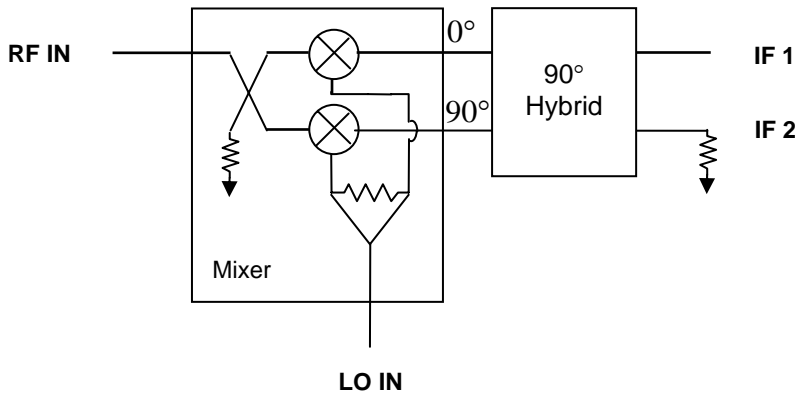
**Mixer With a 90 degree Hybrid Application Note**

Figure 1 shows the mixer equivalent circuit. Figure 2 depicts the mixer with a 90° hybrid used to achieve signal image rejection. All RF parameters are specified with an ideal 90° hybrid on IF output ports. Conversion loss is measured (on wafer) at IF1 and/or IF2 (figure 1) with the second IF port terminated into 50 ohms. Three dB is then added to compensate for an ideal hybrid. The IP3 is stated as an input IP3 number and is obtained via a two-tone measurement.

**Figure 1**



**Figure 2**



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