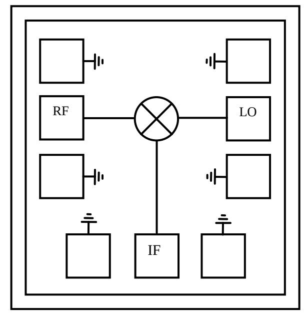
6-18 GHz Double Balanced Mixer

Features

- Passive Double Balanced Topology
- Low Conversion loss
- Excellent Isolations between all ports
- IF Bandwidth of DC to 4GHz
- 0.15-µm InGaAs pHEMT Technology
- Chip Size : 3.0 mm x 2.4 mm x 0.100 mm

Functional Diagram



Typical Applications

- Microwave & MMW Radios
- Military Spade & Test Equipment
- Radar Applications
- VSAT
- Communications & EW

Description

The AMT2852021 is a passive double balanced ring mixer designed to exhibit both down conversion and up conversion capabilities for RF, LO frequencies ranging from 6-18GHz. This design provides an IF bandwidth of DC to 4 GHz. Broad band operation and excellent isolations are provided by on-chip baluns. The Double Balanced Mixer utilizes two coupled-line baluns and four diodes. This chip requires a minimum LO drive of +13dBm for operation. The chip does not require DC Bias and external off-chip components. The die is fabricated using a mature 0.15µm InGaAs pHEMT technology. The MMIC mixer is much smaller in size and more reliable than hybrid diode mixers.

Absolute Maximum Ratings (1)

Parameter	Absolute Maximum	Units
RF input power	+17	dBm
LO input power	+23	dBm
Operating Temperature	-55 to +85	^{o}C
Storage Temperature	-65 to +150	^{o}C

1. Operation beyond these limits may cause permanent damage to the component

Electrical Specifications [1] @ T_A = 25 °C, LO drive =+13 dBm, IF=100MHz

Parameter	Min.	Typ.	Max.	Units
RF Frequency Range	6	-	18	GHz
LO Frequency Range	6	-	18	GHz
IF Frequency Range	DC	-	4	GHz
Conversion Loss	-	8	-	dB
LO to RF Isolation	-	30	-	dB
RF to IF Isolation	-	35	-	dB
LO to IF Isolation	-	40	-	dB
Input IP3 [2]	-	18	-	dBm
1dB Gain Compression(Input)	-	9	-	dBm

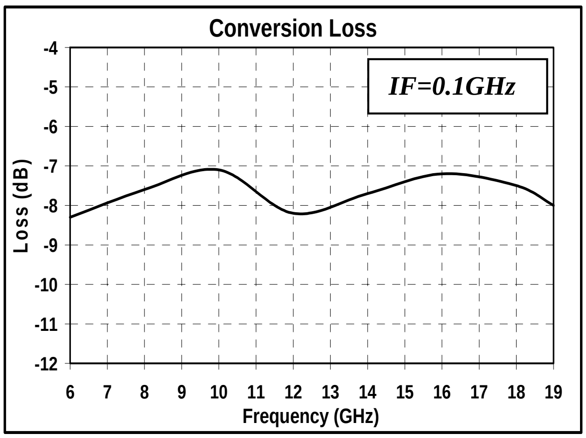
Note:

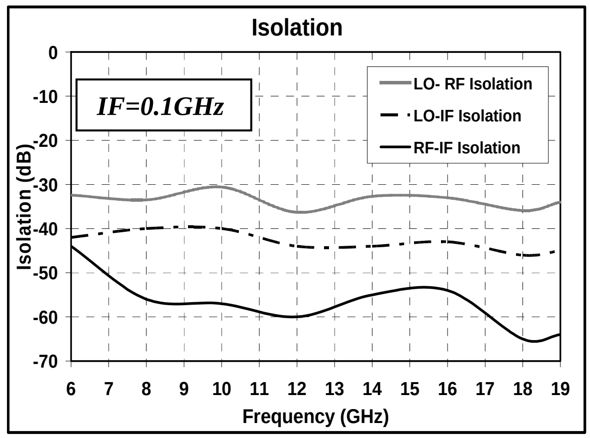
1. Electrical specifications as measured in a test fixture.
2. IIP3 is simulated value

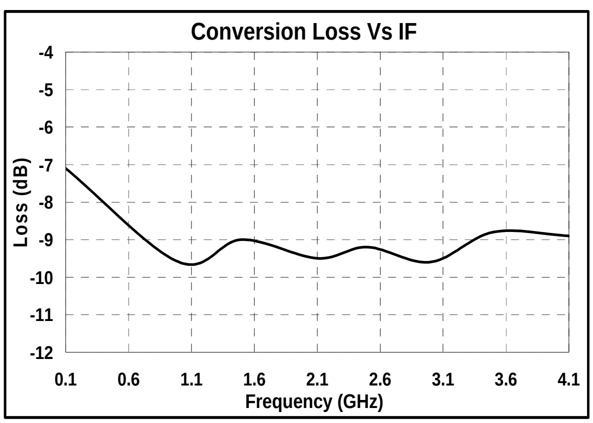
Test fixture data: $T_A = 25\,°C$

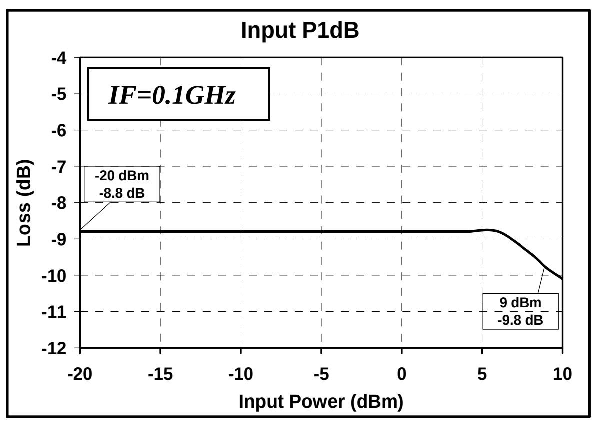
Down converter Performance

P_{LO}=13dBm, P_{RF}=-20dBm





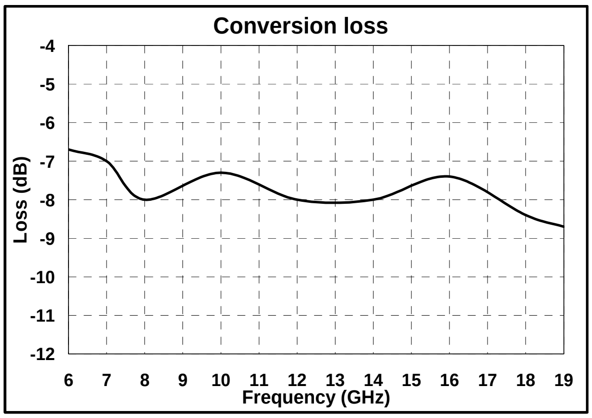


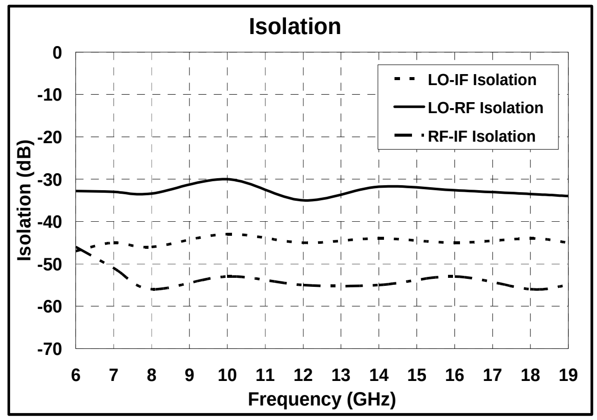


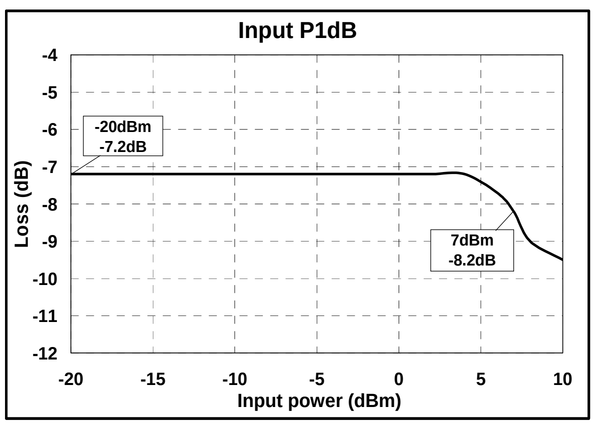
Test fixture data: $T_A = 25\,^{\circ}C$

Up converter Performance

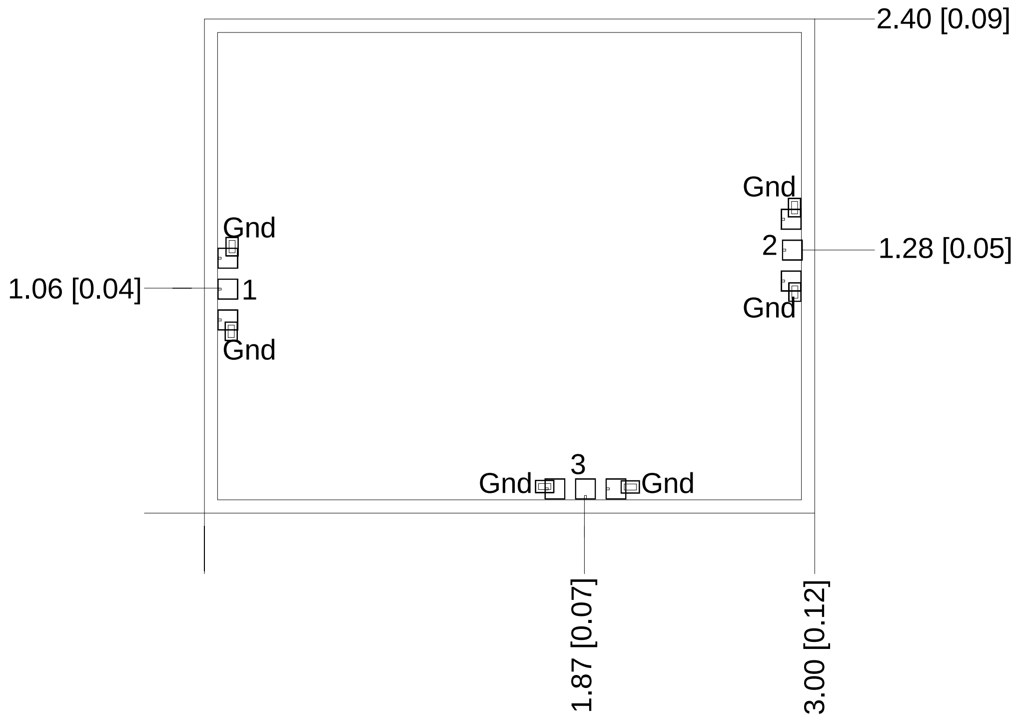
P_{LO}=13dBm, P_{IF}=-20dBm with IF=0.1GHz and LO swept from 6.1 to 18.1GHz







Mechanical Characteristics

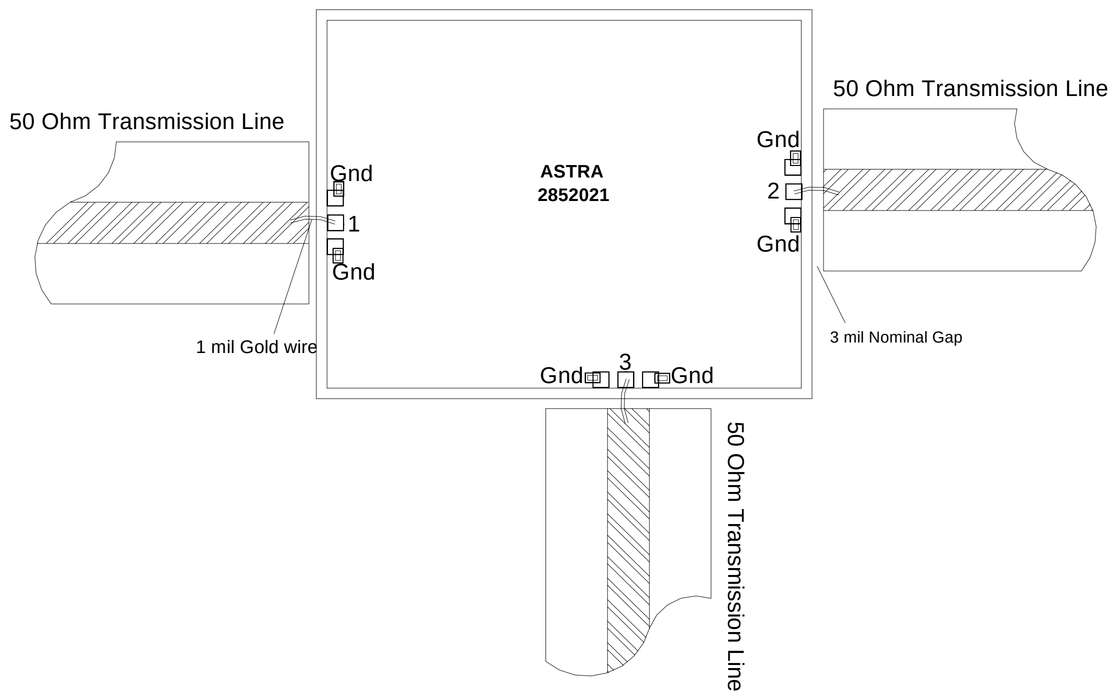


Units: millimeters (inches)

Note:

1. All RF bond pads are 100µm x 100µm
2. Pad no. 1 : RF_In
3. Pad no. 2 : LO_In
4. Pad no. 3 : IF_Out

Recommended Assembly Diagram



Note :

1. Three 1 mil (0.0254mm) bond wires of minimum length should be used for RF and LO inputs and IF output.
2. Input and output 50 ohm lines are on 10 mil RT Duroid substrate

Die attach: For Epoxy attachment, use of a two-component conductive epoxy is recommended. An epoxy fillet should be visible around the total die periphery. If Eutectic attachment is preferred, use of fluxless AuSn (80/20) 1-2 mil thick preform solder is recommended. Use of AuGe preform should be strictly avoided.

Wire bonding: For DC pad connections use either ball or wedge bonds. For best RF performance, use of 150 - 200µm length of wedge bonds is advised. Single Ball bonds of 250-300µm though acceptable, may cause a deviation in RF performance.

GaAs MMIC devices are susceptible to Electrostatic discharge. Proper precautions should be observed during handling, assembly & testing