CMD179
16-26 GHz Fundamental Mixer

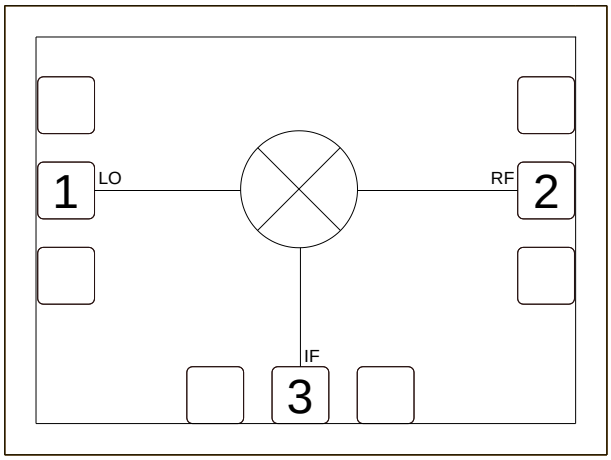
Product Overview

The CMD179 is a general purpose double balanced mixer die that can be used for up- and downconverting applications between 16 and 26 GHz. The CMD179 has very high isolation to both the RF and IF ports due to the optimized balun structures, and can operate with an LO drive level as low as +9 dBm. The CMD179 can easily be configured as an image reject mixer or single sideband modulator with external hybrids and power splitters.

Key Features

- Low Conversion Loss
- High Isolation
- Wide IF Bandwidth
- Passive Double Balanced Topology
- Small Die Size

Functional Block Diagram



Ordering Information

Part No.	Description
CMD179	16-26 GHz Fundamental Mixer, 100 Piece Gel Pack

Electrical Performance (IF = 100 MHz, LO = +13 dBm, T_A = 25 °C, F = 21 GHz)

Parameter	Min	Typ	Max	Units
Frequency Range, RF & LO		16 - 26		GHz
Frequency Range, IF	DC		9	GHz
Conversion Loss		6.5		dB
LO to RF Isolation		40		dB
LO to IF Isolation		48		dB
RF to IF Isolation		26		dB
Input P1dB		10		dBm

Unless otherwise noted, all measurements performed as a downconverter, IF = 100 MHz

Absolute Maximum Ratings

Parameter	Rating
RF / IF Input Power	+21 dBm
LO Drive	+21 dBm
Operating Temperature	-55 to 85 °C
Storage Temperature	-55 to 150 °C
Thermal Resistance, θ_{JC}	538 ºC/W
Power Dissipation, Pdiss	120 mW

Exceeding any one or combination of the maximum ratings may cause permanent damage to the device.

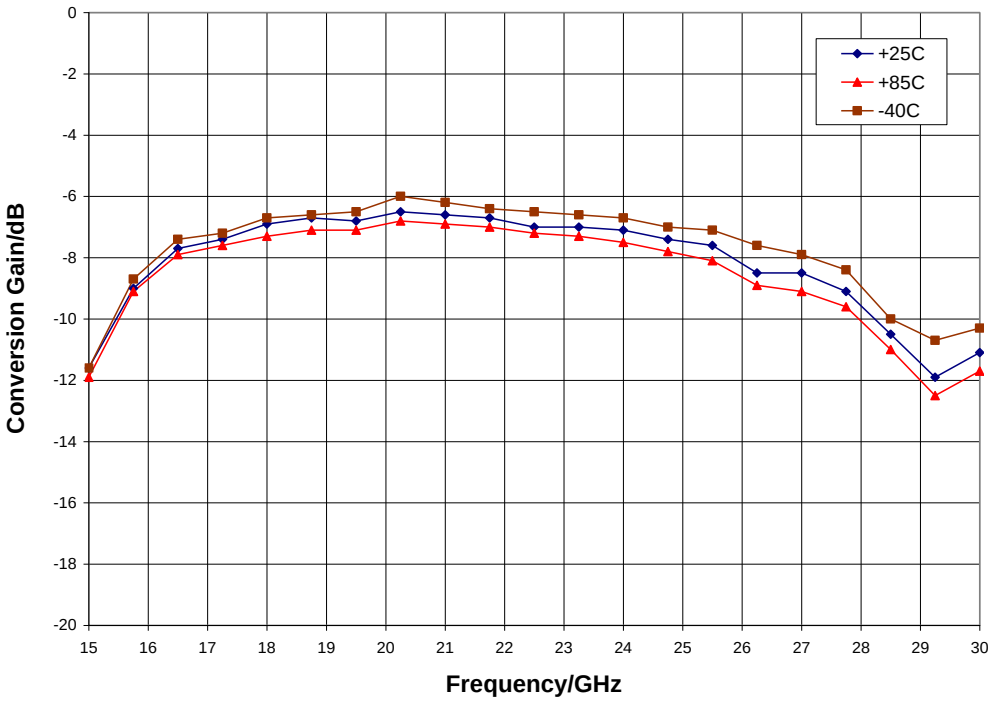
Electrical Specifications (IF = 100 MHz, LO = +13 dBm, T_A = 25 ºC)

Parameter	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range, RF & LO		18 - 24			16 - 26		GHz
Frequency Range, IF	DC		9	DC		9	GHz
Conversion Loss		6.5	8		7	10	dB
Noise Figure (SSB)		6.5	8		7	10	dB
LO to RF Isolation	37	43		36	43		dB
LO to IF Isolation	38	48		29	43		dB
RF to IF Isolation	18	25		15	25		dB
Input P1dB		10			10		dBm
Input IP3		17			17		dBm

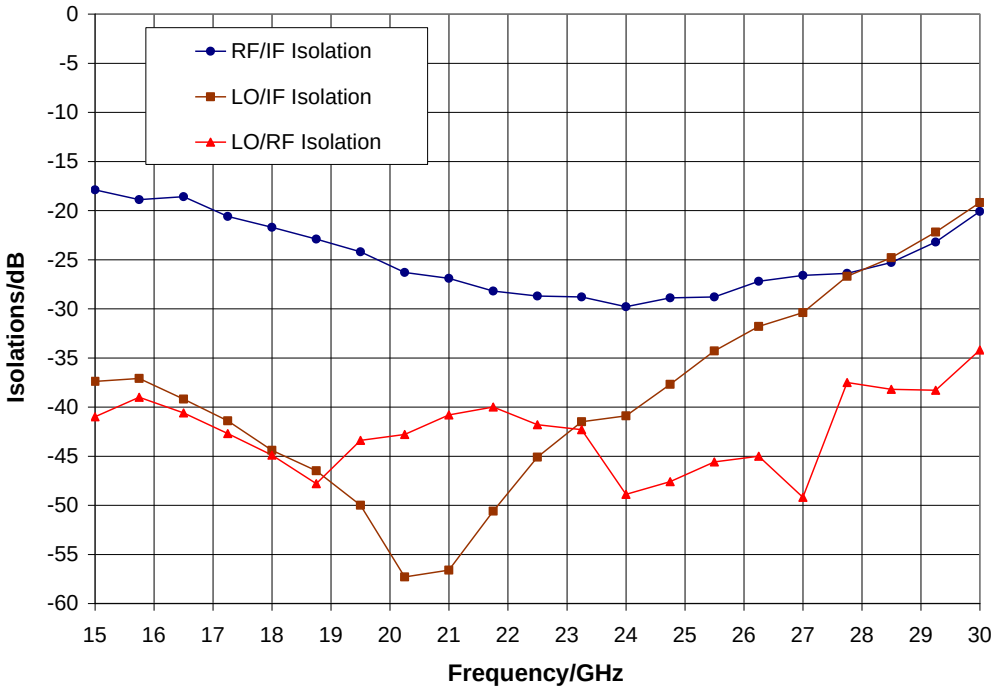
Unless otherwise noted, all measurements performed as a downconverter, IF = 100 MHz

Typical Performance

Conversion Gain vs. Temperature, LO = +13 dBm, IF = 100 MHz USB

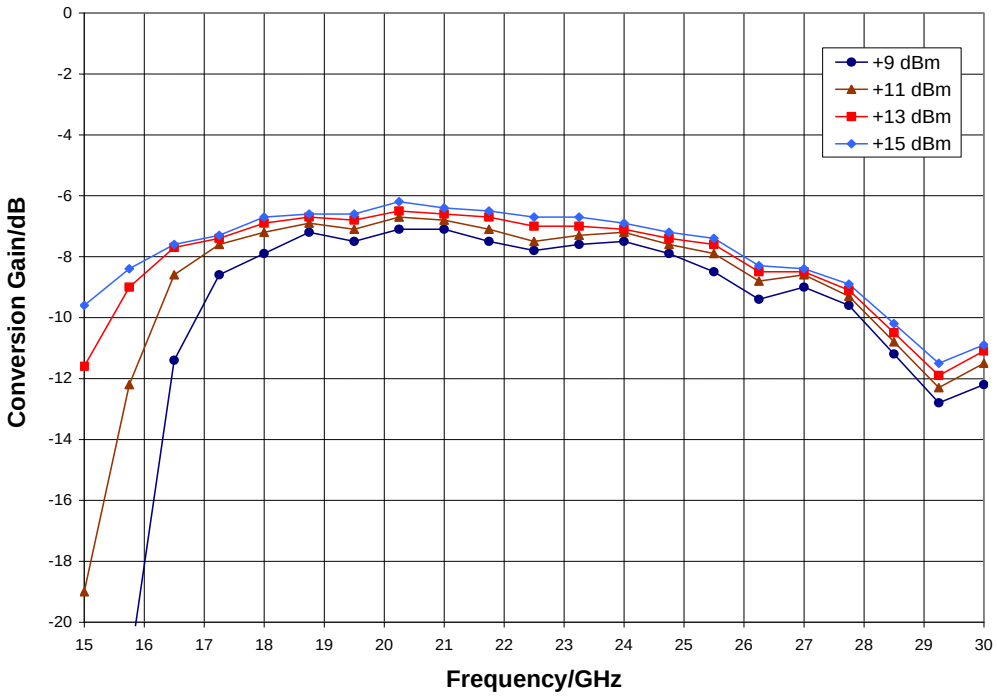


Isolation, LO = +13 dBm

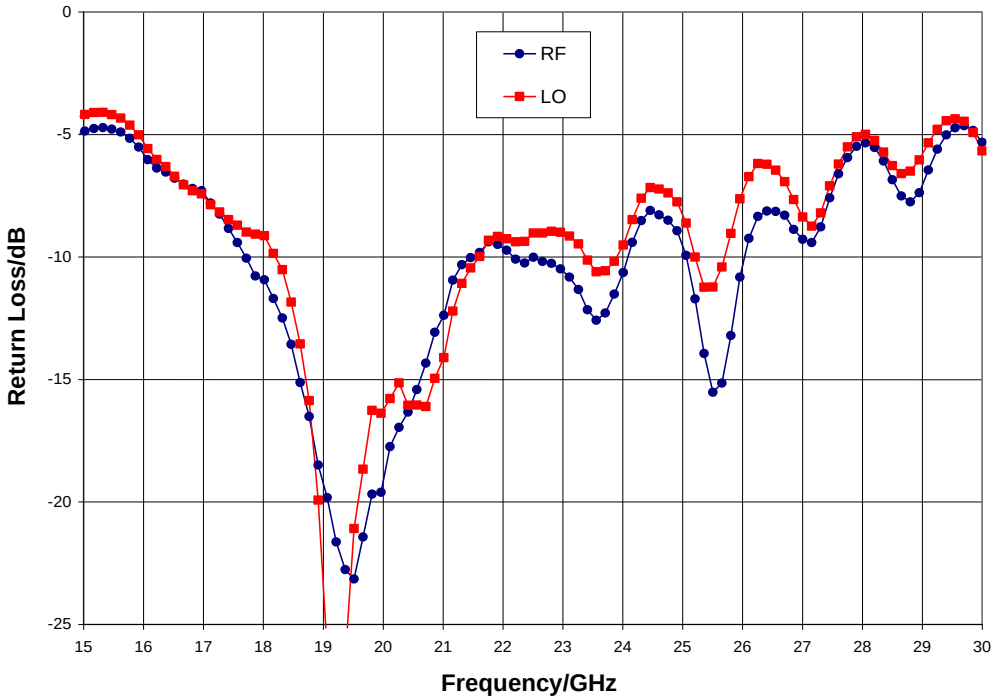


Typical Performance

Conversion Gain vs. LO Drive, IF = 100 MHz USB

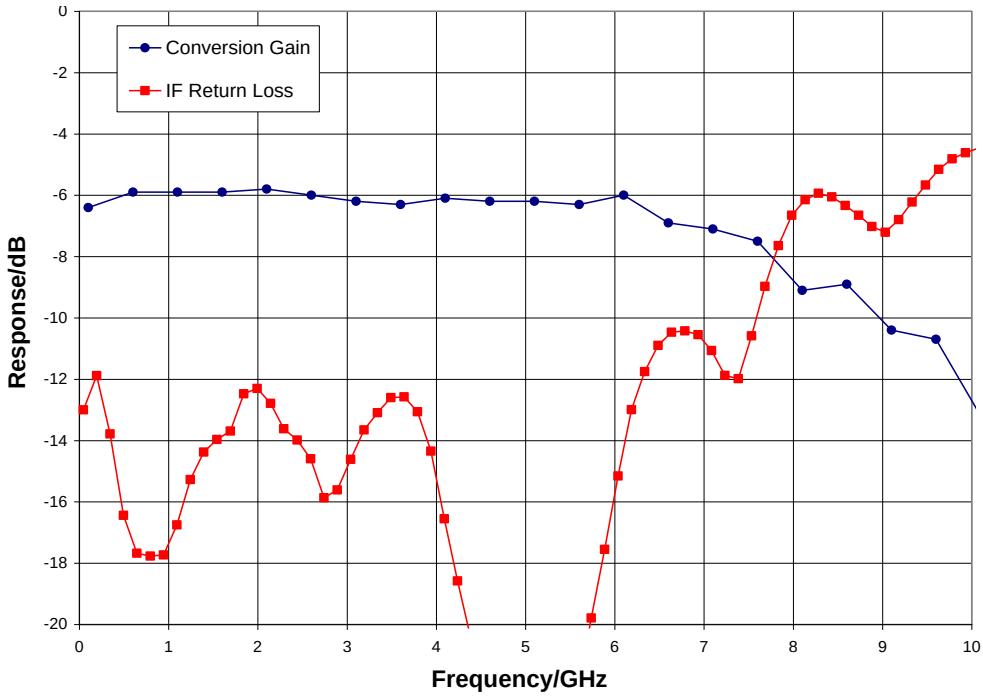


Return Loss, LO = + 13 dBm

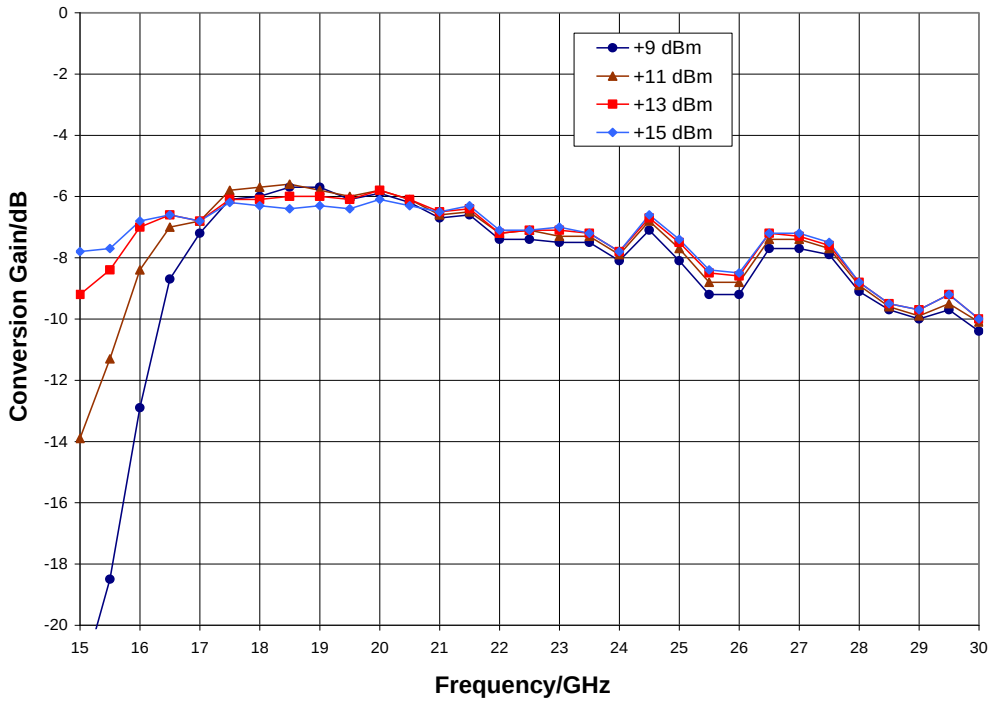


Typical Performance

IF Bandwidth, LO = +13 dBm

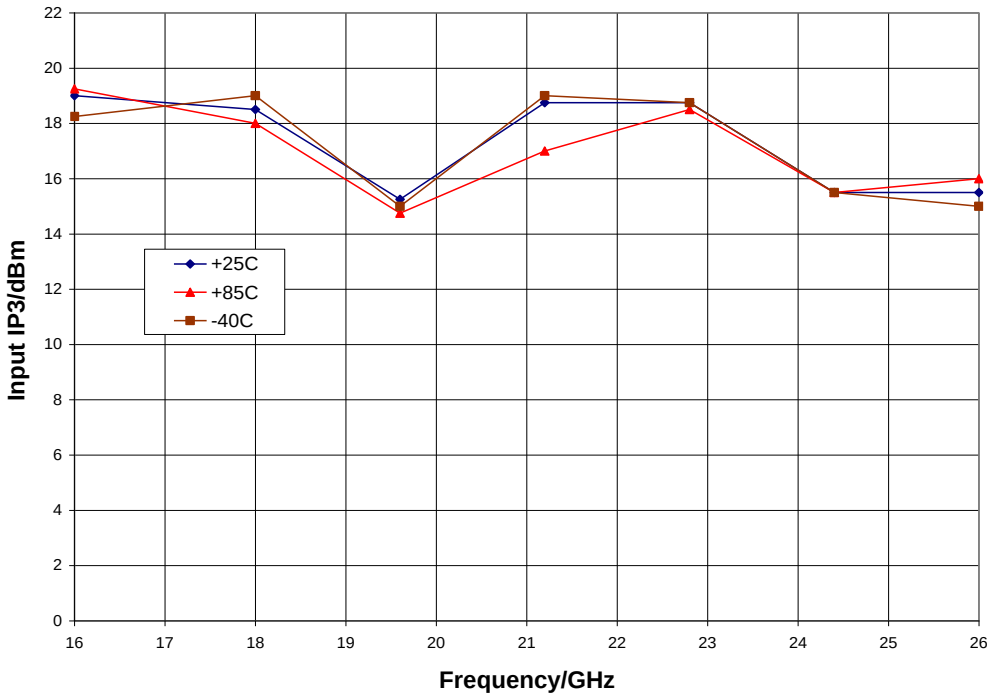


Upconverter Performance, Conversion Gain vs. LO Drive, IF input = 100 MHz

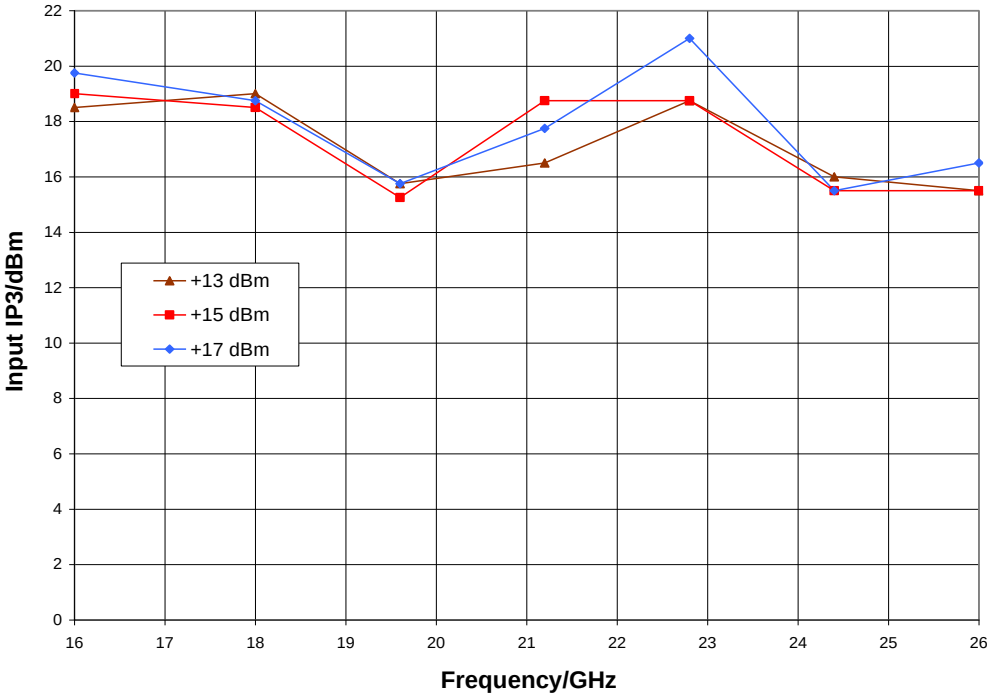


Typical Performance

Input IP3 vs. Temperature, LO = +15 dBm, IF = 100 MHz

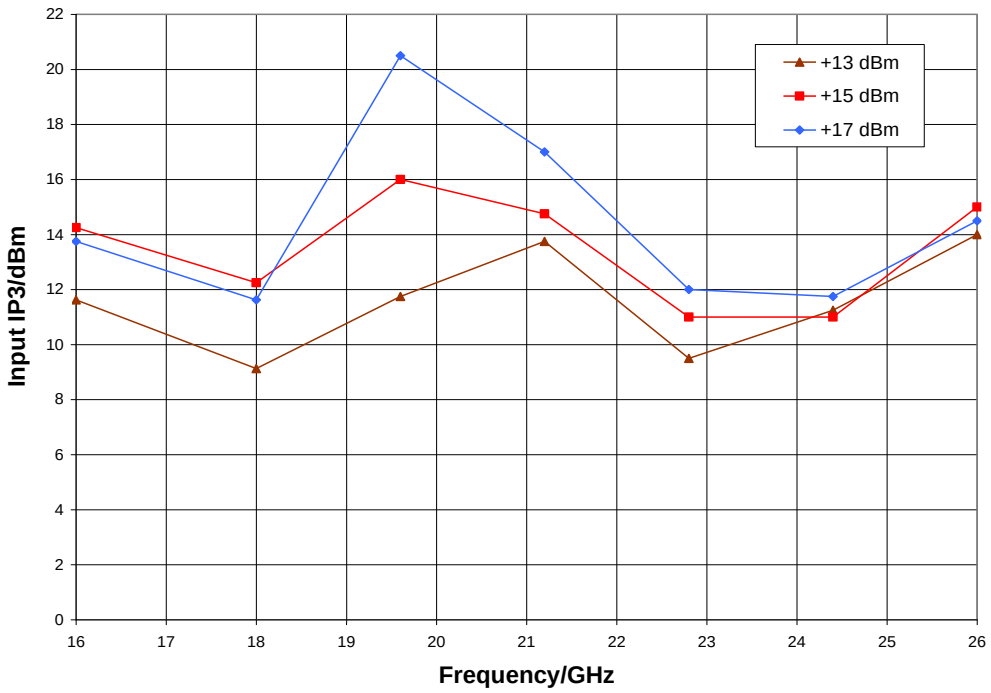


Input IP3 vs. LO Drive, IF = 100 MHz

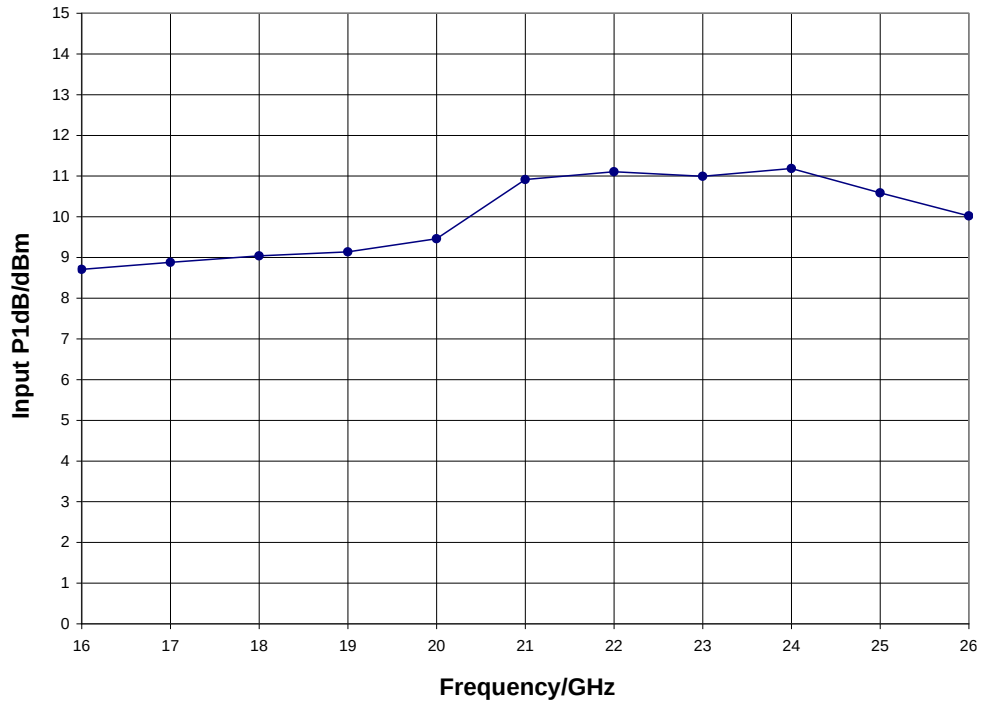


Typical Performance

Upconverter Performance, Input IP3 vs. LO Drive, IF = 100 MHz

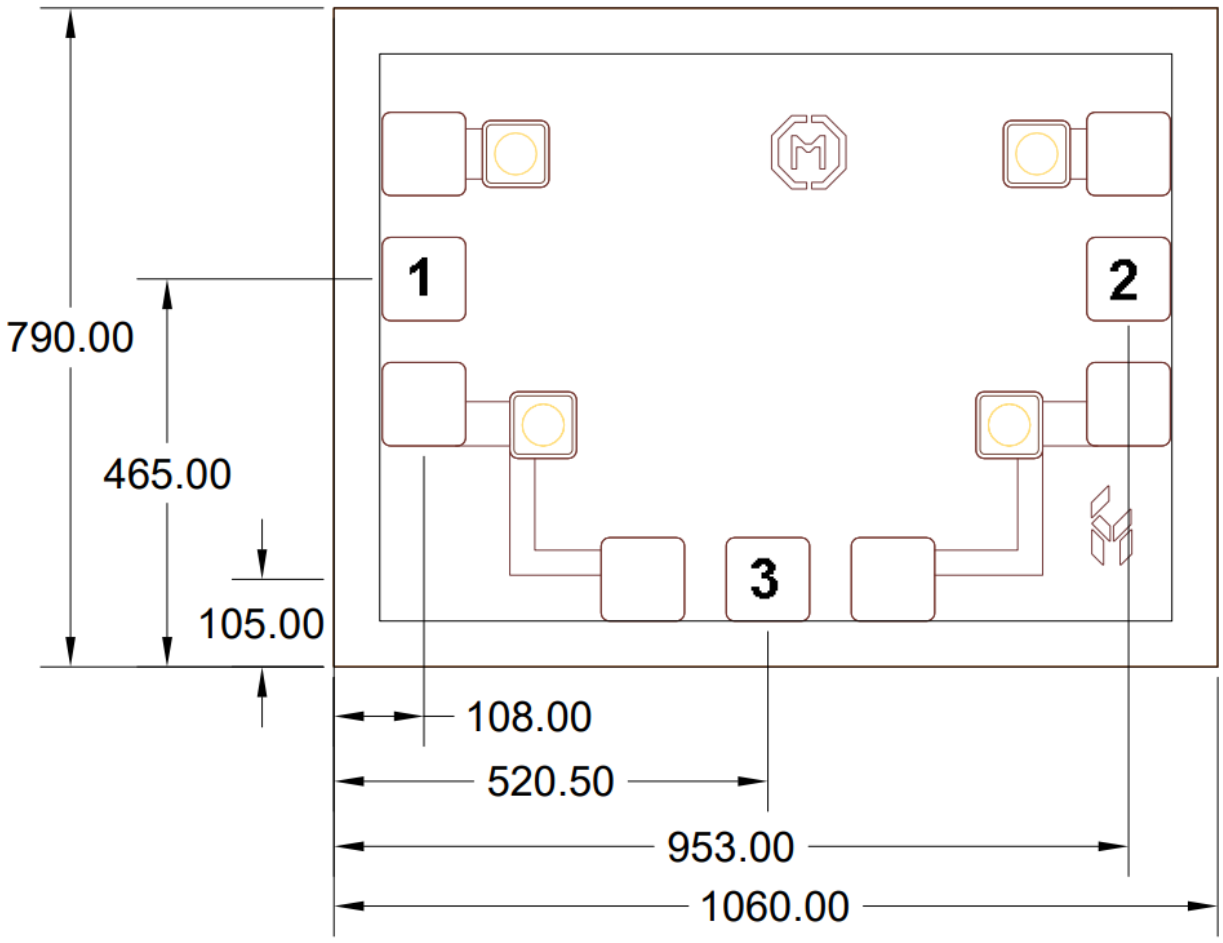


Input P1dB, LO = +13 dBm, IF = 100 MHz USB



Mechanical Information

Die Outline (all dimensions in microns)

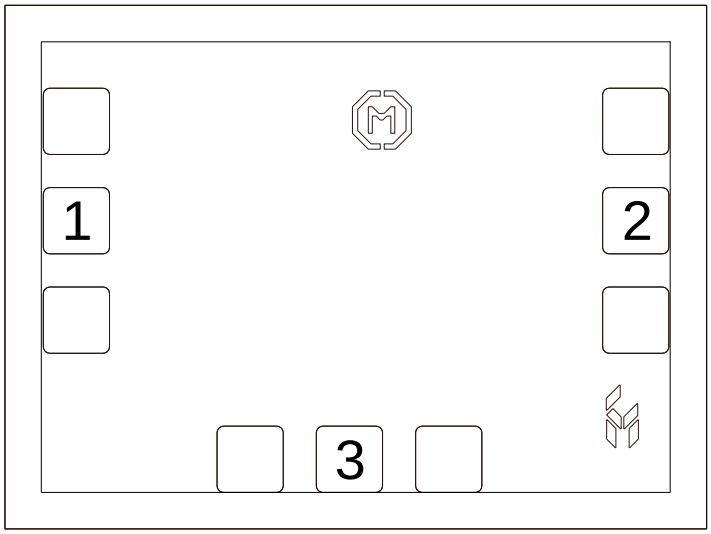


Notes:

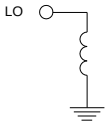
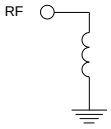
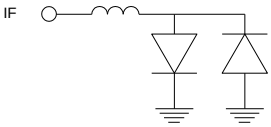
1. No connection required for unlabeled pads
2. Backside is RF and DC ground
3. Backside and bond pad metal: Gold
4. Die is 100 microns thick
5. All bond pads (1, 2, 3) are 100 x 100 microns

Pin Description

Pad Diagram



Functional Description

Pin	Function	Description	Schematic
1	LO	This pin is DC coupled and matched to 50 ohms.	
2	RF	This pin is DC coupled and matched to 50 ohms.	
3	IF	This pin is DC coupled. For applications not requiring operation to DC, this port should be DC blocked externally using a series capacitor whose value has been chosen to pass the necessary IF frequency range. For operation to DC, this pin must not source or sink more than 16 mA of current or part non-function or part failure may result.	
Backside	Ground	Connect to RF / DC ground	

Applications Information

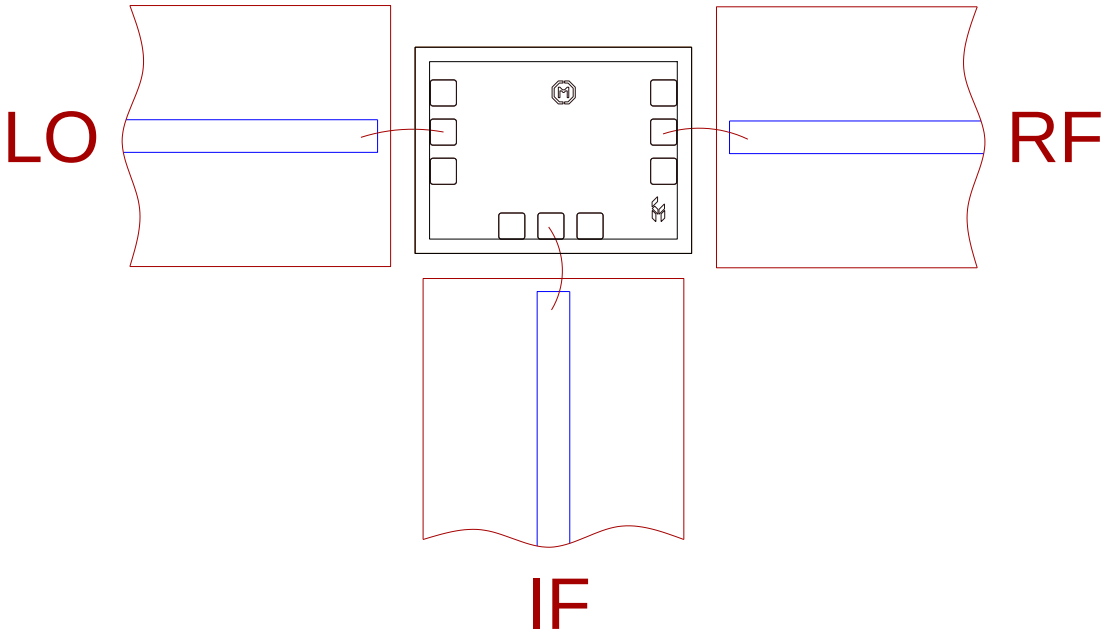
Assembly Guidelines

The backside of the CMD179 is RF ground. Die attach should be accomplished with electrically and thermally conductive epoxy only. Eutectic attach is not recommended. Standard assembly procedures should be followed for high frequency devices. The top surface of the semiconductor should be made planar to the adjacent RF transmission lines.

RF connections should be made as short as possible to reduce the inductive effect of the bond wire. Use of a 0.8 mil thermosonic wedge bonding is highly recommended as the loop height will be minimized.

The semiconductor is 85 um thick and should be handled by the sides of the die or with a custom collet. Do not make contact directly with the die surface as this will damage the monolithic circuitry. Handle with care.

Assembly Diagram



GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.