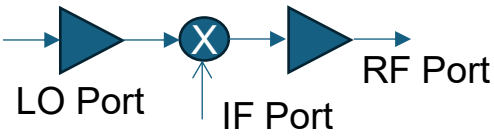
mmTron
Unleashing the mmWave Frontier

TMC170-D
20-80 GHz Broadband Mixer

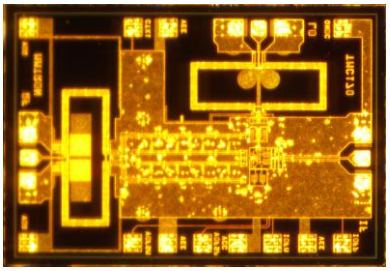
Product Features

- Frequency Range: 20 to 80 GHz
- Conversion Gain: 0 dB
- LO Power: 0 dBm
- RF to IF Isolation: 80dBc
- Die Size: X=1600 um, Y=1090 um, Z=75 um
- DC Power: +5V/90mA, +7V/90mA, -3V/55mA



Application

- Military, EW and Space
- SIGINT
- ELINT
- Instrumentation



Product Description

The TMC170 is an ultra broadband mixer, designed for use in EW, Military, SIGINT, ELINT and Space applications. The TMC170 is a 50 W matched design providing frequency conversion from 20 to 80 GHz and eliminates the need for any port matching. TMC170 has an integrated LO amplifier so it requires a very low input LO power of -3dBm thus eliminating the need for an external LO buffer. The IF signal can be in kHz range as set by the DC blocking capacitor and as high as 70GHz. The RF to IF isolation is > 80 dBc and VSWR on all 3 ports is better than 1.5. The balanced architecture of the mixer in LO, RF and IF will ensure outstanding harmonic performance. The wide bandwidth of IF, LO and RF ports provides much flexibility in frequency planning and simplifies the design. Both bond pad and backside metallization are Au-based that is compatible with ribbon and wedge bonding and high conductivity epoxy die attach methods.

Electrical Performance : **5V/90mA, 7V/90mA, -3V/55mA, TA = 25 °C**

	min	Typ	Max	Units
Frequency	20		80	GHz
Conversion Gain		0		dB
LO Power	-3	0	3	dBm
Input P1dB		3		dBm
Isolation RF to IF		80		dB
VSWR (all Ports)		1.5		

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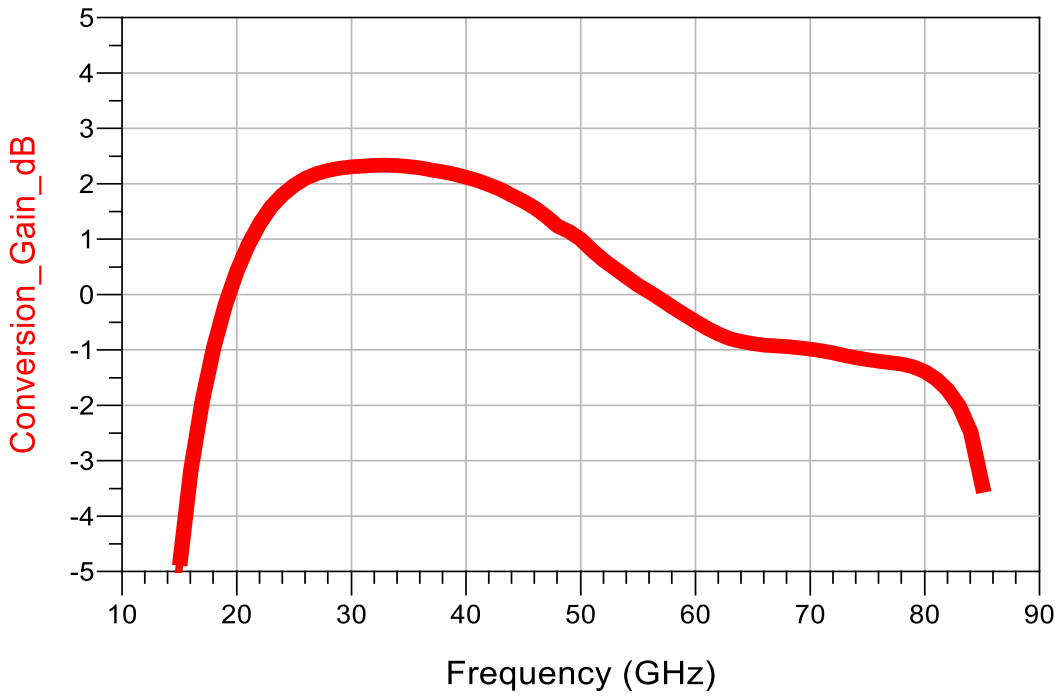
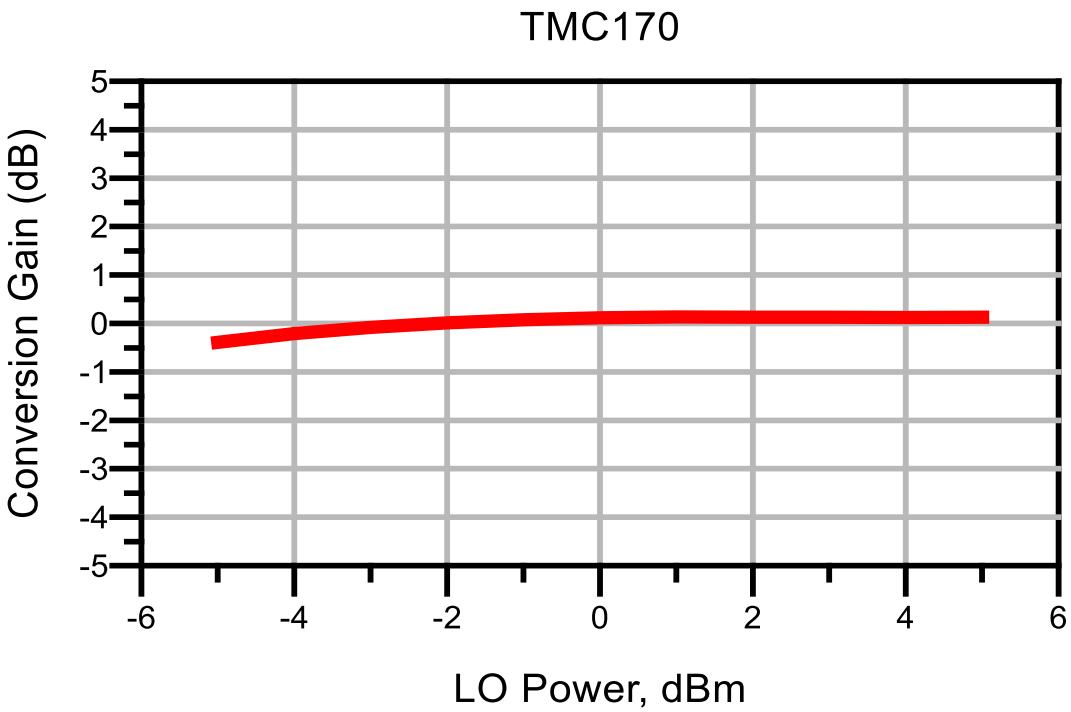
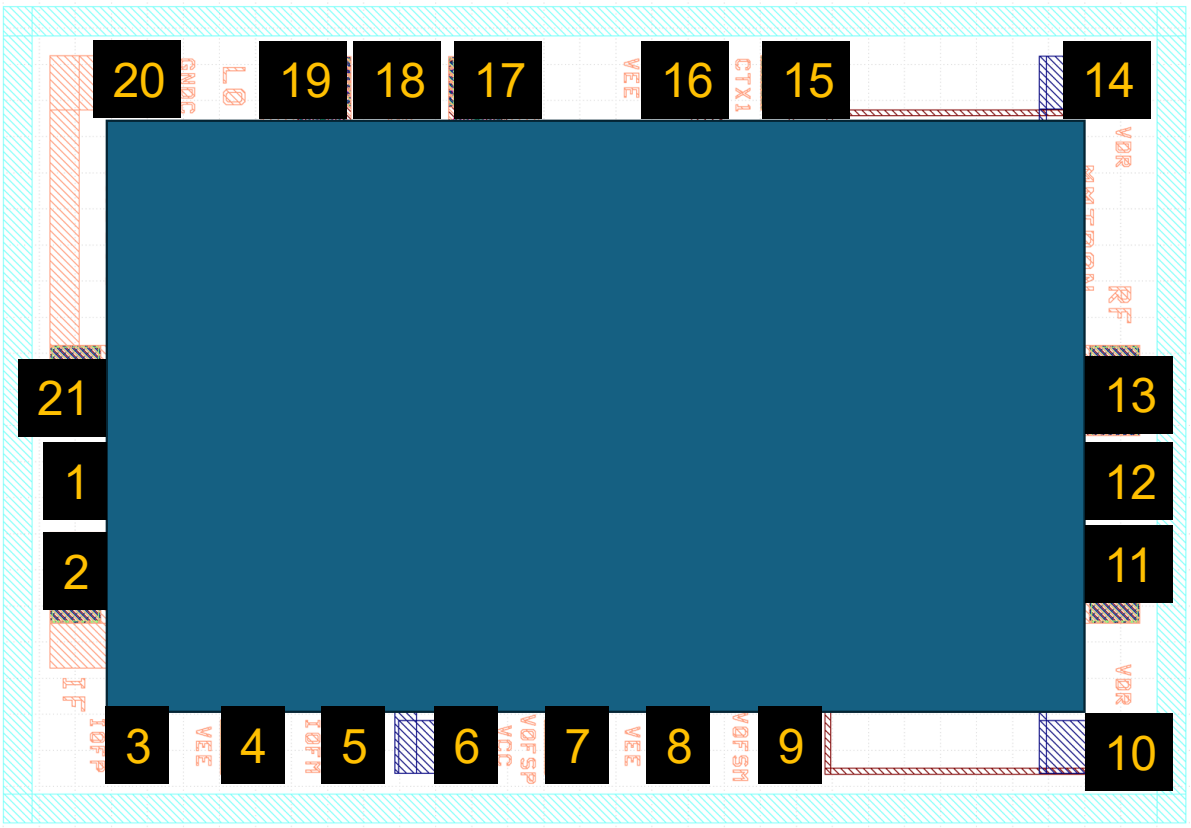

Conversion_Gain_dB
5
4
3
2
1
0
-1
-2
-3
-4
-5
10
20
30
40
50
60
70
80
90
Frequency (GHz)


TMC170
Conversion Gain (dB)
5
4
3
2
1
0
-1
-2
-3
-4
-5
-6
-4
-2
0
2
4
6
LO Power, dBm



Pad #	Function
1	IF
3	N/C
4, 8, 16	VEE BIAS
5	N/C
6	VCC BIAS
7	N/C

Pad #	Function
9	N/C
10, 14	VDR BIAS
12	RF
15	Bypass Cap (10nF)
18	LO
2,11,13,17,19, 20,21	GND

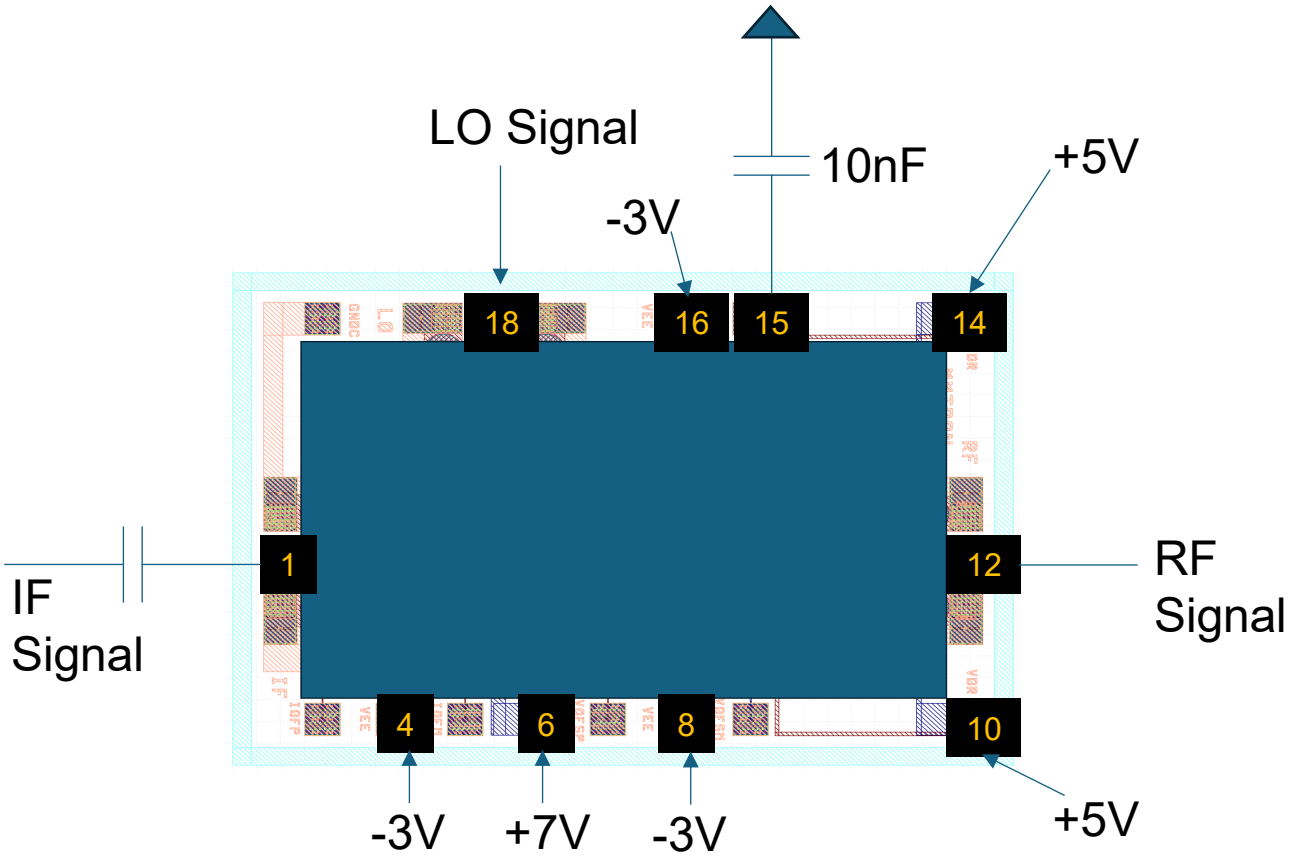
1. DXF and detailed assembly drawings are available on request.

Recommended Biasing

The TMC170 is operated with two positive supplies VC1 and VC2 and one negative supply voltages VE1.

Assembly Technique

The TMC170 is fabricated using an InP-based semiconductor material structure. The chip is back-metalized and can be mounted with standard chip assembly techniques. The mounting surface should be clean and flat.



The three VEE=-3V pads are connected on chip.
The two VDR=+5V pads are connected on chip.



Electrostatic Discharge Caution

This integrated circuit can be damaged by ESD. mmTron Inc. recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications. III-V MMICs are ESD-sensitive. Preventative ESD measures must be employed in all aspects of storage, handling, and assembly. MMIC ESD precautions, handling considerations, and die-attach and bonding methods are critical factors in successful III-V MMIC performance and reliability.



RoHS Compliant

This part is RoHS compliant, meeting the requirements of the EU Restriction of Hazardous Substances Directive 2002/95/EC, commonly known as RoHS. Six substances are regulated: lead, mercury, cadmium, chromium VI (hexavalent chromium), polybrominated biphenyls (PBB), and polybrominated biphenyl ethers (PBDE). RoHS compliance requires that any residual concentration of these substances is below the Directive's maximum concentration values (MCV): cadmium 100ppm by weight and all others 1000ppm by weight.

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