mmTron
Unleashing the mmWave Frontier

TMC191
25-29 GHz Mixer

Product Features

- RF frequency: 25 to 29 GHz
- LO frequency: 18 to 24 GHz
- IF frequency: 4 to 8 GHz
- Conversion Gain: -12 dB
- IP1dB: 5 dBm
- Die Size: X=3.4, Y=3.0, Z=0.1 mm
- Package Size: X=5, Y=5, Z=0.9 mm

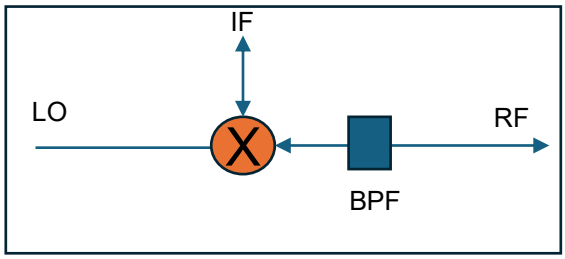
Applications

- Fixed Wireless Access
- Military Radar, EW

Product Description

The TMC191 is a 25-29 GHz, up/down converter die product with built-in RF filter. TMC191 is designed for use in fixed wireless access, Military Radar, and EW applications. The TMC191 has ESD protection and is a 50Ω matched design. IF and RF ports have shunt inductors to ground for ruggedness. External series coupling capacitors would be necessary if there are external DC voltages present on the LO, IF and RF ports. To ensure rugged and reliable operation and moisture protection, the TMC191 is designed with additional passivation for maximum reliability. Both bond pad and backside metallization of TMC191-D bare die are Au-based that is compatible standard wire bonding and die attach methods. TMC191-P5 is the packaged version in a standard 20-pin 5x5 QFN.

Functional Block Diagram



*Add off chip bypassing for VD pad 100pF

Ordering Information

Part No.	Description
TMC191-D	Bare Die
TMC191-P5	Packaged Version

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For additional information and Application support, please visit https://www.mmTron.com/contact

	min	Typ	Max	Units
LO Input Frequency	18	21	24	GHz
RF Frequency	25	27	29	GHz
IF Frequency	4	6	8	GHz
LO Input Drive	12	15	19	dBm
Conversion Gain		-12		dB
Input P1dB		5		dBm
LO Return Loss		-10		dB
RF Return Loss		-10		dB
IF Return Loss		-10		dB

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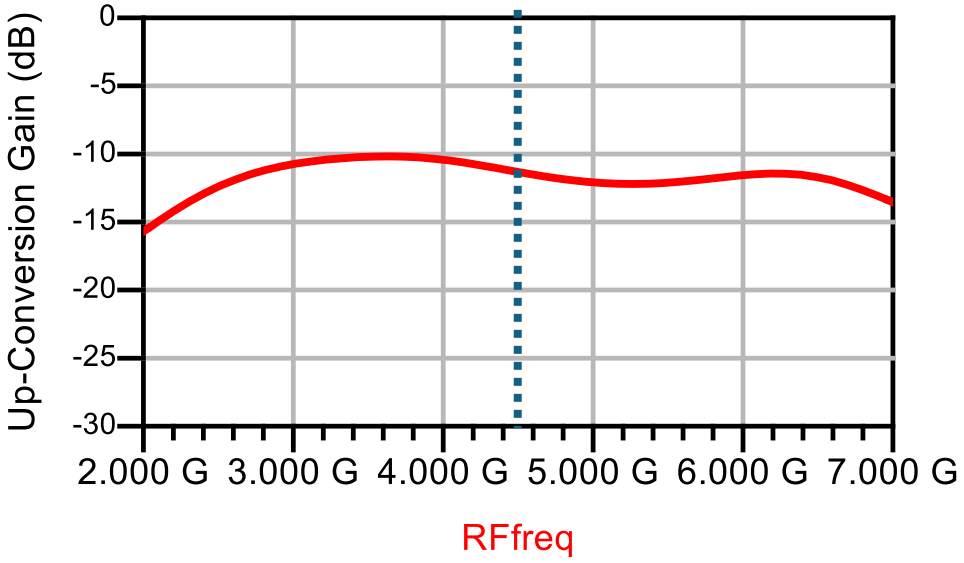
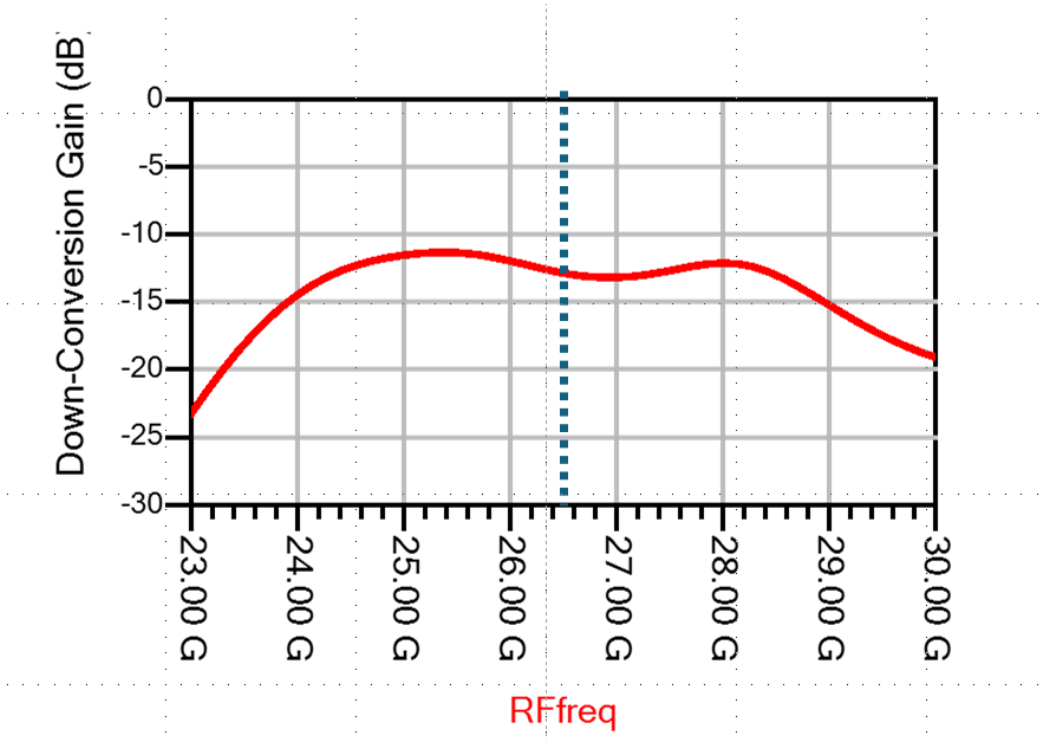
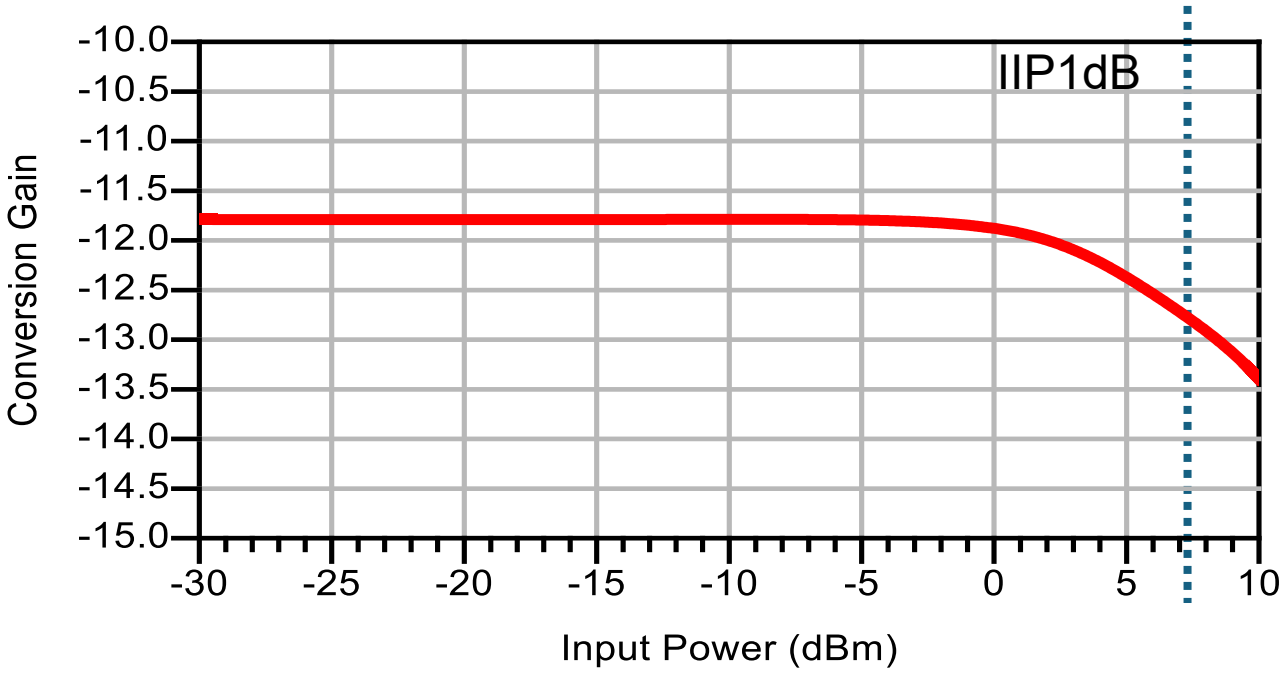

Up-Conversion Gain (dB)
0
-5
-10
-15
-20
-25
-30
2.000 G
3.000 G
4.000 G
5.000 G
6.000 G
7.000 G
RFfreq


Down-Conversion Gain (dB)
0
-5
-10
-15
-20
-25
-30
23.00 G
24.00 G
25.00 G
26.00 G
27.00 G
28.00 G
29.00 G
30.00 G
RFfreq


IIP1dB
Conversion Gain
-10.0
-10.5
-11.0
-11.5
-12.0
-12.5
-13.0
-13.5
-14.0
-14.5
-15.0
-30
-25
-20
-15
-10
-5
0
5
10
Input Power (dBm)

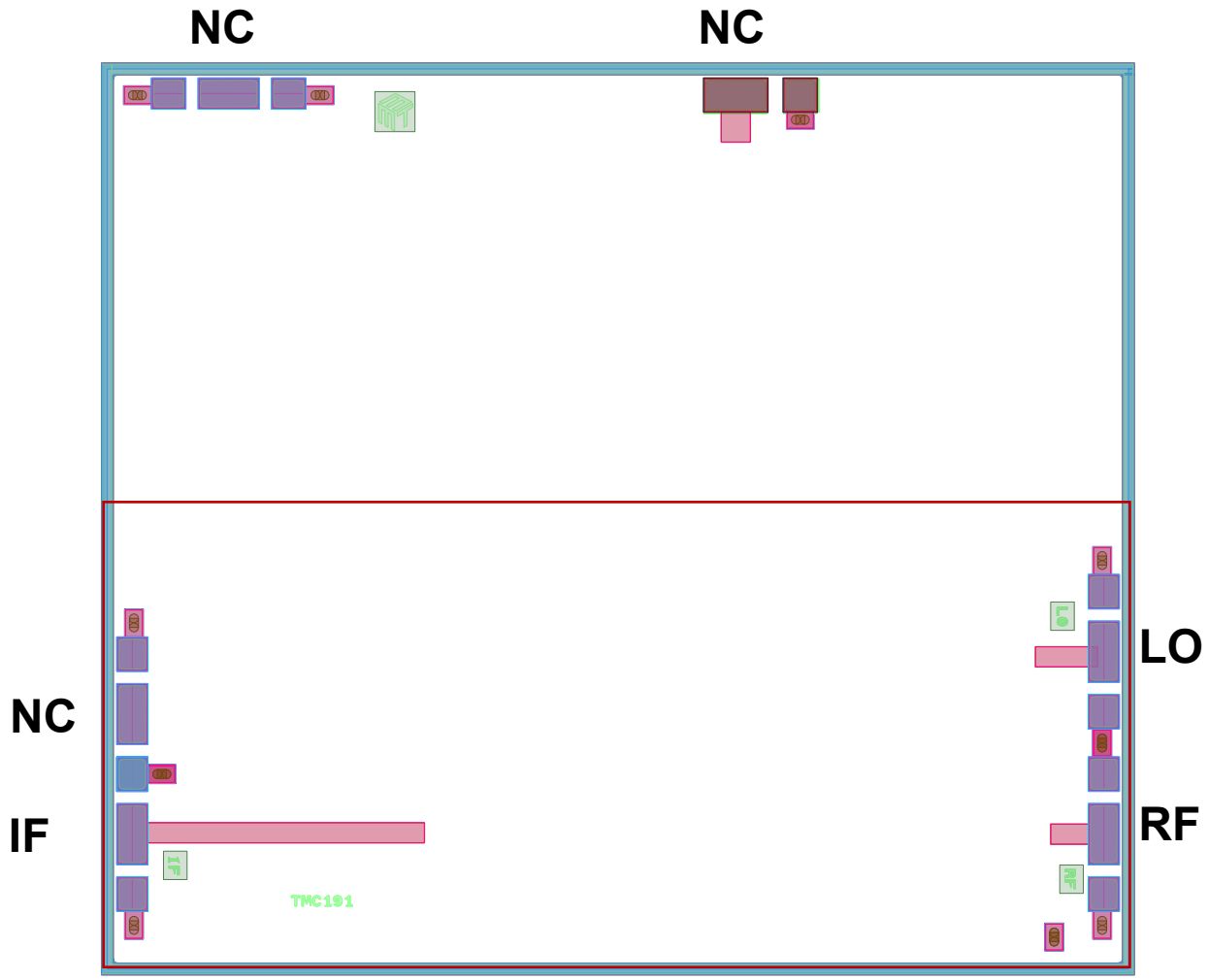
Recommended Biasing

The TMC191 is a passive mixer.

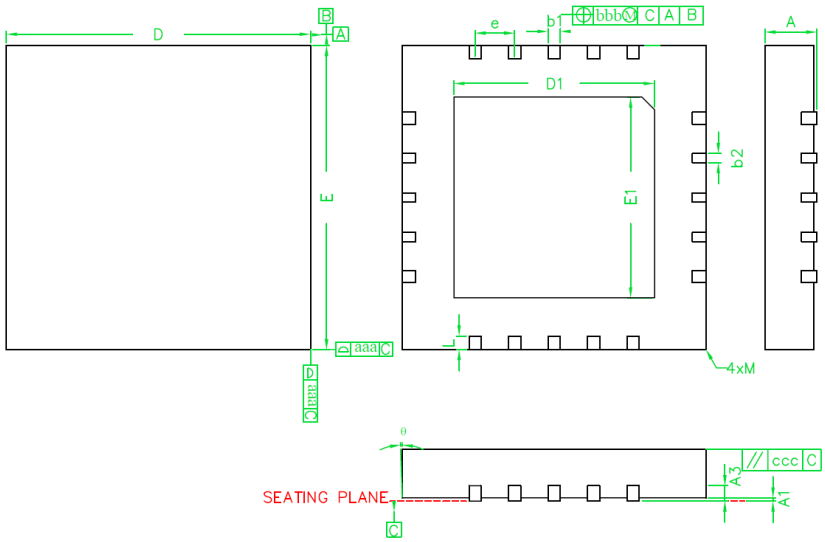
Assembly Techniques

The TMC191 is fabricated using a GaAs-based semiconductor material structure and may be used packaged in a standard overmold or an air-cavity QFN or used as a die.

Layout Drawing



Package Drawing, 5x5, 20-pin, 0.65 pitch



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	0.80	0.90	1.00
A1	0	0.02	0.05
A3	----	0.25REF.	----
b1	0.15	0.20	0.25
b2	0.10	0.15	0.20
D	4.90	5.00	5.10
D1	----	3.30BSC	----
E	4.90	5.00	5.10
E1	----	3.30BSC	----
e	----	0.65BSC	----
L	0.18	0.23	0.28
θ	0	----	12°
aaa	----	0.25	----
bbb	----	0.10	----
ccc	----	0.10	----
M	----	----	0.05

DXF file is available upon request



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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