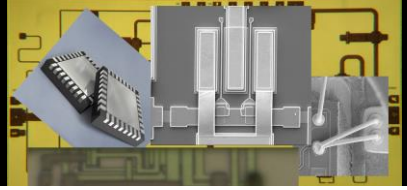
TMC152
22-27 GHz
Power Amplifier



mmTRON
Unleashing the mmWave Frontier

Product Features

- RF frequency: 23 to 27.5 GHz
- Linear Gain: 23 dB
- P_{sat}: 10 W
- Package Size: 28-pin, X=6.0 mm, Y=6.0 mm
- DC Power: 23 VDC, 450 mA

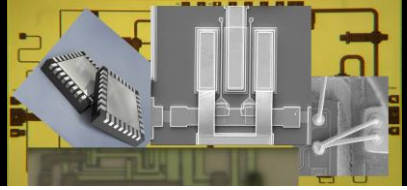
Application

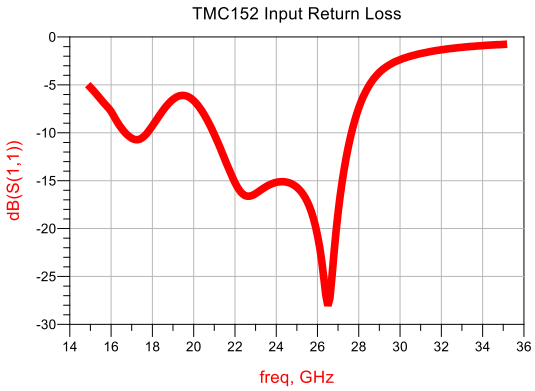
- mmWave 5G FWA
- Point-to-Point Radios and VSATs
- Fiber Optics
- Military, EW and Space

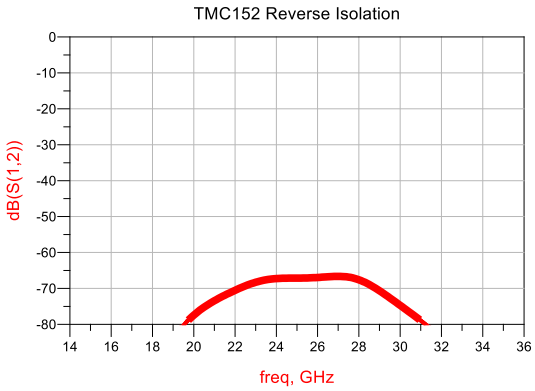
Product Description

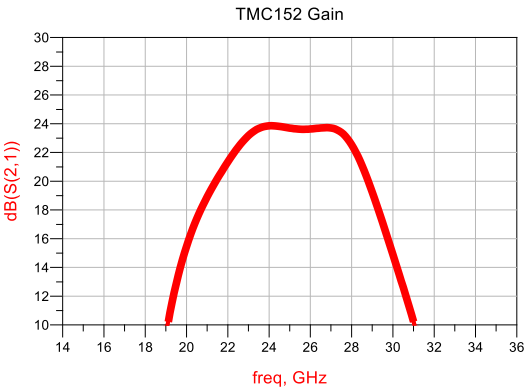
The TMC152 GaN Power amplifier is a high linearity device, designed for use in mmWave 5G, Radios, Military, EW and Space applications. The TMC152 is a 50 Ω matched design providing 10W of saturated power from 22 to 27 GHz and eliminates the need for RF port matching. Both bond pad and backside metallization are Au-based that is compatible with ribbon and wedge bonding and high conductivity epoxy and eutectic die attach methods. The bare die version is available under TMC152D, X=3.5 mm, Y=2.5 mm, Z=0.1mm. TMC152 can be biased from 18V to 28V to adjust outpower levels while maintaining excellent PAE and NPR. TMC152 normal operating temperature is -55 C to +105 C (with max of 130 C) allowing 1E6 hrs of MTBF.

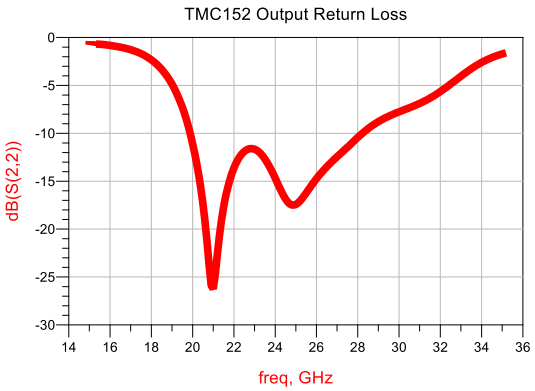
Electrical Performance : **Vdd = 23 V, Vgg = -4.6 V, TA = 25 °C, F = 25 GHz**				
	min	**Typ**	**Max**	**Units**
Frequency	22		27	GHz
Gain		23		dB
P1dB		38		dBm
Psat		39		dBm
Noise Figure		7		dB
OIP3		49		dBm
Bias Voltage		23		V
Bias Current		450		mA

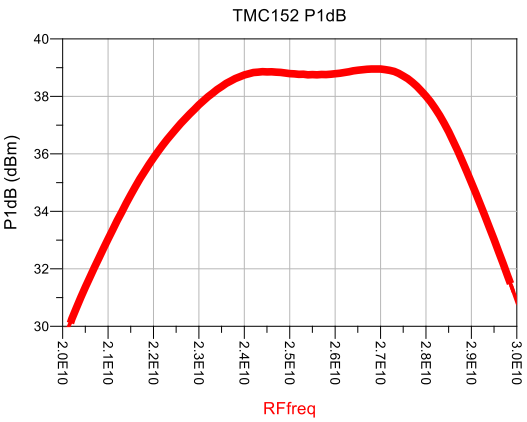


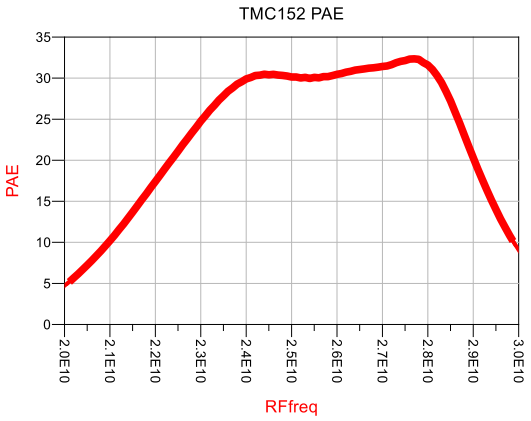




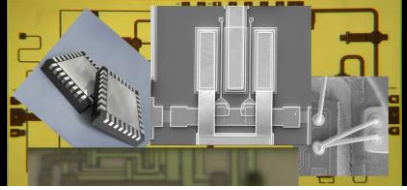


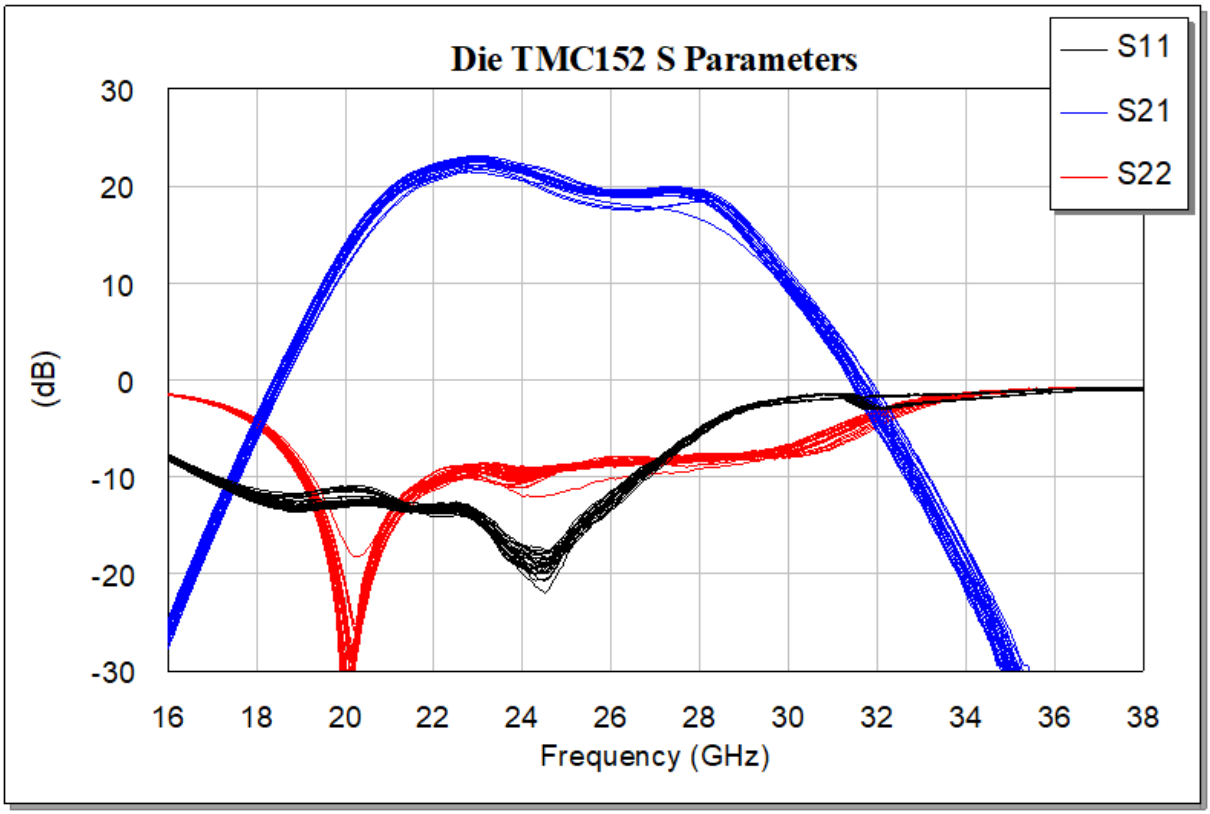




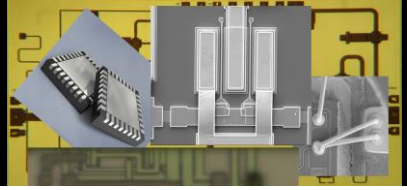


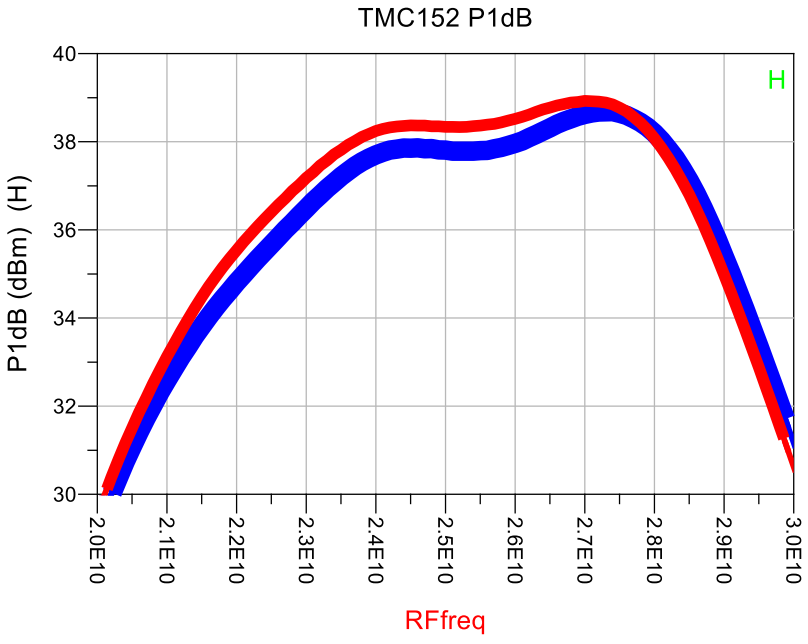
Bare Die (TMC152D) Electrical Performance : **Ta = 25 °C, 23V/450mA**

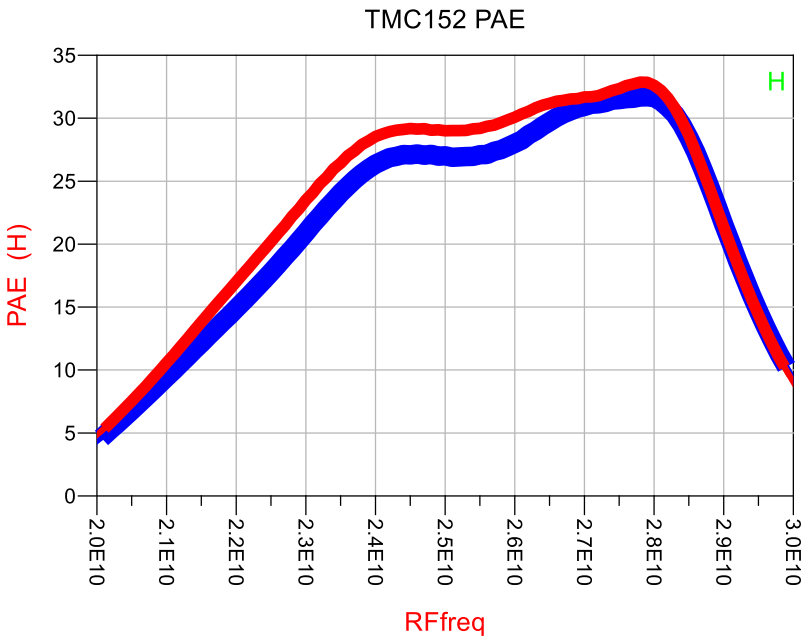




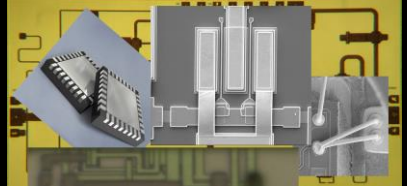
Packaged (TMC152) Electrical Performance on the PCB: Ta = 25 °C, 23V/450mA. measured including PCB transition and Connector Losses

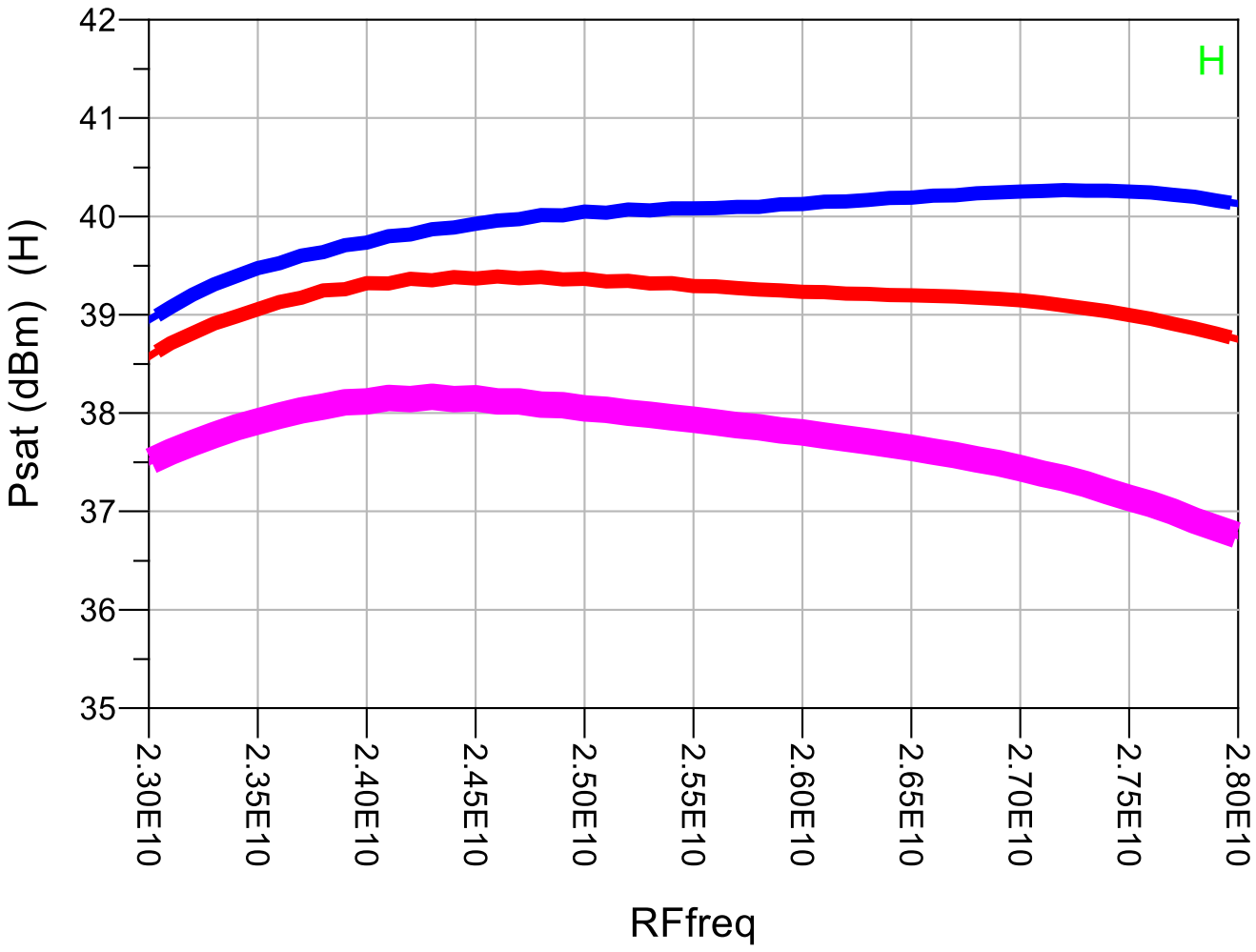




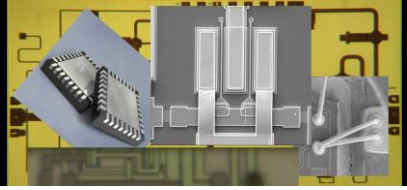


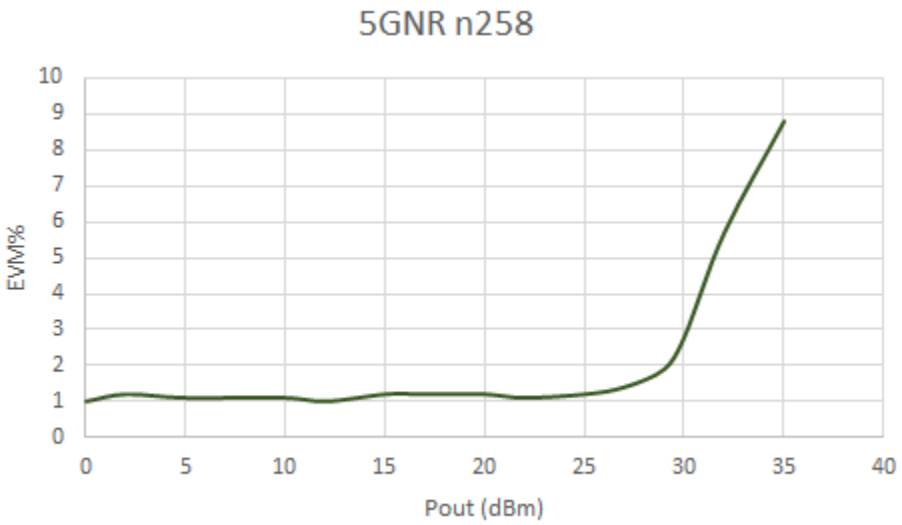
Blue Trace shows the performance at 80 C vs the red trace at 25 C

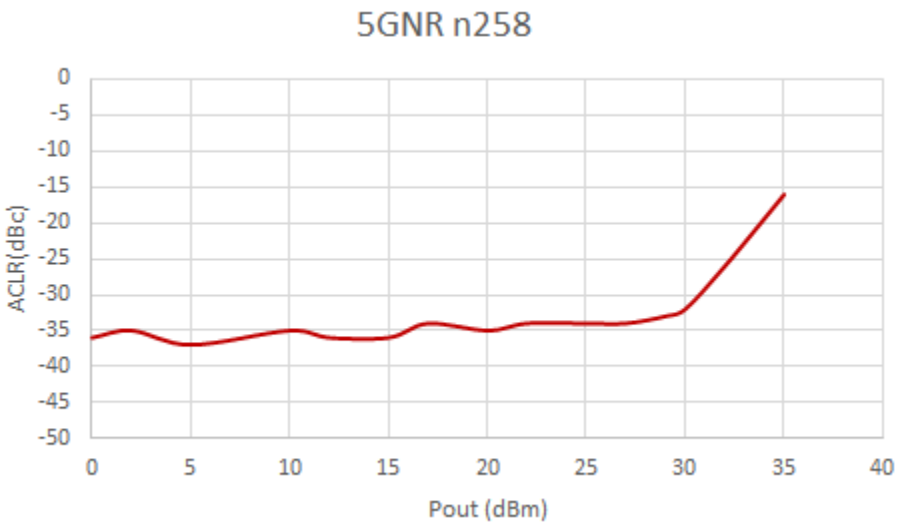




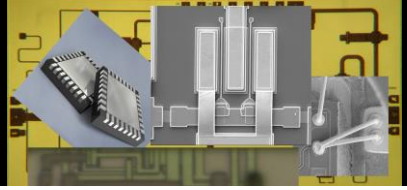
Magenta Trace is for 18V/450mA
Red Trace is for 23V/450mA
Blue Trace is for 28V/450mA







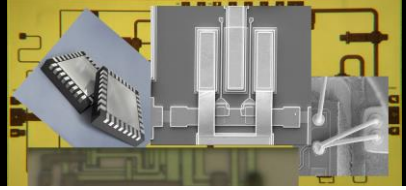
Blue Trace shows the performance at 80 C vs the red trace at 25 C

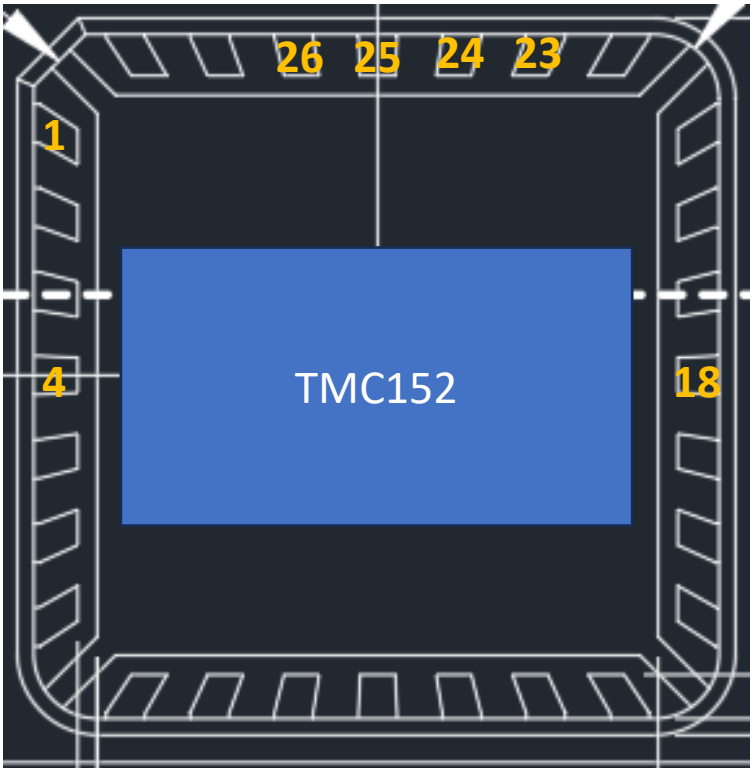


Absolute Maximum Ratings

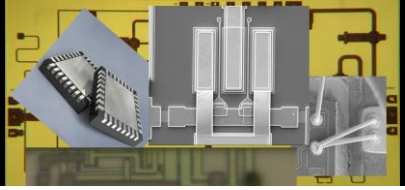
Parameter	Value/Range
Drain Voltage (VD)	+30 V
Gate Voltage (VG)	-7 to 0 V
Drain current (ID1)	500 mA
Drain current (ID2)	650 mA
Gate Current (IG1+IG2), Tj=180 C	20 mA
Power Dissipation, 85 C	16 W
Input Power, CW, 50 Ω	30 dBm
Mounting temperature, 30 sec	260 C
Storage Temperature	-55 to +150 C

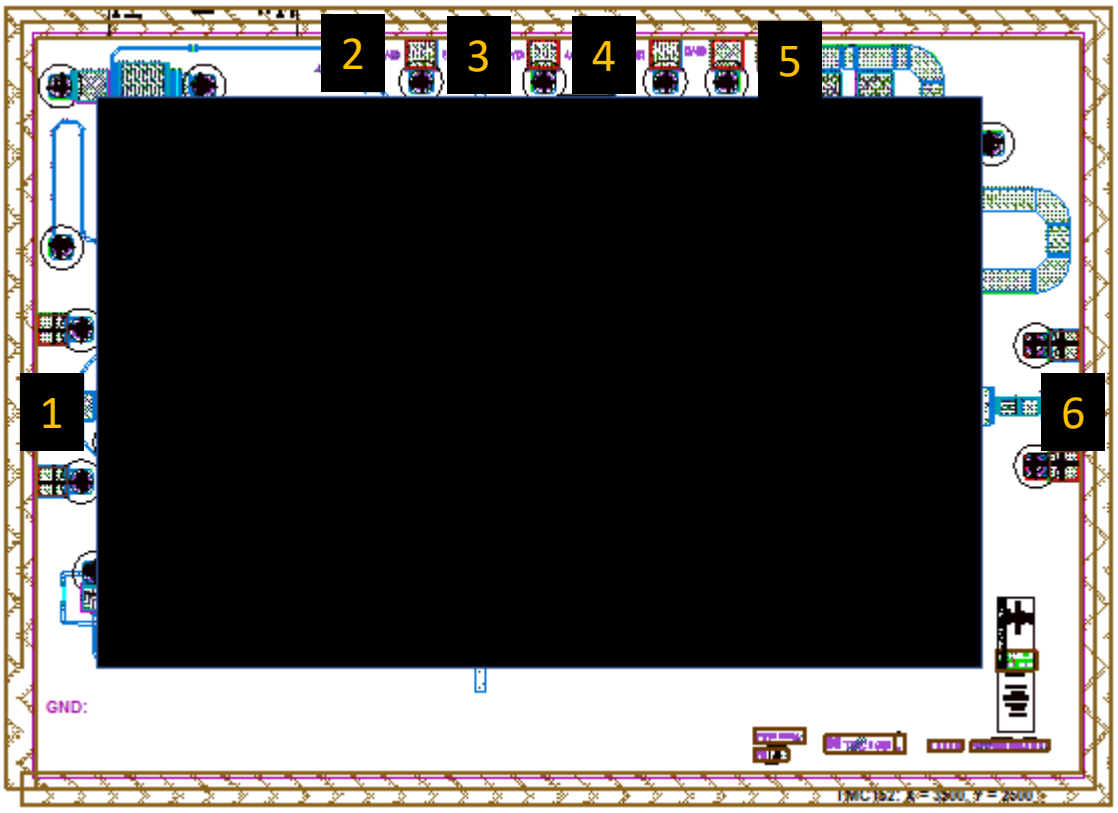
Operation of TMC152 outside the parameter ranges given above can cause irreversible damage.



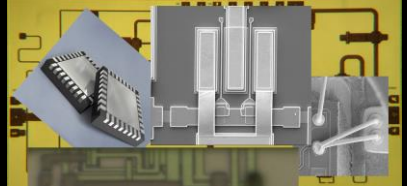


Pin#	Function
3	GND
4	RF Input
5	GND
17	GND
18	RF Output
19	GND
23	VD2
24	VG2
25	VD1
26	VG1
Other pins	GND





Pad #	Function
1	RF INPUT
2, 4	VGG BIAS
3, 5	VDD BIAS
6	RF OUTPUT

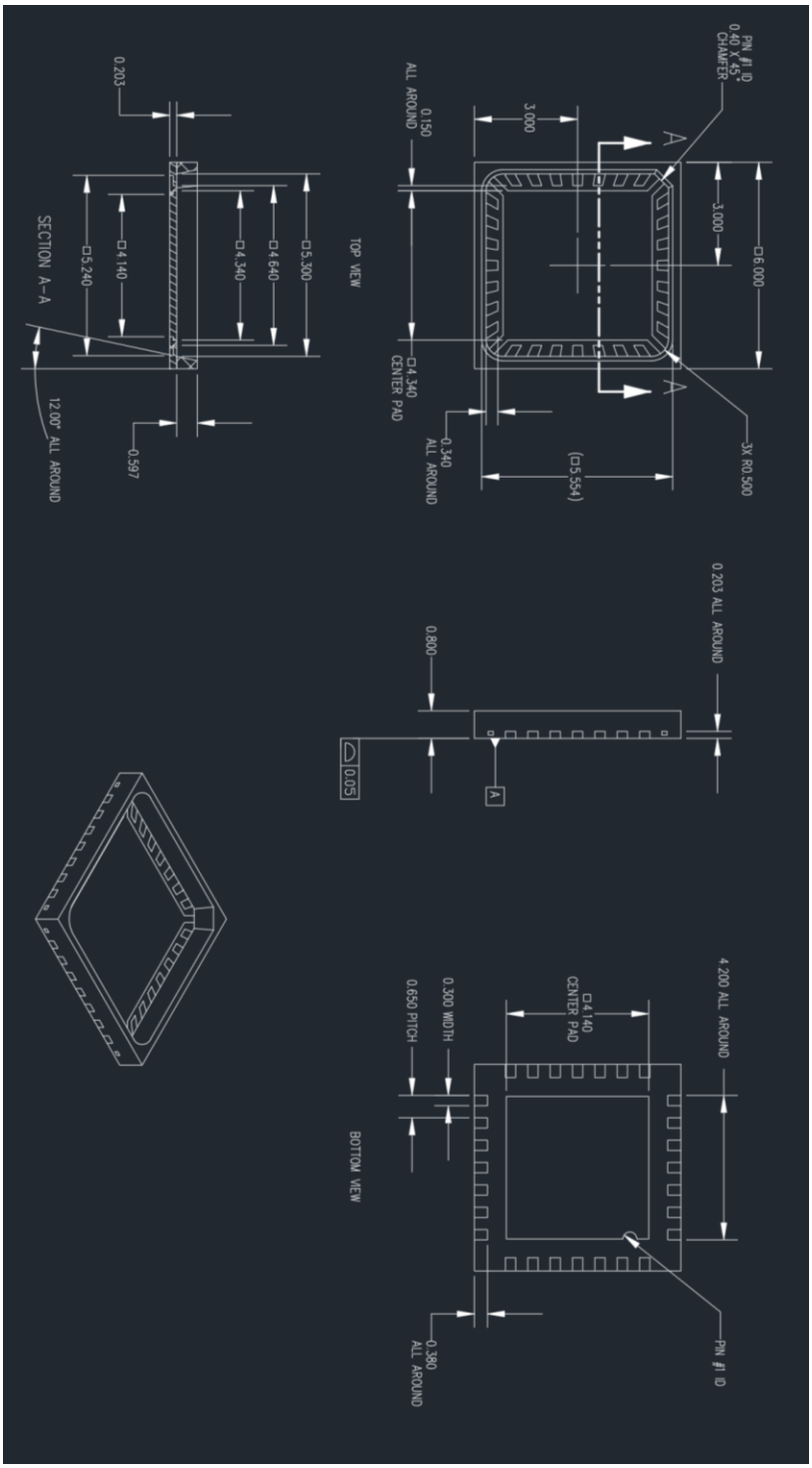


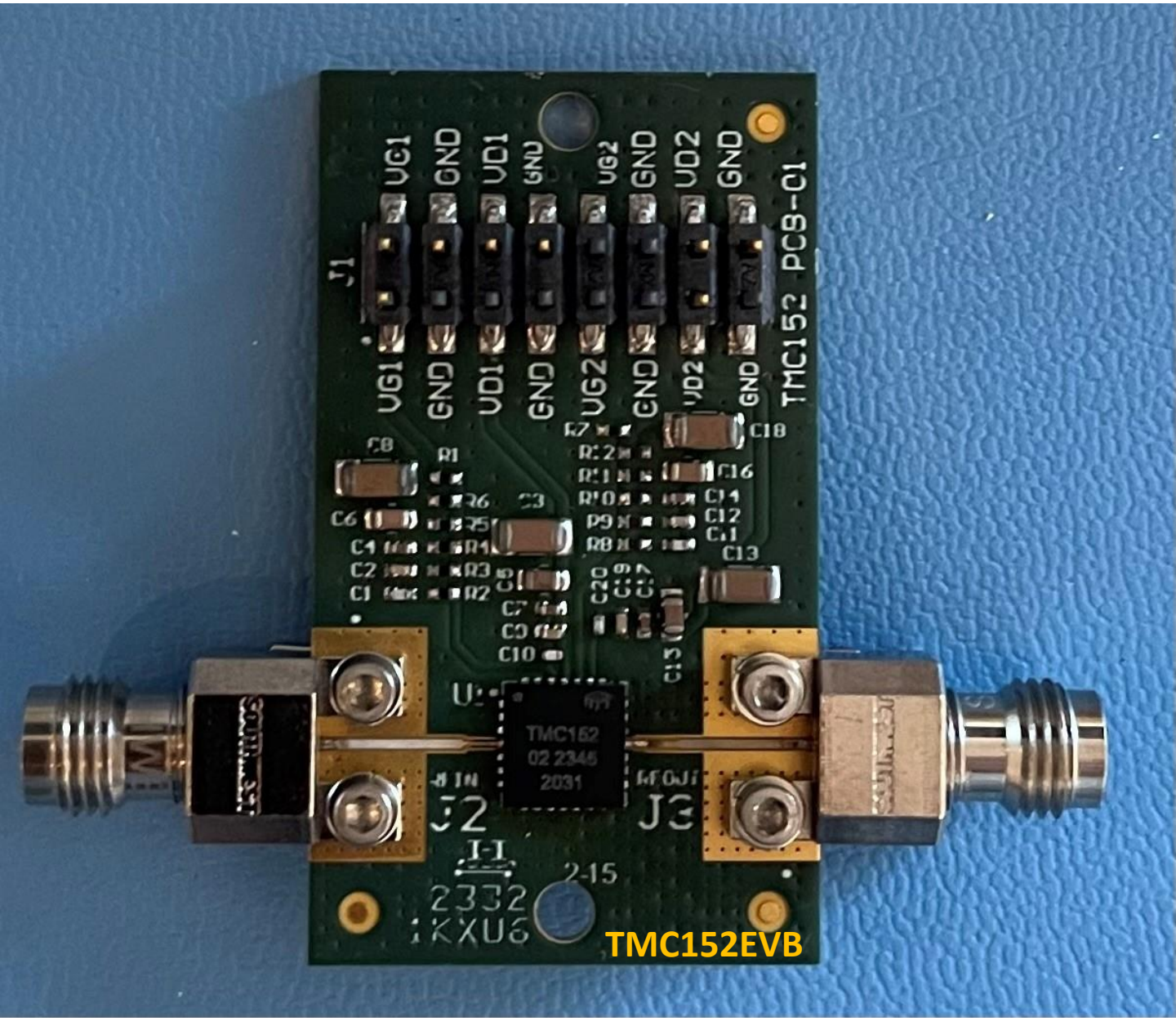
- Recommended Biasing
  - The TMC152 is operated with two positive supplies VD1 and VD2 and two negative supply voltages VG1 and VG2.
  - The positive voltages VD1 and VD2 can be connected together or biased separately. The negative voltages VG1 and VG2 can be connected together or biased separately.
  - The positive supply must be connected to VD pads 23 and 25 on one side of the package. The negative bias should be connected to VG pads 24 and 26 on one side of the package.
  - The VG1=VG2 is biased to -6V first, then VDD is gradually biased to +23V, and finally, VG1=VG2 is adjusted to around -4.6V for ID1+ID2=450mA DC current.
  - Reverse the sequence during power down, i.e. bring the VG1=VG2 to -6V, lower VD1=VD2 to 0V, and then VG1=VG2 to 0.

- Assembly Techniques
  - The TMC152 is fabricated using a GaN-based semiconductor material structure and is to be packaged in an 6x6 air-cavity QFN. The package is back-metalized and can be mounted with standard PCB assembly techniques. The mounting surface should be clean and flat.

- ESD Warning
  - 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 Compliance
  - 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.


PIN #1 ID
0.40 X 45°
CHAMFER
3.000
3.000
□6.000
0.150
ALL AROUND
□4.340
CENTER PAD
0.340
ALL AROUND
(□5.554)
3X R0.500
TOP VIEW
0.203
□5.300
□4.640
□4.340
□4.140
□5.240
SECTION A-A
12.00° ALL AROUND
0.597
0.203 ALL AROUND
0.800
0.05
A
4.200 ALL AROUND
□4.140
CENTER PAD
0.300 WIDTH
0.650 PITCH
BOTTOM VIEW
0.380
ALL AROUND
PIN #1 ID


VG1
GND
VD1
GND
VG2
GND
VD2
GND
TMC152 PCB-C1
J1
C18
C8
R1
C6
C3
C16
C14
C12
C11
C13
C4
C2
C1
R3
R2
C7
C9
C10
C20
C19
C17
C15
U1
TMC152
02 2345
2031
J2
J3
2-15
2332
KXU6
TMC152EVB