

## 5.8 GHz 1W MMIC

### FEATURES

- P<sub>-1</sub> dB: 30 dBm
- Small Signal Gain: 24 dB
- Power Added Efficiency: 24 %
- IP3: 39 dBm
- Match to 50 Ω Operation
- Bias condition: 600 mA @ 7 V

### PHOTO ENLARGEMENT



### DESCRIPTION

The TC3531 is a 2 stage PHEMT MMIC power amplifier. It is designed for use in low cost, high volume, 5.7-5.9 GHz band applications. The MMIC is matched to 50 Ω operation. No external matching component is required. It provides a typical gain of 24 dB and P<sub>1</sub> dB power of more than 30 dBm. Typical bias condition is 7V at 600 mA. The MMIC is packaged in a copper based ceramic 10 pins power package. The copper based carrier of the package allows direct soldering of the device to the PCB for proper heat sinking.

### APPLICATIONS

- Wireless Internet Access

### ELECTRICAL SPECIFICATIONS (Ta = 25 °C)

SYMBOL	DESCRIPTION	MIN	TYP	MAX	UNITS
<b>FREQ</b>	Frequency Range	5.7		5.9	GHz
<b>SSG</b>	Small Signal Gain	22	24		dB
<b>P<sub>-1</sub> dB</b>	Output Power at 1 dB Gain Compression	29	30		dBm
<b>P<sub>-3</sub> dB</b>	Output Power at 3 dB Gain Compression	30	31		dBm
<b>IP3</b>	Third Order Intercept Point	37	39		dBm
<b>VSWR, IN</b>	Input VSWR		2:1		-
<b>VDD</b>	Supply Voltage		7		Volt
<b>Vg</b>	Gate Voltage	-0.6	-1.0	-2	Volt
<b>IDD</b>	Current Supply Without RF		600		mA
<b>IDP<sub>-1</sub></b>	Current Supply @ Pout = P <sub>-1</sub> dB		620		mA
<b>η<sub>a</sub></b>	Power Added Efficiency		24		%
<b>OTR</b>	Operating Temperature Range	-40		85	°C

**Absolute Maximum Ratings**

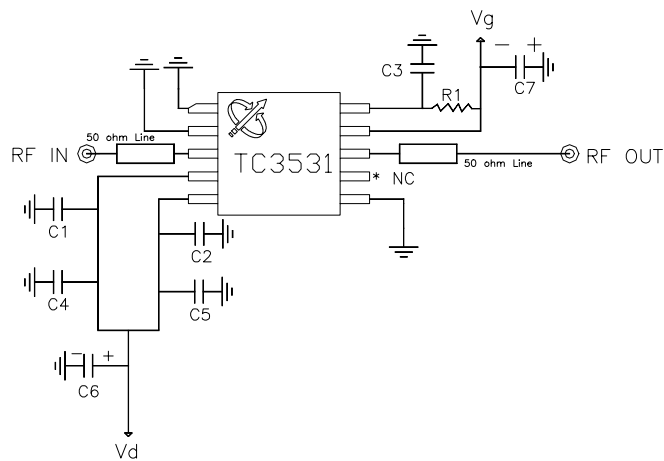
Symbol	Parameter/Conditions	Min.	Max.	Units
V <sub>dd</sub>	Drain-Source Voltage		12	Volts
I <sub>dd</sub>	Total Drain Current		1600	MA
P <sub>in</sub>	RF Input Power		11	dBm
P <sub>t</sub>	Power Dissipation		7	W
T <sub>ch</sub>	Operating Channel Temperature		175	°C
T <sub>STG</sub>	Storage Temperature	-65	175	°C

**Note:**

1. This GaAs MMIC is susceptible to damage from Electrostatic Discharge. Proper precautions should be used when handling these devices.
2. Specifications subject to change without notice.

**TEST CIRCUITS**

Evaluation Board Schematic



**EVALUATION BOARD**

 DXF file of the PCB can be downloaded from our web-site at [www.transcominc.com.tw](http://www.transcominc.com.tw)

PCB Material: RO4003

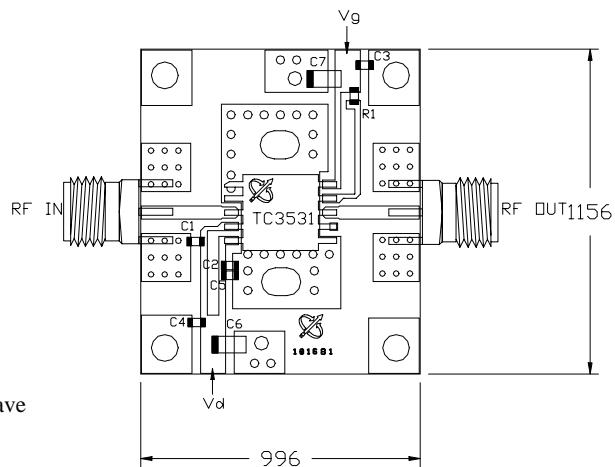
ER = 3.38

Thickness = 20 mil

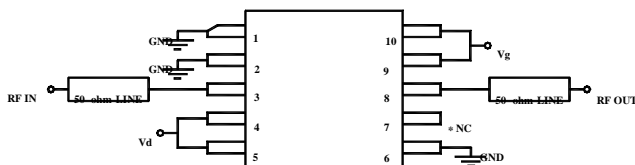
Unit: mil

**Application Notes:**

For better heat sinking and grounding, it's recommended to have the via holes beneath TC3531 filled with solder and have two screws besides TC3531 installed on the PCB area.

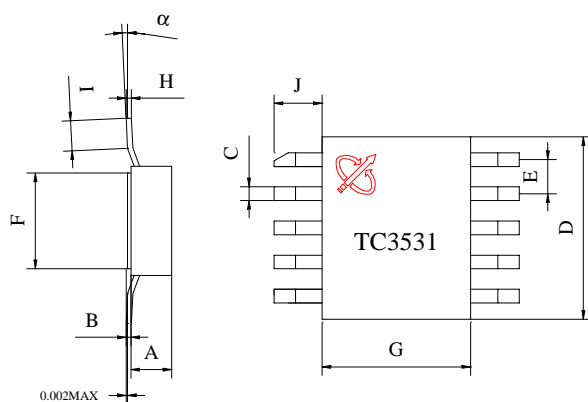

**Evaluation Board Parts List**

Part Type	Reference Designator	Description	Manufacturer	Part Number
Capacitor	C1, C2, C3	1000pF 0603	Murata	GRM39C0G102J50V
Capacitor	C4, C5	0.1 uF 0603	Murata	GRM39Y5V104Z25V
Capacitor	C6, C7	4.7uF Tantalum Cap.		
Resistor	R1	200 ohm 0603		

**CONNECTION DIAGRAM AND PIN DESCRIPTIONS**


Pin #	Name	Description
1, 2, 6	GND	Ground
3	RF IN	RF input (internally DC blocked)
4, 5	V <sub>d</sub>	Input stage drain bias
9, 10	V <sub>g</sub>	FET gate bias
8	RF OUT	RF output and V <sub>d2</sub> External matching circuit required
7	NC	No Connection

## PHYSICAL DIMENSIONS (Unit: inches)



DIMENSION	MINIMUM	NOMINAL	MAXIMUM
A	0.054	0.057	0.060
B	0.007	0.008	0.009
C	0.017	0.020	0.023
D	0.267	0.270	0.273
E	0.047	0.050	0.053
F	0.247	0.250	0.253
G	0.267	0.270	0.273
H	0.007	0.008	0.009
I	0.020		0.040
J	0.073	0.080	0.087
$\alpha$	0°		7°