TRANSCOM

TC3131

REV2_20040412

2.4 GHz 1W MMIC

FEATURES

- P_{-1} dB: 30 dBm
- Small Signal Gain: 28 dB
- Power Added Efficiency: 32 %
- IP3: 39 dBm
- Bias Condition: 400 mA @ 7 V

PHOTO ENLARGEMENT

DESCRIPTION

The TC3131 is a 2 stage PHEMT MMIC power amplifier. It is designed for use in low cost and high volume 2.4-2.5 GHz ISM band applications. The MMIC provides a typical gain of 26 dB and saturation power of more than 30 dBm. Typical bias condition is 7V at 400 mA. The MMIC is packaged in a standard SO-8 power package. The copper based carrier of the package allows direct soldering of the device to the PCB for proper heat sinking. The input and output matching of the MMIC require external components.

ELECTRICAL SPECIFICATIONS (Ta = 25 °C)

SYMBOL	DESCRIPTION	MIN	TYP	MAX	UNITS
FREQ	Frequency Range	2.4		2.5	GHz
SSG	Small Signal Gain	26	28		dB
P_{-1} dB	Output Power at 1 dB Gain Compression	29	30		dBm
P_{-3} dB	Output Power at 3 dB Gain Compression	30	31		dBm
IP3	Third Order Intercept Point	37	39		dBm
VSWR, IN	Input VSWR		2:1		-
VDD	Supply Voltage		7		Volt
Vg	Gate Voltage	-0.8	-1.5	-2	Volt
IDD	Current Supply Without RF		400		mA
IDP_{-1}	Current Supply @ Pout = P_{-1} dB		460		mA
η_a	Power Added Efficiency		32		%

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Absolute Maximum Ratings

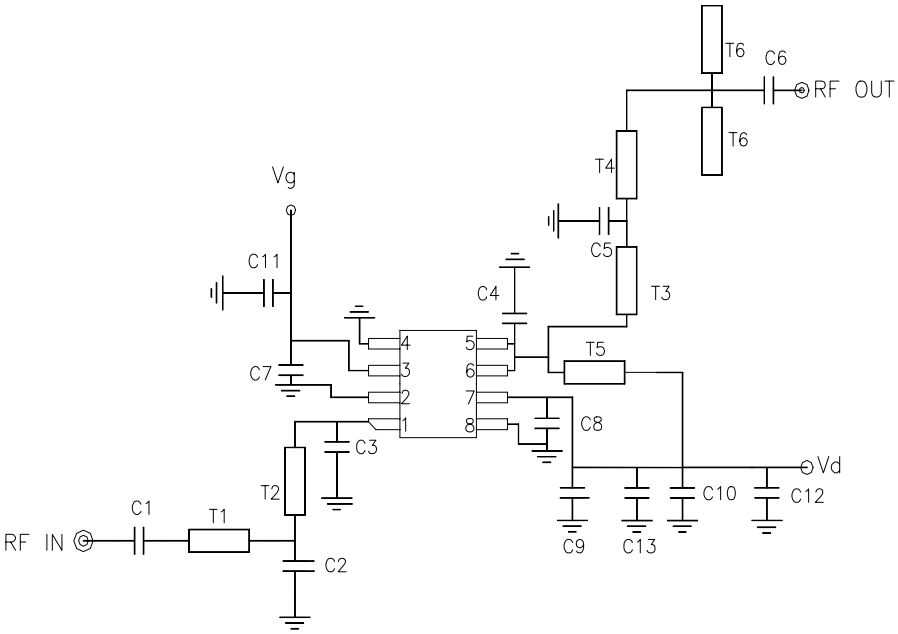
Symbol	Parameter/Conditions	Min.	Max.	Units
V_{dd}	Drain-Source Voltage		12	Volts
I_{dd}	Total Drain Current		1500	mA
P_{in}	RF Input Power		8	dBm
P_t	Power Dissipation		6	W
T_{ch}	Operating Channel Temperature		175	°C
T_{STG}	Storage Temperature	-65	175	°C

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

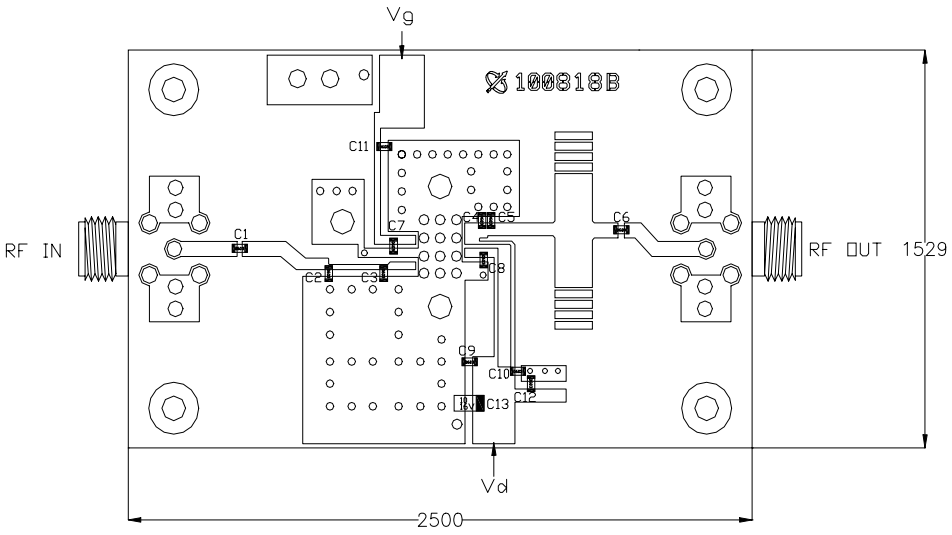
Evaluation Board Schematic



EVALUATION BOARD

PCB Material: FR4
ER = 4.6
Thickness = 31 mil
Unit: mil

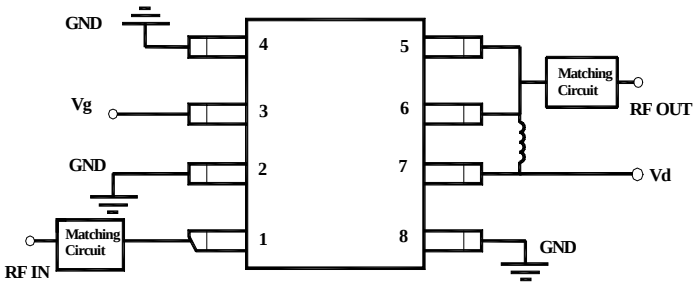
* DXF file of the PCB can be downloaded from our web-site at **www.transcominc.com.tw**
* Application Notes:
For better heat sinking and grounding, it's recommended to have the via holes beneath TC3131 filled with solder and have two screws installed on required heat sink plate besides TC3131 on the PCB area.



Evaluation Board Parts List

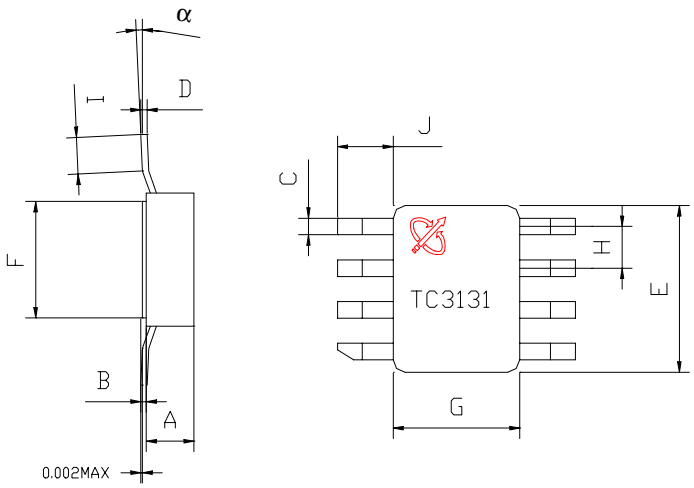
Part Type	Reference Designator	Description	Manufacturer	Part Number
Capacitor	C1	3.3 pF 0603	Murata	GRM39C0G3R3C50V
Capacitor	C2, C5	0.75 pF 0603	Murata	GRM39C0GR75C50V
Capacitor	C3	1.8 pF 0603	Murata	GRM39C0G1R8C50V
Capacitor	C4	2 pF 0603	Murata	GRM39C0G020C50V
Capacitor	C6	3.9 pF 0603	Murata	GRM39C0G3R9C50V
Capacitor	C7~10	1000 pF 0603	Murata	GRM39C0G102J50V
Capacitor	C11, C12	0.1 uF 0603	Murata	GRM39Y5V104Z25V
Capacitor	C13	4.7uF Tantalum Cap.		

CONNECTION DIAGRAM AND PIN DESCRIPTIONS



Pin #	Name	Description
1	RF IN	RF input (internally DC blocked)
2, 4, 8	GND	Ground
3	Vg	FET gate bias
5, 6	RF OUT	RF output and V_{d2} External matching circuit required
7	V_d	Input stage drain bias

PHYSICAL DIMENSIONS (Unit: inch)



DIMENSION	MINIMUM	NOMINAL	MAXIMUM
A	0.083	0.086	0.089
B	0.007	0.008	0.009
C	0.017	0.020	0.023
D	0.007	0.008	0.009
E	0.195	0.200	0.205
F	0.135	0.140	0.145
G	0.155	0.160	0.165
H		0.050	
I	0.020		0.040
J	0.055	0.065	0.075
α	0°		7°