TRANSCOM

TC3142

PRE2_20050615

Preliminary

2.45 GHz 5V 32dBm Single-bias MMIC

FEATURES

- **P_{-1} dB: 33 dBm**
- **Small Signal Gain: 13.5 dB**
- **Power Added Efficiency: 45 %**
- **IP3: 43 dBm**
- **DC Bias: 600 mA @ 5 V**

PHOTO ENLARGEMENT

DESCRIPTION

The TC3142 is a one stage PHEMT MMIC power amplifier. It is designed for use in low cost, high volume, 2.4-2.5 GHz ISM band applications. The MMIC provides a typical gain of 13.5 dB and saturation power of more than 34 dBm. Typical bias condition is 5V at 600 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	12	13.5		dB
P_{-1} dB	Output Power at 1 dB Gain Compression	32	33		dBm
P_{-3} dB	Output Power at 3 dB Gain Compression	33	34		dBm
IP3	Third Order Intercept Point	42	43		dBm
VSWR, IN	Input VSWR		2:1		-
VDD	Supply Voltage		5		Volt
IDD	Current Supply Without RF		600		mA
IDP_{-1}	Current Supply @ Pout = P_{-1} dB		900		mA
η_a	Power Added Efficiency		45		%

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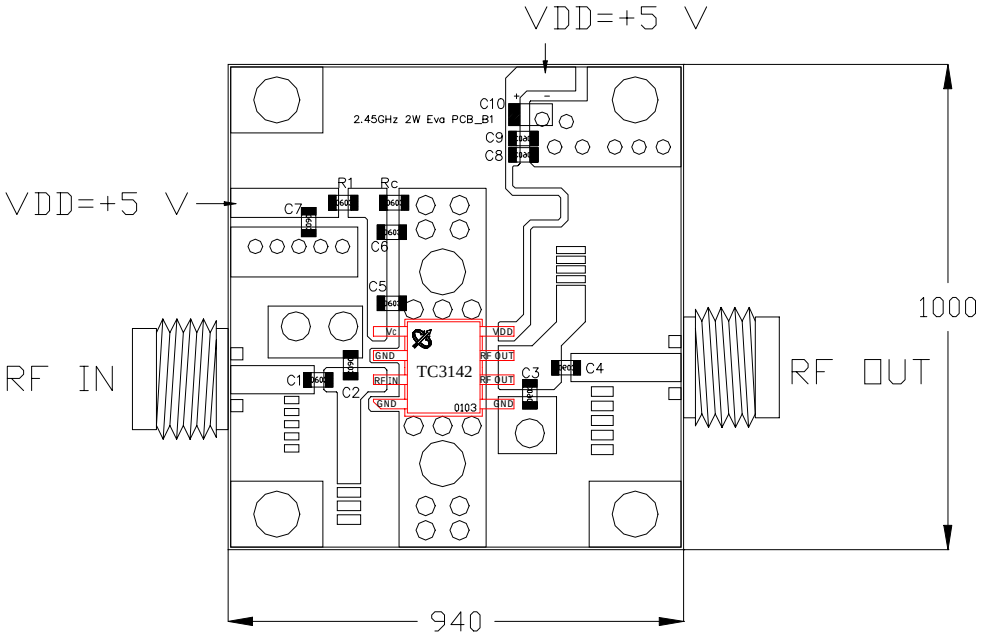
EVALUATION BOARD

PCB Material: FR4

ER = 4.6

Thickness = 31 mil

Unit: mil



Application Notes:

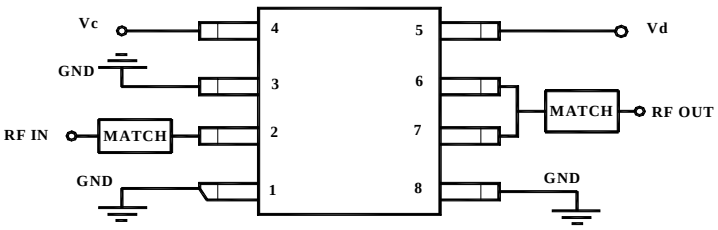
(1) The DC bias condition should be 5 V / 600 mA by setting the Vc voltage which can be adjusted by the Rc on the external evaluation board based on the following formula： $Vc = 5 \times \frac{Rc}{R_1 + Rc}$.

(2) For better heat sinking and grounding, it's recommended to have the via holes beneath TC3142 filled with solder and have two screws besides TC3142 installed on the PCB area.

Evaluation Board Parts List

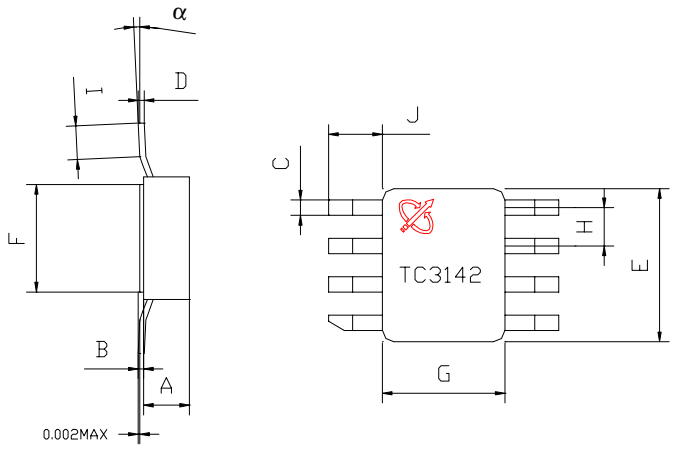
Part Type	Reference Designator	Description	Manufacturer	Part Number
Capacitor	C1	0.5 pF 0603	Murata	
Capacitor	C2	0.75pF 0603	Murata	GRM39C0GR75C50V
Capacitor	C3	1.2 pF 0603	Murata	GRM39C0G1R2C50V
Capacitor	C4	1.5 pF 0603	Murata	GRM39C0G1R5C50V
Capacitor	C5, C8	12 pF 0603	Murata	
Capacitor	C6	100 pF 0603	Murata	
Capacitor	C7, C9	1000 pF 0603	Murata	GRM39C0G102J50V
Capacitor	C10	4.7uF 1206 Tantalum Cap		
Resistance	R1	220 ohm		

CONNECTION DIAGRAM AND PIN DESCRIPTIONS



Pin #	Name	Description
2	RF IN	RF input
1, 3, 8	GND	Ground
4	Vc	FET gate bias
6, 7	RF OUT	RF output
5	V_d	FET 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°