

870~925 MHz Single-Bias GaAs Low Noise Amplifier

FEATURES

- 50 ohm matched for 870~925 MHz
- 24 dBm Typical P1dB
- 19 dB Typical Linear Power Gain
- 36 dBm Typical IP3
- 1.1 dB Typical noise figure
- Nominal PAE of 26%
- Breakdown Voltage: $BV_{DGO} \geq 15V$
- 6.0 Volt single bias
- Suitable for High Reliability Application

PHOTO ENLARGEMENT



DESCRIPTION

The TC3843 is a single-bias with 50 ohm matched GaAs FET. It is designed for low cost, high volume, applied for 870~925 MHz low noise amplifiers. It provides noise figure of 1.1 dB, gain of 19 dB and P1dB of 24 dBm, typically. The single positive drain bias is 6 V and the typical drain-source current is 160 mA. The device is packaged in a copper based ceramic 10-pin SMT packages. The copper based carrier of the package allows direct soldering of the device to the PCB.

ELECTRICAL SPECIFICATIONS ($T_A=25^\circ\text{C}$)

Symbol	CONDITIONS	MIN	TYP	MAX	UNIT
FREQ	Frequency Range	870		925	MHz
P_{1dB}	Output Power at 1dB Gain Compression Point, $V_{DS} = 6\text{ V}$	22	24		dBm
G_L	Linear Power Gain, $V_{DS} = 6\text{ V}$	16	19		dB
IP3	Intercept Point of the 3 rd -order Intermodulation, $V_{DS} = 6\text{ V}$, $*P_{SCL} = 14\text{ dBm}$	33	36		dBm
NF	Noise Figure, $V_{DS} = 6\text{ V}$		1.1	1.5	dB
PAE	Power Added Efficiency at 1dB Compression Power		26		%
I_{DS}	Drain-Source Current at $V_{DS} = 6\text{ V}$		160	220	mA
BV_{DGO}	Drain-Gate Breakdown Voltage at $I_{DGO} = 0.6\text{ mA}$	15	18		Volts

Note: $*P_{SCL}$: Output Power of Single Carrier Level.

ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$)

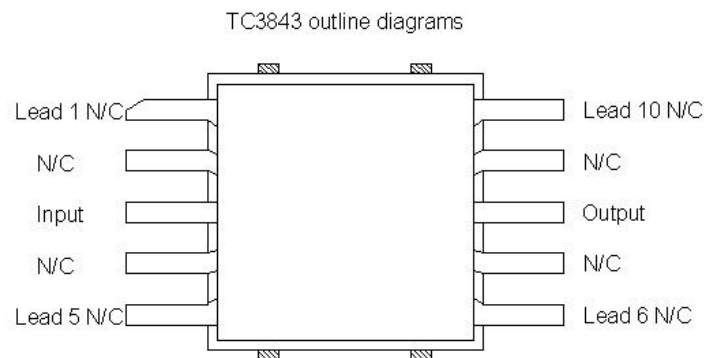
Symbol	Parameter	Rating
V_{DS}	Drain-Source Voltage	10 V
P_{in}	RF Input Power, CW	26 dBm
P_T	Continuous Dissipation	1.9 W
T_{CH}	Channel Temperature	175 $^\circ\text{C}$
T_{STG}	Storage Temperature	- 65 $^\circ\text{C}$ to +175 $^\circ\text{C}$

RECOMMENDED OPERATING CONDITION

Symbol	Parameter	Rating
V_{DS}	Drain to Source Voltage	6 V

HANDLING PRECAUTIONS

The user must operate in a clean, dry environment. Electrostatic Discharge (ESD) precautions should be observed at all stages of storage, handling, assembly, and testing. The static discharge must be less than 300V.

CONNECTION DIAGRAM


* Note : Grounding is via package case

EVALUATION BOARD

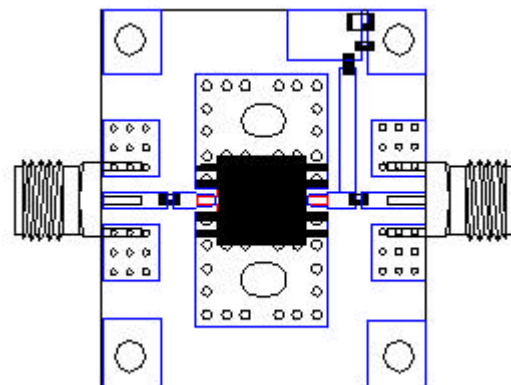
PCB Material: FR4

ER = 4.6

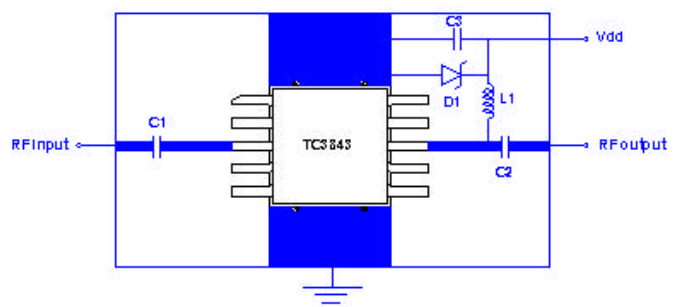
Thickness = 31 mil

* Application Notes:

For better heat sinking and grounding, it's recommended to have via holes beneath TC3843 filled with solder and have two screws installed on required heat sink plate besides TC3843 on the PCB area.



TC3843 evaluation circuits



C1 chip capacitor : 100 pF

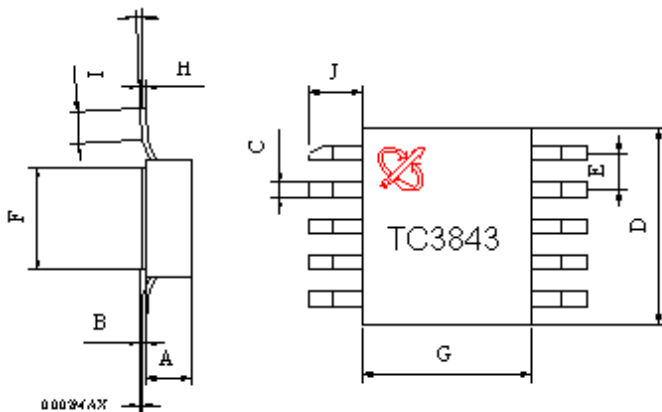
C2 chip capacitor : 100 pF

C3 capacitor : 0.22 uF

L1 : 160 nH

D1 Zener Diode : 7.0 V

50 ohm microstrip line

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
α	0°		7°