1710~1785 MHz Single-Bias GaAs Low Noise Amplifier

FEATURES

- 50 ohm matched for 1710~1785 MHz
- 24 dBm Typical P1dB
- 16 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 TC3843A is a single-bias with 50 ohm matched GaAs FET. It is designed for low cost, high volume, applied for 1710~1785 MHz low noise amplifiers. It provides noise figure of 1.1 dB, gain of 16 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℃)

Symbol	CONDITIONS	MIN	TYP	MAX	UNIT
FREQ	Frequency Range	1710		1785	MHz
P_{1dB}	Output Power at 1dB Gain Compression Point, V_{DS} = 6 V	22	24		dBm
G_L	Linear Power Gain, V_{DS} = 6 V	14	16		dB
IP3	Intercept Point of the 3rd-order Intermodulation, V_{DS} = 6 V, *P_{SCL} = 14 dBm	33	36		dBm
NF	Noise Figure, V_{DS} = 6 V		1.1	1.5	dB
PAE	Power Added Efficiency at 1dB Compression Power		26		%
I_{DS}	Drain-Source Current at V_{DS} = 6 V		160	220	mA
BV_{DGO}	Drain-Gate Breakdown Voltage at I_{DGO} = 0.6 mA	15	18		Volts

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

ABSOLUTE MAXIMUM RATINGS (T_A=25 ℃)

Symbol	Parameter	Rating
V_{DS}	Drain-Source Voltage	10 V
P_{in}	RF Input Power, CW	26 dBm
P_T	Continuous Dissipation	2.0 W
T_{CH}	Channel Temperature	175 ℃
T_{STG}	Storage Temperature	- 65 ℃ to +175 ℃

RECOMMANDED OPERATING CONDITION

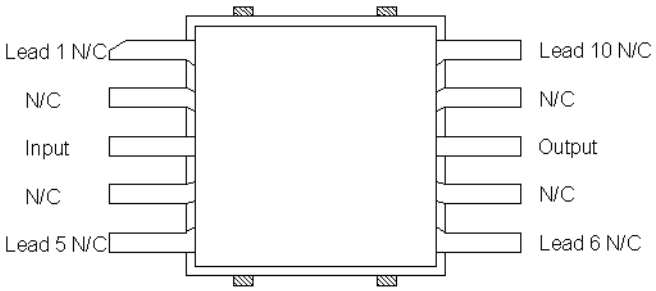
Symbol	Parameter	Rating
V_{DS}	Drain to Source Voltage	6 V

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

TC3843A Outline Diagram

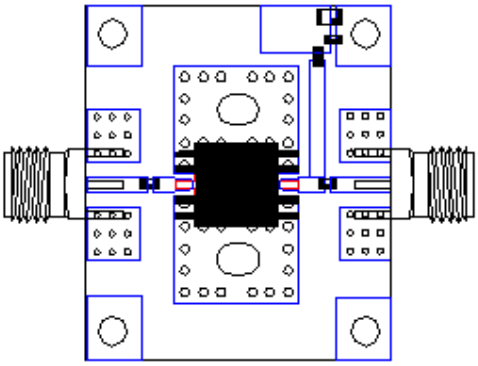


* Note : Grounding is via package case

EVALUATION BOARD

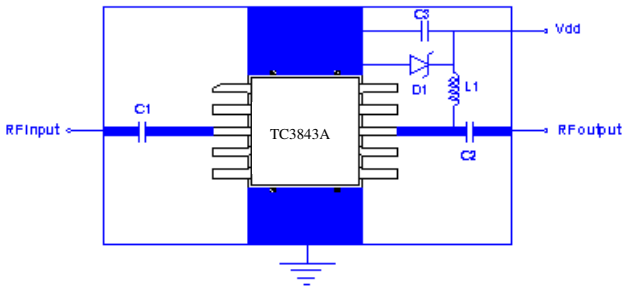
PCB Material: FR4
ER＝4.6
Thickness＝31 mil

* Application Notes:
For better heat sinking and grounding, it's recommended to have via holes beneath TC3843A filled with solder and have two screws installed on required heat sink plate besides TC3843A on the PCB area.

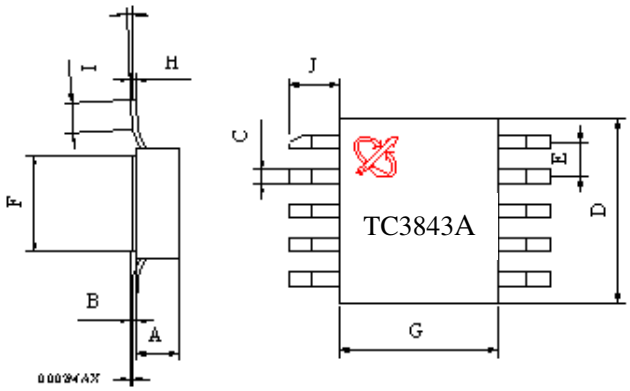


C1 chip capacitor : 100 pF
C2 chip capacitor : 100 pF
C3 capacitor : 0.22 uF
L1 : 160 nH
D1 Zener Diode : 7.0 V
50 ohm microstrip line

TC3843A Evaluation Circuit



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°