

NPN SiGe RF POWER TRANSISTOR

The THN5602F is a low cost, NPN medium power SiGe HBT(Hetero-Junction Bipolar Transistor) encapsulated in a plastic SOT-89 SMD package.

The THN5602F can be used as a driver device or an output device, depending on the specific application.

FEATURES

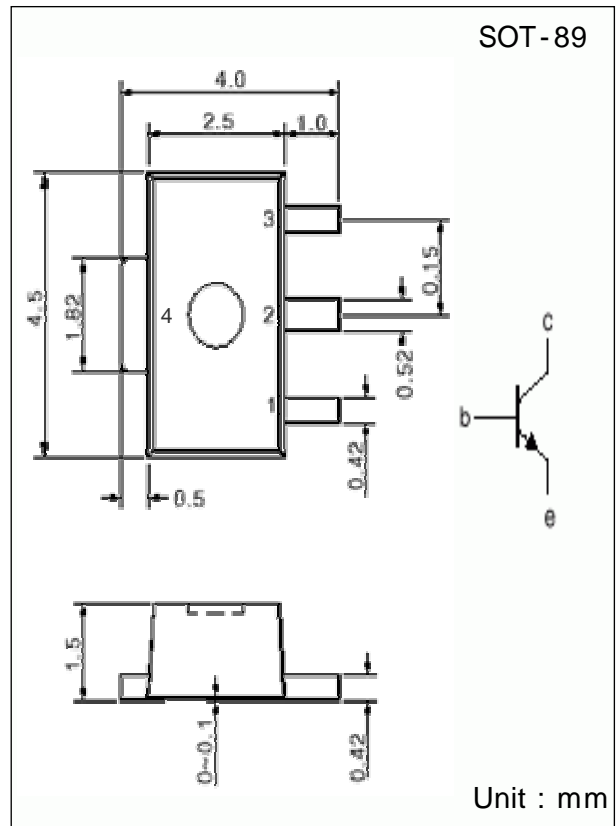
- o 4.8 Volt operation
- o P1dB 28 dBm @f=465MHz
- o Power gain 10 dB @f=465MHz

APPLICATIONS

- o Hand-held radio equipment in common emitter class-AB operation in 450 MHz communication band.

MAXIMUM RATINGS

SYMBOL	PARAMETER	CONDITION	VALUE	UNIT
V _{CB0}	Collector-Base Voltage	Open Emitter	20	V
V _{CE0}	Collector-Emitter Voltage	Open Base	8	V
V _{EBO}	Emitter-Base Voltage	Open Collector	4	V
I _c	Collector Current (DC)		350	mA
P _T	Total Power Dissipation	T _s = 60 ; note 1	1	W
T _{STG}	Storage Temperature		-65 ~ 150	
T _J	Operating Junction Temperature		150	



PIN CONFIGURATION

PIN NO	SYMBOL	DESCRIPTION
1	b	base
2	c	collector
3	e	emitter
4	c	collector

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITION	VALUE	UNIT
Rth j-s	thermal resistance from junction to soldering point	PT=1W; Ts=60 ;note1	55	K/W

* Note 1. Ts is temperature at the soldering point of the collector pin.

QUICK REFERENCE DATA

RF performance at $T_s \leq 60$ in common emitter test circuit (see Fig 6.)

Mode of Operation	f [MHz]	V _{CE} [V]	P _L [mW]	G _P [dB]	c [%]
CW, class-AB	465	4.8	630	10	60

DC CHARACTERISTICS

Tj=25 unless otherwise specified

SYMBOL	PARAMETER	CONDITION	MIN.	MAX.	UNIT
BV _{CBO}	collector-base breakdown voltage	open emitt	20		V
BV _{CEO}	collector-emitter breakdown voltage	open base	8		V
BV _{EBO}	emitter-base breakdown voltage	open collector	3		V
I _s	collector leakage current		0.1		mA
h _{FE}	DC current gain		60	200	
C _c	collector capacitance			4.5	pF

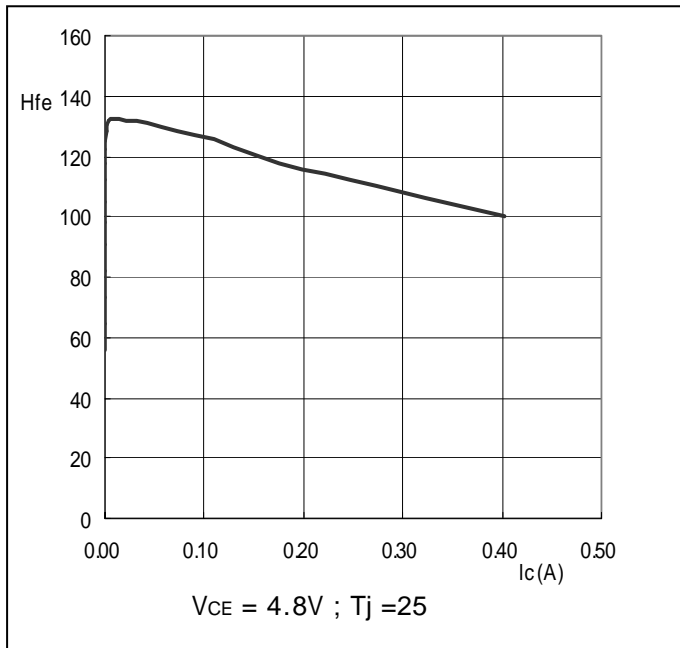


Fig 1. DC Current gain v.s collector current

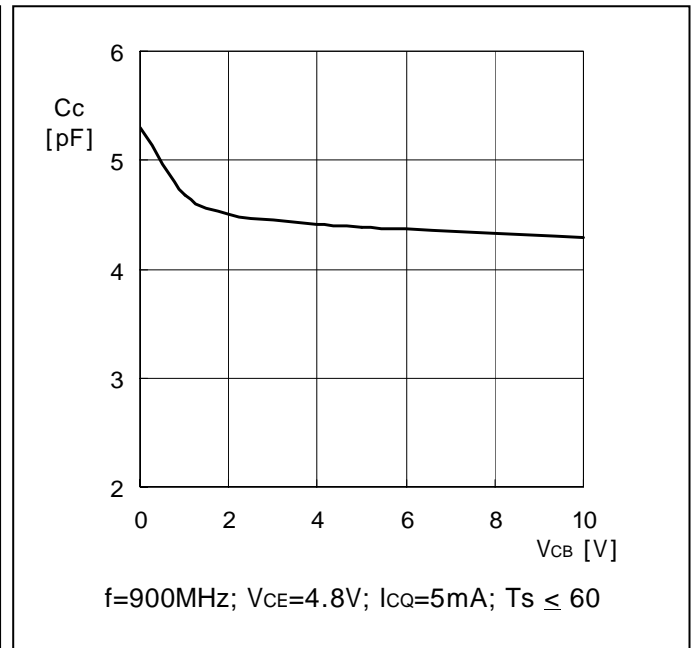


Fig 2. Collector-base capacitance v.s collector-base voltage(DC)

APPLICATION INFORMATION

RF performance at $T_s \leq 60$ in common emitter configuration.

Mode of Operation	f [MHz]	V _{CE} [V]	P _L [mW]	G _P [dB]	c [%]
CW, class-AB	465	4.8	630	10	60

THN5602F Source/Load Impedance as a frequency

V_{CE} = 4.8V, I_{CQ} = 5mA, P_{out} = 28dBm

Freq. [MHz]	Z _S [Ω]		Z _L [Ω]	
	R _s	X _s	R _L	X _L
440	17.34	6.91	22.21	-0.59
450	17.21	7.89	19.31	2.58
460	17.12	8.90	17.20	7.07
470	17.09	9.95	15.66	19.00

THN5602F Transistor Impedance

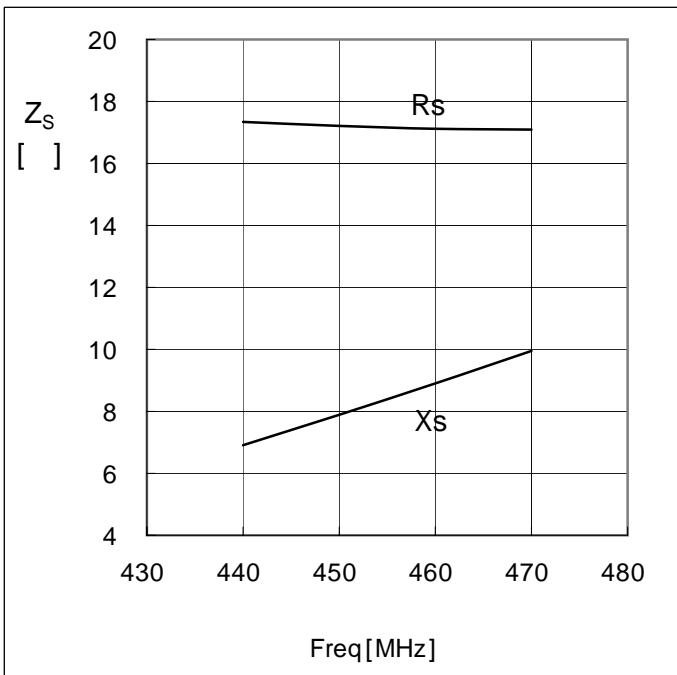
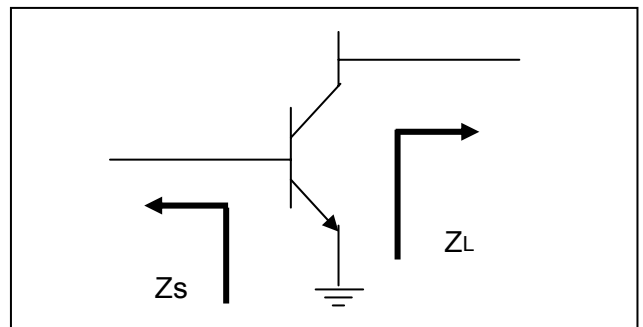


Fig 3. Source Impedance (series components) as a freq, typical values.

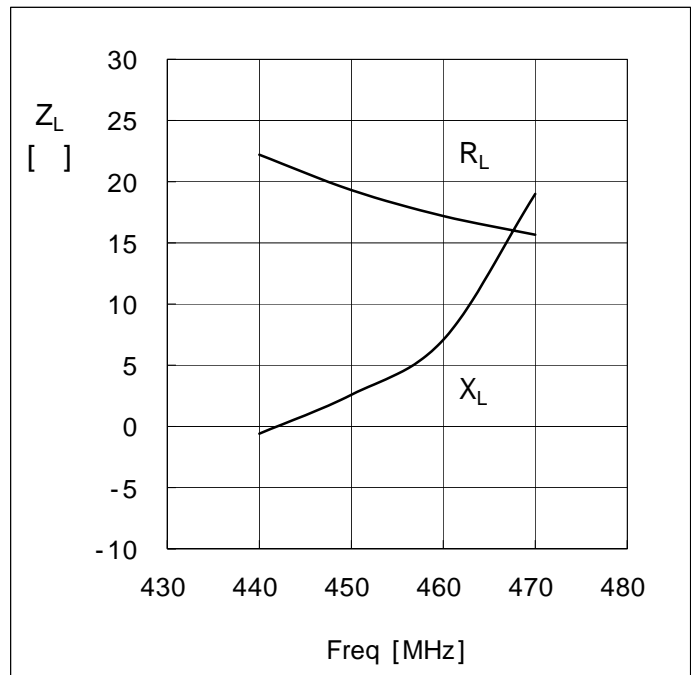
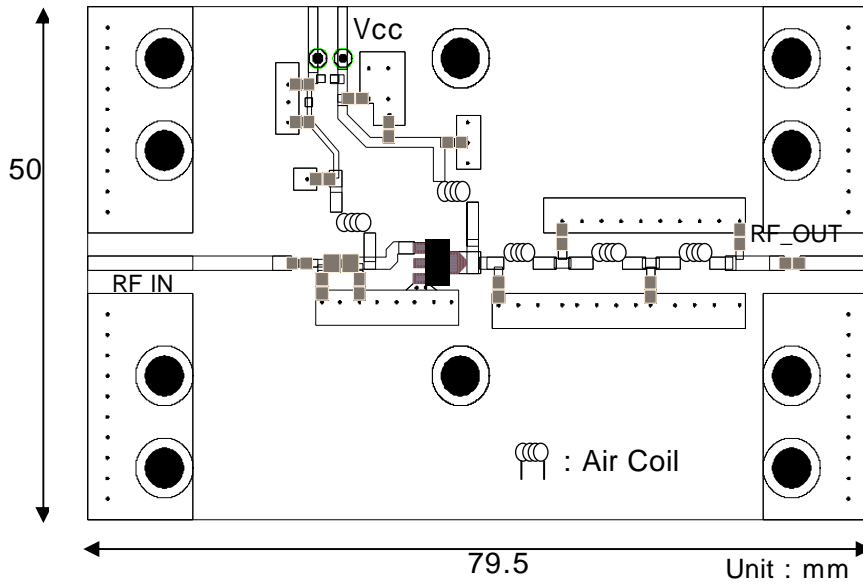


Fig 4. Load Impedance (series components) as a freq, typical values.

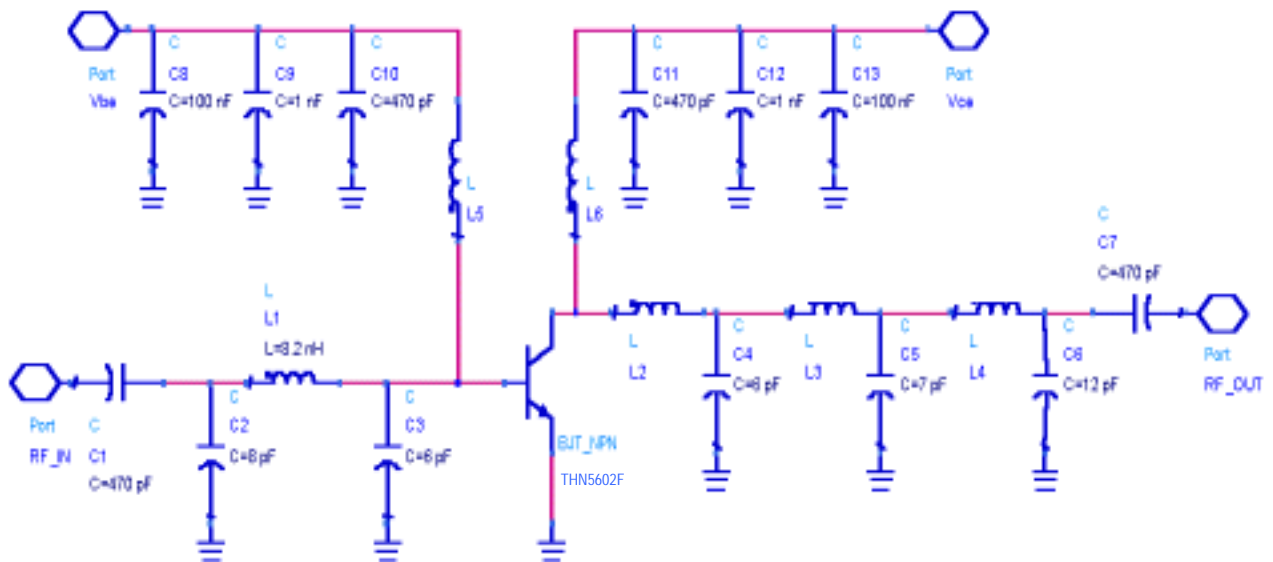


Part List	
C1, C7,C10,C11	470pF
C3,C4	6pF
C2	8pF
C5	7pF
C6	12pF
C9,C12	1nF
C8,C13	100nF
L1(Chip L : 1608)	8.2nH
L2,L3,L4 (Air Coil)	3turn
L5,L6 (Air Coil)	8turn
Air Coil Diameter	2 mm

Fig 5. THN5602F Test Circuit Board Layout @ f = 465MHz

Test board : FR4 glass epoxy board, dielectric constant = 4.5, thickness = 0.8 mm

Test condition : CW test, Vcc = 4.8 V, Icq = 5 mA, frequency = 465 MHz.



THN5602F Test Circuit Schematic Diagram

Fig 6. Test Circuit Schematic Diagram @f = 465MHz

PACKAGE DIMENSION

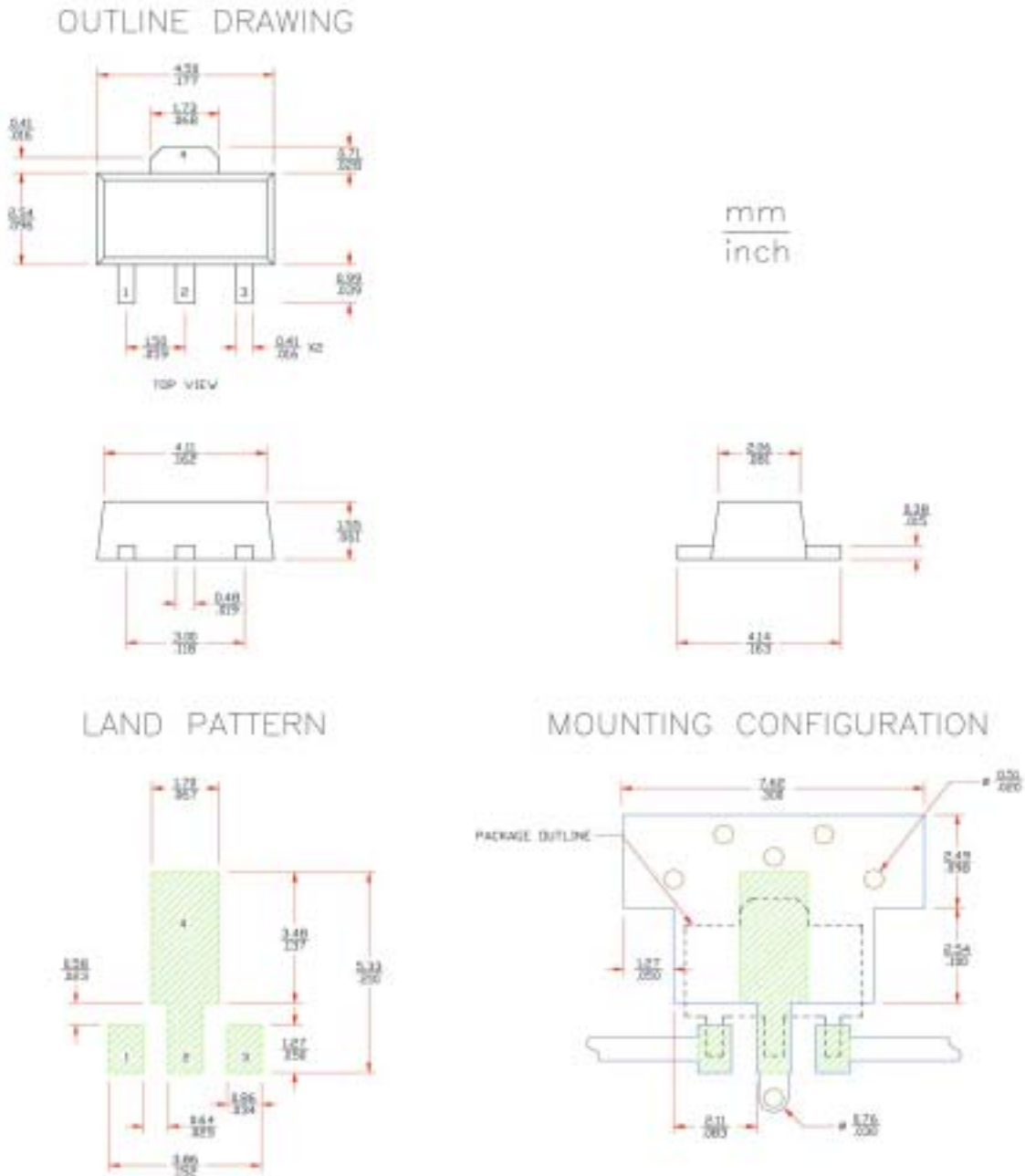


Fig 7. SOT-89 Package dimension